Daria Hollenstein – Geraldine Middea

The Faunal Remains from the Square Building Horizon in the Valley West of Sarıkale, Boğazköy-Ḫattuša, Turkey (16th/15th Century BC),

in: A. Schachner – J. Seeher (Hrsg.), Ausgrabungen und Forschungen in der westlichen Oberstadt von Ḫattuša I, 147–225

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BOĞAZKÖY-ḪATTUŠA
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Andreas Schachner | Jürgen Seeher (Hrsg.)

AUSGRABUNGEN UND FORSCHUNGEN IN DER WESTLICHEN OBERSTADT VON ḪATTUŠA I

Andreas Schachner
Ausgrabungen und Untersuchungen an Yenicekale in der südwestlichen Oberstadt von Boğazköy-Ḫattuša (2006–2008)

Daria Hollenstein | Geraldine Middea
The Faunal Remains from the Square Building Horizon in the Valley West of Sarıkale, Boğazköy-Ḫattuša, Turkey (16th/15th Century BC)

Die Oberstadt von Ḫattuša, die seit der zweiten Hälfte des 16. Jhs. v. Chr. die Siedlungsfläche der Stadt nahezu verdoppelt hat, ist durch öffentliche Bauten unterschiedlichster Funktionen geprägt. Neben dem zentralen Tempelviertel wurden große Wasserspeicher, Vorratseinrichtungen und verschiedene repräsentative Bauten untersucht. Um den urbanen Zusammenhang in seiner Gesamtheit zu erfassen, konzentrierten sich zwischen 2002 und 2009 Ausgrabungen, geophysikalische Surveys und architekturhistorische Untersuchungen auf die Talsenke westlich von Sarıkale und die diese umgebenden, bebauten Felsen in der westlichen Oberstadt. In der vorliegenden Publikation werden die Ergebnisse der Untersuchungen an der Felsenanlage von Yenicekale und zu den Tierknochenfunden der ältesten Bauschicht im Tal vor Sarıkale abschließend vorgelegt.

Die Untersuchungen an Yenicekale erschließen eine der am besten erhaltenen Felsanlagen im Stadtgebiet. Sie lassen den Schluß zu, daß es sich wahrscheinlich um ein dem Ahnenkult dienendes Gebäude – möglicherweise ein ^{NA4}*ḫegur* – handelte, das vermutlich zwischen dem späten 16. und dem frühen 13. Jh. v. Chr. genutzt wurde.

Die älteste Bauschicht in der Talsenke westlich von Sarıkale datiert in die zweite Hälfte des 16. Jhs. v. Chr. und ist durch die regelmäßige Architektur der sogenannten Quadrathäuser charakterisiert. Die Analyse der in diesem stratigraphisch eindeutig definierten Bereiche ausgegrabenen Tierknochen erlaubt einen Einblick in die Nutzungsweisen dieser Gebäude aus einem für die hethitische Geschichte wesentlichen Zeitraum.

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DEUTSCHES ARCHÄOLOGISCHES INSTITUT

BOĞAZKÖY-ḪATTUŠA

Ergebnisse der Ausgrabungen 24

Herausgegeben von Andreas Schachner
und Jürgen Seeher

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Vorwort

Mit diesem Band liegt der erste einer Reihe geplanter Abschlußberichte über die Arbeiten in der westlichen Oberstadt von Ḫattuša vor. Um ein Erscheinen der bereits abgeschlossenen Arbeiten nicht zu verzögern, haben wir uns entschlossen, zwei weniger umfangreiche Studien zusammen in einem Band vorzulegen.

Der erste Teil des vorliegenden Bandes umfaßt die Arbeiten von Autoren unterschiedlicher Fachrichtungen, die sich sehr verschiedenen Aspekten der Anlage von Yenicekale widmen. Dieses monumentale Bauwerk, das, obwohl lange bekannt, bisher nicht im Detail untersucht wurde, dominiert aufgrund seiner herausragenden Lage die westliche Hälfte der Oberstadt der hethitischen Hauptstadt ebenso wie Teile des Umlands. Das Gebäude wird durch diese Arbeiten erstmals in einer dem Denkmal angemessenen Art und Weise der Fachwelt zugänglich gemacht.

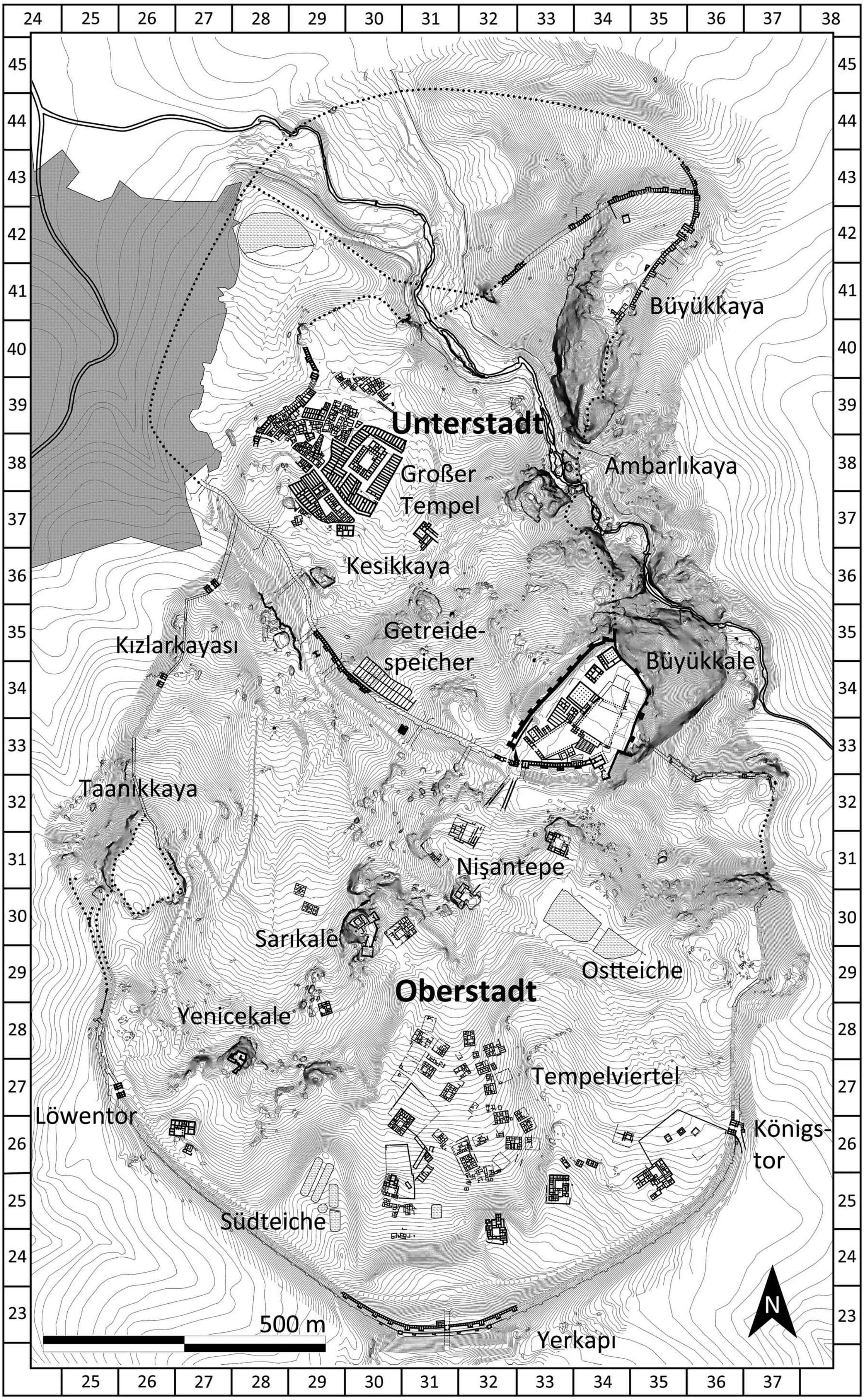
Neben herkömmlichen archäologischen Methoden der Ausgrabung und Baudokumentation erbrachte vor allem die interdisziplinäre Zusammenarbeit mit Geologen der Middle East Technical University in Ankara und der Universität Bern weiterführende Einblicke in die Arbeitsabläufe zur Errichtung der Anlage. Denn durch die Anwendung modernster geologischer und mineralogischer Analysen gelingt es unseres Wissens nach erstmals, den Weg eines Steins vom Steinbruch bis zum fertigen Gebäude am Bespiel eines spätbronzezeitlichen Bauwerks nachzuzeichnen.

Die Entstehung des zweiten Teils des vorliegenden Bandes geht auf die fruchtbare Kooperation zwischen der Boğazköy-Grabung des Deutschen Archäologischen Instituts und dem Institute for Prehistory and Archaeological Sciences an der Universität Basel zurück. Die jeweiligen Masterarbeiten der Autorinnen zu den Tierknochenfunden aus der ältesten Bauschicht im Tal vor Sarıkale bilden die Grundlage des zweiten Teils des vorliegenden Bandes. Besonderer Dank gebührt dem DAI, vertreten durch seine Präsidentin Frau Friederike Fless, die die Vorbereitung der Arbeiten zur Drucklegung durch Stipendien ermöglicht hat.

Diese Studie zu den Tierknochen aus dem Tal westlich vor Sarıkale setzt die Tradition der naturwissenschaftlichen Arbeiten in Boğazköy fort. Sie ist Teil einer Reihe von Arbeiten zur Nutzung der Haus- und Wildtiere in der hethitischen Stadt. Erstmals konzentrieren sich die Überlegungen auf einen gut stratifizierten und datierten Befund aus dem 16. Jahrhundert v. Chr., so daß auch wesentliche funktionale Schlußfolgerungen möglich werden. Obwohl die Ergebnisse nur einen Ausschnitt der hethitischen Geschichte erhellen, vermitteln sie einen Eindruck von der Nutzung der Tiere als wichtigem wirtschaftlichem Faktor in einer Zeit wesentlichen Wandels und Veränderungen im hethitischen Staatswesen. Sollte sich die Interpretation der Befunde des Quadratgebäudehorizonts im Verbund mit dem südlich gelegenen Haus des GAL.MEŠEDI durch weitere Forschungen bestätigen, werden durch die vorliegenden Arbeit erstmals Einblicke in die Versorgung militärischer Einheiten in hethitischer Zeit möglich.

Unser Dank gilt dem Ministerium für Kultur und Tourismus der Republik Türkei für das Vertrauen in die Arbeit des Deutschen Archäologischen Instituts, ebenso wie den Autoren für ihre Beiträge und allen an den Arbeiten Beteiligten für ihr Engagement während der nicht immer einfachen Arbeiten im Gelände. Unser Dank gilt des Weiteren Claudia Beier (Redaktion der Zentrale des DAI) für ihre umsichtige und geduldige Betreuung des Manuskripts. Die Manuskripte wurden im Frühjahr 2012 bzw. im Herbst 2013 abgeschlossen.

Istanbul, November 2013
Andreas Schachner – Jürgen Seeher



1 Gesamtplan von Ḫattuša (Stand der Arbeiten 2009)

2 The Faunal Remains from the Square Building Horizon in the Valley West of Sarıkale, Boğazköy-Ḫattuša, Turkey (16th/15th Century BC)

Daria Hollenstein, Geraldine Middea

mit einem Beitrag von *Jürgen Seeher*

Der Quadratgebäude-Horizont im Tal westlich von Sarıkale

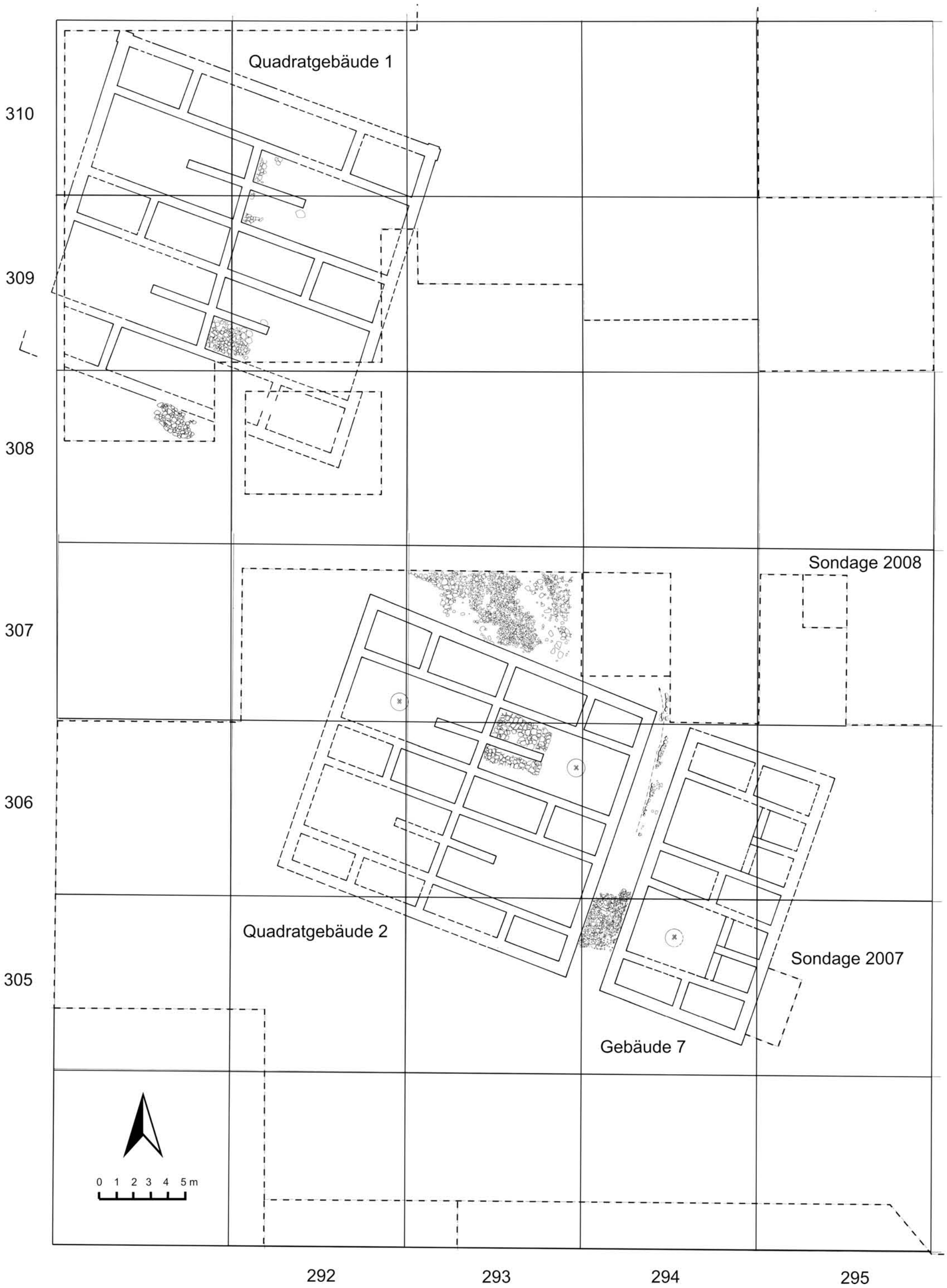
Jürgen Seeher

Im Jahr 2001 wurde in Boğazköy-Ḫattuša mit einem neuen Grabungsprogramm in der westlichen Oberstadt begonnen (Abb. 1). Ziel war es, erstmals Daten über die Nutzung dieses Bereiches zu erlangen und damit neue Aufschlüsse für die Funktion der Oberstadt zu bekommen. Nach den Untersuchungen in der zentralen und östlichen Oberstadt in den Jahren 1979 bis 1993 war der Eindruck entstanden, dass dieser Stadtteil vielleicht nur für kultische und sonstige offizielle Zwecke genutzt worden sei, weil hier fast ausschließlich Tempelgebäude freigelegt worden waren. Zudem stand die Datierung dieses Stadtteils zur Debatte: Grabungen im Bereich der Südteiche hatten hier Aktivitäten bereits im 15. Jh. v. Chr. nachgewiesen hatten und mehrten damit die Zweifel an der ursprünglichen Datierung der Oberstadt ins 13. Jh. v. Chr.

Die neue Grabung im Tal westlich von Sarıkale lieferte dann schnell eine Schichtabfolge, mit der Siedlungsaktivitäten bis in das 16. Jh. v. Chr. zurückverfolgt werden konnten (Seeher 2006b, 176–178; Schachner 2009b). Außerdem wurden zunächst als Streufunde und später dann in Sondagen in Schwemmschichten unter dem ältesten Siedlungshorizont althethitische und karumzeitliche Scherben und Kleinfunde geborgen. Auch wenn dies keine in situ-Funde waren, so belegen sie doch eine erste Nutzung von Bereichen der Oberstadt bereits in vorhethitischer Zeit (Seeher 2004, 72; Schachner 2008, 121–123; Schachner 2009a, 28–30).

Diese Schwemmschichten stellen vermutlich einen Hiatus in der Besiedlungsgeschichte dieses Stadtteils dar. Sie sind das Ergebnis von Erosions- und Sedimentationsvorgängen, die in diesem Bereich besonders häufig waren: Das Tal westlich von Sarıkale ist außer im Norden umgeben von steilen Hängen, von denen das abfließende Niederschlagswasser immer wieder Erdschichten abschwemmte. Im flacheren Gelände am Grund des Tals wurden diese dann als Sedimente wieder abgelagert. Heftige Niederschläge führten aber auch immer wieder zur Entstehung von Erosionsrinnen, die sich auch durch die Siedlungsschichten gefressen und zum Teil erhebliche Störungen an den Befunden erzeugt haben.

Der auf diesen Schwemmschichten gelegene älteste bislang identifizierte Siedlungshorizont im Tal westlich von Sarıkale gehört in die Zeit des späten 16. Jh. bzw. um 1500 v. Chr. Er wurde nach zwei hier freigelegten auffälligen Bauwerken, zu denen später noch ein verwandtes Gebäude hinzukam, Quadratgebäude-Horizont genannt (Abb. 2) (Seeher 2004; 2005; 2006b; Schachner 2008; 2009a).



2 Plan der Bauten des Quadratgebäude-Horizonts

Sie wurden mit Lehmziegelmauern auf einfachen, meist nur 0,5–0,6 m breiten Sockelmauern aus Bruchsteinen errichtet und waren wohl wie alle hethitischen Gebäude mit Flachdächern versehen (Abb. 3–7).

Ihre Ausrichtung nach NNO entspricht nicht dem heutigen, direkt nach N gerichteten Geländeabfall an dieser Stelle. Sie sind parallel zu der auf der Ostseite des Tals senkrecht aufragenden Felsfront von Sarıkale errichtet worden, aber es erscheint durchaus möglich, dass das Gefälle im Tal ursprünglich auch diese Ausrichtung hatte und erst durch die jahrtausendelang einwirkende Erosion verändert worden ist. Jedenfalls sind auch alle später hier entstandenen Bauwerke in diese Richtung orientiert.

3 Fundamentmauern von Quadratgebäude 1, von Südwesten

4 Fundamentmauern des mittleren Teils von Quadratgebäude 1, von Westen

5 Mauern von Quadratgebäude 2, von Osten. Mit a–c sind Feuerstellen bzw. Aschegruben markiert. Oben Mitte und links Mauern von jüngeren Bauwerken

Das Quadratgebäude 1 maß etwa 19 × 19 m. Das knapp 7 m südlich davon gelegene Quadratgebäude 2 war mit 17,8 × 16,2 m etwas kleiner (Abb. 2–6). Auf dessen Ostseite lag, gleich ausgerichtet und nur durch einen 2 m breiten und teilweise gepflasterten Weg getrennt, das Gebäude 7 (Abb. 2. 7). Es war ebenso lang wie Quadratgebäude 2, aber mit 8,9 m nur halb so breit. Diese Ähnlichkeiten in den Ausmaßen finden ihre Entsprechung in der gleichartigen Innenaufteilung dieser drei Bauwerke, bei der identische Module zu erkennen sind (Abb. 2): Quadratgebäude 1 und 2 bestanden aus jeweils vier und Gebäude 7 aus zwei Modulen, deren zentrales Element jeweils ein großer, auf einer Seite durch eine Mauer unterteilter Raum war. Im nicht unterteilten Bereich dieser Räume wurden mehrfach zentral gelegene Herdstellen festgestellt – vermutlich waren sie ursprünglich überall vorhanden (Abb. 5; die Herdstellen sind mit a–c gekennzeichnet). Rechts und links dieses großen Raumes lagen jeweils zwei quer zur Richtung des Gebäudes angeordnete kleinere Räume (bei dem stärker durch Erosion in Mitleidenschaft gezogenen Quadratgebäude 1 gab es bei den äußeren Raumreihen in der Mitte keine Steinfundamente für die Unterteilungsmauern – hier waren Lehmziegelmauern vermutlich direkt auf den Erdboden gesetzt).

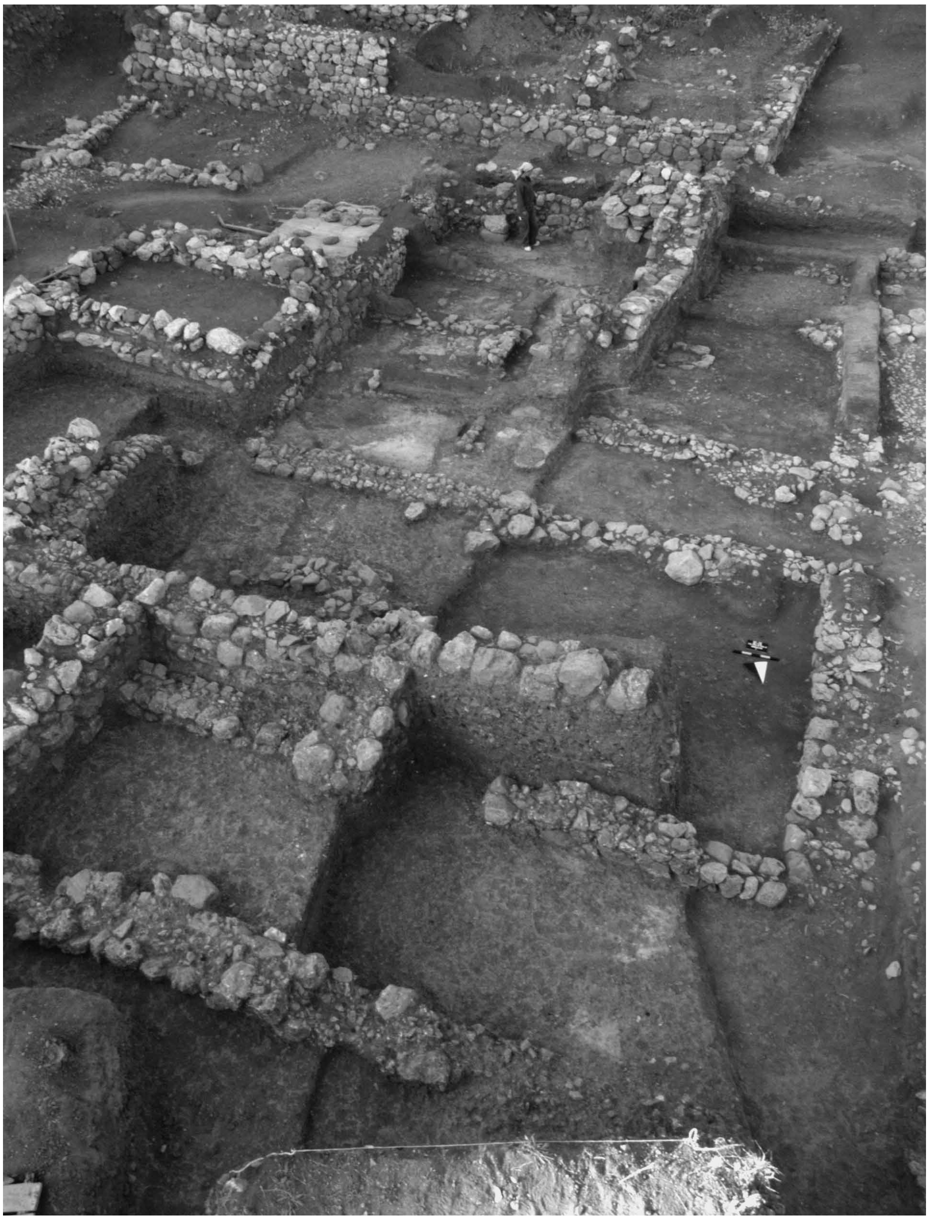
Für diese Art von Architektur sind bisher weder aus Ḫattuša noch aus einer anderen hethitischen Siedlung Parallelen bekannt. In situ-Befunde, die für die Interpretation dieser streng symmetrischen Grundrisse hilfreich sein könnten, fehlen. Die Kombination von zwei bzw. vier gleichartigen mit jeweils einer Herdstelle ausgestatteten Baumodulen unter einem Dach spricht jedenfalls gegen eine Interpretation als normale Wohnarchitektur. Eine derart standardisierte Bauweise entspricht nicht den Bedürfnissen in einem von einer Familie bevölkerten Wohnhaus. Statt dessen scheinen diese präzise geplanten und ausgeführten Bauten einem bestimmten Zweck angepasst zu sein, bei dem jedes Raummodul in gleicher Weise genutzt werden kann. Zu denken wäre an Werkstätten, aber die Grabung hat keine entsprechenden Hinweise wie Werkplätze, Rohmateriallager, Halb- und Fertigprodukte etc. gebracht. Eine Funktion im kultischen Bereich ist wohl ebenfalls auszuschließen angesichts der vielen Vergleichsbeispiele von Kultbauten in Ḫattuša, die keine Ähnlichkeiten erkennen lassen.

6 Mauern von Quadratgebäude 2, von Nordosten. Die Steinmauern im Vordergrund gehören zum Neubauhorizont dieses Bauwerks

Eine mögliche Funktion für diese Bauwerke ist die vorübergehende Unterbringung von bestimmten Menschengruppen. Jedes Modul stünde so als Unterkunft für eine Gruppe zur Verfügung. Denkbar wären Unterkünfte für Pilger, wie sie Wulf Schirmer für die standardisierten Reihen von Bauten in der ins 8. Jh. v. Chr. zu datierenden Ansiedlung auf dem Göllüdağ in Kappadokien in Erwägung zieht (Schirmer 1993, 131). Allerdings geben die in den Bauten des Quadratgebäude-Horizonts gefundenen Objekte keinerlei Hinweise auf kultische Handlungen bzw. Ausrüstung für kultische Zwecke.

Eine andere Art der Unterbringung von Menschengruppen ist die Kasernierung von Soldaten bzw. Wachtruppen, und für diese Möglichkeit scheinen die Waffenfunde aus den Bauwerken des Quadratgebäude-Horizonts die besten Argumente zu liefern: In Quadratgebäude 1 fanden sich fünf Pfeil- oder Speerspitzen, ein Messer und ein Dolch (Seeher 2004, 64 f.), in Quadratgebäude 2 sechs Pfeil- oder Sperspitzen, ein Ärmchenbeil und ein kleines Messer (Seeher 2005, 68; Seeher 2006b, 173) und im Schutt von Gebäude 7 ein weiteres Ärmchenbeil (Schachner 2009a, 28). Die Vielzahl der Waffenfunde aus Bronze verwundert angesichts des Fehlens sonstiger Objekte, die für ein fluchtartiges Verlassen oder eine gewaltsame Zerstörung der Bauten sprechen. Eine mögliche Erklärung wäre, dass die Bewohner der Häuser genug derartige Objekte besaßen und bei ihrem Weggang nicht allzu lange nach jedem verlorenen Stück suchten.

Es gibt überdies noch weitere Argumente für die Annahme, dass in diesen Bauten keine normalen Einwohner von Ḫattuša lebten: Exotische Objekte wie ›unhethitische‹ handgemachte Keramik (Seeher 2010, 223), Schalen von Austern und Nadelschnecken aus dem Schwarzen Meer oder dem Mittelmeer oder auch der kleine Löwe, dessen Knochen in diesem Band besprochen werden, würden als Mitbringsel in einer Unterkunft von weitgereisten Soldaten nicht fehl am Platze erscheinen. Daher ist die Interpretation, dass diese Bauten auf Geheiß eines Herrschers oder Befehlshabers und nach einem vorgegebenen Schema für die Unterbringung einer Militär– oder Gardetruppe errichtet wurden, derzeit am wahrscheinlichsten. Die einzelnen Module der Gebäude des Quadratgebäude-Horizonts dienten jeweils als Wohn– und Schlafplatz von Mannschaftsgruppen, für die auch jeweils eine Feuer-



7 Das Gebäude 7, östlich anschließend an das Quadratgebäude 2, von Norden (2008)

stelle für die Zubereitung der Verpflegung zur Verfügung stand. Die kleineren Räume konnten für Schlafplätze und Lagerung von Ausrüstung genutzt werden. Diese Anordnung erinnert an das *contubernium*, die kleinste organisatorische Einheit der römischen Armee, bei der jeweils acht Soldaten eine Haushalts– und Kampfgemeinschaft bildeten. Im Idealfall standen in den römischen Kasernen und Lagern für ein *contubernium* jeweils zwei quadratische Räume von zusammen 4 × 8 m Größe zur Verfügung – ein Schlafraum und ein Raum für die Zubereitung und Einnahme von Mahlzeiten sowie Lagerung der Ausrüstung. Diese Einheit war etwa halb so groß wie ein Modul der Gebäude im Quadratgebäude-Horizont.

