IMAGE SYSTEM
TEST TARGET

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

1.0 lp/mm

1.5 lp/mm

2.0 lp/mm

2.5 lp/mm

10 PT. ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

8 PT. ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

6 PT ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

4 PT ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

100mm

Castle Rising Castle, Norfolk

by Beric Morley and David Gurney

with contributions from
Susanne Atkin, Matthew Canti, John Cherry, H.E.M. Cool, Elisabeth Crowfoot, Andrew Crowson, B.M.A. Ellis, J.G. Evans, Frances Healy, Michael Heyworth, R.T. Jones, David King, Barry Knight, Alison Locker, Sue Margeson, Bill Milligan, Graham Morgan, Terry O'Connor, A.R. Pipe, K. Reilly, S.E. Rigold, Paul Rutledge, Brian Spencer, D.F. Williams and Val Williams

with illustrations by
Steven Ashley, Andrew Crowson, Judith Dobie, David Fox, David Gurney and Hoste Spalding

and photographs by
Derek A. Edwards, Beric Morley and David Wicks

East Anglian Archaeology
Report No. 81, 1997

Field Archaeology Division
Norfolk Museums Service

A2

EAST ANGLIAN ARCHAEOLOGY
REPORT NO. 81

Published by
Field Archaeology Division
Norfolk Museums Service
Union House
Gressenhall
Dereham
Norfolk NR20 4DR

in conjunction with
The Scole Archaeological Committee

Set in Times Roman by Joan Daniells using ®Ventura Publisher
Printed by

ISBN 0 905594 23 1

For details of *East Anglian Archaeology*, see last page

This volume is published with the aid of a grant from English Heritage

Cover:
Aerial photograph of Castle Rising castle and village, looking north-west.
28 July 1983 (Ref. TF6624/ABB/ATJ25). Photo: Derek A. Edwards

