

## Chapter VI

### HERDING IN PERIOD VI A. DEVELOPMENT AND CHANGES FROM PERIOD VII

*László Bartosiewicz*

#### INTRODUCTION

This chapter is aimed at identifying changes in the exploitation of and attitudes toward animals as societies became increasingly complex during Late Chalcolithic. The settlement of Arslantepe is located in the SE section of the Malatya plain, Eastern Anatolia, approximately 15 km from the Euphrates on the right bank of the river. The focus of research is a transitional period between the presumably more egalitarian, subsistence-based systems of Neolithic villages and the development of hierarchical societies during the Late Chalcolithic and Early Bronze Age in the region. Signatures of social differentiation are shown in the variability of archaeozoological evidence for meat consumption and, indirectly, production. Issues of socioeconomic complexity will be examined on the basis of meat provisioning. The degree of redistributing meat supplies will be generally assessed as a reflection of centralized husbandry. Mass herding of sheep and goat have stereotypically been identified as characteristics of centralized urban economies throughout Southwest Asia. The same trend has been identified at Arslantepe<sup>1</sup>. The question posed in this paper is how we can revise and refine details of this gross tendency in various parts of the site. The picture drafted will inevitably be general, synthesizing trends in animal exploitation between the mid 4<sup>th</sup> to the early 3<sup>rd</sup> millennium BCE, widely thought to parallel events in the Late Uruk civilization of Mesopotamia. Animals are indicators of change in subsistence that must have been interrelated with, or in fact, may have triggered shifts in social organization.

#### MATERIAL AND METHODS

Archaeozoology at Arslantepe was started by Sándor Bökönyi (1926-1994) in 1979. He visited the site regularly and accumulated a major body of data. This work has been continued by this author. The analysis is based on animal remains from the final Late Chalcolithic Period VI A (Late Uruk, 3350-3000 BCE), in comparison with the Late Chalcolithic Period VII

---

<sup>1</sup> Bökönyi 1983.

(3800-3350 BCE) immediately preceding it. Aside from diachronic differences in meat consumption, various contemporaneous areas have been distinguished by settlement function. The material was grouped by rooms within the major areas/chronological units investigated.

#### Early materials (Period VII)

In his 1983 article, Bökönyi published animal remains from Period VII uncovered in the northeastern sector of the tell. Materials from *common households* (A11, A12, A21, A22, A23, A24, A25) are known only from this part of the site. Moreover, the Period VII sequence in the western elite residential area included a *monumental building* with columns (the earliest feature so far excavated) and *elite residences* (A582, A617, A646, A647, A648, A682, A684). *Intermediate levels* were distinguished between layers of the column building and the levels of subsequent Temple C (and related rooms) within the western elite area. Features in these levels (A580, A581, A618) were partially preserved domestic structures from. The end of Period VII is represented by *Temple C* and *long rooms* (A563, A571, A842, A848, A850, A858, and pit K680) behind it, possibly used for storage or in crafts related to activities in the temple itself.

#### Late materials (Period VI A)

For the main period under discussion here, animal remains were analyzed from high-status residential quarters and public spaces on the SW side of the mound. In Late Chalcolithic 5 Period VI A, research focused on the "palace complex", including *Temples A and B*. Bökönyi first analyzed bones from Temple A (A42, A36, A46, A77), then from *store rooms* A340, A364 and A365 on either side of a reception niche adjacent to the temples. Of these, A340 is of special interest as it yielded a concentration of *cretulae* (clay used for sealing), closely associated with large storage vessels which they had once officially closed. A smaller sample of animal remains was analyzed from room A206 in the Period VI A palace complex, where thousands of *cretulae* used as storage jar sealings were likewise discarded. The significance of these deposits, as well as additional provenances with concentrations of fragmented *cretulae* is that they may have been related to redistributing provisions. Additional deposits of discarded broken seal imprints from storage jars kept in the palace provisioning areas (A77, A206 and A430) were also studied. Animal bones from two rooms (A113 and A127) in a *representative building* (III) have also been analyzed.

No Period VI A common households were discovered: the Late Uruk Period was represented only by *elite residences* (A650, A651, A727, A728, A734, A747, A933, A946) in the investigated area. Material from these dwellings may be compared to animal remains from the palace complex as well as with those from households of more ordinary Period VII folk on the other side of the tell.

The aim was to detect differences diagnostic of or influenced by a central elite, intervening in herding and provisioning practices. Thus, an enclave of utmost administrative importance could be delineated in the Late Uruk town, dated to the time when Arslantepe became a major regional node in an emerging centralized system<sup>2</sup>. The spatial patterning of faunal remains across architectural features and public spaces will be used in illustrating diachronic shifts in the degree of social stratification. During the discussion references will be made to the Early Bronze Age I (Period VIB, 3000-2750 BCE), when pastoral economy dominated the picture.

<sup>2</sup> Frangipane, Palmieri 1988-89.

#### Recording and quantification

All materials were hand-collected. Sporadic finds of bird and fish could not be identified due to a lack of collections, but offer evidence for fowling and fishing. The finds were recorded in terms of the number of identifiable specimens (NISP) as the least manipulated form of information. Given the complex depositional history of the site, minimum numbers of individuals (MNI) were not calculated, as the disarticulation and redeposition of carcasses could not be followed even on a macro-level. Therefore aggregation effects might emerge: single individuals may be represented in several provenances, contributing redundant information to MNI estimates. Given sufficiently large sample sizes, taxonomic compositions tend to display comparable proportions regardless of method.

Appendices 1 to 6 show NISP values assigned to each taxonomic group. Due to osteological similarities between certain species and fragmentation that left many pieces without diagnostic features, identifications were sometimes possible only on higher taxonomic levels, usually families or genera. In such cases a species name based on uncertain identification would have been misleading, resulting in the "over-identification" of non-diagnostic bone fragments. The best example of this standard is the subfamily name Caprinae, commonly used in archaeozoology to describe non-distinguishable bone fragments of sheep and goat. Based purely on size, the wild forms of these two species also occurred at Arslantepe, compounding problems of identification.

One of the problems in this study has been different sample sizes. Percentual proportions popular in faunal studies are misleading when not supported by sufficient numbers of cases. Differences in percentages were thus tested for heterogeneity using Chi<sup>2</sup> tests.

Bökönyi (1983: 581) cited only the small number of complete long bones (20 of 3880) as a proxy to fragmentation. Non-identifiable bones were also counted in recent analyses as indicators of preservation. Chances of identification radically decline with fragmentation. Non-identifiable bones were classified by size as large (cattle size) and small ungulates (small ruminants and pig). Previous calculations at the site have shown that the mean length of non-identifiable large ungulate bones equaled that of identifiable caprine remains. Naturally, the latter produced even smaller non-identifiable specimens<sup>3</sup>. In the material under discussion, 20% of the remains could only be identified by size category. Sheep and goat tend to dominate NISP values. However, the bones of large ungulates (more damaged by intentional and natural fragmentation) occurred in greater numbers among the non-identifiable (table VI.1).

In spite of different sample sizes, the heterogeneous distribution (Chi<sup>2</sup>=118.085 d.f.=8, P=0.000) of non-identifiable elements across provenances shows that as the combined effect of butchery, pot-sizing and post-depositional taphonomic events (trampling, leveling, etc.), the

Table VI.1 – The proportion of identifiable and non-identifiable animal remains.

	NISP	Large ungulate	Small ungulate	Total	Non-identifiable %
Temple C	497	29	36	562	11.6
Storage/Temple C level	1953	306	136	2395	18.5
Period VII, intermediate levels	140	23	3	166	15.7
Temple B	1327	296	171	1794	26.0
Period VI A elite residences	506	38	24	568	10.9
<b>Total</b>	<b>4423</b>	<b>692</b>	<b>370</b>	<b>5485</b>	<b>19.4</b>

<sup>3</sup> Bartosiewicz 1998: 227, table 3.

proportion of non-recognizable bone fragments strongly varied between areas of different functions.

DIACHRONIC AND FUNCTIONAL VARIABILITY IN TAXONOMIC COMPOSITION

Animal remains will be reviewed in light of their economic importance and cultural meanings. Faunal lists, detailed by provenances are listed in Appendices I to 6.

Domestic animals

In both Periods VII and VI A, the majority of meat was provided by domestic ruminants – cattle (*Bos taurus* L., 1758), sheep (*Ovis aries* L., 1758) and goat (*Capra hircus* L., 1758) – and to a lesser but diagnostic extent by domestic pig (*Sus domesticus* Erxleben, 1777). The contribution of these species ranged from 90% in Period VII, to 98.9% in Temple A in Period VI A. Not even a higher value would be indicative of subsistence hunting, although the decreasing contribution of game to the diet is significant in statistical terms ( $\text{Chi}^2=159.964$ , d. f.=9,  $P=0.000$ ).

Fig. VI.1 shows the ratios of bones from domestic ungulates by provenance. As has been pointed out before<sup>4</sup>, the main trend in this graph is the diachronic decline of pigs, concentrated in the common households and elite residences of Period VII. It was suggested that pigs in the Levant had been exploited mainly locally when no central authority interfered with herding practices and self-reliance was more prominent<sup>5</sup>. At Arslantepe pork consumption was rare in public areas: it seems to have been concentrated in homes. This confirms the stereotype of self-sufficient households: pork possibly came from animals kept around the house. Sporadic pig bones were also found in Period VI A Temple B and elite residences. They were, however, missing from Temple A and administrative areas. Cattle also contributed the smallest proportions to food refuse in *cretulae* dumps and the representative building from this period. Due to the possibly differential fragmentation of these bones this difference is more difficult to interpret. It only shows that pork was least important in areas of administrative functions. Sheep and goat are not shown in fig. VI.1 separately. Due to the intensive fragmentation, only a fraction of caprine bones could be assigned to species: diagnostic features are easily lost when bones are poorly preserved. Table VI.2 shows the NISP values for sheep and goat by provenance.

Table VI.2 – The ratios between identifiable bones of sheep, goat and caprines.

	Sheep	Goat	Caprine	Sheep/Goat
VII elite	81	154	996	0.5
VII common	34	35	289	0.9
<i>cretulae</i> dumps	164	92	1739	1.8
Temple A	19	10	290	1.9
VI A elite residences	32	15	310	2.1
Temple C	44	19	503	2.3
storage-craft. Temple C level	133	46	978	2.9
Temple B	94	31	716	3.0
representative Bdg. III.	39	9	188	4.3
store rooms	217	48	1556	4.5
VII intermediate levels*	12	2	50	-

\* Not included in calculations due to small sample size.

<sup>4</sup> Bökönyi 1983; Frangipane, Siracusano 1998; Bartosiewicz 1998.  
<sup>5</sup> Hesse 1990.

