6 **THE ANIMAL BONES: DATA** by Andy Hammon

6.1 **Appendix 1: methods**

Taxonomic identification

All specimens were identified to species or taxonomic group where possible. Ribs and vertebrae (excluding the axis and atlas) and unidentifiable specimens were assigned to size class (large/medium). The English Heritage vertebrate skeleton reference collection (held at Fort Cumberland, Portsmouth) was used for identification purposes in addition to published criteria (see below).

Sheep/goat

The distinction between sheep (*Ovis aries*) and goat (*Capra hircus*) was attempted on the mandibular third and fourth deciduous premolars using the criteria of Payne (1985) and on the permanent dentition when *in situ* using the criteria of Halstead *et al*. (2002). Distinction of the following elements was attempted using a combination of Boessneck (1969) and Prummel and Frisch (1986): horncore, humerus, radius, ulna, metacarpal, tibia, astragalus, calcaneum and metatarsal. Additionally, the criteria of Kratochvil (1969) was used for the distal tibia.

Pig/wild boar

Metrical data for the mandibular teeth and distal humerus were used to distinguish between domestic pig and its progenitor wild boar (*Sus scrofa*) following Payne and Bull (1988).

Equids

Species distinction was attempted on the maxillary and mandibular dentition when *in situ* using the criteria of Davis (1987b, 1980), primarily in the effort to separate horse (*Equus caballus*) from donkey (*E. asinus*).

Red/fallow deer

The distinction between red deer (*Cervus elaphus*) and fallow deer (*Dama dama*) was attempted on all elements using the criteria of Lister (1996).

Lagomorphs

The distinction between hare (*Lepus* sp.) and rabbit (*Oryctolagus cuniculus*) was attempted on all elements using the criteria of Callou (1997).

Domestic fowl

The distinction between chicken (*Gallus gallus*) and the closely related species of Guinea fowl (*Numida meleagris*) and pheasant (*Phasianus colchicus*) was attempted on the following elements using the criteria of Albarella (pers. comm.) and MacDonald (1992): scapula, carpometacarpus, femur and tarsometatarsus.

Recording

Identified or classified (rib and vertebrae) fragments were recorded on a Microsoft Access XP database. Each fragment was given an identification number and the following information was recorded: site code; context number; taxa/taxonomic group; skeletal element; side; presence/absence of bone zone (see below); mandibular tooth eruption and wear; post-cranial epiphyseal proximal and distal fusion; whether foetal/neonatal or juvenile; and articulation with other specimens. In addition, other variables were recorded relating to taphonomy and biometry (see below).

Taphonomy

The recovery method, state of surface preservation, presence/absence of root etching, angularity of breaks, gnawing, burning and completeness were all recorded. The type of burning was recorded because it provides a crude measure of temperature and may indicate cooking or disposal method. The type and location of butchery was recorded, the latter using Serjeantson's (1996, 195–200) zones. This will be especially useful when assessing diachronic butchery patterns and in discussions regarding the acculturation of the indigenous population.

Quantification

Three methods of quantification were used to compare the frequencies of the main taxa/taxonomic groups. These methods mirror those used in the earlier reports to make results directly comparable between the hillfort (Grant 1984), DEP (Hamilton 2000a, 2000c, 2000d, 2000e, 2000f; Roncaglia and Grant 2000) and other DERP (Vol. 2 parts 2–6) assemblages.

Number of Identified Fragments

All fragments identified to species were included in the Number of Identified Fragments (NIF) count; 'classified' vertebrae and ribs have been excluded. NIF equates to Number of Identified Specimens/Skeletal Parts (NISP). The fragmentation of specimens was recorded following the zoning system devised by Cohen and Serjeantson (1996, 109–12) and Serjeantson (1996, 195–200); each element has up to eight zones for which the presence (>50%) or absence is recorded.

Epiphyses Only

The epiphysis only (EO) method is described in Grant (1975, 379). In summary, it only includes bones with part of an epiphysis or diaphysis (shaft) fusion surface present, plus mandibles with at least one tooth. Whole bones, except phalanges, are counted twice, once for each epiphysis. Skull fragments, carpals, patella, tarsals, third phalange, sacrum, vertebrae and ribs are excluded.

Minimum Number of Individuals

Minimum Number of Individuals (MNI) was calculated for whole phases following the methodology used by Hamilton (2000b, 75, pers. comm.) for the DEP sites. MNI for individual anatomical elements equates to Minimum Number of Elements (MNE). For the long bones, MNI was calculated from the greater number of left or right ends for each element taking into account fusion. Foetal/neonatal and juvenile bones were treated separately and added to produce a total long bone MNI. A range of methods were used to calculate MNI from mandibles (see Table 7); the greater number of Zone 1 (area of symphysis) or Zone 8 (jaw articulation) taking into account side; the number of mandibles with teeth *in situ* taking into account wear stage and side; the number of mandibular deciduous fourth premolars (dP_4) and third molars (M_3), *in situ* or isolated taking into account side. The overall MNI was the highest element MNE.

Skeletal representation for the main species (sheep/goat, cattle, pig, equid and dog) was calculated using the same method as Grant (1984, 498–500). The percentage for each element is calculated relative to the most common element and corrections are made when there are fewer than two particular bones per skeleton; dog metapodials divided by four, equid phalanges divided by two and cattle/sheep/pig phalanges divided by four.

Ageing

Tooth eruption and wear

Tooth wear was recorded for mandibular teeth *in situ* and isolated: dP_4, permanent fourth premolar (P_4), first molar (M_1), second molar (M_2) and M_3. Tooth eruption and wear for cattle and pig were recorded and 'Mandible Wear Stages' (MWS) assigned using Grant (1982). Payne (1973, 1987) was used for recording eruption and wear stage and assigning age for sheep/goat.

Post-cranial epiphyseal fusion

Epiphyseal fusion stages were recorded and ages assigned using Silver (1969). The fusion stages for mammalian long bones were recorded as 'unfused', 'fusing' and 'fused'. A bone was recorded as 'fusing' when spicules had formed between the shaft and epiphyses with open spaces still present and 'fused' when the line of fusion was closed (Albarella and Davis 1996, 5). Specimens were also classed as 'foetal/neonatal' and 'juvenile' where pertinent to provide greater resolution.

The data in the epiphyseal fusion tables show figures that have been 'minimized' following the method used in the DEP reports, Hamilton (2000a, 75–6) for instance; the greater number of either unfused epiphyses or number of corresponding shaft fusion surfaces taking side into account.

Discrepancies between tooth eruption and wear and the post-cranial epiphyseal fusion data are the result of small datasets and taphonomic factors, including recovery. Immature mandibles are especially prone to greater levels of post-depositional destruction (Munson 2000; Munson and Garniewicz 2003).

Sexing

An attempt was made to sex the pelvis of the main domesticates using Grigson (1982). Domestic fowl (chicken) was sexed on the tarsometatarsus using the presence of spurs and spur-scars. This is not always a reliable indicator because hens also occasionally develop spurs (see Sadler 1991; West 1985). No attempt was made to sex (and age) the horncores of cattle and sheep/goat.

Measurements

Measurements were taken following the standards of von den Driesch (1976). The standardized method allows for the measurements to be compatible with animal bone measurements from the hillfort (Grant 1984, microfiche 16:A3–17:E8) and DEP assemblages, Hamilton (2000a, microfiche 14:B1–D11) for instance, in addition to other Iron Age and Romano-British datasets. The extra measurements to distinguish domestic pig and wild boar are described in Payne and Bull (1988). Additional measurements (BatF, 1, 2, 3, 4, 5, 6, a and b) were taken for cattle, sheep/goat and deer using Davis (1992). Skeletally immature specimens were not measured because to do so would introduce a bias into the dataset. The dimensions of a bone when burnt alter so they were excluded also (see Davis 1987a, 26).

Withers heights for dog were calculated using the factors of Harcourt (1974) and von den Driesch and Boessneck (1974), and for equid using May (1985).