A3

Contents of Microfiche

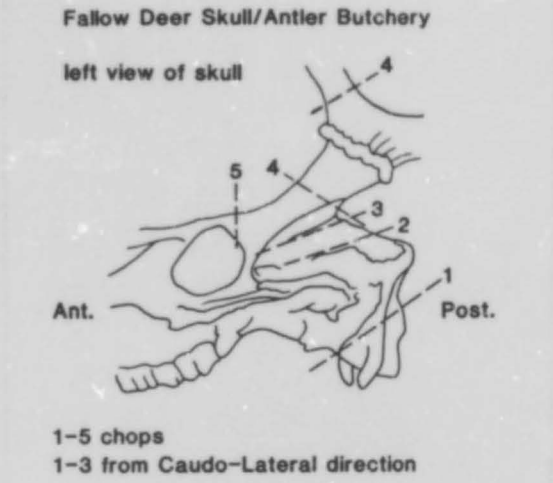

Figure 94 Fallow deer butchery

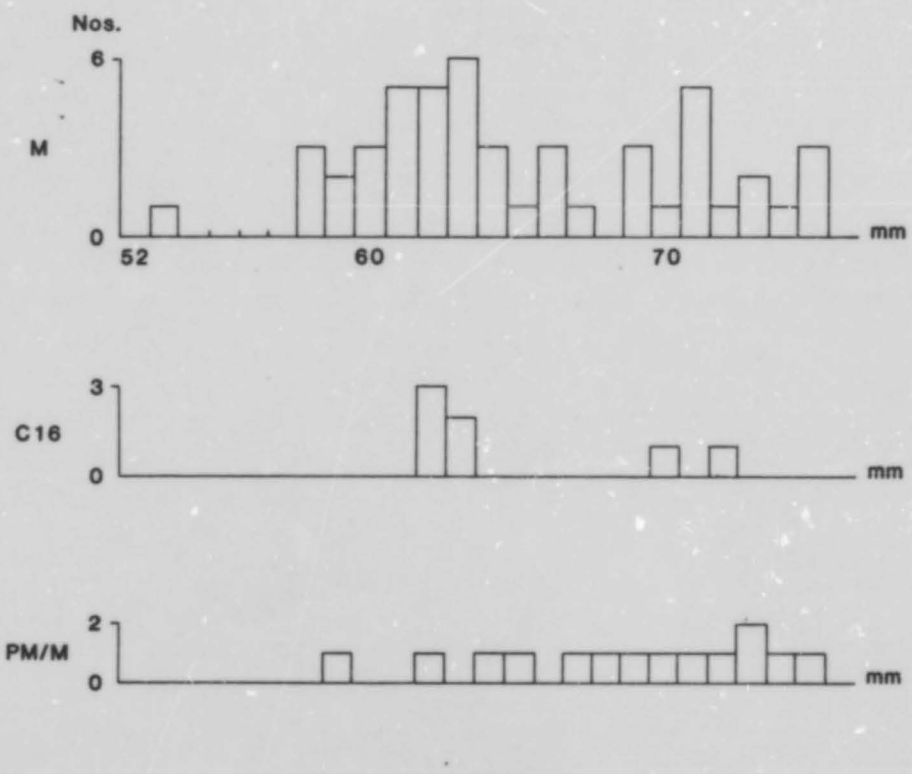

Figure 95 Domestic fowl humeri. Greatest lengths

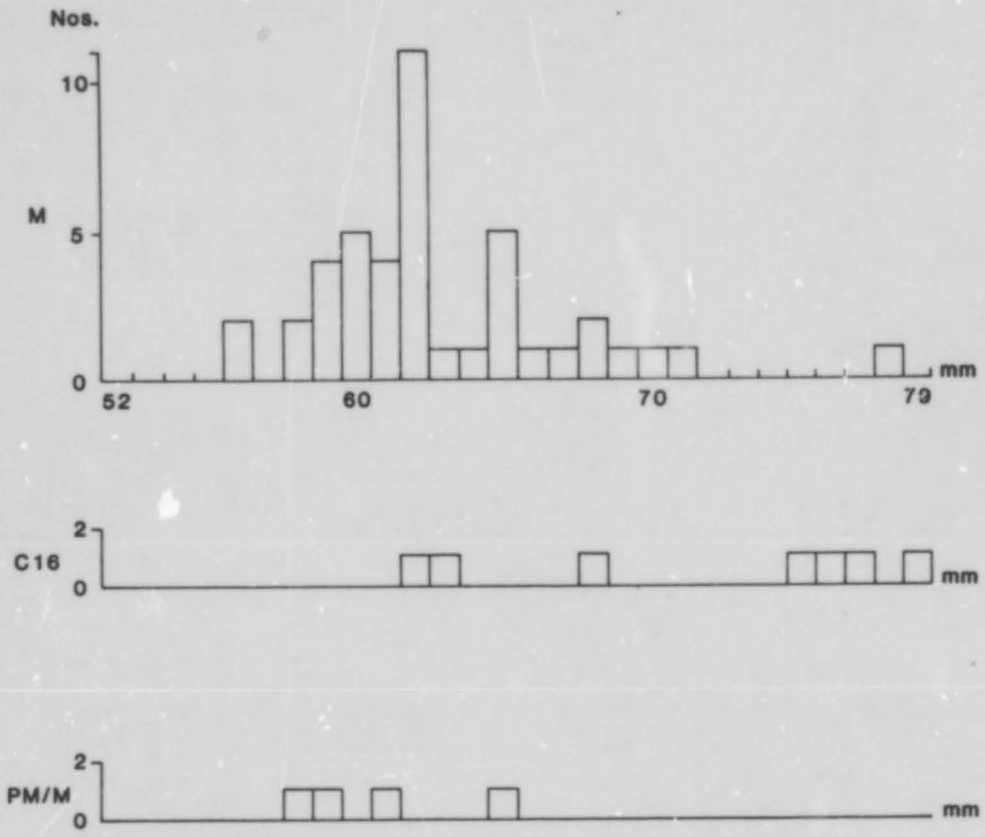

Figure 96 Domestic fowl ulnae. Greatest lengths

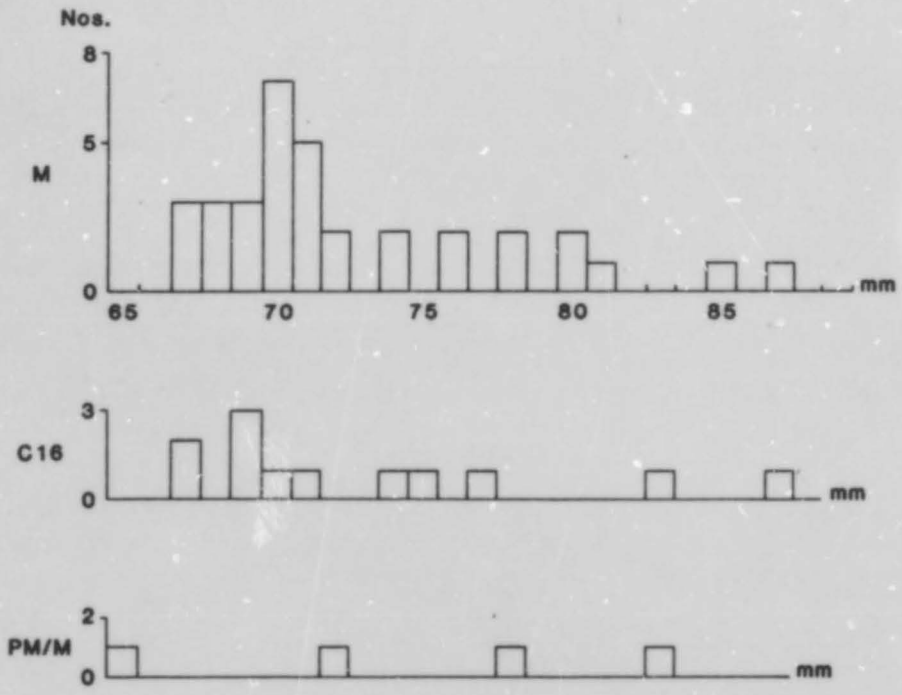

Figure 97 Domestic fowl femora. Greatest lengths

AG

BTL

57.4

103.2

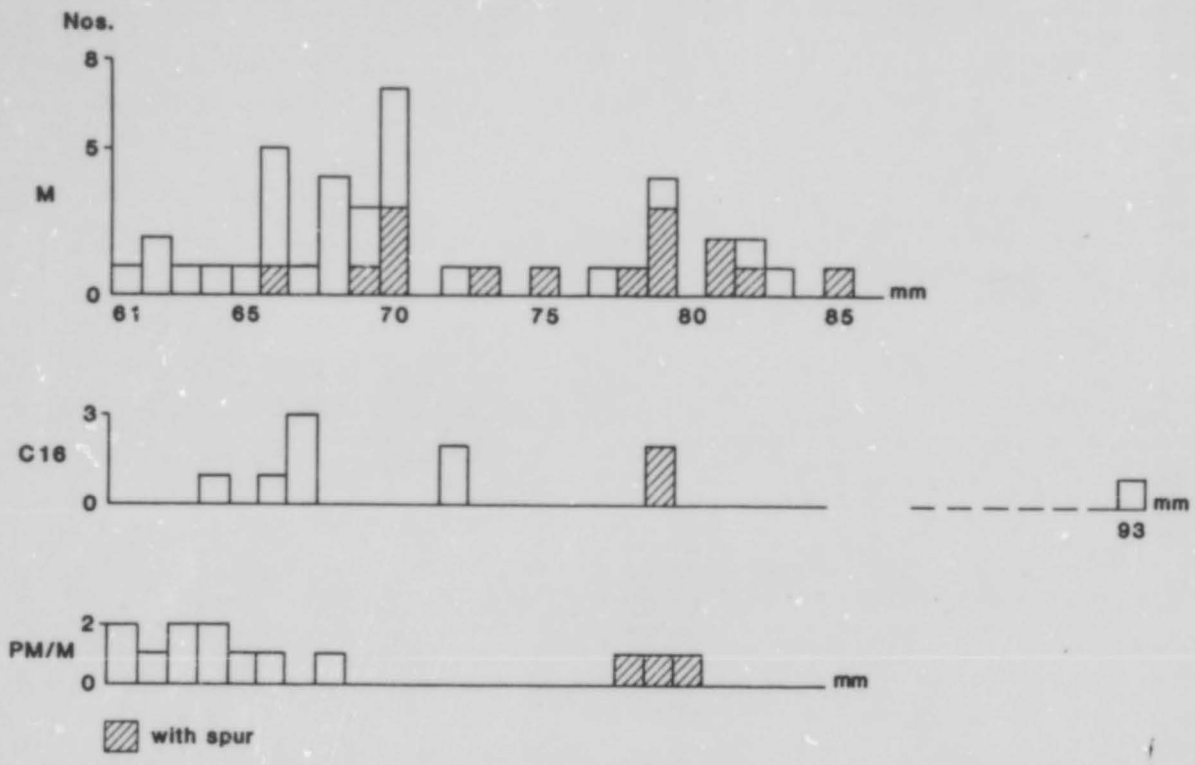

Figure 98 Domestic fowl tarsometatarsi. Greatest lengths

115.4
86.3
53.7
88.0

Table 7.

Estimated combined cow, sheep/goat and pig numbers

Phase	T3	X	T3-X	% of T3
Saxo-Norman	1202	126	1076	89.5%
Medieval	8480	2785	5695	67.1%
16th century	2564	936	1728	67.4%
Post-medieval	1992	744	1248	62.6%

Notes

For T3 see Table 1.

X-T4 (Table 1) is the number of cow, sheep/goat, pig, large unidentified ungulate and small unidentified ungulate.

Ends

Table 8.

Number (N) of mandibles of cow, sheep/goat and pig and calculated minimum numbers (M.N.)

Species	Saxo-Norm	Med	16th C	Post-med
	N(M.N.)	N(M.N.)	N(M.N.)	N(M.N.)
Cow	11(6)	19(11)	24(13)	2(1)
Sheep/goat	9(5)	22(11)	36(19)	6(4)
Pig	15(9)	128(67)	29(16)	20(12)

Ends

Table 9.

