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Summary

A collection of animal remains from a deserted farmstead at Eckweek in Avon dated to between 950 and 1400 AD, were mostly from sheep and cattle of small size. The wide range of ages represented suggests that Eckweek was a 'producer' settlement. Some pig and horse bones were also found, as were small numbers of other species of mammal and bird. Fine sieving of several contexts revealed numerous remains of shrew, wood mouse, field vole and bank vole - all probably derived from owl pellets. There does not appear to have been any significant faunal change between the earlier phase of the site's occupation (950-1250 AD) and the later phase (1250-1400 AD). The presence of both meat-bearing and non-meat-bearing parts of the skeleton suggests that the bones derived from general waste of animals slaughtered locally.

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INTRODUCTION

The site of the deserted settlement at Eckweek (NGR ST 711576) is some 5 miles south west of Bath near the modern village of Peasedown St John; it is mentioned in the Domesday survey. Excavation of the site, undertaken between October 1988 and June 1989 under the supervision of Andrew Young and Alexander Kidd, revealed the presence of timber and stone buildings of a farmstead occupied during late Saxon and Mediaeval periods (c. 950 - 1400).

A particular interest of the bones is that they comprise a reasonably well-dated sequence from a rural settlement. The aim of this report is to describe the animal bones from Eckweek and provide tables of their measurements. The Eckweek animal bones will be stored in the Roman Baths Museum, Bath.

METHODS

Most of the bones were hand-recovered. In addition, some bones were retrieved by wet sieving (with a mesh of 500 microns) a small volume of deposit from certain contexts. Due to the small size of the faunal assemblage, and at the suggestion of Andrew Young, the data have been pooled into two main phases, an early one (ceramic phases 1 - 4 dated c. 950 - 1250 AD) and a late one (ceramic phases 5 and 6 dated 1250 - 1400 AD).

For a full description of the methods used see Davis (AML reports in prep). In brief, all mandibular teeth and a restricted suite of "regions of identification" (i.e. articular ends/epiphyses and metaphyses) of girdle, limb and foot bones (listed in tables 2 and 3) were recorded and used in counts. In order to avoid multiple counting of very fragmented regions, at least 50% of a "region" had to be present for it to be counted. (Broken, and therefore single, caprine and cattle metapodial condyles were counted as halves, pig central metapodials were counted as halves.) An epiphysis is described as "fused" once spicules of bone have formed across the epiphysial plate joining metaphysis to epiphysis.

Sheep/goat teeth were assigned to the eruption and wear stages of Payne (1987), pig and cattle teeth were assigned to the eruption and wear stages of Grant (1982). Measurements taken on the cattle metapodials are illustrated in Davis (1988). In general, other measurements taken follow those suggested by von den Driesch (1976).

The sample of wet sieved bones included mandibles of *Apodemus*. The two British species of this genus, A. *sylvaticus* the woodmouse, and A. *flavicollis* the yellow-necked mouse, are difficult to distinguish. Recent specimens in the AM Lab comparative collection were analysed metrically and, notwithstanding age-related variation, the height of the mandibular ramus measured up the external side opposite the middle of M_2 seems to provide a reasonably good separation of the two species - *flavicollis* are generally larger than *sylvaticus* (see figure 1).

RESULTS and DISCUSSION

Condition and recovery. The scarcity of certain smaller parts of the skeleton such as sheep carpals, incisors, premolars and phalanges (tables 2, 3 and 4 and figure 2) is to be noted. These were probably missed during excavation. Species retrieved by sieving are recorded in table 5. With such a small volume put through this operation and without knowing the total volume of earth excavated at Eckweek it is impossible to estimate the original proportion of smaller skeletal elements and smaller species such as mice and small birds. Most of the bones are fairly well preserved. The scarcity of some of the later-fusing elements such as distal radius and distal metapodials, suggests that differential preservation has had some effect too.

Several bones with gnaw marks were found throughout the sequence at Eckweek as were several bones displaying the characteristic features which Payne and Munson (1986) describe for bones partially digested by dogs. These gnawed and 'digested' bones corroborate the suggeston that extensive dog activity at Eckweek has influenced the pattern of preservation of the bone assemblage.

Species present and their frequencies. 878 hand-recovered mammal and bird bones have been recorded (tables 1,2 and 3). Most of them belonged to sheep (no goat remains were recognised), cattle, and some pig. Several equid bones and teeth are probably horse - the lower molars have a "U" shaped lingual fold, with buccal fold partially penetrating between the flexids. Rabbit bones could be distinguished from those of hare on the basis of their small size.

Most of the galliform bones probably belonged to either chicken or pheasant; bones of these two species being difficult to distinguish. However two exceptions are a) the proximal femur and b) the tarso-metatarsus. None of the chicken/pheasant tarsometatarsi and femora found at Eckweek could be identified as pheasant. It is quite likely then, that all the galliform bones belonged to chickens.

No deer and remarkably few remains of game species were found. The absence of deer may have some significance. In Mediaeval England commoners were not allowed to hunt large game such as deer which were reserved for the aristocracy. Was Eckweek was inhabited by members of the lower classes?

Sheep bones comprise 60 - 65% of the assemblage, far outnumbering the remains of cattle (20 - 25%), and pig (8 - 10%). However, given the larger size of an ox, beef was probably more important than mutton to the inhabitants of Eckweek. Comparison of the early (950 - 1250) with the late (1250 - 1400) assemblages shows (table 1) that very little change occurred in the relative frequencies of different species. The high proportion of sheep compared to cattle is of some interest and puts Eckweek in a similar category, in terms of frequencies of large mammal remains, to the post 10th century levels in Lincoln (O'Connor, 1982), when sheep had increased in frequency from c.30% to over 40%. O'Connor correlates the contemporary fall in the number of cattle bones with the gradual change from the use of oxen to horses for ploughing. By this time the rigid breast harness which enabled horses to be used for ploughing had reached England from the continent (Lefebvre des Noettes, 1931:122). In addition, the increase of sheep numbers may well reflect the growth of the wool industry. At Eckweek the tooth-wear data (see below) show that a substantial proportion of the sheep belonged to the older age groups (circa 4-6 years) which had undoubtedly been shorn of several fleeces (and ewes may have been milked too) prior to slaughter.

