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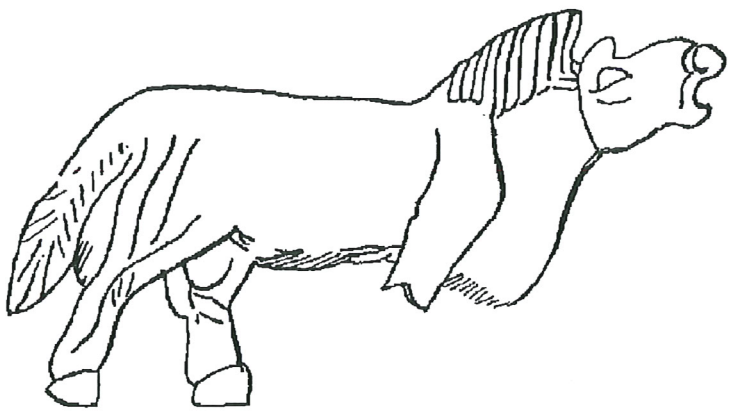

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VOLUME B

ZOOARCHAEOLOGY AT ÇAYÖNÜ: A PRELIMINARY ASSESSMENT OF THE RED DEER BONES

Gülçin İlgezdi[1]

Abstract

Red deer (*Cervus elaphus*) bones from the first four Prepottery Neolithic (PPN) subphases - Round Building, Grill Building, Channeled Building, Cobble-paved Building subphases - at Çayönü Tepesi in southeastern Anatolia are presented and discussed in this paper. In order to show the patterns of exploitation of red deer, kill-off patterns, size, abundance of red deer, and skeletal element distributions in different subphases are compared. Red deer is present in all phases, and there is a marked increase in the ratio of deer to cattle in the later subphases. There is no change in the size and kill-off patterns of red deer in the different subphases. Young individuals are hardly represented in the collection.

Résumé

Les ossements de cerf (*Cervus elaphus*) des quatre sous phases du Néolithique précéramique (PPN) - le bâtiment en ronds, le bâtiment en grille, le bâtiment aux canalisations, le bâtiment pavé aux galets - de Çayönü Tepesi dans le sud-est de l'Anatolie sont présentés dans ce travail afin de mettre en évidence le mode d'exploitation de cet animal. Pour cela, les âges d'abattage, la taille, l'abondance spécifique et la fréquence des parties du squelette sont comparés pour chaque sous-phase. Le cerf est présent durant toutes les phases et l'on observe une augmentation importante pour lui ainsi que pour le bœuf au cours des sous-phases les plus récentes. En revanche, on ne distingue aucun changement des profils d'abattages du cerf sur l'ensemble de la période. Les jeunes individus sont très peu représentés dans cet assemblage.

Key Words: Red deer (*Cervus elaphus*), Çayönü, Prepottery Neolithic, Southeastern Turkey, Kill-off Patterns

Mots Clés: Cerf (*Cervus elaphus*), Çayönü, Néolithique Pré-Poterie, Sud Est de la Turquie, Ages d'abattage

Introduction

The prehistoric site of Çayönü, located in southeastern Turkey is one of the principal sites from the Neolithic period. The site was occupied over almost the entire span of the Neolithic period, from late PPNA up to the Pottery Neolithic (covering some 3000 years, from 10,200 bp to 7,500 bp), it is extensively excavated, and the architecture is well preserved. Thus, the material from the site is apt to give not only substantial but also dependable information on different aspects of neolithization. In the course of the recent study of the faunal material of the site it became evident that hunting was of primary importance through most of the Çayönü sequence. Red deer (*Cervus elaphus*) is one of the most extensively hunted animals at Çayönü. The present study covers the results of the analysis of red deer bones from the four earliest horizons at Çayönü. Relative proportions of red deer in the faunal remains, element distribution, kill-off patterns, size, and location of cut marks were examined in order to investigate exploitation patterns of red deer at the site. The number of red deer bones so far studied amounts to 351 specimens weighing 8839 grams.

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Site and Chronology

Çayönü is located southwest of Ergani in Diyarbakır Province. The site lies on the north bank of a small tributary of the Tigris. (For a map showing the location of Çayönü see Hongo and Meadow, Figure 1, this volume.) The settlement was established on the edge of a rich alluvial plain formed by the deposits of an almost completely filled Pleistocene lake. This lake is situated at the margin of a steppe-like plateau lying on the southern flanks of the southeastern Taurus Mountain range in an area transitional to the high plateau of eastern Anatolia.