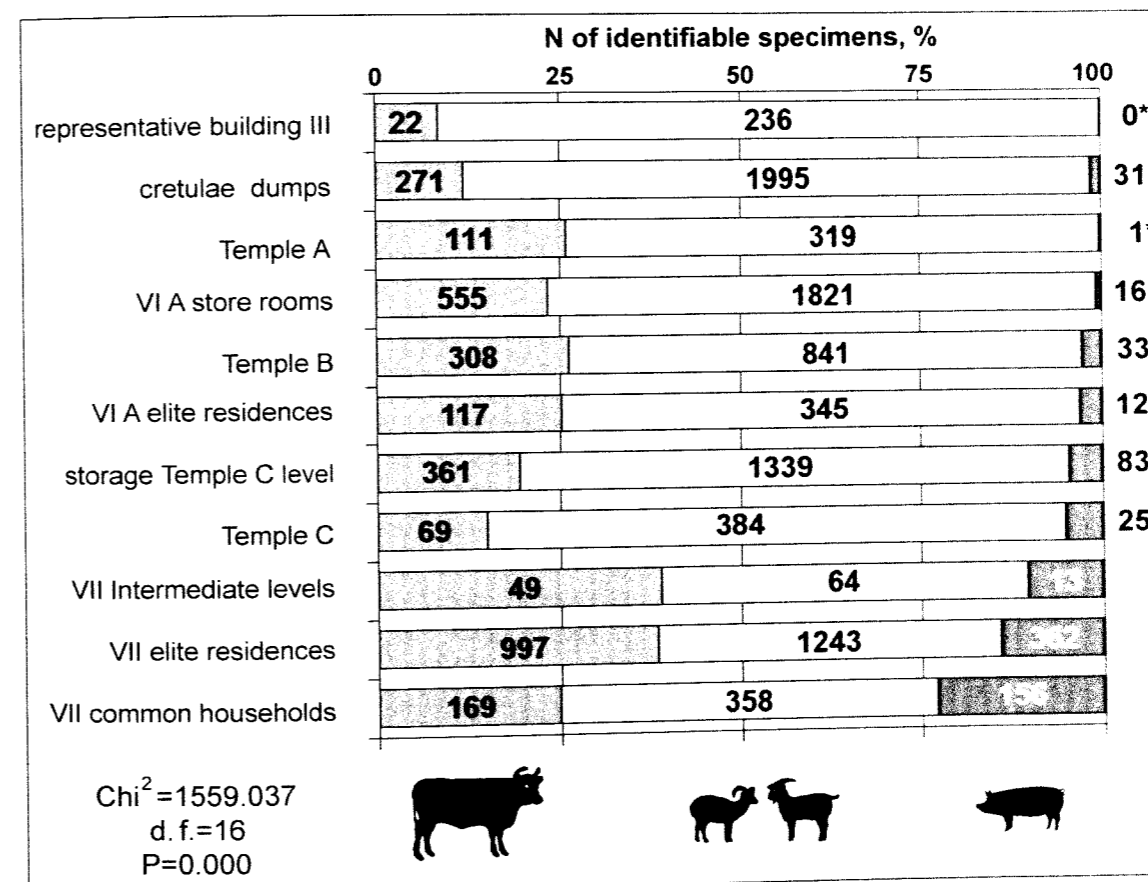


Fig. VI.1 – The percentages of domestic ungulates (NISP) in various samples. Entries marked by an asterisk could not be included in the Chi<sup>2</sup> test due to the small number (NISP<5) of pig bones.

Goat remains decline through time and from residential to public areas in a statistically significant manner ( $\text{Chi}^2=156.296$ , d.f.=9,  $P=0.000$ ). It may be argued that goat, a species of superior milk production, are more typical of self-sufficient households than large-scale herding operations. Reality, however, may have been more complex: here only the trend can be established.

Various equids identified at the site were unlikely to have contributed to the meat diet. Period VII domestic horse (*Equus caballus* L., 1758) must have been far too precious for everyday meat consumption, although horse remains began sporadically occurring during this period<sup>6</sup>. The wild or domestic status of horses is difficult to judge, however, due to the small number of finds, equally characteristic of rare game or a high status, non-meat purpose domesticate. The first convincing date for horse domestication has just been reported from the Eneolithic Botai culture of Kazakhstan, dating to about 3500 BCE that corresponds to Period VII<sup>7</sup>.

Bökönyi himself pointed out that the presence of domestic ass (*Equus asinus* L., 1758) he had identified was unexpectedly early for Arslantepe<sup>8</sup>. Subsequent discoveries of bones from

<sup>6</sup> Boessneck, Von den Driesch 1976: 81.

<sup>7</sup> Outram *et al.* 2009: 1335.

<sup>8</sup> Bökönyi 1983: 589.

Asiatic wild ass (*Equus hemionus* Pallas, 1775) at this site raise the possibility that he also encountered a metacarpal from an unusually gracile individual of this latter species.

Dog (*Canis familiaris* L., 1758) occurred sporadically, the small numbers of their remains among the food refuse do not seem to indicate cynophagy. Marks of dog gnawing are more common in Period VII, a possible sign of dogs living in closer proximity to humans than in urbanized settlement. The presence of dogs may also have been related to hunting, probably more commonly practiced by the early inhabitants of the site.

### Non-domesticates and taxonomic richness

By the Bronze Age, hunting lost economic importance at urban settlements in the Near East, in contrast to the Chalcolithic when it was still a major source of animal products at some sites<sup>9</sup>. Various deer, gazelle, and wild ass were regularly preyed upon, but their remains occur in small numbers at Arslantepe. Wild animals, however, have contributed a very important qualitative aspect to the reconstruction of daily life. It would be erroneous to discuss all "wild" animals as a homogeneous unit: they include bones from large, meat purpose game, a variety of carnivores, small, commensal mammals as well as bird and fish remains. Structural differences between these bones as well as their different numbers in various animals affect their taphonomic histories<sup>10</sup> thereby making direct comparisons to large mammals meaningless if not misleading.

The abundance of mammals exploited was studied as a function of sample size. The number of taxa identified increases with the number of identifiable bone specimens (NISP). Therefore comparisons between samples of different sizes can be strongly biased, as the repertoire of species would reflect the number of bones available for study rather than the culturally idiosyncratic number of taxa sought by the analyst<sup>11</sup>. Although there is a usually high correlation between these two variables, the relationship is not linear: the number of taxa increases in a degressive manner and is exhausted when new species are no longer encountered. Therefore this relationship is shown in decimal logarithms in fig. VI.2 in which relatively rich and poor samples may be identified regardless of size, on the basis of their position relative to the trend line fitted onto all data points.

In fig. VI.2, provenances from Period VII do not deviate from the main trend, in spite of the fact that, hypothetically, hunting must still have been important. Elite residences, Temple C, as well as the small intermediate sample in-between look ordinary. The number of taxa (showing a major contribution of wild animals) is only slightly higher in common residences and the storage area near Temple C. This suggests that most wild animals had no special status value, their remains equally occurred in elite areas and mundane households. The situation became more polarized by Period VI A. While Temple B, storage areas and *cretulae* dumps fit the trendline (i. e. their numbers of taxa are in proportion with sample size), elite residences as well as the representative building seem to be rich in species. Meanwhile Temple A falls short of the faunal diversity expected. An increasing differentiation in Period VI A space use may be related to increasing social complexity reflected in meat consumption. Some, eating in elite residences and using the representative building had access to a variety of animal products. Meanwhile those eating in Temple A especially, consumed a limited variety of animals whether by economic standing or as a means of self-expression.

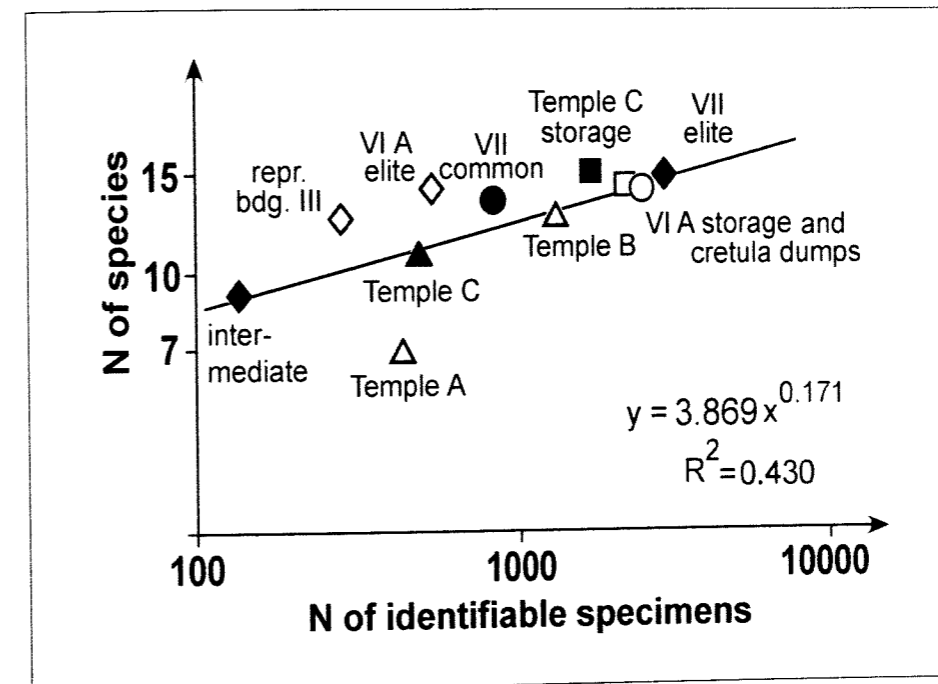


Fig. VI.2 – The position of various samples in terms of taxonomic richness relative to the trendline (both axes were converted into decimal logarithms to produce a linear trend). Black symbols: Period VII. Light symbols: Period VI A.

### Herbivorous game

When discussing the Chalcolithic at Arslantepe, Bökönyi emphasized the possibility of local domestication<sup>12</sup>, as he identified the ancestors of all main domesticates including aurochs (*Bos primigenius* Bojanus, 1827), Asiatic moufflon (*Ovis orientalis* Gmelin, 1774), bezoar goat (*Capra aegagrus* L., 1758), wild pig (*Sus scrofa* L., 1758) and even wolf (*Canis lupus* L., 1758) among the carnivores. Chalcolithic animal husbandry, however, was firmly established. Tedious domestication efforts would have been unnecessary at this site. While bones of sizes transitional between the wild and domestic forms are present<sup>13</sup>, some may result from spontaneous crossings between the two forms. Over a decade ago, Bökönyi (1993: 357) saw the complexity of local cattle domestication in the absence of large aurochs horn cores at the site. Meanwhile phenotypic size alone turned out to have been deceiving in light of Arslantepe. In spite of "transitional forms", the local domestication of aurochs recent DNA research. In spite of "transitional forms", the local domestication of aurochs during the Late Neolithic of Central Europe was refuted: most cattle tested were of Near Eastern origins, unrelated to the local aurochs<sup>14</sup>.

Bökönyi noted the high ratio of horn cores from adult rams and bocks (in the case of wild sheep the male to female ratio is 6:1 and among wild goats only 9 male horn cores occur)<sup>15</sup>. This secondary evidence for local domestication can be interpreted differently. Should hunting have been a form of self-representation for the elites, trophy hunting may have biased the

<sup>9</sup> Clason, Buitenhuis 1998.