Estimation of minimum meat weights of cow, sheep/goat, pig and fallow deer

Saxo-Norm	M.N.	Min.wt (lbs)	% meat	Med	M.N.	Min.wt (lbs)	% meat
Cattle	6	3000	69.7		11	5500	38.0
Sheep	5	300	7.0		11	660	4.6
Pig	9	900	20.9		67	6700	46.3
Fallow	1	100	2.3		16	1600	11.0
16th C.				P.Med			
Cattle	13	6500	58.9		1	500	15.9
Sheep	19	1140	10.3		4	240	7.6
Pig	16	1600	14.5		8	800	25.5
Fallow	18	1800	16.3		16	1600	50.9

Notes

M.N. - Minimum number (Table 1)

Min.wt - Minimum weight of meat represented

The meat yield of a cow is estimated at 500 lbs.

The meat yield of a sheep is estimated at 60 lbs.

The meat yield of a pig is estimated at 100 lbs.

For fallow deer (Chapman) only the killing weights are available.

The mean weights for Richmond Park deer are:-

Doe	Buck	Doe/buck	
85.8	114.4	100	(all in lbs.)

Ends

Table 10.

Sheep/goat horncores

Phase	Ovis	Capra	Measurements	1	2
Sax-Norm	0	2	Capra	67.0	40.3
Medieval	5	1	Capra	30.7	21.2
16th C	21	0	Ovis	37.8	23.1
				39.1	24.8
				35.3	21.8
				27.3	17.2
Post-med	3	0	-	-	-

Notes

Measurements

1 = Oro/aboral diameter 2 = Lateral/medial diameter

Ends

Table 11.

Cattle mandible ageing data (from Silver, 1963)

Phase	Age Group	No.
Saxo-Norman	>24-30 months	6
Medieval	Birth-3 weeks	1
	>24-30 months	7
16th century	Birth-3 weeks	3
	28-36 months	1
	>24-30 months	8
Post-medieval	>24-30 months	1

Ends

Table 12.

Sheep/Goat mandible ageing data (from Silver 1963)

Phase	Age Group	No.
Saxo-Norman	>18-24 months	6
Medieval	3-9 months	1
	12-18 months	2
	>18-24 months	6
16th century	3-9 months	2
	12-18 months	2
	>18-24 months	21
Post-medieval	>18-24 months	3

Ends

Table 13.

Pig mandible ageing data (from Silver 1963)

Phase	Age Group	No.	
Saxo-Norman	<12-16 months	3	
	12-22 months	8	(2 male)
	>17-22 months	3	(1 male)
Medieval	<4-6 months	4	
	4-21 months	21	(4 male, 2 female)
	12-17 months	35	(11 male, 8 female)
	>17 months	29	(8 male, 6 female)
16th century	<12-16 months	3	
	12-22 months	7	(4 male, 1 female)
	>17-22 months	10	(2 male)
Post-medieval	<12-16 months	3	
	12-22 months	9	(1 male, 1 female)
	>17-22 months	7	(2 male)

Ends

Table 14.

Withers heights for cow, sheep/goat and pig

Phase	Species	Bone	G.L.	Withers Heights (mm)
Medieval	Cattle	MT	194.5	Cow 1040.6 Bull 1079.5 No sex 10
Medieval	Sheep	Rad	151.6	606.4
			138.4	553.6
			142.9	571.6
			147.1	588.4
Medieval	Sheep	Cal	53.6	548.3
			54.7	559.6
			51.5(2)	526.8
			57.4	587.2
			53.8	550.4
			49.5	506.4
			51.3	524.8

Notes

G.L. = Greatest length MT = Metatarsal

Rad = Radius Cal = Calcaneum

Ends

Table 15.

Fallow deer minimum numbers and bone element distribution

	SN		M		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Antler			4	3	37	12	6	3
Skull					5	5		
Maxilla			2	2	6	4		
Mandible	1	1	7	4	32	18	12	7
Atlas			1					
Axis			2		1			
Scapula			3	2	9	5	2	2
Humerus			3	3	13	7	7	5
Radius			8	5	12	7	9	4
Ulna					2	1	1	1
Carpal								
Metacarpal			8	5	18	12	20	11
1st phal.			4		11			
2nd phal.					3		1	
3rd phal.					2		1	
Pelvis			7	4	1	1	3	2
Femur			12	4	5	2	1	1
Patella								
Tibia	2	1	26	13	14	8	10	5
Fibula								
Calcaneum			8	7	6	4	4	3
Astragulus	1	1	10	6	10	6	5	4
Tarsal			2				2	
Metatarsal			45	17	28	12	33	16
Vertebrae								
Others	3		1		12		9	

Table 15 Page 2 of 2

Fallow deer minimum numbers and bone element distribution

Key

SN	Saxo-Norman
M	Medieval
16th	16th century
Pm/m	Post-medieval/modern
N	No.bones/no.fragments
MN	Minimum no.animals represented

Ends

Table 16.

Fallow Deer epiphysis fusion

		SN			M			16th			PM/M		
		F	UF	%F	F	UF	%F	F	UF	%F	F	UF	%F
Scapula	- d							9		100	1		100
	- p											1	0
Humerus	- d				3		100	14	1	93.3	6		0
	- p				6		100	10		100	6		100
Radius	- d							4		100	2	1	66.7
	- p				1		100	1		100			
Ulna	- d												
	- p				5	3	62.5	1		100			
Femur	- d				4	1	80.0	1		100	1		100
	- p	1			2	2		1			4		
Tibia	- d	2			20			12			8		
	- p				8			13			16		
Metacarp	- d				3			14	1		14	4	
	- p				27			20			26	1	
Metarars	- d				17	5		10	2		15	2	
Calc.	- p				4	2		5			3		
R/U fused					1			3			1		
1st phal	- p				4			7					
2nd phal	- p							2			1		

Key p proximal d distal F fused

UF unfused %F % fused R/U radius/ulna

Ends

Fallow Deer mandible ageing (after Chapman and Chapman)

a. Fallow mandibles accurately aged up to 7 years

Age	Nos.			
	SN	M	16th	PM
7-13 months			4	
13-17 months			1	1
17-20 months			2	1
3-4 years		4	4	2
5 years			8	2
6 years		1		2
7/>7 years			6	1

b. Total fallow mandibles including those not accurately aged

Age	Nos.			
	SN	M	16th	PM
7-13 months			4	
13-21 months		1	4	1
3/>3 years	1	6	23	11
Total	1	7	31	12

Key

SN	Saxo-Norman
M	Medieval
16th	16th century
PM	Post-medieval

Ends

Table 18.

