

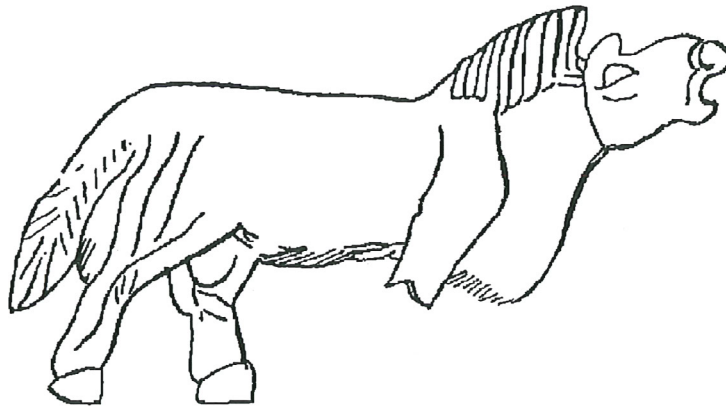


# ARCHAEOZOOLOGY OF THE NEAR EAST IV A

Proceedings of the fourth international symposium on the  
archaeozoology of southwestern Asia and adjacent areas

edited by

**M. Mashkour, A.M. Choyke, H. Buitenhuis and F. Poplin**



ARC - Publicatie 32  
Groningen, The Netherlands, 2000

Cover illustration:

Przewalski from Susa (nacre – mother of pearl)

Dated to 2500 – 2000 BC, identified by F. Poplin

copyright:

Centre for Archeological Research and Consultancy

Groningen Institute for Archaeology

Rijksuniversiteit Groningen The Netherlands

Printing: RCG -Groningen

Parts of this publication can be used if source is clearly stated.

Information: Centre for Archeological Research and Consultancy

Poststraat 6, 9712 ER Groningen, The Netherlands

ISBN 90 – 367 – 1243 - 2

NUGI 644 - 134

## Contents

### VOLUME A

<b>Preface</b>	<b>A</b>
<b>Deborah Bakken</b> Hunting strategies of Late Pleistocene Zarzian populations from Palegawra Cave, Iraq and Warwasi rock shelter, Iran	<b>11</b>
<b>Daniella Zampetti, Lucia Caloi, S. Chilardi and M.R. Palombo</b> Le peuplement de la Sicile pendant le Pléistocène: L'homme et les faunes	<b>18</b>
<b>Sarah E. Witcher, Joel C. Janetski, and Richard H. Meadow</b> Animal bones from Wadi Mataha (Petra Basin, Jordan): The initial analysis	<b>39</b>
<b>Liora Kolska Horwitz and Eitan Tchernov</b> Climatic change and faunal diversity in Epipalaeolithic and Early Neolithic sites from the Lower Jordan valley	<b>49</b>
<b>Paul Y. Sondaar and Sandra A.E. van der Geer</b> Mesolithic environment and animal exploitation on Cyprus and Sardinia/Corsica	<b>67</b>
<b>Pierre Ducos</b> The introduction of animals by man in Cyprus: An alternative to the Noah's Ark model	<b>74</b>
<b>Jean-Denis Vigne, Isabelle Carrère, Jean-François Saliège, Alain Person, Hervé Bocherens, Jean Guilaine and François Briois</b> Predomestic cattle, sheep, goat and pig during the late 9 <sup>th</sup> and the 8 <sup>th</sup> millennium cal. BC on Cyprus: Preliminary results of Shillourokambos (Parekklisha, Limassol)	<b>83</b>
<b>Norbert Benecke</b> Mesolithic hunters of the Crimean Mountains: The fauna from the rock shelter of Shpan'-koba	<b>107</b>
<b>Hitomi Hongo and Richard H. Meadow</b> Faunal remains from Prepottery Neolithic levels at Çayönü, Southeastern Turkey: a preliminary report focusing on pigs ( <i>Sus</i> sp.)	<b>121</b>
<b>Gulcin Ilgezdi</b> Zooarchaeology at Çayönü: a preliminary assessment of the red deer bones	<b>141</b>
<b>Banu Oksuz</b> Analysis of the cattle bones of the Prepottery Neolithic settlement of Çayönü	<b>154</b>
<b>Nerissa Russell and Louise Martin</b> Neolithic Çatalhöyük: preliminary zooarchaeological results from the renewed excavations	<b>163</b>
<b>Alice M. Choyke</b> Bronze Age bone and antler manufacturing at Arslantepe (Anatolia)	<b>170</b>
<b>Ofer Bar-Yosef</b> The context of animal domestication in Southwestern Asia	<b>184</b>
<b>Cornelia Becker</b> Bone and species distribution in late PPNB Basta (Jordan) - Rethinking the anthropogenic factor	<b>195</b>
<b>Justin Lev-Tov</b> Late prehistoric faunal remains from new excavations at Tel Ali (Northern Israel)	<b>207</b>
<b>Daniella E. Bar-Yosef Mayer</b> The economic importance of molluscs in the Levant	<b>217</b>
<b>Daniel Helmer</b> Les gazelles de la Shamiyya du nord et de la Djézireh, du Natoufien récent au PPNB: Implications environnementales	<b>227</b>
<b>Maria Saña Seguí</b> Animal resource management and the process of animal domestication at Tell Halula (Euphrates Valley-Sria) from 8800 bp to 7800 bp	<b>241</b>

