4 **ANIMAL BONES: DATA** by Andy Hammon

4.1 **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 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 1, 2, 4–6) 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, 109–112) 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.

The 'maximum' and 'minimum' values provided in the sheep mortality profiles (Vol. 2 part 3, Fig. 3.109) follow the format used by Hamilton for the DEP reports, Houghton Down (Hamilton 2000a, microfiche 14:B6–7) for instance.

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).

References

ALBARELLA, U. and DAVIS, S.J.M. 1996: Mammals and Birds from Launceston Castle, Cornwall: Decline in Status and the Rise of Agriculture. *Circaea, J. Ass. Envir. Archaeol.* 12, 1−156.

BOESSNECK, J. 1969: Osteological Differences between Sheep (*Ovis Aries* Linné) and Goat (*Capra Hircus* Linné). In Brothwell, D.R. and Higgs, E.S. (eds.), *Science in Archaeology: A Comprehensive Survey of Progress and Research* (London), 331−58.

CALLOU, C. 1997: *Diagnose Différentielle Des Principaux Éléments Squelettiques Du Lapin (Genre Oryctolagus) Et Du Lièvre (Genre Lepus) En Europe Occidentale* (Paris, Centre de Recherches Archéologiques du Centre National de la Recherche Scientifique Fiches D'ostélogie Animale Pour L'archélogie Série B: Mammifères 8).

COHEN, A. and SERJEANTSON, D. 1996: *A Manual for the Identification of Bird Bones from Archaeological Sites* (London, Birkbeck College, University of London).

DAVIS, S. 1987a: *The Archaeology of Animals* (London).

DAVIS, S. 1987b: Especial Study 1: The Dentition of an Iron Age Pony (52–5). In Ashbee, P. and Hook, P., Warsash, Hampshire excavations, 1954. *Proc. Hampshire Field Club Archaeol. Soc.* 43, 21–62.

DAVIS, S.J.M. 1980: Late Pleistocene and Holocene Equid Remains from Israel. *Zoological J. Linnéan Soc.* 70, 289–312.

DAVIS, S.J.M. 1992: A Rapid Method for Recording Information About Mammal Bones from Archaeological Sites (Ancient Monuments Laboratory Report 19/92) (Unpublished report, English Heritage).

GRANT, A. 1975: The Animal Bones. In Cunliffe, B. (ed.), *Excavations at Portchester Castle. Vol. I Roman* (London, Rep. Res. Comm. Soc. Antiq. London 32), 378–406.

GRANT, A. 1982: The Use of Tooth Wear as a Guide to the Age of Domestic Ungulates. In Wilson, B., Grigson, C. and Payne, S. (eds.), *Ageing and Sexing Animal Bones from Archaeological Sites* (Oxford, BAR Brit. Ser. 109), 91–108.

GRANT, A. 1984: Animal Husbandry. In Cunliffe, B., *Danebury: an Iron Age Hillfort in Hampshire. Vol. 2 The excavations 1969–1978: the finds* (London, CBA Res. Rep. 52), 496–527; 31–48; Microfiche 16:A3–17:E8.

GRIGSON, C. 1982: Sex and Age Determination of Some Bones and Teeth of Domestic Cattle: A Review of the Literature. In Wilson, B., Grigson, C. and Payne, S. (eds.), *Ageing and Sexing Animal Bones from Archaeological Sites* (Oxford, BAR Brit. Ser. 109), 7–23.

HALSTEAD, P., COLLINS, P. and ISAAKIDOU, V. 2002: Sorting Sheep from Goats: Morphological Distinctions between the Mandibles and Mandibular Teeth of Adult *Ovis* and *Capra*. *J. Archaeol. Sci.* 29, 545–53.

HAMILTON, J. 2000a: Animal Bones. In Cunliffe, B. and Poole, C., *The Danebury Environs Programme. The Prehistory of a Wessex Landscape. Vol. 2 – Part 6 Houghton Down, Stockbridge, Hants, 1994* (Oxford, English Heritage and OUCA Monogr. 49), 146–61; Microfiche 14:B1–D11.

HAMILTON, J. 2000b: Animal Husbandry: The Evidence from the Animal Bones. In Cunliffe, B., *The Danebury Environs Programme. The Prehistory of a Wessex Landscape. Vol. 1 Introduction* (Oxford, English Heritage and OUCA Monogr. 48), 59–76.

HAMILTON, J. 2000c: The Animal Bones. In Cunliffe, B. and Poole, C., *The Danebury Environs Programme. The Prehistory of a Wessex Landscape. Vol. 2 – Part 2 Bury Hill, Upper Clatford, Hants, 1990* (Oxford, English Heritage and OUCA Monogr. 49), 67–73; Microfiche 3:C1–9.

HAMILTON, J. 2000d: The Animal Bones. In Cunliffe, B. and Poole, C., *The Danebury Environs Programme. The Prehistory of a Wessex Landscape. Vol. 2 – Part 5 Nettlebank Copse, Wherwell, Hants, 1993* (Oxford, English Heritage and OUCA Monogr. 49), 101–16; Microfiche 10:D11–G14.

HAMILTON, J. 2000e: The Animal Bones. In Cunliffe, B. and Poole, C., *The Danebury Environs Programme. The Prehistory of a Wessex Landscape. Vol. 2 − Part 4 New Buildings, Longstock, Hants, 1992 and Fiveways, Longstock, Hants, 1996* (Oxford, English Heritage and OUCA Monogr. 49), 81−6; Microfiche 8:E1−13.