The significant, though admittedly small, number of equid remains is worth noting, and may typify rural sites, such as Raunds in Northamptonshire (Davis, in prep.), rather than urban ones.

Body part frequency. (table 4, figure 2). The relative abundance of different parts of the skeleton shows that, allowing for recovery bias (this would account for the low count of sheep incisors, carpals and third phalanges), there is a large discrepancy between the numbers of teeth and the numbers of limb-bones. A similar discrepancy was noted at the Saxon-Mediaeval rural site of Burystead/Langham Road (Davis, in prep) which was probably caused by extensive activity of dogs. Dogs tend to avoid jaws with their sharp teeth, and so this part of the anatomy is preferentially preserved.

An unusually high frequency of sheep molars, distal humeri and distal tibiae in the later period is difficult to explain. It may be due to a combination of preservation and recovery factors.

Measurements. (see appendix). The 10th - 14th century sheep bones at Eckweek are rather small, and similar in size to the modern "primitive" breed, the Soay (figure 3; note however the shortness of the three metatarsals). This accords with Armitage's (1983) survey of sheep remains in England. He states that measurements of sheep bones from Mediaeval and Tudor archaeological sites indicate that sheep were only slightly larger in stature and build than the modern Soay.

The chicken bones are small and little different from those of present-day bantams.

In terms of their size, the few cattle bones at Eckweek resemble those from other sites of this period.

Ageing. (For very approximate translations of toothwear stage in sheep to actual age in years I refer to Deniz and Payne (1982)). The deciduous and permanent teeth of sheep and their assignment to wear stages (table 6) suggest that a fairly wide range of ages was selected for slaughter, and in this respect there is little evidence for any difference between early and late periods at Eckweek. A ratio of 40 dP_4s:24 P_4s suggests that over half the sheep consumed at Eckweek were less than 2 years old (the approximate age when dP_4 is shed and is replaced by P_4) however the real proportion of juveniles was probably a little lower since isolated dP_4s are more easily recovered than isolated P_4s. 49% of the 217 M_1s and M_2s assigned to wear stage are in wear stages 0 - 8 (i.e. less than 2 years old). The majority of the dP_4s are in wear stages 14 - 16 which probably belonged to lambs aged 5 - 14 months. The peaks of M_1s in wear stage 9 (1 - 3 years), M_2s in wear stage 9 (2.5 - c. 7 years) and M_3s in wear stage 11 (3.5 - c.9 years) suggests that many of the adult sheep were slaughtered between the ages of 2 - 5 years. Thus both lambs and prime-mutton animals were slaughtered for local consumption.

A high proportion of cattle dP_4s compared to P_4s (table 7) may have come from surplus calves slaughtered locally. Wear-data of the other teeth suggest that cattle of a wide range of ages were slaughtered - perhaps these were lame animals not fit for droving into town for sale.

Most of the pigs (table 8) were slaughtered fairly young which is the usual situation in zooarchaeological assemblages and is not surprising for an animal usually only reared for its meat and fat.

The sieved small animal remains - origin and environmental considerations. Eight small fish vertebrae were found among the sieved material. Andrew Jones (Archaeological Resources Centre, York) has identified them as belonging to marine fish. Seven belong to the Clupeidae (herring family) and one to the Apodes (eels/conger eels).

Two contexts, 213 and 273, provided large samples of small bones retrieved by wet sieving. According to the excavator context 213 represents a drain in ceramic phase 6 and context 273 represents a pit in ceramic phase 4. Under microscopic inspection the small animal bones and teeth retrieved by the wet-sieving operation are etched in a manner reminiscent of bones consumed and subsequently regurgitated by owls (i.e. from 'owl pellets'). All the small bird and mammal bones have this sheen and etching. I interpret these small animal remains from contexts 213 and 273 as being derived from owl pellets. Owls probably roosted in the roofs of the buildings in which these contexts were found.

The abundant remains of common shrew, bank vole, field vole and wood-mouse in the sieved samples is not surprising in view of the rural location of Eckweek. Owls will forage over an area some 2-3 square miles, and this spectrum of small mammal species characterises a local environment consisting of open deciduous woodland, some ungrazed grassland, and perhaps fields with hedgerows. The amphibian bones may evidence the presence of semi-permanent bodies of water in the vicinity.

Pathology. Few bones exhibited signs of disease or injury. Three of the cattle incisors, 1 in the later phase and 2 in the earlier phase, exhibit small "v" shaped notches on the lateral sides at the base of their crowns. This abnormal pattern of wear is said to be due to long grass, perhaps associated with abrasive soil, being drawn between the teeth in grazing (Miles and Grigson, 1990:494-5). A single case (out of 19) was observed of a cattle M_3 with absent third pillar (hypoconulid).

CONCLUSIONS and SUMMARY

Most of the large mammal remains found at Eckweek derive from animals killed locally. Beef and mutton were the main sources of meat for the people of Eckweek during the 10th-15th centuries. The remains of sheep and cattle suggest a "producer" rather than a "consumer" economy. Some pork, rabbit, chicken, and goose were also eaten. The absence of wild game such as deer probably reflects the low status of the people who inhabited Eckweek.

In terms of their dimensions, the sheep bones from Eckweek are little different from the Soay of today - a small traditional breed.

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Table 1.

Summary of trench recovered animal bones and teeth from Eckweek.