Fallow Deer antler data

Phase	Context	Posn/Frag.	Age(yrs)	Shed	Descr.	Skull	Suture Fused?	Butchery	Measurements CB	CD	PB	PD	BTL
M	273	RPE			PSLGO			4 PE/LAT	24.3	32.1	24.5	25.2	
M	429	RPE,.5BT,B	=/>3		PSGEO	F/IMM P	U	2	31.4	43.7	26.0	31.1	
M	447	RPE,.5BT,B	=/>3		PSGEO	F/IMM P	.5	3			28.1	30.2	
16th	18	L,PE,.5BT,B	=/>3		PSLGO	F,P	U	2	29.2	41.4	26.3	28.6	
16th	68	LRPE,.5BT B,.5TR	=/>3		PSGEO	F/IMM P	U	3	30.3	47.4	26.3	28.1	
16th	68	R,PE,BT,B	2		PSDGRC		U	4	23.8	26.6	21.3		57.4
16th	70	R,PE,.5BT,B	=/>3	S	GEO		U		31.8	39.1			
16th	281	LR/PE,.5BT, .5TR,BX	=/>3		PSGEO	POST.5	U	1					
16th	334	LPE,BT,B	=/>3		PSGEO	F/P	U	2	31.4	41.9	26.8	28.6	103.2
16th	453	LPE,BT,B	=/>3		PSGEO	F/IMM P	U						
16th	473	RPE,.5BT,B	=/>3	S	PSGEO	F	U		28.5	40.7			
16th	530	LPE,.5BT,B	=/>3	S	PS O		F		33.0	47.3			
16th	537	RPE,.5BT,B	=/>3		PSGEO	F/P	U	2	27.4	43.8	25.9	28.1	
16th	537	LPE,.5BT,B	=/>3		PSGEO	F/IMM P	.5	3	31.9	45.1	30.4	30.6	
16th	537	LPE,.5BT,B	=/>3		PSGEO	F/IMM P	.5	3	33.9	45.7	29.5	31.8	
16th	652/ 650	LPE,IMM BT .5TR,B	=/>3	S	PSGEO		F	4 BR LAT	34.6	46.6			
16th	975	L/R PE,BT,	=/>3		PSGEO	F,IMM P	U	3	34.7	47.5	29.3	31.2	115.4
16th	975	LPE,BT,B	=/>3		PSGEO		F	4 PE,MED,LAT					86.3
16th	984	RPE,.5BT,B	=/>3		E		F						
16th	984	RPE,.5BT,	=/>3		PSGEO	F,IMM P	F						
16th	990	RPE,BT,B	2		PSGEO	F	F	3+5	25.1	27.8	22.9	23.2	53.7
16th	992	LPE,BT,B	=/>3		PSGOE	F	F	3+5	29.6	44.9	27.2	28.9	88.0
16th	995	RPE,.5BT,B	=/>3		PSGEO	F	U	3					
PM	20	LPE,.5BR,B				IMM F/P	U	4 PE,MED					
PM	272	LPE,.5BR,B	=/>3		PSGEO		F						
PM	273	LPE,.5BR,B	=/>3	S	PSGEO		F						

Table 18

Fallow deer antler data

Key

1. Position, fragmentation, skull, butchery

L/	left/right
PE	pedicle (unless shed) burr and coronet
BP	brow tine
B	beam
TR	treztine
.5	half (approx)
IMM	immediate
LAT	lateral
MED	medial (chopping from these directions)
1-5	see Figure
F	frontal
P	parietal

2. Description

S	shed
PS	porous
G	grooves
E	eroded
L	light
D	deep
O	oval coronet
RC	round coronet
F/U/O.5	suture fused/unfused/half-open

3. Measurements

CB	coronet breadth
CD	coronet depth
PB	pedicle breadth
PD	pedicle depth
BTL	brow tine length

N.B. 650 and 652 are same antler but new break.

Undefined fragments:-	Phase	M	16th	PM
	Number	1	14	2

Ends

B10

Table 19.

Fallow deer measurements (mm)

Mandible length

Castle Rising			Black fallow from A.M.L. ref.collection
M	16th	PM	
83.5	86.2	89.9	Male 91.30
84.2	87.7	89.4	Female 87.91
84.9	87.1	85.9	
86.2	87.5		
86.1	88.8		
95.6	92.5		
	87.0		
	88.6		
	85.9		
	86.1		
Mn 86.75	87.70	88.40	
Ra 12.10	6.60	4.00	

B11

A10

A11

B12

Table 19

Fallow deer measurements (mm)

	Metapodials												
	M				16th				PM				
	MC		MT		MC		MT		MC		MT		
	GL	SB	GL	SB	GL	SB	GL	SB	GL	SB	GL	SB	
	186.3	15.7	235.3	17.9	245.0	18.4	210.6	15.6	201.4	19.1	235.3	19.5	
	186.8	16.0	227.7		186.3	15.4	230.1	17.8	196.8	18.3	234.7	17.6	
	182.4		219.4		205.3	18.5	210.4	15.7	206.7	190.3	219.2	17.1	
	187.7	15.5	230.0	17.4	202.8	17.9	231.3	19.7	196.1	18.1	237.3	18.1	
			208.3	15.1	200.8	18.5	225.7	18.6	208.4	18.5	207.1	15.5	
			232.7	17.9					185.1	15.3	230.6	19	
			201.5	15.8					192.4		226.3	17.3	
			199.2	14.7					213.2	18.6			
	185.8	15.7	219.3	16.5	208.0	17.7	221.6	17.5	200.0	18.2	227.2	17.8	Mn
	5.3	0.5	36.1	3.2	44.2	3.1	20.9	4.1	28.1	4.0	30.3	4.2	Ra

Key

MC Metacarpal

MT Metatarsal

GL Greatest length

SB Minimum breadth of shaft

All measurments in mm.

Mandible measurement is length of cheek tooth row.

Mn mean

Ra range

Ends

B13

A12

A13

Table 20

Dog bone element distribution

	Nos.							
	SN		M		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Skull	1		3		7		1	
Maxilla			2	1	2	2		
Mandible	2	2	7	4	8	5	4	3
Atlas	1		1		1			
Axis			2		1		4	
Scapula			17	8	3	2	4	3
Humerus	1	1	38	12	9	5	11	5
Radius	2	1	25	8	6	2	9	3
Ulna	2	2	22	13	6	3	8	6
Carpal			2		1			
Metacarpal	2		24		7		11	
1st phal.	1		4		1		3	
2nd phal.			4					
3rd phal.								
Pelvis			4	2	6	3	4	3
Baculum			1					
Femur	1	1	43	19	5	3	7	4
Patella								
Tibia	1	1	25	10	8	4	9	5
Fibula			7					
Calcaneum	1	1	12	9	1	1	2	1
Astragulus			3	2	2	1	1	1
Tarsal			2					

Table 20

Dog bone element distribution

	SN		M		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Metatarsal	5		37		11		9	
Ribs			26		14			
Vertebrae			29		18			
Others	3		7		9		15	

Key

N Nos. of bones/nos.fragments

MN Minimum numbers

Ends

Table 21.

