

SECOND INTERMEDIATE PERIOD AND 18TH DYNASTY ANIMAL BONE REMAINS FROM TELL EL-RETABA¹

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Abstract: *Faunal remains from six Hyksos tombs and settlement layers from the Second Intermediate Period and 18th Dynasty were subjected to archaeozoological analysis.*

The results indicate that livestock species played a fundamental role in animal economy and meat diet of the inhabitants of Tell el-Retaba, with a marginal significance of fishing, hunting or possible mussel or snail collecting. The statistics concerning the bones of four domestic mammal species (sheep, goat, cattle, pig) demonstrate a certain variety in food preferences that the people living at Tell el-Retaba had in different periods. Generally, in the Second Intermediate Period mutton and goat meat dominated, with a lower share of beef and an even smaller proportion of pork. The role of ovicaprine meat was the most prominent in the times of Hyksos settlement activity. The significance of these animals is emphasized by the fact that they were deposited in the tombs together with humans, probably as a supply of food for the afterlife. It appears that offerings were made of portioned carcasses of subadult sheep, and less frequently subadult goats. Perhaps the local food supply was more varied as the tombs also contained remains of other species of mammals, as well as fishes, birds, and mollusks.

During the 18th Dynasty there was a certain change in the diet, the importance of sheep and goat meat was further strengthened, with a decreased percentage of beef and pork. The trend is derived from modifications in husbandry prac-

tices, which in turn could have changed for cultural or environmental reasons.

Keywords: *Bone remains, meat consumption, economy, Hyksos grave, animal offerings*

The aim of this work is to discuss animal remains from stratigraphic units dated to the Second Intermediate Period – 18th Dynasty² unearthed in the course of excavations conducted at Tell el-Retaba in 2011–2015, mainly in areas 4 and 7 of the site.³

The osteological material was examined according to standard rules and procedures applied in archaeozoology. The mammal, bird and fish remains were identified to the lowest possible taxonomic level (species, genus or order). In the case of examination of bones and teeth of sheep and goat, identification guidelines provided by zoologists and archaeozoologists were used.⁴ Bird bones were identified to a zoological taxon and anatomical element by Professor Teresa Tomek (Institute of Systematics and Evolution of Animals of Polish Academy of Sciences in Cracow) on the basis of a comparative collection and references.⁵ Identification of fish remains was performed with the use of a comparative collection and data published on the FishBase.org website. Mollusk shells were isolated from the material and counted, in order to be subjected to further study in the future.

The age of domestic mammals was estimated on the basis of the stage of development of the bones, as well as the stage of development and wear of the teeth.⁶ The sex was estimated on the

¹ Excavations are carried out by the Polish-Slovak Archaeological Mission, working under the auspices of the Polish Centre of Mediterranean Archaeology, University of Warsaw, in cooperation with: Institute of Archaeology, University of Warsaw; Slovak Academy of Sciences; Aigyptos Foundation, Bratislava. The present study was carried out in the framework of the project financed by the Polish National Science Centre, grant no 2012/05/B/HS3/03748.

² This article is a continuation of the results of archaeozoological analyses presented in *E&L* 25. The previous contribution concerned Ramesside and Third Intermediate Period bone materials, cf. GRĘZAK 2015.

³ For the location of excavations areas and plans of the main archaeological features cf. MALLESON 2016 (in the present volume), Figs. 1–3.

⁴ SCHRAMM 1967, HALSTEAD, COLLINS, ISAAKIDOU 2002, ZEDER, LAPHMAN 2010 and ZEDER, PILAAR 2010.

⁵ WOELFE 1967 and GRUBER 1990.

⁶ SILVER 1970.

basis of features of sexual dimorphism visible on certain bones. Bones were measured according to the unified method⁷. Teichert coefficients were used to calculate the withers height of sheep.⁸ In addition to that, anthropogenic and post-depositional marks on the bones were analyzed.⁹

The state of preservation of faunal remains was rather poor. The bones bore butchery marks as well as marks of destructive activity of biological, chemical, and mechanical factors during the deposition of the remains on the ground surface, as well as in the soil, and then in the course of final exploration. For this reason, a significant part of the material (approx. 30%) was not identified to a zoological taxon. Nevertheless, it seems that a large number of small unidentified fragments came from the skeletal elements described in detail.

The osteological material consisted of both post-consumption remains and deposits found in tombs, which are most likely relics of offerings. Generally, both categories comprised mostly bones and teeth of mammals (tables 1–4), reaching approx. 93% of all analyzed remains. There were much fewer fragments of birds, fish and shells of mussels and snails. Amphibians were represented by one bone. The whole assemblage was divided into two chronological periods: the Second Intermediate Period (phases G3–G1) and the 18th Dynasty (phases F4–F2).¹⁰

Second Intermediate Period

The osteological material from the Second Intermediate Period consists of assemblages unearthed at the settlement and the cemetery.