<sup>10</sup> Bartosiewicz, Gál 2007.

<sup>11</sup> Grayson 1984: 136-137.

<sup>12</sup> Bökönyi 1993a: 128.

<sup>13</sup> Bökönyi 1993b: 357, figs. 3 and 4.

<sup>14</sup> Edwards *et al.* 2007.

<sup>15</sup> Bökönyi 1993b: 355.

sample, as capital males would have been selectively targeted. E.g. the dense, sharply-pointed horns of bezoar bucks make desirable trophies, a strong motive behind poaching even today.

Red deer (*Cervus elaphus* L., 1758) contributed almost half of the wild animal remains at Arslantepe<sup>16</sup>, although this ration is somewhat biased by the inclusion of fragments from potentially shed antler. However, the majority were skeletal bone, showing the popularity of venison. Red deer was also the most common game at comparable site of Korucutepe<sup>17</sup>. Remains of Persian fallow deer (*Dama mesopotamica* Brooke, 1875) were identified in small numbers and those of roe deer (*Capreolus capreolus* L., 1758) are outright rare. Even during period VI A, there were coniferous woods around Arslantepe<sup>18</sup>. However, as forested red deer habitat were lost to pasturelands, sporadic occurrences of probably goitered gazelle (*Gazella cf. subgutturosa* Gldenstaedt, 1780) indicate the opening up of the original landscape. The increasing presence of brown hare (*Lepus capensis* L., 1758) in the diet may reflect the same anthropogenic effect on the natural environment, partly attributable to aggressive grazing by sheep and especially goat. Intensive grazing by small ruminants further precluded the recovery of forests, thereby closing the loop between deforestation and sheep/goat keeping, that has led to the evolution of characteristically open and frequently even barren landscapes.

### Environment and animal exploitation

Interactions between the environment and animal exploitation were explored by performing a correspondence analysis in which co-occurrences between the remains of diagnostic species (both wild and domestic) were used in comparing Period VII and VI A samples. More-or-less omnipresent species that showed diachronic change were selected for this calculation. The decline of pig and goat has already been mentioned. Of the wild mammals, most commonly occurring, red deer, wild caprines (wild sheep/goat pooled) and increasingly frequent hare have been included. Relationships defined by the co-occurrences of bones from these taxa were expressed along axes representing synthetic background variables, of which the first two encompass 86% of the total variance (table VI.3). They were used in mapping the relationships between the five animals as well as Period VII and VI A provenances.

Table VI.3 – Relationships between diagnostic mammals used in classifying Period VII and VI A provenances.

	Axis 1	Axis 2	Axis 3	Axis 4
Domestic pig	0.346	0.142	-0.028	-0.025
Red deer	0.000	-0.152	0.077	0.414
Wild caprine	-0.098	-0.219	0.491	-0.121
Goat	-0.340	-0.274	-0.107	-0.046
Brown hare	-1.213	0.960	0.049	0.025
<b>Eigenvalue</b>	<b>0.163</b>	<b>0.081</b>	<b>0.023</b>	<b>0.016</b>
<b>Cumulative eigenvalue, %</b>	<b>57.4</b>	<b>28.7</b>	<b>8.1</b>	<b>5.8</b>

Axes 1 and 2, define two dimensions theoretically independent of each other, strikingly similar to those outlined using 53 neolithic animal bone assemblages from Southeastern

Europe<sup>19</sup>. When animals are plotted by their respective values on these axes, two pairs of diametric opposites emerge (fig. VI.3: A). Between the positions of goat and pig, the marked diachronic decrease in the significance of pork may be recognized. Meanwhile the strong polarization between red deer and hare reflects deforestation; hares thrive in grassland habitats, including plowlands.

Eigenvalues listed in table VI.3 show that the trend in animal keeping practices (57.4% of total variance) is more directly shown in food refuse than that of habitat change (28.7%). This falls in line with the point that the focus on caprine exploitation coincided not so much with the environmental changes but rather with the emergence of complex societies at the end of the 4<sup>th</sup> millennium BCE<sup>20</sup>. Time lags between settlements correlate with the type and degree economic centralization and the role of individual sites once played in the regional settlement system.

The close proximity of goat and wild caprines in fig. VI.3: A is also noteworthy, possibly indicating the notorious difficulty of distinguishing between the bones of the domesticates and their wild ancestor<sup>21</sup>. Bezoar goats live in small herds of five to ten animals, staying near cliffs in the forest belt where they can quickly climb to safety. Although this species is particularly sensitive to habitat loss by agriculture, it is otherwise rather unwary of people and settlement. Historically, grazing in forests has been very important in Turkey, with goats playing a leading role in exploiting woodlands this way<sup>22</sup>. Therefore, crossings between the wild and domestic stocks may have been a plausible possibility, especially during Period VII, prior to large scale cultivation and pasturing.

Residences and public areas in the Period VII settlement and the palace complex were listed in table VI.4 along with their scores on the axes representing combinations of animal remains. Samples were plotted along the first two axes in fig. VI.3: B.

Table VI.4 – The scores of provenances along the axes measuring relationships between animal remains.

	Axis 1	Axis 2	Axis 3	Axis 4
VII common	<b>0.404</b>	0.041	0.139	0.159
Temple A	<b>0.394</b>	<b>0.616</b>	-0.186	-0.179
VII elite residences	<b>0.255</b>	0.032	-0.093	-0.095
Temple C	<b>0.188</b>	0.006	0.004	0.102
Storage/Temple C level	-0.069	-0.011	0.196	0.026
VI A elite residences	-0.229	-0.141	-0.070	0.208
Store rooms VI A	-0.464	<b>-0.412</b>	-0.148	0.206
VII intermediate levels	-0.497	<b>-0.767</b>	0.595	-0.530
<i>Cretulae</i> dumps	-0.542	<b>-0.327</b>	-0.149	0.007
Representative Building III	-0.771	<b>-0.592</b>	0.495	-0.238
Temple B	-0.873	<b>0.791</b>	0.038	-0.010

With the exception of the intermediate levels, Period VII samples show a concentration in fig. VI.3: B (marked by shading), determined by the co-occurrences of domestic pig and wild

<sup>16</sup> Bkonyi 1993b.

<sup>17</sup> Boessneck, Von den Driesch 1975.

<sup>18</sup> Follieri, Coccollini 1983.

<sup>19</sup> Bartosiewicz 2005a: 53-55.

<sup>20</sup> Frangipane, Siracusano 1998: 242.

<sup>21</sup> Helmer 2008: 173.

<sup>22</sup> Izbirak 1976: 131.

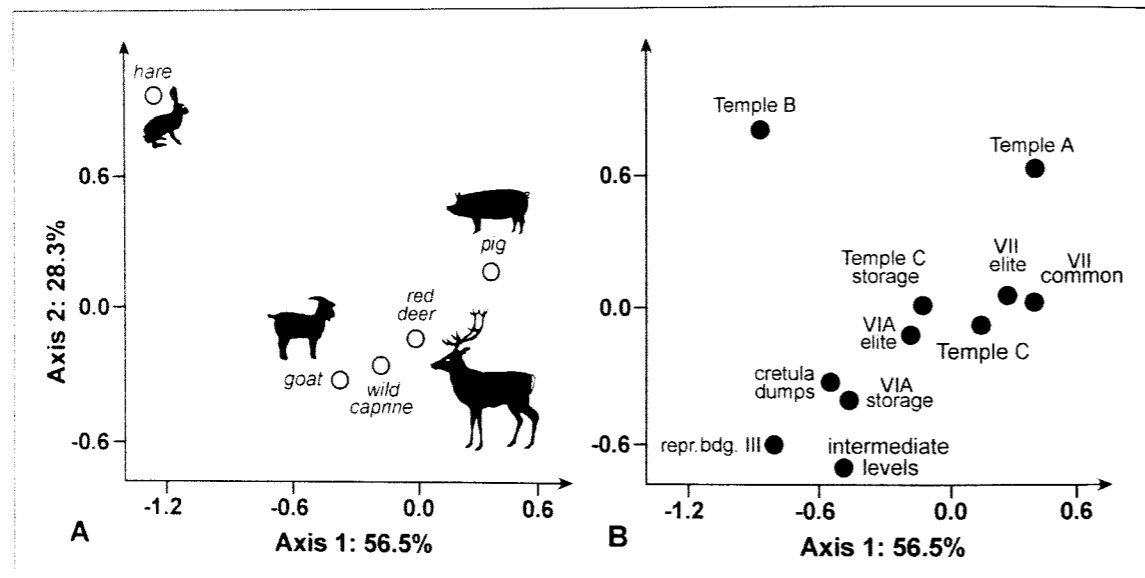


Fig. VI.3 – Results of correspondence analysis showing relationships between diagnostic animal species (Graph A) and samples originating from different provenances. Graph B shows two strong polarizations: from pig to a sheep/goat economy (from right to left) and a less marked “upward” shift from woodland to grassland habitats.

ruminants. This coherent picture “explodes” as a likely result of socioeconomic developments impacting on meat consumption in Period VI A, paralleling functional differentiation in the study area. While elite residences of this later period remain closest to the norm represented by Period VII provenances, others (especially representative building III as well as Period VI A dumps and storages) are scattered toward the “goat” direction. The absence of pig and red deer in Temple A and an increase in hare bones in Temple B sets these samples apart from mundane assemblages. Period VII Temple C was remarkably different. In the main cult room (A42) in Temple A there was a wild boar mandible near the altar/basin on the floor<sup>23</sup>. This as well as the remains of wild animals recovered from Temple C are indicators of the roles wild animals played in ceremonial activities.

### Carnivores

As a consequence of the degressive relationship between assemblage size and taxonomic richness, rare bones of brown bear (*Ursus arctos* L., 1758) and lion (*Panthera leo* L., 1758) have a greater probability to occur in large samples such as the “temple” assemblage of room A450 and the general pooled sample<sup>24</sup>. Although one may hypothesize that some bear and lion teeth and metapodium fragments were attached to prestigious skins worn or displayed otherwise in public spaces, their discovery is also a product of large sample size. Bear bones appear in the less distinct “general” areas as well during Period VII (such as elite residence A617), a reminder that their meat was consumed<sup>25</sup>. During this period meat bearing bones (e. g. humerus) were also found. During this time bear was still relatively common not only

at Arslantepe but throughout the Upper Euphrates Valley, e.g. at Norsuntepe<sup>26</sup>, Tepecik<sup>27</sup> and Korucutepe<sup>28</sup>. Brown bear, a top predator reflects the state of ecosystems as a whole. Nowadays, it mostly occupies mountain forests, but also occurs in plains woodlands. It is there where bear is most threatened by habitat loss due to deforestation. The reduction of its quantitative contribution from a food species to probable trophies by Period VI A mirrors the process as lions went extinct in the Balkans between the Copper and Bronze Ages<sup>29</sup>. That time, lions must have been around in Anatolia, although their remains occur scarcely as they may have been seldom hunted.