HAMILTON, J. 2000f: The Animal Bones. In Cunliffe, B. and Poole, C., *The Danebury Environs Programme. The Prehistory of a Wessex Landscape. Vol. 2 − Part 3 Suddern Farm, Middle Wallop, Hants, 1991 and 1996* (Oxford, English Heritage and OUCA Monogr. 49), 175−93; Microfiche 6:E10−G14.

HARCOURT, R.A. 1974: The Dog in Prehistoric and Early Historic Britain. *J. Archaeol. Sci.* 1, 151−75.

KRATOCHVIL, Z. 1969: Species Criteria on the Distal Section of the Tibia in *Ovis Ammon F. Aries* L. And *Capra Aegagrus F. Hircus* L. *Acta Veterinaria (Brno)* 38, 483−90.

LISTER, A. 1996: The Morphological Distinction between Bones and Teeth of Fallow Deer (*Dama Dama*) and Red Deer (*Cervus Elaphus*). *Int. J. Osteoarchaeol.* 6, 119−43.

MACDONALD, K. 1992: The Domestic Chicken (*Gallus Gallus*) in Sub-Saharan Africa: A Background to Its Introduction and Its Osteological Differentiation from Indigenous Fowls (Numidinae and *Francolinus* Sp.). *J. Archaeol. Sci.* 19, 303−18.

MAY, E. 1985: Widerristöhe Und Langknochenmaße Bei Pferden Ein Immer Noch Aktuelles Problem. *Zeitschrift fur Saugertierkunde* 50, 368−82.

MUNSON, P.J. 2000: Age Correlated Differential Destruction of Bones and Its Effect on Archaeological Mortality Profiles of Domestic Sheep and Goats. *J. Archaeol. Sci.* 27, 391−407.

MUNSON, P.J. and GARNIEWICZ, R. 2003: Age Mediated Survivorship of Ungulate Mandibles and Teeth in Canid Ravaged Faunal Assemblages. *J. Archaeol. Sci.* 30, 405−16.

PAYNE, S. 1973: Kill-Off Patterns in Sheep and Goats: The Mandibles from Asvan Kale. *Anatolian Stud.: J. Brit. Inst. Archaeol. Ankara* 23, 281−303.

PAYNE, S. 1985: Morphological Distinctions between the Mandibular Teeth of Young Sheep, *Ovis*, and Goats, *Capra*. *J. Archaeol. Sci.* 12, 139−47.

PAYNE, S. 1987: Reference Codes for the Wear States in the Mandibular Cheek Teeth of Sheep and Goats. *J. Archaeol. Sci.* 14, 609−14.

PAYNE, S. and BULL, G. 1988: Components of Variation in Measurements of Pig Bones and Teeth, and the Use of Measurements to Distinguish Wild from Domestic Pig Remains. *Archaeozoologia* 2, 27−66.

PRUMMEL, W. and FRISCH, H.-J. 1986: A Guide for the Distinction of Species, Sex and Body Side in Bones of Sheep and Goat. *J. Archaeol. Sci.* 13, 567−77.

RONCAGLIA, N. and GRANT, A. 2000: Animal Husbandry. In Cunliffe, B. and Poole, C., *The Danebury Environs Programme. The Prehistory of a Wessex Landscape. Vol. 2 − Part 1 Woolbury and Stockbridge Down, Stockbridge, Hants, 1989* (Oxford, English Heritage and OUCA Monogr. 49), 70−2.

SADLER, P. 1991: The Use of Tarsometatarsi in Sexing and Ageing Domestic Fowl (*Gallus Gallus* L.), and Recognising Five Toed Breeds in Archaeological Material. *Circaea, J. Ass. Envir. Archaeol.* 8, 41−8.

SERJEANTSON, D. 1996: The Animal Bones. In Needham, S. and Spence, T. (eds.), *Runnymede Bridge Research Excavations. Vol. 2 Refuse and Disposal at Area 16 East, Runnymede* (London, British Museum), 194−223.

SILVER, I.A. 1969: The Ageing of Domestic Animals. In Brothwell, D.R. and Higgs, E.S. (eds.), *Science in Archaeology: A Comprehensive Survey of Progress and Research* (London), 283−302.

VON DEN DRIESCH, A.E. 1976: *A Guide to the Measurement of Animal Bones from Archaeological Sites* (Cambridge, Massachusetts, Peabody Museum of Archaeology and Ethnology, Harvard University Bulletin 1).

VON DEN DRIESCH, A.E. and BOESSNECK, J. 1974: Kritische Anmerkungen Zur Widerristhohenberechung Aus Langenmassen Vor- Und Frühgeschichlicher Tierknochen. *Saugetierkündliche Mitteilungen* 22, 325−48.

WEST, B. 1985: Chicken Legs Revisited. *Circaea, J. Ass. Envir. Archaeol.* 3, 11−14.

4.2 **Appendix 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**
RB	FL 633	OVA	863	19.3
RB	FL F926 (1)	OVA	1145	6.3
na	FL 652	OVA	1112	6.1

FIRST MOLAR

Phase	Context number	Taxa	Bone ID	W
RB	FL F873/1 (1)	OVA	51	7.4
RB	FL 524	O	672	6.8
RB	FL 621	OVA	786	7.3
RB	FL 609	OVA	820	6.9
RB	FL 633	OVA	864	7.2
RB	FL 619	OVA	872	7.6
RB	FL 618	O	898	7.2
RB	FL F871/1 (4)	OVA	941	8.3
RB	FL F926 (536)	OVA	1130	7.4
RB	FL F926 (1)	OVA	1145	6.9
na	FL 486	OVA	469	7.4
na	FL 486	O	517	6.8
na	FL 507	OVA	662	7.3
na	FL 584	OVA	956	7.4
na	FL 652	OVA	1112	6.9