Dog epiphysis fusion

		SN		M		16th		PM/M	
		NF	F	NF	F	NF	F	NF	F
Humerus	- p				12	3	7	1	3
	- d		1		14	1	5	1	7
Radius	- p	1	1		15		1		4
	- d				12		4		3
Femur	- p		1	2	27	2	3		5
	- d				15	2			1
Tibia	- p		1	1	9	2	2		7
	- d				19	2	6		5
Ulna	- p		2	1	16	2	3		7
Metacarp.	- d		2	1	11		3		8
Metatars.	- d				16		4		4
Calcaneum	- p		1	1	10		1		2
1st phal.	- p								

Key

p proximal d distal

F fused NF non-fused

Ends

Table 22

Dog/Cat measurements

Skull measurements:- (1) From the most posterior aspect of the occipital protruberance to the anterior margin of the medial incisor alveoli between the central incisors (alveolare).

(2) From nasion to alveolare.

(3) Palatal width between PM4 and M1.

Other measurements:- GL greatest length

SD minimum breadth of shaft

() withers heights

All measurements in mm.

Table 22 Page 2 of 3

22a. Dog measurements

		M	16th	PM
Skull	1		176.7	
	2		87.2	
	3	79.7	55.4	
	3		68.2	
Humerus	GL	193.1		165.0
	SD	16.1		12.4
	()	635.8		539.4
Humerus	GL	142.6		
	SD	11.1		
	()	462.6		
Radius	GL	138.5		132.2
	SD			9.8
	()	454.4		434.6
Femur	GL	167.3		
	SD	11.4		
	()	512.4		
Tibia	GL	212.7	244.2	142.5
	SD	15.7	17.1	8.7
	()	630.5	722.4	425.5
Tibia	GL	166.7	194.2	181.7
	SD	10.6	12.8	12.4
	()	496.2	576.5	539.9
Tibia	GL	180.5	102.6	
	SD	11.2		10.7
	()	536.5		309.0

22b. Cat measurements

Humerus	GL	77.5	
	SD	5.1	
Radius	GL		80.2
	SD		4.5
Tibia	GL	14.1	

Ends

Table 23.

Cat bone element distribution

	SN		M		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Skull								
Maxilla	1	1						
Mandible			2	1	1	1	2	1
Atlas								
Axis								
Scapula			2	2				
Humerus			5	3	3	1	1	1
Radius			1	1	1	1	1	1
Ulna			2	2			3	2
Carpal								
M/carpal							6	
1st phal.								
2nd phal.								
3rd phal.								
Pelvis			2	1				
Femur	1	1	8	5			4	3
Patella								
Tibia			2	2	1	1	3	1
Fibula								
Calcaneum								
Astragulus								
Tarsal								
M/tarsal							1	
Vertebrae								

N no.bones/no.fragments MN minimum no.animals represented

Ends

Table 24.

Cat epiphysis fusion

		SN		M		16th		PM/M	
		NF	F	NF	F	NF	F	NF	F
Humerus	- p			1	2	1		1	
	- d			1	4		1		1
Radius	- p				2				1
	- d								1
1st phal	- p								
2nd phal	- p								
M/carpal	- d							1	2
Tibia	- p			1	1				2
	- d				1				1
M/tarsal	- d								1
Ulna	- p			1	1				2
Calcaneum	- p								
Femur	- p		1		2			1	3
	- d		1	4	3				2

Key

F fused

NF non-fused

p/d proximal/distal

Ends

Table 25.

Rabbit bone element distribution

	SN		MN		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Skull			5		1		1	
Maxilla			3	2	3	2		
Mandible	1	1	32	16	15	8	2	1
Atlas			2					
Axis			2					
Scapula			12	6	3	3		
Humerus	1	1	27	11	14	9	8	4
Radius	1	1	17	7	8	4	5	3
Ulna			10	4	2	2	5	3
Carpal			4					
M/carpal			36		1			
1st phal.			15		1		1	
2nd phal.			8					
3rd phal.			2					
Pelvis	1	1	16	8	10	8	6	3
Femur	1	1	43	15	11	6	23	8
Patella								
Tibia	4	2	27	10	11	5	15	8
Fibula								
Calcaneum			6	2			2	1
Astragulus			1	1			1	1
Tarsal								
M/tarsal	1		55		13		11	
Vertebrae			10					
Others			1		2			
					Ends			

Table 26.

Rabbit epiphysis fusion

		SN		M		16th		PM/M	
		NF	F	NF	F	NF	F	NF	F
Humerus	- p	1		2	12	1	4	1	2
	- d	1			22	1	12	1	5
Radius	- p			2	5		4	1	4
	- d	1		1	9		3	1	
Ulna	- p			3	6	1	1	3	1
M/carpal	- d			1	6		1		
Tibia	- p	3		3	13	2	3	4	7
	- d	1	2	3	14	2	5	2	7
M/tarsal	- d		1		17	2	4		5
Calcaneum	- p				2		1		2
Femur	- p			11	16	4	4	5	8
	- d		1	8	17	1	4	5	9

Ends

Table 27.

Hare bone element distribution

	SN		M		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Skull			3					
Maxilla					1	1	1	
Mandible			3	2			2	1
Atlas								
Axis								
Scapula								
Humerus			11	6	1	1	3	2
Radius			6	3				
Ulna			5	4				
Carpal								
M/carpal			4					
1st phal.			3					
2nd phal.								
3rd phal.								
Pelvis			6	3			1	1
Femur			3	2			3	2
Patella								
Tibia	1	1	21	8			1	1
Fibula								
Calcaneum			5	4				
Astragulus			3	2				
Tarsal								
M/tarsal			21				2	
Vertebrae								
					Ends			

Table 28.

Hare epiphysis fusion

		SN		M		16th		PM/M	
		NF	F	NF	F	NF	F	NF	F
Humerus	- p			2	2				1
	- d				9		1		2
Radius	- p			1	6				
	- d				1				
M/carpal	- d			2	3				
Tibia	- p		1	3	4				1
	- d			1	11				1
M/tarsal	- d			2	14				1
Calcaneum	- p			1	3				
Ulna	- p								
Femur	- p				1				
	- d			1	1		1		2

Ends

Table 29.

Fowl bone element distribution

	SN		M		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Skull			3					
Mandible			1		1		1	
Trach.ring								
Coracoid	3	2	53	26	9	6	13	6
Furcula	1	1	23		2		3	
Scapula			32	13	2	2	6	3
Humerus	5	3	107	49	29	14	28	16
Radius	2	1	61	26	13	5	8	5
Ulna	7	3	97	47	22	12	16	8
Carpom.carp.			22	14	2	2	1	1
Sternum	2		30		3		2	
Pelvis			27		2		4	
Synsacrum			13		6		2	
Femur	10	4	133	54	29	14	26	9
Tibiotarsus	8	4	148	67	33	15	44	13
Fibula			21				1	
Tarsom/ tarsus	3	1	144(26)	55	22(4)	11	36(3)	15
Ant.phalanx								
Post.phalanx			26		1			
Vertebrae			9		3			
Ribs			2					

N.B. () Nos.with spur

Ends

Table 30.

