THE MAMMALIAN BONES

by M Harman

All the surviving bones were examined. They were well preserved, although most, particularly the larger ones, were fragmentary, and most of them were identifiable. The unstratified bones were not listed although anything unusual amongst them was noted. The bones from each stratified deposit were listed and complete bones or parts of bones were measured. The age of the animals from which the bones came was decided according to the state of tooth eruption and the degree of tooth wear and the state of epiphyseal fusion, using the criteria published by Silver (1963: 250-68). Whole vertebrae and vertebral bodies of large and small size (approximately cattle and sheep size) and fragments of large and small ribs were counted and listed, but are not included in the total numbers of bones. There were not as many as there should have been to go with the number of limb bones found, if all parts of the animal were equally represented. It was assumed that in most cases the bones were domestic refuse, the discarded remains of joints and carcasses brought in for consumption on the premises. There were some exceptional deposits where this was obviously not so, and these will be described below.

The bones from different phases of each house were tabulated and the total number of bones from each species and the minimum number of animals present calculated, the latter figure being derived from the maximum number of a particular bone from the right or left side of the relevant species, with additions where necessary to allow for differences in age. The assemblages from each house were then compared to see if there were any differences between the houses; three particular deposits from Houses 4 and 10 are not included in these figures. As Table 37 shows, there was no great difference between groups of bones from different houses, and the information from each house was then amalgamated within a chronological framework embracing the whole of the site: the results can be seen in Tables 38-42 where the numbers of different bones from each animal are listed. Bones in the middle of the columns cannot be attributed to either the left or the right side. In that the individual house phasings are not chronologically identical (see page 10) the following groupings have been used.

Group 1 — pre 850/900
,, 2 — 850/900 - *c.* 1100
,, 3 — *c.* 1100 - *c.* 1400
,, 4 — *c.* 1400 - *c.* 1500
,, 5 — *c.* 1500 - *c.* 1650

Table 43 shows the ages of animals at death, listed within the major site groupings. The tooth eruption and wear sequence of the cattle and sheep were noted according to the Barley sequence (Ewbank *et al.* 1964: 423-6) but the ages of both these and the pigs are based on Silver's figures, derived from old writers. The information from the post cranial bones is consistent with that from the jaws.

Tables 38-42 demonstrate the importance of the domestic meat producers: the greatest number of bones is derived from cattle, sheep and pigs,— horses, dogs and cats being represented by relatively small numbers of bones, while wild animals were almost incidental. There is a definite decline in the importance of pig in later times and a rise in the importance of sheep, which may be the result either of a change in eating habits or possibly an increase in forest clearance providing less pannage and more open arable and pasture land; the latter might also be consistent with the lack of deer bones in the later phases, though there are very few from the earlier phases and they are mainly antler fragments which may have been imported as raw material for industry. Several horn cores indicate that goats are included among the sheep. It is also evident that some changes have occurred in the sheep during the occupation of the site: while they are almost all horned sheep, in Group 2 two animals with four horns occur, one in Grubenhaus 2 and one in one of the House 10 pits, while single polled sheep occur in Groups 3 and 4, and four polled sheep in Group 5, a large proportion of the total number represented. These changes may have been the result of breeding within the local flocks or the introduction of different breeds from elsewhere.

Table 43 shows that few of the cattle jaws could be aged, but most of them were from animals which had attained their maximum size, although there appear to have been losses of young calves. Similar losses occur among the sheep, and the sheep also show two very definite peaks at Barley stages p/q and v/w/x. It could be argued that these suggest killing animals in their second and third or fourth autumns although this would necessitate some alteration in the absolute ages. Many animals obviously survived beyond dental maturity, some of them having extremely worn teeth. The pigs died at a variety of ages, more commonly when they had achieved maximum size, and few survived long beyond this age. Most of the bones and teeth of the horses are from mature animals, some aged well over ten years.