The settlement layers contained 1100 animal fragments, which were associated with several chronological phases: G3, G2, G3–G2 and G2–G1. The two latter assemblages were not further analyzed due to the low number of remains; however, they are included in the lists of bones and teeth presented in Table 1. The older phase (G3) was represented by 614 animal skeletal fragments, 67.43% of which were identified. The remains mostly came from mammals (91.30%), and of those, the highest number of skeletal elements belonged to sheep and goat. Cattle bones were the next most frequent, and remains of pig and Equids (donkey) were nearly six times less numerous.

There was one bone that belonged to a gazelle skeleton. Additionally, there was a little group of small mammals representing rodents and erinaceids. A low number of bones came from several fish species (Table 3): African sharptooth catfish *Clarias gariepinus*, Nile tilapia *Oreochromis niloticus*, Nile perch *Lates niloticus*, *Synodontis* sp. (including *Synodontis schall*); as well as bird species (Table 2): Eurasian coot *Fulica atra* and duck, most likely *Anas platyrhynchos*. Moreover, four mussel shells and two snail shells were found in the assemblage.

It was possible to identify less than 60% out of 432 animal remains discovered in the layers formed in phase G2. Three quarters of them were fragments of mammal bones, mostly of domestic species (Table 1). Only a few specimens belonged to gazelle, red deer and small synanthropic animals, such as rodents (murid family) and erinaceids. The bones of livestock mammals were represented mainly by sheep and goat remains (70.43%), followed by cattle remains (18.28%), pig (7.53%) and donkey. Another fairly large group was constituted by fish species (Table 3), with the highest number of African sharptooth catfish *Clarias gariepinus* bones, and rather sparse skeletal fragments of tilapia *Oreochromis niloticus*, Nile perch *Lates niloticus* and *Synodontis* catfish. Six bones came from birds (Table 2): great crested grebe *Podiceps cristatus* and a gallinaceous bird (Galliformes) of medium size. Apart from that, eight mussel shells and six snail shells were found.

Anatomical distribution of sheep and goat remains from phases G3 and G2 indicates that all parts of carcass were represented (the head, thorax, proximal and distal parts of the forelimb and hind limb, phalanges), which suggests that the animals were slaughtered and butchered at the settlement, possibly within the examined areas. Similar conclusions could be drawn with regard to cattle bones from a larger assemblage dated to phase G3. The analysed osteological material was very fragmented, primarily due to the burning of the remains of the three most popular livestock species. Nevertheless, it appears that a major portion of ruminant and pig bones came from morphologically immature animals. Detailed analysis of age at death was possible for eight individuals representing sheep and goat. The youngest were killed

⁷ DRIESCH 1976.

⁸ DRIESCH and BOESSNECK 1974.

⁹ LYMAN 1994.

¹⁰ For the phasing system applied in Tell el-Retaba cf. MALLESON 2016 (in the present volume), Table 1.

Table 1 Bone remains (number of identified specimens) from settlement at Tell el-Retaba.

Taxa	Second Intermediate Period					18 th Dynasty										Total
	Phase G3	Phase G2	Phase G3-G2	Phase G2-G1	Total	Phase F4	Phase F3, "Black House" 1, room 1	Phase F3, "Black House" 1, room 3	Phase F3, Black House 1, room 4	Phase F3, "Black House" 3, room 1	Phase F3, "Black House" 3, room 2	Phase F3, area outside houses	Phase F3, F2 Total	Total		
Cattle	126	34	12	2	174	4			2	4	5	49	48	299		
Sheep	6	28			34	2		3		7		49	2	97		
Goat	10	8			18	7					1	10	22	58		
Sheep/goat	182	95	3	16	296	79		65	31	19	8	625	132	1283		
Pig	22	14	2	1	39	7			2	8		11	10	79		
Equids	8	4			12					9	1	5	2	30		
Donkey	10	3			13			2		2		8	3	28		
Dog												3	2	5		
Gazelle	1	4			5	1		4				20	10	40		
Middle size ruminant												5		5		
Red deer (?)		2			2				2			11	10	25		
Carnivora													2	2		
Hare								1					1	1		
Erinaceids	4	2			6							4		10		
Rodents	9	2			11			1				16		28		
Mammals	378	196	17	19	610	100		76	35	51	15	816	244	1990		
Birds	3	6		1	10	4			4	5	1	14	2	49		
Fish	27	44	1	2	74				6	12	5	15	1	115		
Amfibian												1		1		
Bivalve	4	8			12	1				3	1	7	2	26		
Snails	2	6	4		12							1		13		
Unidentified	200	172		10	382	40		55	20		5	659	150	1333		
Total	614	432	22	32	1100	145		131	65	71	27	1513	399	3527		