Fowl longbone fusion

	SN		M		16th		PM/M	
	NF	F	NF	F	NF	F	NF	F
Humerus	4	1	78	19	15	10	19	8
Radius	2	0	42	9	8	3	6	3
Ulna	5	0	74	22	13	9	12	3
Femur	10	0	102	18	23	4	18	4
Tibiotarsus	4	1	92	34	23	5	28	10
Tarso m/tarsus	1	0	86	47	15	6	22	7
TOTAL	26	2	472	149	98	37	105	35
% unfused		7.7		24.0		27.5		25.0

N.B. Fusion of longbones by c. 6 months (Silver 1969, 300)

Ends

Table 31.

Goose bone element distribution

	SN		M		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Skull			1	1				
Mandible			4	3				
Trach.ring								
Coracoid	1		10	6			3	3
Furcula			12	2			1	
Scapula			7	4			2	
Humerus	1		46	20	1		6	4
Radius			36	13	4	2	9	5
Ulna	1	38	13	4	2	4	3	
Carpom/carp.	3	2	28	17	7	4	6	4
Sternum			3	1	1		2	
Pelvis			5				2	
Synsacrum			4				2	
Femur			23	12	3	2	3	2
Tibiotarsus			26	12	7	4	2	2
Tarsom/tars.			27	12	3	2	9	7
Ant.phal.	1		3		1			
Post.phal.			9		5			
Vertebrae			6		2			

Ends

Table 32.

Duck (wild and domestice) Anas platyrhynchus type bone element distribution

	SN		M		16th		PM/M	
	N	MN	N	MN	N	MN	N	MN
Skull			1					
Mandible								
Trach.ring								
Coracoid			6	4	2	1	1	1
Furcula			1					
Scapula			1	1	2	1	2	1
Humerus			8	4	2	2	2	1
Radius			6	5	3	3	1	1
Ulna	1	1	9	6	8	4	2	2
Carpom/carp.			3	2	4	4	4	3
Sternum								
Pelvis			1	1	1	1		
Synsacrum			3		1		1	
Femur			2	2	1	1		
Tibiotars.			7	3	2	2		
Tarsom/tars.			6	3				
Ant.phalanx					1			
Post phalanx								
Vertebrae								
					Ends			

Table 33.

The fish bones

Context	Species	Anatomy
55.89	Ray	1 dermal denticle
	Cyprinidae, cf roach	1 pharyngeal tooth
	Eel	3 vertebral centra
	Cod?	1 tooth
55.83	Ray	2 dermal denticles
	Smelt	2 dentaries
		8 vertebral centra
	Eel	3 vertebral centra
	Cod?	10 teeth
	Flounder	1 pharyngeal tooth
55.43	Ray	8 dermal denticles
	Smelt	5 vertebral centra
55.33	Ray	1 tooth
	Trout	1 vertebral centrum
	Eel	1 vertebral centrum
	Cod?	3 teeth
	Flounder	1 dentary
		1 vertebral centrum
		1 supracleithrum

Table 33.

The fish bones

Context	Species	Anatomy
55.103	Ray	5 dermal denticles
	Trout	1 vertebral centrum
	Smelt	3 dentaries
		8 vertebral centra
	Black (or Common) Goby	1 dentary
55.38	Ray	1 dermal denticle
	Smelt	3 premaxillaries
		8 vertebral centra
		1 dentary
	Eel	2 vertebral centra
	Ling	1 tooth
55.84	Ray	2 dermal denticles
	Smelt	1 vertebral centrum
	Stickleback	2 pelvic spines
	Flounder?	1 pharyngeal tooth
55.34	Perch?	1 scale
	Flatfish (cf flounder?)	1 vertebral centrum
55.113	Smelt	1 dentary
		1 vertebral centrum

Table 33.

The fish bones

Context	Species	Anatomy
55.32	Smelt	2 vertebral centra
	Eel	1 vertebral centrum
	Perch?	1 scale
	Stickleback	1 vertebral centrum
55.92	Eel	1 vertebral centrum
	Perch?	3 scales
	Flatfish (cf flounder)	1 vertebral centrum
55.31	Trout	4 vertebral centra
	Smelt	7 vertebral centra
	Roach?	1 fragment of the pharyngeal
	Eel	5 vertebral centra
	Bib	1 dentary
	Stickleback	1 spine
	Flounder	3 vertebral centra
		1 dentary

Ends

Table 34.

Molluscs

Trench 55 layer	31	32	33	34	38	43	83	84	89	92	103
Valvata cristata M<!1>uller	-	-	-	-	-	2	-	-	-	-	-
Hydrobia ventrosa (Montagu)	10	3	3	2	-	3	1	-	-	1	-
Hydrobia ulvae (Pennant)	4	3	3	6	-	5	1	+	-	-	-
Bithynia tentaculata (L.)	-	1 op	-	-	-	-	-	-	-	-	3 op
Anisus leucostoma (Millet)	-	-	-	1	-	-	-	-	-	-	-
Cochlicopa lubricella (Porro)	3	-	5	1	-	-	1	-	1	-	-
Pupilla muscroum (L.)	6	7	2	2	-	--	-	-	-	-	-
Lauria cylindracea (da Costa)	19	2	17	4	2	14	15	4	8	-	-
Vallonia costata (M<!1>uller)	10	1	4	2	-	1	1	-	-	-	-
Vallonia excentrica Sterki	-	1	2	-	-	-	-	-	-	-	1
Ena obscura (M<!1>uller)	-	cf.2	-	-	-	-	-	-	-	-	-
Discus rotundatus (M<!1>uller)	96	30	33	46	8	2	4	-	-	-	-
Vitrea contracta (Westerlund)	55	21	42	3	-	-	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	6	-	1	-	-	-	-	-	-	-	-
Oxychilus cellarius (M<!1>uller)	63	15	21	12	-	18	7	2	2	-	-
Limacidae	3	-	2	3	-	-	-	-	-	-	-
Cecilioides acicula (M<!1>uller)	4	2	-	1	3	-	-	-	1	-	-
Cochlodina laminata (Montagu)	2	-	-	-	-	-	-	-	-	-	-
Clausilia bidentata (Str<!1>om)	4	-	-	3	-	2	-	1	-	-	-
Balea perversa (L.)	6	1	6	1	-	-	-	-	-	-	-
Helicella itala (L.)	2	-	-	1	2	-	-	-	-	-	-
Trichia hispida (L.)	53	7	22	4	2	12	5	2	6	-	1
Cepaea sp.	-	-	-	-	-	-	2	-	-	-	1
Helix aspersa (M<!1>uller)	-	-	-	-	-	1	-	-	-	-	-
Marine fossils	+	+	+	+	+	+	+	-	+	+	+
Marine shell fragments	-	+	+	-	+	+	+	+	-	+	-
Fish bone/scale	-	+	-	+	-	-	-	-	-	-	-

Key

Land and freshwater molluscs nomenclature after Kerney (1976).

+ presence noted, not counted; op = operculum; cf. = tentative identification.

Butchery marks were recorded from cow, large ungulate, sheep, goat, sheep/goat, small ungulate, red deer, fallow deer, roe deer, dog, domestic goose and domestic fowl.