House 4, Group 3, pits 331 and (370) = 298, contained most interesting assemblages consisting largely of cattle horn cores: 54 horn cores, 12 other cattle bones, 28 sheep bones, two pig bones and 13 horse bones, an exceptionally large number of the last. These assemblages may well be connected with another similar one from pit B114, in Group 4 of the same house, which contains a remarkable collection of bones, listed in Table 44. About 50% by volume of this assemblage consisted of horse bones and 40% of cattle horn cores with skull fragments, the remainder being cattle post cranial bones and bones of sheep and pig. The horn cores were apparently at the bottom of the pit, with horse bones mainly on top, so it is possible that the two collections are not related, although this seems unlikely, particularly as B331 and (370) = 278 echo the proportions seen in this pit. Most of the horn cores had some part of the skull still attached, but on many of them there were chopping marks which indicated that the frontal eminence with the horn cores was removed from the rest of the skull intentionally, probably to provide raw material for horners, and this deposit would therefore seem to be waste material from a horn-working industry. Amongst the skull fragments was a right frontal from a polled beast. It is possible that this was from a single-horned animal; its presence in the group is otherwise difficult to explain if the remains are associated with horn-working. The deposit of horse bones is more difficult to explain. All the bones are those of adult animals and all the teeth present are from aged animals. There was no pairing between the bones; they were from a number of different animals rather than a few animals buried nearly complete.

In House 10, Group 4, in G(133) = 132, was a small group of sheep cannon bones with associated phalanges. There were 23 metacarpals, including six pairs and 22 metatarsals, including six pairs, four carpals, 11 tarsals, 62 first phalanges, 44 second phalanges and 30 third phalanges. About half the bones were from immature animals with the epiphyses not fused, less than 18 months or two years old. Several of the carpals and tarsals have cuts on them and these bones are almost certainly slaughtering waste, lower legs without any meat on them, cut off the sheep carcasses and discarded.

A small number of bones showing evidence of injury or disease occurred. These were submitted to Dr J Baker of the Department of Veterinary Pathology at the University of Liverpool, and his comments are given below. There were more affected horse bones than bones from any other species, although horses were poorly represented on the site, because these animals were kept longer than cattle, sheep or pigs, and each individual therefore was more likely to suffer from some injury or disease affecting the bones.

Cattle

First phalanx	Minor exostoses around distal articular surface. 12mm × 3mm. A576. House 1, Phase 4B.
Second phalanx	Exostoses on lateral aspect. Probably traumatic. K23. House 10, Phase 4.
Cannon bone	Smooth excrescence on anterior metaphyseal surface. Ossified haemotoma. The groove for the extensor tendons continues across its surface. B74. House 4, Phase 6Di.

Table 37 Total numbers of bones from, and minimum numbers of cattle, sheep and pigs from each phase of each house, arranged according to the major periods of the site, with percentages
(For individual house phases see key below)