## Contents

### VOLUME B

<b>Chiara Cavallo, Peter M.M.G. Akkermans and Hans Koens</b>	<b>5</b>
Hunting with bow and arrow at Tell Sabi Abyad	
<b>Caroline Grigson</b>	<b>12</b>
The secondary products revolution? Changes in animal management from the fourth to the fifth millennium, at Arjoune, Syria	
<b>Barbara Wilkens</b>	<b>29</b>
Faunal remains from Tell Afis (Syria)	
<b>Margarethe Uerpmann and Hans-Peter Uerpmann</b>	<b>40</b>
Faunal remains of Al-Buhais 18: an Aceramic Neolithic site in the Emirate of Sharjah (SE-Arabia) - excavations 1995-1998	
<b>Angela von den Driesch and Henriette Manhart</b>	<b>50</b>
Fish bones from Al Markh, Bahrain	
<b>Mark Beech</b>	<b>68</b>
Preliminary report on the faunal remains from an 'Ubaid settlement on Dalma Island, United Arab Emirates	
<b>Jean Desse and Nathalie Desse-Berset</b>	<b>79</b>
Julfar (Ras al Khaimah, Emirats Arabes Unis), ville portuaire du golfe arabo-persique (VIII <sup>e</sup> -XVII <sup>e</sup> siècles): exploitation des mammifères et des poissons	
<b>Chris Mosseri-Marlio</b>	<b>94</b>
Sea turtle and dolphin remains from Ra's al-Hadd, Oman	
<b>Hervé Bocherens, Daniel Billiou, Vincent Charpentier and Marjan Mashkour</b>	<b>104</b>
Palaeoenvironmental and archaeological implications of bone and tooth isotopic biogeochemistry ( <sup>13</sup> C <sup>15</sup> N) in southwestern Asia	
<b>Sándor Bökönyi † and László Bartosiewicz</b>	<b>116</b>
A review of animal remains from Shahr-i Sokhta (Eastern Iran)	
<b>Ann Forsten</b>	<b>153</b>
A note on the equid from Anau, Turkestan, " <i>Equus caballus pumPELLII</i> " Duerst	
<b>Alex K. Kasparov</b>	<b>156</b>
Zoomorphological statuettes from Eneolithic layers at Ilgynly-depe and Altyn depe in South Turkmeniya	
<b>László Bartosiewicz</b>	<b>164</b>
Cattle offering from the temple of Montuhotep, Sankhkara (Thebes, Egypt)	
<b>Louis Chaix</b>	<b>177</b>
A hyksos horse from Tell Heboua (Sinaï, Egypt)	
<b>Liliane Karali</b>	<b>187</b>
Evolution actuelle de l'archéozoologie en Grèce dans le Néolithique et l'Age du Bronze	
<b>Emmanuelle Vila</b>	<b>197</b>
Bone remains from sacrificial places: the temples of Athena Alea at Tegea and of Asea on Agios Elias (The Peloponnese, Greece)	
<b>Wim Van Neer, Ruud Wildekamp, Marc Waelkens, Allan Arndt and Filip Volckaert</b>	<b>206</b>
Fish as indicators of trade relationships in Roman times: the example of Sagalassos, Turkey	
<b>Ingrid Beuls, Bea De Cupere, Paul Van Mele, Marleen Vermoere, Marc Waelkens</b>	<b>216</b>
Present-day traditional ovicaprine herding as a reconstructional aid for understanding herding at Roman Sagalassos	

Address List ASWA

# ANIMAL BONES FROM WADI MATAHA (PETRA BASIN, JORDAN): THE INITIAL ANALYSIS

Sarah E. Whitcher<sup>1</sup>, Joel C. Janetski<sup>2</sup>, and Richard H. Meadow<sup>3</sup>

## Abstract

Wadi Mataha lies 1.2 km north of the ancient city of Petra in southern Jordan. In 1997, a team from Brigham Young University initiated excavations at the site by opening two test pits. The two strata in Test Pit 1 yielded lithics characteristic of the Middle Epipaleolithic (ca. 14,500-13,000 bp) and of the Late Natufian (ca. 11,000-10,300 bp). Test Pit 2 produced material which appears to be Early Natufian (ca. 12,800-11,000 bp). Over 1300 animal bones were recovered from these two test pits. Results of the initial faunal analyses indicate an assemblage dominated by caprine bones. Other taxa include gazelle, equid, dog, hare, rodent, and land tortoise. Temporal variations indicate a slightly more diverse spectrum of exploited taxa in the Natufian phases. Other diachronic differences are found in the relative proportions of taxa. Gazelle bones dominate the Middle Epipaleolithic assemblage while those of goat are more common in the subsequent Natufian phases.