Die Interpretation dieser Bauten im Tal westlich von Sarıkale als Unterkünfte für eine Truppe wird indirekt noch unterstützt durch die Identifikation eines etwa 120 m südlich gelegenen größeren Bauwerks, das durch einen Textfund als Residenz des Kommandeurs der MEŠEDI-Garde zu identifizieren zu sein scheint und darüber hinaus gewisse planerische Ähnlichkeiten mit den Modulen der Bauten des Quadratgebäude-Horizonts aufweist (Schachner 2010, 162 f.). Zwar stammen die datierbaren Funde aus dem 15. Jh. v. Chr., aber das Baudatum könnte früher liegen. Ist dies nicht der Fall, so könnte es dennoch sein, dass es einen Vorgängerbau in der Nähe gab. So könnten tatsächlich die Bauten des Qua-

8 Darstellung der Grundrisse des Quadratgebäude-Horizonts im Tal westlich von Sarıkale (2011). Das Gebäude rechts in der Mitte gehört zu einer jüngeren Bauschicht, ebenso die Terrassierungen im Osten, am unteren Bildrand (Norden ist rechts)

dratgebäude-Horizonts und diese Residenz eine funktionale Einheit gebildet haben.

Spekulationen, wie viele Personen pro Raummodul in diesen Gebäuden untergebracht werden konnten, sind problematisch und sollen hier nicht angestellt werden. Ebenso ist unklar, wie viele weitere derartige Gebäude es im Tal westlich von Sarıkale gegeben hat, denn die Ausgrabung hat ja nur einen Ausschnitt dieser Siedlungsschicht freigelegt (Abb. 8). Aber man kann durchaus damit rechnen, dass hier in einem unbebauten Gelände im Rahmen eines größeren Bauprogramms weitere gleichartige Komplexe existierten.

Material and Methods[1]

Daria Hollenstein, Geraldine Middea

Collecting the Material

The faunal remains of the present assemblage were recovered in the Valley west of Sarıkale from contexts within Square Building 1 (SB1), Square Building 2 (SB2) and Building 7 (B7) during excavation work in the years 2002–2005, under the direction of Jürgen Seeher (Abb. 1–8) (Seeher 2004; 2005; 2006b) and 2006–2008 under the direction of Andreas Schachner (Schachner 2008; 2009a), respectively. The majority of the sample dates to the end of the 16th century, but a smaller proportion dates to the first part of the 15th century B.C. (»Neubauphase«), and some remains were recovered from contexts that could not categorically be attributed to either of these periods. The present study comprises 6705 bone fragments and 3 coprolites collected by the authors during the 2010 campaign. 5 additional human fragments were also found among the zoological material but, already identified during the washing process, were left on site. Bones were washed and left to dry in the sun due to time and space pressure which potentially led to further fractioning of the bones through packing and transport (see Hesse – Wapnish 1985, 62). This is discussed in more detail in the chapter on taphonomy (see p. 156–158).

Identification of Species

The Basel Institute for Prehistory and Archaeological Science (IPAS) archaeozoological collection was used as a base for the morphological identification of the faunal assemblage. Since the collection of the institute mainly contains central and western European Holocene specimens, some of the more difficult to determine fragments were taken to the Museum of Natural History in Basel. There, some western Asian specimens could be studied in order to identify unknown specimens and control for other non-European species which may be mistaken for domesticated sheep or goats (e. g. gazelle or Anatolian deer species).

Species differentiation of sheep and goat bones followed the criteria by Boessneck, Müller and Teichert (1964), and the abridged version published by Boessneck (1970), as well as the criteria set out by Prummel and Frisch (1986). It also took account of the recent article by Zeder and Lapham (2010), who revised various criteria for species differentiation, as defined by the abovementioned authors, among others. The advice by Zeder and Lapham (2010) was followed to first comprehend the criteria in the reference collection, prior to applying them to the sample. Thus, if a skeletal element could not be differentiated in the reference collection, no attempt was made to do so in the sample. The sheep in the sample displayed rather goat-like traits. They had most in common with the individuals of feral *Ovis musimon* in the IPAS reference collection. Therefore, only specimens displaying more goat-like criteria than *Ovis musimon* were attributed to the goats. However, a definite attribution was not always possible. In those cases a preliminary status of either »Ovis?« or »Capra?« was assigned.

Determining Age

In the case of the long bones; the fusion stage of the *epiphysis* was considered first and coded as open, closed or fusing. A chronological age was assigned according to a scheme developed at the Institute for Prehistory and Ar-

1 The authors would like to thank Andreas Schachner and Jürgen Seeher from the DAI in Istanbul and Jörg Schibler from the Institute of Prehistory and Archaeological Science (IPAS) in Basel, Switzerland, whose joint collaboration enabled this project to exist. We would also like to thank the team in Boğazkoy for their help and support during our stay in 2010 and more particularly Ulf Schoop and Y. Yılmaz (Konya Museum), who as the representative of the Turkish Ministry of Culture and Tourism supported our work during the campaign. We are also thankful to the Çorum Museum and especially its director, Önder İpek, for allowing us to transport the archaeozoological material to the Institute for Prehistory and Archaeological Science in Basel.
The identification process would not have been possible without the help of the zooarchaeological team at the IPAS, in particular Barbara Stopp and Sabine Deschler-Erb whose help and patience were extremely precious. We are also grateful for the many pointers and suggestions from Francesca Ginella, Elisabeth Marti-Grädel and Marguerita Schäfer, to Heidemarie Hüster-Plogmann for her help in identifying small animals and to Ruth Zillhart for her technical support. We also thank Loïc Costeur from the Basel Natural History Museum for providing access to their reference collection.
Finally, we want to thank Ben and Philipp from the IPAS for their ears and coffee machine, and Brendan for the proof reading.

chaeological Sciences (IPAS 2007a). If the *epiphyses* were either absent or early fusing, the general aspect of the bone surface was recorded, where a porous surface is generally a sign for youth. These could only produce very broad age categories such as adult, sub-adult or infantile.

In the case of the mandibles, the IPAS (2007a) standard tooth eruption and wear patterns were used. These are based on a variety of previous literature (including Payne 1973; Habermehl 1975; Horard-Herbin 1997; Becker – Johannson 1981; Ducos 1968). Individual teeth were not given an age, unless deciduous.

Determining Sex Morphologically

For the determination of sex on the *pelvis*, only ovicaprids were considered as the low number of *pelvises* and their fragmentation for other species was such that no identification could be attempted. The determination was based on the criteria described by Boessneck (1970, 8–12). Because of fragmentation, only very few fragments could be attributed both a sex and a species (sheep or goat). Ovicaprid horn cores were left out of the equation for various reasons. Firstly, there is the possibility that female sheep may be hornless which would result in a bias towards males. In the case of goat, the opposite would be true as female horns tend to preserve better (Uerpmann 1973). Also, the amount of horn cores and their preservation was too low to attempt sex identification with any confidence. Sex attribution was also made in clear cases such as pig canines which are sexually very dimorphic. For all ovicaprids, an attempt was made to determine sex metrically as well as morphologically. This is discussed in more detail (see below p. 168).

Measurements

Measurements were taken where possible on fused and fusing elements according to von den Driesch (1976). Measurements of fusing elements in sheep and goat were also taken, so as to broaden the basis for metrical differentiation of males and females. As sheep and particularly goats display a considerable degree of sexual size dimorphism (SSD), sexing of elements in a not yet fully fused state has proved potentially possible (Zeder 2001).

OSSOBOOK Database

All data entries were recorded using OSSOBOOK, a software developed at the Institute for Prehistory and Archaeological Science in Basel in the early 90s (Schibler 1998). The idea behind the program is to unify the coding systems used by zooarchaeologists to enter data, and render comparison between raw data more simple. For each fragment, the following was recorded:

Context number, weight, species, skeletal part, age, sex, preservation (gnaw marks, root etching, patina, surface preservation, fragmentation, fracture types and calcification), anthropological modification (cut marks, chop marks, burn marks) and any pathology. A field for commentaries could also be used.

Bone Preservation and Taphonomic Processes

In this chapter the visible traces of various taphonomic processes on the present bone assemblage will be quantified and discussed. The basic idea about recording traces of taphonomic processes is to disentangle processes which are historically relevant from those which may obscure historical interpretation. The attempt to disentangle these processes is made in order to avoid misinterpretations of the results that are discussed in later chapters. It may be expected that most taphonomic factors, those acting mechanically as well as those acting chemically, are likely to exacerbate density-mediated differential preservation that favours the survival of fully-grown and dense bone, over juvenile and less dense bone (Marean 1991, 678; Marean – Spencer 1991; Munson 2000). Therefore, evidence of poor bone preservation may indicate of an exacerbated loss of spongy, fragile and juvenile bone. On the other hand by systematically recording and quantifying those traces on the bones, the differential preservation of several assemblages can be estimated to avoid erroneous conclusions drawn on evidence that will be discussed in coming chapters (Marean 1991). The faunal assemblages of the three buildings will therefore be compared to each other in order to rule out major differences with respect to the bone preservation pattern. It will be argued that comparing and pooling the data from all three buildings for further analysis is not problematic with respect to differential effects of taphonomic factors on each of the assemblages.

General Preservation Pattern: Surface Preservation

First, the bone assemblages from the three buildings are compared to each other with respect to their bone/tooth surface preservation. The bone surface preservation results from various factors and provides a first indication of differential preservation between different assemblages. Surface preservation potentially results from taphonomic factors, including the length of exposure before embedding and the soil chemical environment (e. g. Lyman 2008, 267–274). Furthermore, those may as well include the conditions affecting the bone preservation during retrieval, cleaning and storage. In short, surface preservation is an indicator of both mechanic and chemical processes.

A look at the present assemblages reveals a pronounced difference between the surface preservation of the faunal remains from SB1, where very few fragments (0.8 %) were strongly affected by surface altering processes and the faunal remains from SB2 and B7, where this was the case more often, with 10.8 % and 4.8 % of the fragments respectively displaying poor surface preservation (tab. 1). Categorizing the state of surface preservation may involve a considerable amount of personal judgement and thus the result might partly be due to inter-observer differences. However, the assemblages retrieved from SB2 and B7 were categorized by one person – and those as well – display a discrepancy with respect to surface preservation. Therefore, it is concluded that taphonomic factors altering the surface were relatively less pronounced on the faunal remains from B7 than on those from SB2. This might be explained by the fact that most of the material from B7 originates from floor contexts, whereas this was the case for only a minority of the material from SB2. For floor contexts a much faster embedding is expected and therefore the remains should be exposed to weathering for a shorter time period. Another likely cause for the resulting difference are alterations, tentatively identified as manganese precipitations, and discussed further below in more detail, as they were more often observed among the remains from SB2 than among those from B7. The differences between material from SB2/B7 and material from SB1, which was recorded by a different person, are more likely explained by inter-observer differences. In any case, with only 5.5 % of the fragments from the Valley west of Sarıkale displaying a poorly preserved surface, the overall surface preservation is fairly good to very good. This is in accordance with the numbers received for other less general features, such as root etching, discolouring, animal gnawing and traces of burning, which were observed and recorded consistently among all three assemblages, and which are as well likely to play a part in overall surface preservation (tab. 1).

Pre-Depositional Processes

Pre-depositional factors mainly reflect the biography of the single animal before the deposition of its remains, or in other words the historically relevant. In order to gain insight into past butchery and discarding practices, the

9 *Femur* (*C. hircus*) displaying evidence of roasting. sc. 1 : 1

skeletal parts distribution, cut and hack marks or burn marks are studied. The focus of this chapter is on bone preservation, so there is only a brief mention of bone carbonization and other traces of fire as well as the presence of animal gnawing on the assemblage here.

The proportions of fragments that are either carbonized or calcified were minimal (0.8 %) in all three complexes (tab. 1). There was no particular variation across the contexts. Additionally, single specimens display discrete marks of roasting (fig. 9). Fragments that appeared to have past the digestive tract were minimal throughout all contexts.

Traces of animal gnawing, almost exclusively from carnivores, were observed on 7.4 % of the faunal remains from the Valley west of Sarıkale. In four cases only, rodent gnawing was positively identified. Traces of carnivore gnawing were slightly more prevalent on fragments from SB2 (11.4 %) than either B7 or SB1. Experiments indicate that carnivore gnawing leads to a disproportional loss of axial elements, such as *vertebrae*, ribs and *pelvises* (Marean – Spencer 1991). This will be relevant when interpreting skeletal part distribution. Equally, age at death data from mandibles and long bone epiphyseal fusion is likely to be affected by animal gnawing, which was observed frequently on long bone *epiphyses* within the present assemblage. The results from the study by Munson (2000) suggest that this likely has disproportionally adverse effects on the preservation of infantile and juvenile bone: Therefore young animals are likely to be underrepresented in this assemblage.

Depositional Environment

Apart from the overall surface preservation, traces of root etching, discolouring and patina were recorded in order to estimate the conditions of the depositional environment.

Root etching, with 3.9 % of the fragments being affected, is present although not frequent.

A distinct black to grey discolouring or precipitation of unknown origin, sometimes appearing to intersperse the entire bone structure, was observed frequently over all of the assemblage. The bone surface and structure were found to be altered in some cases to a degree that these features could not be considered for age at death estimation. As a result, the only ageing criteria consistently recorded throughout the entire assemblage is the state of epiphyseal fusion. As inferred from less strongly affected bones this could be the result of manganese precipitation, which was probably caused by fluctuations in the water table (see e. g. Duchaufour 1994, 296): In years with high precipitation the water table rises almost to the modern ground level in the Valley west of Sarıkale (Seeher 2006b; Schachner 2008), which leads to intermittent water logging. Other indicators for water-logging, however, like the more typical dark brown discolouring was observed rarely on the bones (tab. 1) and was not well-expressed if present. Dark brown discolouring basically occurred concentrated within a single context from SB2. It may be concluded that water logging, although not a permanent condition, consisted for extended periods. Further, some of the bones display a shiny surface, of which the cause remains obscure. Any other discolouring or patina, such as a green patina that results from the association with copper items in the embedding environment, was rarely observed in the present assemblage (tab. 1).

Retrieval, Storage, Transport

Processes comprising the retrieval, storage and transport of the animal bones are likely to lead to further fragmentation (Hesse – Wapnish 1985, 62–65). An overall proportion of 33.2 % of the fragments display mainly fresh break faces (tab. 3). Fragmentation might differentially affect bones of different species, thus potentially distorting the Number of Identified Specimens (NISP) (Bartosiewizc 1998, 228). An assessment of the distortion will be approached by comparing the ratio of fragments (n) identified as small ruminants to fragments identified as large ruminants and equids among complete bones and fragments with mostly old fracture faces to the respective ratio among fragments with predominantly fresh fracture faces (tab. 2). As seen in tab. 2 and 3 the distortion is either minor, or does not occur at all. In the case of the remains from SB2 the bias is towards a slight overestimation of the proportion of large ruminants after additional fragmentation, whereas in B7 there is a minor distortion towards additional fragments of small ruminants. However, the numbers are overall very consistent. Additional recent fragmentation therefore, is unlikely to have had a major influence on the relative proportions of the different taxa.

Identification

Of the retrieved fragments, 54 % could be identified to either the level of genus or the category of »sheep or goat« (*Ovis aries*/*Capra hircus*) (tab. 4). When the category »small ruminants« is included[2], the proportion of identified fragments rises to 67 %. The respective proportions, with respect to fragment weight are 85 % for the level of genus plus the category of »sheep or goat« and 90 % when small ruminants are included. The increase in the percentage of identified specimen when shifting from fragment counts to weight is due to the average weight of indeterminable fragments, which lies at 1.6 g, whereas the overall average fragment weight is 5.8 g and average weight of identified specimen is 7.8 g.

To check whether the proportion of indeterminate fragments are likely to change the picture of taxa frequencies, the ratio of small ruminants (comprising the taxa small ruminant, *Ovis aries*; *Ovis aries*?; *Capra hircus*; *Capra hircus*?; *Ovis aries*/*Capra hircus*) to large ruminants (comprising the taxa large ruminant *Bos taurus*, *Cervus elaphus*) and equids (*Equus asinus, Equus* species) is compared to the ratio of indeterminate fragments of small ruminant sized animals to large ruminant sized animals (tab. 5). As the large ruminant sized animals likely include indeterminate fragments of equids as well, identified equids were included in the group of the identifiable fragments. As seen from tab. 5 the proportion of indeterminate fragments still assigned to a size group is not expected to largely distort the pattern of taxa frequencies based on NISP.

In conclusion, the three assemblages display similar levels of bone and tooth preservation with broadly similar proportions of fragments being affected by the single agents as recorded in tab. 1. The overall preservation seems to be good, with only minor impacts of various surface altering features. The crystalline precipitation tentatively identified as manganese precipitation is one exception. Although the prevalence of the precipitation was not quantified consistently throughout the assemblage, it can roughly be estimated to occur on 10–20 % of the remains. This precipitation or patina hampered the attempt to use bone surface and structure for aging specimen. Consequently the state of fusion was the only criteria consistently recorded throughout all the assemblage. Carnivore gnawing was frequently found on long bone *epiphyses* from all three buildings. This is likely to exacerbate the survival and identification of unfused long bones (Marean 1991). Therefore, when considering age at death data, they might be underestimated even more strongly than what could be expected from purely density-mediated differential preservation alone. Additional recent fragmentation (tab. 3), although observed frequently, should not cause major problems when looking at taxa frequencies based on NISP (tab. 2), nor should the proportions of indeterminate fragments hold surprises concerning the faunal composition.

2 Small ruminants are expected to contain almost exclusively sheep and goats.

Species Overview

Previous Zooarchaeological Studies in and around Ḫattuša

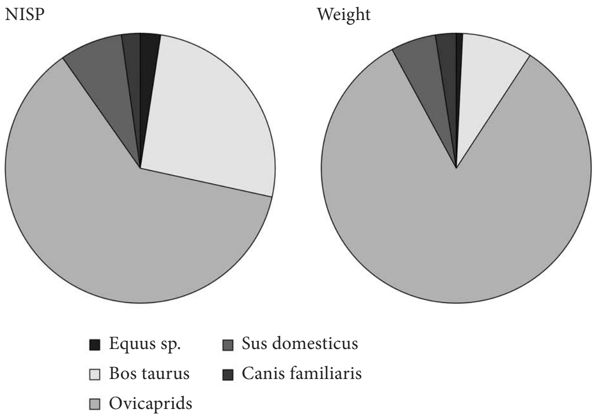
A large number of animal bones have been analysed and published from the site of Boğazköy-Ḫattuša. The first to work on faunal remains from Ḫattuša was R. Vogel (1952) who published a smaller sample and discussion of measurements on bones from the Hittite and the Phrygian period. According to von den Driesch and Boessneck (1981, 7), these bones were collected arbitrarily during excavation work in the years 1931–1939. Subsequently, the equid remains from the nearby rock burial place Osmankayası were published by Herre and Röhrs (1958). In 1977, Boessneck and Wiedemann published an assemblage of around 500 bones from a late Chalcolithic rural settlement, Yarıkkaya, located 2 km to the north of Yazılıkaya (Boessneck – Wiedemann 1977). Based on a single fragment, they argued for the presence of domestic chicken in their assemblage with some reservations concerning the date of the find however. Von den Driesch and Boessneck (1981) published a large sample containing systematically collected bones from a residential area in the Lower City. These finds were recovered during excavation work in 1975 and 1976, and date from Old Assyrian times (18th/17th century B.C.) up to the Empire period (13th century B.C.). Smaller and more arbitrary samples, from the citadel (Büyükkale), recovered in 1958–1960 and 1964/1965, and from the Southern Area (south of Temple I), recovered in 1969 and 1970, were added. The faunal remains from Büyükkale are dated mostly to the 14th century B.C., whereas the material from the Southern Area dates to the 13th century B.C. All specimens together summed up to more than 10,000 identified bones. Apart from the basic archaeozoological analysis, von den Driesch and Boessneck (1981) provided a description of the butchery mark patterning and compiled many insightful Hittite written sources with reference to domestic animals and hunting. The reconstruction of the environment of Ḫattuša was achieved to a certain degree based on the finds of various wild animals including birds and fish and by considering the biogeographic literature regarding the region (Louis 1939; Kumerloeve 1967). More recently, von den Driesch and Pöllath (2004) added to the picture with their analysis encompassing more than 40,000 faunal remains, recovered during excavation work from 1994 to 1998. This sample originates from continuous layers in the area of Büyükkaya, spanning a time frame from the Chalcolithic to the Iron Age. Large granaries were built on top of Büyükkaya during the Old Hittite and Empire period. The spectrum of identified wild species from the site was broadened considerably and synoptic lists of the mammals (von den Driesch – Pöllath 2004, tab. 29), birds (von den Driesch – Pöllath 2004, tab. 31) and molluscs (von den Driesch – Pöllath 2004, tab. 32) attested to the present were given. Von den Driesch and Pöllath (2004) also provided size regression analysis for cattle, sheep and goat and red deer. Further, pathologies encountered in unusually high frequency among the remains of domesticated animals from the Iron Age (1.1 %), were described.

The Natural Environment in Ḫattuša

The natural vegetation in the area around Ḫattuša formerly consisted of hardy woods, but which has mostly been lost through cutting, extended pollarding, and animal browsing (von den Driesch – Pöllath 2004, 37). Surrounding the hardy woods, Louis (1939) located a natural steppe habitat. The presence of typical steppe fauna, such as the Anatolian half-ass, has been interpreted accordingly (von den Driesch – Boessneck 1981). The diverse habitats within the wider region as well as in the vicinity of the city, where cleared arable lands interchanged with woodlands, and where small streams and ponds surrounded by reeds occur (von den Driesch – Boessneck 1981, 56 f.), provided the background for the broad spectrum of species recovered from the site.

Relative Frequencies of Species

The majority of the bones are sheep (*Ovis aries*) and goat (*Capra hircus*) with a total of 61.8 % of the identified specimens belonging to the ovicaprid group and a further 19.3 % which could only be identified as »small ruminants« but which are assumed to be almost exclusively ovicaprids[3] (tab. 6–9; fig. 10). Of all ovicaprid bones, including those identified as small ruminants, 12.2 % could be identified on a species level. This figure is still rather high if com-



10 Relative abundance of domestic species for the Square Buildings horizon

pared to the average amount identified, which generally oscillates between 5–10 % (Buitenhuis 1995). Of those identified on a species level, 66.1 % are sheep and 33.9 % are goat. It is important to note however that different bones can be identified with varying success rates. The result is a bias in the body parts representation for sheep and goats. All of the bones apart from a few notable exceptions such as two large *calcanei*, a second *phalanx* and a third *phalanx*, could be identified as belonging to domestic animals, which is also in accordance with previous results from the same time period. The possible presence of wild specimens is further discussed below (see p. 175 f.). The second most abundant species is cattle (*Bos taurus*) which represents a total of 8.1 % of the identified fragments. Looking at the weight of those fragments, which gives a closer estimate of the amount of cattle meat consumed (assuming cattle remains are mostly derived from meat consumption), this figure rises to 25.4 % of the identified fragments. The domesticated pig (*Sus domesticus*) accounts for 5.3 % of the fragments and 7.3 % of the total weight. This figure includes the group *Sus domesticus/Sus scrofa* as this group is almost entirely composed of juveniles which could not be identified as wild or domesticated. It is assumed here that they are domesticated. Dogs (*Canis familiaris*) represent 2.4 % of the identified fragments, although many of the dog fragments are thought to belong to the same individual (tab. 6. 7). Different types of equids, of which only the donkey (*Equus asinus*) could be identified at the species level, were present. Most, however could not be identified further than their genus, *Equus*. It is possible that horses as well as asses or onagers are amongst the recovered fragments. In total, the Equid group only represents 0.8 % of the identified fragments in the Square Buildings Horizon.

Although the amount of domesticated species represents 97.5 % of the total of identified fragments, various wild species were also found, the most abundant being the wild boar (*Sus scrofa*), the hare (*Lepus europaeus*) and deer species of which only the red deer (*Cervus elaphus*) could be securely identified. If the weight is taken into account then deer and boar are by far the most abundant species accounting for 58 % and 27 % of wild mammals respectively. A few fox (*Vulpes vulpes*) and weasel (*Mustela*) fragments were also recovered as well as the remains of a lion cub (*Panthera leo*). Although only two fragments could be securely identified as lion, the remaining fragments placed on the »large feline« group are thought to belong to the same individual based on age and context.

Birds only represent 0.7 % of all identified fragments. Although most could not be identified to a species level due to strong fragmentation, those that could mostly belonged to the *Anatidae* family which includes ducks (*Anas*) and geese (*Anser*). One partridge (*Perdix perdix*) and one pheasant (*Phasanidae*) were also recovered.

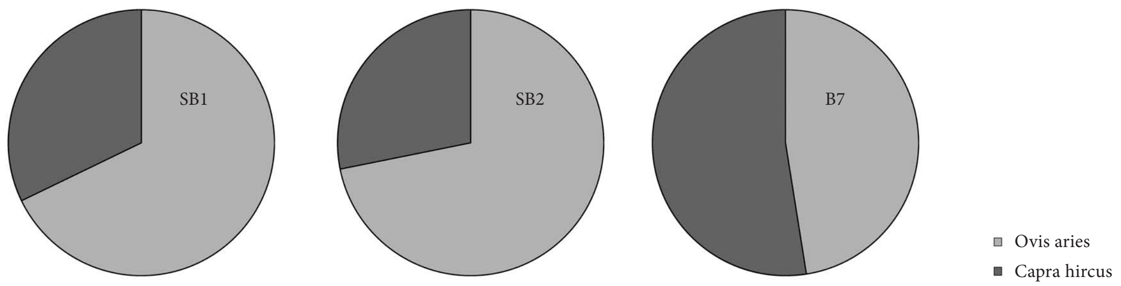
Other species recovered include one toad fragment (*Bufo*) and a few fish (*Pisces*), of which only cyprinids could be identified. Most of the shellfish recovered were oysters (*ostrea edulis*) with a few bivalves.

Differences between the Buildings

Very little difference in the species spectrum is to be noted between SB1 and SB2 concerning domestic species. The only slight difference concerns the slightly greater variety of wild animals in SB1. Since those only represent single finds, not much can be said about differences in the use of the buildings and SB1 and SB2 can be considered as one archaeological assemblage, at least concerning the species spectrum.

B7 however stands out through a lower sheep/goat ratio than in the other two buildings (fig. 11). Indeed, whereas the sheep to goat ratio is close to 2 : 1 in SB1 and SB2, it falls to almost 1 : 1 in B7. This discrepancy may reflect a real difference in the use of the buildings during the Hittite period. However, it has to be noted that the types of archaeological contexts are different in B7 as a

3 Unidentified fragments are mainly represented by ribs and *vertebrae*. From the identified fragments in this study, none were attributed to the roe deer, ibex or fallow deer, which would be the most likely species to be confused with sheep or goats. More than 50,000 animal bones have been analysed from Ḫattuša/Boğazköy to date, and only three among them were assigned to the roe deer (von den Driesch – Boessneck 1981, tab. 1, S.12; von den Driesch – Pöllath 2004, tab. 30, S. 38) and none to the ibex or fallow deer.



11 Relative abundance of sheep and goat in all three buildings

great amount of the B7 faunal assemblage originates from floor contexts as opposed to room fills which compose the majority of the SB1 and SB2 contexts. Floor contexts are considered more reliable and are more likely to reflect the actual use of the buildings. Thus, it may be possible that the amount of goat in the Square Buildings may have been originally higher than observed here.

In the case of ovicaprids, where some variation can be observed, results are given for each building separately when necessary.

Sheep and Goat

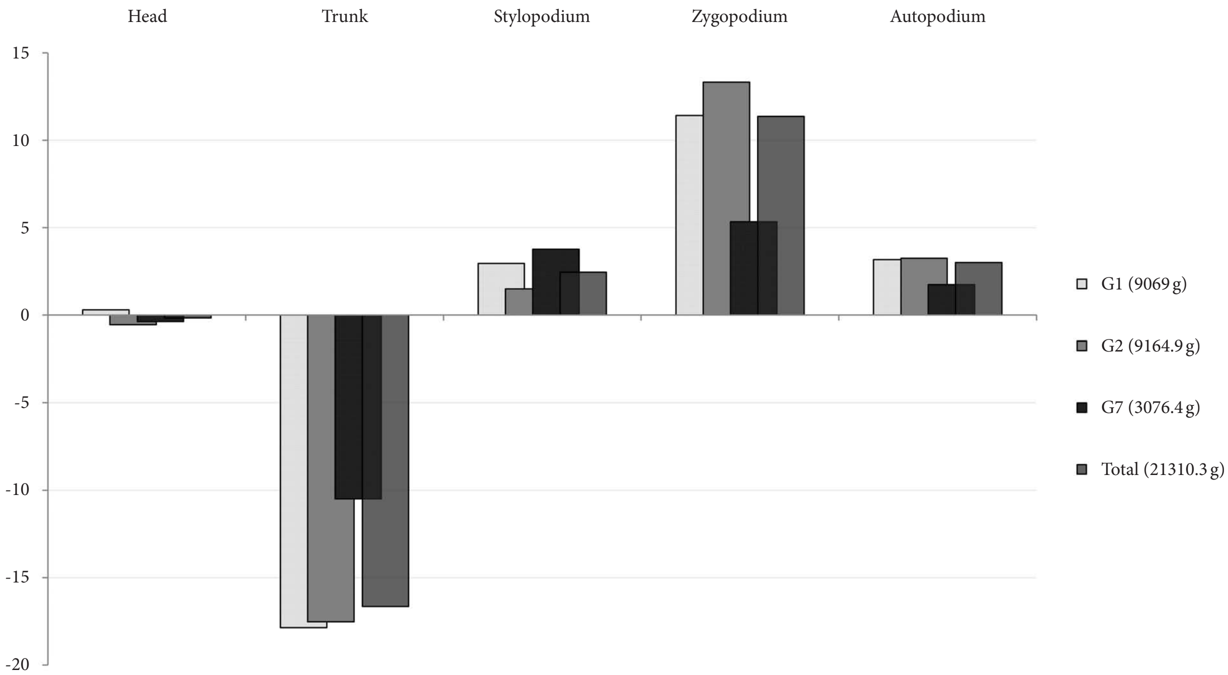
Skeletal Part Distribution and Butchery

Skeletal part representation data may provide valuable insights into activities that took place in or around the Valley west of Sarıkale during the early Hittite empire period. The differential representation of skeletal parts is investigated to determine if the assemblage represents something other than food and butchery waste; for example the by-products of specialised bone manufacturing or leather tannery. Moreover, in cases where certain skeletal parts are systematically absent, it may be inferred that no complete animals reached the Valley west of Sarıkale and that butchering was not performed at this location (see e. g. Zeder 1991; Becker 2004, 256). It may also be the case that residents had to provide certain meat portions to central redistribution bodies or received them through redistribution (Maltby 1984; Zeder 1991). Such questions are of interest because the three buildings are suspected to have housed military staff (Seeher 2004, 66; see above p. 151), who may have received payment in kind for their service (Beal 1992).