	House 1			House 2			House 3			House 4			House 7			House 8			House 9			House 10		
Group 1	22	36	9	75	76	46				7	8	1	6	8	3	46	77	19						
	33	*54*	*13*	*38*	*39*	*23*				*44*	*50*	*6*	*35*	*47*	*18*	*33*	*54*	*13*						
	4	8	4	9	10	7				2	2	1	2	2	1	4	8	3						
	25	*50*	*25*	*35*	*38*	*27*				*40*	*40*	*20*	*40*	*40*	*20*	*27*	*53*	*20*						
	6	18	11																					
	17	*52*	*31*																					
	2	3	2																					
	29	*42*	*29*																					
Group 2	87	108	39	308	303	144							370	218	96	95	103	37	33	12	8	180	211	93
	37	*46*	*17*	*41*	*40*	*19*							*54*	*32*	*14*	*40*	*44*	*16*	*62*	*23*	*15*	*37*	*44*	*19*
	9	12	5	19	30	17							32	18	16	8	11	5	3	2	2	19	20	13
	35	*46*	*19*	*29*	*45*	*26*							*49*	*27*	*24*	*33*	*46*	*21*	*42*	*29*	*29*	*37*	*38*	*25*
Group 3	309	681	109	30	80	19	18	58	5	18	115	16	276	394	88	53	53	20	99	152	42	2	18	4
	28	*62*	*10*	*23*	*62*	*15*	*22*	*72*	*6*	*12*	*77*	*11*	*36*	*52*	*12*	*42*	*42*	*16*	*34*	*52*	*14*	*8*	*75*	*17*
	17	81	15	3	6	4	2	6	2	2	25	3	17	35	18	4	6	8	8	17	9	1	3	1
	15	*72*	*13*	*23*	*46*	*31*	*20*	*60*	*20*	*7*	*83*	*10*	*24*	*50*	*26*	*22*	*33*	*45*	*24*	*50*	*26*	*20*	*60*	*20*
				24	63	21	15	42	6	94	187	26				10	14	1	47	116	14			
				22	*58*	*20*	*24*	*67*	*9*	*31*	*61*	*8*				*40*	*56*	*4*	*27*	*65*	*8*			
				2	7	3	2	6	1	6	14	4				1	2	1	5	9	2			
				17	*58*	*25*	*22*	*67*	*11*	*25*	*58*	*17*				*25*	*50*	*25*	*31*	*56*	*13*			
							27	26	6	7	25	1												
							46	*44*	*10*	*21*	*76*	*3*												
							3	8	1	1	3	1												
							25	*67*	*8*	*20*	*60*	*20*												
							15	26	3															
							34	*59*	*7*															
							2	5	1															
							25	*63*	*12*															
Group 4	77	175	16	25	105	15	11	31	5	10	33	2	9	37	2	10	4	1	8	25	1	71	111	16
	29	*65*	*6*	*17*	*73*	*10*	*23*	*66*	*11*	*22*	*73*	*5*	*19*	*77*	*4*	*67*	*27*	*6*	*23*	*74*	*3*	*36*	*56*	*8*
	6	13	3	2	8	4	2	4	2	1	3	1	2	5	1	3	1	1	1	3	1	9	9	2
	27	*59*	*14*	*14*	*57*	*29*	*25*	*50*	*25*	*20*	*60*	*20*	*25*	*63*	*12*	*60*	*20*	*20*	*20*	*60*	*20*	*45*	*45*	*10*
	41	72	7							13	10	1										13	71	6
	34	*60*	*6*							*54*	*42*	*4*										*14*	*79*	*7*
	5	6	3							1	1	1										3	11	1
	36	*43*	*21*							*33*	*33*	*33*										*20*	*73*	*7*
										92	105	38												
										39	*45*	*16*												
										6	14	6												
										23	*54*	*23*												
Group 5																						58	100	12
																						34	*59*	*7*
																						10	7	2
																						53	*37*	*10*

In each group of figures the top line shows the number of bones of cattle, sheep and pigs respectively, the second line the percentage of the above, the third line the minimum number of animals present and the fourth line the percentage of the minimum number of animals.

Key to Table 37 *(Nos. within grid are site House/Phase numbers)*

	House 1	House 2	House 3	House 4	House 7	House 8	House 9	House 10
Group 1	1 2	pre-4		2	2	3		
Group 2	4	4			4	4	4	4
Group 3	5	5 6A	5 6A 6B 6C	5 6A (B331, 298)	5	5 5-6	5 5-6	5
Group 4	6A 6B	6B	6D	6B 6C 6D	6	6	6	6A 6B
Group 5								7

Table 38 Numbers of bones from different species in Group 1

	Cattle			Sheep			Pig			Horse		
	L		R	L		R	L		R	L		R
Skull	1	1	4	3		6	5		3			
Maxilla	1		1	3		3	2		4			
Mandible	4		3	8		12	9		7			
Tooth		10			9			4			2	
Scapula	5	5	12	14	2	10	6	1	6	1		1
Humerus	8		9	9	1	12	4		5			
Radius	7	1	7	14		13	1		1	2		1
Metacarpal	2	2	3	3	1	1		2				
Pelvis	9		11	9		15	2		4	2		1
Femur	3	6	5	5	17	5	2	1	2		1	
Tibia	11	1	12	28	4	19	3		5	4		
Astragalus	5		3			1	2			1		
Calcaneum	3		2			1	1		1			
Metatarsal	3	2	5	3		4		8		1		
Phalanx 1	3		2	1		1			1		1	
2												
3												
Total no. of bones	162 (33.8%)			228 (47.7%)			88 (18.4%)			16		
Minimum no. of animals	23 (31%)			33 (44.7%)			18 (24.3%)			4		