## Résumé

Wadi Mataha est situé à 1,2 km au nord de l'ancienne cité de Petra dans le sud de la Jordanie. En 1997, une équipe d'archéologie de l'Université de Brigham Young y a entrepris des fouilles en ouvrant deux sondages. Les deux strates du sondage 1 recelaient des objets lithiques caractéristiques de l'Épipaléolithique moyen (ca. 14,500-13,000 BP) et de la fin du Natoufien (ca. 10,000-10,300 BP). Le sondage 2 a fourni du matériel appartenant au Natoufien ancien (ca. 12,800-11,000 BP). Plus de 1300 os ont été découverts dans ces deux sondages. Le résultat d'une analyse préliminaire indique une prédominance des caprinés suivis de la gazelle, d'un équidé, du chien, du lièvre, des rongeurs et de la tortue terrestre. On constate dans la succession chronologique une plus grande diversité de la grande faune durant le Natoufien. D'autres divergences diachroniques se voient dans la proportion relative des taxons. Les ossements de gazelle dominent l'assemblage de l'Épipaléolithique moyen, alors que ceux de la chèvre sont plus communs dans les phases natoufiennes qui font suite.

**Key Words:** Animal Bones, Natufian, Epipaleolithic, Wadi Mataha, Zooarchaeology, Jordan

**Mots Clés:** Ossements animaux, Natoufien, Epipaléolithique, Wadi Mataha, Archéozoologie

## Background

### Site Location and Description

Wadi Mataha is a small Epipaleolithic site in the northern portion of the Petra Basin in southern Jordan. The terrain here is rough and broken, intermediate between the valley bottom (where Petra is located) and the gentler, hilly uplands which still contain some vestiges of oak - pistachio woodlands. The site sits at the top of a steep talus at the base of a south-facing escarpment forming the south edge of Maghur al Mataha, a large sandstone monolith. The elevation of the site is about 950 m. The talus slope is littered with sandstone rubble, chipped stone debris and tools, and occasional bone, all eroding into a small secondary drainage of the site's namesake, Wadi Mataha, an important drainage flowing into the city of Petra 1.2 km to the south. On a sandstone ledge at the base of the escarpment are several bedrock mortars. The artifact scatter covers roughly 1100 m<sup>2</sup>, although this figure may be

<sup>1</sup> Harvard University, Derek Bok Center for Teaching and Learning, Cambridge Mass. 02138, USA.

<sup>2</sup> Department of Anthropology, Brigham Young University, Provo, UT 84602, USA.

<sup>3</sup> Peabody Museum, Harvard University, Cambridge Mass. 02138, USA

misleading since cultural debris is clearly eroding down slope and the scatter there may be surface only. The area covered by primary subsurface deposits may be as low as 150 m<sup>2</sup>. Several Nabataean water control features are cut into the sandstone escarpment and occasional Nabataean sherds are present on the surface of the site.

The site was discovered in 1986 during a routine survey of the region by Dennis Heskell as part of the American Expedition to Petra. Surveyors collected a modest sample of chipped stone tools and marine shell for age assessments. The collections proved to be characteristic of Early Natufian assemblages (Michael Chazan, personal communication 1996), sparking an interest in further investigation given the scarcity of such sites known from southern Jordan.

## **The Excavation**

Test excavations at Wadi Mataha were carried out during the summer of 1997. Testing objectives included confirming the presence of constructed features and obtaining controlled samples of chipped stone tools and debitage, animal bone, and sediments for botanical analysis and dating. To accomplish these goals, excavators dug two 1 m<sup>2</sup> test pits to bedrock and defined seven bedrock mortars. The objectives were met on all accounts. These tests are briefly described below.

### **Test Pit 1**

Test Pit 1 was placed in a heavily stained midden on the northwestern edge of the site near the top of the slope. The midden contained abundant chipped stone artifacts and animal bone in a context of coarse sand and sandstone rubble. At about 30 cm below ground surface, excavators encountered several flat sandstone slabs and an apparent alignment of large, rounded sandstone boulders. Associated with the slabs were two goat horn cores. A sounding in the southwest corner of the test found an additional 70 cm of cultural deposits below the slab layer. The sediments below the slabs were found to be markedly different from the overlying deposit, in that sandstone rubble was nearly absent, giving way to a homogenous gray-brown sand. Animal bone, chipped stone tools and debitage as well as occasional marine shell continued. This lower level contained tools characteristic of the Middle Epipaleolithic period. The maximum depth of culturally stained deposits in Test Area 1 is about 1 m.

### **Test Pit 2**

Test Pit 2 investigated a gently curving alignment of stone masonry to 1) verify that it was architectural, 2) determine the depth of deposits, and 3) ascertain whether floors or other features related to the alignment might be present. The stone alignment was on a steep slope near the top of the talus but below the sandstone ledge containing the mortars. The alignment ended abruptly at about 30 cm below current ground surface, clearly demonstrating that it had been purposefully laid. Sediments above the bottom of the basal stones contained abundant sandstone rubble (much like the upper deposits of Test Area 1), chipped stone tools and flaking debris, animal bone, and an occasional marine shell. Included among the chipped stone tools was a unifacially flaked arrow point, end scrapers on blades, and lunates with Helwan retouch. The latter suggest that this deposit is Early Natufian. Deposits below the stone foundation were found to be essentially sterile, although they continued for an additional 75 cm before bedrock was encountered. No compacted use surface was detected. It is likely that any such surface had eroded downslope, a probability borne out by the sloping nature of the cultural sediments. The bone from this test was heavily encrusted with carbonates.