Excavations at Çayönü took place between 1964 and 1991 as part of the Southeastern Anatolian Joint Prehistoric Project of the Universities of Istanbul and of Chicago (Çambel and Braidwood 1980). The site was occupied during the entire time range from the Prepottery Neolithic A to the Pottery Neolithic period. Six building subphases have been attributed to the PPN; these are, from the earliest, the Round Building [r], Grill Building [g], Channeled Building [ch], Cobble-paved Building [cp], Cell Building [c], and Large Room Building [lr] Subphases. This PPN sequence is followed by the Pottery Neolithic (PN) occupation at the site (A. Özdoğan 1994; A. Özdoğan 1995; M. Özdoğan 1998). While the first two subphases of the settlement are in the PPNA tradition, there was a gradual change leading to the PPNB tradition starting in the latest level of the Grill Building subphase (see Table 2 in Hongo and Meadow, this volume).

Red Deer Remains at Çayönü

In the course of the recent study of the faunal remains from Çayönü it has became evident that hunting was of primary importance through most of the Çayönü PPN sequence, and red deer was one of the most extensively hunted animals. This paper presents the results of the analysis of red deer remains from the four earliest PPN horizons: the Round Building, Grill Building, Channeled Building, and Cobble-paved Building sub-phases. Results of the analysis of the Çayönü faunal remains indicate that ungulates constituted the most important part of animal resources at the site. (See Figure 3 and Table 4 of Hongo and Meadow in this volume.) Red deer appears to have been fourth in abundance during the PPN following pigs, cattle, and caprines (sheep and goat). Bones of red deer account for 5.5% of the total identified specimens in the Round Building, 4.6% in the Grill Building, 4.5% in the Channeled Building and 16.2% in the Cobble-paved Building subphase (Fig. 1). For the present study all the red deer remains from the earliest four subphases at Çayönü, excavated between 1985 and 1991, were analyzed and recorded. The total number of red deer remains studied is 351; their distribution by subphase is presented in Table 1.

Red deer bones are relatively scarce from the Round Building subphase through the Channeled Building subphase. The proportion of red deer bones increases in the Cobble-paved Building subphase.

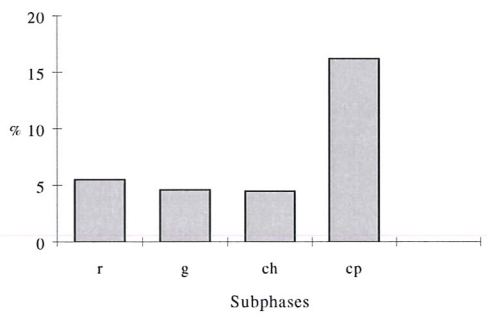

Fig. 1. Proportion of red deer in total NISP

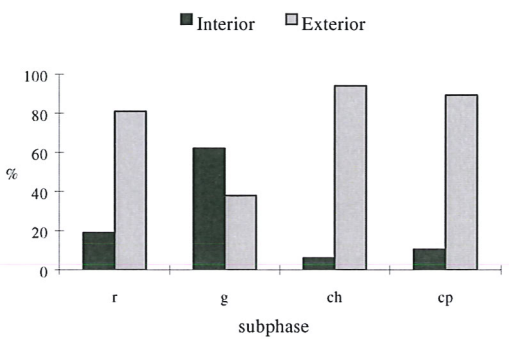

Fig. 2. Distribution of Çayönü red deer bones by context type

Table 1. The number of red deer specimens in each subphase (corrected for articulating specimens).

Subphases	NISP Red Deer	% Total NISP
Round Building	36 (36)	5.5
Grill Building	48 (48)	4.6
Channeled Building	172 (168)	4.5
Cobble – paved Building	95 (91)	16.2

The remains of red deer are generally found outside of buildings except in the Grill Building subphase (Fig. 2). This might be due to the fact that structures belonging to the Grill Building subphase were intentionally covered immediately after the buildings were abandoned.