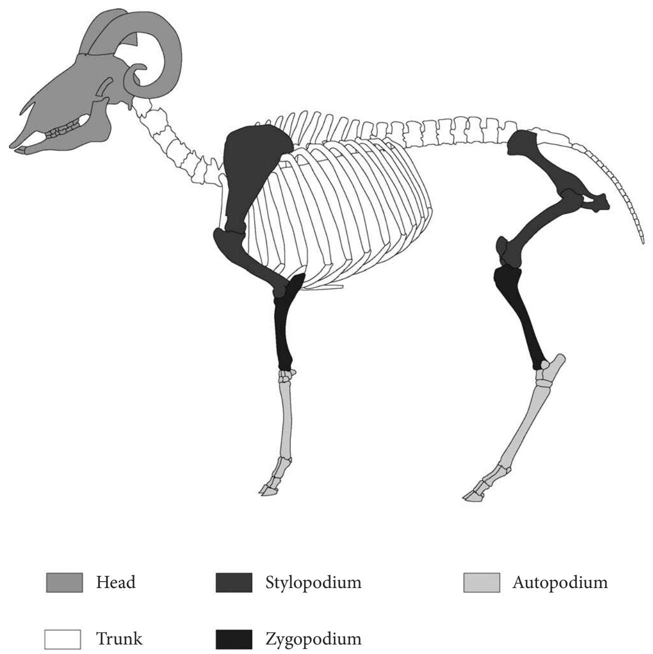
In order to obtain reliable results a certain amount of fragments is necessary. Therefore, only ovicaprids are looked at in the present study. Ovicaprids have been pooled together for this analysis as the body part spectra for sheep and goat cannot be relied upon due to a bias in the accuracy of identification of the different skeletal elements. In order to investigate patterns in skeletal part representation, the differences between weight proportions (g-%) of the skeletal units of a taxon in the assemblage and the corresponding units in a reference individual are computed (according to a standard procedure at the IPAS 2007b). From the corresponding graph (fig. 12) irregularities in the skeletal body part representation in the assemblage as compared to the complete animal are inferred. In order to structure the results into meaningful categories that facilitate visual exploration and interpretation, the skeletal elements are grouped into different anatomical units in this analysis (fig. 13). Where necessary, data that is not apparent from the graph is referred to in the text.

It has been suggested that within the urban environment of an economically and socially segregated society, an attempt can be made to investigate archaeozoological remains in terms of producer and consumer sites (Maltby 1984; Stein 1987; Zeder 1991): Accordingly, producer sites are identified by an overrepresentation of heads and feet, which are expected to represent butchery waste, while a pronounced overrepresentation of the most meat bearing parts (*zygopodia* and *stylopodia*) is considered to evidence a consumer site (Maltby 1984; Stein 1987; Zeder 1991). However, in practice this approach is best supplemented by investigating the patterns of butchering marks on the bones (Maltby 1984; Maltby 1989; Zeder 1991) and identifying skews in the relative frequency of species, and especially in age profiles (Zeder 1991). It is difficult to put forward a meat/food distribution that is organised at the level of a central administration based on only one of those criteria. A high degree of systematisation in the butchering mark distribution has been interpreted as an indication of a specialised butchering practice as opposed to a household butchering practice (Maltby 1989; Zeder 1991, 95–97) (for butchering mark pattern analysis see next paragraph). Further, if a central agency redistributes meat from producers to consumers, some selective mechanism is likely to be in place, where specific animals and age groups are allocated to certain groups of receivers according to their profession and status (Zeder 1991, 35): For example, according to written sources, during the Ur III-Period at Drehem the military primarily received adult female sheep and oxen.

Within the present assemblage the skeletal part representation by weight for ovicaprids (fig. 12) is in agreement with a predominantly bone density-mediated pattern, caused by the differential preservation of teeth, and compact bones like short limb bones, metapodials or the distal *tibiae*, that preserve better than less dense parts like the *cranium*, the *scapula*, the *vertebrae* or the ribs (discussed by Lyman 1994, 235–258 tab. 7. 6). As the cranial parts were grouped together with the mandibles and the lose teeth in fig. 12, the effect of differential preservation is levelled within this group. Had the cranial parts and the mandibular parts been computed separately, an underrepresentation of cranial parts and an overrepresentation of mandibular fragments and teeth would become apparent. Furthermore, the underrepresentation of the axial elements, that are part of the trunk, is likely exacerbated by the impact of carnivore gnawing (Marean – Spencer 1991) which was identified on the remains. *Stylopodia* are more abundant than one might expect, when compared to the *autopodium*. The comparatively low overabundance of ovicaprine *autopodials* (fig. 12) probably indi-



12 Percentage point differences between the weight proportions of different skeletal units in the assemblage and a standard individual for ovicaprids. Based on the total of ovicaprid bones including small ruminants, *O. aries, O. aries* (?)*, C. hircus, C. hircus* (?)*, O. aries/C. hircus*



13 The different anatomical units used in the skeletal parts distribution analysis. Head: comprises the whole head including the teeth, mandible and the hyoid bone. In the case of horn bearing animals such as sheep and goat horn is included. Trunk: comprises the *vertebrae*, the ribs, the *sacrum* and the *sternum*. *Stylopodium*: comprises the *humerus*, the *femur*, the *patella*, the *scapula* and the *pelvis*. *Zygopodium*: comprises the *tibia*, *fibula*, *radius* and *ulna*. *Autopodium*: Includes *carpals*, *tarsals*, *metapodials*, *sesamoids* and *phalanges*

cates that smaller bones like *carpals*, *tarsals* and *phalanges* are missed more easily during excavations. Indeed, from a higher level of detail computation (not enclosed) it was inferred, that the overrepresentation is due to the metapodial fragments within this unit. The slightly less distorted skeletal parts representation of B7 might be due to better overall preservation, as most of the material from this building originates from floor contexts, and therefore a quicker embedding of these remains is likely.

To conclude, in principle all skeletal elements of ovicaprids are present in the assemblages (tab. 31–33). There is no reason to assume from the skeletal part representation by weight, that ovicaprid bones represent something other than primarily food and butchery waste (as opposed to specialised tannery or bone manufacturing). Furthermore, nothing in the distribution contradicts the presence of complete animals in the Valley west of Sarıkale. There are no indications, so far, to suggest that the butchering and the discarding took place somewhere else. Of course, this is not equivalent to the evidence of entire animals reaching the Valley west of Sarıkale and them being slaughtered on site, or the absence of any connection to a redistributive body, both collecting as well as allocating. However, there is no contradiction to a household level subsistence within the skeletal part representation. Yet, with regard to skeletal part representation alone, it is useful to bear in mind that at the time the provision and reallocation of live animals is also a likely scenario (Zeder

1991, 248). With respect to the Hittite military, there is at least the possibility as well, that some of the staff were allocated their own land to farm (Beal 1992). Moreover, according to von den Driesch and Boessneck (1981, 66) the skeletal part representation from the Hittite Lower City, although not analysed in the same manner, equally points towards the acquisition of complete animals, butchered on site. In any case, the skeletal part distribution of the ovicaprids within the assemblage does not point toward the area being part of a pronouncedly dichotomous system of producer and consumer sites (Zeder 1991).

14 Cut marks on the proximal part of a sheep/goat *metacarpus, humerus* and a goat *talus.* sc. 1:1

Cut and Hack Marks

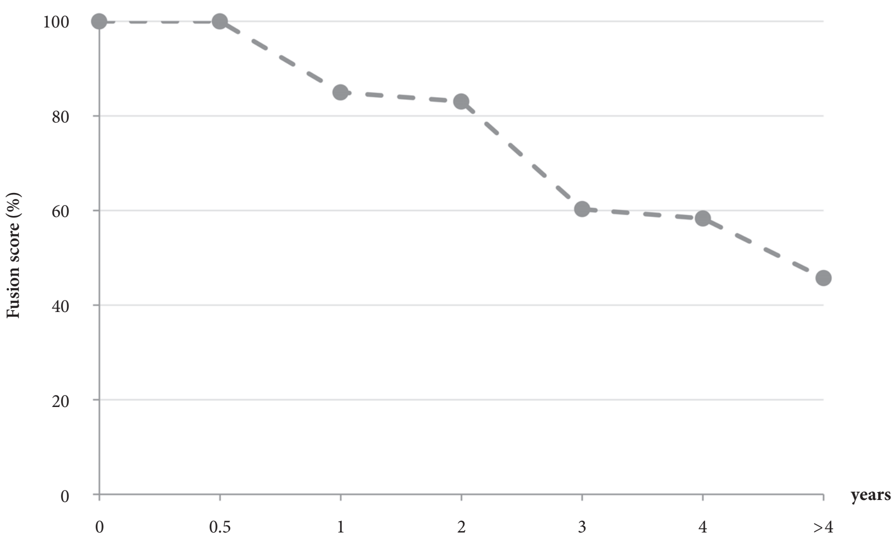
Only ovicaprids provide sufficient NISP to infer basic trends and, therefore, brief discussions of the cut and hack mark pattern on this taxon follow. A table summarizing the number of bones with cut marks for all domesticated taxa is also provided for comparison (tab. 10). Butchering marks in the present assemblage are frequently observed in connection to cutting off the head (marks on *atlases* and *epistropheus*) and the tail (marks on *vertebrae cuadalis*) of the animal (von den Driesch – Boessneck 1981, 66), disarticulating the feet (marks on *astragali*, *metapodials* and *calcanei*) most probably in order to remove the skin (von den Driesch – Boessneck 1981, 66), and cutting off and further disarticulating the most meat bearing parts of the animal: the *stylopodia* and the *zygopodia* (marks on the *vertebra cervicalis*, *scapula*, *humerus*, *radius/ulna*, *pelvis*, *femur* and *tibia*).

The order of the relative frequencies of cut marks with respect to the different skeletal elements seems to be broadly in accordance with that observed by von den Driesch and Boessneck (1981, 65 f.) in the Lower City. Their observations, however, were not explicitly quantified. Looking at ovicaprid bones from the Square Buildings Horizon, butchery marks most frequently occur on the *atlas*, presumably from cutting off the head; on *astragali*, from disarticulating the feet; on the *vertebrae caudalis*, from cutting off the tail and on the elbow joint. Slightly less frequent are butchery marks on *femora* and *tibia*, the most meat bearing parts of the hind limb (tab. 11).

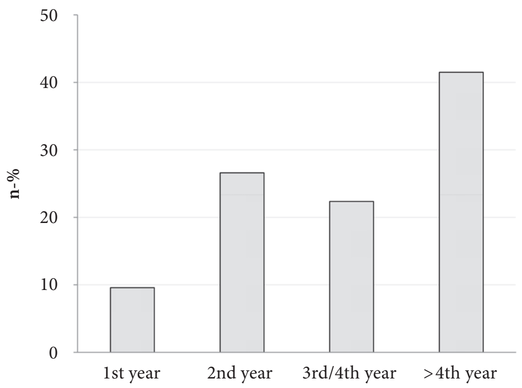
As inferred from the images of cut marks on bones in von den Driesch and Boessneck (1981, Taf. 11, 34–39. 44) the location of cuts on the bones from the Lower City are similar to the observations from the present sample: For example, circular cut marks around the distal shaft of the *tibiae* and on the *metapodials* (fig. 14), again these were made probably in order to remove the skin. With respect to these marks and the relatively few marks on *phalanges*, it was suggested that the Hittites removed the skin from the body and then cut the skin off the feet where it was most convenient (von den Driesch – Boessneck 1981, 66). This suggestion is supported by the present sample.

Hack marks are present on less than 1% of the ovicaprid bones (tab. 10). Corresponding to the assemblage from the Lower City, they are found on the ribs, *astragali* and *vertebrae*. Moreover, some of the *atlases*, *epistropheus* and *cervical vertebrae* show evidence of sagital splitting.

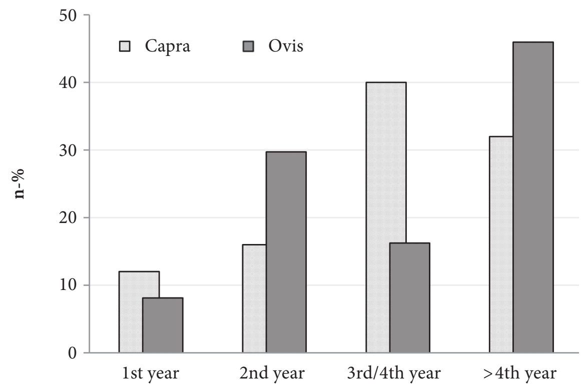
In conclusion, the evidence from skeletal parts representation and butchery mark distribution suggest that the present sample likely represents food and butchery waste, and at least in its sum entire animals. There is no indication of specialised bone manufacturing or the systematic selection of certain body parts for consumption. Butchering marks are found on most of the skeletal elements and there is no indication of a systematic butchering practice at this site (Zeder 1991, fig. 30, 228–230), or the absence of marks related to slaughtering and primary butchering (Maltby 1984; 1989; Bartosiewicz 1995, 35–38) However, a contemporaneous site from Ḫattuša, where similar analysis has been conducted, is lacking to the present. Comparisons to other contemporaneous sites from within and around Ḫattuša will be necessary to establish firm conclusions on the matter. Furthermore, the data is not provided at a convenient level of detail to firmly argue in favour of a standardized butchering practice: It is not sufficient to provide the frequency of butchering marks per



15 Rate of Survival based on Redding's (1981) »fusion score« from epiphyseal fusion data of sheep and goat bones (n = 59) from SB1, SB2 and B7



16 Age at death data from sheep and goat mandibles (94) excluding mandibles aged solely on evidence from the M_1



17 Age at death data from sheep (37) and goat (25) mandibles excluding mandibles aged solely on evidence from the M_1

skeletal element (Zeder 1991, 245). The exact location of the cuts on the bone would have to be investigated.

Age at Death Data

The data on epiphyseal fusion from post-cranial elements of sheep and goats are presented in form of Redding's (1981, 248) »fusion score« per skeletal element multiplied by 100 as according to Zeder (1991, 91) (tab. 12–15):

$$\frac{(f+i*0.5)}{(u+i+f)}*100$$

where *f* is the NISP with fused *epiphyses*, *i* the NISP with fusing *epiphyses* and *u* the NISP with unfused *epiphyses*. The curve plotted based on the scores (fig. 15) gives an impression of the changing ratio of bones with fused and unfused *epiphyses*, when shifting from early to the late fusing elements.

It provides an indication of the age or range of ages in which the majority of animals were slaughtered. For the curve in fig. 15, some of the skeletal elements were grouped according to early fusing elements (fused by the end of the first year) and late fusing elements (fusing after the fourth year) and Redding's (1981) »fusion score« was computed for the sum of the elements in those groups. Hence each data point in the graph indicates the proportion of animals that at least reached the year referred to on the horizontal axis.

Age at death diagrams were created based on tooth eruption and wear data for sheep and goats (fig. 16) and separately for each species (fig. 17). The plotting of specific age at death diagrams was hampered, however, by the limited data available. With respect to the underlying data, the diagrams have to be interpreted with care.

Age at death determination was accomplished by methods as stated in part 2, but modifications to the usual protocol were made in order to adapt it to the peculiarities of the present population: A distal *tibia*, *talus*, *calcaneus*, and *metatarsus* belonging to the same individual was a lucky find. These elements were firmly established as sheep. This sheep's foot proved crucial for the interpretation of the epiphyseal fusion sequence of long bones: The distal *tibia* was fully fused, the *calcaneus* was almost fully fused, whereas the distal *metatarsus* had just started to fuse. Therefore the standard sequence of epiphyseal fusion in the protocol had to be inverted for the *calcaneus* and the *metapodials*, with the *calcaneus* fusing before the *metapodials*. There is good reason to assume that this foot presents a reference for the epiphyseal fusion sequence for the population of sheep in Hittite Ḫattuša: According to the percentage of fused specimen within the present assemblage, and also within the data presented by von den Driesch and Boessneck (1981, tab. 16) there is a greater relative amount of fused *calcanei* than fused *metapodials*. Consequently, if the *calcaneus* is considered to fuse prior to the *metapodials*, the available data becomes more meaningful with respect to survivorship rates. Another modification to the original protocol (IPAS 2007a) had to be made regarding the fusion of the distal *humerus*: There are some examples of large *humeri* with smooth surfaces and distal *epiphyses* in the final state of fusion among the present assemblage. This is in contrast to the standard protocol, where *humeri* are expected to fuse during the first four months and to other seemingly ›young‹ specimen within the present assemblage, which also display fusing distal *epiphyses*. Therefore, it is suggested that in certain cases the distal *humerus* takes at least up to one year to fully fuse. The above mentioned examples potentially point towards the presence of wethers among the faunal remains (O'Connor 2004, 96). However, the delay could have other causes, however each of them is difficult to assess.

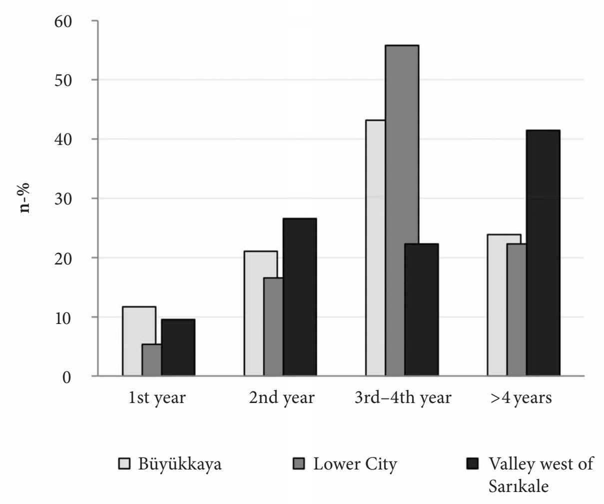
Again, within the urban environment, faunal remains are best interpreted as food and butchery waste and not in terms of herding strategies (Zeder 1991; Bartosiewicz 1998; Arbuckle 2009): The present assemblage probably represents only a part of a herding unit, and people (probably military staff) living in the Valley west of Sarıkale potentially were allocated meat/food through centralized mechanism of redistribution in either the form of rations or live animals (Beal 1992). Moreover, some form of transhumance, that involved the moving to summer pastures from May to October, and celebrating a festival on the occasion of the return in Autumn, is evidenced in Hittite written sources (Klengel 2007). Transhumance is likely to distort the age data from a site, as some animals are potentially culled or lost away from the settlement (Cribb 1984; Helmer – Vigne 2007). However, if the buildings in the Valley west of Sarıkale were part of a larger administrative network, this might show in the age at death profiles in the form of a skewed distribution, with a strong emphasis on a particular age group (Zeder 1991).

Data from epiphyseal fusion as presented in tab. 12–15 and fig. 15 suggests that during the first year of life, there is a 20% drop off, and a further 40% drop off seems to take place over the second, third and fourth year. A ›fusion score‹ of 45.7 % for the late fusing elements suggests, that a fair amount of animals contributing to the assemblage were not primarily kept for their meat, but for stock breeding or secondary products, such as milk and fibre (e. g. Payne 1973; Marom – Bar-Oz 2009). Therefore, with the exception of some tender meat from first year lambs and prime meat animals in their second to third year (18–30 months under traditional herding conditions according to Payne 1973, or 9–15 months according to Munson 2000), a considerable amount of meat originates from animals that were already past their prime.

This picture is roughly supported by the age at death data based on tooth eruption and wear from ovicaprid mandibles (tab. 16–18; fig. 16). About 27% of mandibles belong to prime meat animals, aged between one and two years and another 22% died in their third or fourth year. Less than 10% are tender first year animals (according to Payne 1973) and slightly more than 40% belong to mature individuals aged older than four years (according to Payne's 1973 model, but more than 60% according to Munson 2000, as third and fourth year animals and a part of the second year animals would be included in this class). Looking at sheep and goat profiles separately, subtle differences become apparent (fig. 17): Among the sheep, second year and mature animals dominate, whereas among the goats it is mostly prime adult animals. This pattern might point towards a specific strategy in either culling or allocating animals.

Finally, the presented data from mandibles is compared to the respective data from the Hittite Lower City (phase 3–2) (von den Driesch – Boessneck 1981, 35 tab. 15) and Hittite Büyükkaya (von den Driesch – Pöllath 2004, tab. 10) (fig. 18).

In the Lower City and Büyükkaya animals in their second to their fourth year predominate (around 60–70 %), whereas in the Valley west of Sarıkale there is a comparatively stronger emphasis on mature animals, aged older than four years. Specific age profiles for adult sheep and goats (animals older than two years) are compared to the available data from the Lower City (von den Driesch – Boessneck 1981, 35: including the minor amount of Old Assyrian material, apart from Hittite faunal remains) (fig. 19. 20). The pattern that goats are not being kept in large numbers beyond the age of four years seems to be consistent over the two sites. With respect to



18 Age at death data from sheep and goat mandibles according to year from Hittite Büyükkaya (von den Driesch – Pöllath 2004, Tab. 15, 14) (n = 213), the Hittite Lower City (von den Driesch – Boessneck 1981, Tab. 15, 34. 35) (n = 373) and the Valley west of Sarıkale (n = 94)

sheep the findings from the Lower City is in contrast to the Valley west of Sarıkale: in the Lower City most of the sheep were butchered before they turned four years, whereas in the Valley west of Sarıkale most adult sheep were butchered after their fourth year.

After all, none of the age at death data from any of the three sites shows a highly skewed distribution that could firmly be interpreted in terms of a producer/consumer dichotomy. If a central redistributive mechanism was in place, it was not very specific in allocating certain age groups to certain receivers. The data from the Valley west of Sarıkale is most in accordance with what might be found at a producer site, where some third year animals had to be dispatched for redistribution. It has to be emphasised however, that the three assemblages are not strictly contemporaneous and that the age at death data from Büyükkaya and the Lower City is based on a considerable amount of material that dates to the Hittite Empire period (14th/13th century B.C.). The relatively more abundant senile individuals at the Valley west of Sarıkale may point towards a dichotomy in terms of high (Lower City) versus low status (Valley west of Sarıkale). However again, this conclusion cannot be established because the assemblages are not entirely contemporaneous. More faunal materials from the early Hittite period at Ḫattuša will be needed to shed further light on the matter.

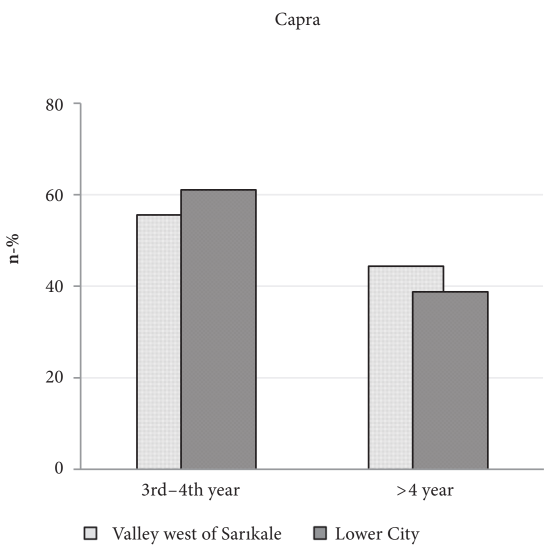
Wither Heights and Size Ranges

Withers heights were calculated for long bones, where the greatest length (GL) was measurable (tab. 19. 20). In total, only four sheep and two goat bones could be taken into account. Withers heights between 62 cm and 70 cm for sheep and 69 cm and 75 cm for the goats are more or less in agreement with the observed data for the Hittite period in Ḫattuša, according to the studies by von den Driesch and Boessneck (1981, tab. 18. 19) and von den Driesch and Pöllath (2004, tab. 25). It had been noted by the authors, however, that goats are in general smaller than sheep in this assemblage, which is not reflected in the wither heights obtained. Withers height measurements are very much dependent on sex in the case of goats which prompts for further analysis if these results are to be considered at all.

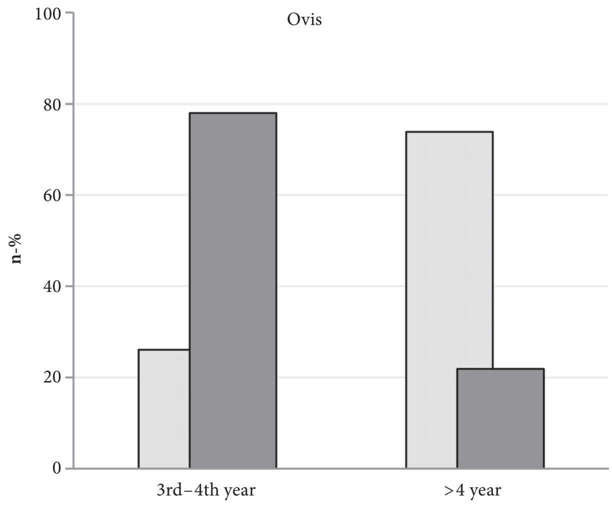
Other measurements, which could not be taken into account for wither heights measurements could however be compared to other assemblages in Ḫattuša (tab. 21–24). The few skeletal elements that provide small series of measurements are well within expected ranges: Measurements on the distal *humerus*, the distal *tibia*, the *phalanx* I and the *astragalus* of sheep and goats, display no major deviations in range and means from the corresponding data of the Lower City (von den Driesch – Boessneck 1981, tab. 21) and Büyükkaya (von den Driesch – Pöllath 2004, tab. 37. 38). Goats systematically display smaller mean measurements than sheep, which agrees with primary observations of the assemblage as well as with previous results in Ḫattuša. One possible explanation for the difference, as previously shown for sheep and goats from Büyükkaya (von den Driesch – Pöllath 2004, 26) is a higher proportion of females among the goats. However, the fact that the lower range for goats is lower than the lower range for sheep in every presented measurement suggests that goats in Ḫattuša really are smaller as a species regardless of sex ratios.

Presence of Wild Specimens

Some specimens, however, display larger deviations from the expected size for domestic sheep and goats (tab. 36. 37). As the site is located in a region which provides habitats for wild sheep (*Ovis Oriantalis*) and wild goats (*Capra aegargus*), they are potentially present among the faunal remains (von den Driesch – Boessneck 1981, 44 tab. 22; von den Driesch – Pöllath 2004, tab. 46. 47). Their wild status, however, remains questionable. Wild sheep and goats are not easily identified in a sample of primarily domestic animals, as the size range of domestic males and wild females can overlap considerably



19 Age at death data from goat mandibles for animals aged older than two years from the Hittite Lower City (von den Driesch – Boessneck 1981, 35) (n = 82) and the Valley west of Sarıkale (n = 23)



20 Age at death data from sheep mandibles for animals aged older than two years from the Hittite Lower City (von den Driesch – Boessneck 1981, 35) (n = 123) and the Valley west of Sarıkale (n = 23)

(Zeder 2001, 67; von den Driesch – Boessneck 1981, 44). The potentially wild specimens in this assemblage may as well be unexpectedly large males in a domestic flock. They could also originate from accidental cross breeding with wild animals (as possibly indicated by written sources, Klengel 2007, 160). Wild females, instead, may be missed among the remains of domestic male animals.

Estimation of Sex Ratios

Estimation of Sex Ratios Morphologically

Only the *pelvis* of ovicaprids could be taken into account. Of the indeterminate ovicaprids, 11 females and 14 males could be identified. Of the sheep, 4 males and 2 females could be identified. Of the goats, 3 males and 1 female could be identified. This is barely adequate to represent the sex ratio in the sample. According to a considerable SSD in sheep and particularly goats (Zeder 2001) the sex ratio can potentially be investigated by means of measurements on fused or almost fused long bones.

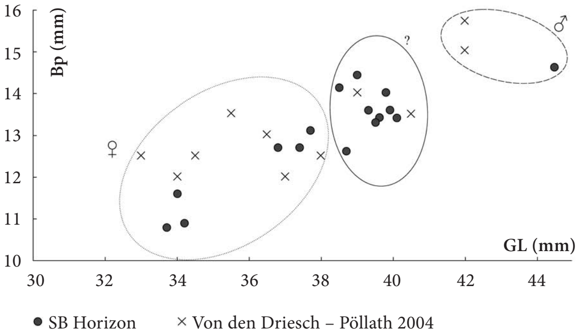
Determining Sex Ratios Metrically

To gain an impression of the overall sex ratio it makes sense to consider early fusing skeletal elements, in order to include as many age classes as possible. Measurements on late fusing skeletal elements may instead represent the sex ratio of a certain age class, e. g. animals > 4 yrs. Therefore, in addition to the plot of the *phalanges* I (fig. 21. 22) measurements on the distal *humerus* (fig. 23. 24) were considered for this purpose.