## **Bedrock Mortars**

Seven bedrock mortars were exposed on a sandstone ledge during minimal cleaning. Four of these are rather deep (30 to 72 cm) while the other three are shallow (less than 10 cm) and are more appropriately called cup mortars. All are conical bottomed. All were either exposed on the surface or

covered with only a few sediments of sand and most appeared to contain secondarily deposited sediments along with a few artifacts. The deepest mortar contained a more diverse assemblage including ground stone and *Dentalium* sp. shell as well as the ubiquitous lithics.

### Site Age

Chipped stone tools recovered from the two test pits provide the only chronometric data available for Wadi Mataha at the time of writing. Preliminary sorting by Michael Chazan of the University of Toronto has identified three periods of occupation: 1) Middle Epipaleolithic at the base of Test Area 1, marked by the presence of Ramon points and some Helwan retouch; 2) Early Natufian in Test Area 2, characterized by lunates with Helwan retouch; and 3) Late Natufian in the upper levels of Test Area 1, which contained steeply backed small lunates and no Helwan retouch. Estimated ages for these cultural periods are ~14,500-13,000 bp for the Middle Epipaleolithic, ~12,800-11,000 bp for the Early Natufian, and ~11,000-10,300 bp for the Late Natufian.

### The Animal Bone Assemblage

Of the 1339 animal bones recovered from the test excavations at Wadi Mataha, 108 were identified both to taxon and to element. The small number of identified specimens is due to the highly fragmented state of the majority of the bones and also attests to the thoroughness of the recovery techniques employed. The 108 bones come from taxa typically found in Natufian assemblages from the steppe and desert zones. The percentages of taxa in the Wadi Mataha test assemblage are shown in Table 1. Caprine bones – including those identified as *Capra* and those identified only to the sub-family level – dominate the assemblage at over 45% of the total identified specimens. The next most common taxon is gazelle at 28%. The predominance of caprines at a site situated as is Wadi Mataha is not unexpected. While gazelle bones often comprise over 80% of assemblages from forest and coastal sites, they are less frequent than caprines in steppe and desert sites (Byrd 1990: 176). The remainder of the fragments identified to taxon come from birds and land tortoises (represented by 11 bones each), dog, hare, and equid (represented by one bone each), and rodents (represented by two bones).

The Wadi Mataha bone fragments that were not identified to taxon were grouped into categories, such as “bovid”, “medium-sized artiodactyl”, and “small mammal” depending on the characters preserved on each specimen. Eight specimens were identified as “large mammal” which means they could have come from equids, bovines, or large cervids. Only equids are represented in the identified part of the collection.

Table 1. Representation of Different Taxa at Wadi Mataha, 1997

Species Name	NISP	Percent
Goat ( <i>Capra aegagrus/Capra ibex</i> )	35	32%
Caprine (probably <i>Capra</i> )	16	15%
Gazelle ( <i>G.gazella/G.dorcas</i> )	30	28%
Equid ( <i>E.asinus/E.hemionus/E.hydruntinus</i> )	1	1%
Dog/Wolf ( <i>Canis</i> sp.)	1	1%
Hare ( <i>Lepus</i> sp.)	1	1%
Partridge ( <i>Alectoris</i> sp.)	7	6%
Other Bird	4	4%
Rodentia	2	2%
Land Tortoise	11	10%
<b>TOTAL</b>	<b>108</b>	<b>100%</b>

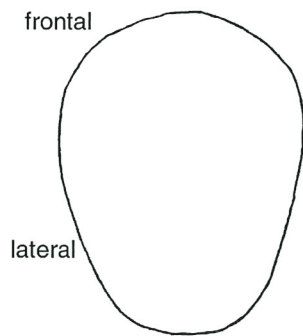


Fig. 1. *Capra ibex*. left horn core from the Late Natufian at Wadi Mataha, Bone #97.26.33.1; Measurements: 57.7 x 41.6 mm (Cross-section taken ca. 10 mm from the base of the horn core)

While a few bones show signs of gnawing and of erosion from having been ingested by carnivores, at least 10 bones have tool cut marks, attesting to human activity. Some specimens are charred, indicating contact with elevated heat, although there is no direct evidence (such as “spit marks”) for cooking over an open fire.

### Caprines

Of the 50 caprine bones, 35 are determined to have come from goats. Given that there are no identified remains of sheep as yet, we can presume that the 15 bones identified to the general caprine category are likewise those of wild goat. Whether these are the bones of *Capra aegagrus* or *Capra ibex* or of both species remains unclear. The measurements of eleven bones determined to be from goats are given in Table 2. Two rather well-preserved horn cores were recovered in the test excavations at Wadi Mataha. One horn core, from a Late Natufian context, provided a clear cross-section (Fig. 1). The frontal margin is rounded and lacks the characteristic keel of *C. aegagrus* horn cores. Its oval cross-section is typical of *C. ibex* (e.g., Ducos 1968: fig. 14; Meadow 1989: fig. 2). Wadi Mataha lies within the known ancient range of both species of wild goat. Horn cores of both *C. aegagrus* and *C. ibex* have been identified at nearby Beidha, where the wild goat would have inhabited the rocky upper slopes and the ibex the drier gorges below the site (Uerpmann 1987: 114; Hecker 1975: 102-107). At Beidha, the caprine post-cranial remains are thought to include only about 15% bones of *C. ibex* (Hecker 1982: 225). While Wadi Mataha is situated within the southernmost extent of the range of *C. aegagrus*, it lies more comfortably within the range of *C. ibex* (Uerpmann 1987: 118-121). However, the difficulty in distinguishing the post-cranial remains of wild goat and ibex, together with the small sample size from Wadi Mataha, precludes any more specific identification than *Capra* sp.