Element Distributions

The most common red deer bones found at Çayönü are phalanges, metapodials, and antlers (Table 2). When the number of specimens is divided by the number of corresponding elements in the whole animal, however, phalanges and metapodials are relatively not so abundant (Figs. 3 a-d). Long bones (distal tibiae, distal humeri, proximal radii), scapulae, carpals and astragali are frequently encountered, but skull pieces and vertebrae are not. Part of the reason for this is that some vertebrae and skull fragments of red deer were not identified to genus and, instead, recorded as "large mammal". Overall, however, relatively few large mammal skull fragments and vertebrae are found in the Çayönü material. Probably large animals were skinned and butchered at the kill site. The hunters might then have stripped the vertebrae and ribs of meat and carried the meat and postcranial segments back to the site in the skin, perhaps with the metapodials and phalanges still attached to the skin. Skull, vertebrae, and ribs would have been left at the kill site.

Table 2. Red deer element distribution by subphase

	Subphase									
Element	r	**r (%)**	g	**g (%)**	ch	**ch (%)**	cp	**cp (%)**	Total	%
Skull	-	**-**	-		1	**0.6**	-	**-**	1	**0.3**
Antler	4	**10.8**	7	**14.6**	12	**7.0**	15	**15.8**	38	**10.8**
Mandibula	1	**2.7**	-	**-**	2	**1.2**	1	**1.1**	4	**1.1**
Teeth	2	**5.4**	4	**8.3**	8	**4.7**	3	**3.2**	17	**4.8**
Scapula	-	**-**	2	**4.2**	5	**2.9**	6	**6.3**	13	**3.7**
Humerus	1	**2.7**	4	**8.3**	9	**5.2**	6	**6.3**	20	**5.7**
Radius	2	**5.4**	3	**6.3**	20	**11.6**	4	**4.2**	29	**8.2**
Ulna	3	**8.1**	1	**2.1**	9	**5.2**	2	**2.1**	15	**4.3**
Radius+Ulna	-	**-**	-	**-**	2	**1.2**	-	**-**	2	**0.6**
Carpals	2	**5.4**	3	**6.3**	10	**5.8**	8	**8.4**	23	**6.5**
Metapodial	4	**10.8**	4	**8.3**	19	**11.0**	16	**16.8**	43	**12.2**
Pelvis	1	**2.7**	1	**2.1**	13	**7.6**	4	**4.2**	19	**5.4**
Femur	3	**8.1**	1	**2.1**	4	**2.3**	-	**-**	8	**2.3**
Patella	1	**2.7**	1	**2.1**	-	**-**	-	**-**	2	**0.6**
Tibia	4	**10.8**	-	**-**	15	**8.7**	6	**6.3**	25	**7.1**
Astragalus	1	**2.7**	-	**-**	10	**5.8**	5	**5.3**	16	**4.5**
Calcaneum	-	**-**	-	**-**	3	**1.7**	-	**-**	3	**0.9**
Tarsals	1	**2.7**	1	**2.1**	1	**0.6**	2	**2.1**	5	**1.4**
Phalanges	6	**16.2**	14	**29.2**	28	**16.3**	17	**17.9**	65	**18.5**
Vertebrae	1	**2.7**	2	**4.2**	1	**0.6**	-	**-**	4	**1.1**
Total	37		48		172		95		352	

Abbreviations: r= Round Building, g=Grill Building, ch= Channeled building, cp= Cobble-paved Building

Table 3. Skeletal parts used for each age stage based on the sequence of epiphyseal fusion

young	**Stage I**	Scapula: glenoid area
		Pelvis: acetabulum area
	Stage II	Distal Humerus
		Proximal Radius
		Phalanx I
		Phalanx II
	Stage III	Distal Metapodial
		Distal Tibia
		Tuber calcanei
		Proximal Femur
	Stage IV	Proximal Humerus
		Distal Radius
		Distal Ulna
		Proximal Ulna
adult		Distal Femur
		Proximal Tibia

Size of Red Deer

Measurements of red deer remains from Çayönü are compared to a "standard animal" (a modern female from Anatolia: specimen # 1 in the collection of the Istanbul University Prehistory Department Laboratory) using the "difference of logs" or "log size index" method developed by Meadow (1983). The standard measurements (the average of left and right measurements in millimeters) are given in Appendix 1. Measurements of the samples from Çayönü are presented in Appendix 2a-h (the measurements are used in the size indices). Figures 4a-d show the log size index distribution of red deer specimens from Çayönü.

The arrows in the figure show the median points. All of the red deer specimens from Çayönü are larger in their dimensions than the modern Anatolian female red deer used as the standard. There is little change in the dimensions of red deer through the earliest four PPN subphases at the site.