SECOND MOLAR

Phase	**Context number**	**Taxa**	**Bone ID**	**W**
IA	FL F881 (3)	OVA	937	6.8
RB	FL F873/1 (1)	OVA	51	8.3
RB	FL 524	O	672	7.8
RB	FL 621	OVA	786	8.2
RB	FL 609	OVA	820	7.2
RB	FL 633	OVA	864	8.0
RB	FL 618	O	898	8.0
RB	FL F888 (3)	OVA	900	8.1
RB	FL F871/1 (4)	OVA	941	8.4
RB	FL 629	OVA	1041	7.9
RB	FL F926 (536)	OVA	1130	8.0
RB	FL F926 (1)	OVA	1145	7.9
na	FL 486	OVA	469	8.1
na	FL 486	O	517	7.3
na	FL 480	OVA	562	7.7
na	FL 507	OVA	662	7.7
na	FL 584	OVA	956	7.8

THIRD MOLAR

Phase	**Context number**	**Taxa**	**Bone ID**	**W**
IA	FL F881 (3)	OVA	937	7.2
RB	FL F873/1 (1)	OVA	51	8.7
RB	FL F873/1 (1)	O	53	8.8
RB	FL 524	O	672	7.9

RB	FL 621	OVA	786	8.5
RB	FL 672	O	854	8.0
RB	FL 633	OVA	864	8.0
RB	FL F888 (3)	OVA	900	8.9
RB	FL F871/1 (4)	OVA	941	8.3
RB	FL 629	OVA	1041	8.2
RB	FL 644	OVA	1128	8.8
RB	FL F926 (536)	OVA	1130	8.0
na	FL 486	OVA	469	8.6
na	FL 486	O	515	8.0
na	FL 486	O	516	7.9
na	FL 486	O	517	7.8
na	FL 480	OVA	562	7.9
na	FL 480	O	566	7.9
na	FL 480	O	567	8.5
na	FL 480	O	568	7.6
na	FL 488	O	701	8.2
na	FL 636	O	1085	8.6
na	FL 654	OVA	1092	8.2

SCAPULA

Phase	Context number	Taxa	Bone ID	SLC
RB	FL F920 (2)	O	236	14.9
RB	FL F920 (2)	O	237	17.6

HUMERUS

Phase	Context number	Taxa	Bone ID	BT	HT	HTC
RB	FL F919 (3)	OVA	140	23.8	14.4	11.7
RB	FL F922 (1)	O	311			13.0
na	FL 486	O	518	26.6	16.5	13.8

RADIUS

Phase	Context number	Taxa	Bone ID	Bd	BFd
RB	FL F918 (1)	O	11	28.8	24.4
RB	FL F920 (2)	O	241	27.0	21.8
RB	FL 498	O	728	26.9	22.7
RB	FL 498	O	729	26.5	23.0
RB	FL 498	O	771	26.3	23.0
RB	FL 498	O	772	26.9	23.1

METACARPAL

Phase	Context number	Taxa	Bone ID	Bp	BatF	1	2	3	a
RB	FL F918 (2)	OVA	98	22.8	24.3	10.7	16.2	13.5	11.3
RB	FL F919 (3)	OVA	143	21.8					
RB	FL F920 (2)	OVA	244	21.2					
na	FL 480	OVA	570	20.8					
na	FL 480	O	571	21.7					

TIBIA

Phase	Context number	Taxa	Bone ID	Bp	Building	Dd
RB	FL 524	OVA	679	19.4		
RB	FL F993 (1)	OVA	1161		23.4	19.0
RB	FL F993	OVA	1169		25.8	19.0
na	FL 486	OVA	527		26.7	20.8
na	FL 486	OVA	528		23.8	19.5

METATARSAL

Phase	Context number	Taxa	Bone ID	Bp
RB	FL 487	O	602	20.1
na	FL 486	OVA	474	18.3
na	FL 522	O	767	19.2

Cattle

FOURTH DECIDUOUS PREMOLAR

Phase	Context number	Bone ID	L	W
RB	FL 489	723		12.7
Na	FL 486	449	12.2	
Na	FL 480	542		12.7
Na	FL Ph1195 (1)	1149	13.1	

FIRST MOLAR

Phase	Context number	Bone ID	W
RB	FL 489	723	13.4
RB	FL F871/1 (4)	940	14.7
RB	FL 583	962	15.6
RB	FL 588	1000	14.8
RB	FL 641	1108	13.5
Na	FL 507	656	14.2

SECOND MOLAR

Phase	Context number	Bone ID	W
RB	FL 489	723	13.8
RB	FL F871/1 (4)	940	17.4
RB	FL 583	962	16.9
RB	FL 588	1000	15.7

RB	FL 641	1108	14.6	
Na	FL 507	656	16.1	

THIRD MOLAR

Phase	Context number	Bone ID	L	W
IA	FL F878 (1)	932	35.5	14.8
RB	FL F871/1 (4)	940	39.5	17.1
RB	FL 583	962	35.7	16.3
RB	FL 585	984	34.4	14.6
RB	FL 588	1000	37.7	16.3
RB	FL 641	1108		14.7
Na	FL 486	451	34.8	15.1
Na	FL 486	492		15.0
Na	FL 507	656	35.4	15.6
Na	FL 488	695	37.1	16.1

HORNCORE

Phase	Context number	Bone ID	45	46
RB	FL 500	715	80.5	59.6

SCAPULA

Phase	Context number	Bone ID	SLC
IA	FL F878 (1)	934	44.0
RB	FL F873/1 (1)	40	44.8
RB	FL 585	985	44.3

HUMERUS

Phase	Context number	Bone ID	BT	HT	HTC
RB	FL F873 (1)	74	66.5	39.4	28.3
RB	FL 524	667			34.2
RB	FL 650	1046	76.4	48.0	35.0
Na	FL 486	498		39.4	