Period:	950 - 1250		1250 - 1400	
	n	%	n	%
Horse	13	4	14	3
Pig	24	8	54	10
Cattle	71.5	25	112.5	22
Sheep/Goat	182.5	62	333	65
(Sheep)	(47)		(72)	
(Goat)	(-)		(-)	
Total domestic ungulates:	291		513.5	
Rabbit	-		2	
Hedgehog	-		9	
Dog	-		3	
Cat	-		7	
Galliform	8		24	
(Chicken)	(5)		(6)	
(Pheasant)	(-)		(-)	
Goose	2		11	
cf Mallard	-		1	
Woodcock	-		1	
Partridge	1		-	
Corvid	-		1	
Rook	1		1	
?Hooded crow	1		-	

Key:
Galliform = probable chicken or pheasant

Tables 2 and 3.

Counts of trench-recovered mammal bones and teeth from Eckweek. A mandible fragment with one or more teeth is counted as a mandible. Counts for loose teeth and for teeth in mandibles are given separately, the count for teeth in mandibles being in parentheses.

Note:

"Horse Incisors" includes both upper and lower teeth.

Some sheep and goat teeth and bones could be identified to species. For example SHEEP/GOAT astragalus "7Sh+2" refers to the presence of 7 astragali which could be identified as definitely sheep and 2 which are either sheep or goat.

Key:

Rab - Rabbit.

Gall - Galliform.

F - epiphysis fused (adult).

U - epiphysis unfused (juvenile).

(for a detailed breakdown of the counts of rabbit, cat and hedgehog teeth see archive)

1250 - 1400 Phases 5-6	SHEEP/GOAT	CATTLE	PIG	HORSE	DOG	OTHERS
Mandible	15Sh+20	7	11	-	-	Rab:2 Cat:3 Hedgehog:7
Mandibular tooth: i	2 (-)	- (-)	2 (-)	- (-)	-	
" " I	7 (-)	16 (-)	13 (-)	2 (-)	- (-)	
" " dp_2	- (9)	- (2)	1 (2)	- (-)	-	
" " dp_3	2Sh (12Sh)	1 (2)	- (4)	- (-)	-	
" " dp_4	12Sh (14Sh)	3 (1)	1 (4)	- (-)	-	
" " P_1			- (-)		- (-)	
" " P_2	- (1)	1 (-)	- (1)	- (-)	- (-)	
" " P_3	1 (3)	3 (-)	- (2)	- (-)	- (-)	
" " $P_{3/4}$				1		
" " P_4	4 (6)	4 (2)	- (3)	- (-)	- (-)	
" " M_1	3 (17)	- (2)	- (4)	- (-)	1 (-)	
" " M_2	7 (17)	- (4)	- (2)	- (-)	- (-)	
" " M_3	44 (13)	10 (5)	1 (-)	1 (-)	- (-)	
" " $M_{1/2}$	85 (1)	13	5 (2)	4		
" " C			1 (1)	- (-)	1 (-)	
Scapula - Coracoid U	-	-	1	-	-	
" " F	6	2	-	-	-	Goose:1 Corvid:1
" " ?	8	-	2	-	-	
Humerus - dist metaph U	3	-	-	-	-	
" dist epiph U	-	-	-	-	-	
" dist F	32	1	1	-	1	Cat:4 Hedgehog:2 Gall:3 Goose:1 Woodcock:1
Radius - dist metaph U	1	1	1	-	-	
" dist epiph U	1	-	-	-	-	
" dist F	2	2	-	-	-	?Gall:1
Radiale	-	3	-	-	-	
C2+3	-	1	-	-	-	
Metacarpal - dist metaph U	1	-	.5	-	-	
" dist epiph U	-	-	-	-	-	
" dist F	1.5Sh	3	-	-	1	Gall:3 Goose:8 ?Mallard:1 Rook:1
Ischium	9	2	2	2	-	?Goose:1
Femur - dist metaph U	-	-	-	-	-	
" dist epiph U	-	-	1	-	-	
" dist F	-	1	-	-	-	Chicken:1 Gall:1
Tibia - dist metaph U	4	-	-	-	-	
" dist epiph U	1	-	-	-	-	
" dist F	20	4	-	-	-	Gall:7
Astragalus	7Sh+2	1	2	-	-	
Calcaneum - tuber calcis U	5	-	2	-	-	
" tuber calcis F	3	1	-	-	-	
" tuber calcis ?	-	3	2	-	-	
Metatarsal - dist metaph U	1	1	-	-	-	
" dist epiph U	-	-	-	-	-	
" dist F	6.5Sh+.5	2.5	-	-	-	Chicken:5 Gall:3
Metapodial - dist metaph U	4.5	-	1	-	-	
" dist epiph U	-	2	.5	-	-	
" dist F	-	-	-	1	-	
Phalanx 1 - prox metaph U	-	-	2	-	-	
" prox epiph U	1	-	-	-	-	
" prox F	9	18	1	1	-	
Phalanx 3	2Sh	6	-	2	-	
TOTALS	333	112.5	54	14	3	