Dimensions of red deer distal humeri (GLT and BT) from Çayönü, from a modern Anatolian female red deer (specimen # 1, Istanbul University Prehistory Department Laboratory Collection), and Mesolithic specimens from Star Carr (Legge and Rowley-Conwy 1988) are plotted in Figure 5. The Star Carr specimens are generally smaller than the Çayönü specimens. Only a specimen from the Channeled Building subphase is smaller than the modern Anatolian female. Measurements of phalanges, not included in the size index analysis, are presented in Appendix 2i. Dimensions of red deer astragali (Bd and GLI) from Çayönü, also not included in the size index analysis, are compared to those from other sites (Fig. 6). A modern Anatolian female red deer (specimen # 3 Istanbul University Prehistory Department Laboratory Collection), Mesolithic red deer from Star Carr (Legge and Rowley-Conwy 1988), modern red deer from Bialowieza and Siebenbürgen, and Neolithic red deer from Burgäschisee-Süd (Jéquier 1963) are plotted in Figure 6. Two specimens, one from the Channeled Building subphase (estimated measurement) and another from the Cobble-paved Building subphase at Çayönü, are smaller than the modern Anatolian female.

Kill-off Patterns

Since red deer teeth are rarely encountered in the faunal assemblage from Çayönü, kill-off patterns are investigated based on the state of epiphyseal fusion of long bones. (see Table 3 for the skeletal parts used for each age stage.) The results show that the majority of animals hunted were adults (Table 4). A somewhat younger kill-off pattern is observed for the Channeled Building subphase. Note that the number of samples in some subphases is very small.

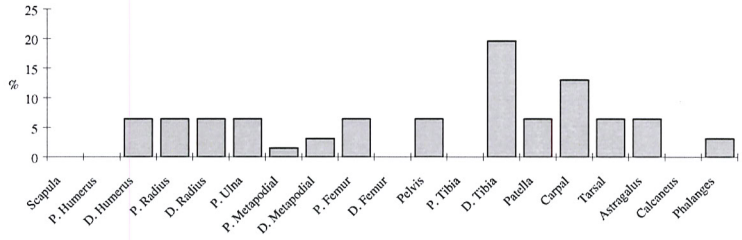

Fig. 3a. Distribution of elements from the Round Building Subphase (corrected by the number of elements in the whole animal; n=23).

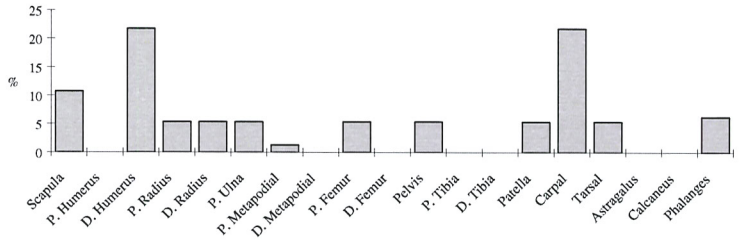

Fig. 3b. Distribution of elements from the Grill Building Subphase (corrected by the number of elements in the whole animal; n=32).

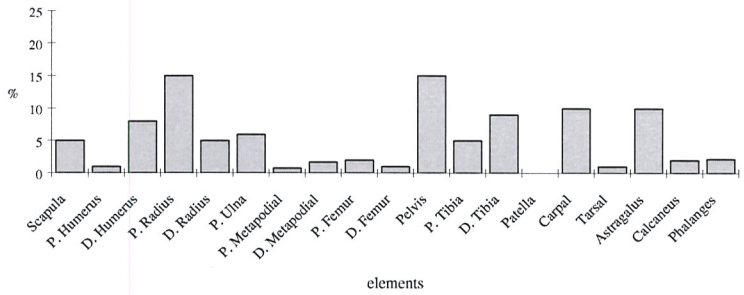

Fig. 3c. Distribution of Element from the Channeled Building Subphase (corrected by the number of elements in the whole animal).