Table 2 Bird bones in archeological context from settlement at Tell el-Retaba

Taxa	Second Intermediate Period					18 th Dynasty							Total	
	Phase G3	Phase G2	Phase G3-G2	Phase G2-G1	Phase F4	Phase F3, "Black House" 1, room 1	Phase F3, "Black House" 1, room 2	Phase F3, "Black House" 1, room 4	Phase F3, "Black House" 3, room 1	Phase F3, "Black House" 3, room 2	Phase F3, area outside houses	Phase F2		
	<i>Anas platyrhynchos</i>							1						
cf. <i>Anas platyrhynchos</i>	1								1				1	3
cf. <i>Anas crecca</i>													1	1
<i>Anas</i> sp.							2							2
<i>Aythya</i> sp.					2						4			6
Anatidae cf. <i>Aythya</i> sp.							1							1
Anatidae						1					1	1		3
<i>Anser</i> sp.					2									2
<i>Ardea cinerea</i>						2								2
<i>Anthinga melanogaster</i>									1					1
<i>Ciconia ciconia</i>								2						2
Falco peregrines													1	1
<i>Fulica atra</i>	1							1				1		3
<i>Galliformes</i> middle size		1												1
<i>Podiceps cristatus</i>		2												2
Aves indet.	1	3		1			2	1	3	1	6			18
Total	3	6	1	1	4	1	8	4	5	1	14	2		49

Table 3 Fish bones in archeological context from settlement at Tell el-Retaba

Taxa	Second Intermediate Period					18 th Dynasty							Total
	Phase G3	Phase G2	Phase G3-G2	Phase G2-G1	Phase F3 "Black House" 1, room 1	Phase F3 "Black House" 1, room 4	Phase F3 "Black House" 3, room 1	Phase F3 "Black House" 3, room 2	Phase F3 area outside houses	Phase F2			
	<i>Clarias gariepinus</i>	14	32					7	1	15			
<i>Lates niloticus</i>	4	2	1		2		5						14
<i>Oreochromis niloticus</i>	5	1		1		1		3					11
<i>Synodontis</i> sp.	2	4		1		1				1			9
<i>Synodontis schall</i>						3							3
Pisces ident.	2	5				1		1					9
Total	27	44	1	2	2	6	12	5	15	1			115

Table 4 Animal bone remains discovered with Hyksos burials at Tell el-Retaba.

Taxa	Tomb [810]	Tomb [920]	Tomb [922]	Tomb [929]	Tomb [942]	Tomb [1696]
Sheep	318 (3 individuals)	108 (2 individuals)		406 (3 individuals)	6	134 (1 individual)
Sheep/goat		340				2 (1 individual)
Goat		7 (1 individual)				
Cattle	1	14		1		1
Pig		14				2
Donkey			3			
Red Deer (?)	5 (? 1 bone)					
Bird						1
<i>Clarias gariepinus</i>	10 (1 individual)	4 (1 individual)				9 (1 individual)
<i>Lates niloticus</i>						1
<i>Synodontis</i> sp.	4					2 (1 individual)
<i>Oreochromis niloticus</i>	1					15 (1 individual)
Bivalve				1		3
Snails				1		
Unidentified	10	40 small fragments ? ovicaprine		50 small fragments ? sheep		15 small fragments, ? ovicaprine
Total	349	527	3	453	6	185

Minimal number of individuals in the brackets

aged 5–6 months (two individuals), four animals were approx. 18–24 months old, and another two were approx. 3 years old. The remains of cattle included two mandibles of animals aged approx. 2.5–3.5 years, however, the structure and development stage of other bones indicate that both younger and older animals (more than 4 years old) were killed. Analysis of the age of pig based on the stage of dentition development implies a common practice of slaughtering very young animals around 4–6 months old (5 individuals) and young animals around 17–20 months old (2 individuals). Four horncores of males were found in the group of goat bones from phase G2. The withers height of two of the individuals was calculated on the basis of talus bones, the animals reached 58.5 and 63 cm. Some bones of cattle (pelvis, ulna, metatarsus, and mandible) and sheep (radius) bore short and narrow cutting marks formed as a result of the division of carcass or filleting, i.e. separating the meat from bones.

The other category of osteological sources, apart from the post-consumption remains unearthed in the course of excavations carried out at the settlement, were deposits found in tombs discovered at the Hyksos cemetery (Table 4).