Table 2

c.950 - 1250 Phases 1-4	SHEEP/GOAT	CATTLE	PIG	HORSE	DOG	OTHERS
Mandible	13Sh+17	5	4	-	-	
Mandibular tooth: i	1 (-)	- (-)	3 (-)	- (-)	-	
" " I	13 (-)	10 (-)	3 (-)	3 (-)	- (-)	
" " dp_2	- (8)	- (1)	- (-)	- (-)	-	
" " dp_3	1 (10Sh)	3 (1)	- (-)	- (-)	-	
" " dp_4	2Sh+1 (11Sh)	3 (2)	- (1)	- (-)	-	
" " P_1			- (-)		- (-)	
" " P_2	- (1)	1 (1)	1 (-)	1 (-)	- (-)	
" " P_3	1 (8)	6 (2)	- (-)	- (-)	- (-)	
" " $P_{3/4}$				-		
" " P_4	5 (9)	1 (1)	1 (1)	1 (-)	- (-)	
" " M_1	5 (21)	1 (3)	- (1)	- (-)	- (-)	
" " M_2	5 (19)	1 (-)	- (2)	- (-)	- (-)	
" " M_3	20 (11)	3 (1)	1 (1)	- (-)	- (-)	
" " $M_{1/2}$	31 (-)	11 (1)	3 (-)	-		
" " C			3 (1)	1 (-)	- (-)	
Scapula - Coracoid U	2	-	-	-	-	
" " F	2	1	1	-	-	
" " ?	2	-	-	-	-	
Humerus - dist metaph U	3	-	-	-	-	
" dist epiph U	-	-	-	-	-	
" dist F	7	1	1	-	-	?Hooded crow:1 Rook:1
Radius - dist metaph U	2	-	1	-	-	
" dist epiph U	-	-	-	-	-	
" dist F	1	1	-	2	-	
Radiale	-	-	-	-	-	
C2+3	-	1	-	-	-	
Metacarpal - dist metaph U	2	-	-	-	-	
" dist epiph U	-	-	-	-	-	
" dist F	2.5Sh	1	-	-	-	Goose:1
Ischium	12	3	-	1	-	
Femur - dist metaph U	-	-	-	-	-	
" dist epiph U	1	-	-	-	-	
" dist F	-	-	-	-	-	Chicken:2 Partridge:1
Tibia - dist metaph U	2	-	-	-	-	
" dist epiph U	-	-	-	-	-	
" dist F	5	1	1	-	-	Gall:2
Astragalus	1Sh+2	6	-	2	-	
Calcaneum - tuber calcis U	1Sh	-	-	-	-	
" tuber calcis F	4Sh	-	-	-	-	
" tuber calcis ?	-	2	-	-	-	
Metatarsal - dist metaph U	2	2	-	-	-	
" dist epiph U	1Sh	-	-	-	-	
" dist F	1.5Sh	2.5	-	-	-	Goose:1 Chicken:3 Gall:1
Metapodial - dist metaph U	-	-	-	-	-	
" dist epiph U	1	-	-	-	-	
" dist F	.5	1	-	-	-	
Phalanx 1 - prox metaph U	1	-	1	-	-	
" prox epiph U	-	-	-	-	-	
" prox F	9	4	-	2	-	
Phalanx 3	-	-	-	-	-	
TOTALS	182.5	71.5	24	13	-	

Table 3

Table 4

Body-part frequencies. Counts of the different parts of the (trench-recovered) skeleton of Sheep/Goat and Cattle in the 1250 - 1400 period and Sheep/Goat in the 950 - 1250 period at Eckweek. Data are from tables 2 and 3. The **MN** columns provide an approximate guide to the relative occurrences of different elements taking into account their anatomical frequency i.e. 2 "Humeri", 8 "i+I", 6 "Molars", 2 "Radii", 8 "Phalanx 1" etc. The numbers of metapodials have been apportioned equally to metacarpals and metatarsals. (These MN numbers would therefore be equal if whole carcasses had originally been buried and if recovery and preservational biasses had had an equal effect on all parts of the skeleton.) Fractions have been rounded up. For example 3 radii must have come from at least 2 (=3/2) individuals, 110 molar teeth must have come from at least 19 (=110/6) individuals, and 6 third phalanges must have come from 1 (=6/8) individual.

	Sh/G 950 - 1250		Sh/G 1250 - 1400		Cattle 1250 - 1400	
		MN		**MN**		**MN**
Mandible	30	15	35	18	7	4
i+I	14	3	9	5	16	3
dp+P	49	9	64	11	19	4
Molars	112	19	187	32	34	6
Scapula	6	3	14	7	2	1
Humerus - dist	10	5	35	18	1	1
Radius - dist	3	2	3	2	3	2
Radiale	0	0	0	0	3	2
C2+3	0	0	0	0	1	1
Metacarpal - dist	5+2	4	3+3	3	3+1	2
Ischium	12	6	9	5	2	1
Femur - dist	1	1	0	0	1	1
Tibia - dist	7	4	24	12	5	3
Astragalus	3	2	9	5	1	1
Calcaneum	5	3	8	4	4	2
Metatarsal - dist	4+2	3	8+3	6	4+1	3
Phalanx 1 - prox	10	2	10	2	18	3
Phalanx 3	0	0	2	1	6	1

Table 5.

Eckweek sieved samples. Numbers of mandibles/lower first molar teeth and other bones of small animals recovered by sieving contexts 213 and 273. In context 213 there were 28 isolated wood mouse M_1s, 4 mandibles with M_1, and and no edentate murine mandibles, giving an estimated total of 32 wood mouse mandibles. In context 273 there were 11 isolated wood mouse M_1s and 28 wood mouse mandibles with their M_1s in place. However, there were also 30 edentate mandibles belonging to either house mouse or wood mouse, and therefore the original number of wood mouse mandibles was estimated as c. 57 (allowing the possibility of 1 edentate mandible belonging to the house mouse).

Context number:	213		273	
Nature of fill:	drain		pit	
Ceramic phase:	6		4	
	n	%	n	%
Pygmy shrew mandibles	-		1	1
Common shrew mandibles	2	4	6	6
Mole mandibles	1	2	1	1
House mouse - estimated total number of mandibles	4	9	2	2
Wood mouse - estimated total number of mandibles	32	68	57	54
Field vole M_1	2	4	20	19
Bank vole M_1	6	13	19	18
Rabbit tibia shaft			+	
cf Turdidae distal tarso-metatarsus			+	
cf Chaffinch distal humerus			+	
Small songbird phalanx 3	+			
cf Galliform phalanx 2			+	
Amphibian long-bone shaft	+			
Totals:	47		106	

Table 6.