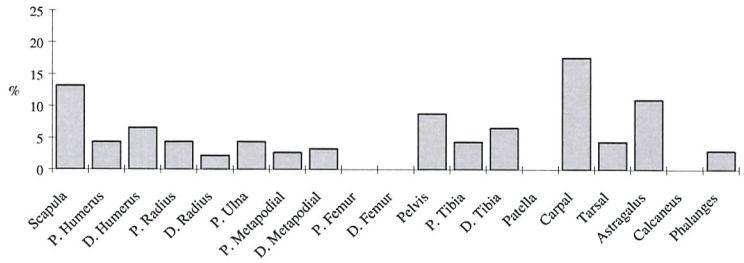

Fig. 3d. Distribution of Element from the Cobble-Paved Building Subphase (corrected by the number of elements in the whole animal; n=68)

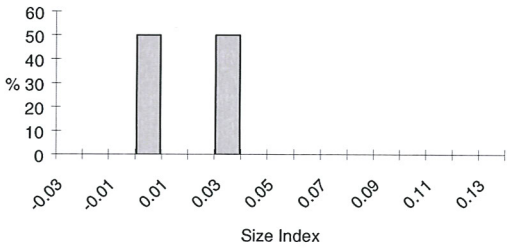

Fig. 4a. Log Size Indices of red deer bones from the Round Building Subphase (n=5)

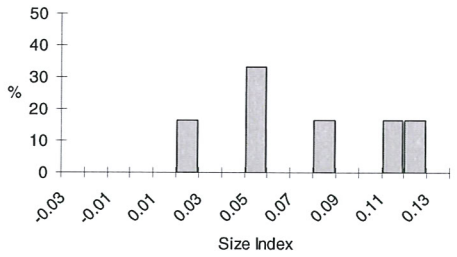

Fig. 4b. Log Size Indices of red deer bones from the Grill Building Subphase (n=6)

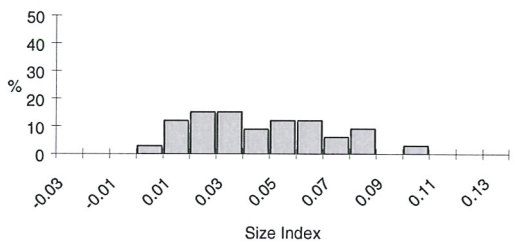

Fig. 4c. Log Size Indices of red deer bones from the Channeled Building Subphase (n=33)

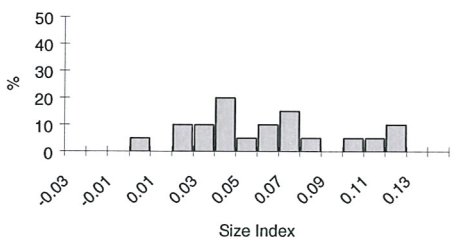

Fig. 4d. Log Size Indices of red deer bones from the Cobble-paved Building Subphase (n=20)

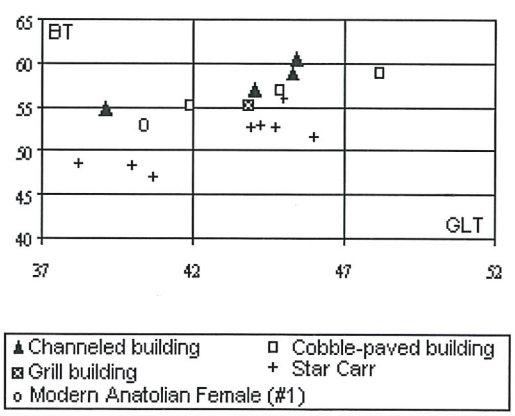

Fig. 5. Dimensions of red deer humeri (GLT – BT).

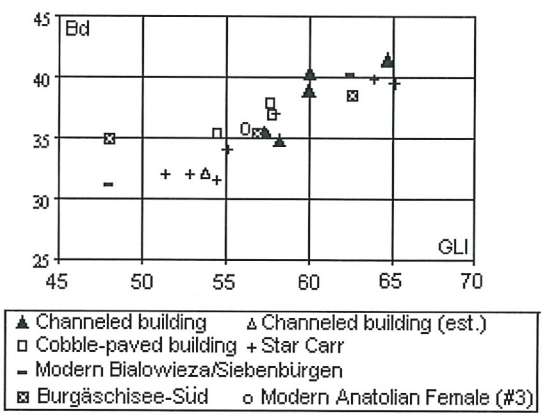

Fig. 6. Dimensions of red deer astragali (Bd – GLl).

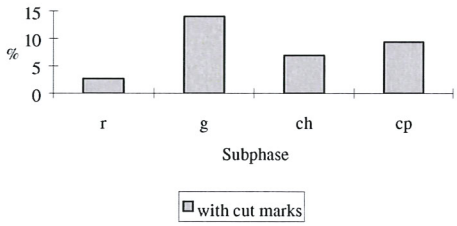

Fig. 7. Proportions of red deer bone with cut marks

For example, there is only one specimen for Stage I and IV for the Round Building subphase, none for Stage III, and only one for Stages I and IV for the Grill Building subphase.