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6.2 A**ppendix 2: measurements**

Taxa codes

OVA	Sheep (*Ovis aries*)
CAH	Goat (*Capra hircus*)
O	Sheep (*O. aries*)/goat (*C. hircus*)
B	Cattle (*Bos taurus*)
BOP?	Aurochs? (cf. *B. primigenius*)
EQC	Horse (*Equus caballus*)
EQ	Equid (*Equus* sp.)
CAF	Dog (*Canis familiaris*)
CAF?	Dog? (cf. *Canis familiaris*)
VUV?	Ref fox? (cf. *Vules vulpes*)
GAG	Chicken (*Gallus gallus*)
GN	Chicken (*G. gallus*)/Guinea fowl (*Numida meleagris*)
GP	Chicken (*G. gallus*)/pheasant (*Phasianus colchicus*)
GNP	Chicken (*G. gallus*)/Guinea fowl (*N. meleagris*)/pheasant (*P. colchicus*)

Sheep/goat

FOURTH DECIDUOUS PREMOLAR

Phase	Context number	Taxa	Bone ID	W	Comments
EIA	HD P392 (1)	OVA	3397	5.8	
LIA	HD P399 (2)	OVA	3291	6.4	
LIA	HD P399 (1)	OVA	3343	7.0	
LIA	HD F511/2 (1)	OVA	3451	5.8	
LIA	HD F511/6 (1)	OVA	3488	6.2	
LIA	HD F516/2 (1)	OVA	3620	5.8	
LIA	HD F516 (1)	OVA	3642	5.6	
LIA	HD F515/6 (1)	OVA	3723	5.4	
LIA	HD F513/4 (2)	OVA	3729	6.3	
ERB	HD 302	OVA	4535	6.2	Articulated; ID 4534-8 (SK & MDs); left
ERB	HD 302	OVA	4536	6.1	Articulated; ID 4534-8 (SK & MDs); right
ERB	HD 302	OVA	4549	6.2	
LRB	HD 291	OVA	4141	6.0	
LRB	HD 285	OVA	4220	6.5	
LRB	HD 285	OVA	4226	5.9	
LRB	HD 285	OVA	4279	6.0	
LRB	HD 286	OVA	4353	6.5	
LRB	HD 316	OVA	4409	6.0	
LRB	HD 325	OVA	4578	6.5	
LRB	HD 326	OVA	4595	6.3	
LRB	HD 322	OVA	4628	6.9	
Na	HD F546 (1)	OVA	3784	6.3	

FIRST MOLAR

Phase	Context number	Taxa	Bone ID	W
EIA	HD P392 (1)	OVA	3397	6.4
EIA	HD P392 (1)	OVA	3398	6.8
LIA	HD P399 (2)	OVA	3291	7.1
LIA	HD F511/2 (1)	OVA	3451	6.4
LIA	HD F511/18 (1)	OVA	3470	6.0
LIA	HD F511/6 (1)	OVA	3488	6.9
LIA	HD F511/6 (1)	OVA	3489	6.4
LIA	HD F511 +	OVA	3574	6.9
LIA	HD F515/4 (2)	OVA	3592	6.6
LIA	HD F515/3 (1)	OVA	3624	7.0
LIA	HD F513/4 (1)	OVA	3703	7.2
LIA	HD F513/4 (2)	OVA	3729	7.2
ERB	HD F584 (1)	OVA	3922	6.8
LRB	HD 291	OVA	4141	6.9
LRB	HD 285	OVA	4225	7.1
LRB	HD 285	OVA	4227	7.4
LRB	HD 286	OVA	4353	6.5
LRB	HD 286	OVA	4354	6.4
LRB	HD 308	OVA	4440	7.4
LRB	HD 312	OVA	4458	7.8
LRB	HD 314	OVA	4482	7.2
LRB	HD 325	OVA	4579	7.0
LRB	HD 326	OVA	4595	7.0

LRB	HD 322	OVA	4628	8.2
na	HD F456 (2)	OVA	3440	6.6
na	HD F546 (1)	OVA	3784	6.8
na	HD F546 (1)	O	3785	6.5
na	HD F547 (1)	OVA	3818	7.0
na	HD F548 (2)	OVA	3893	7.4

SECOND MOLAR

Phase	Context number	Taxa	Bone ID	W
EIA	HD P392 (1)	OVA	3397	7.0
LIA	HD F511/2 (1)	OVA	3451	7.4
LIA	HD F511/18 (1)	OVA	3470	6.9
LIA	HD F511/6 (1)	OVA	3488	6.9
LIA	HD F511/6 (1)	OVA	3489	7.1
LIA	HD F511 +	OVA	3574	7.7
LIA	HD F515/4 (2)	OVA	3592	7.4
LIA	HD F515/3 (1)	OVA	3624	7.5
LIA	HD F513/4 (1)	OVA	3703	7.3
ERB	HD F604 (1)	OVA	3996	7.5
LRB	HD 285	OVA	4221	8.1
LRB	HD 286	OVA	4354	7.1
LRB	HD 300	OVA	4412	7.5
LRB	HD 308	OVA	4440	8.1
LRB	HD 312	OVA	4455	8.2
LRB	HD 312	OVA	4457	8.3
LRB	HD 312	OVA	4458	8.7
LRB	HD 314	OVA	4482	7.8
LRB	HD 324	OVA	4571	7.2
LRB	HD 325	OVA	4579	7.6
LRB	HD 322	OVA	4629	7.8
na	HD F456 (2)	OVA	3440	7.0
na	HD F546 (1)	O	3785	6.8
na	HD F546 (1)	OVA	3786	7.4
na	HD F547 (1)	OVA	3818	7.5
na	HD F549 (1)	OVA	3909	7.5

THIRD MOLAR

Phase	Context number	Taxa	Bone ID	W
EIA	HD P392 (2)	O	3367	7.6
EIA	HD P392 (2)	O	3368	7.7
EIA	HD P392 (2)	O	3369	7.9
LIA	HD P399 (2)	O	3294	8.5
LIA	HD F511/18 (1)	OVA	3470	7.4
LIA	HD F511/8 (1)	O	3503	8.1
LIA	HD F511 +	O	3573	7.9
LIA	HD F511 +	OVA	3574	7.9
LIA	HD F515/4 (2)	OVA	3592	7.8
LIA	HD F515/3 (1)	OVA	3624	8.0
LIA	HD F513/6 (1)	O	3677	7.5
LIA	HD F513/4 (1)	OVA	3703	7.5
LIA	HD F515/6 (1)	O	3724	7.5
ERB	HD F554 (2)	O	3898	8.7
ERB	HD F604 (1)	OVA	3996	7.5
ERB	HD F595 (1)	O	4036	7.6
ERB	HD 302 (1923)	O	4513	8.6
LRB	HD 291	O	4145	7.3
LRB	HD 291	O	4152	7.6
LRB	HD 285	O	4281	7.4
LRB	HD 285	O	4285	7.8
LRB	HD 300	OVA	4412	8.3
LRB	HD 312	OVA	4455	8.6
LRB	HD 312	OVA	4457	8.5
LRB	HD 314	OVA	4482	8.0
LRB	HD 314	O	4483	7.3
LRB	HD 324	OVA	4571	7.6
LRB	HD 322	O	4626	7.6
LRB	HD 322	OVA	4629	8.2
na	HD F546 (1)	OVA	3786	7.2
na	HD F547 (1)	OVA	3818	7.9
na	HD F548 (1)	O	3877	8.4
na	HD F548 (2)	O	3892	7.6
na	HD F549 (1)	OVA	3909	7.9

SCAPULA

Phase	Context number	Taxa	Bone ID	SLC
LRB	HD 294	O	4452	17.6
LRB	HD 312	O	4465	17.4

HUMERUS

Phase	Context number	Taxa	Bone ID	BT	HT	HTC
LIA	HD P399 (2)	OVA	3296	24.6	15.6	12.0
LIA	HD P399 (2)	OVA	3297	24.4	16.1	12.6
LIA	HD F511/8 (1)	OVA	3526	28.5	17.8	14.0
LRB	HD 285	OVA	4286	25.9	17.3	12.8

RADIUS

Phase	Context number	Taxa	Bone ID	Bp
EIA	HD P392 (1)	O	3403	26.0

METACARPAL

Phase	Context number	Taxa	Bone ID	GL	SD	Bp	BatF	Bd	1	2	3	4	5	6	a	b
LIA	HD F516 (1)	OVA	3648	113.2	10.5	18.2		21.3				9.0	13.6	12.1	10.0	9.7
LRB	HD 291	OVA	4160			19.9										
LRB	HD 312	OVA	4471				25.7	26.0	10.8	16.2	14.1	10.6	15.9	14.2	11.9	11.9
LRB	HD 326	O	4594				59.1	65.7								
LRB	HD 322	OVA	4640	113.6	10.7	18.4	20.4	20.4	9.3		11.7	8.9	13.2	12.0	9.2	9.4

PELVIS

Phase	Context number	Taxa	Bone ID	LA
LIA	HD F513/6 (1)	O	3678	23.7

TIBIA

Phase	Context number	Taxa	Bone ID	Bd	Dd
ERB	HD 302 (1923)	OVA	4515	25.9	19.1
LRB	HD 291	OVA	4167	22.7	17.1
LRB	HD 291	O	4168	21.1	16.5
LRB	HD 291	OVA	4169	23.4	18.6

ASTRAGALUS

Phase	Context number	Taxa	Bone ID	GLl	GLm	Dl	Bd
EIA	HD F603/3 (2)	OVA	4025	24.4	23.7	13.4	15.5
LIA	HD F516 (1)	OVA	3655	26.4	25.3	14.5	
LIA	HD F516 (1)	OVA	3656	25.7	25.0	14.0	16.1

Cattle

FOURTH DECIDUOUS PREMOLAR

Phase	Context number	Bone ID	W
LIA	HD F511/6 (2)	3547	14.0
LIA	HD F511 +	3567	13.1

FIRST MOLAR

Phase	Context number	Bone ID	W
LIA	HD F511/8 (1)	3501	13.5
LIA	HD F511/8 (1)	3506	14.9
LIA	HD F511/8 (1)	3507	14.4
LIA	HD F511/6 (2)	3547	15.1
LRB	HD 323	4667	14.0

SECOND MOLAR

Phase	Context number	Bone ID	W
LIA	HD F511/8 (1)	3501	15.3
LIA	HD F511/8 (1)	3506	15.5
LIA	HD F511/6 (2)	3547	14.2
LRB	HD 308	4445	15.3
LRB	HD 323	4667	15.3