Eckweek sheep/goat mandibular teeth wear stages (Payne, 1987)

Payne Wear Stage:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	?
Phases 5 - 6 (1250 - 1400)																									
dP_4	1				1				3	2	1			2	6		6		1	1		1			1
P_4	1	2							2	1			3		1										
M_1						1			1	10		1	2			4									1
$M_{1/2}$	2		4		2	5	5	17	16	24	2	3	1			1									4
M_2			1		1	1	1	4		13		3													
M_3	8		4			2	1	2	3	3	2	27													5
Phases 1 - 4 (c. 950 - 1250)																									
dP_4											1		1	2	6		2				1				1
P_4	4					1	1	2	3				2			1									
M_1			2					3	1	13			3			3									1
$M_{1/2}$	4		1			1	4	2	3	15	1														
M_2						1	4	1	5	7	1				1	1									3
M_3	4		1		1	3		1	4	2	2	8	1												4
Payne Wear Stage:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	?

Table 7.

Eckweek cattle mandibular teeth wear stages (Grant, 1982)

Grant Wear Stage:	a	b	c	c/d	d	e	e/f	f	g	h	i	j	j/k	k	l	m	n	o	p	?
Phases 5 - 6 (1250 - 1400)																				
dP_4			1										1	1		1				
P_4			1		1			3												1
M_1									1					1						
$M_{1/2}$		2			2			1				1		3	2	2				
M_2									1					2	1					
M_3		1	1	1					7			2		1	1	1				
Phases 1 - 4 (c. 950 - 1250)																				
dP_4								1				1		3						
P_4									1	1										
M_1	1								1					2						
$M_{1/2}$		2			1			2	2			1		2		1				1
M_2														1						
M_3							1		1	1						1				
Grant Wear Stage:	a	b	c	c/d	d	e	e/f	f	g	h	i	j	j/k	k	l	m	n	o	p	?

Table 8.

Eckweek pig mandibular teeth wear stages (Grant, 1982)

Grant Wear Stage:	a	b	c	d	e	f	g	h	i	j	k	l	m	n	?
Phases 5 - 6 (1250 - 1400)															
dP_4			1	1	1	1				1					
P_4		2				1									
M_1			1		2	1									
$M_{1/2}$	3	1	1		1	1									
M_2	1	1													
M_3	1														
Phases 1 - 4 (c. 950 - 1250)															
dP_4						1									
P_4			1		1										
M_1													1		
$M_{1/2}$			3												
M_2								1		1					
M_3	1		1												
Grant Wear Stage:	a	b	c	d	e	f	g	h	i	j	k	l	m	n	?

	Apodemus		
	flavicollis	*sylvaticus*	Eckweek
3.8	o		
3.7			
3.6	o		
3.5	o		
3.4	oaAO		
3.3	ayyA		A
3.2	yy	O	AAAA
3.1	yyyy	AAAAOOO	YAA
3.0	yy	YAAAOOO	YYAAO
2.9		YYAAAAAAOO	YAAAAA
2.8	y	YA	YAAO
2.7		YAA	A

Figure 1.

Distinction between mandibles of *Apodemus sylvaticus* and *A. flavicollis* and the identity of the Eckweek *Apodemus* from contexts 273 and 213. The minimum height of the mandibles in millimetres measured up the external side adjacent to M_2 is plotted. Modern *flavicollis* and *sylvaticus* from the AM Laboratory Comparative Collection are compared with mandibles from Eckweek.

Key: Lower case letters refer to laboratory bred animals, upper case letters refer to wild caught animals. Mandibles were assigned to one of three "age" groups "Young", "Adult", and "Old", according to the amount of wear on the lower first molar tooth (see Miller, 1912:802) as follows:

Y - dentine of 1 or more of the tubercles t1-t4 is separate t3-t4 are distinct from t5-t6

A - dentine of t1-t4 is confluent

O - dentine of t5-t6 is also confluent with the median posterior tubercle.

Note that the mandible appears to increase in size with age. Despite this age-dependent variation, the Eckweek *Apodemus* can be identified with some confidence as *A. sylvaticus*.

Figure 2.

Display of the data in table 4. Each asterisk represents an MN of 3.

	Sheep/Goat 950 - 1250	Sheep/Goat 1250 - 1400	Cattle 1250 - 1400
Mandible	*****	******	**
i+I	*	**	*
dp+P	***	****	**
Molars	*******	**********	**
Scapula	*	***	*
Humerus - dist	**	******	*
Radius - dist	*	*	*
Radiale			*
C2+3			*
Metacarpal - dist	**	*	*
Ischium	**	**	*
Femur - dist	*		*
Tibia - dist	**	****	*
Astragalus	*	**	*
Calcaneum	*	**	*
Metatarsal - dist	*	**	*
Phalanx 1 - prox	*	*	*
Phalanx 3		*	*

Figure 3.

Measurements of the sheep from Eckweek compared to modern Soays in the Ancient Monuments Laboratory Comparative Collection. Plots of distal humerus *minimum diameter of trochlea*, distal humerus *width of trochlea*, distal humerus *width*, metacarpal *length*, distal tibia *width*, astragalus *width*, and metatarsal *length*. The measurements are in millimetres. Each rectangle represents a single specimen, specimens from Eckweek are depicted hatched. Most of the modern Soays are females, two male are shown cross-hatched).