Tomb [810], burial of two men (812), (830)¹¹

Tomb [810] contained two human burials, original (830) and secondary (812). Skeleton (812) most likely belonged to a man who died at the age of *adultus I* (20–29 years). It was discovered next to the entrance to the chamber, with the remains of an animal skeleton. The arrangement of the remains suggests that the animal was deposited in the tomb after the deceased man had been interred.

347 animal remains were subjected to analysis. Most of them came from the skeleton of one sheep – adult, aged above 3–3.5 years and with a withers height reaching about 63–66 cm (Table 5). All

¹¹ Description and plan of the tomb can be found in: RZEPKA et al. 2014, 39–43

Table 5 Morphological data concerning the sheep from tomb [810].

Bone	Measurement	/mm/		Withers Height /cm/
		Right	Left	
Humerus	Breadth of the proximal end – Bp	42.0		
	Breadth of the distal end – Bd	28.8	28.6	
Radius	Greatest length – GL		160.2	64.4
	Breadth of the proximal end – Bp		28.9	
	Breadth of the distal end – Bd		27.3	
	Smallest breadth of diaphysis – SD		15.0	
Metacarpus III	Greatest length – GL		131.8	65.6
	Breadth of the proximal end – Bp		22.4	
	Breadth of the distal end - Bd	22.3	25.0	
	Smallest breadth of diaphysis – SD		12.9	
Femur	Greatest length – GL	184.4		65.1
	Breadth of the distal end – Bd	42.1		
	Breadth of the proximal end – Bp	36.8	36.8	
	Smallest breadth of diaphysis – SD	14.8		
Tibia	Greatest length – GL		220.1	66.3
	Breadth of the proximal end – Bp		40.0	
	Breadth of the distal end – Bd		26.2	
	Smallest breadth of diaphysis – SD		14.3	
Calcaneus	Greatest length – GL	55.0	54.9	62.7 62.6
Talus	Greatest length – GL	28.4	28.3	64.4 64.2
	Greatest breadth – GB	18.0	18.0	
Metatarsus	Breadth of the distal end - Bd	23.8	23.7	
Phalanx proximal	Greatest length – GL	35.7 36.4 36.9 36.9	35.8 35.8 36.5 36.7	
	Breadth of the proximal end – Bp	-	10.8 10.8 12.1 12.3	
	Breadth of the distal end – Bd	11.4 10.3 11.3 11.4	10.1 10.3 11.3 11.4	
	Smallest breadth of diaphysis – SD	9.8 9.4 9.9 10.0	9.0 9.4 10.0 10.0	
Phalanx medial	Greatest length – GL	21.6 21.8 21.9 22.4	20.6 21.3 21.4 22.1	
	Breadth of the proximal end – Bp	8.8 9.5 10.8 10.7	10.5 11.5 11.8 11.7	
	Breadth of the distal end – Bd	9.0 7.8 8.4 8.2	7.9 8.8 8.8 8.8	
	Smallest breadth of diaphysis – SD	9.3 8.4 8.3 7.8	7.7 9.0 9.1 8.9	

parts of the skeleton were represented: mandible, cranial elements, axial skeleton and limb bones. More than ten bones bore cutting marks. They were found on ribs (near the heads), vertebral bodies of cervical and thoracic vertebrae (from the dorsal side), wings of sacrum (Fig. 1) and the head



Fig. 1 Tomb [810]. Sheep sacrum with cutting marks (Photo A. Gręzak).

of left humerus. These cut placements indicate that the carcass was subjected to certain butchery practices before deposition in the tomb. Apart from the elements of this sheep skeleton, the tomb contained several fragments of sheep or goat bones which belonged to a young individual (aged below 20–24 months), a fragment of a frontal bone of a young pig (aged below 3–4 months), a fragment of cattle radius, a fragment of ulna which probably came from red deer and fish remains. The latter included four elements of *Synodontis* catfish, one bone of tilapia *Oreochromis niloticus*, and ten fragments of a neurocranium which belonged to one African sharptooth catfish *Clarias gariepinus*. The bones of the sheep are most likely evidence for an offering associated with funerary rituals, or possibly one made after a certain period of placing the deceased in the tomb. It is difficult to determine whether the remains of the other animals are related to a similar function.

Tomb [920], burial of female (927)¹²

Tomb [920], which had been looted and damaged, contained remains of a woman who died at age *maturus II* (ca 50–59 years). The skeleton was disturbed and at the moment of discovery, it was not arranged in anatomical order.