RADIUS

Phase	Context number	Bone ID	Bp	BFp	Bd
RB	FL F874 (1)	919			70.6
Na	FL 488	697	85.8	76.9	

METACARPAL

Phase	Context number	Bone ID	GL	SD	Bp	BatF	Bd	1	2	3	4	5	6	a	b
RB	FL F873/1 (3)	86			61.7										
RB	FL F874 (2)	946			51.6										
RB	FL 631	1073			60.4										
Na	FL 486	426				49.1									
Na	FL 486	500			59.8										
Na	FL 654	1088	187.8	30.0		50.6	55.3		31.1	28.0				26.8	26.1
Na	FL 654	1089				61.2	67.5	26.6		33.5	28.1		32.6	33.2	31.2
Na	FL 674	1104	193.3	35.0	60.3	58.3	63.9	25.6	32.7	29.0	24.4	32.8	29.6	30.8	30.0
Na	FL 640	1120	189.9	28.0		49.3	52.1	22.4	28.7	25.8	20.6	27.5	26.1	24.5	23.9

TIBIA

Phase	Context number	Bone ID	Bd	Dd
RB	FL F873/1 (1)	47	55.7	43.6

ASTRAGALUS

Phase	Context number	Bone ID	GLl	GLm	Dl	Bd
RB	FL 650	1047	60.53	55.1	33.3	
na	FL 488	698	64.44	58.5	36.2	43.9

CALCANEUM

Phase	Context number	Bone ID	C	C+D
RB	FL F873/1 (1)	48	21.4	42.8
RB	FL F873/1 (1)	49	27.1	46.8

METATARSAL

Phase	Context number	Bone ID	GL	SD	Bp	BatF	Bd	1	2	3	4	5	6	a	b
RB	FL 621	785				50.7				28.5					
RB	FL 631	1074			49.8	50.4	56.5	24.7		29.0	23.4			26.0	26.1
na	FL 674	1105	229.3	29.5	49.9	55.3	58.2	23.6	31.5	27.6	21.9	30.7	28.3	27.6	25.9
na	FL 674	1106						21.2		25.5				23.2	

Pig

FOURTH DECIDUOUS PREMOLAR

Phase	Context number	Bone ID	L	WP
RB	FL F919 (5)	183	19.4	8.6

SECOND MOLAR

Phase	Context number	Bone ID	WP
RB	FL 498	736	14.6
RB	FL 498	776	14.7

THIRD MOLAR

Phase	Context number	Bone ID	L	WA	WC
na	FL 486	534	41.8	16.9	17.1

RADIUS

Phase	Context number	Bone ID	Bp
na	FL 486	477	27.2

TIBIA

Phase	Context number	Bone ID	Bd	Dd
RB	FL F873/1 (1)	57	36.1	32.5

ASTRAGALUS

Phase	Context number	Bone ID	GLl	GLm	Dl	Building
RB	FL F980 (1)	1155	42.8	40.2	21.9	26.4

CALCANEUM

Phase	Context number	Bone ID	GL	C	C+D
RB	FL F873/1 (1)	58	90.8	15.0	33.0

Equid

HUMERUS

Phase	Context number	Bone ID	Element	BT	HT	HTC
na	FL F940 (1)	318	HU		47.0	35.1

METACARPAL

Phase	Context number	Bone ID	Element	Bp	Dp	Building
EIA	FF F1291/21 (2)	6193	MC	44.8	29.6	
EIA	FF F1291/21 (3)	6312	MC			44.9

TIBIA

Phase	Context number	Bone ID	Element	Bd	Dd
IA	FL F881 (3)	939	TI	59.7	38.1
RB	FL 680	1114	TI	73.7	44.8

ASTRAGALUS

Phase	Context number	Bone ID	Element	GH	LmT	GB	BFd
RB	FL 600	1052	AS			64.5	52.3
na	FL Ph1201 (1)	1139	AS	52.6	52.4	55.9	48.0

METATARSAL

Phase	Context number	Bone ID	Element	GL	SD	Bp	Dp	Bd	Comments
IA	FL F881 (4)	948	MT			43.9	42.2		Articulated; ID 948-51 (PMTs & NC)
RB	FL F871/1 (4)	943	MT				37.1	47.4	
na	FL 507	664	MT	272.2	27.0			49.4	

Dog

HUMERUS

Phase	Context number	Bone ID	HT	HTC	Articulated
RB	FL F882/3 (1)	906	16.1	11.0	Skeleton; ID 906-16

Domestic fowl

HUMERUS

Phase	Context number	Taxa	Bone ID	Bp	Bd
RB	FL F919 (5)	GNP	184	17.8	
RB	FL F925 (1)	GNP	393		14.9
RB	FL F925 (1)	GNP	394		13.6
RB	FL F925 (1)	GNP	395		13.7
RB	FL 593	GNP	839	19.5	
RB	FL 597	GNP	856	18.7	
RB	FL F874/2 (540)	GNP	931	15.8	

RADIUS

Phase	Context number	Taxa	Bone ID	GL	SC	Bd
RB	FL F925 (1)	GNP	397	58.6	2.6	6.4

ULNA

Phase	Context number	Taxa	Bone ID	GL	SC	Bp
RB	FL F920 (2)	GNP	263	59.6	4.0	8.5
RB	FL F920 (2)	GNP	264	64.7	4.0	7.9
RB	FL F939 (2)	GNP	335	71.0	4.7	9.6

CARPOMETACARPUS

Phase	Context number	Taxa	Bone ID	GL	L	Bp	Did
RB	FL F920 (2)	GP	266			11.4	
RB	FL F939 (3)	GP	346	37.6	35.1	10.3	7.1