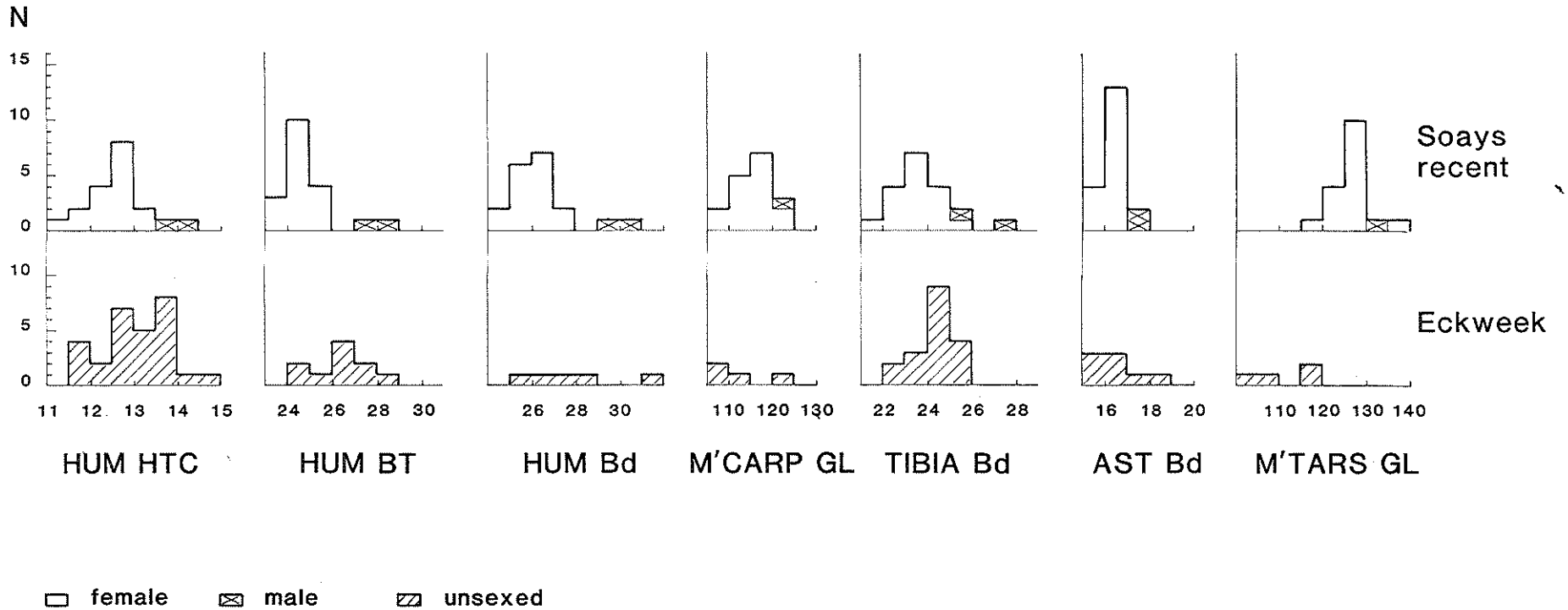
N
15
10
5
0
10
5
0
Soays
recent
Eckweek
11 12 13 14 15
24 26 28 30
26 28 30
110 120 130
22 24 26 28
16 18 20
110 120 130 140
HUM HTC
HUM BT
HUM Bd
M'CARP GL
TIBIA Bd
AST Bd
M'TARS GL
female
male
unsexed

Figure 3

Appendix

Measurements of teeth and bones from Eckweek in millimetres.
Approximate measurements are in parentheses.

Key:

Cont	- Context
Ph	- Phase
Sh	- Sheep
G	- Goat
Sh/G	- Sheep or Goat
Gall	- Galliform
l	- length
w	- width
HTC	- minimum diameter of the trochlea (humerus)

I, II and III refer respectively to the first, second and third "units" of a tooth.

In general measurements taken follow those suggested by von den Driesch (1976). Pig teeth are measured as in Payne and Bull (1989).

Cattle metapodials are measured as in Davis (1988).

Sheep and goat metacarpals are measured as in Payne (1969):

W.Con	- width of condyle
W.Troc	- minimum depth of trochlea

Eckweek Pig teeth measurements

Date	Context	phase	dP_4 l	dP_4 wIII	M_1 l	M_1 wI	M_1 wII	M_2 l	M_2 wI	M_2 wII	M_3 l	M_3 wI	M_3 wII
1300 - 1400	98	6					10.9	19.9	12.8	13.3			
1300 - 1400	57	6	19.0	8.9									
1300 - 1400	65	6	(17.6)	(7.4)									
1300 - 1400	65	6			16.1	9.2	9.7						
1250 - 1400	2	5-6	19.4	8.7									
1250 - 1400	2	5-6			16.9	9.7	10.2	20.4	12.3	13.6			
1250 - 1300	235	5									27.7	12.4	12.9
1250 - 1300	193	5	18.1	8.6	17.2	9.9	-						
1250 - 1300	204	5	18.7	-									
1050 - 1100	3028	3	(17.8)	8.2									
1050 - 1100	149	3									32.1	(15.8)	14.9
1000 - 1100	3153	2/3						17.6	11.8	-			
1000 - 1050	3010	2									33.6	15.2	14.1

Eckweek Cattle
Lower Third Molar tooth measurements

Date	Context	phase	l	wl
1300 - 1400	201	6	32.2	14.7
1300 - 1400	65	6	34.4	14.9
1250 - 1400	2	5-6	33.9	-
1250 - 1400	2	5-6	35.7	15.6
1250 - 1400	2	5-6	35.9	15.3
1250 - 1400	2	5-6	39.0	16.8
1250 - 1300	176	5	-	14.8
1250 - 1300	220	5	-	13.8
1250 - 1300	331	5	32.7	-
1250 - 1300	316	5	34.8	15.5
1250 - 1300	161	5	-	15.2
1050 - 1100	3016	3	-	15.9
1050 - 1100	3037	3	32.3	15.2
1000 - 1050	3062	2	34.1	14.9