Wild cat (*Felis silvestris*, Schreber 1777), red fox (*Vulpes vulpes* L., 1758) and various mustelids, including weasel (*Mustela nivalis* L., 1766) may have been of smaller symbolic significance. In fact, the bones of burrowing foxes may form secondary deposits in archaeological strata. The weasel skeleton recovered from room A850 associated with Temple C may also be considered an intrusion. Weasel remains occur regularly at archaeological sites in Anatolia<sup>30</sup>.

### Commensal animals

A small group of partially identified remains seem to originate from animals sharing human habitats but not introduced intentionally into the archaeological record. Due to the lack of water-sieving, rodent (Rodentia) bones were few and far between. They could not be identified in relation to the archaeological record.

A far more peculiar situation of archaeological relevance was observed in the case of remains that may be tentatively identified as bones from commonly occurring greater horseshoe bat (*Rhinolophus cf. ferrumequinum* Schreber, 1774) widely distributed both in Anatolia and SE Europe<sup>31</sup>. *In situ* skeletal remains of these animals were found on the floor of Temple C. The largely intact bodies of these delicate animals may have been deposited at a time when the roof of the building was at least partially still in place, but human trampling in the (presumably abandoned) building was minimal. This simple taphonomic phenomenon offered a glimpse at the building’s own taphonomy.

Among the poikilotherm animals identified at the site, the sporadic bones of frogs/toads (Anura) and Greek tortoise (*Testudo graeca* L., 1758) may also be considered natural deposits, although according to Bökönyi some tortoise finds were contemporaneous with the archaeological levels as some carapax fragments were cut and sometimes charred<sup>32</sup>.

### Birds and aquatic animals

In the absence of water sieving, the bones of large species dominated the small assemblage of avian remains. The bones of great bustard (*Otis tarda* L., 1758), white pelican (*Pelecanus onocrotalus* L., 1758) and some eagle (Falconiformes) represent different habitats, largely in the plain/floodplain area north of the site. The remains of perching birds (Passeriformes)

<sup>23</sup> Frangipane, Palmieri 1983a: 392, fig. 19.

<sup>24</sup> Bökönyi 1983.

<sup>25</sup> Bökönyi 1983: 590.

<sup>26</sup> Boessneck, Von den Driesch 1976: 98.

<sup>27</sup> Boessneck, Von den Driesch 1973: 114.

<sup>28</sup> Boessneck, Von den Driesch 1975: 142-143.

<sup>29</sup> Bartosiewicz 2008: 768.

<sup>30</sup> Boessneck 1973.

<sup>31</sup> Bilgin *et al.* 2009.

<sup>32</sup> Bökönyi 1993b: 355.



including crows were also found. The majority of bird remains, however, could not be identified on location.

The few bones of carp-like fish (Cyprinidae) point toward the Euphrates as a source of aquatic food as well as the non-worked piece of riverine shell (*Unio* sp.) that had to be brought onto the mound by people. Human mediation is even more evident in the case of a purple snail (*Murex* sp.) fragment. This snail is the source of costly and labor-intensive dyes that had to be imported to the Malatya plain from the Mediterranean. The single find originates from room A954 in the Temple C area.

FOOD REMAINS FROM THE VI A STORAGE AREA

Along with increasing centralization during Phase VI A, the general concept of redistribution became eminently important in the form of reinvesting into a labour force that performed communal tasks, possibly through the distribution of meals, including meat. During the earlier, formative periods of the settlement this may have taken place within the context of religious ceremonies, as in Temple C or possibly in temples A and B. Subsequently, a more secular form of redistribution seems to have been administered in the storerooms of the palace.

Based on field observations a comparison between the animal bone assemblages from two of the Period VI A store rooms – A340 and A365 – looked especially promising (fig. VI.4= fig[1].I.04-storerooms-x-web). Both were located to the south of Temple B, among a series of three rooms found towards the Southwest of this public building complex. Over a thousand (NISP=1546) animal bones came to light from room A340. This room is the smaller of the two and was designated the food “redistribution room” on the basis of over a hundred mass-produced bowls and some 160 *cretulae*, most tossed in its western corner, possibly used in controlling and recording withdrawals. Both artefact types were nearly absent from room A365, which was larger and full of storage vessels, and possibly serving as an actual deposit of meals provisions<sup>33</sup>, but it contained an entire order of magnitude fewer bones (NISP=104). The overwhelming majority of animal remains in both rooms came from domestic ruminants. A few wild ungulate remains was also recovered, however, the two features could be best compared in terms of the anatomical distribution of cattle and caprine bones. Due to intensive fragmentation, less than 20% of the latter could be identified to species, sheep remains consistently outnumbering those of goats in both rooms (table VI.5).

Table VI.5 – The number of bones from domestic ruminants.

Room	Cattle	Caprine	Sheep	Goat	Total
A340	434	919	123	12	1488
A365	35	55	4	3	97

Fig. VI.5 shows the frequencies of individual skeletal elements for cattle (top) and caprines (bottom) in the two rooms of interest (NB: NISP values are shown in decimal logarithmic scales improving the visibility of smaller numbers). A notable feature of both cattle and caprine remains is that given sufficiently large sample sizes (A340) their anatomical distribution is relatively even in terms of the classification by three gross meat quality categories as defined

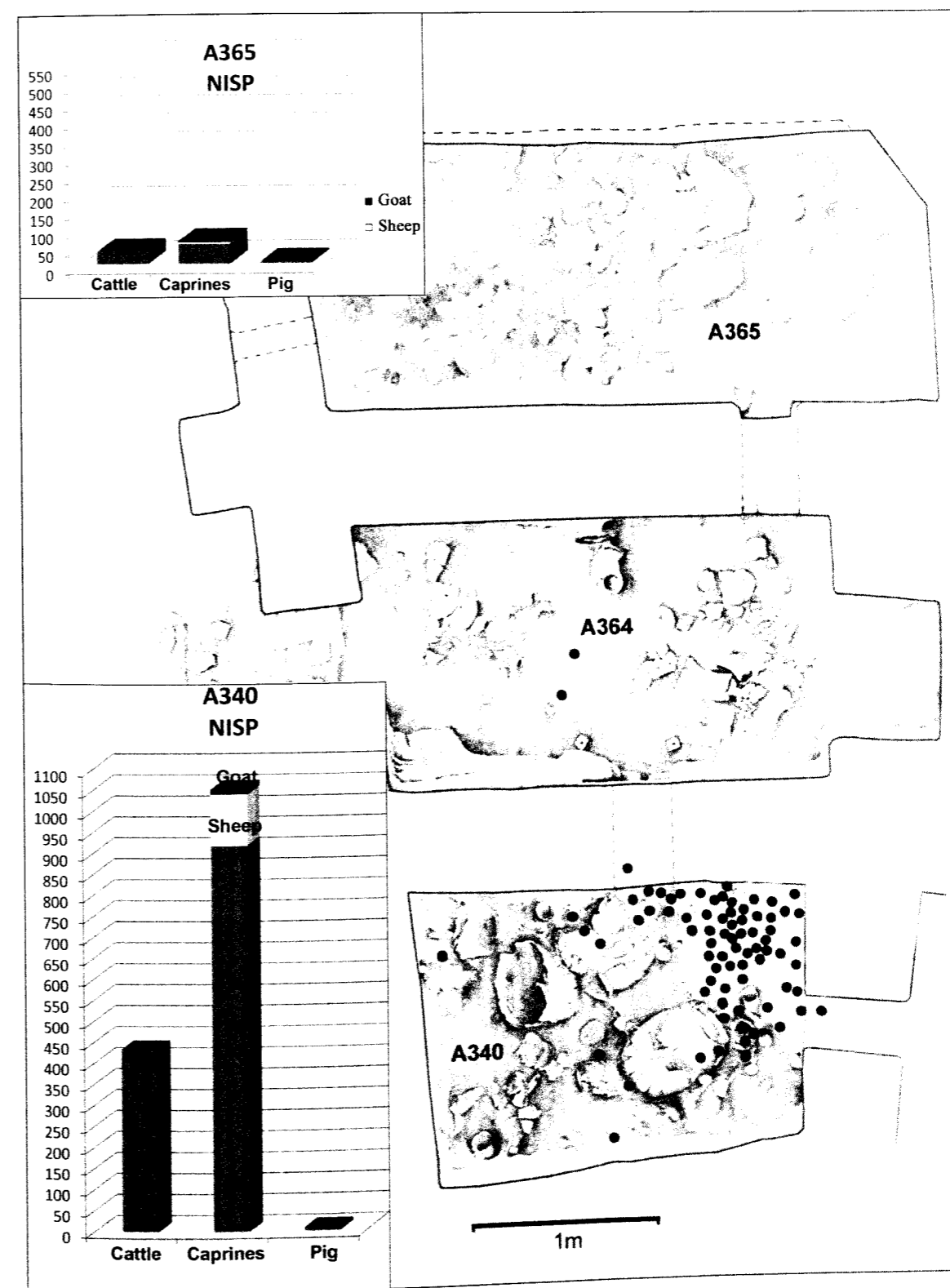


Fig. VI.4 – The different quantities of domestic animal remains found in Period VI A storage rooms A340 and A365 (expressed in actual number of bones). The find spots of *cretulae* are indicated by dots (from Frangipane 2007b, fig. 1.4).

<sup>33</sup> Frangipane, Palmieri 1988-89.

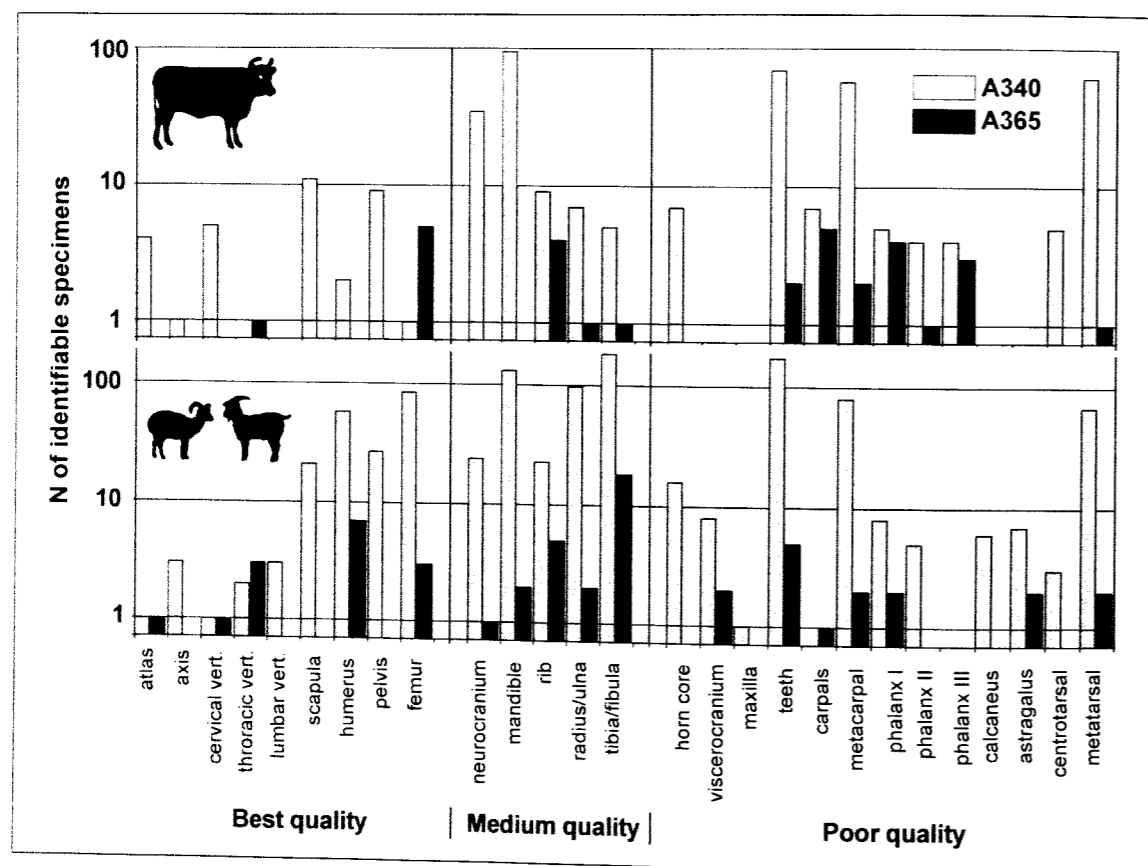


Fig. VI.5 – The anatomical distribution of bone finds from cattle (top graph) and caprines (bottom graph) recovered from rooms A340 and A365. Note the concentration of poor quality cattle bone in room A365.