THIRD MOLAR

Phase	Context number	Bone ID	L	W
EIA	HD P392 (2)	3353		15.9
LIA	HD F511/2 (1)	3447	38.1	15.9
LIA	HD F511/6 (1)	3473	37.9	15.2
LIA	HD F511/8 (1)	3501	33.3	16.0
LIA	HD F511/8 (1)	3506	35.0	14.9
LIA	HD F515/4 (1)	3602	35.3	16.0
LRB	HD 285	4197	34.5	15.4
LRB	HD 285	4198		14.9
LRB	HD 308	4445	36.7	15.8
LRB	HD 323	4667	36.4	15.7
Na	HD Ph928 (1)	4087	37.3	16.0

HORNCORE

Phase	Context number	Bone ID	45	46	Comments
ERB	HD F584 (1)	3915	53.7	30.8	Left
ERB	HD F584 (1)	3915	54.7	32.3	Right
ERB	HD F604 (1)	3990	44.1	33.9	Left
ERB	HD F604 (1)	3990	45.0	34.3	Right
Na	HD F547 (1)	3823	43.7	35.3	

SCAPULA

Phase	Context number	Bone ID	SLC
LIA	HD F511/6 (2)	3548	47.5
LIA	HD F615 (3)	4004	52.6
ERB	HD F584 (1)	3916	51.2
ERB	HD F604 (1)	3993	58.4
ERB	HD 302	4528	45.1
LRB	HD 291	4120	42.7
Na	HD F546 (1)	3777	52.4
Na	HD F547 (1)	3829	48.9

HUMERUS

Phase	Context number	Bone ID	BT	HT	HTC
LIA	HD F511/12 (1)	3456		38.8	30.3
LIA	HD F511/12 (1)	3457	60.5		29.9

LIA	HD F511 +	3570	62.6		26.7	
LIA	HD F516 (1)	3638	69.5	41.4	31.1	
ERB	HD P396 (1)	3331	66.4	45.1	32.3	
LRB	HD 285	4260	62.2	42.2	31.9	

RADIUS

Phase	Context number	Bone ID	Bp	BFp	Bd	BFd
LIA	HD F511/16 (1)	3429		60.3		
LIA	HD F511/2 (1)	3448	81.3	75.8		
LIA	HD F511/8 (1)	3512	68.3	62.4		
LIA	HD F513/4 (1)	3697	83.8	75.3		
LRB	HD F517/1 (2)	3798			70.7	64.5
LRB	HD 285	4261	68.7	62.7		
Na	HD F547 (1)	3830	85.3	77.2		

METACARPAL

Phase	Context number	Bone ID	Bp	BatF	Bd	1	2	3	4	5	6	a	b
EIA	HD P392 (1)	3388							20.2	27.2	25.0		
LIA	HD F511/4 (1)	3583	52.8										
LIA	HD F515/1 (2)	3599	50.1										
LRB	HD 291	4126	54.2										
LRB	HD 285	4262	49.2										
LRB	HD 322	4603	52.7										
LRB	HD 322	4604	49.2										
Na	HD F547 (1)	3832		57.4	65.5	24.4	32.2	29.0	23.1	31.4	28.9	31.1	31.4
Na	HD Ph942 (1)	4065		47.2	51.1	21.5	28.2	25.1	20.2	27.5	25.3	24.3	24.1

TIBIA

Phase	Context number	Bone ID	Bd	Dd
EIA	HD P392 (1)	3391	62.4	44.2
LIA	HD F511/6 (2)	3557		43.6
LRB	HD 286	4346	53.6	41.3
LRB	HD 324	4570	61.5	46.1
Na	HD F456 (3)	3443	64.4	49.4
Na	HD 292	4129	53.4	40.7

ASTRAGALUS

Phase	Context number	Bone ID	GLl	GLm	Dl	Bd	Comments
LIA	HD F511/6 (1)	3481	52.4	47.0	30.3	33.3	
LIA	HD F511/8 (1)	3520			34.1		
LIA	HD F511/6 (2)	3558	60.1	53.4	34.2	39.3	
LIA	HD F515/6 (1)	3720		51.5			
LRB	HD 285	4207	66.4	60.9	36.0	41.0	
LRB	HD 285	4265	55.3	50.2	29.5	33.5	
LRB	HD 285	4266	55.5	50.2	29.2	33.8	
LRB	HD 322	4610	58.4	52.1	32.7	38.5	
Na	HD F547 (1)	3838	66.4	60.1	36.4	44.6	Articulated; ID 3838-9 (NC)

CALCANEUM

Phase	Context number	Bone ID	C	C+D
Na	HD F547 (1)	3843	49.7	28.2

Pig

FOURTH DECIDUOUS PREMOLAR

Phase	Context number	Bone ID	L	WP
Na	HD F549 (1)	3913		8.5
Na	HD Ph957 (1)	4057	19.3	8.7

FIRST MOLAR

Phase	Context number	Bone ID	WA	WP
LRB	HD 324	4573		11.2
LRB	HD 323	4674	10.1	
LRB	HD 323	4679	9.7	10.7

SECOND MOLAR

Phase	Context number	Bone ID	WA	WP
LIA	HD F516 (1)	3658	12.9	14.1
LRB	HD 324	4573	13.4	13.7
LRB	HD 323	4674	13.4	14.1
LRB	HD 323	4679	12.6	
LRB	HD 323	4680	12.9	13.3

THIRD MOLAR

Phase	Context number	Bone ID	L	WA	WC
LIA	HD F511/8 (1)	3535	34.0	14.1	11.3
LIA	HD F511/8 (1)	3536	30.9	14.4	10.9
LIA	HD F515/4 (2)	3593	31.0	14.4	10.5
LIA	HD F515/5 (2)	3617	33.5	13.6	10.9
LRB	HD 285	4338	31.1	15.0	10.4
LRB	HD 308	4449		14.9	
LRB	HD 312	4477		15.8	
LRB	HD 324	4573		14.5	

HUMERUS

Phase	Context number	Bone ID	BT	HT	HTC
LIA	HD F515/4 (2)	3595	31.4	27.0	17.4

PELVIS

Phase	Context number	Bone ID	LA
LIA	HD F511/8 (1)	3539	33.0

ASTRAGALUS

Phase	Context number	Bone ID	GLl	GLm
ERB	HD F604 (1)	4000	41.5	38.6

Equid

THIRD PREMOLAR

Phase	Context number	Taxa	Bone ID	Wa
LIA	HD F513/6 (1)	EQC	3682	12.7

FOURTH PREMOLAR

Phase	Context number	Taxa	Bone ID	Wa
LIA	HD F513/6 (1)	EQC	3682	13.9

FIRST MOLAR

Phase	Context number	Taxa	Bone ID	Wa	Wd
LIA	HD F513/6 (1)	EQC	3682	13.9	4.1

SECOND MOLAR

Phase	Context number	Taxa	Bone ID	Wa	Wd
LIA	HD F513/6 (1)	EQC	3682	12.2	3.4

HUMERUS

Phase	Context number	Taxa	Bone ID	BT	HT	HTC
LIA	HD F513/6 (1)	EQ	3683	63.7	45.3	31.1
Na	HD F546 (1)	EQ	3793		48.0	34.2

RADIUS

Phase	Context number	Taxa	Bone ID	Bd
Na	HD F549 (1)	EQ	3905	69.6

METACARPAL

Phase	Context number	Taxa	Bone ID	Bp	Dp
EIA	HD P392 (1)	EQ	3407	43.9	28.4
LRB	HD 291	EQ	4175	45.3	29.3
LRB	HD 285	EQ	4251	48.4	

TIBIA

Phase	Context number	Taxa	Bone ID	GL	SD	Bd	Dd
LIA	HD F516 (1)	EQ	3659	296.7	32.1	61.6	41.4
Na	HD F547 (1)	EQ	3814			68.7	44.6

ASTRAGALUS

Phase	Context number	Taxa	Bone ID	GH	LmT	GB	BFd
LRB	HD F517/1 (2)	EQ	3806	57.8	57.4	57.7	49.8

METATARSAL

Phase	Context number	Taxa	Bone ID	Bp	Dd
LIA	HD F516 (1)	EQ	3660		33.8
LRB	HD 285	EQ	4250	31.4	
LRB	HD 322	EQ	4662	35.5	
Na	HD F549 (1)	EQ	3906		35.1

FIRST PHALANGE

Phase	Context number	Taxa	Bone ID	GL	SD	Bp	BFp	Dp	Bd
LRB	HD 322	EQ	4663	67.4	27.0	44.6	41.7	28.7	37.2

Dog

SKULL

Phase	Context number	Taxa	Bone ID	1	8	30	36
LRB	HD F517/3 (2)	CAF	3773	222.0	110.8	120.1	44.9

FIRST MOLAR

Phase	Context number	Taxa	Bone ID	L	W	Comments
LRB	HD F517/2 (1)	CAF	3771	22.0	8.9	
LRB	HD 286	CAF	4365	21.3	8.6	
Na	HD 284	CAF	4398	19.2	8.2	Articulated; ID 4396-401 (SK & MDs)

HUMERUS

Phase	Context number	Taxa	Bone ID	Bd	Comments
Na	HD F549 (5)	CAF?	3927	20.6	Skeleton; ID 3924-86