+ Dog humerus: L
Hare? pelvis: R
Beaver incisor

NB Ram skull fragment

Table 39 Numbers of bones from different species in Group 2

	Cattle			Sheep			Pig			Horse		
	L		R	L		R	L		R	L		R
Skull	29	8	30	25	13	18	8	2	19			
Maxilla	6		8	10		10	17		11			
Mandible	33	2	37	31		29	35		19			
Tooth		111			79			41			8	
Scapula	46	13	39	33	10	37	21	7	23			
Humerus	35	3	36	50		40	25		29			
Radius	32	1	39	41	4	51	14	2	13	3		1
Metacarpal	24	14	23	29	41	23		8			1	1
Pelvis	61		34	43		40	9		18			1
Femur	34	53	25	18	63	21	16	2	14	6		
Tibia	54	2	61	77	13	78	16	1	27	2		2
Astragalus	23		16	6			4		4	1		1
Calcaneum	37		30	1		15	5		10	1		
Metatarsal	15	14	24	28	21	32		29		2		
Phalanx 1	41		32	4		10	1		5		2	
2	13		13				1		1		2	
3	8		12			1	1					
Total no. of bones	1060 (43.4%)			965 (39.5%)			417 (17.1%)			26		
Minimum no. of animals	90 (37.2%)			93 (38.4%)			59 (24.4%)			6		

+ Dog mandible; R, tooth: 1, ulna: L, R, metacarpal: R, pelvis: L, R, femur: R, tibia: L, and most of one puppy aged *c.* 4 months (H 10 pits).
Cat mandible: L, R, scapula: R, humerus: 2L, R, pelvis: R, femur: L. 2 virtually complete (H2).
Red deer 6 antler frags., phalanx: 1R. Roe deer radius: 2R, metacarpal: L.
Hare pelvis: R, tibia: R.

NB 4 horned sheep H10 Grubenhaus and pits.
4 rams' horns.

Table 40 Number of bones from different species in Group 3

	Cattle			Sheep			Pig			Horse		
	L		R	L		R	L		R	L		R
Skull	71	80	77	44	49	53	9	2	12	2	1	1
Maxilla	8		9	30		33	13		12	1		4
Mandible	35		26	84		97	27		30			2
Tooth		199			353			40			21	
Scapula	45	32	39	57	13	66	19	4	14	3	1	2
Humerus	36	4	24	86		64	26		17	1		2
Radius	21	1	32	69	2	68	8	3	19	5		3
Metacarpal	19	16	22	60	85	79		12		1	2	4
Pelvis	38	1	36	73		68	13		11	4		4
Femur	19	29	18	31	87	24	5	4	10	7	2	
Tibia	33	7	40	101	37	115	16		19	5		2
Astragalus	13		8	11		15	3		3	2		1
Calcaneum	16		12	12		7	5		3	2		1
Metatarsal	17	47	10	60	114	63		44		1		
Phalanx 1	23		34	55		60	5		4		16	
2	12		17	9		14	2				5	
3	5		10	3		8	2		1		5	
Total no. of bones	1042 (30.4%)			2006 (58.6%)			377 (11.0%)			92		
Minimum no. of animals	75 (19.8%)			230 (60.8%)			73 (19.3%)			7		

+ Dog skull: 2, mandible: 2L, humerus: 3R, radius: fragment, ulna: 2L, 2R, pelvis: 2R, femur: R, tibia: 2L, R, calcaneum: R, metatarsal: 4.
Cat skull: 4, maxilla: 1L, 2R, mandible: 2L, 6R, humerus: 2L, 3R, radius: R, metacarpal: 1, pelvis: L, femur: 1L, 2R, tibia: 5L, 2R, metatarsal: 7.
Red deer 4 antler tines, phalanx 1: L, R.
Lagomorph mandible: R, humerus: fragment, radius: fragment, tibia: 2R.

NB 5 ram horn cores. 5 goat horn cores.
1 polled sheep.

Table 41 Number of bones from different species in Group 4

	Cattle			Sheep			Pig			Horse		
	L		R	L		R	L		R	L		R
Skull	45	44	40	9	6	11	5	1	3			
Maxilla	1		2	4		5	4		4			
Mandible	11	1	8	33		19	10		8	1		1
Tooth		42			139			12			6	
Scapula	10	8	18	25	9	21	4		4	2		3
Humerus	14		8	21	3	30	2	1	4	1		2
Radius	14		14	23	1	31	4	1	2	1		4
Metacarpal	4	2	6	31	37	25		2			2	1
Pelvis	4		6	25		34	4		2	1		1
Femur	3	13	5	8	44	8	6	1	2	2		
Tibia	14	3	11	43	12	41	4		1			1
Astragalus	4		4	3		4	1		2	2		1
Calcaneum	4		4	10		6	1		3			
Metatarsal	6	7	6	41	46	40		12			2	2
Phalanx 1	16		10	31		26	2		3		2	
2	5		8	7		6	1		2			
3	2		6	3		2	1					
Total no. of bones	391 (30.5%)			784 (61.2%)			107 (8.3%)			32		
Minimum no. of animals	50 (32.5%)			78 (50.6%)			26 (16.9%)			5		