Both elements are expected to fuse during the first year of life (Zeder 2006 and references therein), and are supposed to display a convenient degree of SSD (Zeder 2001, 67; Marom – Bar-Oz 2009, 61). Even in mixed samples of anterior and posterior *phalanges* I, it is potentially possible to differentiate females and males by means of the greatest length (Zeder 2001, 66). Measurements from the Square Buildings Horizon were pooled with those from other Hittite contexts in Ḫattuša in the case of *phalanges*. This enabled a more accurate interpretation concerning the assessment of sexual dimorphism.

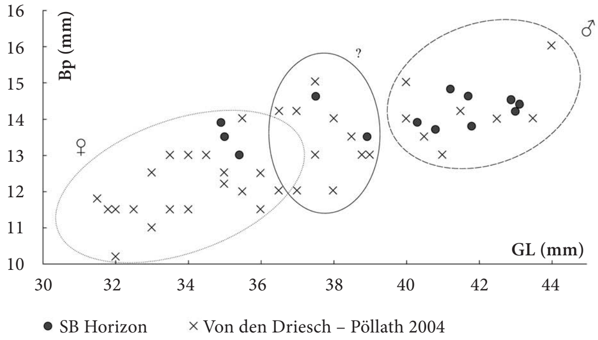
There seems to be a relatively even distribution of males and females for both species with goats showing a tendency towards a greater amount of females. However, the sample size is still too low to infer sex ratios with an acceptable degree of certainty. In order to increase the sample size and use all the measurements available, an attempt to assess sex ratios was made using logarithmic size indices.

Goat – Phalanx I



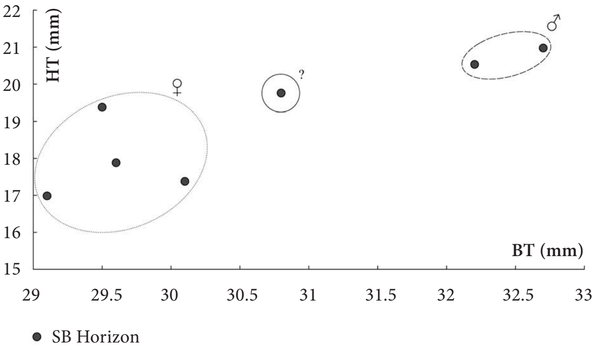
21 *Phalanx* measurements for goats. GL = Greatest length, Bp = Breadth of the proximal end. Measurements based on von den Driesch 1976. Each point represents a fragment

Sheep – Phalanx I



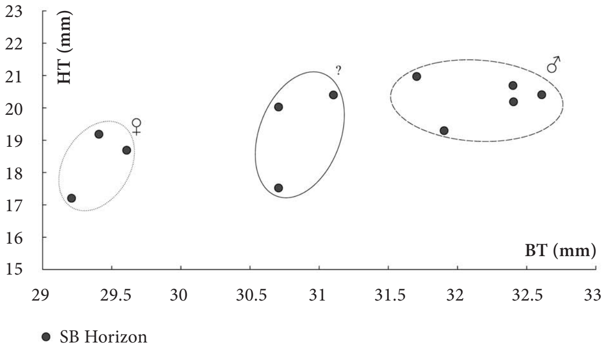
22 *Phalanx* measurements for sheep. GL = Greatest length, Bp = Breadth of the proximal end. Measurements based on von den Driesch 1976. Each point represents a fragment

Goat – Humerus



23 *Humerus* measurements for goats. BT = Breadth of the *trochlea*, HT = Height of the *trochlea*. Measurements based on von den Driesch 1976. Each point represents a fragment

Sheep – Humerus



24 *Humerus* measurements for sheep. BT = Breadth of the *trochlea*, HT = Height of the *trochlea*. Measurements based on von den Driesch 1976. Each point represents a fragment

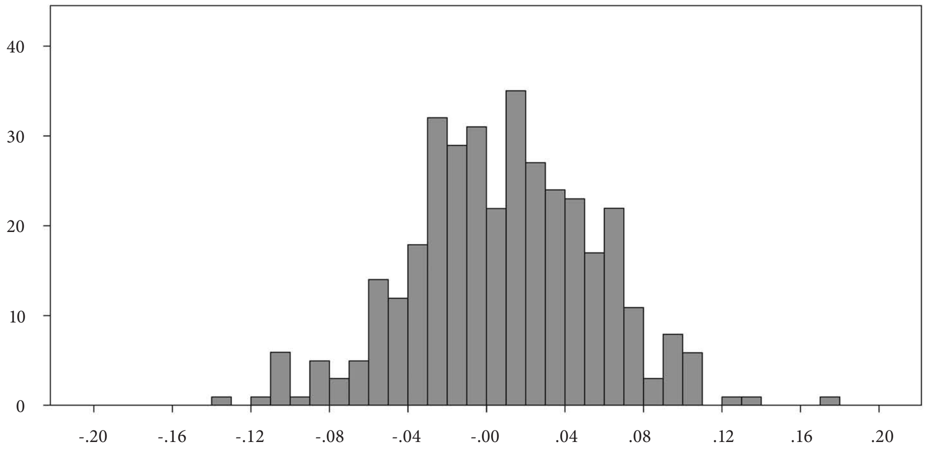
Determining Sex Ratios Using Logarithmic Size Indices

First developed by Simpson and Lewontin (1960), the Logarithmic Size Index (LSI) method is based on the relative difference between a specimen and a standard individual (or measurement). This relative difference is obtained by calculating the difference between the base-10 log values of the same measurements in the standard individual and the archaeological material.

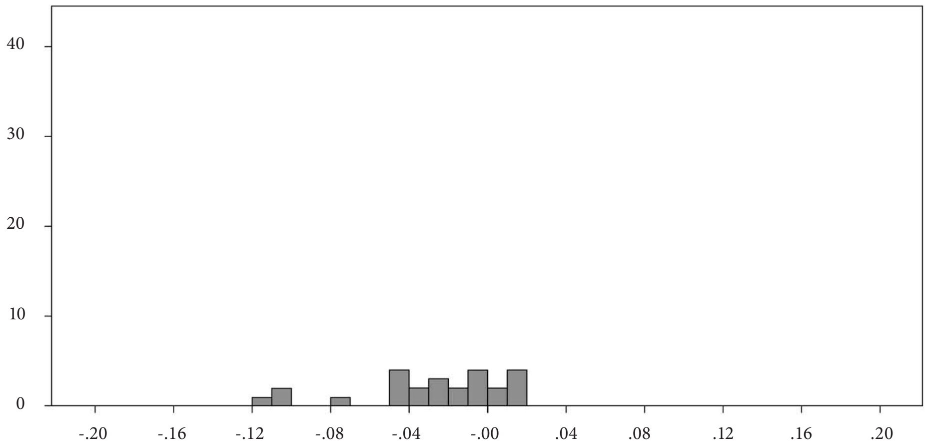
Log_x-Log_s = LSI where x is the measurement derived from the archaeological material and s is the measurement derived from the standard individual.

Many zooarchaeological studies since Simpson have relied on LSI for morphometric analysis (Albarella – Payne 2005; Haber – Dayan 2004; Breuer – Rehazek – Stopp 1999; Meadow 1984). The general advantage of the method is the possibility to pool different measurements together, enlarging the data set. It is important to stress that LSI analysis focuses on proportion rather than size. There does not however seem to be any consensus as to which measurements are best suited, or which standard should be used, although some recommendations as to the use of size indices on a general basis, as well as an overview of its potential can be found in Meadow (1999).

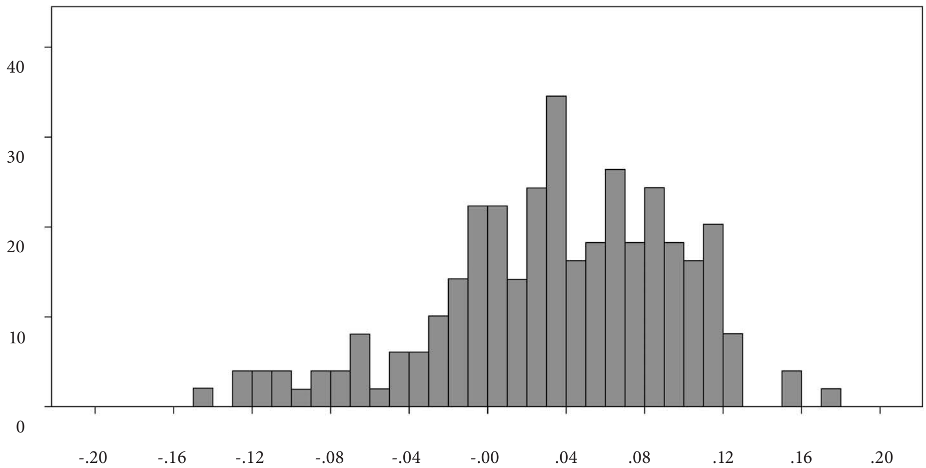
The standard measurements should derive from the same individual or the average of one population. In order to obtain an extensive set of measurements compatible with those taken on the Square Buildings Horizon assemblage, a goat (*Capra hircus*) and a sheep (*Ovis musimon*) from the reference collection in the IPAS in Basel were measured. A full list of measurements (63 in total) can be found in the appendix. All measurements are taken from von den Driesch (1967). The reference individuals were chosen on the basis of their completeness and suitability for comparison with Bronze Age Turkish material:



25 LSI values for all sheep measurements. The origin 0 represents the standard individual *O. musimon*. The x-axis represents the number of fragments per LSI value



26 LSI values for sheep bone fragments that could be aged as »senile«. The origin 0 represents the standard individual *O. musimon*. The x-axis represents the number of fragments per LSI value



27 LSI values for all goat measurements. The origin 0 represents the standard individual *O. capra*. The x-axis represents the number of fragments per LSI value

Individual Z-2266: mature male sheep *Ovis musimon*. The individual was already recorded as »mature«, which was confirmed by the fused proximal *ulna*. *Ovis musimon* (or mufflon) was chosen over *Ovis aries* for two reasons. Firstly, the sheep in Ḫattuša seemed rather large and during the identification process, seemed the closest morphologically to *Ovis musimon*. Secondly, the *Ovis aries* specimens from the IPAS which were complete enough to serve as standard individuals mostly derived from modern breeds. Although this is perfectly adequate for morphological identification, the proportions may be too different from ancestral breeds to be used for LSI.

Individual Z-1585: mature female goat (*Capra hircus*). Although this individual was only recorded as »adult« in the institute's database, the fused proximal *ulna* and pubic *symphysis* point towards a mature individual. 1585 is also the smallest specimen of goat in the IPAS collection. European goats are generally bigger than sheep, but in Ḫattuša the opposite seems to be true.

In the case of sheep, two peaks are clearly visible (fig. 25). This, combined with the previous results obtained using *phalanx* and *humerus* measurements, suggest that this indeed reflects male and female populations. This is also supported by the fact that the individual used for comparison is male, suggesting that those larger than Z-2266 are also male. Should this be the case, then the sex ratio for sheep points towards an equal number of males and females. In order to obtain more detailed information of the assemblage, an attempt was made to combine age class and sex ratio information.

Fig. 26 shows the LSI values for all the measurements belonging to senile individuals (total of 25 measurements). These are mainly from the *femur* and the *ulna*, which fuse late, and where the distinction between young adults and senile adults is possible, as well as the proximal *humerus* and proximal *tibia*. Not only does the senile group appear to be tightly knit in their range, but it is the smaller individuals of the population being represented, suggesting that senile individuals tend to be females.

In the case of goats, interpretation is more difficult. Although the fact that there is less data than for sheep complicates the matter, the LSI values do not reject the hypothesis that there are more adult female goats to sheep. Supporting this idea is the general tendency of the goat assemblage to tail off into the more gracile individuals (fig. 27).

Discussion on Ovicaprids from the Square Buildings Horizon

The skeletal part distribution can best be interpreted as a pattern arising from differential density-mediated bone preservation with food and butchery waste as a starting point (Lyman 1994, 235–258 tab. 7. 6). There is nothing in the skeletal part distribution to indicate a one-sided representation of either, only meat bearing parts, quasi kitchen garbage, or disposed butchery waste such as feet and heads (Maltby 1984; 1989; Zeder 1991). The analysis of butchery mark distribution on ovicaprid bones is preliminary and not conducted at a desirable level of detail (Zeder 1991, 245). However, the butchery marks seem to exhibit a certain consistency with respect to their location on the bones, when qualitatively compared to the material from the Lower City (von den Driesch – Boessneck 1981, 65 f.). This topic deserves further investigation as the Valley west of Sarıkale is the first site in Ḫattuša, where a quantitative analysis of butchery marks has been conducted. Further material is needed to establish the characteristics of something like an early Hittite butchery practice in Ḫattuša (if it existed) and deviations thereof. In any case, neither the skeletal part distribution nor the butchery mark pattern on ovicaprid bones conflict with a household-level butchery and the acquisition of the entire animal.

If the evidence from age at death data and measurements on sheep bones are considered together, an equal sex ratio among sheep, with the senile specimen mainly representing females, can tentatively be inferred. In general, the emphasis on animals aged older than four years is high, especially among the sheep, when compared to the findings from the Lower City (von den Driesch – Boessneck 1981, 35), where the largest group are animals aged between two and four years. Sheep aged older than four years, were clearly kept for purposes other than predominantly for their meat (Munson 2000). As many of them are female, their purpose, alongside wool production, presumably was breeding. Wool production with female sheep is evidenced in Hittite texts (Klengel 2007, 157: female wool sheep). Measurements taken on sheep bones, as well as sheep *humeri* with seemingly delayed distal epiphyseal fusion, suggest the presence of wethers (O'Connor 2004, 96). These sheep must have been castrated at a young age, otherwise a delay in the fusion of the distal *humerus* would not be observed. Interestingly, these wethers would apparently not have served the purpose of wool production (compare to von den Driesch – Vagedes 1997), as they must have been slaughtered somewhere within the first or second year of life.

Goats in the Square Buildings Horizon occur in high proportions (sheep to goat ratio: 2:1), especially in

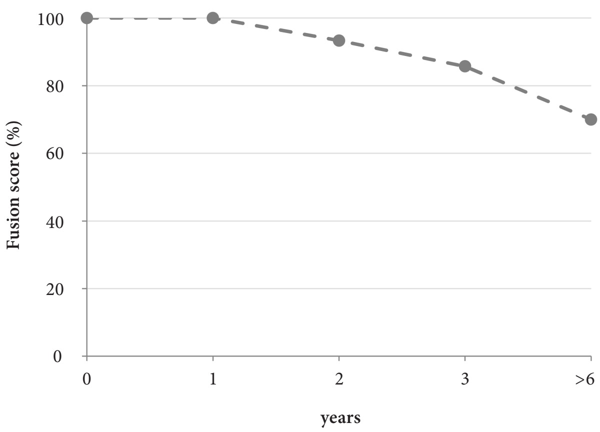
B7 where the sheep to goat ratio was found even, when compared to the Lower City (von den Driesch – Boessneck 1981, 33) or Hittite Büyükkaya (von den Driesch – Pöllath 2004, 6). Beyond that, most of the material from B7 originates from floor contexts, and floor contexts are suspected to relate to the original use of the building. The significance of this difference in the sheep to goat ratio is difficult to assess, as we lack suitable comparative material from strictly contemporaneous sites within the city of Ḫattuša. However, textual evidence from Hittite law may suggests that goat's meat was less popular, as the price for a goat was about half or two thirds the price for a sheep (Friedrich 1959, 79; Klengel 2007). The scarce data on age at death for goats seems to be in accordance with the profiles from the Lower City (von den Driesch – Boessneck 1981, 35) and findings from various sites in central Anatolia (Arbuckle – Öztan – Gülçur 2009, 149). In contrast to sheep, among goats the majority of adult animals are slaughtered before the beginning of their fifth year of life. In Anatolia, up to the Bronze Age, the pattern observed is that goats tend to survive longer than sheep (Arbuckle – Öztan – Gülçur 2009). This is the case up until the advent of wool production when a higher survival age of sheep is observed. The »multi-functional« management of goats (Arbuckle 2009, 149) and the production of wool from sheep would result in the main difference in survivorship in the adult category. In fact, LSI analysis of goat bones from the present assemblage indicates that goats older than four years, as for the sheep, seem to be female. It may be suggested that these goats were reared for breeding and milking, before they ended up in the kitchens. According to measurements taken on goat bones, however, there is a fair amount of adult male goats present in the assemblage. Apart from their meat, they could have been kept for their hair as well. Indeed, according to Hittite written sources goats were occasionally classified by the colour of their hair (Klengel 2007). These findings fit in well with the »multi-funcitional management« of goats as postulated by Arbuckle – Öztan – Gülçur (2009) for Neolithic to Bronze Age central Anatolia.

Cattle

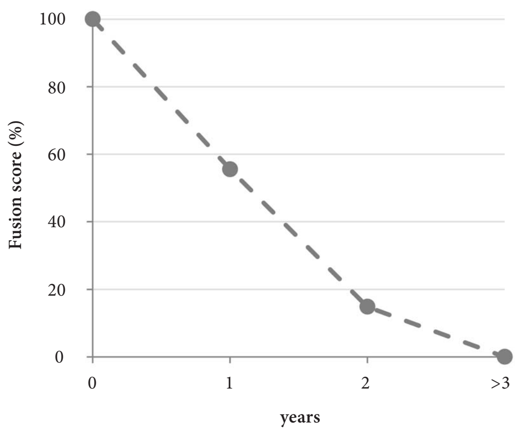
The age at death data for cattle is presented in the same way as it is for sheep and goats (tab. 25). Analysis of this data reveals a sharp contrast between pig and cattle age at death data (see fig. 28. 29). According to the fragments with *epiphyses* preserved, there is no evidence to indicate cattle were slaughtered in the first year of their life, and most of the late fusing elements (fusion score: 72,5 %) originate from animals that lived until the age of 6, and even older. This suggests that the cattle remains from the Square Buildings Horizon primarily belong to animals that were kept for their secondary products, perhaps as traction animals or for milking, and that their meat was only consumed once they reached old age. However, there were no pathologies found to indicate the use of the cattle as traction animals (e. g. Bartosiewicz 2002; Becker 2008). The varying sizes of fully fused elements suggest that there is more than one type of cattle present in the assemblage. Von den Driesch and Vagedes (1997) suggest that the variation in cattle size at Ḫattuša is a result of cattle trading with the surrounding areas. Their variation in size may also be a result of different breeding techniques and/or the food the animals consumed: At the middle Assyrian site of Dur Katlimmu, written sources may provide evidence for the existence of a special type of large cattle at the site, which was fed special fodder and was used exclusively for traction and threshing (Röllig 2008; Becker 2008).

The Pig

The pig is found in low frequency (ca. 5.3 %) in the Valley west of Sarıkale as it is in the Hittite Lower City (von den Driesch – Boessneck 1981, tab. 3) and Hittite Büyükkaya (von den Driesch – Pöllath 2004, tab. 8). This reflects what is commonly found in Hittite faunal assemblages (Arbuckle 2009): The pig occurs in relatively low frequencies at urban and high-status sites, and is, conversely, more abundant in rural settlements. Based on the findings from the Hittite area and from other regions and periods in the Near East, the pig is regarded as a low-status animal that is connected to a household level subsistence as compared to domestic ruminants that support a more politically-centralized economy (Zeder 1991; Bartosiewzcz 1998; Becker 2008; Arbuckle 2009).



28 Rate of Survival based on Redding's (1981) »fusion score« from epiphyseal fusion data of cattle bones (n = 59) from SB1, SB2 and B7



29 Rate of Survival based on Redding's (1981) »fusion score« from epiphyseal fusion data of pig bones (n = 33) from SB1, SB2 and B7

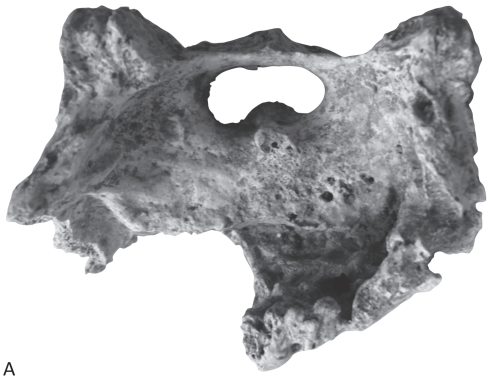
While the pig (as well as the dog) is designated as an unclean animal in Hittite written sources and used in magic rituals (Collins 1990; Mouton 2004), archaeozoological analysis suggest their wide use as a food source (e. g. at Ḫattuša: von den Driesch – Boessneck 1981; von den Driesch – Pöllath 2004). Age at death data from pig remains of the Square Buildings Horizon are in accordance with their use primarily as a source of meat.

Age at death data from pig bones is presented in the same way as data from sheep and goats and skeletal elements are grouped according to early, intermediate and late fusing. According to the evidence from early fusing fragments, around 45% (fusion score: 55.6%) of the pigs did not live past their first year and only a few fragments (fusion score: 14.8%) evidence the survival of pigs beyond their third year of life (fig. 29; tab. 26). The respective fragments all originate from SB1. Among the late fusing bones, no fragment with a fused *epiphyse* was present, suggesting that pigs were usually slaughtered before they reached the age of three years or soon thereafter. This conclusion is supported by the tooth eruption and abrasion data: There are no specimens within the present assemblage that show the slightest sign of abrasion on their third molar, if the third molar has fully erupted at all. The age at death profile of the Square Buildings Horizon is in agreement with the assumption that pigs are primarily a source of meat. Since pigs produce large litters, the majority are culled within their first three years of life (Arbuckle 2009); either they are slaughtered when they reached their full size, or they are culled earlier if especially tender meat is wanted.

The Dog

With 2.4% of the NISP, the dog is more frequent among this assemblage than in Hittite Büyükkaya (0.4% of the NISP, von den Driesch – Pöllath 2004, tab. 8) and in the Hittite Lower City (1.1 % of the NISP, von den Driesch – Boessneck 1981, tab. 3). It is tempting to relate the higher frequency of dogs in the Valley west of Sarıkale to the presumed purpose of the buildings as housing for sentries: Previously, a similarly high proportion of dogs from the contexts of the temple in Kušaklı-Sarissa was tentatively interpreted as possible evidence for the presence of guard dogs belonging to the temple area (von den Driesch – Vagedes 1997, 131). However, the relation of the dog remains within the present assemblage and the original use of the Square Buildings remains unclear.

The dog as well must have added to some extent to the menu of the Hittites (von den Driesch – Boessneck 1981, 54). Indeed with respect to the present assemblage cut marks on dog bones indicate that their post-mortem exploitation was not restricted to the use of fur: Cut marks occur in similar frequency (11%) as for typical meat suppliers like the pig (tab. 10), and are found on the ribs, the *femur*, the *calcaneus* and lumbar *vertebrae*. Still there is not much textual evidence for the eating of dogs (Collins 1990, 213) and the dog was considered to be an unclean animal and was not offered to the gods (Collins 1990, 225). Instead dogs are closely related to the huntsman and the hunt (Collins 2002a; 2002b) and were kept for shepherding and guarding (Collins 1990). Moreover the pup-



A

B

C

30 Lumbar *vertebra* and *sacrum* of dog. Note the *exostosis* from the *sacrum* overlapping on the last lumbar *vertebra*. sc. 1:1

31 Cut marks on dog *humerus*. Frontal view. sc. 1:1

py played an important role in magic purification rituals. Those rituals however, did not occur at the Hittite royal court but were confined to the people and the military (Collins 1990, 224).

Apart from the surprisingly high proportion of cut marked bones among the dog remains (11%), the finds of dogs from the Square Buildings Horizon display some more peculiarities: First, there is an overabundance of cranial and mandibular parts among the dog remains, as opposed to the skeletal part representation of common meat suppliers (fig. 4 for an example). Further the bulk part of dog finds from Square Building 2, were confined to contexts from a single room and contained among others skull and mandible fragments of at least four but possibly nine individuals; two to four adults, one to three juveniles, and one to two infantiles. The significance of this find however, remains unclear. In SB1 on the other hand, the remains (eight lumbar *vertebrae*, the *sacrum*, the *pelvis*, parts of the *femur* and the *tibia*) of an adult dog where found with a severe degree of exostosis on the last lumbar *vertebra* and the *sacrum*. The pathology seems so severe, that the individual would have been in some pain and would have had difficulty moving the rear end (fig. 30). The fact that the *acetabulum* region on the *pelvis* is fine however would suggest that it could still have at least walked. In any case, the continuous *vertebrae* along with all the other fragments would support the idea that this individual was found in situ. Yet, one of the distal *humeri* from the same context shows clear cut marks from flesh removal (fig. 31). Two possibilities arise. First, either the *humerus* does not belong to the same individual showing the pathology. This would mean that some dogs were eaten whereas others were kept into old age. Or, the *humerus* may well belong to the same individual. This would mean that dogs could have been kept into old age, and still have been eaten.

Equids

For common livestock like cattle, sheep/goat and pig the percentage of specimens displaying cut and hack marks or a combination thereof, is quite homogenous at around 12% (tab. 4). Although the NISP for equids is considerably smaller than the NISP for the other taxa, it is still worth mentioning the 8.8% frequency of butchery marks on equid bones, in accordance to a similar finding made by von den Driesch and Boessneck: Low frequency equid meat consumption seems to be a consistent feature of the Hittite faunal assemblages from Ḫattuša, and from elsewhere (e. g. von den Driesch – Boessneck 1981, 60; von den Driesch 1996, 30). Written sources provide evidence for the consumption of equid meat, at least in times of need (Klengel 2007, 162 and references therein). An alternative explanation for the cut mark on equid bones could be, that as in other parts of the Near East equid meat was fed to dogs (Zeder 1991, 35), and the proportion of dogs is relatively high in the Square Buildings Horizon compared to the Hittite Lower City of Ḫattuša or Hittite Büyükkaya (von den Driesch – Boessneck 1981, tab. 3; von den Driesch – Pöllath 2004, tab. 8).

Wild Species

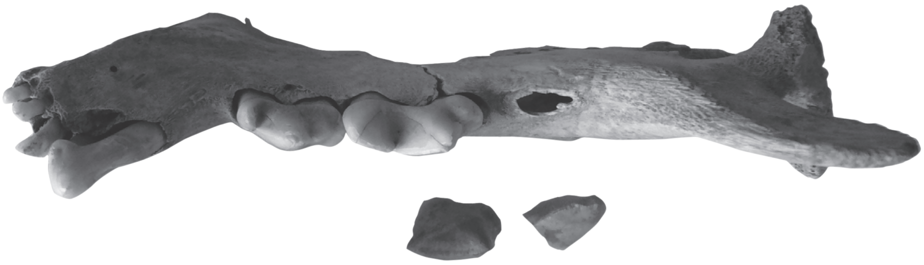
Overview

A few wild species were found in the Square Buildings Horizon, although they only represent 2.5% of the assemblage. Deer and boar, which are typical meat game represent 85% of the total weight of all wild animals. Other species which may have been primarily eaten include hare, fish, of which only cyprinids could be identified and birds. The latter are mainly represented by ducks, geese, partridges and pheasants which are all edible. Oyster shells were also found on site. Other wild species included fox and weasel, which along with the hare, could have been used primarily for their fur, although these only represent a few individuals. A special note can be made of a single lion cub which is discussed in more detail below.

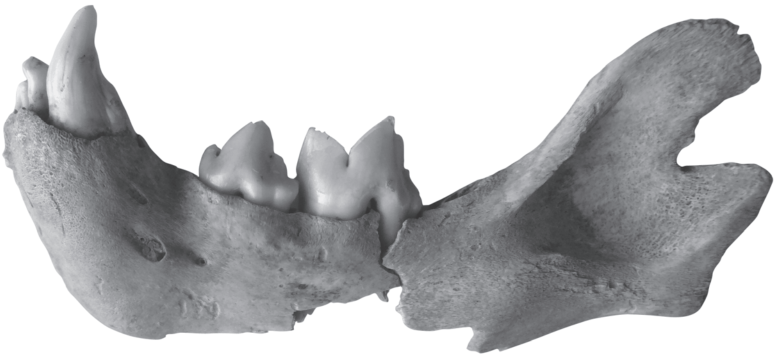
Luxury and Exotic Items

Only two species identified could be classified as exotic or remarkable, a lion cub and some oysters. Although only the mandible could be identified as *Panthera leo*, the remaining bones belonging to a large feline are most probably the same individual. Altogether, a *mandibula*, two *metatarsi*, a *metacarpus* II, a *humerus*, a *pelvis*, 2 *femori* and a *radius* are thought to belong to the same animal. It is only about 5 months old based on the teeth eruption pattern (Smuts – Anderson – Austin 1978) as shown in fig. 32. 33. Until now, there is no reason not to believe that the lion *Panthera leo* was present in Anatolia at the time of the Hittite Empire. A review of the literature and the archaeological finds (bones as well as artefacts or reliefs) concerning the lion and its distribution during the Holocene can be found in Schnitzler (2011) and citations within. There still remains the problem of deciding whether the finds relate to imported animals from Syria (Schnitzler 2011). The fact that the cub is quite young may suggest that it was born at a not too great distance, since young cubs are difficult to rear. The reason for its presence is more difficult to interpret. Lion cubs have a very soft fur with spots up to the age of 3 months (Schaller 1972, 28). By the age of 5 months, their fur is short and tawny coloured, much like those of the adults. This would suggest that fur was not the main purpose of this animal, as has been suggested for other lions from the Hittite Empire (Schnitzler 2011). Indeed, it is too old for spotted fur, and too small for an adult-looking hide. There are also no obvious cut-marks on the bones that would suggest removal of flesh or skinning. Ünal (1985, 427 f.) mentions written sources that suggest the presence of live game, including lions, within settlements. These game animals were being kept in compounds for taming or for use in magic rituals.