RADIUS

Phase	Context number	Taxa	Bone ID	Bp	Comments
Na	HD F549 (5)	CAF?	3928	11.0	Skeleton; ID 3924-86

SECOND METACARPAL

Phase	Context number	Taxa	Bone ID	GL	Bd	Comments
LIA	HD F511/16 (1)	CAF	3433	51.9	8.8	Articulated; ID 3433 (MC2-4)

THIRD METACARPAL

Phase	Context number	Taxa	Bone ID	GL	Bd	Comments
LIA	HD F511/16 (1)	CAF	3434	60.2	8.7	Articulated; ID 3433 (MC2-4)

FOURTH METACARPAL

Phase	Context number	Taxa	Bone ID	GL	Bd	Comments
LIA	HD F511/16 (1)	CAF	3435	59.9	8.5	Articulated; ID 3433 (MC2-4)

PELVIS

Phase	Context number	Taxa	Bone ID	LA	Comments
Na	HD F549 (5)	CAF?	3930	13.9	Skeleton; ID 3924-86; left
Na	HD F549 (5)	CAF?	3931	14.1	Skeleton; ID 3924-86; right

FEMUR

Phase	Context number	Taxa	Bone ID	GL	GLC	SD	Bd	Comments
Na	HD F549 (5)	CAF?	3932	117.3	118.9	8.7	19.9	Skeleton; ID 3924-86

CALCANEUM

Phase	Context number	Taxa	Bone ID	GL	Comments
Na	HD F549 (5)	CAF?	3936	29.1	Skeleton; ID 3924-86

SECOND METATARSAL

Phase	Context number	Taxa	Bone ID	GL	Comments
Na	HD F549 (5)	CAF?	3940	52.7	Skeleton; ID 3924-86

THIRD METATARSAL

Phase	Context number	Taxa	Bone ID	GL	Bd	Comments
Na	HD F549 (5)	CAF?	3939	57.7	5.8	Skeleton; ID 3924-86

FOURTH METATARSAL

Phase	Context number	Taxa	Bone ID	GL	Bd	Comments
Na	HD F549 (5)	CAF?	3938	58.4	5.4	Skeleton; ID 3924-86; left
Na	HD F549 (5)	CAF?	3942	57.9	5.2	Skeleton; ID 3924-86; right

FIFTH METATARSAL

Phase	Context number	Taxa	Bone ID	GL	Bd	Comments
Na	HD F549 (5)	CAF?	3937	54.3	5.9	Skeleton; ID 3924-86; left
Na	HD F549 (5)	CAF?	3943		6.0	Skeleton; ID 3924-86; right

Domestic fowl

CORACOID

Phase	Context number	Taxa	Bone ID	GL	Lm	BF
LRB	HD F595 (2)	GNP	4034	45.2	43.4	10.1

HUMERUS

Phase	Context number	Taxa	Bone ID	GL	SC	Bp	Bd
LRB	HD 327	GNP	4587	63.1	6.0	17.3	14.1

RADIUS

Phase	Context number	Taxa	Bone ID	GL
LRB	HD 334	GNP	4574	56.1

ULNA

Phase	Context number	Taxa	Bone ID	GL	SC	Bp
LRB	HD 334	GNP	4575	62.1	4.3	8.7

CARPOMETACARPUS

Phase	Context number	Taxa	Bone ID	GL	L	Bp	Did
LRB	HD 334	GP	4576	34.0	31.8	10.7	6.7

FEMUR

Phase	Context number	Taxa	Bone ID	Bp	Dp	Bd	Dd
ERB	HD F554 (3)	GNP	3863			14.4	12.5
LRB	HD 335	GN	4563	13.7	9.1		

TIBIOTARSUS

Phase	Context number	Taxa	Bone ID	GL	La	SC	Dip	Bd	Dd
LRB	HD 325	GNP	4581	100.0	97.2	5.6	17.4	10.1	10.5

6.3 **Appendix 3: mandibular tooth eruption and wear**

Taxa codes

OVA	Sheep (*Ovis aries*)
CAH	Goat (*Capra hircus*)
O	Sheep (*O. aries*)/goat (*C. hircus*)

Element codes

dP4	Deciduous fourth premolar
P4	Fourth premolar
M1	First molar
M2	Second molar
M3	Third molar
M12	First OR second molar

Sheep/goat

Phase	Context number	Bone ID	Taxa	dP4	P4	M1	M2	M3	M12	Articulated
EIA	HD P392 (2)	3363	O						9A	
EIA	HD P392 (2)	3364	O						9A	
EIA	HD P392 (2)	3365	O						10A	
EIA	HD P392 (2)	3366	O						9A	
EIA	HD P392 (2)	3367	O					4A		
EIA	HD P392 (2)	3368	O					5A		
EIA	HD P392 (2)	3369	O					11G		
EIA	HD P392 (1)	3397	OVA	16L		8A	2A			
EIA	HD P392 (1)	3398	OVA			6A				
EIA	HD P392 (1)	3401	O						6A	
EIA	HD F603/1 (2)	4020	O						5A	
EIA	HD F603/1 (2)	4021	O						5A	
LIA	HD P399 (2)	3291	OVA	14L		9A				
LIA	HD P399 (2)	3292	O						8A	
LIA	HD P399 (2)	3293	O						2A	
LIA	HD P399 (2)	3294	O					11G		
LIA	HD P399 (1)	3343	OVA	13L		E				
LIA	HD F511/16 (1)	3431	O						6A	
LIA	HD F511/2 (1)	3451	OVA	17L		9A	6A			
LIA	HD F511/12 (1)	3463	O						5A	
LIA	HD F511/18 (1)	3470	OVA		15A	14A	9A	11G		
LIA	HD F511/6 (1)	3488	OVA	14L		8A	5A			
LIA	HD F511/6 (1)	3489	OVA		15A	11B	9A			
LIA	HD F511/8 (1)	3503	O					11G		
LIA	HD F511/8 (1)	3523	O						9A	
LIA	HD F511/8 (1)	3524	O						8A	
LIA	HD F511 +	3573	O					8G		
LIA	HD F511 +	3574	OVA		9A	9A	9A	8G		
LIA	HD F515/4 (2)	3592	OVA			9A	9A	9G		
LIA	HD F515/3 (1)	3624	OVA		12S	10A	9A	11G		
LIA	HD F515/3 (1)	3625	O						4A	
LIA	HD F516 (1)	3643	O						7A	
LIA	HD F516 (1)	3644	O						0	
LIA	HD F513/6 (1)	3675	O		15A					
LIA	HD F513/6 (1)	3676	O						7A	
LIA	HD F513/4 (1)	3703	OVA			9A	9A	5A		
LIA	HD F513/8 (1)	3712	O						9A	
LIA	HD F515/6 (1)	3724	O					11G		
LIA	HD F513/4 (2)	3729	OVA	14L		7A	E			
LIA	HD F513/4 (2)	3730	O						9A	
LIA	HD F544 (1)	3747	O						7A	
LIA	HD F615 (3)	4009	O						B	
ERB	HD F575 (1)	3859	O						5A	
ERB	HD F554 (2)	3897	O						9A	
ERB	HD F554 (2)	3898	O					6G		
ERB	HD F584 (1)	3921	O						5A	
ERB	HD F584 (1)	3922	OVA		9A	9A				
ERB	HD F604 (1)	3996	OVA				9A	9G		
ERB	HD F604 (1)	3997	O						7A	
ERB	HD F595 (1)	4036	O					2A		

