

tanneries and casting workshops with wells (NAGY T. 1973, 118) lay underneath the recent industrial district. Here a road station (NAGY T. 1962, 522) and a sanctuary was found too (NAGY T. 1962, 43, Fig. 9). Recent investigations have increased our knowledge regarding the structures of the Roman period industrial quarter, of which the limes road formed a boundary to the east. Concerning the road-system of the northeastern industrial quarter, we possess informations regarding the road running in an E-W direction as a branch off the limes road (NAGY T. 1962, 522), and another one running roughly from south to north (NAGY T. 1973, general plan). The western part of the northern industrial quarter of the vicus, laying partly under the embankments, was not excavated. On the western edge of the Albertfalva vicus, potter's workshops built in stone, came to light (NAGY T. 1973, 118).

During the investigations before the construction of road no. 6, remnants of a good-quality stone building, renewed several times, were excavated west of the auxiliary vicus (surfaces 4-4/a and 4/B). The plan of the building is still incomplete, so its function is unknown as well. Stone masonry constructions without binding material were found too (Fig. 9, surfaces A-B), but it is impossible to determine their complete plan and function. During the work we have gained new informations concerning settlement structure of the vicus.

Regarding provinces of the Roman Empire, military vici known so far from Britain were studied in detail (SOMMER 1984). In connection with auxiliary vi-

ci of the limes section in Hungary, we possess scarce informations (NAGY T. 1973, 124; MÓCSY 1980, 365-376; MÓCSY and FITZ 1990, 234). According to the list below, vici of the following auxiliary fortresses were identified: *Ad Flexum* (PUSZTAI 1976, 15), *Quadrata* (GABLER 1976a, 19; VISY 1988, 44), *Arrabona* (GABLER 1971, 5-54; GABLER 1976b, 23; VISY 1988, 46), *Ács-Vaspuszta* (GABLER 1989), *Ad Mures* (GABLER 1976c, 29; VISY 1988, 52), *Crumerum* (VISY 1988, 63), *Tokod* (MÓCSY 1976a, 47; MÓCSY 1981), *Solva* (SOPRONI 1976a, 49; SOPRONI 1978, 16-21), *Cirpi* (SOPRONI 1976b, 69; SOPRONI 1978, 62), *Ulcisia Castra* (SOPRONI 1976c, 77; SOPRONI 1978, 68; VISY 1988, 78), *Aquincum* (NAGY T. 1971, 59-81; NÉMETH 1992, 84), Albertfalva³⁶, *Campona* (FÜLEP 1976, 93; VISY 1988, 90), *Matrica* (MÓCSY 1976b, 95), *Vetus Salina* (BARKÓCZI 1976, 99; VISY 1988, 98), *Intercisa* (VISY 1976a, 101; VISY 1988, 100), *Annamatia* (VISY 1976b, 107; VISY 1988, 109), *Ad Statuas-Várdomb* (FITZ 1976, 111).

Reverting to the vicus of the Albertfalva auxiliary fortress, I have to call attention to the fact, that 75% of the "vicus" lays uninvestigated underneath a depression without embankments, and this area is still free of modern buildings! Thus the Albertfalva auxiliary vicus is in the fortunate situation, that with the systematic investigation of this free standing area, we shall be able to gain a complete picture regarding the characteristics of vici at the auxiliary fortresses in Pannonia.³⁷

Krisztina Szirmai
Budapesti Történeti Múzeum
Aquincumi Múzeum
Budapest, Szentendrei út 139.
H-1031

Alice M. Choyke

ANIMAL BONES FROM THE ALBERTFALVA VICUS (Excavation years 1990-1991)

In 1990 and 1991, further rescue excavations were carried out in the vicus area beyond the walls of the Roman camp at Albertfalva in advance of highway construction work (M 6 national roadway). A team was directed there headed by Dr. Krisztina Szirmai of the Budapest Historical Museum at Aquincum. Research trenches were concentrated on both sides of the János Hunyadi street. The goal was to transect both the prolongation of the east-west running *via decumana* or road leading into the military camp as well as the Roman road crossing it in a north-south direction. In the process, parts of the roads and vicus outside the walls of the military camp were excavated.