An obvious import however is the oyster *Ostrea edulis* of which a total of 11 fragments were found. This is almost 3 times as many as found in Büyükkaya, all periods put together. What is also very particular is that from the 3 fragments found in Büÿukkaya dating from the Hittite period, all were perforated to be used as jewellery (von den Driesch – Pöllath 2004, tab. 32). From the Lower City, a total of 52 molluscs, described as sea molluscs were found dating from the 16th to the 14th century. It is not clear however, what species of shells they are or whether they were worked. It is also not clear whether there is a change in quantity through time (von den Driesch –



32 Mandible of lion. View from above. Note the emerging *alveolus* for the first adult molar. The crown of an M_1 pictured below the mandible was found inside the mandible. sc. 1:1



33 Mandible of lion, lateral view. sc. 1:1

Boessneck 1981, 14 f.). In the case of the Valley west of Sarıkale, none of the oyster shells were worked, and one was complete with both halves fitting together. Entire shells had also been noted during the 2003 excavations (Seeher 2004). The only traces of modification could be seen at the base suggesting they had been opened much as they are today, for consumption. This also suggests that they were probably transported alive.

Artefacts

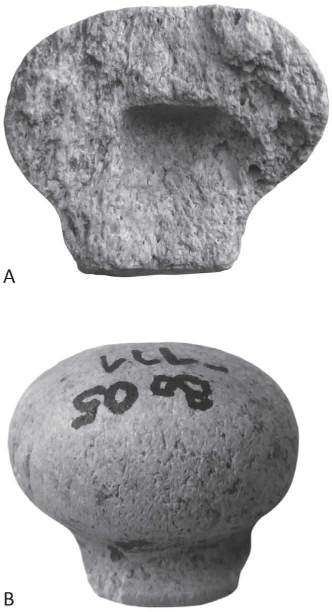
In three cases bones displayed holes potentially as described by von den Driesch and Pöllath (2004, 46 f.) (fig. 34). The holes were found on the *collum* of a *scapula*, the dorsal and plantar side of the distal shaft of a *tibia* and on a *calcaneus*. The reason for these modifications and the possible use of the items, however, remains unknown. In the present assemblage, it cannot entirely be ruled out that some of the holes may be the result of carnivore gnawing.

A few sheep and goat *astragali* display bifacial or unifacial abrasion, occurring on the medial and lateral faces as well as on the distal and proximal faces (fig. 35). Evidence for the use of *astragali* as an item in games, or an item holding symbolic meaning is well-documented. In Roman and Greek times and the ancient Near East (Boehmer – Wrede 1985; Gostnečnik 2005, 196 f.; Ayalon 2005, 71; von den Driesch – Pöllath 2004, 47). There is also evidence for its more recent use as dice in Greece or Iraq (Boehmer – Wrede 1985). A social significance was assigned to the finds of sheep, goat and pig *astragali* with similarly smoothed surface, at the Bronze Age site, Gonur Tepe, in Turkmenistan. This was based on the find of a stone *astragalus* model on that site and accumulated finds of smoothed and un-worked *astragali* within two rooms of a building (Moore 1993, 220). Further support for a special significance of the *astragalus* comes from Kilise Tepe, in South Turkey, where a deposit of 99 *astragali*,

34 Distal end of an ovicaprid with potentially man-made hole. sc. 1:1

A B

35 Sheep *talus* displaying evidence for bi-facial abrasions.
View from the dorsal side (a) and from the lateral side (b). sc. 1:1



A

B

36 Piece of manufactured antler;
possibly a small pedestal or knob. sc. 2:1

almost exclusively from sheep and goat, was uncovered in a Late Hittite non-residential building (Baker 2008, 411). In this respect it is interesting to note that both worked and un-worked *astragali* that were uncovered from the Square Buildings contexts were almost exclusively found in SB2 and B7. There was no accumulation with respect to single contexts, however.

Two additional artefacts made of antler were found and both were possibly parts of furniture. Fig. 36 could be a small pedestal or knob.

Discussion and Conclusions

The subjects of this study are the 6,705 faunal remains recovered from three buildings in the Valley west of Sarıkale, Ḫattuša. These buildings are Square Buildings 1 and 2, including a slightly younger phase atop of Square Building 2, the so-called »Neubau«-Horizon, and Building 7 (Seeher 2003; 2004a; 2005; 2006; Schachner 2008; 2009a). All of the three buildings date to the turn of the 16th to the 15th century B.C. (Schoop – Seeher 2006). The three buildings display a very similar layout and form an architectural complex. Presumably, they were constructed as a part of a larger building program in the capital that was conducted in the course of the emerging Hittite empire (Schachner 2009). Seeher (2004, 66) has suggested that the three buildings may have housed military sentries (see above p. 151).

Of the 6,705 fragments (38,849 g) 67.1 % (90.7 % according to weight) could be assigned to either the level of genus, to the category »*Ovis aries/Capra hircus*« or small ruminant. All of the identified species in this study have been attested for in previous archaeozoological work in Ḫattuša (von den Driesch – Boessneck 1981; von den Driesch – Pöllath 2004). The frequencies with which the different taxa occur are broadly consistent with the findings from those previous studies: The majority of the fragments represent domestic animals (97.6% of NISP), whereas fishing and hunting of game and birds, which were primarily waterfowl, were of minor importance.

Some features of the present assemblage however, seem to stand out, when compared to the other Hittite faunal assemblages from Ḫattuša that have been analysed until now. Firstly, the assemblage displays a very high proportion of ovicaprids overall, with a comparatively low sheep to goat ratio. The high amount of ovicaprids seems to come at the expense of cattle. The dog is more frequent than in other Hittite sites in Ḫattuša. And, finally, there are quite a few fragments of oysters as well as a lion cub from SB1, that may stand out as exotic or luxury items. These findings deserve further discussion.

The relative frequencies of the different taxa are fairly consistent over the three buildings. The most abundant taxa are ovicaprids (tab. 6), which is not surprising for a Bronze Age assemblage of the Near East (e. g. Gündem 2010). However, the extent to which this particular assemblage is dominated by the remains of ovicaprids (81.1%) is remarkable when compared to the previously analysed faunal remains from Ḫattuša. In the earlier Hittite contexts from the Lower City (phase 2/3), sheep and goats constitute around 54% of the fragments (von den Driesch – Boessneck 1981, tab. 3), whereas in contexts from Büyükkaya, they range from 70% in the older Hittite period (ca. 16th century B.C.) to 58% in the period of the Hittite empire (von den Driesch – Pöllath 2004, tab. 5–7). Interestingly, the ovicaprid proportion from the Square Buildings Horizon is closest to the contemporaneous old-Hittite assemblage from Büyükkaya. Based on the currently available evidence, there seems to be a stronger reliance on sheep and goats during the early Hittite period (16th/15th century B.C.) than during the following Hittite Empire period (14th/13th century B.C.) in Ḫattuša (von den Driesch – Pöllath 2004, tab. 5–7). In the present assemblage the higher proportion of sheep and goat is at the expense of cattle: Whereas in Büyükkaya and the Lower City, cattle make up around 30% of the NISP in Hittite times (von den Driesch – Boessneck 1981, tab. 3; von den Driesch – Pöllath 2004, tab. 8), less than 10% of the remains from the Square Buildings Horizon belong to cattle. Pigs and equids however, are as frequent in the Valley west of Sarıkale as in the assemblages from the Hittite Lower City (von den Driesch – Boessneck 1981, tab. 3) and Hittite Büyükkaya (von den Driesch – Pöllath 2004, tab. 8).

Various explanations have been put forward for an increased reliance on ovicaprids: An increase in the number of sheep and goats at the expense of cattle has been related to climatic deterioration at the advent of the Iron Age in central Anatolia (Hongo 1998): A decrease in rainfall would have resulted in a pressure to farm all available arable lands in the valleys that otherwise would have been left to grazing cattle. Sheep and goats, it is argued, are more often pastured on elevated or steep terrains, where they are less in competition with crop farming (Hongo 1998, 261). Similarly, an increase in the importance of ovicaprids at the beginning of the Iron Age at Gordion has been related to the disintegration of super-regional power structures and a co-current climatic deterioration (Zeder – Arter 1994). For northern Syria, elevated frequencies of cattle have been related to the emergence of a wider regional organisation, whereas the subsequent decrease in cattle frequency along with an increase in ovicaprids during the Late Bronze Age and at the beginning of the Iron Age has been explained with a return to a more local scale economy (Clason – Buitenhuis 1998). On the other hand, during the Uruk time, shifts in subsistence strategies towards an increased importance of ovicaprids have been related to the emergence of superregional trade and administration in the North of Syria and the South of Central Anatolia (Siracusano 2004).

In other words, there is no single explanation for an increased dependence on ovicaprids. Instead, every shift has to be interpreted within its geographical and historical context. Although the ovicaprid frequencies in the assemblages from early Hittite Büyükkaya and the earlier Hittite phases at the Lower City do not reach the level of the respective frequency from the Square Buildings Horizon, it is interesting to note that in both sequences, the highest amount of ovicaprid bones were found in association with earlier Hittite layers with ca. 70% of the faunal assemblage identified as ovicaprids in early Hittite Büyükkaya and 54% in the earlier Hittite Lower City, phase 3 and 2 (von den Driesch – Boessneck 1981, tab. 7; von den Driesch – Pöllath 2004, tab. 5–7). However, for the present assemblage an interpretation reaching beyond the scale of the Valley west of Sarıkale is not attempted, as strictly contemporaneous comparative material from within and around Ḫattuša remains scarce. Furthermore, findings from the assemblage from Kaman Kalehöyük (Hongo 1998) suggest that a relatively high proportion of ovicaprids is not a specific feature of 16th century B.C. faunal assemblages in Central Anatolia: The faunal material from Kaman Kalehöyük IIIb (1650–1500 B.C.) contains less than 50% sheep and goat bones, and in fact, displays the lowest ovicaprid proportion within the analysed sequence, that stretches from the Old Assyrian time up to the Iron Age (Hongo 1998, 260 fig. 2). The high ovicaprid frequency in the Square Buildings Horizon could be connected to a more centrally organized economy under early Hittite rule in Ḫattuša. However, the subsequent decrease in the importance of sheep and goats during the 14th and 13th century B.C. at Ḫattuša (von den Driesch – Boessneck 1981, tab. 7; von den Driesch – Pöllath 2004, tab. 6. 7) comes at a time, when the Hittite rule is fully established and the degree of central organisation is supposedly at its peak.

The faunal remains of the Square Buildings Horizon should therefore be considered from a more local perspective: They represent the food and butchery remains from a single site within a presumably complex, stratified urban society. At the moment, the findings might be best interpreted in terms of the social status or the preferences of the residents of the Valley (Bartosiewicz 1998; Arbuckle 2009). The residents of the Square Buildings, potentially military staff, could have been connected to a central redistributive apparatus. This could actually show through a strong emphasis on a single taxon, as expected by Zeder (1991). The connection of the faunal remains to the use of the buildings from which they were retrieved has reasonably been questioned in the past (Becker 2008). However, the strong emphasis on sheep and goat is also observed when only the material from floor contexts in this assemblage is considered, suggesting that the importance of sheep and goat in the Square Buildings Horizon was real during its period of use. Within a centrally organised economic system, the Square Buildings consequently could represent a receiving or a contributing unit. If the former was the case, the valley residents were allocated a comparatively large amount of ovicaprids past their prime, especially senile female sheep and a relatively large amount of goats. However, the picture that arises from age at death data and the skeletal part distribution, if interpretable in terms of a dichotomous consumer and producer mode at all, rather speak in favour of a ›producer site‹ at the Valley west of Sarıkale (compare Stein 1987; Zeder 1991). The species and age spectrum of the ovicaprids would then result from selling or contributing marketable prime meat, all the while having to do with a lot of mature animals kept for stock breeding (Arbuckle 2009, 189) and probably fibre production (Arbuckle – Öztan – Gülçur 2009). Finally, it is also possible that the ovicaprid bones from the assemblage represent a herding unit (even if it is lacking some part of the prime meat animals), in which case fibre production likely was a focus of the herding strategies (Payne 1973; Arbuckle 2009; Arbuckle – Öztan – Gülçur 2009; Marom – Bar-Oz 2009).

During the Hittite Empire, wool was central to the economy. This is suggested by the many mentions of wool and sheep in texts (Beckmann 1988). Weavers had a particular status and were absolved of certain duties as mentioned in the Hittite law (Beckman 1988). Wool and skins are attested for on a religious level as sacrifice or offering alongside meat or whole animals. According to Beckman (1988) though, shepherds and herders in general did not share the same high status or respect as the weavers, on the contrary.

The sheep to goat ratio was 2:1 in the Square Buildings Horizon. In fact, for B7, where most of the material originates from floors, the amount of sheep and goat was found even. This ratio differs from the findings by von den Driesch and Boessneck (1981, 33) in the Lower City (considering all periods) that gave a 3:1 ratio of sheep to goat. On Hittite Büyükkaya, the sheep to goat ratio was 5:2 (von den Driesch – Pöllath 2004, 6). The relatively strong reliance on goats could have various causes, such as a preference for goat meat, or it could be a matter of social status. However, an interpretation is difficult to establish, as the faunal remains from the Lower City and Büyükkaya are not strictly contemporaneous (von den Driesch – Boessneck 1981, 19). According to textual evidence (Klengel 2007) and the faunal remains from Kuşaklı-Sarissa (von den Driesch – Vagedes 1997), there might be a connection between the sheep to goat ratio in the faunal remains and the social status of the residents from an area. The analysis of the Kuşaklı faunal material revealed a pronounced difference between the sheep to goat ratio from the temple contexts (9:1) and the residential quarters (4:1), where people seem to have relied much more on goat meat consumption than in the temple area (von den Driesch – Vagedes 1997, 124). However, as the time frame for the material from Kuşaklı spans around 400 years (beginning of the 16th century B.C. to 1200 B.C.), with no finer subdivision, the significance of this finding is difficult to assess. Moreover, the ratios found at the temple area and the residential quarters are both above any of the findings from the three sites in Ḫattuša. In his article about Hittite animal husbandry, Klengel (2007) quotes legal texts mentioning the compensation for stolen animals: According to Hittite law, goats were valued about half the price of a sheep. A low sheep to goat ratio would therefore not point towards the Square Building residents having had a high social status.

Cattle seemingly did not contribute to a large extent to the meat consumption of the residents of the Square Buildings Horizon. Cattle remains account for only around 8% of the identified fragments. Moreover, the relation of those remains to the original use of the buildings is much more doubtful, as the relative frequency of cattle remains in floor contexts seems to be considerably lower than in the less well stratified contexts within the same rooms. This might point to an even smaller amount of cattle meat being consumed in the Square Buildings. Age at death data for cattle does not point towards a regular consumption of prime cattle meat at Valley west of Sarıkale either: The majority of the animals must have been slaughtered at the age of six years or older. Hence, most of the cattle attested for did not primarily serve the purpose of meat production, but were mainly kept for their labour force or other secondary products.

The relatively high proportion of dog within the assemblage, compared to the Hittite Lower City (von den Driesch – Boessneck 1981, tab. 3) and Büyükkaya (von den Driesch – Pöllath 2004, tab. 8), could have various explanations. We know from texts about the importance of the dog as a companion in the hunt, in herding and as a guard (Collins 2002a). The latter use of the dogs would be consistent with Seeher's (2004, 66 and see above p. 147–153) suggestion that the Square Buildings housed military sentries. Indeed, a similarly elevated proportion of dog remains from the temple area in Kuşaklı was interpreted as a possible evidence for the presence of guard dogs belonging to the temple area (von den Driesch – Vagedes 1997, 131). However, the relation of the dog remains within the present assemblage and the original use of the Square Buildings remains unclear.

To summarise, the faunal assemblage in the Square Buildings Horizon does point to something particular, which is not typical of either temple or residential quarters during the Hittite period in Ḫattuša. It is impossible unfortunately to reconstruct the exact function of these buildings based on the zoological material. The archaeozoological assemblage in the Square Buildings Horizon however does not reject the hypothesis that they were military barracks. Indeed, the animal remains there point towards something previously unknown in Ḫattuša, which could be consistent with administrative units. Only further excavation of similar horizons could shed more light on this question.

Tables

	SB1	SB2	B7	Total
Poorly preserved surface (n-%)	0.8	10.8	4.8	5.5
Root etching (n-%)	5.3	2.7	3.3	3.9
Animal gnawing (n-%)	3.1	11.4	8.6	7.4
Traces of burning (n-%)	0.8	1.1	2.2	1.1
Mortar or plaster incrustations (n-%)	0.4	2.4	1.4	1.4
Patina green (n-%)	0.4	0.5	0.1	0.4
Patina brown (n-%)	0	2.1	1.2	1
Total (n)	**2931**	**2765**	**1009**	**6705**

Table 1 Visible taphonomic effects on bones. Green patina is usually a sign for contact with copper

	SB1	SB2	B7	Total
Identified fragments with predominantly old break faces and complete bones (n)	**1377**	**1542**	**488**	**3407**
of which small ruminants (n)	1111	1270	403	2784
of which small ruminants (%)	83.2	83.3	83.6	83.4
of which large ruminants and equids (n)	122	148	41	311
of which large ruminants and equids (%)	9.1	9.7	8.5	9.3
Identified fragments with predominantly fresh break faces (n)	**473**	**523**	**173**	**1168**
of which small ruminants (n)	369	389	151	909
of which small ruminants (%)	82	75.7	87.8	80
of which large ruminants and equids (n)	39	64	11	114
of which large ruminants and equids (%)	8.7	12.5	6.4	10

Table 2 Types of breakage observed on identified fragments

	SB1	SB2	B7	Total
n-% of fragments with new break faces	31.7	31.9	41	33.2
n-% of fragments det. to the level of genus (n-%)	50.6	59.6	48.3	54
n-% of fragments det. to the level of genus plus small ruminant	61.8	73.7	64.9	67.1
Total (n)	**2931**	**2765**	**1009**	**6705**

Table 3 Percentage of all fragments with fresh break faces in the different buildings; The determinate (det.) to the level of genus (including the category of *O. aries*/*C. hircus*); determinate to the level of genus (including the category of *O. aries*/*C. hircus*) or small ruminant, according to building and in total

	SB1	SB2	B7	Total
Average fragment weight (g)	5.9	5.8	5.4	5.8
g-% of fragments det. to the level of genus	84.2	86.6	86.2	85.5
g-% of fragments det. to the level of genus plus small ruminant	87.7	92.7	94.2	90.7
Total (g)	17285	16079	5486	38849
Average weight of fragment det. to the level of genus plus small ruminant (g)	8.4	7.3	7.9	7.8
Total of fragments det. to the level of genus plus small ruminant (g)	15160.9	14903.8	5165.9	35230.6
Average weight of indet. fragments (g)	1.9	1.6	0.9	1.6
Total of indet. fragments (g)	2120.5	1174.5	319.7	3614.7

Table 4 Average fragment weight (g) per building compared to the percentage of successfully identified fragments

	SB1	SB2	B7	Total
Small ruminants (n)	1503	1657	557	3717
Large ruminants and equids (n)	163	212	53	428
Indet. size small ruminant (n)	627	311	173	1111
Indet. size large ruminant (n)	77	66	19	162
Ratio det. small : large ruminant	9.2	7.8	10.5	8.7
Ratio indet. small : large ruminant sized animal	8.1	4.7	9.1	6.9

Table 5 Number of fragments successfully identified as ruminants compared to number of fragments which could not be identified beyond their size. Small ruminant include small ruminant, *O. aries*, *O. aries*?, *C. hircus*, *C. hircus*?, and *O. aries*/*C. hircus*. Large ruminants and equids include large ruminants, *B. taurus*, *C. elaphus*, *Equus sp*. and *E. asinus*

NISP (n)	**SB1**	**SB2**	**B7**	**Total**
Equus sp.	12	14	5	31
Equus asinus	3	-	-	3
Bos taurus	133	190	48	371
Ovis aries	71	103	28	202
Ovis aries?	47	40	9	96
Capra hircus	31	41	27	99
Capra hircus?	25	15	14	54
Small ruminant	327	389	168	884
Ovis a./Capra h.	1002	1069	311	2382
Sus domesticus	69	77	31	177
Sus dom./scrofa	44	19	1	64
Canis familiaris	45	58	6	109
Vulpes v./Canis fam.	-	1	-	1
Total domesticates	**1809**	**2016**	**648**	**4473**
Cervus elaphus	4	8		12
Cervidae indet.	3	-	-	3
Sus scrofa	7	12	2	21
Panthera leo	2	-	-	2
Large feline	8	-	-	8
Vulpes vulpes	2	-	-	2
Lepus europaeus	4	11	2	17
Mustela erminea/nivalis	1	-	-	1
Total wild mammals	**31**	**31**	**4**	**66**
Perdix perdix	-	1	-	1
Anas sp.	5	-	-	5
Anser sp.	3	1	-	4
Anatidae	-	7	3	10
Phasanidae	1	-	-	1
Aves indet.	6	4	2	12
Total birds	**15**	**13**	**5**	**33**
Bufo sp.	1	-	-	1
Cyprinidae	-	1	-	1
Pisces indet.	-	-	1	1
Ostrea edulis	4	4	3	11
Bivalvia	2	-	-	2
Total wild	**53**	**49**	**13**	**115**
Total	**1862**	**2065**	**661**	**4588**

Table 6 NISP (n) of all identified fragments for all three buildings

NISP (%)	SB1	SB2	B7	Total
Equus sp.	0.6	0.7	0.8	0.7
Equus asinus	0.2	-	-	0.1
Bos taurus	7.1	9.2	7.3	8.1
Ovis aries	3.8	5	4.2	4.4
Ovis aries?	2.5	1.9	1.4	2.1
Capra hircus	1.7	2	4.1	2.2
Capra hircus?	1.3	0.7	2.1	1.2
Small ruminant	17.6	18.8	25.4	19.3
Ovis a./Capra h.	53.8	51.8	47	51.9
Sus domesticus	3.7	3.7	4.7	3.9
Sus dom./scrofa	2.4	0.9	0.2	1.4
Canis familiaris	2.4	2.8	0.9	2.4
Vulpes v./Canis fam.	-	0	-	0
Total domesticates	**97.2**	**97.6**	**98**	**97.5**
Cervus elaphus	0.2	0.4	-	0.3
Cervidae indet.	0.2	-	-	0.1
Sus scrofa	0.4	0.6	0.3	0.5
Panthera leo	0.1	-	-	0
Large feline	0.4	-	-	0.2
Vulpes vulpes	0.1	-	-	0
Lepus europaeus	0.2	0.5	0.3	0.4
Mustela erminea/nivalis	0.1	-	-	0
Total wild mammals	**1.7**	**1.5**	**0.6**	**1.4**
Perdix perdix	-	0	-	0
Anas sp.	0.3	-	-	0.1
Anser sp.	0.2	0	-	0.1
Anatidae	-	0.3	0.5	0.2
Phasanidae	0.1	-	-	0
Aves indet.	0.3	0.2	0.3	0.3
Total birds	**0.8**	**0.6**	**0.8**	**0.7**
Bufo sp.	0.1	-	-	0
Cyprinidae	-	0	-	0
Pisces indet.	-	-	0.2	0
Ostrea edulis	0.2	0.2	0.5	0.2
Bivalvia	0.1	-	-	0
Total wild	**2.8**	**2.4**	**2**	**2.5**
Total	**100**	**100**	**100**	**100**

Table 7 NISP (%) of all identified fragments for all three buildings

Weight (g)	SB1	SB2	B7	Total
Equus sp.	205.2	378.6	100.6	684.4
Equus asinus	122.9			122.9
Bos taurus	3634.8	3886	1464	8984.8
Ovis aries	1140.6	1220.2	508.1	2868.9
Ovis aries?	683.1	551.2	124.3	1358.6
Capra hircus	316.2	490.2	263.3	1069.7
Capra hircus?	394.8	145.3	123.3	663.4
Small ruminant	600.1	972.5	439.8	2012.4
Ovis a./Capra h.	5933.2	5785.5	1618.3	13337
Sus domesticus	1152.9	714.5	361.3	2228.7
Sus dom./scrofa	279	81	1.7	361.7
Canis familiaris	400.9	314.7	48.4	764
Vulpes v./Canis fam.		1.2		1.2
Total domesticates	**14863.7**	**14540.9**	**5053.1**	**34457.7**
Cervus elaphus	131.2	166.6		297.8
Cervidae indet.	79.8			79.8
Sus scrofa	39.4	117.3	18.2	174.9
Panthera leo	20.2			20.2
Large feline	35.6			35.6
Vulpes vulpes	7.9			7.9
Lepus europaeus	10.1	11.7	5.1	26.9
Mustela erminea/nivalis	0.1			0.1
Total wild mammals	**324.3**	**295.6**	**23.3**	**643.2**
Perdix perdix		0.5		0.5
Anas sp.	3.5			3.5
Anser sp.	3.6	0.2		3.8
Anatidae		4.9	1.7	6.6
Phasanidae	1			1
Aves indet.	3.2	3.3	0.6	7.1
Total birds	**11.3**	**8.9**	**2.3**	**22.5**
Bufo sp.	0.1			0.1
Cyprinidae		5.4		5.4
Pisces indet.			5.6	5.6
Ostrea edulis	112.1	49	12.1	173.2
Bivalvia	0.3			0.3
Total wild	**448.1**	**358.9**	**43.3**	**850.3**
Total	**15311.8**	**14899.8**	**5096.4**	**35308**

Table 8 Weight (g) of all identified fragments for all three buildings

Weight (%)	SB1	SB2	B7	Total
Equus sp.	1.3	2.5	2	1.9
Equus asinus	0.8	0	0	0.3
Bos taurus	23.7	26.1	28.7	25.4
Ovis aries	7.4	8.2	10	8.1
Ovis aries?	4.5	3.7	2.4	3.8
Capra hircus	2.1	3.3	5.2	3
Capra hircus?	2.6	1	2.4	1.9
Small ruminant	3.9	6.5	8.6	5.7
Ovis a./Capra h.	38.7	38.8	31.8	37.8
Sus domesticus	7.5	4.8	7.1	6.3
Sus dom./scrofa	1.8	0.5	0	1
Canis familiaris	2.6	2.1	0.9	2.2
Vulpes v./Canis fam.	0	0	0	0
Total domesticates	**97.1**	**97.6**	**99.2**	**97.6**
Cervus elaphus	0.9	1.1	0	0.8
Cervidae indet.	0.5	0	0	0.2
Sus scrofa	0.3	0.8	0.4	0.5
Panthera leo	0.1	0	0	0.1
Large feline	0.2	0	0	0.1
Vulpes vulpes	0.1	0	0	0
Lepus europaeus	0.1	0.1	0.1	0.1
Mustela erminea/nivalis	0	0	0	0
Total wild mammals	**2.1**	**2**	**0.5**	**1.8**
Perdix perdix	0	0	0	0
Anas sp.	0	0	0	0
Anser sp.	0	0	0	0
Anatidae	0	0	0	0
Phasanidae	0	0	0	0
Aves indet.	0	0	0	0
Total birds	**0.1**	**0.1**	**0**	**0.1**
Bufo sp.	0	0	0	0
Cyprinidae	0	0	0	0
Pisces indet.	0	0	0.1	0
Ostrea edulis	0.7	0.3	0.2	0.5
Bivalvia	0	0	0	0
Total wild	**2.9**	**2.4**	**0.8**	**2.4**
Total	**100**	**100**	**100**	**100**

Table 9 Weight (%) of all identified fragments per species for all three buildings

	%	n
Equus sp.	8.8	34
Bos taurus	11.9	371
Ovicaprids	11.5	3717
Sus	12.4	241
Canis fam.	11	109

Table 10 Percentage of the NISP of the domestic species displaying butchery marks (cut marks, hack marks or a combination thereof). n represents the total amount of fragments for each species

Skeletal element	**n**	**C**	**H**	**C+H**	**Total (%)**
Os cornu	31	2			6.5
Cranium	110	8			7.3
Tooth	128		1		0.8
Mandibula	339	6			1.8
Scapula	127	17			13.4
Humerus	218	46			21.1
Pelvis	105	15			14.3
Femur	211	38			18
Radius	255	57			22.4
Ulna	57	10			17.5
Tibia	309	47			15.2
Astragalus	38	12	1	1	36.8
Calcaneus	45	7			15.6
Metapodials	271	51	1		19.2
Phal. 1 ant./post.	73	2			2.7
Costa	651	55	8		9.7
Atlas	24	11			45.8
Epistropheus	16	2	1		18.8
Vertebra cervicalis	77	6	5		14.3
Vertebra thoracalis	111	8			7.2
Vertebra lumbalis	63	6	1		11.1
Vertebra caudalis	7	2			28.6
Total	**3717**	**408**	**18**	**1**	**11.5**

Table 11 Number of ovicaprid fragments displaying butchery marks per skeletal element. n = total number of fragments per skeletal element. C = number of fragments displaying cut marks. H = number of fragments displaying hack marks. C + H = number of fragments diplaying both cut and hack marks. The total percentage includes all fragments displaying butchery marks