by Uerpmann<sup>34</sup>. This relatively even representation of all skeletal parts results in positive correlations between the frequencies the great variety of skeletal elements (table VI.6).

Table VI.6 – Coefficients of Spearman rank correlation between skeletal elements.

d.f.=27	A340 cattle	A365 caprine
A365 cattle	$r_s=0.367$ $P=0.052$	$r_s=0.562$ $P=0.003$
A340 caprine	$r_s=0.594$ $P=0.002$	$r_s=0.635$ $P=0.001$

The only discrepancy (shown by a near lack of correlation) was observed between the compositions of cattle bone in rooms A340 and A365. The small sample from room A365 is dominated by bones from the feet (dry limb), therefore it is dissimilar to the more evenly represented skeletal remains of caprines and even the larger sample of cattle bones in A340.

<sup>34</sup> Uerpmann 1973.

The exact relation between these bones – mostly representing the animals' entire body – and the activities that once took place in this area was further clarified with regard to the taphonomy of animal remains. Could the bones be leftovers of primary butchering (especially of caprines represented in very similar ways in both rooms) that preceded handing out food provisions? Or do these bones represent simple “fast food” consumed on location by officials who handled the seals and products in the storage jars that were not necessarily of animal origins?

These questions were studied in additional detail using the microstratigraphy of the A340 bone assemblage that was, in fact, formed by the collapse of a two storey building. It was hypothesized that, among other goods, meat was also redistributed in this area, given the major difference observed in the number of bones in storeroom A340 – which is more likely to have been the scene of redistributing food to people working in the palace – and A365, which during its excavation seems to have been simply a storage facility for food to be sent to other distribution rooms.

It was of utmost interest, whether the animal remains in A340 were mainly concentrated in the upper part of the fill or in the lower portion, near the floor (layers 1a-b represent post destruction fill in this area). As has been ascertained through the analysis of the distribution of *cretulae* and pottery within the layers of this room, however, it seems certain that material from layers 2a to 2f belonged to the upper storey, whereas those found in layers 2g-h and 3 were associated with activity in the lower storey of the building. It was hoped that differences between the strata assigned to the lower and upper deposits (fig. VI.6A) would reflect possible functional differences between the two levels of the building. For one thing, the majority (102) of *cretulae* found had been deposited in the strata of the lower storey where less than a quarter (220) of all animal bones were found. The rest of the bones (773) came to light from the ruins of the upper level accompanied by only one third of all *cretulae* (63) found in the building (table VI.7).

Table VI.7 – The microstratigraphic distribution of animal remains and *cretulae* in the layers assigned to the two levels of room A340.

A340	Upper storey						Lower storey		
	2a	2b	2c	2d	2e	2f	2g	2h	3
Cattle	28	31	57	62	60	27	28	10	27
Caprine	87	52	104	75	122	39	55	38	54
Dog				1				1	
Aurochs	1	1	3	1	2	2	1		
Wild caprine			2		1				
Red deer			2	3	2				
Fallow deer									
Wild pig	1	1	3		1	1	1		
Hare							1	3	
Bird (small)						1	1		
<b>Total</b>	<b>117</b>	<b>85</b>	<b>171</b>	<b>142</b>	<b>188</b>	<b>70</b>	<b>88</b>	<b>51</b>	<b>81</b>
<i>Cretulae</i>	3	1	3	8	25	23	21	18	63



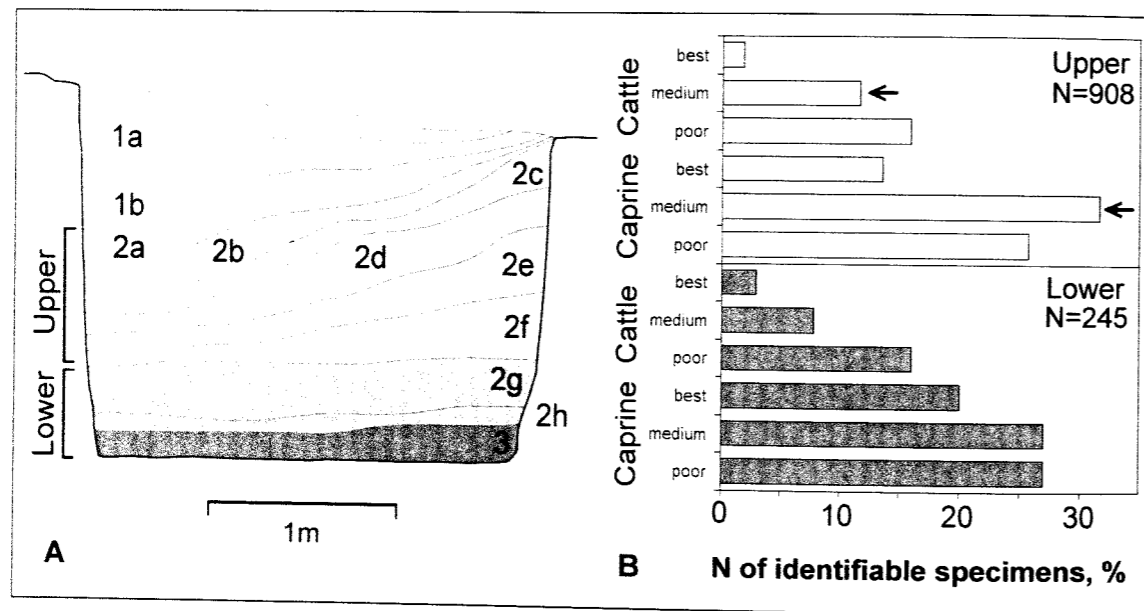


Fig. VI.6 - The stratigraphic section of A340 showing the microstratigraphy of the upper and lower storey (A) and the percentual distribution of domestic ruminant bones (100%) by meat quality categories (B). Differences between the compositions of the upper and lower deposits are indicated by arrows.

In addition to the aforementioned inverse pattern of bone and *cretulae* deposition in A340, more wild animal bones seem to originate from the upper storey. This in itself, however, may also be related to the significantly greater number of bones available from layers 2a through 2f that would by definition represent greater taxonomic richness (c.f. fig. VI.2). The overall composition of this sub-assembly, however, largely conforms of other, well-defined concentrations of *cretulae* in the area (c.f. fig. VI.3B): the zoological material is dominated by the rather monotonous presence of bones from sheep and goat, complemented by a smaller portion of cattle remains. *Cretulae* were carefully discarded once they had served their function, some were even found in situ in the proximity of commodities they had once sealed. Their relation to animal bones, however, is somewhat ambiguous.

As remains of domestic ruminants dominated in this sub-assembly (notably, no bone from domestic pig could be identified!), anatomical distributions of their bones were analyzed in an effort to further elucidating functional differences within this feature of crucial importance. Table VI.8 shows the anatomical distribution of cattle remains within the microstratigraphy summarized by categories of "best", "medium" and "poor" quality cuts.

In general, remarkably few bones represent the axial skeleton: vertebrae carrying valuable meat (especially in the lumbar region) and even ribs, usually represented in great numbers as a combined result of butchering and fragmentation, seem to be missing. Other large, meat bearing bones, such as those of the stylopodia, humerus and femur, are also rare. Remains of possibly highly fragmented mandibulae and probably associated teeth, however, occur commonly in the material. It is also surprising that dry limb bones, metapodia in particular, are represented by many fragments. Breaking up these robust bones in cattle would take a special effort resulting in very small yields of marrow. There is practically no edible meat around these bones of the dry limb.

The distribution of sheep and goat bones across the stratigraphy is summarized in table VI.9.

Table VI.8 - The anatomical distribution of cattle bones within the microstratigraphy of room A340.

A 340	Fill		Upper storey						Lower storey			Sum
	1a	1b	2a	2b	2c	2d	2e	2f	2g	2h	3a	
<b>Cattle</b>												
Atlas	2	1									1	4
Axis				1								1
vertebra cervicalis	1						1		1			2
vertebra thoracalis												
vertebra lumbalis												
Scapula		1	1		1	3	1	1			3	11
Humerus					2							2
Pelvis	2	2	3		1					1		9
Femur		1										1
<b>Best quality</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>1</b>		<b>6</b>	<b>33</b>
Cranium	5	2	1	2	4	6	6	2	5	1	1	35
Mandibula	6	12	2	12	16	14	16	11	5	1	1	96
Costa		1		1	2	1		1	1		2	9
radius/ulna		1	1			1	3				1	7
tibia/fibula	1		1		1	1				1		5
<b>Medium quality</b>	<b>12</b>	<b>16</b>	<b>5</b>	<b>15</b>	<b>23</b>	<b>23</b>	<b>25</b>	<b>14</b>	<b>12</b>	<b>2</b>	<b>5</b>	<b>152</b>
processus cornualis	1	2		1			2				1	7
Maxilla								1				1
Dentes	4	3		9	10	15	15		4	5	5	70
Carpalia	1	1					2	2	1			7
Metacarpalia	7	5	9	3	12	6	4	4	3		5	58
phalanx proximalis		1					1	1		1	1	5
phalanx media							2	1			1	4
phalanx distalis		2					1				1	4
Calcaneus						1						1
Astragalus						1						1
Centrotarsale				1		1	1		1	1		5
Metatarsalia	6	8	10	1	8	10	6	3	5	2	2	62
<b>Poor quality</b>	<b>19</b>	<b>22</b>	<b>19</b>	<b>15</b>	<b>30</b>	<b>35</b>	<b>34</b>	<b>11</b>	<b>15</b>	<b>8</b>	<b>16</b>	<b>224</b>

Similarly to cattle remains, meat bearing bones from the axial skeleton are almost entirely missing, although the aforementioned stylopodium (esp. femur) fragments occur in relatively high numbers. The dominant fractions of mandibula and tibia remains must be, at least in part, resulting from intensive fragmentation. Tooth and skull remains occurred in great numbers as well. Similarly to cattle, metapodium remains of negligible nutritive value occur in relatively great numbers as well.