+ Dog pelvis: R, tibia: L, astragalus: R, metapodial.
Cat skull: 1, mandible: L, R, humerus: L, 2R, pelvis: L, R, also 24 metacarpals, 17 metatarsals, with phalanges, from at least 3 cats of varying ages.
Lagomorph mandible: L, humerus: L, 2R, radius: L, pelvis: 2L, R, femur: L, 2R, tibia: R.

NB 1 goat horn core. 1 polled sheep.

Table 42 Number of bones from different species in Group 5

	Cattle			Sheep			Pig			Horse	
	L		R	L		R	L		R	L	R
Skull	10	8	3	3	2	4			1		
Maxilla			2			1					
Mandible	5		5	5		4	1				
Tooth		7			8			4			
Scapula	1	2		4	2	5					
Humerus	1	1	1			2			1		1
Radius	1		2	2	1	7			2		
Metacarpal			1	5	6			2			
Pelvis	1		1	4		6					
Femur	1	1	1		3	1		1			
Tibia	3		3	4		2	2	1	1	1	
Astragalus											
Calcaneum	2		2	1							
Metatarsal				5	5	4				1	
Phalanx 1				2		4					
2				2		2					
3				1		1					
Total no. of bones	58 (34.1%)			100 (58.8%)			12 (7.1%)			3	
Minimum no. of animals	10 (52.6%)			7 (36.8%)			2 (10.5%)			1	

+ Cat maxilla: L, R.
Rabbit tibia: R.

NB 4 polled sheep.

Table 44 Number of bones from different species in Pit B114

	Cattle			Sheep			Pig			Horse	
	L		R	L		R	L		R	L	R
Skull	55	65	44	4		2			1		4
Maxilla				1			1			4	4
Mandible				3		1	1		2	2	1
Tooth		1			1					20	
Scapula	1	2		3		1	2				1
Humerus	1		2			1			3	2	3
Radius	1		2	1		1			1	4	7
Metacarpal	1		3		1	1				5	3
Pelvis	3		7	1		2			1	9	6
Femur	6		6	1		1	1		1	4	5
Tibia			5	1						3	5
Astragalus										2	4
Calcaneum	2		1								3
Metatarsal		4		1		2				5	7
Phalanx 1	2									2	
2										1	
3										2	
Total no. of bones (164 horn cores)	214			27			14			98	
Minimum no. of animals (excluding horn cores)	7			4			3				

+ Dog vertebra: 1.

Table 43 Ages of animals at death

	Cattle																										
Group 1				1	1				1			1	1		4	2	1				4	3	3		11	
Group 2																											
Group 3		1	2			1				1			1	2		1			1		3	1			11	
Group 4	1		6																			1			3		
Group 5			2																				1		1		
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	z+
Silver's Old Ages	0——————1 month					6——————9 months							30 months						4——————5 years								

	Sheep																										
Group 1								2							1	1					1	1			3	1	
Group 2						2						1				4	4			3		1	8	3	2	18	2
Group 3	1	5	5	1			1	1	1	1	1			1	2	27	15	2		1	2	13	30	11	2	76	5
Group 4		1	1		1											2	1	1			1	4	4	1		26	3
Group 5						1																		1		4	1
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	z+
Silver's Old Ages	0——————1½ months						6 months						18 months						3——————4 years								

	Pig																										
Group 1		2		1						2		3		1													
Group 2		2		4		5		3		17		10		6													
Group 3		3		3		3		5		27		13		2													
Group 4				3		1		2		6		1															
Group 5																											
Silver's Old Ages				1 year				2 years		2½ years		3 years															

Sheep

Mandible	Paradontal disease with bone and tooth loss, mainly in premolar region. B247. House 4, Phase 6D/?C.
Mandible	Paradontal disease, origination between molars and premolars. B170. House 4, Phase 6Di.
Scapula	Irregularity of shape of glenoid fossa with lateral and dorsal extension of articular surface with some bone proliferation at site of insertion of synovial membrane. Probably a reflection of a diseased humeral head. A439. House 1, Phase 5.
Radius and ulna and lower end of humerus	Exostosis formation around the elbow has resulted in a joint which cannot be disarticulated. The primary lesion is a healed fracture of the olecranon. K173. House 10, Phase 4.
Cannon bone —lower end	Metaphyseal exostoses and thickening. A508. House 1, Phase 5.