SB1	**Skeletal element**	**unfused**	**fusing**	**fused**	**Total**
0.5 years	*scapula*	0	0	11	11
	radius prox.	0	0	13	13
1st year	*phal. II*	0	0	17	17
	humerus dist.	2	1	20	23
	phal. I	3	3	16	22
2nd year	*tibia dist.*	2	0	21	23
3rd year	*calcaneus*	5	0	7	12
4th year	*metapodials dist.*	5	0	14	19
> 4 years	*humerus prox.*	2	0	2	4
	femur	9	1	6	16
	radius dist.	6	0	3	9
	ulna	4	0	1	5
	tibia prox.	0	2	4	6
	vertebrae	29	4	17	50

Table 12 State of fusion of the different ovicaprid long bones in SB1. The years represent the ages at which the different elements fuse

SB2	Skeletal element	unfused	fusing	fused	Total
0.5 years	*scapula*	0	0	14	14
	radius prox.	0	0	18	18
1st year	*phal. II*	1	0	12	13
	humerus dist.	2	2	16	20
	phal. I	5	7	24	36
2nd year	*tibia dist.*	5	2	21	28
3rd year	*calcaneus*	4	2	9	15
4th year	*metapodials dist.*	9	1	9	19
> 4 years	*humerus prox.*	2	1	5	8
	femur	12	2	11	25
	radius dist.	4	0	3	7
	ulna	1	1	5	7
	tibia prox.	4	0	4	8
	vertebrae	29	4	19	52

Table 13 State of fusion of the different ovicaprid long bones in SB2. The years represent the ages at which the different elements fuse

B7	Skeletal element	unfused	fusing	fused	Total
0.5 years	*scapula*	0	0	8	8
	radius prox.	0	0	7	7
1st year	*phal. II*	1	0	6	7
	humerus dist.	1	2	8	11
	phal. I	0	1	3	4
2nd year	*tibia dist.*	1	1	3	5
3rd year	*calcaneus*	3	1	3	7
4th year	*metapodials dist.*	3	0	1	4
> 4 years	*humerus prox.*	1	0	0	1
	femur	4	0	5	9
	radius dist.	4	0	2	6
	ulna	0	1	2	3
	tibia prox.	0	0	0	0
	vertebrae	11	6	12	29

Table 14 State of fusion of the different ovicaprid long bones in B7. The years represent the ages at which the different elements fuse

year of fusion	skeletal element	fusion score	unfused	fusing	fused
0.5 year	*scapula*	100	0	0	33
	radius prox.	100	0	0	38
	total 0.5 years	100	0	0	71
1st year	*humerus dist.*	86.1	5	5	44
	phal. II	94.6	2	0	35
	phal. I	78.2	8	11	43
	total 1st year	85	15	16	122
2nd year	*tibia dist.*	83	8	3	45
3rd year	*calcaneus*	60.3	12	3	19
4th year	*metapodials dist.*	58.3	17	1	24
> 4 years	*humerus prox.*	57.7	5	1	7
	femur	47	25	3	22
	radius dist.	36.4	14	0	8
	ulna	60	5	2	8
	tibia prox.	64.3	4	2	8
	vertebrae	42	69	14	48
	total > 4 years	45.7	122	22	101

Table 15 Redding's (1981) »fusion scores« for ovicaprid bones for all three buildings

Age at death	SB1	SB2	B7	Total
1st year	1	7	1	9
2nd year	13	9	3	25
3rd/4th year	4	11	6	21
> 4 years	22	14	3	39
Total	40	41	13	94

Table 16 Age at death estimations for ovicaprid mandibles only. Mandibles where only the M_1 could be recorded are left out

Age at death	SB1	SB2	B7	Total
1st year	0	3	0	3
2nd year	1	1	2	4
3rd/4th year	1	3	6	10
> 4 years	6	2	0	8
Total	8	9	8	25

Table 17 Age at death estimations for goat mandibles only. Mandibles where only the M_1 could be recorded are left out

Age at death	SB1	SB2	B7	Total
1st year	0	2	1	3
2nd year	5	5	1	11
3rd/4th year	1	5	0	6
> 4years	5	10	2	17
Total	11	22	4	37

Table 18 Age at death estimations for sheep mandibles only. Mandibles where only the M_1 could be recorded are left out

Ovis	GL	Factor	Height
Metacarpus	144	4.89	70.4
Metatarsus	146.8	4.59	67.4
Radius	166.3	4.02	66.8
Radius	152.2	4.02	61.8

Table 19 Wither heights in cm from the GL of long bones for sheep after Teichert (1975)

Capra	GL	Factor	Height
Metacarpus	120	5.75	69
Metatarsus	139.5	5.34	74.4

Table 20 Wither heights in cm from the GL of long bones for goat after Teichert (1975)

		Goat (n)	Range	x	Sheep (n)	Range	x
Valley west of Sarıkale		10	32.7–27.7	30.2	25	34.4–27.3	31.5
Lower City	von den Driesch – Boessneck 1981 (Tab. 21, 42)	34	37.5–27.5	31.8	138	38.0–27.5	32.3
Büyükkaya	von den Driesch – Pöllath 2004 (Tab. 37, 58; 38, 64)	7	35.0–28.0	30.5	42	35.0–26.5	31.2

Table 21 Range and mean of measurements on the *trochlea humeri* (BT) for goats and sheep from the Valley west of Sarıkale, compared to previous studies in Ḫattuša

		Goat (n)	Range	x	Sheep (n)	Range	x
Valley west of Sarıkale		9	29.3–23.7	27	25	31.4–23.8	28.2
Lower Valley	von den Driesch – Boessneck 1981 (Tab. 21, 43)	39	33.0–23.0	27.6	192	32.5–23.5	29.1
Büyükkaya	von den Driesch – Pöllath 2004 (Tab. 37, 60; 38, 65)	6	27.0–24.0	25.1	56	32.5–20.2	28.5

Table 22 Range and mean of measurements on the distal breadth (Bd) for goats and sheep from the Valley west of Sarıkale, compared to previous studies in Ḫattuša

		Goat (n)	Range	x	Sheep (n)	Range	x
Valley west of Sarıkale		13	30.7–25.3	27.8	19	34.3–27.3	30.8
Lower City	von den Driesch – Boessneck 1981 (Tab. 21, 43)	9	30.5–24.5	27.4	19	36.0–26.0	31.2
Büyükkaya	von den Driesch – Pöllath 2004 (Tab. 37, 61. 62; 38, 65)	3	28.0–24.0	27,0	15	33.5–28.0	30.1

Table 23 Range and mean of measurements on the greatest length of the lateral half (GLl) for goats and sheep from the Valley west of Sarıkale, compared to previous studies in Ḫattuša

		Capra (n)	Range	x	Ovis (n)	Range	x
Valley west of Sarıkale		16	44.5–33.7	38.3	17	43.1–34.9	39.5
Lower City	von den Driesch – Boessneck 1981 (Tab. 21, 43)	18	43.0–33.0	38.8	38	42.0–33.5	38.5
Büyükkaya	von den Driesch – Pöllath 2004 (Tab. 37, 62. 63; 38, 66)	16	42.0–33.0	37.5	63	44.0–31.5	36.9

Table 24 Range and mean of measurements of the greatest length (GL) for goats and sheep *phalanges* from the Valley west of Sarıkale, compared to previous studies in Ḫattuša. The goat *phalanx* with GL 44,5 (wild?) from the Valley west of Sarıkale is not included

year of fusion	skeletal element	fusion score	unfused	fusing	fused
1st year	*scapula*	100	0	0	7
	radius prox.	100	0	0	10
	total 1st year	100	0	0	17
2nd year	*humerus dist.*	100	0	0	2
	phalanx II	87.5	1	0	7
	phalanx I	100	0	0	5
	total 2nd year	93.3	1	0	14
3rd year	*tibia dist.*	100	0	0	4
	metapodials dist.	100	0	0	2
	calcaneus	0	1	0	0
	total 3rd year	85.7	1	0	6
> 6 years	*humerus prox.*	100	0	0	4
	radius dist.	33.3	2	0	1
	femur dist. & prox.	50	2	0	2
	tibia prox.	100	0	0	2
	vertebrae	78.6	1	1	5
	total > 6 years	70	5	1	14

Table 25 Number of fragments with unfused, fusing or fused *epiphyses* according to skeletal element and age of fusion for the cattle bones from SB1, SB2 and B7.

year of fusion	skeletal element	fusion score	unfused	fusing	fused
1st year	*humerus dist.*	57.1	3	0	4
	scapula	33.3	2	0	1
	radius prox.	60	2	0	3
	phalanx II	66.7	1	0	2
	total 1st year	55.6	8	0	10
3rd year	*tibia dist.*	20	4	0	1
	metapodials dist.	15.8	16	0	3
	phalanx I	0	2	0	0
	calcaneus	0	1	0	0
	total 3rd year	14	23	0	4
> 3 years	*humerus prox.*	0	2	0	0
	radius dist.	0	1	0	0
	ulna prox.	0	2	0	0
	femur dist. & prox.	0	6	0	0
	fibula	0	2	0	0
	total > 3 years	0	13	0	0

Table 26 Number of fragments with unfused, fused, or fusing *epiphyses* according to skeletal element and age of fusion for the pig bones from SB1, SB2 and B7. Where fragments of obviously very young individuals (younger than 6 months) with no *epiphyse* preserved were present in the assemblage, they were counted among the specimen with an unfused *epiphyse* on the earlier fusing *epiphyse* of the respective bone, irrespective of the absence of the *epiphyse*. Considering the remarks on carnivore gnawing (see p. 157 f.), this approach was followed, as unfused *epiphyses* of very young animals are strongly prone to adverse taphonomic effects (Marean 1991), and hence the bias towards better preserved fusing and fused elements would be even stronger without the consideration of those items.

NISP (n)	SB1	SB2	B7	Total
Equus sp.	12	14	5	31
Equus asinus	3			3
Bos taurus	133	190	48	371
Ovis aries	71	103	28	202
Ovis aries?	47	40	9	96
Capra hircus	31	41	27	99
Capra hircus?	25	15	14	54
Small ruminant	327	389	168	884
Ovis a./Capra h.	1002	1069	311	2382
Sus domesticus	69	77	31	177
Sus dom./scrofa	44	19	1	64
Canis familiaris	45	58	6	109
Vulpes v./Canis fam.		1		1
Total domesticates	**1809**	**2016**	**648**	**4473**
Cervus elaphus	4	8		12
Cervidae indet.	3			3
Sus scrofa	7	12	2	21
Panthera leo	2			2
Large feline	8			8
Vulpes vulpes	2			2
Lepus europaeus	4	11	2	17
Mustela erminea/nivalis	1			1
Total wild mammals	**31**	**31**	**4**	**66**
Perdix perdix		1		1
Anas sp.	5			5
Anser sp.	3	1		4
Anatidae		7	3	10
Phasanidae	1			1
Aves indet.	6	4	2	12
Total birds	**15**	**13**	**5**	**33**
Bufo sp.	1			1
Cyprinidae		1		1
Pisces indet.			1	1
Ostrea edulis	4	4	3	11
Bivalvia	2			2
Total wild	**53**	**49**	**13**	**115**
Indet. size hare	2			2
Indet. size cow	88	66	19	173
Indet. size sheep	627	311	173	1111
Indet. small/medium sized carnivore	2	2	1	5
Indet.	338	317	154	809
Homo sapiens	12	4	1	17
Total	**2931**	**2765**	**1009**	**6705**

Table 27 NISP (n) of all fragments for all three buildings including indeterminates and homo

NISP (%)	SB1	SB2	B7	Total
Equus sp.	0.4	0.5	0.5	0.5
Equus asinus	0.1	-	-	0.0
Bos taurus	4.5	6.9	4.8	5.5
Ovis aries	2.4	3.7	2.8	3.0
Ovis aries?	1.6	1.4	0.9	1.4
Capra hircus	1.1	1.5	2.7	1.5
Capra hircus?	0.9	0.5	1.4	0.8
Small ruminant	11.2	14.1	16.7	13.2
Ovis a./Capra h.	34.2	38.7	30.8	35.5
Sus domesticus	2.4	2.8	3.1	2.6
Sus dom./scrofa	1.5	0.7	0.1	1.0
Canis familiaris	1.5	2.1	0.6	1.6
Vulpes v./Canis fam.	-	0.0	-	0.0
Total domesticates	**61.7**	**72.9**	**64.2**	**66.7**
Cervus elaphus	0.1	0.3	-	0.2
Cervidae indet.	0.1	-	-	0.0
Sus scrofa	0.2	0.4	0.2	0.3
Panthera leo	0.1	-	-	0.0
Large feline	0.3	-	-	0.1
Vulpes vulpes	0.1	-	-	0.0
Lepus europaeus	0.1	0.4	0.2	0.3
Mustela erminea/nivalis	0.0	-	-	0.0
Total wild mammals	**1.1**	**1.1**	**0.4**	**1.0**
Perdix perdix	-	0.0	-	0.0
Anas sp.	0.2	-	-	0.1
Anser sp.	0.1	0.0	-	0.1
Anatidae	-	0.3	0.3	0.1
Phasanidae	0.0	-	-	0.0
Aves indet.	0.2	0.1	0.2	0.2
Total birds	**0.5**	**0.5**	**0.5**	**0.5**
Bufo sp.	0.0	-	-	0.0
Cyprinidae	-	0.0	-	0.0
Pisces indet.	-	-	0.1	0.0
Ostrea edulis	0.1	0.1	0.3	0.2
Bivalvia	0.1	-	-	0.0
Total wild	**1.8**	**1.8**	**1.3**	**1.7**
Indet. size hare	0.1	0.0	-	0.0
Indet. size cow	3.0	2.4	1.9	2.6
Indet. size sheep	21.4	11.2	17.1	16.6
Indet. small/medium sized carnivore	0.1	0.1	0.1	0.1
Indet.	11.5	11.5	15.3	12.1
Homo sapiens	0.4	0.1	0.1	0.3
Total	**100**	**100**	**100**	**100**

Table 28 NISP (%) of all fragments for all three buildings including indeterminates and homo

Weight (g)	SB1	SB2	B7	Total
Equus sp.	205.2	378.6	100.6	684.4
Equus asinus	122.9	-	-	122.9
Bos taurus	3634.8	3886.0	1464.0	8984.8
Ovis aries	1140.6	1220.2	508.1	2868.9
Ovis aries?	683.1	551.2	124.3	1358.6
Capra hircus	316.2	490.2	263.3	1069.7
Capra hircus?	394.8	145.3	123.3	663.4
Small ruminant	600.1	972.5	439.8	2012.4
Ovis a./Capra h.	5933.2	5785.5	1618.3	13337.0
Sus domesticus	1152.9	714.5	361.3	2228.7
Sus dom./scrofa	279.0	81.0	1.7	361.7
Canis familiaris	400.9	314.7	48.4	764.0
Vulpes v./Canis fam.	-	1.2	-	1.2
Total domesticates	**14863.7**	**14540.9**	**5053.1**	**34457.7**
Cervus elaphus	131.2	166.6	-	297.8
Cervidae indet.	79.8	-	-	79.8
Sus scrofa	39.4	117.3	18.2	174.9
Panthera leo	20.2	-	-	20.2
Large feline	35.6	-	-	35.6
Vulpes vulpes	7.9	-	-	7.9
Lepus europaeus	10.1	11.7	5.1	26.9
Mustela erminea/nivalis	0.1	-	-	0.1
Total wild mammals	**324.3**	**295.6**	**23.3**	**643.2**
Perdix perdix	-	0.5	-	0.5
Anas sp.	3.5	-	-	3.5
Anser sp.	3.6	0.2	-	3.8
Anatidae	-	4.9	1.7	6.6
Phasanidae	1.0	-	-	1.0
Aves indet.	3.2	3.3	0.6	7.1
Total birds	**11.3**	**8.9**	**2.3**	**22.5**
Bufo sp.	0.1	-	-	0.1
Cyprinidae	-	5.4	-	5.4
Pisces indet.	-	-	5.6	5.6
Ostrea edulis	112.1	49.0	12.1	173.2
Bivalvia	0.3	-	-	0.3
Total wild	**448.1**	**358.9**	**43.3**	**850.3**
Indet. size hare	0.3	-	-	0.3
Indet. size cow	682.7	337.5	96.9	1117.1
Indet. size sheep	861.9	429.3	140.8	1432.0
Indet. small/medium sized carnivore	1.2	1.6	0.2	3.0
Indet.	175.5	310.3	72.2	558.0
Homo sapiens	251.6	100.0	79.1	430.7
Total	**17285**	**16079**	**5486**	**38849**

Table 29 Weight (g) of all fragments for all three buildings including indeterminates and homo

Weight (%)	**SB1**	**SB2**	**B7**	**Total**
Equus sp.	1.2	2.4	1.8	1.8
Equus asinus	0.7	-	-	0.3
Bos taurus	21.0	24.2	26.7	23.1
Ovis aries	6.6	7.6	9.3	7.4
Ovis aries?	4.0	3.4	2.3	3.5
Capra hircus	1.8	3.0	4.8	2.8
Capra hircus?	2.3	0.9	2.2	1.7
Small ruminant	3.5	6.0	8.0	5.2
Ovis a./Capra h.	34.3	36.0	29.5	34.3
Sus domesticus	6.7	4.4	6.6	5.7
Sus dom./scrofa	1.6	0.5	0.0	0.9
Canis familiaris	2.3	2.0	0.9	2.0
Vulpes v./Canis fam.	-	0.0	-	0.0
Total domesticates	**86.0**	**90.4**	**92.1**	**88.7**
Cervus elaphus	0.8	1.0	-	0.8
Cervidae indet.	0.5	-	-	0.2
Sus scrofa	0.2	0.7	0.3	0.5
Panthera leo	0.1	-	-	0.1
Large feline	0.2	-	-	0.1
Vulpes vulpes	0.0	-	-	0.0
Lepus europaeus	0.1	0.1	0.1	0.1
Mustela erminea/nivalis	0.0	-	-	0.0
Total wild mammals	**1.9**	**1.8**	**0.4**	**1.7**
Perdix perdix	-	0.0	-	0.0
Anas sp.	0.0	-	-	0.0
Anser sp.	0.0	0.0	-	0.0
Anatidae	-	0.0	0.0	0.0
Phasanidae	0.0	-	-	0.0
Aves indet.	0.0	0.0	0.0	0.0
Total birds	**0.1**	**0.1**	**0.0**	**0.1**
Bufo sp.	0.0	-	-	0.0
Cyprinidae	-	0.0	-	0.0
Pisces indet.	-	-	0.1	0.0
Ostrea edulis	0.6	0.3	0.2	0.4
Bivalvia	0.0	-	-	0.0
Total wild	**2.6**	**2.2**	**0.8**	**2.2**
Indet. size hare	0.0	-	-	0.0
Indet. size cow	3.9	2.1	1.8	2.9
Indet. size sheep	5.0	2.7	2.6	3.7
Indet. small/medium sized carnivore	0.0	0.0	0.0	0.0
Indet.	1.0	1.9	1.3	1.4
Homo sapiens	1.5	0.6	1.4	1.1
Total	**100**	**100**	**100**	**100**

Table 30 Weight (%) of all fragments for all three buildings including indeterminates and homo

	Equus sp.	*Equus asinus*	*Bos taurus*	*Ovis aries*	*Ovis aries?*	*Capra hircus*	*Capra hircus?*	*Ovis a./Capra h.*	*Sus domesticus*	*Sus dom./scrofa*	*Canis familiaris*	*Cervus elaphus*	*Cervidae indet.*	*Sus scrofa*	*Panthera leo*	*Vulpes vulpes*	*Lepus europaeus*	*Mustela erminea/nivalis*	Small ruminant	Small/medium sized carnivore	*Aves*	*Bufo sp.*	*Homo sapiens*	**Total**
Os cornu				4	2	2		5					3											**16**
Cranium			1	2	1			40	5		2												4	**55**
Mandibula			10	10	1	5	3	152	7	3	3				1	1			45					**241**
Dentes			6					171	1	3				4					47					**232**
Os Hyoidium								3																**3**
Vertebrae	2		17	1	1	1		113	6		13								3					**157**
Sacrum			1					3			1													**5**
Sternum																					1			**1**
Costae	7		23							18	2								232	1				**283**
Scapula			9		4		1	47	3	1	1						1							**67**
Humerus			7	8	2		2	62	13	1	3	1			1		1				4			**105**
Radius			11	4	15		2	78	1	1					1									**113**
Ulna			8		4			12	2	4	1					1					2			**34**
Carpalia			2					2																**4**
Pelvis			2		3		2	46	7		5				1									**66**
Femur	1	1	9	7		2		54	5	5	4	1		1	2		2	1					1	**96**
Patella			2					2																**4**
Tibia			9	7	8	2	5	86	5	2	6	2		1							2		5	**140**
Fibula										3										1			1	**5**
Tarsalia			5	7	1	4	1	9	1													1		**29**
Metapodia	2		2	3	4	2	4	104	12	3	4				4									**144**
Phalanges		2	9	18	1	13	5	13	1					1										**63**
long bone indet.																					5		1	**6**

Table 31 Number of bone fragments per species and per skeletal element in SB1

	Equus sp.	*Equus asinus*	*Bos taurus*	*Ovis aries*	*Ovis aries?*	*Capra hircus*	*Capra hircus?*	*Ovis a./Capra h.*	*Sus domesticus*	*Sus dom./scrofa*	*Canis familiaris*	*Vulpes v./Canis fam.*	*Cervus elaphus*	*Cervidae indet.*	*Sus scrofa*	*Vulpes vulpes*	*Lepus europaeus*	Small ruminant	Small/medium sized carnivore	*Aves*	*Pisces*	*Homo sapiens*	**Total**
Os cornu			9		2	3		8															**22**
Cranium	1		10	7	12	4	5	38	4	13	7				1							1	**103**
Mandibula			15	16	6	9		92	8	1	3						1						**151**
Dentes			9					143	6		8				1		3	11					**181**
Os Hyoidium	1		1					1															**3**
Vertebrae			22					37	8		7				1			88					**163**
Sacrum			1						1		1												**3**
Sternum																		1		1			**2**
Costae	3		37					1	7	1	16		3		1		1	288	2	1			**361**
Scapula			12					57	4		1				1		1			1			**77**
Humerus	2		8	7	6	2	1	94	9		1		2							4			**136**
Radius	2		5	8	2	1		111	1		2									1			**133**
Ulna			4	6				22	3		1						1			2			**39**
Carpalia			7					6							1								**14**
Pelvis			5					42	3		4		1				1						**56**
Femur	1		8	3	2	2	3	103	5	2	2		1							1		1	**134**
Patella								3															**3**
Tibia			11	9	9	2	2	143	4	1					1		1	1		1		2	**187**
Fibula									7														**7**
Tarsalia			7	27	1	6	1	5	1														**48**
Metapodia	1		9	9		5		125	5		5	1	1		1		2						**164**
Phalanges	3		10	11		7	3	38	1	1					4								**78**
Coracoid																				1			**1**
Operculare																					1		**1**

Table 32 Number of bone fragments per species and per skeletal element in SB2

	Equus sp.	*Equus asinus*	*Bos taurus*	*Ovis aries*	*Ovis aries?*	*Capra hircus*	*Capra hircus?*	*Ovis a./Capra h.*	*Sus domesticus*	*Sus dom./scrofa*	*Canis familiaris*	*Sus scrofa*	*Lepus europaeus*	Small ruminant	Small/medium sized carnivore	*Aves*	*Pisces*	*Homo sapiens*	**Total**
Os cornu			1	3		1		1											**6**
Cranium			1	1	2	1	3	8	1					2			1		**20**
Mandibula				4		6	2	21	5										**38**
Dentes			1					47	5					2					**55**
Os Hyoidium								1											**1**
Vertebrae			4					28	2					32					**66**
Sacrum	1							1											**2**
Costae			12						1		2	2		131					**148**
Scapula	1		4					18			1								**24**
Humerus			5	2	2	4	3	23	2										**41**
Radius			6	3	1	3	1	26	1	1	1								**43**
Ulna				2		1		10								1			**14**
Carpalia			2					4											**6**
Pelvis	1							12	2		1					1			**17**
Femur	1		3	2	2	1		30					1					1	**41**
Patella			2					1											**3**
Tibia	1		2	1	1		1	32	3							1			**42**
Fibula									1										**1**
Tarsalia			1	8	1	8	2	9			1								**30**
Metapodia			2	1		1		25	4				1		1				**35**
Phalanges			2	1		1	2	14	4										**24**
long bone indet.														1					**1**
Carpometacarpus																1			**1**
Coracoid																1			**1**

Table 33 Number of bone fragments per species and per skeletal element in B7

Os cornu		**GD base**	**LD base**	**basal circumference**			
	B7	52.2	40.4	145.0			
Mandibula		**L P4–P2**		**H in front of P2**		**H in front of M1**	
	SB2	50.2		34.6		47.3	
Scapula		**GLP**	**LG**	**BG**			
	SB1	-	51.7	43.3			
	SB2	67.5	56.0	45.9			
Sacrum		**HFcr**					
	SB2	27.9					
Humerus		**BT**					
	B7	81.8					
Radius		**Bd**	**Dd**	**Bp**	**BFp**		
	SB1	75.8	36.7	-	-		
	SB1	-	39.7	-	-		
	SB1	-	-	78.0	72.1		
	SB2	-	-	75.4	67.1		
	B7	-	-	83.3	76.3		
Femur		**Bd**	**DC**				
	SB1	-	44.7				
	SB1	92.8	-				
Tibia		**GB**	**GL**	**Bd**			
	SB1	52.2	62.2	-			
	SB1	-	58.7	-			
	SB1	-	-	56.8			
	SB2	-	-	52.5			
Os carpale II & III (C.)		**GB**					
	SB1	32.6					
	SB1	34.2					
	SB2	34.1					
Os carpale IV		**GB**					
	SB2	34.5					
Os malleolare (T.)		**GD**					
	SB2	35.5					
Radiale (C.)		**GB**					
	SB2	45.7					
	SB2	38.8					
	SB2	40.7					
Intermedium (C.)		**GB**					
	B7	39.8					
Ulnare (C.)		**GB**					
	SB2	46.5					
	B7	41.6					
Astragalus		**GLl**	**GLm**	**Dl**	**Dm**	**Bd**	
	SB1	68.9	-	37.7	-	-	
	SB2	65.4	61.3	35.6	33.5	43.2	
	SB2	-	-	31.2	-	-	
	SB2	62.4	59.0	35.1	32.7	41.1	
	SB2	59.4	55.4	30.1	-	36.6	
	B7	-	62.0	-	-	-	
Centrotarsale		**GB**					
	SB1	51.7					
Calcaneus		**GB**					
	SB2	44.8					

Table 34 – Page 1 *Bos* measurements

Phal. I anterior/posterior		GL	SD	Bp	Bd	Dp	Dd
	SB1	-	-	26.1	-	32.2	-
	SB1	56.2	25.5	28.6	26.4	31.1	19.5
	SB1	53.8	23.5	27.7	26.5	30.8	20.5
	SB1	-	-	30.3	-	30.3	-
	SB2	-	-	-	26.9	-	-
	B7	60.5	-	27.7	25.8	-	-
Phal. II anterior/posterior		**GL**	**SD**	**Bp**	**Bd**	**Dp**	**Dd**
	SB2	40.0	22.7	28.6	23.6	34.4	28.1
	SB2	44.2	26.2	30.0	26.0	-	-
	SB2	40.3	22.0	27.4	21.6	-	-
	SB2	34.9	16.5	21.7	19.0	-	-
	SB2	-	22.7	26.7	22.9	-	-
	B7	42.9	22.5	28.4	-	-	-
Phal. III anterior/posterior		**DLS**	**Ld**	**MBS**			
	SB2	74.4	54.3	24.4			
	SB2	63.9	51.9	21.8			
	SB2	62.9	49.8	20.0			

Table 34 – Page 2 *Bos* measurements

Phal. I posterior		GL	SD	Bp	Bd	Dp	BFp	BFd
E. asinus	SB1	58.0	19.4	33.1	28.6	24.3	31.2	27.7
E. asinus	SB1	65.0	22.8	37.1	33.0	27.9	36.2	31.0
Phal. I anterior/posterior		**GL**	**SD**	**Bp**	**Bd**	**Dp**	**BFd**	
E. caballus?	SB2	86.5	34.9	53.6	46.2	39.7	45.1	
Phal. II anterior/posterior		**GL**	**SD**	**Bp**	**Dp**	**BFd**		
E. caballus?	SB2	50.0	44.7	54.1	31.2	47.5		