Table 2. Measurements\* of *Capra* sp. bones from Wadi Mataha, 1997

Element	Period**	Measurements (mm)					
horn core	LN	57.7 x 41.6 (at 10 mm above base)					
humerus	LN	BT: ca. 23.4					
radius	LN	Bd: 29	BFd: 26				
metacarpal	EN	Bd: 33.8					
tibia	EN	Bd: 33.3	Dd: 26.4	SD: ca. 20.1			
tibia	EN	Dd: 24.5					
calcaneus #	EN	GL: 74.2	GB: ca. 24.2	Bp: 18			
astragalus #	EN	GL: 32.2	GLm: 30.7	Bd: 20	DI: 17.3	Dm: 17.6	
astragalus	LN	GL: 30		GLm: 26.3	Bd: 18.5	DI: 15.4	Dm: 14.4
astragalus	EN	GL: 30		GLm: 28.4		DI: 16.5	
metatarsal	LN	Bd: 29.5					
phalanx 2	EN	GL: 25.5	Bp: 13.5	Bd: 11	SD: 10.7		
phalanx 2	ME	Bp: 14.7					

\* Measurements (in mm) after Von Den Driesch (1976)

\*\* ME: Middle Epipaleolithic; EN: Early Natufian; LN: Late Natufian

# This articulated left astragalus (bone # 97.26.55.2) and calcaneus (bone #97.26.55.13) probably come from one individual

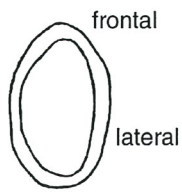


Fig. 2. *Gazella* sp. Right horn core from the Middle Epipaleolithic at Wadi Mataha, Bone #97.26.46.91; Measurements: 25 x 14.3 mm (cross-section taken 15 mm above the base of the horn core); 21.6 x 11.9 mm (cross-section taken 35 mm above base, approximately half-way between the base and the tip of the horn core)

## Gazelles

The size of the gazelle bones from Wadi Mataha suggests that they are from the larger species *Gazella gazella*, the mountain gazelle. *Gazella dorcas* probably did not inhabit this area during the Natufian (Tchernov *et al.* 1986/7). Differences between the two species are size, horn core shape, and certain cranial features (Tchernov *et al.* 1986/7), of which the first two are relevant to the collection at hand. The Wadi Mataha assemblage includes one male gazelle horn core from the Middle Epipaleolithic period, although it is from a young individual and so must be evaluated with caution. *G. gazella* horn cores have a wide groove on the frontal margin of the horn core, while both *G. gazella* and *G. dorcas* have a groove on or near the nuchal margin (Ducos, 1968). In addition, the *G. gazella* horn core cross-section is elliptical, while that of *G. dorcas* is egg-shaped with a wider nuchal margin (Tchernov *et al.* 1986/7). The Wadi Mataha horn core, in spite of the fact that it comes from a young animal, appears elliptical in shape (Fig. 2). Additionally, its shape and size index falls well within the range of *G. gazella* (Tchernov *et al.* 1986/7).<sup>4</sup>

All the measured gazelle bones from Wadi Mataha (Table 3) fall within ranges for *G. gazella* (Horwitz *et al.* 1990). Four gazelle bones (two metacarpals, and two first phalanges) are most likely from male animals.<sup>5</sup> For three other bone fragments sex is indeterminate as the dimensions fall within the higher end of the female range and the lower end of the male range.

Table 3. Measurements\* of *Gazella* sp. Bones from Wadi Mataha, 1997

Element	Period**	Measurements (mm)
horn core	ME	25 x 14.3 (at 15 mm above base)
ulna	EN	BPC: 14.5
femur	--	DC: 17.5
tibia	LN	Bd: 22.8                      Dd: ca.18.5
phalanx 1	LN	Bd: 7.7
phalanx 1	EN	Bd: 9.2
phalanx 1	EN	Bp: 10.8                      Dp: 14.4

## Equids

Like those of caprines, equid bones are common in Epipaleolithic steppe and desert sites. At Wadi Mataha only a single bone could be identified as equid – a left central tarsal (Fig. 3), found in an Early Natufian deposit. Measurements taken on the central tarsal from Wadi Mataha include a greatest breadth (GB) of 46.1 mm, and a breadth of the proximal articular surface (BFp) of 44.5 mm. It is too small to be *Equus ferus*, but might be from one of the other three species of equids known from the southern Levant, namely, *Equus africanus*, *Equus hydruntinus*, or *Equus hemionus*. The central tarsal is a bone for which measurements are rarely published. The size and shape of the articular

<sup>4</sup> The index is: (least diameter/greatest diameter)\*100. The Wadi Mataha gazelle horn core scores a 68.2 mm, in the middle of the range for *G. gazella*.

<sup>5</sup> Sex determinations are based on measurements given in Horwitz, Cope, and Tchernov 1990.