This section describes, for each of these species, the occurrence of butchery marks in terms of bone element and location. Such descriptions are given only for identifiable bone elements.

Cow

Butchery marks were recorded from the skull, horn core, maxilla, mandible, scapula, humerus, radius, ulna, femur, tibia, astragalus, calcaneus, sacrum, sternebra, first sacral vertebra and rib.

Skull:- Medieval: one; chopped medio-laterally through the orbit.
16th century: one; showing a dorso-ventral chop through the temporal condyle.

Horn core:- Saxo-Norman: one; showing a proximal dorso-ventral chop.

Maxilla:- Medieval: one; chopped dorso-ventrally through the site of distal, ventral end of the bone.
Medieval: two mid-shafts each chopped dorso-ventrally, one through the site of M3.
16th century: five; four chopped dorso-ventrally at the mid-shaft, the remainder postero-anteriorly.
Post-medieval: one; chopped at the posterior mid-shaft.

Scapula:- Medieval: fifteen; showing various chops, all of which were mainly medio-lateral across the mid-shaft.
16th century: eight; six chopped medio-laterally, one sawn medio-later showing an oblique proximo-lateral chop.
Post-medieval: five; one sawn and the remainder chopped medio-laterally.

Cow (continued)

Humerus:- Saxo-Norman: two; one chopped right through medio-laterally; one postero-anteriorly.

Medieval: thirteen; with three exceptions, these showed oblique, medio-lateral cuts at the distal end of the shaft. The remainder were chopped postero-anterior at either the mid-shaft or the distal end.

16th century: two; one chopped medio-laterally at the distal end, the other postero-anteriorly at the mid-shaft plus a superficial antero-medial cut at the distal end.

Post-medieval: two; one chopped dorso-ventrally at the mid-shaft, one showed four cuts two superficial at the mid-shaft and two oblique medio-lateral.

Radius/Ulna:- Medieval: one; chopped medio-laterally.

16th century: one; chopped medio-laterally at the mid-shaft.

3rd/4th metacarpal:- Medieval: two; both chopped postero-anteriorly, one at the mid-shaft; one at the other at the distal end.

Post-medieval: one; chopped superficially from the lateral aspect.

Cow (continued)

Femur:- Medieval: eighteen; showing a variety of chops; particularly medio-lateral at the mid-shaft, dorso-ventral oblique at the proximal joint surface and medio-lateral and dorso-ventral oblique at the distal joint surfaces.
16th century: four; each showing a different mark. These were a medio-lateral chop at the proximal end of the mid-shaft, a dorso-ventral oblique chop through the proximal joint surface and two oblique dorso-ventral cuts, one lateral and one medial at the distal end.
Post-medieval: three; three different marks. One chopped right through postero-anteriorly at the mid-shaft; one chopped medio-laterally; one chopped dorso-ventrally/obliquely at the disto-lateral extremity.

Tibia:- Medieval: three; all chopped medio-laterally at the mid-shaft and distal end.
16th century: one; chopped medio-laterally at the mid-shaft.
Post-medieval: one; chopped medio-laterally at the mid-shaft.

Astragalus:- Medieval: four; three showed dorso-ventral chops, one chopped medio-laterally right through.
16th century: four; three chopped dorso-ventrally, one postero-anteriorly/oblique.

Calcaneus:- Medieval: one; chopped medio-laterally from the medial aspect.
16th century: one; chopped medially at the mid-shaft.
Post-medieval: two; sawn dorso-ventrally/obliquely.

Cow (continued)

Rib:- Medieval: two; one chopped dorso-ventrally at the proximal end; one medio-laterally at the mid-shaft.

Sternebra:- Medieval: two; both chopped dorso-ventrally.

Sacrum:- Medieval: three; two were chopped dorso-ventrally, one postero-anteriorly.

1st sacral vertebra:- Medieval: three; all chopped dorso-ventrally.

Large ungulate

Butchery marks were recorded from cervical, thoracic and lumbar vertebrae, ribs and long bone fragments.

Cervical vertebra:- Medieval: five; all chopped dorso-ventrally/oblique at the mid-shaft.

16th century: three; all chopped dorso-ventrally at the mid-shaft, caudal or obliquely.

Thoracic vertebra:- Medieval: fourteen; thirteen chopped dorso-ventrally, one postero-anteriorly.

Post-medieval: one; chopped dorso-ventrally.

Lumbar vertebra:- Saxo-Norman: one; chopped dorso-ventrally.

Medieval: twenty-four; all chopped dorso-ventrally.

16th century: seven; six chopped dorso-ventrally, one postero-anteriorly.

Rib:- Saxo-Norman: one; chopped medio-laterally.

Medieval: thirty-nine; thirty-three chopped medio-laterally, three dorso-ventrally at the proximal end, one dorso-ventrally at the mid-shaft; one oblique at the mid-shaft; one postero-anteriorly.

Long bone fragment:- Post-medieval: one; chopped.

Red Deer

Butchery marks were recorded from antler/antler tine, atlas vertebra and os coxae.

Antler:- 16th century: one; sawn at the mid-shaft.

Antler tine:- Medieval: one; chopped medio-laterally, postero-anteriorly at proximal end.

16th century: one; chopped at the proximal end and cut superficially at the mid-shaft.

Atlas vertebra:- 16th century: one; chopped dorso-ventrally.

Os coxae:- 16th century: one; chopped dorso-ventrally at the mid-shaft.

Roe Deer

Butchery marks were recorded from antler and tibia.

Antler:- Medieval: one; chopped medio-laterally right through at the proximal end.

Tibia:- Saxo-Norman: one; three dorso-ventral chops at the distal end.

Medieval: two; dorso-ventral oblique and postero-anterior mid-shaft chops.

Fallow Deer

Butchery marks were recorded from antler, skull, scapula, humerus, radius, ulna, 3rd/4th metacarpal, os coxae, femur, calcaneus, astragalus, tibia, atlas vertebra and axix vertebra.

Antler/skull:- see text and Fig.4.

Scapula:- Post-medieval: one; chopped cranio/medially at the mid-shaft.

Humerus:- Medieval: one; chopped postero-anteriorly at the mid-shaft.

16th century: three; two chopped medio-laterally at the mid-shaft. One cut on the posterior mid-shaft.

Radius:- Medieval: one; chopped medio-laterally at the mid-shaft.

16th century: one; chopped medially.

Post-medieval: three; one sawn and one chopped right through medio-laterally at the mid-shaft. One was chopped right through at the distal/lateral end.

Ulna:- Post-medieval: one; chopped at proximal joint surface.

3rd/4th metacarpal:- Medieval: three; one chopped medio-laterally at the distal end. One chopped laterally at the proximal mid-shaft, and one cut proximo-anteriorly.

Os coxae:- Medieval: two; one chopped through the ventro-cranial joint surface, the other cut ventrally mid-shaft.

Fallow deer (continued)

Tibia:- Medieval: six; four chopped dorso-ventrally at a number of points; mainly anterior and posterior oblique at the proximal end, mid-shaft and disto-lateral end. One was cut superficially at the distal end, one chopped medio-laterally.