Periodization

The first construction period in the vicus at Albertfalva began in the Flavian period which lasted from the 1st to the 2nd centuries. Remains of pit houses, post holes from planked buildings and cold storage pits were uncovered during the 1990 excavation season. No bone material which can be said to derive unequivocally from Period 1 at this site was available for study because of subsequent contemporary leveling and construction work on the two Roman roads.

Period 2 at this site, excavated in 1990, may be said to be the time stone masonry begins to be used and road construction commences. A total of 60 bone specimens came to light in a level which represents the very foundations of the roads just previous to their actual building. In this period the military camp becomes more firmly entrenched which reflects on the service village outside its gates in terms of its less temporary appearance. Again, the number of bones which come with certainty from this level is very small. All bones represent secondary deposits of some sort.

Period 1-2 is the most significant in terms of archaeozoological material from this site with a total of 251 bone specimens. As the Roman road construction got underway, earth was brought in to flatten and even out the bed of the road so that animal bones from both Period 1 and Period 2 may be found mixed with each other with no possibility of distinguishing between them. These bones are not clearly assignable to precise time periods, actual structures, or industrial activity areas. They represent, however, such a large proportion of the site's animal bone assemblage that it was deemed useful to study them in a general context. Such finds may be regarded as a reflection of how animals were exploited in the *vicus* and in the military camp which the *vicus* served, for example, as pack animals.

Period 3 at the Albertfalva *vicus* is also characterized by stone masonry buildings in recognizable levels,

uncovered in 1990. These levels date to a time after the Marcomannic wars between 150 and 170 AD. Some parts of the settlement are rebuilt at this time. Only 11 bone specimens, all in secondary positions, come certainly from Period 3 reflecting the continual Roman rebuilding and clearing at this site.

Distinct Period 4 levels are missing in the settlement's studied part, although it contains remains of stone buildings and reconstructions dating from the Severus period (turn of the II-III centuries). Buildings from this period came to light during the 1990 excavations.

In the same way, distinguishable stratigraphic levels are absent from Period 5. The stone buildings are characterized by dry wall masonry and a building with a well. No bone material can be said to come expressly from this level. The constructions from this period were found during the 1991 excavations of undifferentiated settlement material.

The second largest animal bone assemblage comes from this settlement area. Because levels could not be clearly determined here due to both contemporary and recent disturbances, it is termed Period 1-2-3-5 where Period 4 is totally absent. This part of the settlement yielded 109 animal bone specimens.

The 54 bones from levels above the Roman road may easily have been mixed with more recent, non-Roman material and have not been included in the analyses except for the frequencies of bones per species.