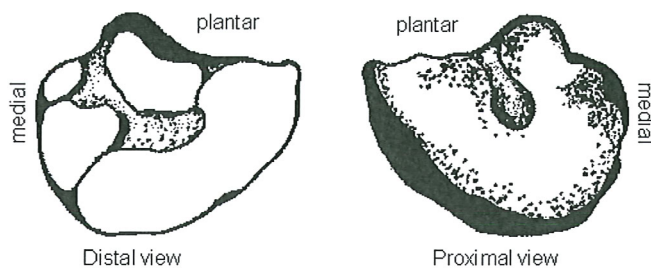


Fig. 3. *Equus* sp. right central tarsal from the Early Natufian at Wadi Mataha, Bone #97.26.61.1; Measurements (mm): GB 46.1 mm; BFp 44.5 mm

facets are different than those of a specimen of Syrian onager (*Equus hemionus hemippus*) to which it was compared at Harvard University's Museum of Comparative Zoology.<sup>6</sup> Additionally, the overall size of the specimen is slightly larger than that of the onager,<sup>7</sup> suggesting that the specimen might be from *E. africanus*, an animal more similar in size to the onager than to the smaller *E. hydruntinus*. Bones of *E. africanus* have been identified in the Early Natufian at Wadi Judayid (Uerpmann 1991: 17) and, more recently at Upper Besor 6 (UB6) in Israel (Horwitz personal comm.).

### Canids

One metatarsal fragment (the proximal articular end of a fifth digit) was determined to be from a small member of the genus *Canis*. With no information regarding the age of the animal, however, it is not clear whether it comes from a young wolf, a medium-sized domestic dog, or a jackal. This single canid specimen comes from a context that has been attributed to the Late Natufian.

### Birds

Bird bones are found in small numbers in all periods at Wadi Mataha (Fig. 4, Table 5). Seven of the eleven bird bones from the test excavations are from a species of partridge (*Alectoris* sp.). The chukar (*Alectoris chukar*) is common in this area today on dry rocky mountain slopes with or without scrub vegetation (Jonsson 1993). It breeds and is present year-round in this area. The four remaining bird bones have not been identified to taxon.

### Body Part Representation

A preliminary assessment of skeletal part representation has been attempted for gazelle and goat bones from Wadi Mataha. Although the samples are very small, they show a difference in the relative percentages of body part groupings (Table 4). The most outstanding fact is that goat cranial bones and teeth ("head" category) make up nearly half of the total goat elements in all phases. This is undoubtedly due to the high number of pieces of goat horn cores: ten fragments, as opposed to only one gazelle horn core fragment. When horn cores are removed from the sample (Table 4), goat "head" bones still predominate over those of gazelle in all but the Late Natufian phase. The paucity of gazelle head elements might be a bias of the small sample; however, these potential differences should be kept in mind in future analyses.<sup>8</sup>

<sup>6</sup> Measurements taken on the Syrian onager from the MCZ are: GB: 37.8 mm; BFp: 35.8 mm

<sup>7</sup> Two comparable *E. hemionus* central tarsals from Çayönü in southeast Turkey have the following measurements (in mm): GB: 42.1, 42.1; BFp: 40.1, 40.2; DFp: 27.2, 27.7 (Meadow 1986: 296; Table 3f).

<sup>8</sup> In their work at early Natufian Wadi Judayid in southern Jordan, Henry and Turnbull (1985: 60) interpreted a dearth of skulls and horn cores (along with large limb bones, pelvic and shoulder girdles) as possibly indicating butchery away from the site.

Table 4. Body Part Representation in caprines and gazelles at Wadi Mataha, 1997

<i>With horn cores</i>						
	Middle Epipaleolithic		Early Natufian		Late Natufian	
Caprine	NISP	Percent	NISP	Percent	NISP	Percent
<i>head</i>	2	40%	13	46%	6	46%
<i>back</i>	0	0	0	0	0	0
<i>upper forelimb</i>	0	0	2	7%	2	15%
<i>upper hindlimb</i>	1	20%	3	11%	2	15%
<i>feet</i>	2	40%	10	36%	3	23%
<b>Total</b>	<b>5</b>		<b>28</b>		<b>13</b>	
Gazelle	NISP	Percent	NISP	Percent	NISP	Percent
<i>head</i>	1	17%	2	14%	2	29%
<i>back</i>	0	0	3	21%	0	0
<i>upper forelimb</i>	1	17%	3	21%	1	14%
<i>upper hindlimb</i>	1	17%	1	7%	2	29%
<i>feet</i>	3	50%	5	36%	2	29%
<b>Total</b>	<b>6</b>		<b>14</b>		<b>7</b>	
<i>Without horn cores</i>						
	Middle Epipaleolithic		Early Natufian		Late Natufian	
Caprine	NISP	Percent	NISP	Percent	NISP	Percent
<i>head</i>	2	40%	7	32%	2	22%
<i>back</i>	0	0	0	0	0	0
<i>upper forelimb</i>	0	0	2	9%	2	22%
<i>upper hindlimb</i>	1	20%	3	14%	2	22%
<i>feet</i>	2	40%	10	45%	3	33%
<b>Total</b>	<b>5</b>		<b>22</b>		<b>9</b>	
Gazelle	NISP	Percent	NISP	Percent	NISP	Percent
<i>head</i>	0	0	2	14%	2	29%
<i>back</i>	0	0	3	21%	0	0
<i>upper forelimb</i>	1	20%	3	21%	1	14%
<i>upper hindlimb</i>	1	20%	1	7%	2	29%
<i>feet</i>	3	60%	5	36%	2	29%
<b>Total</b>	<b>6</b>		<b>14</b>		<b>7</b>	