527 animal bones were recovered from the chamber of the tomb and analyzed. Most of the remains were fragments of small ruminant skeletons. The analysis of anatomical elements revealed that they came from three individuals, two sheep and probably one goat. The identification of sheep was based on a number of anatomical elements belonging to that species, i.a. skulls and mandibles with dentition, pelvises, and various long bones of the limbs. Apart from sheep bones (Minimum Number of Individuals=2), the discovered bones included goat remains – a fragment of a humerus, two proximal phalanges, and three medial phalanges. For this reason, it is suggested that the third individual, whose numerous bones were described as belonging to an ovicaprid, was a goat. Anatomical distribution of the remains indicates that complete or almost complete carcasses were deposited in the tomb. Although an accurate description of bone arrangement is missing, the cutting marks noted on the ribs, the goat humerus, and the sheep ulna indicate that disarticulated parts of carcass were deposited in the chamber. The animals were morphologically young at the time of death, they did not exceed 3–3.5 years of age, and one of the sheep was approx. 21–24 months old (permanent molars were in the process of erupting).

Apart from the bones and teeth of sheep and goat, the tomb accommodated skeletal elements of cattle (maxillar third molar, scapula, proximal phalanx), pig (cranium fragments with cutting marks on frontal bones, cervical vertebra – atlas), as well as four fragments of African sharptooth catfish *Clarias gariepinus* neurocranium.

Grave [922], child burial (922)¹³

Grave [922] accommodated a complete but damaged skeleton of a child who died at an age of 2–4 years (*infans I*). Fragments of the hind limb bones (tibia, metatarsal, and fragment of medial phalanx) of donkey, devoid of anthropogenic marks, were found near the human remains.

¹² Description and plan of the building can be found in: RZEPKA et al. 2014, 43–45

¹³ Description and plan of the grave can be found in: RZEPKA et al. 2014, 43–44

Tomb [929], burial of adult man (947)¹⁴

Tomb [929] accommodated a burial of an adult male who died at the age *maturus II/senilis I* (ca. 50<years); the skeleton was disturbed and mixed with animal bones.

The analyzed faunal assemblage consisted of 453 fragments; almost all of them belonged to sheep. The number of elements and anatomical composition suggest that three individuals were deposited in the tomb. It seems that a number of remains came from two individuals, since only two pairs of limb bones, e.g. left and right humeri or tali, corresponding in size, were identified. The presence of the third individual is confirmed solely by the horncore and a fragment of tibia found during exploration. The absence of complete skeletons of the three animals might be a consequence of damage and mixing of the bone material caused by looting, which took place in antiquity. It is possible that incomplete animals (animal carcasses) were placed in the tomb, or that only two individuals were deposited, and the additional horncore was added as a result of a sacrifice ritual. It is certain that the carcasses were subjected to butchery procedures, which is indicated by cutting marks on the ribs, scapula, pelvis, humerus (Fig. 2) and talus. The two sheep, represented with a high number of fragments, were adult; one of them was about 3–3.5 years old at the time of death and the



Fig. 2 Tomb [929]. Sheep humerus with cutting marks (Photo A. Gręzak).

¹⁴ Description and plan of the tomb can be found in: RZEPKA et al. 2014, 43; 45

other was slightly older, the tooth wear suggests that it was adult but not old. It can be supposed with a high degree of probability that this sheep was not older than five years. The withers height of these animals fell within the range of 57–71 cm (Table 6). It was not possible to establish the sex of the individuals since both the horncores and the pelvises, which are diagnostic elements, were badly damaged.

Apart from the remains of sheep, the faunal assemblage discovered in the tomb also consisted of a fragment of cattle metacarpal attributed to a young individual, as well as shells of one mussel and one snail.

Tomb [942], burial of young man (1425)¹⁵

Tomb [942] contained the skeleton of a juvenile individual discovered in an undisturbed anatomical position. The tomb did not hold any elements of grave goods; however, there were some animal bones inside the structure, which were taken for analysis. There were a few remains of a sheep skeleton: a fragment of a frontal bone, cervical vertebra – axis, a fragment of radius, ulna and talus. It is highly likely that the remains come from one individual, whose age at death was 3–4 months at most. Apart from the fragments of the sheep skeleton, the assemblage contained one mussel shell. It is not possible to tell whether the remains are relics of an offering or an intrusion.

Tomb [1696], burial of three individuals (1757, 1–3)¹⁶

Tomb [1696] has been badly damaged over the recent years. Anthropological analysis revealed that three individuals were buried in this tomb. The last interred and best preserved was a child at age *infans I* (3–5 years). Only some fragments of bones of the other two, not found *in situ*, were recovered – an adult man and a boy in the *iuvenis* age group (15 years ±36 months). Older burials were probably moved when the successive interments were placed there. It is also possible that they were removed, however, the northern part of the tomb (the supposed location of the bones) is badly damaged, which precludes unequivocal conclusions.