ERB	HD 302 (1923)	4511	O						3C	
ERB	HD 302 (1923)	4512	O						9A	
ERB	HD 302 (1923)	4513	O					9G		
ERB	HD 302	4535	OVA	16L		6A	C			Y
ERB	HD 302	4536	OVA	14L		6A	C			Y
ERB	HD 302	4545	O						7A	
ERB	HD 302	4546	O						8A	
ERB	HD 302	4547	O						9A	
ERB	HD 302	4548	O						9A	
ERB	HD 302	4550	O						9A	
ERB	HD 302	4551	O						9A	
ERB	HD 302	4552	O						9A	
LRB	HD F517/2 (1)	3764	O						9A	
LRB	HD F517/2 (1)	3765	O						9A	
LRB	HD F517/1 (2)	3801	O						9A	
LRB	HD F517/1 (2)	3802	O						6A	
LRB	HD 291	4141	OVA	16L		6A				
LRB	HD 291	4142	O						7A	
LRB	HD 291	4143	O						9A	
LRB	HD 291	4144	O						9A	
LRB	HD 291	4145	O					11G		
LRB	HD 291	4146	O						9A	
LRB	HD 291	4147	O						6A	
LRB	HD 291	4148	O						9A	
LRB	HD 291	4149	O						8A	
LRB	HD 291	4150	O						7A	
LRB	HD 291	4151	O						3A	
LRB	HD 291	4152	O					9G		
LRB	HD 285	4221	OVA				8A	10G		
LRB	HD 285	4222	O						8A	
LRB	HD 285	4223	O						8B	
LRB	HD 285	4225	OVA			9A				
LRB	HD 285	4226	OVA	13L			V			
LRB	HD 285	4227	OVA		11S	9A				
LRB	HD 285	4228	O						9A	
LRB	HD 285	4229	O						9A	
LRB	HD 285	4230	O						9A	
LRB	HD 285	4231	O						7A	
LRB	HD 285	4280	O						5A	
LRB	HD 285	4281	O					9G		
LRB	HD 285	4284	O						7A	
LRB	HD 285	4285	O					7G		
LRB	HD 286	4353	OVA	16L		2A	0			
LRB	HD 286	4354	OVA			8A	5A			
LRB	HD 286	4355	O						7A	
LRB	HD 300	4412	OVA		8B	9A	8B	6G		
LRB	HD 308	4440	OVA	17L		9A	7A			
LRB	HD 308	4441	O					4A		
LRB	HD 312	4455	OVA		12S	12A	9A	11G		
LRB	HD 312	4456	OVA			9A	9A			
LRB	HD 312	4457	OVA		12S	13B	9A	11G		
LRB	HD 312	4458	OVA		9A	9A	9A			
LRB	HD 312	4462	O		9A					
LRB	HD 312	4463	O						9A	
LRB	HD 314	4482	OVA		9A	9A	8A	4A		
LRB	HD 314	4483	O					6A		
LRB	HD 324	4571	OVA				8A	2A		
LRB	HD 325	4579	OVA			9A	6A			
LRB	HD 326	4595	OVA	16L		8A	0			
LRB	HD 322	4621	O						8A	
LRB	HD 322	4622	O						9A	
LRB	HD 322	4623	O						7A	
LRB	HD 322	4624	O						7A	
LRB	HD 322	4625	O						9A	
LRB	HD 322	4626	O					8G		
LRB	HD 322	4627	O					11G		
LRB	HD 322	4628	OVA	14L		6A				
LRB	HD 322	4629	OVA		14S	15A	9A	11G		
LRB	HD 322	4630	O						9A	
LRB	HD 322	4631	O						9A	
LRB	HD 323	4669	OVA		7A					
na	HD F456 (2)	3440	OVA		9A	9A	8A			
na	HD F546 (1)	3784	OVA	16L		8A				
na	HD F546 (1)	3785	O			14A	9A			
na	HD F546 (1)	3786	OVA				6A	6A		
na	HD F546 (1)	3787	O						8A	
na	HD F547 (1)	3818	OVA		12S	9A	9A	10G		
na	HD F549 (2)	3855	O						9A	
na	HD F548 (1)	3874	OVA		14S	12A	9A	11G		
na	HD F548 (1)	3877	O					9G		
na	HD F556 (3)	3887	O						6A	
na	HD F548 (2)	3892	O					3C		
na	HD F548 (2)	3893	OVA		11S	9A				
na	HD F549 (1)	3909	OVA				12A	11G		
na	HD F548 (1)	3923	O						8A	
na	HD F616 (1)	4042	O						7A	
na	HD Ph941 (1)	4077	O						9A	
na	HD Ph950 (2)	4100	O						0	
na	HD 282	4107	O						9A	

na	HD 282	4108	O					6A
na	HD 284	4381	O					7A
na	HD 284	4382	O					12A
na	HD 292	4435	O					9A
na	HD 293 +	4499	O					4A

Cattle

Phase	Context number	Bone ID	dP4	P4	M1	M2	M3	M12
EIA	HD P392 (6)	3337						k
EIA	HD P392 (2)	3351						k
EIA	HD P392 (2)	3352						k
EIA	HD P392 (2)	3353					g	
EIA	HD F609/2 (1)	4040						l
LIA	HD P399 (2)	3283	a					
LIA	HD F511/10 (1)	3418						j
LIA	HD F511/2 (1)	3446						d
LIA	HD F511/2 (1)	3447					E	
LIA	HD F511/6 (1)	3473					g	
LIA	HD F511/6 (1)	3475						k
LIA	HD F511/8 (1)	3501			l	k	g	
LIA	HD F511/8 (1)	3506		g	l	k	g	
LIA	HD F511/8 (1)	3507		g	k			
LIA	HD F511/6 (2)	3547	j		g	b	V	
LIA	HD F511 +	3567	j					
LIA	HD F515/1 (2)	3597						k
LIA	HD F515/4 (1)	3602					e	
LIA	HD F515/3 (1)	3622						k
LIA	HD F515/6 (1)	3716						f
ERB	HD 302 (1923)	4505						j
ERB	HD 302	4527						a
LRB	HD 291	4118						l
LRB	HD 285	4197				l	j	
LRB	HD 285	4198					a	
LRB	HD 286	4343						b
LRB	HD 308	4445				f	c	
LRB	HD 322	4600	k					
LRB	HD 322	4601						f
LRB	HD 323	4667			k	k	g	
Na	HD F456 (2)	3437						k
Na	HD F546 (1)	3776						l
Na	HD Ph928 (1)	4087					j	

Pig

Phase	Context number	Bone ID	dP4	P4	M1	M2	M3	M12
LIA	HD F511/8 (1)	3535					d	
LIA	HD F511/8 (1)	3536					e	
LIA	HD F515/4 (2)	3593					e	
LIA	HD F515/5 (2)	3617					c	
LIA	HD F516 (1)	3658				f		
LIA	HD F515/2 (2)	3694						f
LIA	HD F513/10 (1)	3709					C	
LRB	HD 285	4315		b				
LRB	HD 285	4338					e	
LRB	HD 308	4449					c	
LRB	HD 312	4477					b	
LRB	HD 324	4573		c	g	d	E	
LRB	HD 323	4674		b	e	d		
LRB	HD 323	4679		b	d	c		
LRB	HD 323	4680		e	m	j	c	
Na	HD F549 (1)	3913	j					
Na	HD Ph957 (1)	4057	e					
Na	HD Ph919 (1)	4103		f				
Na	HD 284	4392						j

6.4 **Tabulated data (Tables 1–19)**

Table 1. Numbers of fragments (NIF) for all cases by phase and feature type

Phase/	**EIA**						**EIA**		**LIA**				**LIA**		**ERB**										**ERB**	
Feature/	Pit		Ditch		Other		**Total**		Pit		Ditch		**Total**		Pit		Ditch		Structure		Well		Quarry		**Total**	
Taxa	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%
Cattle	26	*25.5*	3	*37.5*	5	*13.9*	34	*23.3*	3	*8.3*	129	*33.4*	132	*31.3*	2	*16.7*	2	*22.2*	1	*14.3*			32	*31.7*	37	*26.8*
Sheep	3	*2.9*			1	*2.8*	4	*2.7*	4	*11.1*	18	*4.7*	22	*5.2*									8	*7.9*	8	*5.8*
Sheep/Goat	39	*38.2*	3	*37.5*	14	*38.9*	56	*38.4*	21	*58.3*	110	*28.5*	131	*31.0*	7	*58.3*			4	*57.1*	4	*44.4*	33	*32.7*	48	*34.8*
Pig	6	*5.9*			1	*2.8*	7	*4.8*	1	*2.8*	29	*7.5*	30	*7.1*							1	*11.1*	3	*3.0*	4	*2.9*
Horse											1	*0.3*	1	*0.2*												
Equid	9	*8.8*	1	*12.5*	1	*2.8*	11	*7.5*	1	*2.8*	22	*5.7*	23	*5.5*									7	*6.9*	7	*5.1*
Dog											9	*2.3*	9	*2.1*												
Dog?																										
Dog/Fox																										
Red deer																										
Hare																										
Chicken/Guinea fowl																										
Chicken/Pheasant																										
Chicken/Guinea fowl/Pheasant																					1	*11.1*			1	*0.7*
Aythyin					2	*5.6*	2	*1.4*																		
Corvid																										
Barn owl																										
Total identified	83		7		24		114		30		318		348		9		2		5		6		83		105	
Large mammal	8	*7.8*			6	*16.7*	14	*9.6*	2	*5.6*	36	*9.3*	38	*9.0*	1	*8.3*	2	*22.2*	1	*14.3*	1	*11.1*	6	*5.9*	11	*8.0*
Medium mammal	11	*10.8*	1	*12.5*	6	*16.7*	18	*12.3*	4	*11.1*	32	*8.3*	36	*8.5*	2	*16.7*	5	*55.6*	1	*14.3*	2	*22.2*	12	*11.9*	22	*15.9*
Total classified	19		1		12		32		6		68		74		3		7		2		3		18		33	
TOTAL	102		8		36		146		36		386		422		12		9		7		9		101		138	