Table 35 *Equus* measurements

Mandibula		**L M3–P2**	**L M3–M1**	**L P4–P2**	**L diastema**	**H front P2**	**H front M1**	**H behind M3**
Ovis	SB1	-	-	22.1	25.0	-	16.1	-
Ovis	SB1	-	-	23.7	-	-	-	-
Ovis	SB1	-	51.9	-	-	-	-	-
Ovis?	SB1	76.9	51.3	25.1	-	-	-	37.4
Ovis	SB2	-	-	-	-	-	25.4	-
Ovis	SB2	-	-	-	-	-	25.4	-
Ovis	SB2	-	-	26.0	-	18.8	23.9	-
Ovis	SB2	-	-	23.8	-	16.0	21.7	-
Ovis	SB2	-	-	20.5	-	20.9		-
Ovis	SB2	-	-	-	-	-	27.1	-
Ovis	SB2	-	-	21.7	-	-	-	-
Ovis	SB2	-	-	-	-	-	-	37.6
Ovis	SB2	-	-	-	-	17.0	-	-
Ovis?	SB2	-	-	27.8	-	17.4	24.7	-
Ovis?	SB2	-	-	-	-	-	-	39.4
Ovis?	SB2	-	-	-	-	-	20.4	-
Ovis	B7	77.3	52.5	25.8	-	19.7	23.8	-
Ovis	B7	-	-	-	-	-	-	38.3
Atlas		**GL**	**BFcr**	**BFcd**				
Ovis?	SB1	46.0	55.3	49.3				
Scapula		**SLC**	**GLP**	**BG**				
Ovis?	SB1	21.5	33.0	21.2				
Ovis?	SB1	21.0	35.2	-				
Ovis?	SB1	21.6	37.0	24.6				
Ovis?	SB1	21.0	32.5	22.1				
Humerus		**BT**	**HT**	**Bd**	**Bp**	**SD**		
Ovis	SB1	30.1	-	31.8	-	-		
Ovis	SB1	34.4	-	38.0	-	-		
Ovis	SB1	30.6	-	32.9	-	14.6		
Ovis?	SB1	32.2	-	33.3	-	-		
Ovis	SB1	31.3	-	33.9	-	-		
Ovis	SB1	30.0	-	31.9	-	-		
Ovis?	SB1	30.8	-	30.5	-	-		
Ovis	SB1	32.4	-	33.3	-	-		
Ovis	SB2	32.6	20.4	34.5	-	-		
Ovis	SB2	32.4	20.2	33.0	-	-		
Ovis	SB2	32.4	20.7	33.4	-	-		
Ovis	SB2	31.9	19.3	32.5	-	-		
Ovis	SB2	31.7	21.0	34.6	-	-		
Ovis	SB2	31.1	20.4	33.0	-	-		
Ovis	SB2	30.7	20.0	32.2	-	-		
Ovis?	SB2	34.5	20.5	35.6	-	-		
Ovis?	SB2	33.8	21.0	34.5	-	-		
Ovis?	SB2	29.6	18.7	30.9	-	-		
Ovis?	SB2	29.4	19.2	-	-	-		
Ovis?	SB2	29.2	17.2	29.6	-	-		
Ovis?	SB2	28.9	18.6	30.3	-	-		
Ovis?	SB2	-	-	-	42.1	-		
Ovis	B7	34.9	22.2	37.4	-	-		
Ovis	B7	27.3	17.0	28.0	-	-		
Ovis?	B7	33.7	21.2	-	-	-		
Ovis?	B7	30.7	17.5	31.5	-	-		

Table 36 – Page 1 *Ovis* measurements

Radius		**GL**	**SD**	**Bp**	**Dp**	**BFp**	**Bd**
Ovis	SB1	-	-	32.6	15.3	-	-
Ovis	SB1	-	-	34.6	-	32.2	-
Ovis	SB1	-	-	34.8	17.2	-	-
Ovis	SB1	166.3	17.3	36.1	17.2	32.1	-
Ovis?	SB1	-	20.2	-	-	-	-
Ovis?	SB1	-	17.1	-	-	-	-
Ovis	SB2	-	-	37.5	-	31.7	-
Ovis	SB2	-	-	36.6	-	-	-
Ovis	SB2	-	-	33.5	-	-	-
Ovis	SB2	-	-	32.7	-	31.9	-
Ovis	SB2	-	-	30.6	-	-	-
Ovis	SB2	152.2	15.7	-	-	-	28.8
Ovis	SB2	-	-	-	-	-	32.1
Ovis?	SB2	-	-	37.3	-	-	-
Ovis	B7	-	-	31.8	-	-	-
Ovis	B7	-	-	30.7	-	-	-
Ulna		**SDO**	**DPA**	**BPC**			
Ovis?	SB1	24.0	29.1	-			
Ovis?	SB1	-	-	19.4			
Ovis	SB2	23.4	26.6	19.6			
Ovis	SB2	22.7	27.0	19.3			
Ovis	SB2	23.8	-	-			
Ovis	B7	20.4	22.8	-			
Metacarpus		**GL**	**Bp**	**SD**	**Bd**	**Dp**	**DD**
Ovis	SB1	-	28.5	15.4	29.6	20.3	10.5
Ovis	SB1	-	-	15.2	28.7	-	9.2
Ovis	SB1	-	28.0	15.7	29.5	20.5	10.7
Ovis?	SB1	-	-	-	25.7	-	9.5
Ovis?	SB1	-	28.7	15.9	-	21.1	-
Ovis?	SB1	-	25.9	14.7	-	19.1	-
Ovis	SB2	-	-		30.1	-	-
Ovis	SB2	-	-	17.1	29.7	-	-
Ovis	B7	144.0	27.3	16.9	29.7	-	-
Pelvis		**SB**	**SH**	**LA**			
Ovis?	SB1	13.2	21.6	-	male		
Ovis?	SB1	-	-	28.5	female		
Femur		**Bp**	**Bd**	**DC**			
Ovis	SB1	-	-	22.3			
Ovis	SB1	46.4	-	21.0			
Ovis	SB1	-	41.1	-			
Ovis	SB1	-	32.8	-			
Ovis	SB2	53.2	-	-			
Ovis	SB2	46.7	-	-			
Ovis?	SB2	40.0	-	-			
Ovis	B7	49.0	-	-			
Tibia		**SD**	**Bp**	**Bd**	**Dd**		
Ovis	SB1	16.3	-	29.7	22.3		
Ovis	SB1	-	-	28.5	22.7		
Ovis	SB1	-	-	28.8	21.8		
Ovis	SB1	614.0	-	26.8	19.9		
Ovis	SB1	-	-	26.5	20.5		
Ovis	SB1	-	44.5	-	-		
Ovis	SB1	-	42.7	-	-		
Ovis?	SB1	-	-	28.0	22.0		
Ovis?	SB1	-	-	27.7	21.7		

Table 36 – Page 2 *Ovis* measurements

Ovis?	SB1	-	-	30.8	21.8			
Ovis?	SB1	-	-	31.4	23.5			
Ovis?	SB1	-	-	27.6	23.1			
Ovis?	SB1	-	-	29.1	22.0			
Ovis	SB2	-	-	30.8	-			
Ovis	SB2	-	-	30.2	-			
Ovis	SB2	15.5	-	28.4	-			
Ovis	SB2	-	-	25.8	-			
Ovis	SB2	-	-	24.9	-			
Ovis?	SB2	-	-	30.2	-			
Ovis?	SB2	-	-	28.9	-			
Ovis?	SB2	-	-	28.9	-			
Ovis?	SB2	-	-	28.5	-			
Ovis?	SB2	-	-	28.1	-			
Ovis?	SB2	-	-	26.6	-			
Ovis?	SB2	-	-	24.8	-			
Ovis?	SB2	-	-	23.8	-			
Ovis?	B7	-	-	31.1	-			
Centrotarsale		**GB**						
Ovis	SB2	26.5						
Astragalus		**GLl**	**Bd**	**GLm**	**Dl**			
Ovis	SB1	27.3	17.8	26.2	15.0			
Ovis	SB1	28.1	18.4	26.7	16.1			
Ovis	SB2	34.3	-	32.0	18.1			
Ovis	SB2	34.1	-	33.2	19.5			
Ovis	SB2	33.0	-	32.1	18.1			
Ovis	SB2	31.7	-	31.0	17.6			
Ovis	SB2	31.7	-	31.6	18.2			
Ovis	SB2	31.4	-	29.6	18.0			
Ovis	SB2	30.9	-	-	17.9			
Ovis	SB2	30.2	-	28.4	17.0			
Ovis	SB2	30.1	-	28.9	-			
Ovis	SB2	29.6	-	28.1	16.7			
Ovis	SB2	29.0	-	27.8	17.0			
Ovis	SB2	-	-	28.8	-			
Ovis	SB2	-	-	32.0	18.7			
Ovis?	SB2	28.6	-	26.7	14.3			
Ovis	B7	33.4	-	31.3	19.5			
Ovis	B7	32.1	-	-	17.6			
Ovis	B7	31.6	-	29.6	16.9			
Ovis	B7	29.5	-	28.0	17.0			
Ovis	B7	28.6	-	27.8	16.7			
Calcaneus		**GL**	**GB**					
Ovis	SB1	64.2	22.7					
Ovis	SB1	63.8	22.0					
Ovis	SB1	65.1	23.0					
Ovis	SB1	58.9	18.9					
Ovis	SB2	70.9	22.5	wild?				
Ovis	SB2	69.7	21.0	wild?				
Ovis	SB2	63.0	20.0					
Ovis	SB2	62.7	20.0					
Ovis	SB2	61.2	20.0					
Ovis	SB2	59.9	20.0					
Ovis	SB2	58.7	21.0					
Ovis	SB2	-	21.0					

Table 36 – Page 3 *Ovis* measurements

Metatarsus		**GL**	**Bp**	**SD**	**Bd**			
Ovis	SB2	146.8	23.9	13.4	27.8			
Ovis	SB2	-	-	-	24.8			
Ovis	SB2	-	-	-	28.3			
Ovis	SB2	-	-	-	25.0			
Ovis	SB2	-	24.1	-	-			
Phal. I anterior/posterior		**GL**	**SD**	**Bp**	**Bd**	**Dp**	**Dd**	
Ovis	SB1	38.9	11.1	13.5	12.8	15.1	12.2	
Ovis	SB1	36.6	-	-	12.5	-	12.5	
Ovis	SB1	40.3	10.3	13.9	12.3	15.7	11.3	
Ovis	SB1	40.1	12.2	-	12.9	-	12.6	
Ovis	SB1	43.0	12.2	14.2	14.1	15.5	12.8	
Ovis	SB1	40.8	10.2	13.7	11.9	15.7	10.7	
Ovis?	SB1	-	-	-	10.8	-	10.1	
Ovis	SB2	43.1	11.3	14.4	13.6	-	-	
Ovis	SB2	42.9	11.6	14.5	14.2	-	-	
Ovis	SB2	41.8	10.1	13.8	11.9	-	-	
Ovis	SB2	41.7	11.2	14.6	-	-	-	
Ovis	SB2	41.2	12.3	14.8	12.6	-	-	
Ovis	SB2	39.1	10.3	-	11.6	-	-	
Ovis	SB2	37.5	11.2	14.6	12.7	-	-	
Ovis	SB2	35.4	10.6	13.0	12.3	-	-	
Ovis	SB2	35.0	10.3	13.5	11.3	-	-	
Ovis	SB2	34.9	10.6	13.9	12.2	-	-	
Ovis	B7	39.0	10.7	13.7	13.0	-	-	
Phalanx II		**GL**	**SD**	**Bp**	**Bd**	**Dp**	**Dd**	
Ovis	SB1	-	8.4	11.2	8.9	12.5	10.4	
Ovis	SB1	20.6	11.2	13.6	11.3	12.9	11.1	
Ovis	SB1	24.5	8.5	11.5	9.7	13.7	10.0	
Ovis	SB1	24.5	9.2	13.2	-	13.3	12.2	
Ovis	SB1	26.0	9.9	14.4	10.8	15.0	13.3	
Ovis	SB1	24.0	9.1	12.2	9.7	11.4	10.7	
Ovis	SB1	-	9.9	13.2	11.0	14.2	13.0	
Ovis	SB1	26.9	9.9	13.9	11.3	14.4	11.3	
Ovis	SB1	22.0	10.4	13.6	10.9	14.3	12.2	
Phalanx III		**Ld**	**DLS**	**MBS**				
Ovis	SB1	19.2	26.6	5.5				
Ovis	SB1	20.0	30.5	6.1				

Table 36 – Page 4 *Ovis* measurements

Mandibula		**L M3–P2**	**L M3–M1**	**L P4–P2**	**H front P2**	**H front M1**	**H behind M3**
Capra?	SB1		50.5	-	-	23.5	38.0
Capra	SB2	-	-	24.9	18.9	24.5	-
Capra	SB2	-	-	-	-	21.0	-
Capra	SB2	-	-	25.3	-	-	-
Capra	SB2	-	-	-	-	22.3	-
Capra	B7	-	-	21.4	17.6	22.3	-
Capra	B7	73.8	49.3	23.3	15.9	21.4	37.9
Capra?	B7	-	-	28.8	19.5	-	-
Scapula		**SLC**	**GLP**	**BG**			
Capra?	SB1	23.0	39.4	27.1			
Humerus		**BT**	**HT**	**Bd**			
Capra?	SB1	31.8	-	31.4			
Capra	B7	30.8	19.8	33.4			
Capra	B7	30.1	17.4	31.7			
Capra	B7	29.6	17.9	29.9			
Capra	SB2	29.5	19.4	30.2			
Capra	SB2	29.1	17.0	29.8			
Capra	B7	27.5	16.1	28.6			
Capra?	B7	32.7	21.0	36.4			
Capra?	SB2	32.2	20.6	35.3			
Capra?	B7	28.8	18.2	-			
Radius		**Bp**					
Capra	B7	28.7					
Capra	B7	27.2					
Capra?	B7	31.6					
Ulna		**SDO**	**DPA**	**BPC**			
Capra	B7	19.0	22.3	19.9			
Metacarpus		**GL**	**SD**	**Bd**	**DD**		
Capra	SB1	-	-	27.4	11.3		
Capra	B7	120.0	15.9	30.2	-		
Metatarsus		**GL**	**SD**	**Bp**	**Bd**	**Dd**	**DD**
Capra?	SB1	139.5	13.5	24.3	28.5	18.8	11.1
Capra?	SB1	-	-	-	28.8	18.6	10.7
Capra?	SB1	-	-	-	23.7	15.2	8.8
Capra?	SB1	-	-	-	27.8	17.9	11.7
Capra	B7	-	-	-	21.8	-	-
Pelvis		**SB**					
Capra?	SB1	11.7	male				
Femur		**Bp**	**DC**				
Capra	SB1	38.9	19.1				
Capra	SB1	38.2	19.0				
Capra	SB2	43.8	-				
Capra	SB2	41.9	-				
Tibia		**SD**	**Bd**	**Dd**	**Bp**		
Capra	SB1	-	24.0	19.4	-		
Capra	SB1	-	25.5	19.9	-		
Capra	SB1	-	28.0	22.2	-		
Capra	SB1	-	28.9	21.3	-		
Capra	SB1	17.0	27.3	21.2	-		
Capra?	SB1	-	-	-	44.8		
Capra?	SB1	-	-	22.7	-		
Capra	SB2?	-	27.8	-	-		
Capra?	SB2	-	29.3	-	-		
Capra?	SB2	-	28.3	-	-		
Capra?	B7	-	23.7	-	-		

Table 37 – Page 1 *Capra* measurements

Astragalus		GLl	Bd	GLm	Dl		
Capra	SB1	28.9	19.5	27.8	14.6		
Capra	SB2	30.7	-	29.6	16.7		
Capra	SB2	29.6	-	28.6	16.7		
Capra	SB2	26.4	-	24.8	14.2		
Capra	SB2	25.8	-	24.5	13.8		
Capra	SB2	25.5	-	24.6	13.8		
Capra?	SB2	27.8	-	26.0	15.7		
Capra	B7	28.9	-	27.5	15.6		
Capra	B7	28.3	-	27.1	14.8		
Capra	B7	27.3	-	24.8	14.5		
Capra	B7	25.3	-	23.4	13.4		
Capra?	B7	29.8	-	29.3	16.5		
Capra?	B7	26.5	-	24.2	14.2		
Calcaneus		**GL**	**GB**				
Capra	SB1	18.5	52.4				
Capra	SB1	19.5	56.0				
Capra	SB2	53.7	16.5				
Capra	B7	53.3	16.5				
Capra	SB2	49.6	16.5				
Phal. I anterior/posterior		**GL**	**SD**	**Bp**	**Bd**	**Dp**	**Dd**
Capra	SB1	39.0	11.6	14.4	18.8	16.7	11.5
Capra	SB1	36.8	10.6	12.7	11.9	14.1	9.9
Capra	SB1	39.5	9.3	13.3	11.6	16.0	9.8
Capra	SB1	37.7	9.9	13.1	11.6	14.2	10.1
Capra	SB1	39.3	10.6	13.6	13.1	16.5	11.2
Capra?	SB1	37.4	9.8	12.7	11.8	14.9	10.4
Capra?	SB1	38.7	9.8	12.6	11.6	15.6	10.2
Capra?	SB1	38.5	11.6	14.1	13.7	15.9	11.1
Capra	SB2	34.2	8.3	10.9	10.5	-	-
Capra	SB2	34.0	9.1	11.6	10.8	-	-
Capra	SB2	-	9.4	12.5	11.6	-	-
Capra?	wild? SB2	44.5	11.1	14.6	13.8	-	-
Capra?	SB2	39.9	9.7	13.6	12.2	-	-
Capra?	SB2	33.7	9.3	10.8	10.5	-	-
Capra	B7	40.1	10.2	13.4	11.7	-	-
Capra?	B7	39.8	12.4	14.0	14.2	-	-
Capra?	B7	39.6	10.4	13.4	-	-	-
Phal. II anterior/posterior		**GL**	**SD**	**Bp**	**Bd**	**Dp**	**Dd**
Capra	SB1	23.6	11.2	13.8	11.5	13.5	12.7
Capra	SB1	25.0	10.0	13.5	11.2	13.3	12.2
Capra	SB1	23.7	9.6	12.8	10.5	13.1	12.1
Capra	SB1	25.5	9.9	12.8	9.9	13.2	11.9
Capra	SB1	23.6	11.4	15.0	12.4	14.6	11.3
Capra	SB1	23.7	11.1	14.5	12.1	13.7	13.3
Phal. III anterior/posterior		**Ld**	**DLS**				
Capra	SB1	4.1	36.2				
Capra	SB1	-	37.5				

Table 37 – Page 2 *Capra* measurements

Maxilla		**L P4–P2**						
	SB1	26.0						
Mandibula		**L M3–P2**	**L M3–M1**	**L P4–P2**	**L diastema**	**H front P2**	**H front M1**	**H behind M3**
	SB1	-	-	24.1	-	19.7	24.2	-
	SB1	-	53.0	-	-	-	21.0	-
	SB1	-	-	25.4	-	-	-	-
	SB1	-	-	-	-	16.8	-	-
	SB1	-	-	26.1	-	-	-	-
	SB1	-	-	32.2	-	17.8	-	-
	SB2	69.3	37.1	31.1	-	16.9	22.9	38.1
	SB2	-	-	20.0	-	18.4	24.0	-
	SB2	-	-	21.4	-	18.0	21.7	-
	SB2	-	-	-	41.7	-	-	-
	SB2	-	-	-	-	19.0	-	-
M3 from mandibles		**L**	**B**					
	SB2	26.6	8.9					
	SB2	26.0	9.1					
	SB2	26.0	9.6					
	SB2	25.1	9.0					
	SB2	24.7	8.6					
	SB2	24.4	9.1					
	SB2	23.7						
	SB2	23.2	9.3					
	SB2	22.0	8.5					
	SB2	-	9.1					
	SB2	-	9.1					
	SB2	-	8.9					
	SB2	-	8.9					
	SB2	-	9.2					
wild?	B7	31.2	8.6					
	B7	25.1	9.1					
Atlas		**GL**	**BFcr**	**BFcd**	**GLF**	**H**		
	SB1	35.3	-	-	-	-		
	SB2	66.5	56.8	55.2	-	49.0		
	SB2	64.5	-	-	-	-		
	SB2	62.7	-	-	-	-		
	SB2	-	51.9	48.3	44.2	37.5		
Vertebra cervicalis		**PL**	**HFcr**	**BFcd**	**BFcr**	**LAPa**		
	SB2	-	-	-	-	42.1		
	SB2	-	-	-	-	31.6		
	SB2	25.0	-	-	-	-		
	B7	-	-	-	-	38.2		
	B7	40.6	21.9	27.6	23.1	51.5		
	B7	-		28.4		-		
	B7	31.6	18.7	21.8	17.8	38.9		
	B7	29.3	-	-	-	-		
	B7	-	-	-	-	37.3		
	B7	-	-	-	-	33.8		
	B7	-	20.6	-	20.2	-		
Epistropheus		**BFcr**						
	SB2	50.8						
	SB2	43.2						
Vertebra thoracalis		**PL**						
Small ruminant	SB2	25.1						
Small ruminant	SB2	24.8						
Small ruminant	B7	33.2						

Table 38 – Page 1 *Ovis/Capra* measurements

Vertebra lumbalis		**PL**						
Small ruminant	SB2	35.8						
Small ruminant	SB2	30.6						
Sacrum		**BFcr**						
	SB1	26.3						
Scapula		**SLC**	**GLP**	**LG**	**BG**			
	SB1	21.8	-	-	-			
	SB1	18.2	-	-	-			
	SB1	21.3	-	-	22.3			
	SB1	19.5	30.3	-	20.7			
	SB1	19.6	-	-	19.6			
	SB2	22.5	34.1	27.0	21.1			
	SB2	22.0	36.0	28.4	23.5			
	SB2	20.3	33.8	28.3	-			
	SB2	20.2	32.6	25.7	22.4			
	SB2	19.7	34.9	30.2	22.5			
	SB2	-	-	-	24.8			
	SB2	-	-	-	22.5			
	SB2	-	-	26.3	-			
	SB2	-	38.6	29.6	24.4			
	SB2	-	34.0	27.0	22.2			
	B7	22.4	33.0	28.0	23.9			
	B7	19.5	31.7	27.7	22.2			
	B7	19.0	31.2	25.8	20.7			
	B7	18.2	31.2	24.9	18.7			
	B7	17.9	29.7	24.7	-			
	B7	17.0	-	26.4	21.0			
Humerus		**SD**	**BT**	**HT**	**Bd**			
	SB1	-	31.0	-	34.4			
	SB1	-	25.8	-	-			
	SB1	-	35.7	-	-			
	SB1	-	31.8	-	32.9			
	SB1	-	27.1	-	-			
	SB1	13.4	-	-	-			
	SB1	-	30.7	-	-			
	SB1	13.5	-	-	-			
	SB1	-	31.5	-	35.5			
	SB1	16.2	33.2	-	35.1			
Intermedium (C.)		**GB**						
	SB2	25.0						
	SB2	20.0						
	B7	17.7						
Os carpale II & III (C.)		**GB**						
	SB2	16.0						
	B7	16.2						
Radiale (C.)	SB2	22.4						
	SB2	19.5						
	B7	19.4						
	SB2	19.1						
	B7	16.0						
Radius		**SD**	**Bd**	**Bp**	**Dp**	**BFp**		
	SB1	16.3	-	33.5	17.2	29.4		
	SB1	16.1	-	-	15.9	29.1		
	SB1	20.9	-	-	-	-		
	SB2	16.5	-	-	-	-		
	SB2	-	26.3	-	-	-		
Ulna		**BPC**						
	SB2	20.7						
	SB2	21.6						

Table 38 – Page 2 *Ovis/Capra* measurements

	SB2	18.8						
	SB2	17.8						
	B7	17.2						
Metacarpus		**Bp**	**Bd**	**Dd**	**DD**			
	SB1	-	24.6	16.9	9.7			
	SB1	26.0	-	-	-			
	SB1	26.1	-	-	-			
	SB1	25.5	-	-	-			
Metatarsus		**SD**	**Bp**	**Bd**	**DD**			
	SB1	11.7	22.2	-	11.2			
	SB1	12.3	23.3	-	11.4			
	SB1	14.1	23.3	-	11.6			
	SB1	-	23.9	-	-			
	SB1	-	-	24.8	8.9			
	SB1	-	21.8	-	-			
	SB2	-	23.9	-	-			
	SB2	-	22.3	-	-			
	SB2	-	23.1	-	-			
	SB2	-	22.1	-	-			
	SB2	-	22.0	-	-			
Pelvis		**LA**	**SH**	**SB**				
	SB1	-	17.3	11.1				
	SB1	-	16.4	9.8				
male	SB1	31.9	-	-				
female?	SB1	25.7	-	7.7				
	SB1	-	19.1	11.2				
	SB1	-	16.5	10.9				
female?	SB1	-	15.4	9.9				
female?	SB1	-	15.4	11.1				
	SB1	-	14.2	9.5				
female?	SB2	28.6	-	-				
female?	SB2	32.6	-	-				
male?	SB2	33.8	-	-				
male?	SB2	33.8	-	-				
male?	SB2	31.9	-	-				
male?	SB2	30.6	15.2	11.1				
male?	SB2	-	18.5	11.4				
male?	SB2	-	18.5	10.7				
male?	SB2	-	17.8	11.6				
	SB2	-	16.4	11.3				
Patella		**GL**	**GB**					
	SB2	29.5	20.8					
Tibia		**SD**	**Bd**					
	SB1	13.0	-					
	SB1	15.4	-					
	SB1	13.3	-					
	SB1	15.6	-					
	SB1	16.1	-					
	SB1	15.7	-					
	SB1	13.6	-					
	SB2	-	29.9					
	SB2	-	28.5					
	SB2	15.8	27.0					
	SB2	15.4	-					
Small ruminant	SB2	13.5	24.5					
	B7	-	25.2					

Table 38 – Page 3 *Ovis/Capra* measurements

Astragalus		**GLl**	**Bd**	**GLm**	**Dl**			
	SB1	26.8	16.6	25.1	13.7			
	SB1	26.6	17.5	24.8	13.4			
Calcaneus		**GB**	**GL**					
	SB1	21.5	60.5					
Centrotarsale		**GB**						
	B7	22.6						
Phal. I anterior/posterior		**GL**	**SD**	**Bp**	**Bd**	**Dp**	**Dd**	
	SB1	35.5	10.5	13.4	12.5	15.5	12.1	
	SB1	34.6	8.7	10.8	10.3	12.8	10.1	
	SB1	-	-	14.2	-	15.7	-	
	SB1	-	-	12.5	-	-	-	
	SB1	40.0	9.7	13.1	11.4	15.2	10.6	
	SB1	37.7	-	13.3	13.1	17.3	11.4	
	SB2	41.1	11.0	15.5	13.4	-	-	
	SB2	39.8	10.5	13.4	11.9	-	-	
	SB2	39.0	-	14.2	11.9	-	-	
	SB2	38.9	10.0	12.7	12.2	-	-	
	SB2	37.5	11.0	13.3	12.5	-	-	
	SB2	37.1	10.9	13.0	13.9	-	-	
	SB2	36.6	10.5	14.0	12.6	-	-	
	SB2	35.2	10.4	12.3	12.2	-	-	
	SB2	34.8	8.6	11.7	10.5	-	-	
	SB2	34.3	9.6	12.2	12.6	-	-	
	SB2	-	10.8	13.8	-	-	-	
	SB2	-	-	13.1	-	-	-	
	B7	-	-	13.6	-	-	-	
Phal. II anterior/posterior		**GL**	**SD**	**Bp**	**Bd**	**Dd**		
	SB1	24.2	9.8	13.6	11.1	12.7		
	SB1	25.8	8.9	12.7	9.9	11.4		
	SB2	26.6	9.5	13.2	10.6	-		
	SB2	25.7	8.5	12.7	9.5	-		
	SB2	24.1	8.1	11.1	8.9	-		
	SB2	23.5	8.4	11.5	-	-		
	SB2	23.1	9.0	13.5	-	-		
	SB2	23.0	10.0	13.2	10.8	-		
	SB2	22.9	9.6	12.3	10.3	-		
wild?	SB2	22.1	9.2	13.7	10.5	-		
	SB2	21.9	9.3	12.8	10.0	-		
	SB2	21.8	9.3	13.1	11.1	-		
	SB2	20.4	10.1	12.5	10.6	-		
	B7	25.4	8.1	11.4	9.4	-		
	B7	24.4	8.6	11.9	9.8	-		
	B7	24.2	12.0	15.0	12.8	-		
	B7	23.9	8.1	12.8	9.6	-		
	B7	23.6	7.3	10.4	8.6	-		
	B7	21.1	7.9	11.3	9.5	-		
Phal. III anterior/posterior		**Ld**	**DLS**	**MBS**				
	SB1	23.2	31.9	6.8				
	SB1	-	32.9	-				
	SB2	27.5	34.4	6.3				
	SB2	26.9	33.5	5.7				
	SB2	25.8	32.9	7.5				
	SB2	24.7	30.1	6.0				
	SB2	22.4	28.5	5.5				
	B7	31.0	38.0	8.9				
	B7	24.8	31.3	6.7				
wild?	B7	21.7	29.2	7.1				

Table 38 – Page 4 *Ovis/Capra* measurements

Mandibula		**L M3–P2**	**L M3–M1**	**L P4–P2**	**L M3–C**	**L diastema**	**H front M1**	**H behind M3**
	SB2	97.8	62.0	33.5	115.2	32.7	43.7	-
	B7	-	66.4	-	-	-	41.8	50.6
	B7	104.9	66.7	36.1	-	-	-	-
Maxilla		**L M3–M1**						
	SB1	61.5						
	SB2	64.3						
Scapula		**GLP**	**BG**					
	SB2	29.4	19.9					
Atlas		**BFcr**	**H**					
	SB2	49.4	46.5					
Humerus		**SD**	**Bp**	**Bd**				
	SB1	13.1	-	35.6				
	SB1	13.3	33.3	-				
	SB2	-	-	34.4				
	SB2	14.1	-	33.5				
Ulna		**DPA**	**BPC**					
	SB1	36.2	18.0					
	SB1	-	20.0					
	SB1	28.9	-					
Radius		**Bp**						
	SB2	27.2						
Astragalus		**GLl**	**GLm**					
	SB1	35.3	33.1					
Metacarpus III		**GL**	**Bp**	**Bd**	**Dd**			
	SB1	57.9	14.7	13.6	13.9			
	SB2	-	16.6	-	-			
Metacarpus IV		**GL**	**SD**	**Bp**	**Bd**	**Dd**		
	SB1	58.3	10.7	12.9	13.0	14.0		
Pelvis		**LA**	**LAR**	**SH**	**SB**			
	SB1	-	-	24.2	13.2			
	SB1	31.1	25.0	-	-			
	SB2	-	34.2	-	-			
Tibia		**Bd**	**Dd**					
	SB1	26.8	23.4					
Metatarsus III		**Bp**						
	SB1	13.6						
	SB1	12.7						
Metatarsus V		**GL**						
	SB1	49.9						
Phalanx I anterior		**GL**	**Bp**	**Dp**	**Dd**			
	SB1	27.7	15.1	12.5	9.3			
Phal. II anterior/posterior		**GL**	**SD**	**Bp**	**Bd**			
	B7	22.5	12.6	15.4	12.6			
Phal. III anterior/posterior		**DLS**	**Ld**	**MBS**				
	B7	26.3	26.4	11.0				