Table VI.9 – The anatomical distribution of caprine bones within the microstratigraphy of room A340.

A 340 Caprine	Fill		Upper storey						Lower storey			Sum
	1a	1b	2a	2b	2c	2d	2e	2f	2g	2h	3a	
Atlas								1				1
Axis	1					1				1		3
vertebra cervicalis					1							1
vertebra thoracalis		1						1				2
vertebra lumbalis							1	1			1	3
Scapula	1	3	4		1		1	1	5	2	3	21
Humerus	6	4	3	2	9	5	15	2	3	4	5	58
Pelvis	3	1	3	2	1	2	9		3	3		27
Femur	4	5	10	5	13	13	11	5	2	6	12	86
<b>Best quality</b>	<b>15</b>	<b>14</b>	<b>20</b>	<b>9</b>	<b>25</b>	<b>21</b>	<b>38</b>	<b>10</b>	<b>13</b>	<b>16</b>	<b>21</b>	<b>202</b>
Cranium	7	4	2		1	3	2	3	2			24
Mandibula	16	11	16	9	22	8	14	23	11	2		132
Costa	1	2	4	2	2		1	2	2	2	5	23
radius/ulna	17	3	13	5	23	7	9	6	5	4	5	97
tibia/fibula	30	17	30	8	27	13	17	15	10	3	14	184
<b>Medium quality</b>	<b>71</b>	<b>37</b>	<b>65</b>	<b>24</b>	<b>75</b>	<b>31</b>	<b>43</b>	<b>49</b>	<b>30</b>	<b>11</b>	<b>24</b>	<b>460</b>
processus cornualis	2	2	1	1		1	5	1	2	1		16
Maxilla		1							2			3
Dentes	25	17	22	21	29	19	15	4	12	1	12	177
Carpalia				1								1
Metacarpalia	4	8	16	7	13	4	8	5	6	1	8	80
phalanx proximalis	1	2			1		2	1	1	1		9
phalanx media							1	1	1		2	5
phalanx distalis				1		1						2
Calcaneus			2					1	2		1	6
Astragalus	3		1				1	1		1	1	8
Centrotarsale					1	1		1			1	4
Metatarsalia	8	8	5	3	10	7	14	4	3	1	5	68
<b>Poor quality</b>	<b>43</b>	<b>38</b>	<b>47</b>	<b>34</b>	<b>54</b>	<b>33</b>	<b>46</b>	<b>19</b>	<b>29</b>	<b>6</b>	<b>30</b>	<b>379</b>

Cattle and caprine remains from the two storeys of A340 were summarized by meat value categories in table VI.10. The percentual distribution of these remains is summarized by the two discussed deposits in fig. VI.6B. Revisiting our raw data in tables VI.8 and VI.9, however, is a reminder that the pattern thus emerging should be interpreted cautiously. In the case of cattle, it is mandible fragments that contribute this difference, while among caprine remains numerous fragments representing medium quality meat originate from the notoriously fragile zygopodium bones, especially the tibia. Similarly to mandibles, the effect of post depositional

fragmentation cannot be ruled out. Although it is difficult to tell to what extent qualitative differences in the anatomical composition of the upper and lower storey assemblages reflect nuances in diet or are a product of taphonomic bias, it can be said with certainty that animal heads and limbs dominated the repertoire of meat available and that far more meat must have been dealt with on the upper level of the building. This becomes patently clear in table VI.10 and fig. VI.8, a percentual summary of cattle and caprine remains from this two storey building.

Table VI.10 – A comparison between the upper and lower sections of A340 by meat value categories as published by Uerpman (1973).

	Fill (1a-b)	Upper 2a-f	Lower 2g-3	Sum
Cattle, best	9	16	7	32
Cattle, medium	28	105	19	152
Cattle, poor	41	144	39	224
Caprine, best	29	123	50	202
Caprine, medium	108	287	65	460
Caprine, poor	81	233	65	379
<b>Sum</b>	<b>296</b>	<b>908</b>	<b>245</b>	<b>1449</b>

Over three quarters of bones in the two discussed deposits in A340 originated from the upper storey. Given the evidently great difference between sample sizes and the basic similarity between the anatomical profiles of the upper and lower storey deposits (fig. VI.6B), the heterogeneity of distributions by meat quality categories was confirmed using a Chi<sup>2</sup> test. The test showed that two trends visible in the percentual distribution of bones are significant in formal statistical terms: bone fragments representing medium quality beef and mutton were slightly more common in the larger deposit originating from the upper storey (Chi<sup>2</sup>=11.503; df=5; P=0.042). Bones of very high or very low quality did not show such differences.

These results seem to suggest that food remains in this building were strongly associated with central administration (the absence of pig remains and the presence of bones from possibly high status game in the upper storey deposit). The presence of bones, however, is apparently not directly associated with that of *cretulae*. Considering the type of meat present, the almost complete lack of bones bearing valuable meat from the axial skeleton is remarkable: vertebrae and ribs make up one third of total skeletal weight both in cattle (18.8+13.9%) and sheep (21.7+12.8%)<sup>35</sup>. Even if they tend to be relatively prone to natural fragmentation, they represent a mass of bone that would have been unlikely to disappear almost without trace in this deposit through even the toughest taphonomic process. It is likely that although the heads and feet of animals represent low quality meat by modern "western" tastes<sup>36</sup>, these body parts (especially in the case of cattle) were accumulated in room A340 selectively after having been separated

<sup>35</sup> Reichstein 1974.<sup>36</sup> Bartosiewicz 1997.

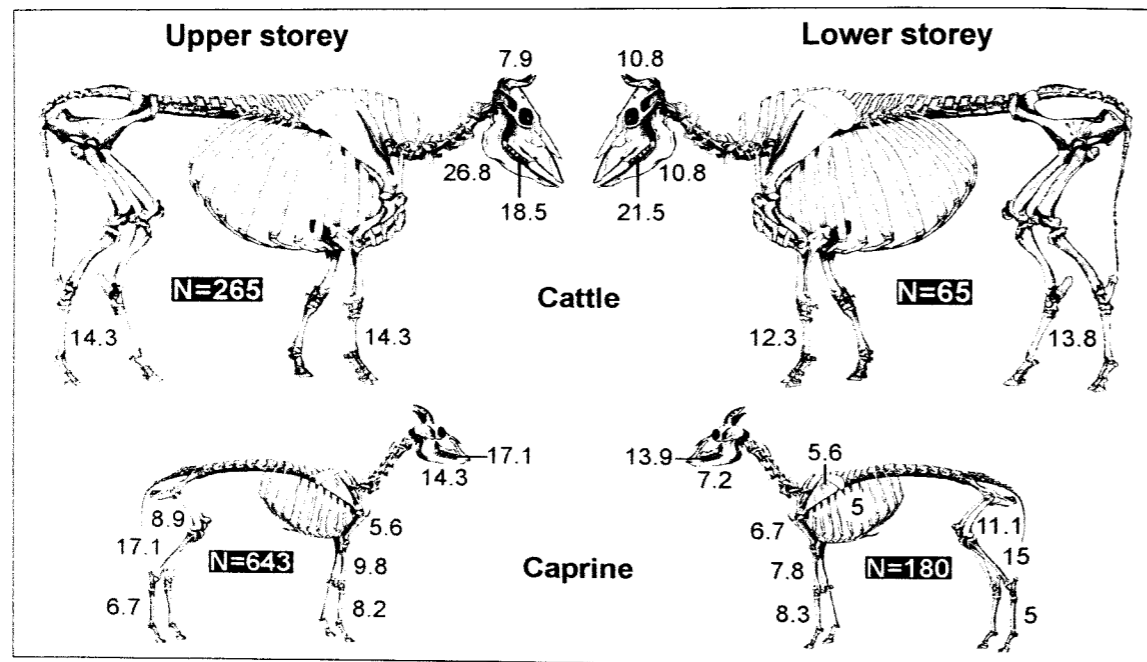


Fig. VI.7 – The anatomical distribution of bone finds from cattle (top) and caprines (bottom) in the upper and lower storey deposits of A340. Skeletal parts represented by over 5% of each species/deposit are labelled with the respective percentage values. These add up to around 80% in each case, clearly illustrating the relative absence of bones from the axial skeleton (vertebrae and ribs). For raw data see tables 7 and 8.

the dressed carcass of greatest nutritive value. Primary butchery must have taken place elsewhere and these less precious cuts were taken to room A340 in the area of redistribution. Since the majority came to light from the upper storey, including some cuts of large game, these bones may represent meals by the personnel or guards in charge of dealing with the ware accounted for with the *cretulae* in the lower storey. Alternatively, they may be regarded as evidence of cheap cuts handed out as part of food distribution to those dependent on provisions by the central power that ruled Arslantepe during Phase VI A. The absence of pork from the menu (whoever consumed the meat once handled here) is remarkable: it seems to illustrate the centralized economic control mechanism that ultimately may have resulted in banning pork, – a staple in independent, rural household economies – by religious means<sup>37</sup>.

THE AGE DISTRIBUTION OF CATTLE IN SELECTED AREAS WITHIN THE PERIOD VI A PALACE COMPLEX

Patterns of meat consumption in different public and private contexts are crucial to our understanding of social relations at this settlement. Although the detailed analysis of age groups in various domesticates is beyond the scope of this study, in light of previous results the age distribution of cattle bones seemed worth considering. As one of the critical points in this paper is demonstrating the difference in animal remains between the various functional areas within the palace complex, this animal of great individual value seemed the best indicator of such hypothetical differences.

<sup>37</sup> Diener, Robkin 1978.

Therefore, ageable cattle bones found in temple areas A and B were compared to the storage area designated A340 and a selected set of rooms in the elite residences of Period VI A that contained major numbers of cattle bones. As caprine remains dominated in all these areas, cattle was represented by relatively small numbers of identifiable fragments. Although in store room A340 almost one third of the bone fragments originated from this animal, cattle was represented consistently by one quarter of the identifiable bones in the rest of the studied provenances (table VI.11).

Table VI.11 – The number and percentual contribution of cattle bones in the selected provenances.

Provenance	Cattle NISP	% of total NISP
Store room A340	434	29.0
Period VI A elite residences total	117	24.4
Temple A total	112	25.9
Temple B total	308	25.4

Unfortunately, however, only a fraction of these remains could be precisely aged, largely due to the high degree of artificial and natural fragmentation of the bones. The proportion of ageable cattle bones has varied considerably throughout the sample. The age composition of cattle remains in this sub-sample is summarized in table VI.12.

Table VI.12 – A comparison of cattle ages between the provenances selected for study.