Cut Marks

Traces of cutting, which are rarely observed, exist generally on astragali, metapodials, and carpals (Fig. 7, Plates 1 and 2). Many of the bone tools from Çayönü are made of deer bones and especially metapodials (Efe 1998: 289-303).

Conclusion

Results of the analysis of the Çayönü faunal remains indicate that red deer was an important animal resource for the ancient inhabitants of the site. The contribution of red deer bones increased in the Cobble-paved Building subphase from under 6% to over 16% of the assemblage. There is, however, little change in the kill-off patterns and size of red deer during the four PPN subphases discussed here. The kill-off patterns for red deer suggest that the majority of animals hunted were adults. Most of the red deer bones from Çayönü are larger than the modern female Anatolian red deer used as standard.

Based on the study of pig and cattle remains, animal exploitation patterns at Çayönü started to change during the Channeled Building subphase. Hunting of wild animals continued, however, and interestingly, red deer appears to have been more actively hunted in the Channeled and Cobble-paved Building subphase than it was previously (Fig. 1, and also see Table 4 in Öksüz, this volume). If the changes in cattle exploitation patterns in the Channeled and Cobble-paved subphases (see Öksüz, this volume) indicate the beginning of cattle keeping at the site, the intensification of red deer hunting may be interpreted as a response to the need for a meat supply for immediate consumption.

It is now necessary to analyze material from the Cell and Large Room Building subphases to see whether the patterns of red deer exploitation changed in the later part of the PPN at Çayönü. It will be especially interesting to investigate whether there were any changes in hunting patterns after the beginning of animal domestication at Çayönü.

Table 4. Red Deer epiphyseal fusion patterns by subphase. For abbreviations of subphases see Table 2.

Subphase	**r**	**r**	**r**	**g**	**g**	**g**	**ch**	**ch**	**ch**	**cp**	**cp**	**cp**
stage	N	N fused	**% fused**	N	N fused	**% fused**	N	N fused	**% fused**	N	N fused	**% fused**
I	1	1	**100.0**	1	1	**100.0**	16	13	**81.3**	8	7	**87.5**
II	3	3	**100.0**	9	9	**100.0**	29	29	**100.0**	13	13	**100.0**
III	6	5	**83.3**	0		**--**	16	12	**75.0**	9	9	**100.0**
IV	1	1	**100.0**	1	1	**100.0**	14	10	**71.4**	5	4	**80.0**
Total	11	10		11	11		75	64		35	33	

Acknowledgments

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Appendix 1. Modern Anatolian female red deer measurements (# 1, Istanbul University, Prehistory Department Laboratory Collection, in mm)

Scapula	Definition	GLP	LG	BG	HN	SLC										
	Measurement	55.3	41.0	37.2	36.0	34.4										
Humerus	Definition	Bd	BT	Dd	LT (mid)	GLT	LT (lat)									
	Measurement	55.0	49.9	56.1	30.4	37.1	23.9									
Radius	Definition	Bp	BFp	Dp	Bd	BFd	St*3	St*4	St*5	St*6						
	Measurement	54.8	50.1	30.3	49.3	48.3	18.6	14.5	26.0	23.9						
Ulna	Definition	SDO	DPA	LO	BPC	SLFp	SBO	St*3	St*4							
	Measurement	44.6	49.5	74.2	31.4	25.6	10.7	17.3	33.0							
Metacarpal	Definition	Bp	BFp	DFp	Dp	Bd	BT	BT (m)	BT (l)	Dv (m)	Dv (l)	DT	St*1	St*2	St*3	St*4
	Measurement	41.9	40.9	29.0	29.6	39.8	39.4	18.8	18.0	21.5	19.8	28.0	29.7	26.9	23.0	16.0
Metatarsal	Definition	Bp	Bd	BT	BT (m)	BT (l)	Dv (m)	Dv (l)	Dp	DT						
	Measurement	35.8	38.0	40.5	19.4	18.2	20.4	18.9	38.0	28.7						
Femur	Definition	Bd	Bp	DC	Dd											
	Measurement	68.5	82.2	35.6	92.5											
Tibia	Definition	Bp	Bd	Dd	DFd											
	Measurement	77.2	46.4	37.2	42.0											

Measurement criteria after von den Driesch (1976)
St: Additional measurements defined by Stampfli (1963)
Additional measurement definitions:

Humerus GLT, LT (mid), LT (lat) : greatest length of trochlea (medially) and least length in the middle and laterally.