FEMUR

Phase	Context number	Taxa	Bone ID	GL	Lm	SC	Bp	Dp	Bd	Dd
RB	FL F871/1 (5)	GN	27				13.3	8.7		
RB	FL F919 (2)	GN	133						13.2	11.5
RB	FL F919 (5)	GN	185				12.7	8.6		
RB	FL 593	GN	840	68.9	65.0	5.6	12.2	8.7	13.0	10.6
RB	FL F871/1 (4)	GNP	944						13.0	10.9
na	FL 547	GN	714				12.0	8.7		

TIBIOTARSUS

Phase	Context number	Taxa	Bone ID	Dip	Bd	Dd
RB	FL F920 (1)	GNP	218	17.5		
RB	FL F920 (2)	GNP	270	17.3		
RB	FL F920 (2)	GNP	271		9.7	10.1
RB	FL F925 (1)	GNP	399	17.7	9.7	9.8

TARSOMETATARSUS

Phase	Context number	Taxa	Bone ID	Bp	Bd	SpurL
RB	FL F918 (1)	GAG	18		12.9	15.2
RB	FL F920 (2)	GNP	273	11.6		
RB	FL 498	GN	737		10.2	

Red deer

Humerus

Phase	Context number	Bone ID	BT	HT	HTC
RB	FL 524	681	56.1	44.3	31.2

Radius

Phase	Context number	Bone ID	Bp	BFp	Bd	BFd
RB	FL F873/1 (1)	63			54.0	53.7
RB	FL F873 (1)	79			52.8	51.8
RB	FL 487	608	54.0	51.9		

Metacarpal

Phase	Context number	Bone ID	Bp
RB	FL 631	1082	39.5

Tibia

Phase	Context number	Bone ID	Bd	Dd
RB	FL 583	978	50.8	42.4

Calcaneum

Phase	Context number	Bone ID	C	C+D
RB	FL F873/1 (1)	68	23.9	44.1

4.3 **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
RB	FL F871/1 (1)	32	O						7A
RB	FL F873/1 (1)	51	OVA		E	9A	7A	E	
RB	FL F873/1 (1)	52	O		12S	15A			
RB	FL F873/1 (1)	53	O					11G	
RB	FL F873/1 (3)	91	O			15A	10A		
RB	FL F920 (2)	232	OVA				E		
RB	FL F929 (538)	320	O						9A
RB	FL F939 (2)	323	O					11G	
RB	FL 479	650	O						9A
RB	FL 524	672	O			9A	7A	11G	
RB	FL 489	727	O						9A
RB	FL 563	780	O		15A	15A			
RB	FL 621	786	OVA		14S	15A	9A	11G	
RB	FL 609	820	OVA		E	9A	7A	V	
RB	FL 672	854	O					11G	
RB	FL 633	863	OVA	6A					
RB	FL 633	864	OVA		12S	9A	9A	7G	
RB	FL 619	872	OVA			10A		11G	
RB	FL 618	898	O		0	9A	8A	1A	
RB	FL F888 (3)	900	OVA				7A	4A	
RB	FL F888 (2)	902	OVA	14L					
RB	FL F888 (2)	903	O						7A
RB	FL F888 (2)	904	O						15A
RB	FL F888 (2)	905	O						9A
RB	FL F871/1 (4)	941	OVA				9A	11G	
RB	FL 585	990	O						9A
RB	FL 629	1041	OVA				8A	7A	
RB	FL 546	1110	O						9A
RB	FL 644	1128	OVA					9G	
RB	FL F926 (536)	1130	OVA		12S	9A	9A	7A	
RB	FL F926 (1)	1145	OVA	19L		9A	7A		
RB	FL F993 (1)	1156	O						9A
IA	FL F881 (3)	937	OVA				9A	11G	
na	FL 486	468	O						5B
na	FL 486	469	OVA		4B	9A	7A	2A	
na	FL 486	512	O						
na	FL 486	513	O						5A
na	FL 486	514	O						8A
na	FL 486	515	O					11G	
na	FL 486	516	O					9G	
na	FL 486	517	O			9A	7A	0	
na	FL 480	562	OVA		9A		9A	11G	
na	FL 480	563	O						5A
na	FL 480	564	O						9A
na	FL 480	565	O						9A
na	FL 480	566	O					11G	
na	FL 480	567	O					8G	
na	FL 480	568	O					8G	
na	FL 475	624	O						9A
na	FL 475	625	O						5A
na	FL 484	630	O						9A
na	FL 507	660	OVA	14L					

na	FL 507	662	OVA				9A	8A	
na	FL 488	701	O						4C
na	FL 584	956	OVA				9A	8A	
na	FL 636	1085	O						9G
na	FL 654	1092	OVA			12S	11A	9A	11G
na	FL 652	1112	OVA		14L		9A		

Cattle

Phase	Context number	Bone ID	dP4	P4	M1	M2	M3	M12
IA	FL F878 (1)	932					f	
RB	FL F871 +	5					a	
RB	FL F873/1 (1)	39						b
RB	FL 489	723	j		f	a		
RB	FL F871/1 (4)	940			j	g	b	
RB	FL F893/2 (1)	947		g				
RB	FL F882/1 (1)	952						k
RB	FL 583	962		e	k	j	g	
RB	FL 585	984					b	
RB	FL 588	1000		g	k	k	g	
RB	FL 588	1001						k
RB	FL 641	1108		c	j	f	d	
Na	FL F884 (1)	108					h	
Na	FL 486	422						k
Na	FL 486	447						B
Na	FL 486	448						B
Na	FL 486	449	k					
Na	FL 486	450						j
Na	FL 486	451					g	
Na	FL 480	542	j					
Na	FL 480	543						k
Na	FL 480	544						g
Na	FL 480	545						g
Na	FL 480	546						k
Na	FL 475	616					a	
Na	FL 485	633	j		b	E		
Na	FL 507	656			l	k	k	
Na	FL 488	695					k	
Na	FL Ph1195 (1)	1149	j					
Na	FL Ph1195 (1)	1150	l					