¹⁵ Description and plan of the tomb can be found in: RZEPKA et al. 2015, 97–100

¹⁶ Description and plan of the tomb can be found in: RZEPKA et al. in print.

Table. 6 Morphological data concerning the sheep from tomb [929].

Bone	Measurement	/mm/		Withers Height /cm/
		Right	Left	
Humerus	Greatest length – GL	152.5	148.2	65.3 63.4 63.2
	Breadth of the distal end – Bd	33.6	32.4 33.6	
	Smallest breadth of diaphysis – SD	-	16.0	
Radius	Greatest length – GL	159.4	161.4	64.1 64.9
	Breadth of the proximal end – Bp	33.4	31.0	
	Breadth of the distal end – Bd	29.8	29.6 30.0	
	Smallest breadth of diaphysis – SD	16.2	16.3	
Metacarpus	Greatest length – GL	130.2 134.5	130.6	63.7 65.8 63.9
	Breadth of the proximal end – Bp	24.0 23.4	24.3	
	Breadth of the distal end - Bd	26.2 26.0 23.6	26.0	
	Smallest breadth of diaphysis – SD	13.6 14.0	13.3	
Femur	Greatest length – GL	171.5 181.1	172.7 180.6	60.5 63.9 61.0 63.8
	Breadth of the proximal end – Bp	45.4 44.7	46.0 45.0	
	Breadth of the distal end – Bd	39.5 33.4	41.2 33.3	
	Smallest breadth of diaphysis – SD	16.9 16.9	17.4 16.9	
Tibia	Greatest length – GL	221.1	219.4 221.4 210.8	66.6 66.0 66.6 63.6
	Breadth of the proximal end – Bp	42.9	43.6 42.8 42.2	
	Breadth of the distal end – Bd	26.8	27.2 26.7 27.1	
	Smallest breadth of diaphysis – SD	14.9	15.0 15.2 14.4	
Calcaneus	Greatest length – GL	56.4	55.9 51.5	64.3 63.7 58.7
Talus	Greatest length	31.4 29.1	29.2 31.3	71.2 66.0 66.2 71.0
	Greatest breadth – GB	19.6 19.7	19.9 20.3	
Metatarsus	Greatest length – GL		142.2	64.5
	Breadth of the proximal end – Bp		21.2	
Phalanx proximal	Breadth of the distal end – Bd		24.6	
	Smallest breadth of diaphysis – SD		11.9	
	Greatest length – GL	34.8 35.0 35.2 36.0 36.0 37.0 36.3 37.2	36.7 36.5 34.6 34.6 36.1 36.8 37.8 -	
	Breadth of the proximal end – Bp	14.0 13.0 13.6 13.3 12.5 13.2 - 12.0	13.6 13.4 12.5 12.5 13.2 12.8 13.8 -	
	Breadth of the distal end – Bd	12.9 11.6 13.0 13.2 11.1 10.8 11.4 10.8	12.6 12.9 11.3 10.9 12.6 11.3 12.6 10.9	
Phalanx medial	Smallest breadth of diaphysis – SD	10.9 10.3 10.9 10.8 9.3 10.8 9.6 9.3	10.8 10.9 9.8 10.2 10.8 10.0 10.6 -	
	Greatest length – GL	27.2 21.8 21.8 20.0 20.0 20.7 20.9 21.2	21.2 21.8 21.8 20.4 20.5 20.6	
	Breadth of the proximal end – Bp	13.8 13.6 13.5 11.7 11.8 13.8 12.2 11.2	13.5 13.4 13.6 11.2 11.6 11.8	
	Breadth of the distal end – Bd	10.3 10.5 10.3 9.0 9.1 10.6 8.8 8.8	10.6 10.6 10.5 8.9 9.9 8.6	
	Smallest breadth of diaphysis – SD	10.4 10.0 10.1 8.3 8.4 9.6 8.4 8.2	9.9 9.8 9.9 8.6 9.8 8.2	

185 animal remains were found in the tomb; at least 134 of these bones belonged to ovicaprids. Most of them are fragments of various parts of the axial skeleton and limbs of a sheep aged slightly more than 21–24 months. Only two pieces of ulna and tibia can be regarded as remains of another animal: a sheep or goat below 3 years old. There were also fish bones representing various species: Nile tilapia *Oreochromis niloticus*, African sharp-tooth catfish *Clarias gariepinus*, *Synodontis* sp., and Nile perch *Lates niloticus*. Additionally, the assemblage contained bones of pig (humerus and proximal phalanx), cattle (humerus), pelvis of an unidentified large bird species, and three mussel shells. None of these elements bore butchery marks.

18th Dynasty.