Eckweek Cattle Metacarpal measurements

Date	Context	phase	U/F	GL	SD	BFd	B at f	BFdm =a	BFdl =b	1	Ddm =2	3	4	Ddl =5	6
1300 - 1400	114	6	F			59.2	53.6	29.4	-	23.8	30.7	28.0	21.8	30.1	28.1
1300 - 1400	114	6	F	(174)	30.5	-	-	-	-	-	-	-	-	-	-
1000 - 1050	139	2	F	179	26.6	52.6	48.1	24.7	24.8	21.6	28.5	25.4	20.6	27.7	26.1

Eckweek Cattle Astragalus measurements

Date	Context	phase	GLl	Bd	Dl
1300 - 1400	65	6	66.1	41.6	36.8
1100 - 1250	273	4	-	38.5	32.9
1050 - 1100	149	3	60.1	37.1	33.0
1050 - 1100	3040	3	56.0	34.7	30.7

Eckweek Cattle Metatarsal measurements

Date	Context	phase	U/F	GL	SD	BFd	B at f	BFdm =a	BFdl =b	1	Ddm =2	3	4	Ddl =5	6
1300 - 1400	150	6	F			(57.8)	53.5	27.5	25.8	24.1	32.0	28.8	22.0	31.0	29.3
1250 - 1400	2	5-6	F			(71.2)	59.6	34.2	-	27.5	-	32.5	25.6	-	31.6
1100 - 1250	158	4	F			55.0	50.1	(26.6)	26.7	22.3	30.1	27.5	20.9	28.7	27.3
1000 - 1050	338	2	F	(196)	23.7	53.5	49.1	25.7	24.2	23.2	29.9	26.7	21.2	28.7	26.5

Eckweek Sheep/Goat Humerus measurements
(all distal epiphyses fused)

Date	Cont	ph	ID	GL	GLC	HTC	BT	Bd
1300 - 1400	65	6	Sh	123	110	12.6	25.0	26.3
1300 - 1400	114	6	Sh			13.6	-	-
1300 - 1400	20	6	Sh/G			12.2	-	-
1300 - 1400	65	6	Sh			13.8	27.0	-
1300 - 1400	57	6	Sh/G			11.6	24.7	-
1300 - 1400	65	6	Sh			13.4	26.6	-
1300 - 1400	65	6	Sh			11.6	-	-
1300 - 1400	3	6	Sh			12.7	-	-
1300 - 1400	65	6	?Sh			13.2	-	-
1300 - 1400	65	6	Sh			12.7	-	-
1300 - 1400	65	6	Sh/G			12.3	-	-
1250 - 1400	2	5-6	Sh/G			12.9	-	-
1250 - 1400	2	5-6	Sh/G			12.7	-	-
1250 - 1400	2	5-6	Sh/G			13.7	26.0	-
1250 - 1400	2	5-6	Sh/G			13.7	-	-
1250 - 1400	2	5-6	Sh			13.5	26.6	-
1250 - 1400	2	5-6	Sh			13.3	26.5	(28.1)
1250 - 1400	2	5-6	Sh/G			13.6	-	-
1250 - 1400	2	5-6	Sh/G			13.3	-	-
1250 - 1400	2	5-6	Sh			12.5	24.0	25.4
1250 - 1400	2	5-6	Sh/G			14.1	-	-
1250 - 1300	330	5	Sh/G			11.6	-	-
1250 - 1300	220	5	Sh/G			11.6	-	-
1250 - 1300	316	5	Sh			13.0	-	-
1100 - 1250	347	4	Sh/G			12.9	27.2	27.6
1050 - 1100	236	3	Sh			14.5	28.9	31.1
1050 - 1100	408	3	?Sh			13.7	-	-
1000 - 1050	3091	2	Sh/G			13.6	-	-

Eckweek Sheep Metacarpal measurements (all epiphyses fused)

Date	Cont	ph	GL	SD	BFd	Dd	W.Con med	W.Troc med	W.Con lat	W.Troc lat
1300 - 1400	147	6	106	11.6	22.0	13.8	10.4	9.1	10.2	8.7
1100 - 1250	313	4	121	14.0	25.5	16.7	12.2	11.2	12.0	10.6
1050 - 1100	3135	3	113	11.4	21.6	14.1	10.4	9.4	9.9	9.3
c950 - 1000	206	1	109	-	-	-	10.5	9.6	-	-

Eckweek Sheep/Goat Tibia measurements
(all distal epiphyses fused, further identification to species was not made)

Date	Cont	ph	Bd
1300 - 1400	41	6	23.1
1300 - 1400	147	6	24.2
1300 - 1400	12	6	23.7
1300 - 1400	12	6	24.1
1250 - 1400	2	5-6	22.3
1250 - 1400	2	5-6	25.0
1250 - 1400	2	5-6	23.3
1250 - 1400	2	5-6	25.1
1250 - 1400	2	5-6	24.5
1250 - 1400	2	5-6	24.7
1250 - 1400	2	5-6	24.6
1250 - 1400	2	5-6	24.3
1250 - 1400	2	5-6	24.2
1250 - 1300	331	5	22.4
1050 - 1100	149	3	24.7
1050 - 1100	149	3	24.9
1050 - 1100	236	3	25.0
1050 - 1100	192	3	25.6
1000 - 1050	3010	2	24.2

Eckweek Sheep and Goat
Astragalus measurements

Date	Cont	ph	ID	GLl	Bd	Dl
1300 - 1400	114	6	Sh	26.8	17.2	14.9
1300 - 1400	124	6	?	25.5	16.5	14.2
1300 - 1400	41	6	Sh	26.0	16.1	14.4
1300 - 1400	57	6	Sh	27.5	-	15.3
1300 - 1400	65	6	?	26.6	18.0	15.3
1300 - 1400	65	6	Sh	-	16.9	13.8
1250 - 1400	2	5-6	Sh	25.1	15.9	13.6
1250 - 1300	220	5	?Sh	25.1	15.9	13.8
1050 - 1100	1911	3	?	28.2	-	14.5
1000 - 1050	194	2	Sh	25.4	15.8	-