The material by periods

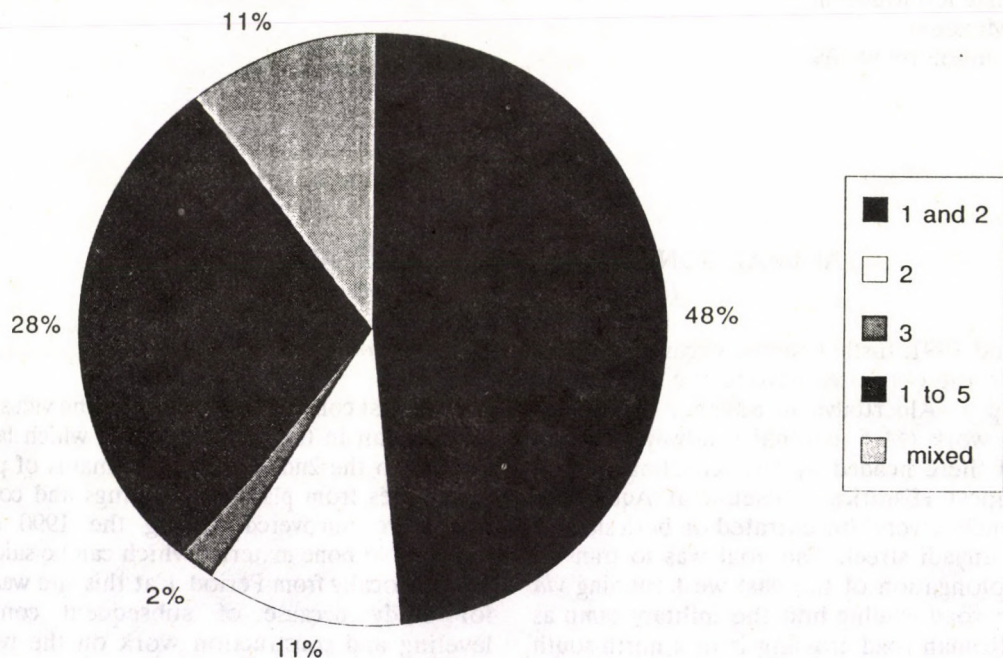


Fig. 1 The percentual distribution of bone material by periods

Method

Because of the very small number of specimens, 484 including mixed material from possibly secondary deposits, it was not deemed reasonable to calculate the otherwise contradictory minimum number of individuals (MNI values). At this site, it was not possible to separate out debris from butchering, cooking and whole animal skeletons because of recurring construction disturbances during the life of the settlement (SCHIFFER 1987). Faunal lists (number of identifiable bone specimens) and skeletal element frequencies are presented by periods.

Following the archaeological periodization of this site, the 484 bone specimens available for study were classified into the following periods:

- a) Mixed material possibly biased by modern bone specimens,
- b) Period 1–5 mixed Roman material from the settlement,
- c) Period 3,
- d) Period 2 when the roads were constructed,
- e) Period 1–2 (the bulk of the material comes from here) which represents the level from the construction and leveling activities surrounding road building.

The percentual distribution of animal bone fragments by period is shown in Figure 1.

The few bone measurements available in this material were taken following the standard published by

von den Driesch (1976). Although they were not of sufficiently great number to permit conclusions, these measurements are listed by mandibulae and long bones on the Tables 6–7.

The Bone Material

Comparing the representation of domestic species from the five periods (Table 1), it may be seen that, with the exception of Period 3 (n=11), cattle (*Bos taurus L.*), sheep and/or goat (*Caprinae*) and pig (*Sus scrofa dom. L.*) are represented by roughly the same proportions. Period 3 has so few bones that it is not surprising that species variability is correspondently negligible. The number of equid remains (*Equus caballus L.* and possibly other *Equidae*) varies more capriciously.

Results and Conclusions

The animal species available to the inhabitants of the vicus at Albertfalva were, more-or-less, similar to those found at other Roman sites in Pannonia. The relatively low number of bone fragments is probably responsible for the small range of animal species identified at this site (BARTOSIEWICZ 1990/91).

The percentages of the main, meat purpose domesticates roughly parallel what Bökönyi found in his analysis of animal bones from within the *Albertfalva castrum* (Figure 2). His assemblage was, however, roughly four times larger than this one so that variability