Pig

Tibia	Fracture with infection. The leg below the fracture was probably lost. K57. House 10, Phase 7.

Horse

Femur	Exostoses over proximal quarter of shaft. Extensive damage and remodelling of femoral head with formation of new articular surfaces and alterations in shape. Dislocation and false joint formation. B(268)=218. House 4, Phase 6A.
Femur	Healed fracture at base of neck. The neck lies medial to and fused to the shaft of the bone. The bone has been shortened by about 65mm. B158. House 4, Phase 6Di.
Tibial tarsal	Pitting and roughening of distal articular surface. Probably bacterial. C(109)=20. House 7, Phase 5.
Third tarsal	Exostoses on anterior surface with pitting and erosion of the dorsal aspect. Bacterial.
Metatarsal	Minor exostoses around proximal end. Spavin. B114. House 4, Phase 6D/?C.
Metatarsal with tarsals 1 to 4 fused on to it with exostoses	Metatarsals 2 and 4 were also involved in the exostoses. Spavin. B114. House 4, Phase 6D/?C.
Metatarsal	Relatively smooth exostoses on antero-lateral aspect of proximal metaphysis. Traumatic. B114. House 4, Phase 6D/?C.

Dog

Tibia with fragment of fibula	The shaft is bowed along its length suggestive of healed rickets.

There was a small quantity of human bone from the site. The complete upper half of the skeleton of a man occurred below a modern cellar to the east of House 6 (B84). The posterior right portion of the maxilla was missing, but of the 28 possible tooth sockets left, 16 were closed, the teeth having been lost before death, and the remaining teeth were so worn as to suggest an age of well over 40 years. Evidence of osteo-arthritis on cervical vertebrae 3 to 7 and thoracic vertebrae 1 to 8, on the right scapula in the glenoid fossa and on the acromion process, and on the left humerus head, supports the idea that the individual was aged. 19 other isolated bones and fragments of bones from a number of individuals occurred in various deposits in Houses 1, 2, 4, 7 and 10, and these are doubtless to be attributed to the disturbance of burials near the church in antiquity.

THE BIRD BONES

by D Bramwell

Lists of identifications and additional notes were prepared by D Bramwell but because of illness the report itself was written by M Harman

Most of the bones were well preserved though some were fragmentary. Domestic birds account for 828 of the identified bones, while wild birds account for 62. The majority of the bones were those of fowl (*Gallus gallus*) though goose (*Anser anser*) was also well represented. Domestic fowls at Northampton on the whole are small birds, with a number of smaller, Bantam-sized birds. There is evidence that cocks' spurs were utilised in some way; this is borne out by other medieval and Saxon examples. In the few examples where the sex of the fowl could be decided, most of the bones were from hens. Several of the tarso-metatarsi show a scar present at the origin of the spur, indicating that the spur has either never formed or has dropped off, which suggests that these were from capons. There may have been a deliberate tendency to kill young cocks, accounting for some of the juvenile bones found.

Domestic geese adhere closely to the wild greylag form but probably develop slightly more robust tarso-metatarsi. Both they and ducks are difficult to distinguish from the wild ancestor. Some large ducks could be raised by rearing mallard under ideal conditions, for instance special feeding and clipped wings. There are few dove bones, though there are parts of two young ones from House 1.

The number of bones of fowl and goose found in each house is shown in Table 46 divided according to the groupings used in the mammalian bone report. The figures in brackets represent young bones, but are included within the total.