Eckweek Sheep Metatarsal measurements

Date	Cont	ph	ID	U/F	GL	SD	BFd	Dd
1300 - 1400	65	6	Sh	F	(117)	10.5	20.4	(13.4)
1300 - 1400	41	6	Sh	F			20.9	13.7
1300 - 1400	21	6	Sh	F			(21.9)	14.4
1300 - 1400	19	6	?Sh	F	109	9.6	-	-
1250 - 1400	2	5-6	Sh	F	(100)	9.7	21.4	13.7
1250 - 1300	331	5	Sh	F			22.7	14.8
1250 - 1300	330	5	Sh	F	118	10.3	(22.6)	14.5
1050 - 1100	3135	3	Sh	F			21.3	14.2
1050 - 1100	3135	3	Sh	U			21.6	14.3

Closegate I and II carnivore measurements.

Date	Cont	Ph	Ident	Bone	Measurements
1300 - 1400	65	6	Cat	Mandible	ldP_4=5.5
1300 - 1400	65	6	Dog	M_1	w=8.8
1300 - 1400	65	6	Cat	Humerus	Bd=15.2 HTC=9.4
1250 - 1400	2	5-6	Cat	Mandible	5=17.4 lP_3=4.9 wP_3=2.3 lP_4=6.0 wP_4=2.6 lM_1=6.7 wM_1=3.1 9=9.5 10=8.1
1250 - 1400	2	5-6	Cat	Mandible	5=19.2 lP_3=5.3 wP_3=2.6 lP_4=6.5 wP_4=3.1 lM_1=7.6 wM_1=3.4 9=9.9 10=9.1
1250 - 1300	161	5	Dog	Metacarpal V	GL=54.7

Eckweek bird measurements. All specimens unless stated otherwise are osteologically mature.

Date	Cont	Ph	Ident	Bone	Measurements
1300 - 1400	74	6	Gall	Humerus	Bd=13.4 SC=6.1
1300 - 1400	3	6	Gall	Humerus	GL=64.6 Bp=17.0 SC=5.7 Bd=13.2
1250 - 1300	185	5	Gall	Humerus	GL=64.2 Bp=17.8 SC=5.6 Bd=14.1
1300 - 1400	31	6	Gall	Carpometacarpus	GL=43.1 Bp=12.8 Did=7.7
1300 - 1400	65	6	Gall	Carpometacarpus	GL=37.9 Bp=11.3 Did=7.9
1300 - 1400	74	6	Chicken	Femur	GL=(72) Lm=66.6 Bd=13.5 Bp=14.4 Dd=11.3 SC=6.3
1050 - 1100	192	3	Chicken	Femur	Gl=78.2 Lm=73.2 Bp=(16.0) Bd=15.5 SC=6.8
1300 - 1400	15	6	Gall	Tibiotarsus	La=115.8 Bd=12.8 Dd=12.8
1300 - 1400	74	6	Gall	Tibiotarsus	GL=98.8 La=95.1 Bd=10.2 Dd=10.5
1300 - 1400	74	6	Gall	Tibiotarsus	Bd=9.7 Dd=10.4
1300 - 1400	147	6	Gall	Tibiotarsus	Bd=13.6 Dd=14.1
1100 - 1250	273	4	Gall	Tibiotarsus	Bd=10.2 Dd=11.1
1050 - 1100	149	3	Gall	Tibiotarsus	Bd=10.2 Dd=10.4
1300 - 1400	74	6	Chicken	Tarsometatarsus (no spur)	GL=67.2 Bd=11.5 SC=5.6 Bp=11.9
1300 - 1400	74	6	Chicken	Tarsometatarsus (no spur)	Sc=5.4 Bd=11.3
1300 - 1400	12	6	Chicken	Tarsometatarsus (+ spur)	GL=83.3 Bp=14.5 SC=7.9
1250 - 1300	193	5	Chicken	Tarsometatarsus (no spur)	Bd=11.4
1100 - 1250	170	4	Chicken	Tarsometatarsus (no spur)	GL=65.4 SC=5.7 Bp=11.8 Bd=11.6
1100 - 1250	273	4	Chicken	Tarsometatarsus (no spur)	GL=60.1 SC=4.4 Bp=10.7 Bd=10.1
1300 - 1400	150	6	Goose	Humerus	GL=160.6 SC=11.3 Bd=24.1
1300 - 1400	150	6	Goose	Carpometacarpus	Bp=22.8
1300 - 1400	15	6	Goose	Carpometacarpus	GL=94.0 Bp=22.2 Did=11.5
1300 - 1400	67	6	Goose	Carpometacarpus	Bp=21.0
1300 - 1400	135	6	Goose	Carpometacarpus	GL=94.1 Bp=22.2 Did=11.6
1300 - 1400	12	6	Goose	Carpometacarpus	GL=86.6 Bp=21.1
1300 - 1400	72	6	Goose	Carpometacarpus	GL=91.8 Bp=21.2 Did=11.5
1300 - 1400	150	6	cf Goose	Carpometacarpus	Did=10.6
1300 - 1400	41	6	cf Mallard	Carpometacarpus	Bp==13.1
1300 - 1400	65	6	Woodcock	Humerus	GL=49.9 SC=3.4 Bd=8.3
1000 - 1050	3043	2	Rook	Humerus	GL=63.4 Bd=15.1 SC=6.3
1250 - 1400	2	5-6	Rook	Carpometacarpus	GL=45.7 Bp=11.0
1050 - 1100	3112	3	?Carrion crow	Humerus	Bd=15.1
1000 - 1100	3001	2/3	Partridge	Femur	GL=57.1 Lm=54.3 Bp=(9.8) Bd=9.3 SC=4.1