Ulna SLFp (Smallest length of *facies articularis proximalis*): least length (diameter) of articular surface for humerus
SBO smallest breadth of olecranon

Metapodial: DT (m), DT (l): Depth of distal trochea medially and laterally
BT (m), BT (l): Breadth of distal trochea medially and laterally
Dv (m), Dv (l): depth of verticillus medially and laterally

Appendix 2a-i: The measurements (in mm) of red deer from Çayönü used in the size index analysis
For abbreviations of subphases see Table 2
(e): estimated measurement

Appendix 2a		SCAPULA				
Subphase	**Spec. No**	**SLC**	**BG**	**GLP**	**LG**	**HN**
g	2032	25.1	47.8	63.0	49.2	38.3
ch	2193		43.0	63.4	49.5	38.6
ch	2380		40.6	57.3	39.7	
ch	2204	36.1	45.2	59.5	46.6	38.8
cp	2281		50.0			
cp	2432		49.7			

Appendix 2b		ULNA							
Subphase	**Spec. No**	**BPC**	**DPA**	**SDO**	**LO**	**SBO**	**SLFp**	**St*3**	**St*4**
r	664							17.1	35.2
r	2009	32.0							
ch	2216	33.5	61.0	56.4	88.8	15.0			
ch	2343	29.4					26.4	17.7	33.9
ch	2195	32.1(e)	56.0	49.8	81.0	13.0		19.6	37.3
ch	2201	31.3						19.1	36.7
ch	2188	36.0						18.3	36.2
cp	2230								34.4(e)

Appendic 2c		RADIUS								
Subphase	**Spec. No**	**Bp**	**Dp**	**BFp**	**Bd**	**BFd**	**St*3**	**St*4**	**St*5**	**St*6**
r	2008	57.3	31.0	53.2						
g	137	61.4	32.2	57.6						
g	74				55.5	51.9	22.8	13.5	23.6	32.9
ch	2378		32.4(e)							
ch	2196				58.0	56.8	22.3	13.7	25.1	32.3
ch	2200	59.5	32.6	54.4						
ch	2206				68.0	57.4	24.3	12.5	22.1	25.1
cp	2406				62.2	57.9	27.1	15.6	27.4	36.2(e)
cp	2413	59.8	31.2	55.8						

Appendix 2d		FEMUR			
Subphase	**Spec. No**	**DC**	**Bp**	**Bd**	**Dd**
ch	2220	38.6			
ch	2219	37.1	87.9		
ch	2205			73.1(e)	96.5

Appendix 2e **HUMERUS**

Subphase	Spec. No	Bd	BT	Dd	GLT	LT(mid)	LT(lat)
g	2175	61.1	55.0	64.5	43.8	33.4	
g	2179			73.0	48.5		
ch	2342			63.2	42.4	32.4	
ch	2191	71.9	60.5	67.5	45.4	33.5	29.5
ch	2192	66.3(e)	58.9	66.5	45.3	31.0	27.7
ch	2218	65.0	57.0	63.3	44.0	32.5	28.9
ch	2381		54.8	60.3	39.1	31.7	27.1
cp	2252	68.8	58.8		48.2	32.9	29.1
cp	2428	64.2	56.2	66.9		34.3	29.7(e)
cp	2436	67.6	56.9	64.7	44.9	35.1	31.1
cp	2448		55.1		41.9	32.9	27.2(e)

Appendix 2f **TIBIA**

Subphase	Spec. No	Bp	Bd	Dd	DFd
r	912		52.0	39.5	
r	2012		52.9	39.1	
ch	2226		59.9	42.6	
ch	2349	86.5(e)			
ch	2361		50.3(e)	36.1(e)	
ch	2198		53.5	41.0	
ch	2199		50.2	41.1	
cp	2302		52.8	38.7	
cp	2415		52.8	41.9	39.1
cp	2399		57.1	42.7	39.6