Pig

Phase	Context number	Bone ID	dP4	P4	M1	M2	M3	M12
RB	FL F919 (5)	183	a		C			
RB	FL 498	736				d	V	
RB	FL 498	776				e	V	
RB	FL 610	1069	f		e			
na	FL 486	534					b	
na	FL 522	768						d

4.4 **Tables 1–19**

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

Phase/	**IA**		**RB**								**RB**		**ND**	**TOTAL**	
Feature/	Ditch		Ditch		Occupation		Structure		Demolition		**Total**				
Taxa	NIF	*%*	NIF	*%*	NIF	*%*	NIF	*%*	NIF	*%*	NIF	*%*	NIF	NIF	*%*
Cattle	4	*25.0*	34	*23.3*	23	*4.2*	56	*21.8*	17	*15.3*	130	*12.3*	112	246	*17.0*
Cattle/Red deer			1	*0.7*							1	*0.1*	1	2	*0.1*
Sheep	1	*6.3*	5	*3.4*	11	*2.0*	5	*1.9*	3	*2.7*	24	*2.3*	11	36	*2.5*
Sheep/Goat			19	*13.0*	240	*44.3*	71	*27.6*	27	*24.3*	357	*33.8*	123	480	*33.1*
Sheep/Goat/Roe deer					1	*0.2*					1	*0.1*		1	*0.1*
Pig			5	*3.4*	44	*8.1*	11	*4.3*	4	*3.6*	64	*6.1*	29	93	*6.4*
Horse													1	1	*0.1*
Equid	7	*43.8*	9	*6.2*	6	*1.1*	31	*12.1*	5	*4.5*	51	*4.8*	7	65	*4.5*
Dog			11	*7.5*	1	*0.2*	1	*0.4*	2	*1.8*	15	*1.4*	2	17	*1.2*
Brown bear			3	*2.1*							3	*0.3*		3	*0.2*
Red deer			8	*5.5*	2	*0.4*	3	*1.2*			13	*1.2*	3	16	*1.1*
Red deer/Fallow deer							2	*0.8*			2	*0.2*	1	3	*0.2*
Fallow deer/Roe deer							1	*0.4*			1	*0.1*	1	2	*0.1*
Red fox			1	*0.7*							1	*0.1*		1	*0.1*
Hare					2	*0.4*	1	*0.4*			3	*0.3*		3	*0.2*
Rabbit									25	*22.5*	25	*2.4*	6	31	*2.1*
Lagomorph									1	*0.9*	1	*0.1*		1	*0.1*
Chicken					2	*0.4*					2	*0.2*		2	*0.1*
Chicken/Guinea fowl			1	*0.7*	6	*1.1*			1	*0.9*	8	*0.8*	2	10	*0.7*
Chicken/Pheasant					3	*0.6*	1	*0.4*			4	*0.4*		4	*0.3*
Chicken/Guinea fowl/Pheasant			9	*6.2*	38	*7.0*	2	*0.8*	1	*0.9*	50	*4.7*	2	52	*3.6*
Mallard/Domestic duck					1	*0.2*					1	*0.1*		1	*0.1*
Aythyin?					1	*0.2*					1	*0.1*		1	*0.1*
Rock dove/Feral pigeon?					1	*0.2*					1	*0.1*		1	*0.1*
Plover					1	*0.2*					1	*0.1*		1	*0.1*
Plover?													1	1	*0.1*
Woodcock					2	*0.4*					2	*0.2*	1	3	*0.2*
Rook/Carrion crow			2	*1.4*	4	*0.7*					6	*0.6*		6	*0.4*
Rook/Carrion crow?					1	*0.2*					1	*0.1*		1	*0.1*
Water rail					1	*0.2*					1	*0.1*		1	*0.1*
Turdid/Sturnid					1	*0.2*					1	*0.1*		1	*0.1*
Passeriforme					1	*0.2*					1	*0.1*		1	*0.1*
Total identified	12		108		393		185		86		772		303	1087	
Large mammal	3	*18.8*	20	*13.7*	37	*6.8*	41	*16.0*	11	*9.9*	109	*10.3*	43	155	*10.7*
Medium mammal	1	*6.3*	18	*12.3*	112	*20.7*	31	*12.1*	14	*12.6*	175	*16.6*	32	208	*14.3*
Total classified	4		38		149		72		25		284		75	363	
TOTAL	16		146		542		257		111		1056		378	1450	

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

IA	**Poor**	*%*	**Moderate**	*%*	**Good**	*%*	**Yes**	*%*	**No**	*%*	**Total**
Ditch	9	*75.0*	3	*25.0*			11	*91.7*	1	*8.3*	12
Total	9	*75.0*	3	*25.0*			11	*91.7*	1	*8.3*	12

RB	**Poor**	*%*	**Moderate**	*%*	**Good**	*%*	**Yes**	*%*	**No**	*%*	**Total**
Ditch	17	*15.7*	48	*44.4*	43	*39.8*	49	*45.4*	59	*54.6*	108
Occupation	97	*24.7*	143	*36.4*	153	*38.9*	230	*58.5*	163	*41.5*	393
Structure	130	*70.3*	52	*28.1*	3	*1.6*	158	*85.4*	27	*14.6*	185
Demolition	35	*40.7*	27	*31.4*	24	*27.9*	60	*69.8*	26	*30.2*	86
Total	273	*35.4*	271	*35.1*	228	*29.5*	494	*64.0*	278	*36.0*	772