Animal species by period

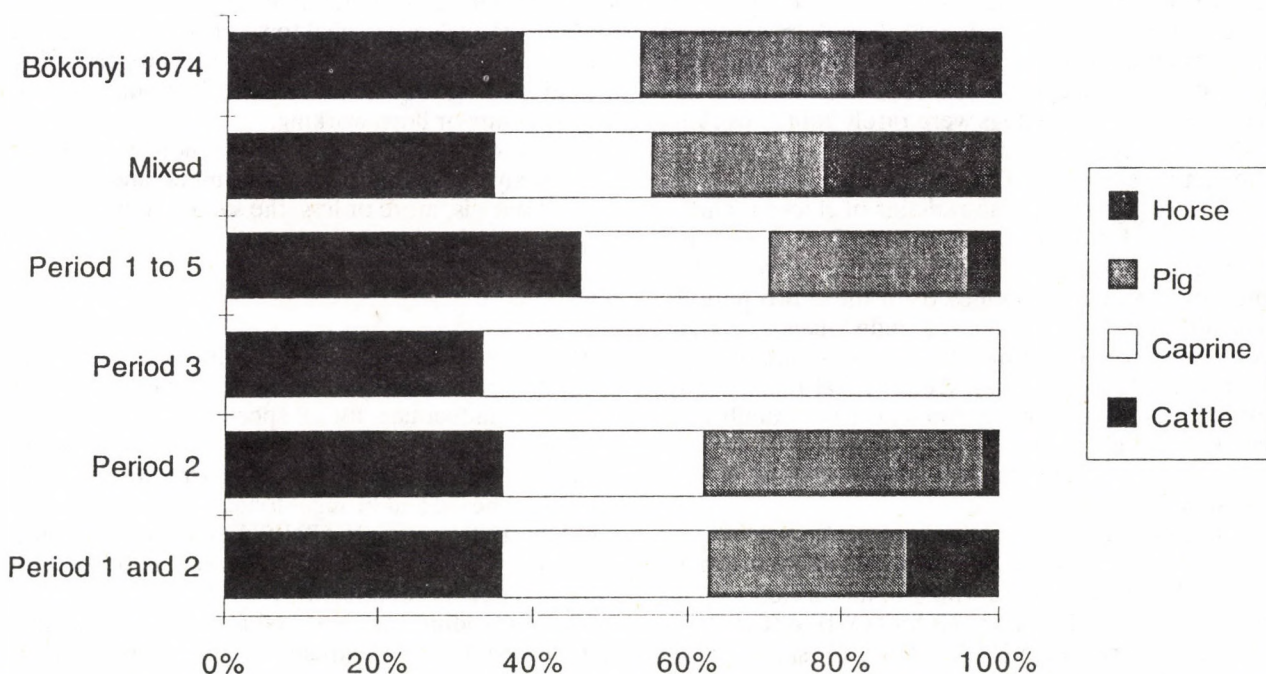


Fig. 2 The percentual distribution of bones (NISP) from the most important domesticates at Albertfalva. Bökönyi's 1974 data represent the military camp

lity was bound to have been greater and percentages somewhat different. Statistically the two archaeozoological assemblages are not really comparable due to the difference in sample size.

In all periods at the Albertfalva *vicus*, cattle dominates. This dominance is a general feature of Roman sites. Caprines occur in almost equal proportions to pig. Compared to sites at nearby Aquincum the proportion of horse bone seems unusually high. However, the disturbance at the site means that a few complete skeletons might have been broken up and spread around during construction and rebuilding work during the Roman period. This would create an artificial impression that equids were more important in the domesticated fauna than was actually the case. On the other hand, the relatively high proportion obtained for equids may equally reflect the use of horse or mule, whose bones are not always easily distinguishable from each other, in army transport (BÖKÖNYI 1974). Remains of donkey (*Equus asinus* L.), which might also be expected (BÖKÖNYI 1984), did not occur in the faunal material from either site.

In fact, Bökönyi (1974) found an even higher percentage of equids within the military *castrum*. This earlier observation supports the present impression gained from the *vicus* that equid species played an important role in the transport economy of the village supporting the military camp.

The numbers of animal bones precisely identifiable to sheep (*Ovis aries* L.) or goat (*Capra hircus* L.) on a species level are too small to be conclusive. Dog (*Canis familiaris* L.) occurs in Period 1–2 and Period 1–5. The problem of complete but scattered skeletons applies to this domestic species of smaller body size as well. All that can be said is that dogs do not seem to have been common within the settlement and they probably died and were entered outside the *vicus*. The assumption that dogs were rarely kept as working animals or even pets at Albertfalva is underlined by the fact that very few of the refuse animal bones show signs of dog gnawing. The remains of chicken (*Gallus domesticus* L.) were found in the Period 1–2 and Period 1–5 materials. Their occurrence is related to the larger number of bones from these two periods. The identification of one of the individuals as a young cock was based on epiphyseal fusion of and the spur found on a tarsometatarsal from Period 1–2. Bökönyi (1974) also found a reasonably large number of chicken bones. Goose (*Anser domesticus* L.), which came to light in the *castrum* as well, is missing from the small *vicus* assemblage.

Hunting and fishing activities contributed very little indeed to the diet of the village people. A comparison of the percentages of wild animals in Roman military versus civilian sites (BARTOSIEWICZ 1991, 112) shows that there is a tendency for slightly more wild species to appear in the faunal assemblage of military camps. Except in certain instances this picture is typical of many but by no means all Roman period si-

tes in Pannonia inferior. In fact, Bökönyi found a rather large number of aurochs (*Bos primigenius* Boj.) at the Albertfalva military camp but there is no trace of this species from the *vicus* material. If the identification is correct (in the 1950's when the determination was made, there was much less data on the size range overlaps of wild and domestic cattle in this time period) it would suggest that military personnel in the *castrum* had better hunting possibilities than the civilian population of the *vicus* even allowing for the difference in sample size. There are remains of red deer (*Cervus elaphus* L.), and one each of roe deer (*Capreolus capreolus* L.) and wild boar (*Sus scrofa fer.* L.). A rodent skull, several bones from fish (*Pisces* sp., one bone from a sturgeon: *Acipenser* sp.) and one bivalve mollusc shell (*Unio* sp.) were also found. It must be mentioned that red deer is represented only by an antler fragment in the material of Period 1–2. Should this piece have been gathered as shed antler, it may not be regarded as evidence of hunting.