Table 1 cont. Numbers of fragments (NIF) for all cases by phase and feature type

Phase/	**LRB**						**LRB**		**ND**	**TOTAL**	
Feature/	Ditch		Occupation		Demolition		**Total**				
Taxa	NIF	*%*	NIF	*%*	NIF	*%*	NIF	*%*	NIF	NIF	*%*
Cattle	4	*9.5*	89	*21.8*	10	*9.8*	103	*18.6*	66	372	*22.5*
Sheep		*0.0*	22	*5.4*	12	*11.8*	34	*6.1*	8	76	*4.6*
Sheep/Goat	20	*47.6*	182	*44.5*	38	*37.3*	240	*43.4*	109	584	*35.3*
Pig			29	*7.1*	14	*13.7*	43	*7.8*	31	115	*7.0*
Horse										1	*0.1*
Equid	6	*14.3*	28	*6.8*	2	*2.0*	36	*6.5*	13	90	*5.4*
Dog	2	*4.8*	5	*1.2*	1	*1.0*	8	*1.4*	8	25	*1.5*
Dog?									63	63	*3.8*
Dog/Fox									1	1	*0.1*
Red deer			1	*0.2*	2	*2.0*	3	*0.5*	2	5	*0.3*
Hare			1	*0.2*	3	*2.9*	4	*0.7*		4	*0.2*
Chicken/Guinea fowl			1	*0.2*			1	*0.2*		1	*0.1*
Chicken/Pheasant			1	*0.2*			1	*0.2*		1	*0.1*
Chicken/Guinea fowl/Pheasant			8	*2.0*	1	*1.0*	9	*1.6*	2	12	*0.7*
Aythyin										2	*0.1*
Corvid									1	1	*0.1*
Barn owl									1	1	*0.1*
Total identified	32		367		83		482		305	1354	
Large mammal	5	*11.9*	16	*3.9*	8	*7.8*	29	*5.2*	39	131	*7.9*
Medium mammal	5	*11.9*	26	*6.4*	11	*10.8*	42	*7.6*	50	168	*10.2*
Total classified	10		42		19		71		89	299	
TOTAL	42		409		102		553		394	1653	

Table 2. Surface preservation and root etching by phase and feature type

EIA	Poor	%	Moderate	%	Good	%	Yes	%	No	%	Total
Pit	5	*6.0*	74	*89.2*	4	*4.8*	6	*7.2*	77	*92.8*	83
Ditch	2	*28.6*	5	*71.4*			3	*42.9*	4	*57.1*	7
Other	1	*4.2*	21	*87.5*	2	*8.3*	3	*12.5*	21	*87.5*	24
Total	8	*7.0*	100	*87.7*	6	*5.3*	12	*10.5*	102	*89.5*	114

LIA	Poor	%	Moderate	%	Good	%	Yes	%	No	%	Total
Pit	4	*13.3*	19	*63.3*	7	*23.3*	5	*16.7*	25	*83.3*	30
Ditch	6	*1.9*	301	*94.7*	11	*3.5*	23	*7.2*	295	*92.8*	318
Total	10	*2.9*	320	*92.0*	18	*5.2*	28	*8.0*	320	*92.0*	348

ERB	Poor	%	Moderate	%	Good	%	Yes	%	No	%	Total
Pit	1	*11.1*	6	*66.7*	2	*22.2*	1	*11.1*	8	*88.9*	9
Ditch	2	*100.0*					1	*50.0*	1	*50.0*	2
Structure	4	*80.0*	1	*20.0*			2	*40.0*	3	*60.0*	5
Well	1	*16.7*	5	*83.3*					6	*100.0*	6
Quarry	11	*13.3*	65	*78.3*	7	*8.4*	26	*31.3*	57	*68.7*	83
Total	19	*18.1*	77	*73.3*	9	*8.6*	31	*29.5*	74	*70.5*	105

LRB	Poor	%	Moderate	%	Good	%	Yes	%	No	%	Total
Ditch	5	*15.6*	24	*75.0*	3	*9.4*	8	*25.0*	24	*75.0*	32
Occupation	58	*15.8*	302	*82.3*	7	*1.9*	123	*33.5*	244	*66.5*	367
Demolition	46	*55.4*	31	*37.3*	6	*7.2*	51	*61.4*	32	*38.6*	83
Total	109	*22.6*	357	*74.1*	16	*3.3*	182	*37.8*	300	*62.2*	482

Table 3. Butchery marks by phase and taxa, excluding isolated teeth

EIA	Cattle	%	Sheep/goat	%	Pig	%	Equid	%
Chopped								
Cut			1	*3.1*				
Sawn								
Shave marks								
Split axially								
Unbutchered	24	*100.0*	31	*96.9*	7	*100.0*	7	*100.0*
Total	24		32		7		7	

LIA	Cattle	%	Sheep/goat	%	Pig	%	Equid	%
Chopped	2	*1.9*	1	*1.3*	2	*9.5*		
Cut	9	*8.7*	7	*9.2*	1	*4.8*	2	*10.5*
Sawn								
Shave marks								
Split axially	1	*1.0*						
Unbutchered	91	*88.3*	68	*89.5*	18	*85.7*	17	*89.5*
Total	103		76		21		19	

ERB	Cattle	%	Sheep/goat	%	Pig	%	Equid	%
Chopped	1	*3.8*						
Cut								
Sawn								
Shave marks								
Split axially								
Unbutchered	25	*96.2*	25	*100.0*	2	*100.0*	3	*100.0*
Total	26		25		2		3	

LRB	Cattle	%	Sheep/goat	%	Pig	%	Equid	%
Chopped	7	*10.0*					2	*7.1*
Cut	3	*4.3*	4	*2.6*	1	*3.6*		
Sawn								
Shave marks	1	*1.4*						
Split axially								
Unbutchered	59	*84.3*	147	*97.4*	27	*96.4*	26	*92.9*
Total	70		151		28		28	

Table 4. Burning frequencies by phase, excluding isolated teeth

EIA	Pit	*%*	Ditch	Other	*%*	ALL	*%*
Singed	8	*14.0*	1	2	*18.2*	11	*14.9*
Burnt	2	*3.5*				2	*2.7*
Calcined							
Unmodified	47	*82.5*	5	9	*81.8*	61	*82.4*
Total	57		6	11		74	

LIA	Pit	*%*	Ditch	*%*	ALL	*%*
Singed	3	*16.7*	46	*21.1*	49	*20.8*
Burnt						
Calcined						
Unmodified	15	*83.3*	172	*78.9*	187	*79.2*
Total	18		218		236	

ERB	Pit	Ditch	Structure	Well	Quarry	*%*	ALL	*%*
Singed	1	1			6	*13.6*	8	*13.8*
Burnt								
Calcined								
Unmodified	5	1	3	3	38	*86.4*	50	*86.2*
Total	6	2	3	3	44		58	

LRB	Ditch	Occupation	*%*	Demolition	*%*	ALL	*%*
Singed	3	44	*18.3*	4	*7.1*	51	*16.1*
Burnt		2	*0.8*			2	*0.6*
Calcined							
Burnt & calcined		1	*0.4*			1	*0.3*
Unmodified	17	193	*80.4*	52	*92.9*	262	*82.9*
Total	20	240		56		316	

Table 5. Gnawing frequencies by phase, excluding isolated teeth

EIA	ALL exc.	*%*	ART.	*%*	Inc.	*%*
Canid	16	*21.6*			16	*21.6*
Felid						
Rodent						
Part digested	1	*1.4*			1	*1.4*
Unmodified	57	*77.0*			57	*77.0*
Total	74				74	

LIA	ALL exc.	*%*	ART.	*%*	Inc.	*%*
Canid	64	*27.1*			64	*26.8*
Felid						
Rodent	1	*0.4*			1	*0.4*
Part digested	2	*0.8*			2	*0.8*
Unmodified	169	*71.6*	3	*100.0*	172	*72.0*
Total	236		3		239	

ERB	ALL exc.	*%*	ART.	*%*	Inc.	*%*
Canid	16	*27.6*			16	*25.8*
Felid						
Rodent						
Part digested	1	*1.7*			1	*1.6*
Unmodified	41	*70.7*	4	*100.0*	45	*72.6*
Total	58		4		62	

LRB	ALL exc.	*%*	ART.	*%*	Inc.	*%*
Canid	78	*24.7*			78	*24.7*
Felid	1	*0.3*			1	*0.3*
Rodent	1	*0.3*			1	*0.3*
Part digested	1	*0.3*			1	*0.3*
Unmodified	235	*74.4*			235	*74.4*
Total	316				316	

Table 6. Numbers of identified fragments (NIF), Epiphyses only (EPIF) and minimum numbers of individuals (MNI) by major domesticate and phase

EIA	**All except articulated**					**Articulated**			**All**					
	NIF	*%*	Epiph.	*%*	MNI	NIF	Epiph.	MNI	NIF	*%*	Epiph.	*%*	MNI	*%*
Cattle	34	*30.4*	10	*34.5*	3				34	*30.4*	10	*34.5*	3	*30.0*
Sheep	60	*53.6*	13	*44.8*	3			2	60	*53.6*	13	*44.8*	5	*50.0*
Pig	7	*6.3*	2	*6.9*	1				7	*6.3*	2	*6.9*	1	*10.0*
Equid	11	*9.8*	4	*13.8*	1				11	*9.8*	4	*13.8*	1	*10.0*
Dog														
Total	112		29		8			2	112		29		10	

LIA	**All except articulated**					**Articulated**			**All**					
	NIF	*%*	Epiph.	*%*	MNI	*%*	NIF	Epiph.	MNI	NIF	*%*	Epiph.	*%*	MNI	*%*
Cattle	132	*38.3*	40	*46.5*	6	*25.0*				132	*37.9*	40	*45.5*	6	*21.4*
Sheep	153	*44.3*	25	*29.1*	10	*41.7*			3	153	*44.0*	25	*28.4*	13	*46.4*
Pig	30	*8.7*	10	*11.6*	6	*25.0*				30	*8.6*	10	*11.4*	6	*21.4*
Equid	24	*7.0*	10	*11.6*	1	*4.2*				24	*6.9*	10	*11.4*	1	*3.6*
Dog	6	*1.7*	1	*1.2*	1	*4.2*	3	2	1	9	*2.6*	3	*3.4*	2	*7.1*
Total	345		86		24		3	2	4	348		88		28	