Key to body parts:

*head*: cranium, horn core, maxilla, mandible, teeth

*back*: vertebrae, ribs

*upper forelimb*: scapula, humerus, radius/ulna

*upper hindlimb*: pelvis, femur, patella, tibia

*feet*: carpals, tarsals, metapodials, phalanges

### Temporal Variation

As discussed above, three distinct periods have been defined from test excavations at Wadi Mataha. The two strata in Test Pit 1 yielded lithics characteristic of the Middle Epipaleolithic (ca. 14,500-13,000 bp) and of the Late Natufian (ca. 11,000-10,300 bp). Test Pit 2 produced material which appears to be Early Natufian (ca. 12,800-11,000 bp). Only 34 of the 1339 animal bones recovered came from contexts unrelated to any of these three strata.

Table 5. Representation of Different Taxa by Period at Wadi Mataha, 1997

Species Name	Middle Epipaleolithic		Early Natufian		Late Natufian	
	NISP	Percent	NISP	Percent	NISP	Percent
Goat ( <i>C.aegagrus/C. ibex</i> )	2	13%	22	42%	11	35%
Caprine (probably <i>Capra</i> )	3	19%	7	13%	3	10%
Gazelle ( <i>G.gazella/G.dorcas</i> )	7	44%	14	26%	7	23%
Equid ( <i>Equus</i> sp.)	--	--	1	2%	--	--
Dog/Wolf ( <i>Canis</i> sp.)	--	--	--	--	1	3%
Hare ( <i>Lepus</i> sp.)	--	--	1	2%	1	3%
Aves	3	19%	1	2%	5	16%
Rodentia	--	--	1	2%	--	--
Land Tortoise	1	6%	6	11%	3	10%
<b>TOTAL</b>	<b>16</b>		<b>53</b>		<b>31</b>	

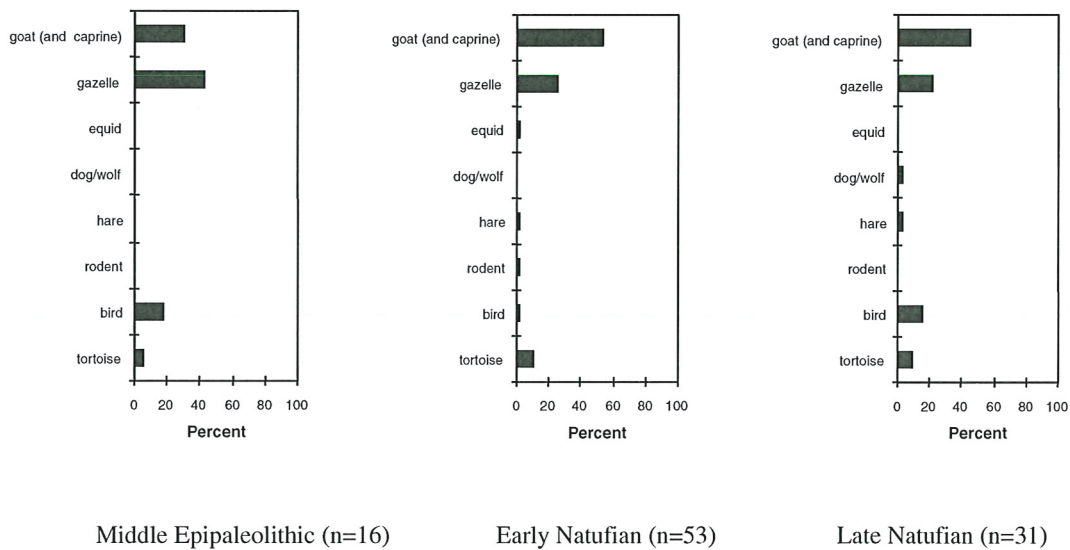


Fig. 4. Representation of the various taxa in the Middle Epipaleolithic, Early Natufian, and Late Natufian at Wadi Mataha, 1997

Faunal data from the Middle Epipaleolithic are valuable, because very little is known about subsistence practices from the periods preceding the Natufian (Valla 1995). At Wadi Mataha, there is a slightly narrower spectrum of taxa exploited during the Middle Epipaleolithic than in the Natufian. However, this lack of variation is most likely due to the small size of the sample (16 identified specimens). The greatest change seen in the Wadi Mataha bone assemblage is in the relative proportions of gazelle and goat between the Middle Epipaleolithic and the Natufian. In the Middle Epipaleolithic, gazelle predominate, while in both the Early and the Late Natufian, goat are more common (Fig. 4, Table 5). Although this observation is based on a small number of bones, it may represent a significant shift in exploitation practices in the Natufian. Within the Natufian itself, it is intriguing that there appears to be a broader spectrum of animal exploitation in the Late Natufian than in the Early Natufian. These apparent differences, however, need to be evaluated when a larger assemblage is available.