Skeletal part frequencies

The skeletal part frequencies from different periods at the Albertfalva *vicus* (Tables 2 to 5) are typical of a situation where the majority of the meat is produced offsite (CRABTREE 1989). The distribution of bones by these anatomical categories is characterized by a somewhat higher proportion of good quality meat bearing elements such as the bones of the upper limb (stylopodium; UERPMANN 1973). Nevertheless, it is also clear from the presence of all body parts that at least some of the animals were brought live on to the settlement. In contrast to larger, more complex settlements such as the civil town of Aquincum, there are no specialized deposits of body parts representing the debris of industrial activities such as smoking, hide processing or horn working.

The proportion of head (skull) to body (vertebrae, ribs and stylopodium) to dry limb (meta- and autopodium) bones is, more or less, the same for cattle, sheep/goat and pig.

Aging

Based on tooth eruption and epiphyseal fusing the overwhelming majority of the bones came from adult or mature individuals for all species. This underlines the impression that often draft and pack animals, too old or sick for work in nearby villa farms, were slaughtered, butchered and brought for sale in the market of the Albertfalva *vicus* (WAPNISH and HESSE 1988). Provincial Romano-British urban and military sites also used beef predominantly from mature cattle. Immature individuals not required for work or breeding were probably culled already at the rural breeding centers (MALTBY 1981, 1984). Meat from younger animals would also probably have represented a greater market value.

Butchering

The impression given from the regularity of chop marks on the bones (with the exception of horse and dog which were not consumed) is that the meat purpose animals were processed after slaughter by semi-professionals. In Britain, patterning in carcass dressing and butchery varied more at smaller Roman villa materials than at greater settlements (PECK 1986). At Albertfalva mandibles were hacked behind the third molar. The vertebrae are often split and the ribs chopped from them below the *collum costae* in the manner of spare rib cuts. Long bones are often split through the epiphyses in a longitudinal direction. The very few short bones of cattle found are also typically chopped through to create almost geometric faceted forms. As at the Aquincum civil town, little attention was paid to separating the carcass at the joints but rather "pot size" pieces were produced which maximally exposed the marrow cavity. This latter suggests that meat was often cooked in stews or soups making full use of the caloric and nutritious bone marrow.

Conclusions

In terms of meat consumption, the civilian inhabitants of this village at the cross-roads outside the military camp differed little from other small centers in the province. In meat consumption, cattle predomina-

ted followed by sheep or goat and pig in almost equal proportions. The animals eventually slaughtered for meat seem largely to have been adult or mature, except for a few sub-adult pig. Thus, it seems animals were exploited for meat after they could no longer be used for secondary purposes (traction, milk, wool) due to sickness or age. Horse or mule seems to have been relatively important at this settlement. Equids were widely used in Roman military transport. Finds of horse remains from inside the *castrum* support the impression that these animals did play a significant role in the life of this particular community. Meat from hunted animals was of no significance in the diet of the villagers.

Meat probably came into the vicus from outlying villa farms either on the hoof or already butchered. The slight predominance of stylopodium bones, representing more meaty body parts points in this latter direction. Once in the village the carcass parts were processed by semiprofessional butchers.

While it cannot be over-emphasized that the small size of the faunal sample from the vicus outside the Albertfalva military camp makes detailed discussion of Roman provisioning, subsistence, and animal marketing pointless some data on general consumption habits are still provided. It is to be hoped that eventually many such small assemblages will shed light on these larger theoretical problems of animal exploitation in the Roman hinterland.