Table 39 *Sus* measurements

Mandibula		L M3–P2	L M3–M1	L P4–P2	L P4–P1	L M3–C	H front P2	H front M1	H behind M3	H vert. ramus	L Condylus-Infradentale (=GL)	L Angulus-Infradentale	L Cond./Angul.-Infradentale	L Condylus-C
	SB1		34.5				34.5	18.0						
	SB2	64.2	33.7	30.5	35.3	75.7	17.1	19.8	25.1	51.6	129.9	128.4	125.6	111.9
Vertebra cervicalis		**PL**	**BPacd**											
	SB2	19.9	29.1											
Vertebra thoracalis		**PL**	**BFcd**	**HFcr**										
	SB2	19.8	19.0	10.9										
Vertebra lumbalis		**PL**	**HFcr**											
	SB2	28.0	14.0											
Sacrum		**HFcr**												
	SB2	11.5												
Scapula		**SLC**	**GLP**	**LG**	**BG**									
	SB1	25.7	33.7	33.7	19.9									
	SB2	22.4	27.5	24.1	15.4									
	B7	22.4	27.2	-	-									
Humerus		**Bd**												
	SB1	31.0												
*	SB1	34.7												
	SB2	29.5												
Radius		**Bp**	**Bd**											
	SB2	-	21.5											
	SB2	16.7	-											
Ulna		**SDO**	**DPA**											
	SB2	18.9	22.2											
Metacarpus II		**GL**	**Bp**											
		52.3	8.2											
Pelvis		**SB**	**SH**	**LAR**										
*	SB1	9.3	21.2	25.3										
*	SB1	9.6	21.1	-										
	SB1	-	21.2	-										
	SB1	6.6	16.6	-										
Femur		**SD**	**Bd**	**DC**										
	SB1	17.3	-	-										
*	SB1	14.6	-	-										
*	SB1	-	-	22.5										
*	SB1	-	33.6	-										
Tibia		**SD**	**Bp**	**Dp**										
*	SB1	14.1	-	-										
*	SB1	-	36.9	26.4										
Metatarsus IV		**GL**	**Bp**											
	SB2	74.3	8.5											
Metatarsus V		**GL**	**Bp**											
	SB2	59.0	9.2											
Calcaneus		**GL**	**GB**											
	B7	48.7	19.6											

* = probably one individual

Table 40 *Canis* measurements

Metacarpus		Bd
female?	SB2	42.3

Table 41 *Cervus elaphus* measurements

Radiale		**GB**			
	SB2	29.4			
Nebenstrahlphal. I		**GL**	**Bp**	**Bd**	
	SB2	30.0	15.4	11.0	
Phalanx I anterior		**Bd**	**Dd**		
	SB1	20.0	14.3		
Tibia		**Bd**	**Dd**		
	SB1	35.9	31.6		
Phal. I anterior/posterior		**GL**	**SD**	**Bd**	
	SB2	47.6	16.9	18.4	
Phal. II anterior/posterior		**GL**	**SD**	**Bp**	**Bd**
	SB2	32.0	16.7	20.7	17.2
Phal. III anterior/posterior		**DLS**	**Ld**	**MBS**	
	SB2	39.5	37.7	15.8	

Table 42 *Sus scrofa* measurements

Scapula		**GLP**	**BG**	
	SB1	12.9	11.3	
	SB1	12.8	10.5	
Humerus		**SD**		
		5.8		
Femur		**Bd**	**BTr**	
	SB1	-	22.7	
	SB1	18.7	-	
	SB1	19.5	-	
	B7	19.5	-	
Metatarsus III		**GL**	**Bd**	
	SB2	56.6	6.4	
Scapula		**GLP**	**LG**	**BG**
	SB2	12.8	11.2	10.5

Table 43 *Lepus europeus* measurements

Mandibula		L P4–P2	L P4–P1	H front P2	H in front M1
Vulpes vulpes	SB1	28.5	32.6	12.2	14.2
Ulna		**DPA**			
Vulpes vulpes	SB1	14.8			
Femur		**SD**	**Bp**	**Dp**	
Mustela herminea	SB1	2.2	6.1	3.3	

Table 44 Wild carnivore measurements

Humerus		GL	Bp	Bd	Dp	SC	Dd
Anas sp.	SB1	60.0	-	9.5	7.0	4.3	5.5
Anas sp.	SB1	-	13.0	-	8.8	4.3	-
Anas sp.	SB1	-	-	14.0	-	-	8.2
Ulna		**Bp**					
Anser sp.	SB1	9.9					
Tibia		**Bd**	**Dd**				
Anas sp.	SB1	8.2	7.9				

Table 45 Birds measurements

		Z-2266 *Ovis musimon*			Z-1585 *Capra hircus*		
		Left	Right	Mean	Left	Right	Mean
Astragalus	GLl	32.2	32	32.1	26.4	26.6	26.5
	Bd	19.1	19.3	19.2	15.1	15	15.05
	GLm	30.2	30.3	30.25	24.6	24.5	24.55
	Dl	17.9	17.8	17.85	13.8	14	13.9
Calcaneus	GB	26	25	25.5	19	19	19
	GL	64.3	64.2	64.25	52.8	52.7	52.75
Centrotarsale	GB	24.1	24.1	24.1	20	19.8	19.9
Femur	Bp	51.1	50.9	51	40.1	40.3	40.2
	Bd	42.7	43.2	42.95	36.8	36	36.4
Humerus	SD	15.5	15.3	15.4	17.1	16.2	16.65
	BT	31.5	31.1	31.3	27.7	26.9	27.3
	Bp	46	47	46.5	37	37	37
	Bd	32	32	32	-	-	-
Metacarpus	GL	161	-	161	97	97	97
	SD	12.5	-	12.5	12.6	13.1	12.85
	Bp	20.8	-	20.8	18.1	18	18.05
	Bd	25.7	-	25.7	22.1	21.8	21.95
	Dd	17.3	-	17.3	14.3	14.3	14.3
	DD	10.6	-	10.6	9	9	9
Metatarsus	GL	148	147	147.5	90.5	90	90.25
	SD	14	13.4	13.7	14.9	14.7	14.8
	Bp	24.2	24.7	24.45	21	20.9	20.95
	Bd	27.7	27.2	27.45	24.9	24.5	24.7
	Dp	17.4	17.6	17.5	15.7	15.7	15.7
	DD	10.9	10.6	10.75	8.9	9.1	9
Pelvis	SB	8.7	8.8	8.75	8	7.5	7.75
	SH	16.7	16.9	16.8	13.7	14	13.85
	LA	31.6	31.9	31.75	25.9	26.3	26.1
Radius	GL	-	186	186	-	-	-
	SD	17.3	17.8	17.55	17.9	18.9	18.4
	Bp	34.2	34.5	34.35	-	-	-
	Bd	-	32.1	32.1	29.9	28.7	29.3
	Dp	-	17.5	17.5	-	-	-
	BFp	32.3	32.3	32.3	27.4	26.7	27.05
Scapula	SLC	22.3	22.3	22.3	20.6	20.4	20.5
	GLP	37.9	37.6	37.75	31	30.7	30.85
	BG	22.9	22.3	22.6	19.8	20.2	20
Tibia	SD	16.1	15.7	15.9	14.9	14.9	14.9
	Bp	44.2	45.3	44.75	37.4	37.9	37.65
	Bd	24.5	25	24.75	24.2	23.7	23.95
	Dd	21.1	21.3	21.2	18.5	18.7	18.6
Ulna	SDO	24.1	24.3	24.2	21.7	22.1	21.9
	DPA	28.5	29.1	28.8	26.5	25.7	26.1
	BPC	18.8	-	18.8	-	-	-

Table 46 List of measurements of the reference individuals used for the LSI analysis. *Phalanges* measurements represented table 47 and 48

		Z-2266 *Ovis musimon*				Mean
Phalanx I posterior	GL	40.6	40.6	39.6	40	40.2
	SD	9.6	8.8	9.6	8.9	9.225
	Bp	11.7	12.5	11.5	12.4	12.025
	Bd	11.3	11.3	11	11.3	11.3
	Dp	15.6	16.5	15.5	16.4	15.6
	Dd	9.9	9.9	9.8	9.9	9.9
Phalanx I anterior	GL	40.4	40.6	41.1	41.1	40.4
	SD	10.5	10.3	10.3	9.9	10.5
	Bp	13.2	13.5	12.7	12.4	13.2
	Bd	12.8	13	13.4	13.4	12.8
	Dp	16.7	16.1	16	15.8	16.7
	Dd	11.7	11.6	11.5	11.5	11.7
Phalanx II posterior	SD	8.6	8.6	8.2	7.9	8.6
	Bp	11.4	11.3	11.4	11.3	11.35
	Bd	9.4	9.3	9.5	9.1	9.325
	Dp	11.2	11.2	10.9	10.8	11.025
Phalanx II anterior	SD	9.2	9	9.2	9.2	9.15
	Bp	13.2	12.6	13.1	12.7	12.9
	Bd	10.1	10.2	10.2	10.1	10.15
	Dp	12.2	12.2	12.6	12.3	12.325
Phalanx III posterior	Ld	20.9	20.2	20.1	21.4	20.65
	DLS	30.7	31.2	30.3	31.3	30.875
Phalanx III anterior	Ld	22.4	22.2	22.1	22	22.175
	DLS	33.9	33.5	33.6	33.7	33.675

Table 47 *Phalanges* measurements of *O. musimon* used as a reference for the LSI analysis

		Z-1585 *Capra. Hircus*								Mean
Phalanx I	GL	32.3	30.9	31.5	31.1	31.1	31.5	32.3	31.9	31.575
posterior and anterior	SD	10.7	9.5	10.5	9.4	10	9.5	10.8	10.7	10.1375
	Bp	11.4	10.6	11.4	10.5	10.3	10.5	11.5	11.5	10.9625
	Bd	10.7	10.1	11.4	10.5	10.1	10.3	10.6	11.2	10.6125
	Dp	12.2	13.4	13.5	12.3	12.9	12.5	13.4	13.3	12.9375
	Dd	9.9	8.8	10.3	8.9	8.8	8.9	10.3	10.3	9.525
Phalanx III	DLS	30.3	32.2	31	32.3	32.1	31.9	32.3	29.8	31.4875
posterior and anterior	MBS	5.1	5.7	6.1	6.4	6.2	6.1	5.5	5.1	5.775

Table 48 *Phalanges* measurements of *C. hircus* used as a reference for the LSI analysis

Özet: Boğazköy-Ḫattuša'nın Yukarı Şehri, Sarıkale Vadisindeki Kareli Binalar Tabakasında Bulunan Hayvan Kemikleri (M.Ö. 16. ve 15. yüzyıl)

Boğazköy-Ḫattuša'nın Yukarı Şehri'nin batı kısmında yer alan Sarıkale önü vadisinde 2002–2008 yılları arası gerçekleştirilen kazılarda bu alanda Hitit Dönemi'ne ait üç binadan oluşan en eski mimari tabakasında bulunan toplam 6075 hayvan kemiği bu çalışmanın konusudur. 1 ve 2 nolu kareli yapılar, onların »Neubau« olarak adlandırlan yenileme safhası ve benzer bir şekilde önceden planlanmış modüllerden oluşturulan 7 nolu yapı M.Ö. 16. yüzyılın ikinci yarısında bu alanda yeni kurulmuş yerleşimin örneklerini temsil etmektedir (Seeher 2003; 2004a; 2005; 2006; Schachner 2008; 2009a). Söz konusu yapılar karbon tarihlendirmeleri sayesinde M.Ö. 16. yüzyılın ikinci yarısına tarihlendirilebilir (Schoop – Seeher 2006). Tüm bu yapılar birbirine çok yakın ortak mimari özelliklerine sahip olup, döneminde köklü değişiklikler yaşayan Hitit Devleti Yukarı Şehrin kurulmasıyla ortaya konulan mimari ve yapı programının bir parçasını simgelemektedir (Schachner 2009). J. Seeher (2004, 66) bu yapıların askeri birliklerin kışlaları olabileceğini önermiştir.

Toplam 6705 kemik fragmanlarının (38849 g) % 67,1 (ağırlığa göre % 90,7) türleri ya da en azından genel sınıfı tespit edilebilmiştir. Ayrıca, çalışmamızda görülen tüm hayvan türleri daha önce Ḫattuša'da gerçekleştirilen araştırmalarda da tespit edilmişlerdir (von den Driesch – Boessneck 1981; von den Driesch – Pöllath 2004). Türlerin bulunan miktarı daha önce tespit edilen oranlara çok yakındır: Evcil hayvanlar büyük bir çoğunluğu (NISP'nin % 97,6) oluşturmaktadır. Avlanan hayvanlar ve kuşlar ise küçük bir grubu teşkil eder.

Ancak, incelenen grubun bazı özellikleri, Ḫattuša'da daha önce araştırılan hayvan kemiklerinden farklıdır: İlk olarak bu grupta, keçi/koyun türlerinin yoğunluğu, sayıca şehrin diğer bölgelerinden açık bir şekilde fazladır. Buna karşın, sığırların sayısı ise nispeten düşüktür. Köpek, bu alanda şehrin araştırılan diğer bölgelerine oranla sayıca daha fazla görülür. Ayrıca, nispeten çok istiridye ve 1 nolu kareli binada bulunan genç bir aslanın kemiği, detaylı bir tartışma gerektiren lüks veya egzotik örnekler olarak nitelendirilebilir.

Görülen türlerin sıklığı üç binada da birbirine çok yakın. Bir Tunç Çağı kenti için şaşırtıcı olmayıp, en yoğun olarak keçi/koyun tespit edilmiştir (tab. 6; genel olarak Gündem 2010). Ancak, Sarıkale düzlüğünde elde edilen bu grupta keçi/koyun türlerinin ezici bir çoğunlukta bulunmuş olması, (% 81,1) Ḫattuša'da incelenen diğer alanlardan farklıdır. Aşağı Şehir'de, 3. ve 2. tabakalarında keçi/koyun türleri sayıca fragmanların % 54'ünü temsil ediyor (von den Driesch – Boessneck 1981, tab. 3). Büyükkaya'da ise Eski Hitit Dönemi'nde (yak. M.Ö. 16. yy.) % 70'i temsil eden bu türler İmparatorluk Dönemi'nde % 58'e gerilemektedir (von den Driesch – Pöllath 2004, tab. 5–7). Kareli yapılardan elde edilen grupta, keçi/koyun miktarı Büyükkaya'daki, yaklaşık çağdaşı olan gruba yakındır. Dolayısıyla Ḫattuša'da var olan verilere dayanarak Eski Hitit Dönemi'nde, keçi/koyun türlerinin sonraki dönemlere göre daha çok tüketildiği tahmin edilebilir (von den Driesch – Pöllath 2004, tab. 5–7). Sarıkale düzlüğündeki kareli yapılarda elde edilen verilere göre keçi ve koyun türlerinin yoğunluğu sığırların aleyhinedir. Büyükkaya ve Aşağı Şehir'de sığırlar düzenli olarak yaklaşık % 30'u temsil etmesine karşın incelenen grupta sadece % 10'a tekabül eder. Domuz ve at ise Sarıkale düzlüğünde Aşağı Şehir ve Büyükkaya'da tespit edilmiş benzer oranlarda görülür (von den Driesch – Boessneck 1981, tab. 3; von den Driesch – Pöllath 2004, tab. 8).

Bu farklılıkları aydınlatabilmek için coğrafi ve tarihsel çerçeve göz önünde bulundurmak gerekir. İç Anadolu'nun Demir Çağı'nın başlangıcında bazı yerlerde görülen sığıralara göre, artan koyun ve keçi kullanımı değişen iklim şartlarına bağlanmıştır (Hongo 1998). Azalan yağışlar dolayısıyla daha önce sığırların otlatıldığı ovalardaki alanların, tarımda kullanılması gerektiği düşünülür. Buna karşın keçi ve koyunlar tarımla rekabet etmediği için yüksek plato ve yaylalarda otlatılması nedeniyle çoğalmıştır (Hongo 1998, 261). Benzer bir şekilde Gordion'da görülen keçi/koyun türlerinin çoğalması, devlet strüktürlerinin dağılmasına ve paralelindeki iklim değişikliliğine bağlanmıştı (Zeder – Arter 1994).

Kuzey Suriye bölgesinde, tespit edilen sığırların çoğalması, artan devlet organizasyonu düzeyine ve oluşan bölgesel iletişim mekanizmalarıyla aydınlatılmıştır. Geç Tunç Çağı ve Demir Çağı'nın başında ise, görülen keçi/koyun türlerinin çoğalması, imparatorlukların yıkılması ve daha bölgesel siyasi strüktürlere dönmesiyle açıklanmaktadır (Clason – Buitenhuis 1998). Buna karşın, Uruk Dönemi'nde görülen keçi/koyun türlerinin çoğalması Kuzey Suriye ve hatta Anadolu'yu da kapsayan bölgelerarası idari mekanizmaların ve iletişim ağlarının oluşmasıyla bağlı olduğu öne sürülmüştür (Siracusano 2004).

Görüldüğü gibi keçi/koyungillerin çoğalması için tek sebepli bir açıklama mümkün değildir. Tespit edilen değişiklikler her seferinde bölgesel, tarihi ve coğrafi çerçeve içerisinde değerlendirilmeli. Büyükkaya (yak. %70) ve Aşağı Şehir'deki (yak. %54) Eski Hitit Dönemi'ne ait buluntuların arasında keçi/koyungillerin miktarlarının Sarıkale düzlüğündeki kadar yüksek olmasa da yine de her iki alanda Eski Hitit Dönemi'nde en çok keçi/koyungillerin kullanıldığı görülmüştür (von den Driesch – Boessneck 1981, tab. 7; von den Driesch – Pöllath 2004, tab. 5–7). Bu ve benzer durumlara rağmen Sarıkale düzlüğündeki buluntular için daha detaylı bir açıklama yapılamıyor; çünkü tam çağdaşı buluntular henüz yok.

Kaman Kalehöyük'teki buluntular, keçi/koyungillerin yüksek oranları M.Ö. 16. yüzyıla özgün bir durum olmadığına işaret eder. Çünkü, burada IIIb tabakasında (yak. M.Ö. 1650–1500) keçi ve koyun buluntularının % 50'sini bile teşkil etmeyerek Assur Koloni Çağı'ndan Demir Çağı'na kadar süre gelen dönemde en düşük miktarı olmuştur (Hongo 1998, 260 fig. 2). Keçi/koyungillerin kareli yapılarda olağanüstü yüksek oranı giderek artan bir devlet kontrolüne belki bağlanabilir ancak, bu türlerin paylarının daha sonra M.Ö. 14. ve 13. yüzyıllardaki gerileme (von den Driesch –Boessneck 1981, tab. 7; von den Driesch – Pöllath 2004, tab. 6. 7) Hitit egemenliğinin en yoğun şekilde görüldüğü dönemlerde olmuştur.

Bu nedenle kareli yapılarda elde edilen buluntular arasındaki keçi/koyungillerin paylarının açıklanması için daha çok lokal bir sebep aranması gerekir. Eldeki buluntular karmaşık bir toplumun, bir yerdeki tüketim ve kesme alışkanlıklarını yansıtmaktadır. Böylece bu buluntular, bu alanda yaşayanların alışkanlıklarının, sosyal statüden kaynaklandığı düşünülebilir (Bartosiewicz 1998; Arbuckle 2009). Binaların kullanıcıları – bir ihtimalle askeri personel – muhtemelen merkezi bir tedarik sistemine bağlı olduğu için, seçilmiş bir hayvan türünün ağırlıklı kullanılmasından anlaşılır (Zeder 1991). Böylece kareli yapıların sakinleri, merkezi bir tedarik sisteminin içerisinde ya alıcı ya da dağıtıcı konumundadırlar. Eğer ilki doğruysa burada yaşayanlara özellikle yaşlı dişi koyunlar ve büyük bir miktar keçi verilmiştir. Ancak, hayvanların kesim yaşı ve bulunan parçaları göz önünde tutulursa, Sarıkale vadisindeki alanın daha çok bir »üretici merkezi« olduğuna işaret etmektedir (Stein 1987; Zeder 1991). Keçi/koyungillerin tespit edilen türleri ve yaşlarının dağılımı, sürülerin güdülmesi (Arbuckle 2009, 189) ve yün üretimi (Arbuckle – Öztan – Gülçur 2009) için tercih edilen yaşlı hayvanlarla uğraşarak, pazarlamaya uygun etlerin satışlarından kaynaklanabilir. Ayrıca, bulunan keçi/koyungillerin kemiklerinin geniş bir sürüden kaynaklandığı söylenebilir. Bu durumda yine yün üretimi ön planda olmalıydı (Payne 1973; Arbuckle 2009; Arbuckle – Öztan – Gülçur 2009; Marom – Bar-Oz 2009).

Hitit İmparatorluğu'nda özellikle metinlerde sıkça bahsi geçen yün, genel ekonomi için çok önemli bir ürün olmalıydı (Beckmann 1988). Hitit kanunlarına göre; dokumacılar ve yünle uğraşanlar özel bir statüye sahip olup, bazı hizmetlerden muhaftılar (Beckmann 1988). Yün, deri, et veya tüm hayvanlar metinlerde ve ritüellerde kurbanlık olarak geçmektedir. Ancak Beckmann'a göre (1988) çobanlar, dokumacılar gibi özel bir statüye tabii değillerdi.

Kareli yapılarda koyun ile keçi arasındaki oran yaklaşık 2/1 idi. Yanındaki 7 nolu yapıda ise bu oran benzer idi. Bu iki türün arasındaki oran Aşağı Şehir'de yaklaşık 3/1 olan durumundan farklıdır (von den Driesch – Boessneck 1981, 33). Hitit Dönemi Büyükkaya'da ise koyun/keçi oranı 5/2 olarak hesaplanabilir (von den Driesch – Pöllath 2004, 6). Sarıkale düzlüğünde tespit edilen oran da görülen, keçiye verilen önemi değişik sebeblerden kaynaklanabilir: Keçi etinin, tercih edilmesinin yanısıra sosyal nedenlerin olduğu da düşünülebilir. Yine, adı geçen diğer alanlardaki buluntular tam çağdaş olmadığı için (von den Driesch – Boessneck 1981, 19) nihai bir yorum yapılamaz. Ancak, yazılı kaynaklar (Klengel 2007) ve Kuşaklı'da elde edilen sonuçlar (von den Driesch – Vagedes 1997) göz önünde tutulduğunda bu durumun sosyal sebeblerden kaynaklandığı düşünülebilir. Kuşaklı-Sarıssa'da, tapınakta bulunan kemiklerde koyun/keçi oranı 9/1 ise, konutlarda sadece 4/1'dir. Böylece, konutlardaki insanlar çok daha fazla keçi eti tüketmişlerdir (von den Driesch – Vagedes 1997, 124). Bu durum Kuşaklı'daki buluntuların nispeten uzun bir zaman dilimini kapsadığından çok zor yorumlanır. Üstelik Kuşaklı'da tespit edilen oranlar, Ḫattuša'da adı geçen üç ayrı bölgeden üstündür. Hitit kanunlarına göre; bir keçi bir koynun sadece yarı değerindeydi. Bu nedenle düşük bir koyun keçi oranı, Sarıkale düzülüğündeki kareli yapılarının bulunduğu mimari tabakanın sakinlerinin yüksek bir refah seviyeye sahip olduklarına işaret etmemektedir.

Kareli yapıların bulunduğu mimari tabakaların sakinleri, sığırları çok yoğun bir şekilde kullanmamışlardır. Çünkü sığırlardan kaynaklanan kemikler, buluntu topluluğun sadece % 8'ini kapsamaktadırlar. Ayrıca, bulunan sığırların kesim yaşı bu alanda hayvanların en iyi et kısımlarının tüketilmediğine işaret etmektedir. Hayvanların büyük bir çoğunluğu altı yaşında ya da daha yaşlıydı. Sadece hayvanların % 7'si iki yaşına girmeden kesilmiştir. Bu verilere dayanarak bu alandaki sığırlar, et tüketiminden ziyade iş güçü için kullanılmış olmalıdır.

Sarıkale düzlüğündeki kareli yapılar tabakasında şehrin diğer alanlarına göre – Büyükkaya (von den Driesch – Pöllath 2004, tab. 8) ve Aşağı Şehir (von den Driesch – Boessneck 1981, tab. 3) – daha fazla köpek kemiklerinin bulunması değişik sebeplerden kaynaklanabilir. Yazılı kaynaklar köpeklerin Hitit Dönemi'nde av, sürülerin güdülmesi ve bekçi olarak kullanıldığını aktarmaktadır (Collins 2002a). Köpeklerin bekçi olarak kullanılması özellikle Seeher'in (2004, 66) bu mimari yapıların askeri kışla olarak yorumlamasıyla örtüşür. Kuşaklı'daki tapınağında benzer bir şekilde yüksek oranda köpeklerin tespit edilip (von den Driesch – Vagedes 1997, 131) onların orada bekçi olarak kullanıldığı düşünülmesi bu yorumu desteklemektedir.

Genel olarak, Sarıkale düzlüğünde en eski Hitit mimari tabakayı oluşturan kareli yapılarda bulunan hayvan kemikleri, tapınak ve konut mahallelerindeki buluntulardan çok farklı bir konuma sahiptir. Söz konusu yapıların fonksiyonları hayvan kemiklerinin yardımıyla çözümlenemiyorsa da bu yapıların askeri kışla olarak kullanıldığı öneriye de karşı çıkmamaktadır. Bulunan kemik topluluğu Ḫattuša'da daha önce bilinmeyen ve özel bir idari fonksiyona sahip olan bir kuruma işaret etmektedir. Açık kalan sorular ancak benzer buluntu toplulukları açığa çıkarıldığı zaman çözülebilir.

Sources of Illustrations

Abb. 1 Archiv der Boğazköy-Grabung, DAI (erstellt von J. Eger basierend auf Daten der Grabungsdokumentation)
Abb. 2–8 Archiv der Boğazköy-Grabung, DAI (A. Schachner – J. Seeher)
Fig. 9–12 Archiv der Boğazköy-Grabung, DAI (D. Hollenstein – G. Middea)
Fig. 13 Drawing by M. Coutureau after Barone 1976
Fig. 14–36 Archiv der Boğazköy-Grabung, DAI (D. Hollenstein – G. Middea).

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Abbreviations

B Breadth
Bd (Greatest) Breadth of the distal end
BFcr (Greatest) Breadth of the Facies articularis cranialis
BFcd (Greatest) Breadth of the Facies articularis caudalis
BFd (Greatest) Breadth of the Facies articularis distalis
BFp (Greatest) Breadth of the Facies articularis proximalis
BG Breadth of the Glenoid cavity
Bp (Greatest) Breadth of the proximal end
BPacd (Greatest) Breadth across the Processus articulares craniales
BPC (Greatest) Breadth across the Coronoid Processus
BT (Greatest) Breadth of the Trochlea
BTr (Greatest) Breadth of the region of the Trochanter tertius
B7 Building 7
DC (Greatest) Depth of the Caput femoris
DD (Smallest) Depth of the Diaphysis
Dd (Greatest) Depth of the distal end
det. determinate
dist. distal
Dl (Greatest) Depth of the lateral half
DLS (Greatest) Diagonal Length of the Sole
Dm (Greatest) Depth of the medial half
Dp Depth of the proximal end
DPA Depth across the Processus anconaeus
GB Greatest Breadth
GD Greatest Diameter
GL Greatest Length
GLF Greatest Length from the Facies articularis cranialis to the Facies articularis caudalis
GLl Greatest Length of the lateral part
GLm Greatest Length of the medial half
GLP Greatest Length of the Processus articularis
H Hight
HFcr Hight of the Facies terminalis cranialis
HT Hight of the Trochlea
indet. indeterminate
IPAS Institute for Prehistory and Archaeological Science
L Length
LA Length of the Acetabulum
LaPa (Greatest) Length of the Arch including the Processus articulares caudales
LAR Length of Acetabulum on the Rim
LD Least Diameter
Ld Length of the dorsal surface
LG Length of the Glenoid cavity
LSI Logarithmic Size Indes
M Molar
MBS Middle Breadth of the Sole
NISP Number of Identified Specimens
P Premolar
phal. phalanx
PL Physiological Lenght
prox. proximal
SB Smallest Breadth of the shaft of ilium
SB1 Square Building 1
SB2 Square Building 2
SC Smallest breadth of the Corpus
SD Smallest breadth of the Diaphysis
SDO Smallest Depth of the Olecranon
SH Smallest Height of the shaft of ilium
SLC Smallest Length of the Collum scapulae
SSD Sexual Size Dimorphism