## The Potential of the Assemblage for Future Studies

The three temporally-distinct complexes which have been identified at Wadi Mataha provide the potential for a tripartite analysis focusing on continuity and change between the Middle Epipaleolithic, the Early Natufian, and the Late Natufian. It is hoped that future excavations will provide sufficient animal bone for a much-needed characterization of Middle Epipaleolithic subsistence practices, as well as for comparisons within the Natufian.

The distinction between Early and Late Natufian deposits may prove useful for an assessment of climatic variability. The Middle Epipaleolithic and the beginning of the Early Natufian are thought by some to have experienced a warmer, more humid climate than the Late Natufian (and the end of the Early Natufian), which was colder and drier (Valla 1995). This climate shift, associated with the Younger Dryas, might have affected the types and frequencies of species in the area,<sup>9</sup> and might be reflected in animal behavior, or in human behavior relating to animal exploitation.

A division has been noted among the steppe and desert sites during the Natufian. One set of steppe and desert sites is distinguished by rather permanent settlements, while the other is characterized by less permanence of occupation and more specialized hunting (Byrd 1990: 188). Wadi Mataha potentially may provide an opportunity to compare animal exploitation by humans in non-sedentary and early sedentary or semi-sedentary societies. However, it should be noted that this site is on the "periphery" of the Natufian Carmel-Galilee center, so it is perhaps more "impoverished" (Valla 1995: 184) and might show less evidence of early sedentism.

Finally, while there is no morphological evidence for the domestication of wild plants and herd animals during the Natufian (Byrd 1990), the domestication process might have been underway in this early period. The increase in goat bones from the Middle Epipaleolithic into the Natufian at Wadi Mataha is interesting, and while there are too few bones at present to draw any conclusions, it might indicate a fundamental change in human-animal relationships that ultimately led to domestication.

## References

- Byrd, B.F., 1990. The Natufian: settlement variability and economic adaptations in the Levant at the end of the Pleistocene. *Journal of World Prehistory* 3: 159-197.
- von den Driesch, A., 1976. *The measurement of animal bones from archaeological sites*. Peabody Museum Bulletin 1. Harvard: Harvard University Press.
- Ducos, P., 1968. *L'origine des animaux domestiques en Palestine*. Bordeaux, Publications de Préhistoire de l'Université de Bordeaux 6.
- Goring-Morris, N., 1995. Complex hunter/gatherers at the end of the Paleolithic (20,000-10,000 BP). In: T.E. Levy (ed.), *The archaeology of society in the Holy Land*,. New York, Facts on File: 141-168
- Hecker, H., 1975. The faunal analysis of the primary food animals from pre-pottery Neolithic Beidha (Jordan). Unpublished Ph.D. dissertation. Columbia University (University Microfilms International, Ann Arbor).
- Hecker, H., 1982. Domestication revisited: its implications for faunal analysis. *Journal of Field Archaeology* 9: 217-236.
- Henry, D.O., and P.F. Turnbull, 1985. Archaeological and faunal evidence from Natufian and Timnian sites in southern Jordan. *Bulletin of the American Schools of Oriental Research* 257: 45-64.
- Horwitz, L.K. and E. Tchernov, this volume. Climatic change and faunal diversity in Epipaleolithic and early Neolithic sites from the lower Jordan Valley
- Horwitz, L., C. Cope, and E. Tchernov, 1990. Sexing the bones of mountain-gazelle (*Gazella gazella*) from prehistoric sites in the southern Levant. *Paléorient* 16: 1-12.
- Jonsson, L., 1993. *Birds of Europe, with North Africa and the Middle East*. Princeton, University

<sup>9</sup> The presence of wild sheep, cattle, and asses in the faunal assemblage from Wadi Judayid is thought to indicate a moister climate during the early Natufian (Henry and Turnbull 1985: 61).

- Press.
- Meadow, R.H., 1986. Some equid remains from Çayönü, southeastern Turkey. In: R.H. Meadow and H.P. Uerpmann (eds.), *Equids in the Ancient World* Wiesbaden, Ludwig Reichert Verlag: 266-301.
- Meadow, R.H., 1989. Prehistoric wild sheep and sheep domestication on the eastern margin of the Middle East. In: P.J. Crabtree, D. Campana, K. Ryan (ed.), *Early Animal domestication and its cultural context*. Philadelphia, MASCA, The University Museum: 24-36
- Tchernov, E., T. Dayan, and Y. Yom-Tov, 1986/7. The paleogeography of *Gazella gazella* and *Gazella dorcas* during the Holocene of the southern Levant. *Israel Journal of Zoology* 34: 51-59.
- Uerpmann, H.P., 1987. *The ancient distribution of ungulate mammals in the Middle East: Fauna and archaeological sites in southwest Asia and northeast Africa*. Wiesbaden: Reichert.
- Uerpmann, H.P., 1991. *Equus africanus* in Arabia. In: R.H. Meadow and H.P. Uerpmann (eds.), *Equids in the Ancient World*, Vol. II. Wiesbaden: Ludwig Reichert Verlag: 12-33.
- Valla, F., 1995. The first settled societies- Natufian (12,500-10,200BP). In: T.E. Levy (ed.), *The archaeology of society in the Holy Land*. New York, Facts on File: 169-187