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

RB	Cattle	*%*	Sheep/goat	*%*	Pig	*%*	Red deer	*%*
Chopped	2	*1.9*	7	*2.3*	1	*1.8*	1	*7.7*
Cut	1	*1.0*	7	*2.3*				
Sawn							1	*7.7*
Shave marks								
Split axially	3	*2.9*						
Unbutchered	97	*94.2*	292	*95.4*	56	*98.2*	11	*84.6*
Total	103		306		57		13	

Table 4. Burning frequencies by phase, excluding isolated teeth

IA	Ditch	ALL
Singed		
Burnt		
Calcined		
Unmodified	4	4
Total	4	4

RB	Ditch	%	Occupation	%	Structure	%	Demolition	%	ALL	%
Singed	27	*32.1*	10	*2.5*	13	*9.5*	3	*6.4*	53	*7.9*
Burnt			4	*1.0*			4	*8.5*	8	*1.2*
Calcined										
Burnt & calcined			1	*0.2*					1	*0.1*
Unmodified	57	*67.9*	389	*96.3*	124	*90.5*	40	*85.1*	610	*90.8*
Total	84		404		137		47		672	

Table 5. Gnawing frequencies by phase, excluding isolated teeth

IA	ALL exc.	ART.	Inc.	%
Canid				
Felid				
Rodent				
Part digested				
Unmodified	4	4	8	*100.0*
Total	4	4	8	

RB	ALL exc.	%	ART.	%	Inc.	%
Canid	70	*10.4*			70	*9.7*
Felid	2	*0.3*			2	*0.3*
Rodent	11	*1.6*			11	*1.5*
Part digested	3	*0.4*			3	*0.4*
Unmodified	586	*87.2*	47	*100.0*	633	*88.0*
Total	672		47		719	

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

IA	**All except articulated**			**Articulated**			**All**			
	NIF	Epiph.	MNI	NIF	Epiph.	MNI	NIF	%	Epiph.	MNI
Cattle	4	1	1				4	*33.3*	1	1
Sheep	1		1				1	*8.3*		1
Pig										
Equid	3	1	1	4	2	1	7	*58.3*	3	2
Dog						1				1
Total	8	2	3	4	2	2	12		4	5

RB	**All except articulated**						**Articulated**					**All**					
	NIF	%	Epiph.	%	MNI	%	NIF	%	Epiph.	%	MNI	NIF	%	Epiph.	%	MNI	%
Cattle	131	*21.1*	53	*25.9*	6	*21.4*						131	*20.4*	53	*24.4*	6	*17.6*
Sheep	382	*61.5*	106	*51.7*	16	*57.1*						382	*59.4*	106	*48.8*	16	*47.1*
Pig	59	*9.5*	27	*13.2*	4	*14.3*	5	*22.7*	3	*25.0*	2	64	*10.0*	30	*13.8*	6	*17.6*
Equid	45	*7.2*	12	*5.9*	2	*7.1*	6	*27.3*	1	*8.3*	1	51	*7.9*	13	*6.0*	3	*8.8*
Dog	4	*0.6*	7	*3.4*			11	*50.0*	8	*66.7*	3	15	*2.3*	15	*6.9*	3	*8.8*
Total	621		205		28		22		12		6	643		217		34	

Table 7. Minimum Number of Individuals, using different methods

Cattle	**IA**	**RB**
	ALL exc.	ALL exc.
Longbone	**1**	5
Prox/dist mandible		4
dP4/M3	**1**	**6**
Teeth *in-situ*		3

Sheep	**IA**	**RB**
	ALL exc.	ALL exc.
Longbone		7
Prox/dist mandible		9
dP4/M3	**1**	**16**
Teeth *in-situ*		13

Pig	**RB**	
	ALL exc.	ART.
Longbone	**4**	**2**
Prox/dist mandible	3	
dP4/M3	3	
Teeth *in-situ*	**4**	

Equid	**IA**		**RB**	
	ALL exc.	ART.	ALL exc.	ART.
Longbone	**1**	**1**	**2**	**1**
Prox/dist mandible			**2**	
dP4/M3				
Teeth *in-situ*				

Dog	**IA**	**RB**
	ART.	ART.
Longbone	**1**	**3**
Prox/dist mandible		
dP4/M3		
Teeth *in-situ*		

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

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

RB	Def.	Attrib.	Accum.	*Accum. %*	Range		Range		*Accum. min. %*	*Accum. max.%*	Suggested age
A											0-2 mnths
B											2-6 mnths
C	1	1	2	*16.7*					*11.8*	*11.8*	6-12 mnths
D	2		4	*33.3*					*23.5*	*23.5*	1-2 yrs
E	4		8	*66.7*					*47.1*	*47.1*	2-3 yrs
F	2		10	*83.3*			FGH	4	*58.8*	*82.4*	3-4 yrs
G	2		12	*100.0*	GH	1			*94.1*	*100.0*	4-6 yrs
H			12	*100.0*					*100.0*	*100.0*	6-8 yrs
I			12	*100.0*					*100.0*	*100.0*	8-10 yrs
Total	11	1				1		4			