Appendix 2g **METACARPAL**

Subphase	Spec. No	Bp	Dp	DFp	St*1	St*2	St*3	St*4	Bd	DT (m)	DT (l)	DT	BT (m)	BT (l)	Dvm	Dvl
ch	2530								45.0	30.1	29.8	30.1	21.9	20.7	21.8	20.4
ch	2350								49.2	32.2		32.0	24.0	22.9	24.1	
ch	2367								46.8	31.8	31.3	31.7	22.2	20.6	23.8	21.8
ch	2189		33.4	30.0	28.0	27.2										
cp	2265								22.9			31.4				
cp	2431	47.0			30.0	25.5	24.4	19.6				30.4				
cp	2433											28.9				
cp	2437	47.7	33.2		31.2	27.5	25.4	20.0								
cp	2409	41.3	29.8		28.6	25.7	24.4	17.2								

Appendix 2h **METATARSAL**

Subphase	Spec. No	Bp	Dp	Bd	BT	DT	BT (m)	BT (l)	Dv (m)	Dv (l)
ch	2339			48.6						
ch	2346			50.9		31.3	23.6	25.0	23.6	21.2
ch	2369						21.5		22.7	
ch	2371	43.0	42.5							
cp	2322	45.1(e)		52.5						
cp	2237				51.7	33.8	23.5	23.0	24.4	22.5
cp	2408			47.2		31.1	22.0	22.0	21.8	21.3

Appendix 2i **Ph 2 Posterior**

Subphase	Spec. No	Bd	Dd
cp	2238	18.5	25.4
cp	2274	21.2	27.8
cp	2444	21.5	28.3
ch	2338	19.5	27.2

Plate 1. Cut marks on red deer bones from the earliest four levels at Çayönü.
a1 – a2: #2368, astragalus, dorsal and medial view, Channeled Building Subphase; b: #2221, astragalus, dorsal view, Channeled Building Subphase; c: ÇT'86, GHd, 5-73, lumbar vertebra; d: #2220, proximal femur, Channeled Building Subphase; e: ÇT' 86, GT 7-19, distal humerus, medial view; f: #2153, central tarsal, Grill Building Subphase; g: #2336, intermediate carpal, Channeled Building Subphase

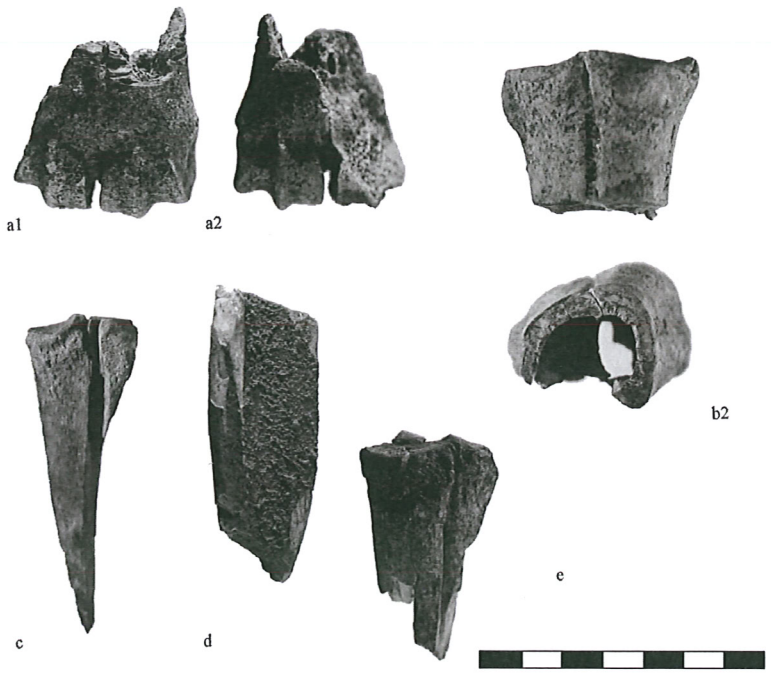

Plate 2. Worked red deer bones from the earliest four levels at Çayönü.
a1 – a2: #2369, distal metatarsal, dorsal and plantar view, Channeled Building Subphase; b1 – b2: #2431, proximal metacarpus, dorsal and distal view, Cobble-paved Building Subphase; c: ÇT' 87, 27 M 7-24, proximal metatarsus, dorsal view; d: ÇT' 86, 20 L, 6-10, metapodial shaft, Channeled Building Subphase; e: ÇT' 86, BS, 1-17, proximal metatarsal, dorsal view, Cobble-paved Building Subphase