The earliest phase connected with the reign of the 18th Dynasty (F4) yielded only 145 remains, 105 of which were identified (Table 1). Nearly 84% of fragments of that group were ovicaprine bones and teeth. Only a few elements came from cattle and pig, and one bone belonged to gazelle. In addition, four shafts of bird bones were distinguished, but it was impossible to associate them with particular species; there was also one mussel shell.

In the case of remains from layers related to phase F3, some assemblages with a low number of elements were discovered in the rooms of two buildings – “Black House” 1 and “Black House” 3, however, most were found in layers deposited around the buildings (Table 1). The whole osteological material connected with that phase was analyzed jointly, regardless of its location.

Only 61% of the remains were identified to a zoological taxon and anatomical element. Out of this number, the majority of the fragments came from mammals, mostly sheep and goat (81.66% of mammal remains). There were much fewer bones and teeth of cattle, Equids, pig, and dog. There were also bones that belonged to small mammals of erinaceids and the rodent order, which were probably deposited in the layers without any connection with the economic activity of the inhabitants of the settlement. Apart from these elements, the assemblage consisted of 40 fish bones (Table 3): African sharp-tooth catfish *Clarias gariepinus*, Nile perch *Lates niloticus*, Nile tilapia *Oreochromis niloticus* and *Synodontis* sp. Other animals associated with the water environment include mussels, whose shells were found in

deposits dated to phase F3, and the large proportion of birds represented in this assemblage: mostly ducks (i.a. mallard, *Anas platyrhynchos*, possibly Common teal cf. *Anas crecca*, *Aythya* sp.), Grey heron *Ardea cinerea* and White stork *Ciconia ciconia* (Table 2). Moreover, one bone represented each of the following: Eurasian coot *Fulica atra*, Peregrine falcon *Falco peregrinus*, Oriental darter *Anhinga melanogaster*, as well as unidentified species of lizard and snail.

The layers associated with phase F2 contained 399 animal remains, out of which 249 (62.40%) were identified to a zoological taxon and anatomical element. As it was the case of older assemblages, this one also comprised mostly bones and teeth of mammals; sheep and goat fragments represented the majority in this group, reaching 63.40%. Other domestic species – cattle, pig, Equids, and dog accounted for a minor percentage. As far as the wild game is concerned, there were skeletal fragments of red deer and an unidentified species of gazelle; however, their bones constituted a fractional percentage of the mammal remains. Two bones belonged to birds – Eurasian coot *Fulica atra* and a representative of *Anatidae* sp., one to fish of *Synodontis* sp. In addition to that, two mussel shells were found.

As it is the case with the osteological material from the Second Intermediate Period, the assemblages from the 18th Dynasty also show that the most popular livestock species – sheep, goat, and cattle – were represented by elements of all parts of the skeleton. A large group comprised fragments of the head, mostly cranium, which mainly resulted from the young age of the slaughtered animals. In the case of sheep and goat, the most frequent ages at death were 4–6 months and 24 months; very few individuals lived up to, or exceeded the age of 3 years. They included sheep of the withers height reaching from 61.7 to 74.8 cm, and a goat measuring approx. 69 cm. Among the bones of cattle, there were two specimens which belonged to animals below one year of age. The age of seven pigs was estimated: six were killed aged between 3–4 and 6 months old, and one before it turned 34 months old. Nearly half of the bones (almost exclusively from phase F3 layers) displayed white burning marks, but only some bore cutting marks. These marks were noted on humeri, tibiae, and ulnae of sheep and goat, cattle metacarpal and red deer ulna. Apart from post-consumption marks, some bones showed traces of bone-working procedures. These objects

were simple tools – awls and spatulas made of the ribs or scapulae of big ruminants. Four such artefacts were found among the bone waste in layers dated to the 18th Dynasty.

Summary

The examined osteological material can be divided into categories depending on the type of deposit. Most of the animal bones and teeth are post-consumption remains and kitchen waste, or remains of animals exploited in economy. Analysis of this assemblage provides an opportunity to reconstruct the meat diet, possible changes in the menu over time, as well as the manner of procuring meat and animal exploitation.

Animal remains deposited in tombs can be sources of different types of information. It is assumed that they are skeletons of animal offerings made for the deceased, which could serve as a type of grave goods to be used in the afterlife, thus they could indicate certain ritual practices.

The bones of animals whose presence at the site is totally unconnected with the activity of its inhabitants are not related to the issues mentioned above. This group comprises small rodents and insectivorous mammals, which, as synanthropic animals, occupied the same space as humans. A more challenging question lies in the presence of species living in habitats adjacent to areas exploited by the local population for economic activities. These animals could potentially become objects of human interest for consumption (some species of birds, mussels) or for aesthetic reasons (shells of mussels and snails). The absence of any marks associated with culinary processing or craft techniques on these remains discourages any definite conclusions on the character of the deposit or incorporation of such objects into the groups described above. On the other hand, in the case of osteological materials dated to the Second Intermediate Period and the 18th Dynasty, these remains are so sparse that even if they played a certain role in the diet or craft industry of the local people, it must have been marginal.