ERB	**All except articulated**					**Articulated**			**All**					
	NIF	*%*	Epiph.	*%*	MNI	NIF	Epiph.	MNI	NIF	*%*	Epiph.	*%*	MNI	*%*
Cattle	37	*37.4*	14	*63.6*	2				37	*35.6*	14	*58.3*	2	*18.2*
Sheep	51	*51.5*	3	*13.6*	4	5	2	2	56	*53.8*	5	*20.8*	6	*54.5*
Pig	4	*4.0*	1	*4.5*	1				4	*3.8*	1	*4.2*	1	*9.1*
Equid	7	*7.1*	4	*18.2*	2				7	*6.7*	4	*16.7*	2	*18.2*
Dog														
Total	99		22		9	5	2	2	104		24		11	

LRB	**All except articulated**					**Articulated**			**All**					
	NIF	*%*	Epiph.	*%*	MNI	*%*	NIF	Epiph.	MNI	NIF	*%*	Epiph.	*%*	MNI	*%*
Cattle	103	*22.2*	37	*36.6*	4	*14.3*				103	*22.2*	37	*36.6*	4	*13.8*
Sheep	274	*59.1*	39	*38.6*	15	*53.6*			1	274	*59.1*	39	*38.6*	16	*55.2*
Pig	43	*9.3*	6	*5.9*	6	*21.4*				43	*9.3*	6	*5.9*	6	*20.7*
Equid	36	*7.8*	18	*17.8*	2	*7.1*				36	*7.8*	18	*17.8*	2	*6.9*
Dog	8	*1.7*	1	*1.0*	1	*3.6*				8	*1.7*	1	*1.0*	1	*3.4*
Total	464		101		28				1	464		101		29	

Table 7. Minimum Number of Individuals, using different methods

Cattle	**EIA**	**LIA**	**ERB**	**LRB**
	ALL exc.	ALL exc.	ALL exc.	ALL exc.
Longbone	2	5	**2**	**4**
Prox/dist mandible	**3**	2		1
dP4/M3	1	**6**		**4**
Teeth *in situ*		1		1

Sheep	**EIA**		**LIA**		**ERB**		**LRB**	
	ALL exc.	ART.	ALL exc.	ART.	ALL exc.	ART.	ALL exc.	ART.
Longbone	1		6	**3**	3	1	6	**1**
Prox/dist mandible	2		1			1	12	
dP4/M3	**3**		**10**		**4**	**2**	**15**	
Teeth *in situ*		**2**					1	

Pig	**EIA**	**LIA**	**ERB**	**LRB**
	ALL exc.	ALL exc.	ALL exc.	ALL exc.
Longbone	**1**	1	**1**	1
Prox/dist mandible	**1**	1		
dP4/M3		**6**		**6**
Teeth *in situ*		4		3

Equid	**EIA**	**LIA**	**ERB**	**LRB**
	ALL exc.	ALL exc.	ALL exc.	ALL exc.
Longbone	**1**	**1**	**2**	**2**
Prox/dist mandible		**1**		
dP4/M3				
Teeth *in situ*		**1**		

Dog	**LIA**		**LRB**
	ALL exc.	ART.	ALL exc.
Longbone	**1**	**1**	**1**
Prox/dist mandible			
dP4/M3			
Teeth *in situ*			

Table 8. Sheep mandible wear stages following Payne (1973 and 1987)

EIA	Def.	Attrib.	Range	Range		Suggested age
A						0-2 mnths
B				BCD	1	2-6 mnths
C		1				6-12 mnths
D						1-2 yrs
E	2					2-3 yrs
F				FGH	1	3-4 yrs
G						4-6 yrs
H						6-8 yrs
I						8-10 yrs
Total	2	1			2	

LIA	Def.	Attrib.	Accum.	*Accum. %*	Range	Range		*Accum. min. %*	*Accum. max. %*	Suggested age
A										0-2 mnths
B	1		1	*10.0*				*7.7*	*7.7*	2-6 mnths
C	1	1	3	*30.0*				*23.1*	*23.1*	6-12 mnths
D			3	*30.0*				*23.1*	*23.1*	1-2 yrs
E	1		4	*40.0*				*30.8*	*30.8*	2-3 yrs
F	3		7	*70.0*		FGH	3	*53.8*	*76.9*	3-4 yrs
G	3		10	*100.0*				*100.0*	*100.0*	4-6 yrs
H			10	*100.0*				*100.0*	*100.0*	6-8 yrs
I			10	*100.0*				*100.0*	*100.0*	8-10 yrs
Total	9	1					3			

ERB	Def.	Attrib.	Range	Range	Suggested age
A					0-2 mnths
B					2-6 mnths
C	(2)				6-12 mnths
D					1-2 yrs
E	2				2-3 yrs
F	2				3-4 yrs
G					4-6 yrs
H					6-8 yrs
I					8-10 yrs
Total	4(2)				

LRB	Def.	Attrib.	Accum.	*Accum. %*	Range	Range		*Accum. min. %*	*Accum. max. %*	Suggested age
A										0-2 mnths
B						BCD	1		*4.3*	2-6 mnths
C	3	2	5	*26.3*				*26.1*	*26.1*	6-12 mnths
D			5	*26.3*				*26.1*	*26.1*	1-2 yrs
E	5	1	11	*57.9*		EFG	1	*52.2*	*56.5*	2-3 yrs
F	5		16	*84.2*		FGH	2	*78.3*	*87.0*	3-4 yrs
G	3		19	*100.0*				*100.0*	*100.0*	4-6 yrs
H			19	*100.0*				*100.0*	*100.0*	6-8 yrs
I			19	*100.0*				*100.0*	*100.0*	8-10 yrs
Total	16	3					4			

NB. Articulated specimens in parenthesis, excluded from calculations

Table 9. Sheep epiphysial fusion data following Silver (1969), excluding articulated specimens

Phase	**EIA**		**LIA**			**ERB**		**LRB**		
Element/Fusion	U	F	U	F	*F%*	U	F	U	F	*F%*
6-8 mnths										
Scapula									2	*100.0*
10 mnths										
Humerus D	1			5	*100.0*				1	*100.0*
Radius P		1		2	*100.0*			3	3	*50.0*
Total/Average	*1*	*1*		*7*	*100.0*			*3*	*4*	*57.1*
13-16 mnths										
1st phalange		1		2	*100.0*				5	*100.0*
2nd phalange	1									
Total/Average	*1*	*1*		*2*	*100.0*				*5*	*100.0*
1.5-2 yrs										
Tibia D							1	2	3	*60.0*
Metapodial D	2			2	*100.0*			1	2	*66.7*
Total/Average	*2*			*2*	*100.0*		*1*	*3*	*5*	*62.5*
2.5-3 yrs										
Radius D								4		
Ulna										
Femur P			1							
Total/Average			*1*					*4*		
3-3.5 yrs										
Humerus P	1									
Femur D				2	*100.0*			1	1	*50.0*
Tibia P								1	2	*66.7*
Calcaneum			1				1			
Total/Average	*1*		*1*	*2*	*66.7*		*1*	*2*	*3*	*60.0*

NB. Metatarsal 20-28 mnths

Table 10. Sheep anatomical representation by phase

Phase/	**EIA**	**LIA**		**ERB**		**LRB**	
Articulation/	ALL exc.	ALL exc.		ALL exc.	ART.	ALL exc.	
Element	N	N	%	N	N	N	%
Horncore	1	1	*5.6*			1	*3.2*
Skull	5	10	*55.6*	4	1	17	*54.8*
Mandible	5	18	*100.0*	8	2	31	*100.0*
Atlas		1	*5.6*				
Axis		1	*5.6*				
Scapula	1	1	*5.6*			7	*22.6*
Humerus P	1	1	*5.6*	1		5	*16.1*
Humerus D	2	9	*50.0*	2		7	*22.6*
Radius P	4	6	*33.3*			22	*71.0*
Radius D	4	6	*33.3*	2		18	*58.1*
Ulna	1					1	*3.2*
Metacarpal P	2	4	*22.2*	4		11	*35.5*
Metacarpal D	1	3	*16.7*	2		22	*71.0*
Pelvis		5	*27.8*			3	*9.7*
Femur P		1	*5.6*				
Femur D		1	*5.6*			4	*12.9*
Patella	1	1	*5.6*				
Tibia P	2	5	*27.8*	3		9	*29.0*
Tibia D	4	10	*55.6*	5		23	*74.2*
Astragalus	1	3	*16.7*	1			
Calcaneum		1	*5.6*	1			
Navicular cuboid	1						
Metatarsal P	1	4	*22.2*	2		9	*29.0*
Metatarsal D		4	*22.2*	2		12	*38.7*
1st phalange	1	1	*5.6*			2	*6.5*
2nd phalange	1	1	*5.6*				
3rd phalange						1	*3.2*

Table 11. Cattle mandible wear stages following Grant (1982)