Fraction numbers show the proportion of ageable specimens to all cattle bone	Room	neonatus	juvenilis	subadultus	adultus	maturus	senilis
<b>Store room</b>							
59/434	A340	1	10	9	37	2	0
<b>Period VI A elite residences</b>							
6/45	A650	0	0	2	4	0	0
1/1	A651	0	0	0	0	1	0
1/1	A727	0	0	0	0	1	0
22/46	A747	0	0	1	1	19	0
<b>Period VI A public</b>							
<i>Temple A</i>							
1/3	A36	0	0	0	0	1	0
15/85	A42	0	3	4	8	0	0
5/9	A46	0	0	2	3	0	0
1/1	A47	0	0	0	0	1	0
9/9	A84	0	0	0	9*	0	0
<i>Temple B</i>							
139/223	A450	0	0	1	9	129	0
10/24	A800	0	0	0	0	10	0
6/9	A809	0	0	0	1	5	0
1/1	A810	0	0	0	0	1	0
32/51	A812	0	0	1	2	29	0

\* Single skull.

The age distribution of cattle bone in some of these rooms is shown in absolute terms in fig. VI.8 (percentages would have been meaningless, given the small size of some sub-samples). Evidently, storage room A340 stands out with a reasonably varied age composition for the cattle slaughtered. We already know from figure VI.5, that this room had access to higher quality beef therefore eating the meat of relatively younger cattle (in fact of all age groups) fits a pattern of possibly high-status food. The opposite, a large quantity of presumably poorer quality, tougher meat from mature individuals was consumed in room A450 within the complex of Temple B. It is noteworthy that Temple B also stood out with its relatively great contribution of hare bones to the faunal sample (fig. VI.3B).

Evidently, meaningful conclusions can be drawn only from these two, larger sub-samples that indeed seem different in terms of age composition. Although the number of bones is far too small to have this difference tested statistically, the hypothesis that age diversity may have been an artefact of sample size was considered in fig. VI.9. As may be seen, the overwhelming majority of sub-samples outline a strongly degressive trendline. Of the two major sub-samples, cattle bones from store room A340 basically follow this pattern: the better representation of a variety of age groups is, in part, the result of larger sample size. On the other hand, the greatest number of ageable cattle bones, recovered from room A450 of Temple B is dominated by bones from mature individuals. By modern standards, beef originating from these animals must have been far tougher, even if very old cattle or oxen possibly used in draught work could not be identified. It seems, however, that the meat consumed in this public area was of lesser gastronomic value. This places the interpretation of hare bones in a different light: could this small game have been a luxury food, or a complementary source of meat procured by common people opportunistically?

In any case beef, even of poor quality, would not have been worth providing only to a few people. It must have been an important source of animal protein for "the masses". However, a differential distribution by quality (also related to the age of the animal at the time of slaughtering) seems apparent at Arslantepe.

DISCUSSION AND CONCLUSIONS

One of the aims of this paper has been detecting possible economic interference by the early state elites in the life of their population, seen through the Phases VII-VI A faunal data from the Chalcolithic of Arslantepe. The increasing dominance of caprine-based herding practices at the site was linked to the evidently new function that the settlement acquired by Period VI A as a great regional centre<sup>38</sup>. The site contains tantalizing hints of increasing social stratification reflected in the variability of access to the meat of particular animal species. Arslantepe is an ideal site in which to identify evidence of the early development of social complexity with regard to differential and centralized provisioning characteristic of this phase of the urbanization process.

The bones of sheep, goat and cattle occurred most commonly, followed by those of pig (usually contributing less than 20% of NISP to the repertoire of domestic animals). In line with the results of previous investigations, the contribution of pork and game to the diet decreased between Periods VII and VI A. It must be emphasized, however, that hunting had hardly any practical significance in meat provisioning during the studied late Chalcolithic

<sup>38</sup> Frangipane, Siracusano 1998: 242.

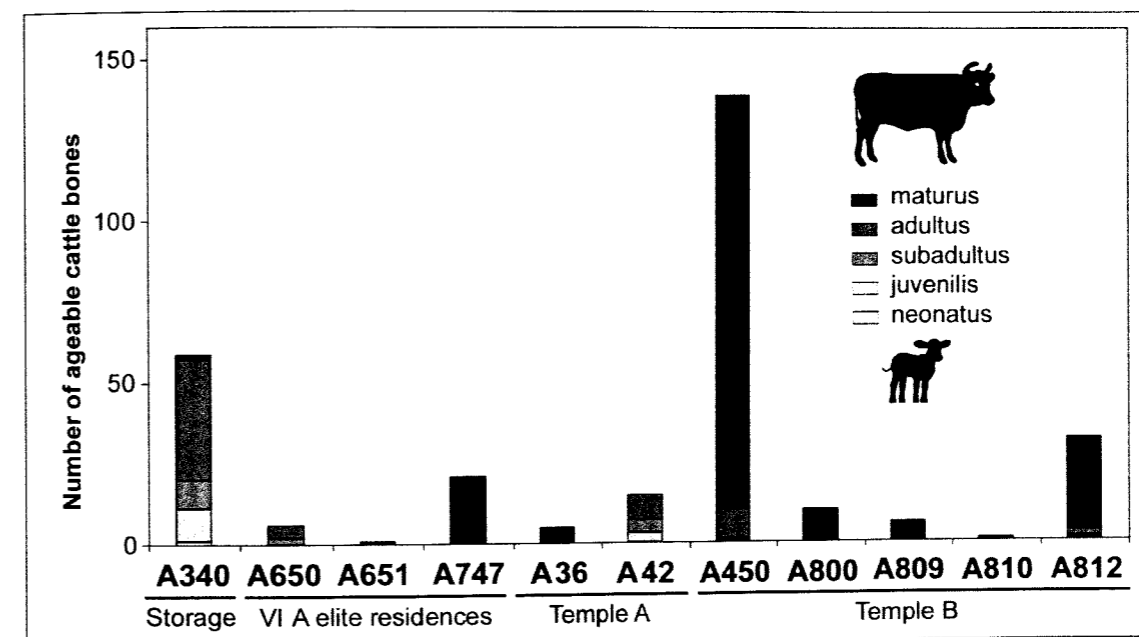


Fig. VI.8 – The age distribution of cattle bone by ageable NISP in the selected provenances. Note the remarkable differences in the numbers available for study.

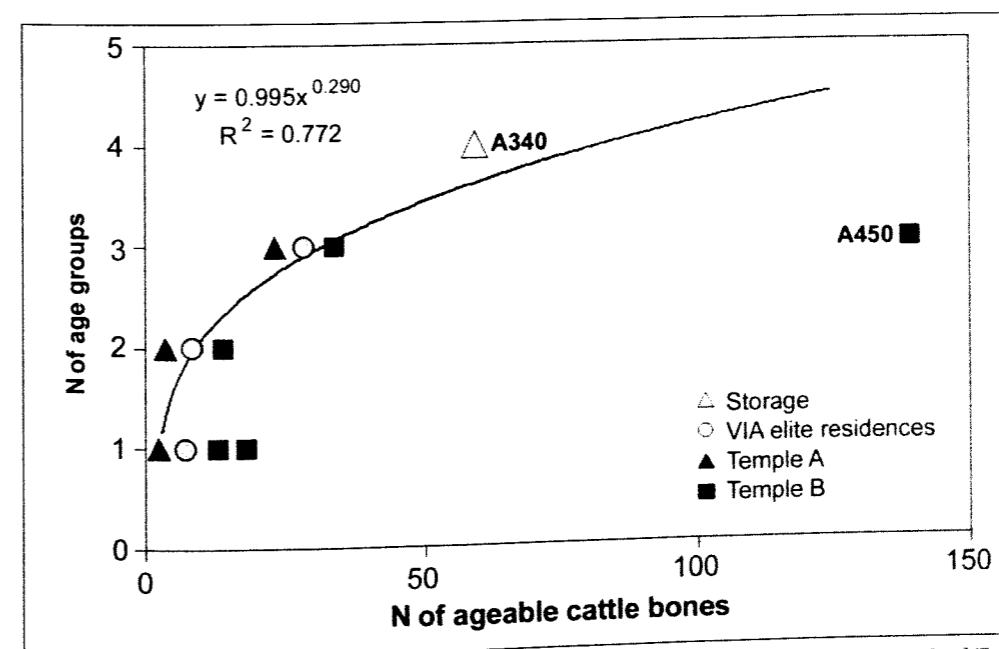


Fig. VI.9 – Age diversity in cattle bone as a function of sample size (ageable NISP). Room A450 of Temple B is dominated by a monotonous set of bones from mature individuals.

periods. It is difficult, if not impossible, to tell whether the act of hunting was still a token for ascribed status or whether it was used to reinforce prestige that rooted in a more archaic way of life. All that can be seen is that meat diets definitely diversified as social complexity increased. Mutton and beef (often of poor quality) were consumed in Period VI A public areas, while the remains of wild animal products were detected in all earlier provenances and more

recent, elite sections of the palace complex. Increasing spatial differentiation is paralleled by consonant patterns in meat consumption that may be considered a reflection of economic changes that are usually considered a reflection of economic changes that became consolidated during the subsequent Bronze Age.

Although the meat diet was based on mutton, beef and pork, domestic animals were not consumed in equal proportions across the Near East. Percentages based on the total number of remains show that the ratios between domesticates are largely dependent on the natural environment<sup>39</sup>. In the Levant, the remains of domestic ruminants are the most frequent, but pig remains are also present. In northern Syria, sheep and goat are the main food animals, with cattle in second place and pig only in very low percentages. In Iran, sheep and goat were the principal food animals. In SE Turkey sheep and goat are less dominant and pig is found in higher percentages. The environments near Malatya and Elazig on the northern edge of the region resemble one another more than they do the south-eastern part of Anatolia<sup>40</sup>.

Not only are there slight differences between the regions, but in each area we may also tentatively observe a similar trend of increasing importance of cattle in the Early Bronze Age, and a stabilization in the Middle Bronze Age. This trend seems less apparent at Arslantepe, where a major shift toward caprine herding took place at the turn of Periods VII and VI A under discussion here<sup>41</sup>. It seems possible that this shift in meat consumption was influenced by the Mesopotamian model in the south that relied heavily on the exploitation of caprines thereby impacting on Calcolithic animal keeping more directly in southern Turkey<sup>42</sup>. These broad geographical trends are worth considering in light of declining pork consumption: the natural environment of Arslantepe would have been most suitable for pig husbandry.

The in depth analysis of two Phase VI A storage rooms associated with central administrative functions in the palace area reconfirmed osteological signs showing a strong trend of socioeconomic centralization outlined in the general archaeozoological analysis of Phases VII and VI A at Arslantepe, adding the important aspect of meat quality to the overall picture.

Appendix 1 – Period VII, domestic animals.