16th century: two; chopped medio-laterally; one at the mid-shaft and one obliquely.

Post-medieval: two; both chopped dorso-ventrally, one obliquely and the other at the posterior mid-shaft.

Calcaneus:- Medieval: one; chopped medio-laterally right through at the mid-shaft.

Astragalus:- Medieval: four; two cut/chopped at the mid-shaft either postero-anteriorly or medio-laterally. One chopped postero-anteriorly at the posterior end and the remainder was cut superficially at the distal end.

Atlas vertebra:- Medieval: one; chopped dorso-ventrally at the cranial end.

Axis vertebra:- Medieval: one; chopped dorso-ventrally at the caudal end.

Sheep

Butchery marks were recorded from the skull and the horn core.

Skull:- 16th century: two; one split dorso-ventrally, one proximo-laterally.

Post-medieval: one; chopped through base of horn core.

Horn core:- Medieval: one; chopped dorso-ventrally/obliquely.

16th century: five; three chopped medio-laterally, one chopped mid-shaft, one chopped postero-anteriorly, one chopped medial right through.

Post-medieval: one; chopped at the proximal end.

Goat

Butchery marks were recorded from the skull only.

Skull:- Saxo-Norman: three; two chopped dorso-ventrally, one obliquely/medio-laterally.

Medieval: one; medial knife cut.

16th century: one; chopped dorso-ventrally.

Ovicaprid

Butchery marks were recorded from the mandible, scapula, humerus, radius, os coxae, femur, tibia, astragalus, calcaneus, atlas vertebra, axis vertebra and sacrum.

Mandible:- 16th century: seven; five chopped dorso-ventrally (two obliquely at the distal end, three at the mid-shaft). The other two with superficial marks.

Scapula:- Medieval: seven.
16th century: one; all examples showed medio-lateral chops across the mid-shaft.

Humerus:- Medieval: four; all chopped at the distal end.

Radius:- Medieval: ten; five chopped at the distal end, three at the mid-shaft, the remainder at the proximal end.

Os coxa:- Medieval: five; three chops at the mid-shaft, the remainder at the caudal and cranial joint surfaces.
16th century: two; chops at mid-shaft and joint surfaces as medieval.

Femur:- Medieval: two; chopped at mid-shaft and distal end.
16th century: four; three chopped at the proximal end, one at the distal.

Tibia:- Medieval: eight; five chopped through the mid-shaft, the remainder with superficial cuts.
16th century: two; both with lateral cuts through the mid-shaft.

Astragalus:- Medieval: one; postero-anterior chop on mid-shaft.

Calcaneus:- Medieval and 16th century, one in each phase.

Atlas vertebra:- Medieval: two; both chopped dorso-ventrally.

EC

Ovicaprid (continued)

Axis vertebra:- Medieval: three; one chopped postero-anteriorly, the other dorso-ventrally.

16th century: two; both chopped dorso-ventrally through the mid-shaft.

Sacrum:- Medieval: two; fragments chopped dorso-ventrally.

Small ungulate

Butchery marks were recorded from tibia, calcaneus, cervical, thoracic and lumbar vertebra, rib and fragments.

Tibia:- Medieval: one; burnt.

Fragments:- Saxo-Norman 2; medieval 3; burnt.

Calcaneum:- Medieval: one; chopped medio-laterally mid-shaft.

Cervical vertebra:- Medieval: seven; 16th century: two; post-medieval: one; chopped dorso-ventrally.

Thoracic vertebra:- Saxo-Norman: one; medieval: nine; 16th century: three; all chopped dorso-ventrally mid-shaft.

Lumbar vertebra:- Medieval: nineteen; 16th century: five; all chopped dorso-ventrally.

Pig

Butchery marks were recorded from the skull, mandible, scapula, humerus, ulna, os coxae, femur, tibia, astragalus, calcaneus and atlas vertebra.

Skull:- Medieval: five; various chops.

Maxilla:- Medieval: three; 16th century: one; dorso-ventral chops between P4 and M2.

Mandible:- Saxo-Norman: one; Medieval: thirty-five; 16th century: two; post-medieval: three; mainly chopped dorso-ventral through the mid-shaft at points varying from PM2 to M4.

Scapula:- Medieval: four; two chopped through the mid-shaft, two obliquely at proximo-lateral.

Humerus:- Medieval: one; post-medieval: one; chopped through mid-shaft.

Ulna:- Post-medieval: one.

Os Coxae:- Medieval: four; post-medieval: one.

Femur:- Medieval: three; two with oblique distal cuts, one chopped right through at the proximal.

Tibia:- Medieval: one; chopped laterally through the mid-shaft. 16th century: two; sawn through proximal mid-shaft. 16th century: one; chopped obliquely through the distal end.

Astragalus:- Medieval: three.

Calcaneus:- Medieval: one; all with chops mid-shaft.

Atlas:- Medieval: three; post-medieval: one; all medieval chopped through dorso-ventrally.

Dog

Butchery marks were recorded from the mandible, scapula, humerus, radius, ulna, os coxae, tibia and axis vertebra.

Mandible:- Medieval: one; chopped medio-laterally at mid-shaft.

Scapula:- As mandible.

Humerus:- Medieval: five; chopped at proximal, mid-shaft and distal ends.

Radius:- Post-medieval: one; chopped obliquely at proximal end.

Ulna:- Medieval: four; chopped at mid-shaft and proximal end.

Os coxae:- Medieval: one; chopped obliquely/dorso-ventrally at the caudal end.

Femur:- Medieval: one; 16th century: one; both with lateral mid-shaft chops.

Tibia:- Medieval: one; as femur.

Axis:- Post-medieval: one; chopped dorso-ventrally.

Fowl

Butchery marks were recorded from the humerus, femur, tibiotarsus, tarsometatarsus and synsacrum.

Humerus:- Medieval: one; burnt.

Femur:- Medieval: four; three chopped at distal end, one at proximal.

16th century: one; chopped at distal end.

Tibiotarsus:- Medieval: three; two chopped proximally, one distally.

16th century: four; one chopped proximally, three distally.

Tarsometatarsus:- 16th century: one; chopped right through proximally.

Synsacrum:- 16th century: one; chopped dorso-ventrally.

D12

Goose

Butchery marks were recorded from the coracoid, furculum, humerus, carpometacarpus, ulna, femur, tarsometatarsus, synsacrum and cervical vertebra.

Coracoid:- Medieval: one.

Furculum:- Medieval: three; chopped through mid-shaft.

Humerus:- Medieval: four; three chopped at distal end, one at proximal.

Ulna:- Medieval: two; one chopped at proximal, one at distal. 16th century: one; chopped at distal end.

Carpometacarpus:- Medieval: one; post-medieval: one; both chopped at proximal end.

Femur:- Medieval: one; knife cut at mid-shaft.

Tarsometatarsus:- Medieval: three; two chopped through proximal, one through distal.

Synsacrum:- Medieval: one; chopped dorso-ventrally.

Cervical vertebra:- Medieval: one; 16th century: one; both chopped dorso-ventrally.

Ends