EIA	Def.	Attrib.	Range	Range		Suggested age
1-5			1-10	1-15		
6-10			6-15	6-20		<6 mnths
11-15			11-20	11-25		
16-20			16-25	6-25		
21-25			21-30			
26-30			26-35	26-40		2-2.5 yrs
31-35			31-40			2-3 yrs
36-40			36-45	36-50	1	
41-45			41-50	41-55		
46-50			46-55			
Total					1	

LIA	Def.	Attrib.	Range	Range		Suggested age
1-5			1-10	1-15		
6-10			6-15	6-20		<6 mnths
11-15			11-20	11-25		
16-20			16-25	6-25		
21-25	1		21-30			
26-30		1	26-35	26-40		2-2.5 yrs
31-35			31-40			2-3 yrs
36-40		1	36-45	36-50	2	
41-45	1		41-50	41-55		
46-50			46-55			
Total	2	2			2	

LRB	Def.	Attrib.	Range	Range	Suggested age
1-5			1-10	1-15	
6-10			6-15	6-20	<6 mnths
11-15			11-20	11-25	
16-20			16-25	6-25	
21-25			21-30		
26-30		1	26-35	26-40	2-2.5 yrs
31-35		1	31-40		2-3 yrs
36-40			36-45	36-50	
41-45	1		41-50	41-55	
46-50		1	46-55		
Total	1	3			

Table 12. Cattle epiphysial fusion data following Silver (1969), excluding articulated specimens

Phase	**EIA**		**LIA**			**ERB**			**LRB**		
Element/Fusion	U	F	U	F	*F%*	U	F	*F%*	U	F	*F%*
7-10 mnths											
Scapula				3	*100.0*		4	*100.0*		1	*100.0*
12-16 mnths											
Humerus D				6	*100.0*		1	*100.0*		3	*100.0*
Radius P	1	2		6	*100.0*		2	*100.0*		1	*100.0*
1st phalange		1		3	*100.0*		1	*100.0*	1	4	*80.0*
2nd phalange							1	*100.0*		1	*100.0*
Total/Average	*1*	*3*		*15*	*100.0*		*5*	*100.0*	*1*	*9*	*90.0*
2-3 yrs											
Tibia D		2		2	*100.0*		1	*100.0*		1	*100.0*
Metapodial D		1	1	2	*66.7*					2	*100.0*
Total/Average		*3*	*1*	*4*	*80.0*		*1*	*100.0*		*3*	*100.0*
3.5-4 yrs											
Humerus P			1	1	*50.0*		1	*100.0*			
Radius D	1			2	*100.0*	1				1	*100.0*
Ulna										1	*100.0*
Femur P										1	*100.0*
Femur D	1										
Tibia P			1			1				1	*100.0*
Calcaneum											
Total/Average	*2*		*2*	*3*	*60.0*	*2*	*1*	*33.3*		*4*	*100.0*

Table 13. Cattle anatomical representation by phase

Phase/ Articulation/ Element	**EIA** ALL exc. N	**LIA** ALL exc. N	**ERB** ALL exc. N	**LRB** ALL exc. N
Horncore		1	1	
Skull	2	8	3	7
Mandible	4	7	2	4
Atlas				
Axis			1	2
Scapula	1	5	6	3
Humerus P		2	1	1
Humerus D		8	2	4
Radius P	3	6	2	1
Radius D	2	3	1	4
Ulna		8		6
Metacarpal P	1	6		6
Metacarpal D	1	2		1
Pelvis		2	1	5
Femur P	1			
Femur D	1			
Patella				
Tibia P		3	1	3
Tibia D	2	2	1	2
Astragalus		5		6
Calcaneum	1	1	1	1
Navicular cuboid	1			
Metatarsal P		3	3	3
Metatarsal D		3	2	2
1st phalange	1	1	1	2
2nd phalange			1	1
3rd phalange				

Table 14. Pig mandible wear stages following Payne (1973 and 1987)

LIA	Def.	Attrib.	Range		Range		Suggested age
1-5			1-10				<6 mnths
6-10			6-15				<12 mnths
11-15			11-20	1	11-35		<15 mnths
16-20			16-25				c. 15 mnths
21-25			21-30		21-50	1	<2 yrs
26-30			26-35	1			
31-35			31-40	1			>2 yrs
36-40			36-45	2			
41-45			41-50				
46-50			46-55				
Total				5		1	

LRB	Def.	Attrib.	Range		Range		Suggested age
1-5			1-10				<6 mnths
6-10			6-15				<12 mnths
11-15			11-20		11-35	2	<15 mnths
16-20			16-25				c. 15 mnths
21-25			21-30		21-50	3	<2 yrs
26-30			26-35				
31-35			31-40	1			>2 yrs
36-40			36-45	1			
41-45			41-50				
46-50			46-55				
Total				2		5	

Table 15. Pig epiphysial fusion data following Silver (1969), excluding articulated specimens

Phase	**EIA**		**LIA**		**LRB**	
Element/Fusion	U	F	U	F	U	F
1 yr						
Scapula						
Humerus D				1		
Radius P						1
2nd phalange						
Total/Average				*1*		*1*
2-3 yrs						
Tibia D						
Calcaneum	1				1	
Metapodial D	1		2	1		
1st phalange						
Total/Average	*2*		*2*	*1*	*1*	
3.5-4 yrs						
Humerus P						
Radius D						
Ulna			1			
Femur P						
Femur D						
Tibia P						
Total/Average			*1*			

Table 16. Pig anatomical representation by phase

Phase/ Articulation/ Element	**EIA** ALL exc. N	**LIA** ALL exc. N	**ERB** ALL exc. N	**LRB** ALL exc. N
Skull		2		2
Mandible	1	6		6
Atlas		1		
Axis			1	
Scapula	1	2		1
Humerus P				1
Humerus D		4		5
Radius P				1
Radius D				
Ulna		1		1
Metacarpal P		1		
Metacarpal D	1	1		
Pelvis		1		
Femur P				
Femur D	1			
Patella				
Tibia P	1	1		2
Tibia D		1		2
Astragalus			1	
Calcaneum	1			2
Navicular cuboid				
Metatarsal P		1		1
Metatarsal D	1	1		
1st phalange				
2nd phalange				
3rd phalange	1			

Table 17. Equid epiphysial fusion data following Silver (1969), excluding articulated specimens

Phase	**EIA**		**LIA**		**ERB**		**LRB**		
Element/Fusion	U	F	U	F	U	F	U	F	*F%*
1 yr									
Scapula								2	*100.0*
1st phalange						1		1	*100.0*
2nd phalange				1				1	*100.0*
Total/Average				*1*		*1*		*4*	*100.0*
15-18 mnths									
Humerus D				1				1	*100.0*
Radius P								1	*100.0*
Metapodial D				1		1		4	*100.0*
Total/Average				*2*		*1*		*6*	*100.0*
20-24 mnths									
Tibia D				2				1	*100.0*
3-3.5 yrs									
Humerus P									
Radius D								1	*100.0*
Ulna									
Femur P		1							
Femur D		1						1	*100.0*
Tibia P				2					
Calcaneum				1					
Total/Average		*2*		*3*				*2*	*100.0*

NB. Scapula 12 mnths; Metatarsal 16-20 mnths; 1st phalange 13-15 mnths; 2nd phalange 9 mnths

Table 18. Equid anatomical representation by phase

Phase/ Articulation/ Element	**EIA** ALL exc. N	**LIA** ALL exc. N	**ERB** ALL exc. N	**LRB** ALL exc. N
Skull	1	1	1	1
Mandible		1	1	1
Atlas				
Axis		1		
Scapula				2
Humerus P		1		
Humerus D		1		
Radius P				
Radius D				
Ulna				
Metacarpal P	1			3
Metacarpal D				3
Pelvis	1			
Femur P				1
Femur D	1			1
Patella				
Tibia P	1	2		
Tibia D		2		1
Astragalus				2
Calcaneum	1	2		2
Navicular cuboid				
Metatarsal P		1	2	3
Metatarsal D		1	2	4
1st phalange		1	1	1
2nd phalange		1		1
3rd phalange				

Table 19. Dog anatomical representation by phase

Phase/	**LIA**		**LRB**
Articulation/	ALL exc.	ART.	ALL exc.
Element	N	N	N
Skull			1
Mandible			2
Atlas	1		
Axis			
Scapula			
Humerus P			
Humerus D			
Radius P			
Radius D			1
Ulna	1		1
Metacarpal P	1	1	
Metacarpal D	1	1	
Pelvis			
Femur P			
Femur D			
Patella			
Tibia P			
Tibia D			
Astragalus			
Calcaneum			
Navicular cuboid			
Metatarsal P	1		1
Metatarsal D	1		1
1st phalange			
2nd phalange			
3rd phalange			

6.5 **Small mammal bones: data** by Jim Williams

Table 1. Small mammal bones from Houghton Down

Species code: 6 = water vole; 20 = indet. Rodentia; 20 (large) = possibly rat or water vole

SITE	HD97	HD97	HD97
CONTEXT	337	F609/4 (1)	F609 (1)
SAMPLE	HC	(1)	
SPECIES	20	6	20 (large)
No. of bones	1	11	1
Right mandible		1	
R M_1		1	
R M_2		1	
R M_3		1	
Left mandible		1	
L M_1		1	
L M_2		1	
L M_3			
mandibular incisors		2	
maxillary incisors		2	
humerus			1
tibia	1		