	Cattle	Sheep	Goat	Caprine	Domestic pig	Horse	Domestic ass	Dog	Domestic total
<b>Bökönvi 1988</b>	<b>1405</b>	<b>100</b>	<b>167</b>	<b>1114</b>	<b>554</b>	<b>16</b>	<b>1</b>	<b>80</b>	<b>3437</b>
<b>Period VII common houses</b>									
A21	65	15	25	184	96	2		7	394
A22	85	15	10	92	46	1		2	251
A23	3	1		2					6
A24	2			2	1				5
A25	14	3		9	13				39
Common total	169	34	35	289	156	3		9	695
<b>Period VII elite residences</b>									
A682	24	4	1	26	9			6	70
A617	548	32	60	550	145			30	1365
A684	25	3	3	29	7			1	68
A582	365	34	89	365	196			3	1052
A646	5	2	1	5	2				15
A647	28	8	1	26	5			2	70
A648	2	1		3	1				7
Elite total	997	84	155	1004	365			42	2647
<b>Period VII</b>									
<b>Intermediate levels</b>									
A580	30	10	1	50	13				104
A581	2	1							3
A618	17	1	1						19
Intermediate total	49	12	2	50	13				126
<b>Period VII public</b>									
<b>Temple C</b>									
A900	10	5	2	54	4				75
A932	2	5	1	12	1				21
A934	11	2	1	36	5				55
A950	46	17	7	242	15				327
Temple C total	69	29	11	344	25				478
<b>Storage/craft, Temple C level</b>									
A563	22	7	2	15	2				48
A571				3					3
A842	104	39	17	313	27			3	503
A848	62	25	1	164	17			9	278
A850	61	38	16	250	16			11	392
A858	19	17	5	74	3				118
A953	7	3		39	5				54
A954	61	12	8	120	8			2	211
K680	25	7	5	159	5			6	207
Storage/craft total	361	148	54	1137	83			31	1814

<sup>39</sup> Clason, Buitenhuis 1998: 236, fig. 3.

<sup>40</sup> Frangipane, Siracusano 1998: 238.

<sup>41</sup> Bartosiewicz 2005b: 98.

<sup>42</sup> Frangipane, Siracusano 1998: 242; Bartosiewicz 2005c: 155, table 1.

Appendix 2 – Period VI A, domestic animals.

	Cattle	Sheep	Goat	Caprine	Domestic pig	Horse	Domestic ass	Dog	Domestic total
<b>Period VI A elite residences</b>									
A650	45	2	7	65	3			1	123
A651	1			13					14
A727	1			2					3
A728	3		1	4					8
A734	2			13					15
A747	46	22	4	132	2			4	210
A933	6	1		41					48
A946	13	4	2	32	7				58
Elite total	117	29	14	302	12			5	479
<b>Period VI A public</b>									
<b>Temple A</b>									
A36	3			2					5
A42	85	15	8	266	2				376
A44	5	1	2	7					15
A46	9	3		8					20
A47	1								1
A49				2					2
A84	9			5					14
Temple A total	112	19	10	290	1				432
<b>Temple B</b>									
A450	223	65	23	509	32			27	879
A800	24	7		60				2	93
A809	9	6	4	29				2	50
A810	1			2					3
A812	51	16	4	116	1				188
Temple B total	308	94	31	716	33			31	1213
<b>Period VI A administrative</b>									
<b>Cretulae dumps</b>									
A77 (Temple A)	61	87	28	773	7				956
A206	131	71	60	859	24			1	1146
A430	79	6	4	107					196
Cretulae dumps total	271	164	92	1739	31			1	2298
<b>Store rooms</b>									
A340	434	123	12	919	8	1		2	1499
A364	49	18	12	146				2	227
A365	35	4	3	55	5	1			103
A369	37	72	21	436	3			1	570
Store rooms total	555	217	48	1556	16	2		5	2399
<b>Representative Bdg. III.</b>									
A113	22	17	9	183		1		2	234
A127		22		5					27
Representative Bdg. total	22	39	9	188		1		2	261

Appendix 3 – Period VII, large game.

	Aurochs	Wild sheep	Wild goat	Wild caprine	Goitered gazelle	Red deer	Persian fallow deer	Roe deer	Wild pig	Wild ass	Brown bear	Lion	Gray wolf	Large game total
<b>Bökönyi 1988</b>	68	16	28	29	1	154	24		40	10	39	1	1	411
<b>Period VII common houses</b>														
A21	5	1	1	1		13			6					27
A22	4		2	9		14			4		2		1	36
A23						1								1
A24														
A25						4			1		1			6
<b>Common total</b>	9	9	3	10		32			11		3		1	78
<b>Period VII elite</b>														
<b>Elite residences</b>														
A682	4		1			1			3					9
A617	37	6	11	11		29	8	2	4		10			118
A684		2												2
A582	22													22
A646		1						1						2
A647						1								1
A648														
<b>Elite total</b>	63	9	12	11		31	8	2	7		10			153
<b>Period VII Intermediate levels</b>														
<b>Intermediate levels</b>														
A580	2	6							1		1			10
A581														
A618	1	1												2
<b>Intermediate total</b>	3	7							1		1			12
<b>Period VII public</b>														
<b>Temple C</b>														
A900 TC	1	1				1					1			4
A932 TC											2			4
A934						2								6
A950 TC	1	2				2		1						6
<b>Temple C total</b>	2	3				5		1			3			14
<b>Storage/craft, Temple C level</b>														
A563	2	1				4		1			1			9
A571														
A842	23	4				7		2						36
A848	9	2				1	1		6					19
A850	12	8						1	3		2			26
A858	1	2				2		1	2					8
A953														
A954	1	4				2		1			2			10
K680		1	2			3		2						8
<b>Storage/craft total</b>	48	22	2			19	1	8	11		5			116



Appendix 4 – Period VI A, large game.

	Aurochs	Wild sheep	Wild goat	Wild caprine	Goitered gazelle	Red deer	Persian fallow deer	Roe deer	Wild pig	Wild ass	Brown bear	Lion	Gray wolf	Large game total
<b>Period VI A elite residences</b>														
A650	2					3	1	1					2	9
A651							1							1
A727														
A728														
A734														
A747	7	1	1						1		1			11
A933														
A946						2					2			4
<b>Elite total</b>	<b>9</b>	<b>1</b>	<b>1</b>			<b>5</b>	<b>2</b>	<b>1</b>	<b>1</b>		<b>3</b>		<b>2</b>	<b>25</b>
<b>Period VI A public</b>														
<b>Temple A</b>														
A36														
A42	1	1		1	1	6			4				1	15
A44														
A46														
A47														
A49														
A84														
<b>Temple A total</b>	<b>1</b>	<b>1</b>		<b>1</b>	<b>1</b>	<b>6</b>			<b>7</b>				<b>1</b>	<b>18</b>
<b>Temple B</b>														
A450	15	2				5+2		1			3			21
A800	2		1			2			3					8
A809														
A810	1													
A812	3	3				3								1
<b>Temple B total</b>	<b>21</b>	<b>5</b>	<b>1</b>			<b>5</b>		<b>1</b>	<b>3</b>		<b>3</b>			<b>39</b>
<b>Period VI A administrative</b>														
<b>Cretulae dumps</b>														
A77 (Temple A)	2		1	2		14			4					23
A206	5	3	2		3	2			2					17
A430			8		1			1						11
<b>Cretulae dumps total</b>	<b>7</b>	<b>3</b>	<b>11</b>	<b>2</b>	<b>4</b>	<b>16</b>	<b>1</b>	<b>1</b>	<b>6</b>					<b>51</b>
<b>Store rooms</b>														
A340	12	3				13	2		9					39
A364							1		1					2
A365														
A369			2											
<b>Store rooms total</b>	<b>12</b>	<b>3</b>	<b>2</b>			<b>13</b>	<b>3</b>		<b>10</b>		<b>2</b>			<b>45</b>
<b>Representative Bdg. III.</b>														
A113	2		2	2							1		10	17
A127						1		1						2
<b>Representative total</b>	<b>2</b>		<b>2</b>	<b>2</b>		<b>1</b>		<b>1</b>			<b>1</b>		<b>10</b>	<b>19</b>

Appendix 5 – Period VII, small game.

	Mustelid	Weasel	Wild cat	Red fox	Brown hare	Rodent indet.	Bat indet.	Great bustard	Pelican	Eagle	Passeriform bird	Bird indet.	Greek tortoise	Frog/Toad	Cyprinid fish	Fish indet.	Small game total
<b>Bökönyi 1988</b>				2	1							1	25			2	31
<b>Period VII common</b>												1					1
A21												1					1
A22																	
A23																	
A24																	
A25												1	1				1
<b>Common total</b>												1	1				2
<b>Period VII elite</b>																	
<b>Elite residences</b>																	
A682					6												6
A617					2								2				4
A684																	
A582																	
A646																	
A647																	
A648																	
<b>Elite total</b>					8												8
<b>Period VII Intermediate levels</b>																	
<b>Intermediate levels</b>																	
A580				2													2
A581												1					1
A618												1					1
<b>Intermediate total</b>				2								1					3
<b>Period VII public</b>																	
<b>Temple C</b>																	
A900					1			3				1			1		6
A932																	
A934					1							1					2
A950												3			2		10
<b>Temple C total</b>					1			3				5			3		20
<b>Storage/craft, Temple C lev.</b>																	
A563												1					1
A571													2				5
A842													6	2	1		16
A848	1								3	3			4	1			13
A850		1 sk							3	2 sk			5				6
A858									1								3
A953										3							4
A954												4					4
K680													2				3
<b>Storage/craft total</b>	<b>1</b>	<b>1</b>							<b>11</b>	<b>6</b>	<b>2</b>	<b>20</b>	<b>7</b>	<b>1</b>	<b>2</b>		<b>51</b>

Appendix 6 – Period VI A, small game.

	Mustelid	Weasel	Wild cat	Red fox	Brown hare	Rodent indet.	Bat indet.	Great bustard	Pelican	Eagle	Passeriform bird	Bird indet.	Greek tortoise	Frog/Toad	Cyprinid fish	Fish indet.	Small game total
<b>Period VI A elite residences</b>																	
A650																	
A651																	
A727																	
A728																	
A734																	
A747																	
A933						1						1					2
A946						1											1
Elite total					2							1					3
<b>Period VI A public</b>																	
<b>Temple A</b>																	
A36																	
A42	1				2							2					5
A44																	
A46																	
A47																	
A49																	
A84																	
Temple A					1							1					2
<b>Temple B</b>																	
A450					10		5					8		4			27
A800					2												2
A809					1					1							2
A810					1												1
A812					17			2			2	2		1	34		58
Temple B total					31		5	2	1		2	10		5	34		90
<b>Period VI A administrative</b>																	
<b>Cretulae dumps</b>																	
A77 (Temple A)					11							2					13
A206		1			2			1				1					5
A430	2				9				13	33							57
Cretulae dumps total	2	1			11			1	13	33		3					64
<b>Store rooms</b>																	
A340					4		4										8
A364	1						1										2
A365																	
A369																	
Store rooms total	1				4		5										10
<b>Representative Bdg. III.</b>																	
A113					1					1							2
A127																	
Representative total					1					1							2