Table 1: Comparative faunal lists by periods of the Roman vicus at Albertfalva

	Period 1 and 2	Period 2	Period 3	Period 1 to 5	Modern and mixed	Total
Cattle	78	18	3	45	17	161
Caprine	52	11	5	20	8	96
Sheep	2	2	1	3	2	10
Goat	4			1		5
Pig	56	18		25	11	110
Horse	25	1		4	11	41
Ass		1				1
Dog	5			1		6
Domestic hen	3	1		2		6
Red deer	1	1		1		3
Roe deer	1				1	2
Wild pig				1		1
Rodent		1				1
Sturgeon	1					1
Fish	2					2
Unio	1	1				2
Homo					1	1
Non-ident	19	5	2	6	3	35
Total	250	60	11	109	54	484

Table 2: Skeletal element distributions by species in the material from Period 1-2

	Cattle	Caprine	Sheep	Goat	Pig	Horse	Dog	Red deer	Roe deer
Horn core/antler	2							1	
Skull fragment	7				2				
Maxilla	1				1				
Mandibula	5	2			5	4	2		
Ramus mandibulae		1			1				
Tooth	3				5	4			
Vertebrae									
atlas	12				1				
axis									
cervical	4	1			1				
thoracic	3					3			
lumbar						2			
sacral									
Rib	12	9			7	1			
Scapula	5	2	1		4	3			
Humerus	10	7		1	4				
Radius	3			1	1	1	1		
Ulna	1	1		1	1		1		
Metacarpus	1	7			7	1			
Pelvis	1	2			1				
Acetabulum pelvis	1				2	1			
Femur	5	8			3				
Tibia	3	11			7	2	1		
Fibula					1				
Astragalus									
Calacaneus	1								
Centrotarsale									
Tarsalia	1								
Metatarsus	6		1	1	2	1			1
Phalanx									
proximal	1	1				2			
middle	1								
distal									
Total	78	52	2	4	56	25	5	1	1

Table 3: Skeletal element distributions by species in the material from Period 2

	Cattle	Caprine	Sheep	Pig	Horse	Ass	Red deer	Hen
Horn core/antler								
Skull fragment	1							
Maxilla	1							
Mandibula	2		2	2				
Ramus mandibulae	2							
Tooth				10	1			
Vertebrae								
atlas								
axis	1							
cervical								
thoracic								
lumbar								
sacral								
Rib	2	1		2				
Scapula				1				
Humerus	1	1		2				
Radius								
Metacarpus		2						
Pelvis	2							
Acetabulum pelvis								
Femur	4	7		3				
Tibia	1			2				1
Fibula				3				
Astragalus								
Calcaneus	1							
Centrotarsale								
Tarsalia								
Metatarsus							1	
Phalanx								
proximal								
middle								
distal								
Total	18	11	2	25	1		1	1

Table 4: Skeletal element distributions by species in the material from Period 3

	A	B	C	D
1				
2				
3		Cattle	Caprine	Sheep
4	Skull fragment	2		
5	Rib		1	
6	Humerus		1	
7	Radius	1		1
8	Pelvis		2	
9	Tibia		1	
10	Total	3	5	1

Table 5: Skeletal element distributions by species in the material from Period 1-5

	Cattle	Caprine	Sheep	Goat	Pig	Horse	Dog	Red deer	Hen
Horn core/antler									
Skull fragment	5				2				
Maxilla				1	5				
Mandibula	1				1	1			
Ramus mandibulae	2				1				
Tooth	2								
Vertebrae									
atlas									
axis									
cervical									
thoracic	2								
lumbar									
sacral	1								
Rib	5				2				
Scapula	4		1						
Humerus	3	5	1		2				
Radius		3			1	1			
Ulna	1				2				1
Metacarpus	1	4	1		1	2			
Pelvis	9								
Acetabulum pelvis									
Femur	5	3					1		
Tibia	3	5			8			1	
Fibula									
Astragalus									
Calcaneus									
Centrotarsale									
Tarsalia									
Metatarsus	1								
Phalanx									
proximal									
middle									
distal									
Total	45	20	3	1	25	4	1	1	1

Table 6: Mandibular measurements from the *Albertfalva vicus*

Measurement	Sheep 1	Horse 1	Horse 2	Horse 3	Horse 4	Dog 1	Dog 2
Gonion caudale-aboral M3		35.8	134.1				
Gonion caudale-oral P2		364	310.2				
Length toothrow	75.9	178.1	182	161		71.8	
Length molar row	49.3	86.2	86	85.4		34.2	32.7
Length premolar row	24.7	90.5	92.1	84.8		38.1	
Length P2		34.5	35.5	30.5			
Breadth P2		17.6	16.3	17.8			
Length P3		27.2	27.3	26			
Breadth P3		20.3	19.3	20.8			
Length P4		26.9	26	24.1			
Breadth P4		20.1	19.7	20.4			
Length M1	21.9	26.1	27	21.6			
Breadth M1	7	18.4	19.3	18.8			
Length M2		26.4	25.5	22.4		8.9	7.8
Breadth M2		18.3	17.7	17.1		6.1	4.9
Length M3		32.7	34	30.3	31.5		
Breadth M3		17.2	16.2	15.8			
Aboral height ramus		214.1	211.2		14.8		
Middle height ramus		195.3	190.3				
Height behind M3		52.3	99	107.2			
Height in front M1	29.4	71	70.7	80.1			
Height in front P2	21.2	98.9		59.6			
Height behind M1						23.5	20.5
Height between P2-P3						18.6	