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

Phase	**RB**		
Element/Fusion	U	F	*F%*
6-8 mnths			
Scapula	3	4	*57.1*
10 mnths			
Humerus D	2	2	*50.0*
Radius P		1	*100.0*
Total/Average	*2*	*3*	*60.0*
13-16 mnths			
1st phalange	2	23	*92.0*
2nd phalange		5	*100.0*
Total/Average	*2*	*28*	*93.3*
1.5-2 yrs			
Tibia D	1	5	*83.3*
Metapodial D	5	2	*28.6*
Total/Average	*6*	*7*	*53.8*
2.5-3 yrs			
Radius D	3	7	*70.0*
Ulna	2		
Femur P	2	3	*60.0*
Total/Average	*7*	*10*	*58.8*
3-3.5 yrs			
Humerus P	2		
Femur D	2		
Tibia P	1	1	*50.0*
Calcaneum	3	2	*40.0*
Total/Average	*8*	*3*	*27.3*

NB. Metatarsal 20-28 mnths

Table 10. Sheep anatomical representation by phase

Phase/	**IA**	**RB**	
Articulation/	ALL exc.	ALL exc.	
Element	N	N	%
Horncore		3	*10.3*
Skull		13	*44.8*
Mandible	1	19	*65.5*
Atlas		3	*10.3*
Axis		2	*6.9*
Scapula		7	*24.1*
Humerus P		5	*17.2*
Humerus D		10	*34.5*
Radius P		23	*79.3*
Radius D		29	*100.0*
Ulna		5	*17.2*
Metacarpal P		15	*51.7*
Metacarpal D		19	*65.5*
Pelvis		7	*24.1*
Femur P		10	*34.5*
Femur D		14	*48.3*
Patella		1	*3.4*
Tibia P		18	*62.1*
Tibia D		24	*82.8*
Astragalus		3	*10.3*
Calcaneum		6	*20.7*
Navicular cuboid		3	*10.3*
Metatarsal P		19	*65.5*
Metatarsal D		23	*79.3*
1st phalange		8	*27.6*
2nd phalange		2	*6.9*
3rd phalange		1	*3.4*

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

IA	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	1	36-50	
41-45			41-50		41-55	
46-50			46-55			
Total				1		

RB	Def.	Attrib.	Range		Range	Suggested age
1-5			1-10		1-15	
6-10			6-15		6-20	<6 mnths
11-15			11-20	1	11-25	
16-20			16-25		6-25	
21-25			21-30			
26-30		1	26-35	1	26-40	2-2.5 yrs
31-35	2		31-40			2-3 yrs
36-40			36-45		36-50	
41-45	2		41-50		41-55	
46-50			46-55			
Total	4	1		2		

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

Phase	**IA**		**RB**		
Element/Fusion	U	F	U	F	*F%*
7-10 mnths					
Scapula				2	*100.0*
12-16 mnths					
Humerus D				4	*100.0*
Radius P		1	1	4	*80.0*
1st phalange				2	*100.0*
2nd phalange				1	*100.0*
Total/Average		*1*	*1*	*11*	*91.7*
2-3 yrs					
Tibia D			1	5	*83.3*
Metapodial D			2	3	*60.0*
Total/Average			*3*	*8*	*72.7*
3.5-4 yrs					
Humerus P				1	*100.0*
Radius D			2	1	*33.3*
Ulna					
Femur P			1		
Femur D					
Tibia P				2	*100.0*
Calcaneum				1	*100.0*
Total/Average			*3*	*5*	*62.5*

Table 13. Cattle anatomical representation by phase

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

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

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

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

Phase **Element/Fusion**	**RB** U	F	*F%*
1 yr			
Scapula			
Humerus D			
Radius P	3		
2nd phalange	2	1	*33.3*
Total/Average	*5*	*1*	*16.7*
2-3 yrs			
Tibia D	1	2	*66.7*
Calcaneum	1	1	*50.0*
Metapodial D		1	*100.0*
1st phalange	2	1	*33.3*
Total/Average	*4*	*5*	*55.6*
3.5-4 yrs			
Humerus P			
Radius D	5		
Ulna			
Femur P	1		
Femur D	1		
Tibia P			
Total/Average	*7*		

Table 16. Pig anatomical representation by phase

Phase/	**RB**	
Articulation/	ALL exc.	ART.
Element	N	N
Skull	1	
Mandible	5	
Atlas		
Axis		
Scapula	8	
Humerus P	1	
Humerus D	2	
Radius P	5	
Radius D	7	
Ulna	1	
Metacarpal P		
Metacarpal D		
Pelvis	1	
Femur P	1	
Femur D	2	
Patella		
Tibia P	8	
Tibia D	9	
Astragalus	1	
Calcaneum	2	
Navicular cuboid		
Metatarsal P	1	2
Metatarsal D		2
1st phalange	1	
2nd phalange	1	
3rd phalange		

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

Phase	**IA**		**RB**	
Element/Fusion	U	F	U	F
1 yr				
Scapula				
1st phalange				2
2nd phalange				1
Total/Average				*3*
15-18 mnths				
Humerus D				
Radius P				
Metapodial D				2
Total/Average				*2*
20-24 mnths				
Tibia D		1		3
3-3.5 yrs				
Humerus P				
Radius D				
Ulna				
Femur P				
Femur D				
Tibia P			1	1
Calcaneum			1	
Total/Average			*2*	*1*

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

Table 19. Dog anatomical representation by phase

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

4.5 **Small mammal bones** by Jim Williams

Table 1. Small mammal bones from Fullerton

SITE	FL00	FL00	FL00	FL00	FL01
CONTEXT	F920 (2)	F920 (2)	TR1	F922 (1)	F980 (1)
SAMPLE	HC	HC	514	HC	HC
SPECIES	20 large	20	20	20	6
N^{o} of bones	1	3	2	1	5
Right mandible					1
R M_1					1
R M_2					1
R M_3					1
incisors					1
femur	1	2	2	1	
Tibia		1			

Species code 20 = indet. Rodentia; 6 = water vole