Animal husbandry was definitely of the highest importance for the provision of meat for the local community. The percentages of species in assemblages dated to different chronological phases suggest that mammals were the major source of pro-

tein and fat. The statistics concerning the bones of the four livestock species (sheep, goat, cattle, pig) demonstrate a certain variety in food preferences that the people living at Tell el-Retaba had in different periods.

In an attempt to define general tendencies in the meat consumption on the basis of data related to the two periods, it can be observed that in the Second Intermediate Period mutton and goat meat dominated, with a lower share of beef and an even smaller proportion of pork. During the 18th Dynasty, the importance of sheep and goat meat in the diet was further strengthened, with a decreased percentage of beef and pork. The trend is derived from modifications in husbandry practices, which in turn could have changed for cultural or environmental reasons. The key factor for this shift could have been a more severe climate, which was unfavourable for animal husbandry. Changes in the climate conditions could have caused fodder shortage and thus reduced the ability to support a more demanding species. The results of the analysis of charred plant macrofossil assemblage¹⁷ suggest that after relatively wet conditions in the Second Intermediate Period, the area gradually dried up during the late 18th-early 19th Dynasties. Nevertheless, in this case, it might reflect a change in the manner of exploitation of the land and a possible change of the population as a result of human migration. In phase F4, the examined portion of the site featured semi-permanent structures built of greenish mud bricks, possibly as an open settlement. Such type of buildings and the domination of small ruminants in animal husbandry and consumption might indicate a more mobile, semi-nomadic lifestyle of the local people. In such circumstances, the “specialization” in husbandry and the preference for consumption of mutton and goat meat would be easily justified. This economic tradition could have been maintained in more recent phases of occupation of the site during the 18th Dynasty, which might have converged with the gradual drying up of the climate.

Animal husbandry, apart from meat, brought considerable benefits in the form of milk, dung, wool, or exploitation of animals for farming or transport. The latter two functions were fulfilled by donkeys, whose presence is confirmed by the sparse bone remains discovered at the site.

¹⁷ MALLESON, in this volume

The significance of hunting in the Second Intermediate Period was marginal. Dorcas gazelle, hare and most likely red deer represented the locally hunted animals. Fishing was undertaken fairly seldom (African sharp-tooth catfish, tilapia, wahrindi, Nile perch), and even less frequently, if at all, was bird hunting (e.g. mallard, Eurasian coot, gallinaceous birds), and mussel or snail gathering.

The reign of the 18th Dynasty did not bring notable changes. Venison (meat of two species of gazelles and red deer) and possibly meat of wild birds introduced an occasional variety in the menu, but not a supplementary supply of meat apart from the one sourced from husbandry. Fishing and mollusk gathering was equally uncommon. Although these activities brought minor benefits to the people, the presence of wild animals at the site provides sufficient data to reconstruct the environmental conditions of the area penetrated by the inhabitants of Retaba. All species of birds mentioned above lived in water habitats (open waters, rivers) or wetlands (marshes, floodlands, swamps, drier grassy areas bordering marshes and rivers). Some of them are sedentary species, while others are migratory birds that winter in Egypt or migrate over the Retaba area after the breeding season. The presence of fish species typical of the Nile delta is a clear indication of the existence of a body of water in the vicinity. This is also a favora-

ble habitat for ducks and mussels as these species show preference for still or slowly flowing waters. Geological research¹⁸ implies that there was a water reservoir on the north-west edge of the site. The area was periodically flooded and dried up regularly, and then underwent a dry period during the 18th-early 19th dynasty.

To sum up, the meat diet of the residents whose refuse was found in the area of the site was composed mainly of meat from livestock mammals. The role of sheep and goat was the most prominent in the times of Hyksos settlement activity. The significance of these animals is emphasized by the fact that they were deposited in the tombs together with humans, probably as a supply of food for the afterlife. It appears that offerings were made of portioned carcasses of subadult sheep, and less frequently subadult goats. Perhaps the local food supply was more varied as the tombs also contained remains of other species of mammals, as well as fishes, birds, and mollusks. They were normally found in small assemblages consisting of a few fragments and therefore it cannot be stated with certainty that they represented offerings.

During the 18th Dynasty, ovicaprids dominated in animal husbandry and their meat was the most popular ingredient containing animal protein and fat.

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¹⁸ The results of geological research can be found In: RZEPKA et al. 2015, 149–160

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