Table 7: Long bone measurements from the *Albertfalva vicus*

Species	Skeletal part	Age	Greatest length	Proximal breadth	Proximal depth	Smallest breadth	Smallest depth	Distal breadth	Distal depth
cattle	radius	mature	305.0	88.0	44.1	46.1	27.8	84.1	44.7
sheep	metatarsus	adult		22.9		13.1			
goat	radius	mature		34.4	18.5	18.4			
pig	humerus	mature			40.2				
pig	radius	mature		30.6	18.7				
pig	tibia	mature						28.4	23.9
horse	scapula	mature						96.5	47.4
horse	scapula	mature						92.5	46.8
horse	scapula	mature						99.8	48.4
horse	radius	mature		76.8	47.8				
horse	metacarpus	mature		50.5	35.3				
horse	phalanx I	mature	97.6	59.5	39.2				
horse	tibia	mature	365.0	98.9	85.3	42.8	30.6	77.7	47.9
horse	metatarsus	mature	273.0	52.1	42.0	32.2	28.6	49.6	39.9
hen	metacarpus	mature	39.4	11.0					5.5
hen	tibiotarsus	mature						15.3	17.3

BIBLIOGRAPHY

- BARTOSIEWICZ 1990/91 L. BARTOSIEWICZ, *Animal bones as indicators of continuity at Roman provincial sites*. *Antaeus* 19–20 (1990/91) 103–124.
- BÖKÖNYI 1974 S. BÖKÖNYI, *History of Domestic Mammals in Central and Eastern Europe*. Budapest 1974.
- BÖKÖNYI 1984 S. BÖKÖNYI, *Animal Husbandry and Hunting in TÁC-Gorsium*. Budapest 1984.
- CRABTREE 1989 P. J. CRABTREE, *Zooarchaeology at Early Anglo-Saxon West Stow*. in: L. Redman ed.: *Medieval Archaeology. Medieval and Renaissance Text & Studies*. State University of New York at Binghamton 1989, 202–215.
- DRIESCH VON DEN 1976 A. DRIESCH, von den *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Peabody Museum Bulletin 1. Cambridge, Massachusetts 1976.
- MALTBY 1981 J. M. MALTBY, *Iron Age, Romano-British and Anglo-Saxon Animal Husbandry = A Review*. In C. M. Jones and G. Dimbleby, eds.: *The Environment of Man: The Iron Age to the Anglo-Saxon Period*. BAR British Series 87 (1981) 155–203.
- MALTBY 1984 J. M. MALTBY, *Animal bones and the Romano-British Economy*. in C. Grigson and J. Clutton-Brock eds.: *Animals and Archaeology 4 Husbandry in Europe*. BAR International Series 227 (1984) 125–138.
- PECK 1986 R. W. PECK, *Applying Contemporary Analogy to the Understanding of Animal Processing Behavior on Roman Villa Sites*. 2 vols. Ph. D. dissertation, University of Southampton, England. Ann Arbor: University Microfilms 1986.
- SCHIFFER 1987 M. B. SCHIFFER, *Formation Processes of the Archaeological Record*. University of New Mexico Press, Albuquerque 1987.
- UERPMANN 1973 H-P. UERPMANN, *Animal Bone Finds and Economic Archaeology*. *WA* 4/3 (1973) 308–309.
- WAPNISH—HESSE 1988 P. WAPNISH—B. HESSE, *Urbanization and the Organization of Animal Production at Tell Jemmeh in the Middle Bronze Age Levant*. *JNES* 47/2 (1988) 81–94.

A. M. Choyke
 Budapesti Történeti Múzeum
 Aquincumi Múzeum
 Budapest, Szentendrei út 139.
 H-1031