Only a small number of bones probably from domestic ducks were found, shown in the list below:

Group	House	Number of bones
2	1	1
2	2	1
2	7	1
2	10	1
3	1	3
3	4	3
4	4	4
5	10	1

The number of bones found from wild birds was extremely small. A list of the species represented is given below. The paucity suggests that hunting was unimportant, domestic birds and animals providing sufficient sources of food. Crane is generally represented in medieval lowland settlements and on Roman sites.

The wild species do provide some indication of the surrounding environments: raven, rook and crow usually indicate agricultural activities, borne out by wild geese associated with stubble; partridge and lapwing may be indicative of pasture. Wild geese, plover and crane suggest marshy ground, wild duck and bittern open water, rivers or lakes while woodpigeon, woodcock and stock dove indicate woodland, and songthrush, redwing and the small passerine suggest bushy areas.

The goshawk may be evidence of falconry.

Table 45 Bones of wild bird species

Wild species	House	Phase	No. of bones
Bittern (*Botaurus stellaris*)	1	5	1
Wild goose?—barnacle (*Branta leucopsis*), white front (*Anser albifrons*) or pink-footed (*Anser brachyrhynchus*)	1	6A	8
Goose or Crane (*Grus grus*)	2	4A	1
,, ,, ,, ,, ,,	4	6A	1
,, ,, ,, ,, ,,	7	4/5	2
Duck cf. mallard (*Anas platyrhynchos*)	1	5	2
,, ,, ,, ,, ,,	1	6A	1
,, ,, ,, ,, ,,	1	6Biv	1
,, ,, ,, ,, ,,	4	6A	1
,, ,, ,, ,, ,,	9	5	1
Duck cf. gadwall (*Anas strepera*)	1	5	1
,, teal (*Anas crecca*)	1	5	3
Red kite (*Milvus milvus*)	1/2	4C/B	1
Goshawk (*Accipiter gentilis*)	1	5	1
Partridge (*Perdix perdix*)	1	5	1
Crane (*Grus grus*)	1	5	5 (+ ossified tendons)
,, ,, ,,	2	4A	3
,, ,, ,,	7	4/5	1
,, ,, ,,	8	1	1 (R tibiotarsus showing butchery distally)
,, ,, ,,	8	5?	1
Golden plover (*Pluvialis apricaria*)	1	4B	1
,, ,, ,, ,,	1	5	3
,, ,, ,, ,,	7	4	1
Lapwing (*Vanellus vanellus*)	10	6A?	1
Woodcock (*Scolopax rusticola*)	2	6A-B	1
,, ,, ,,	3	6Di	1
,, ,, ,,	9	6i	1
Dove ?domestic (*Columba* sp.)	1	4B	9 (2 young doves)
,, ,, ,,	1	4B	1
Dove ?domestic or stock dove	10	4	1
Dove cf. stock dove (*Columba oenas*)	1	4B	2
,, ,, ,, ,,	10	4	1
Songthrush (*Turdus philomelos*) or Redwing (*Turdus iliacus*)	1	5	1
Jay (*Garrulus glandarius*) or Jackdaw (*Corvus monedula*)	1	5	1
Rook (*Corvus frugilegus*)	2	4A	1
or Crow (*Corvus corone*)	8	3	1
,,	10	4/?5	1
,,	10	6B	1
,,	10	6B/C1	
Jackdaw (*Corvus monedula*)	2	4B	1
Raven (*Corvus corax*)	1	destrat	3
Small passerine finch size	10	7	1

Table 46 Number of bones of fowl and goose found from each house, within each group. Numbers in brackets, included within the main total, are numbers of bones from juvenile birds

	House 1		House 2		House 3		House 4		House 7		House 8		House 9		House 10	
	Fowl	Goose	Fowl	Goose	Fowl	Goose	Fowl	Goose	Fowl	Goose	Fowl	Goose	Fowl	Goose	Fowl	Goose
Group 1			2	4												
Group 2	27 (8)	8	5	6					21 (3)	5	4 (1)	2			52 (2)	25
Group 3	109 (15)	50	27 (2)	8	19 (5)	9	47 (5)	17	34 (8)	17 (1)	4 (1)	2	31 (3)	5	12 (2)	5
Group 4	52 (9)	30	3	2	2 (1)	1	44 (6)	24	15 (4)	2					9 (1)	12
Group 5															38 (8)	1

THE AMPHIBIAN BONES

by R T Jones

Frogs (*Rana* sp.)

House 1	Phase 4	A576	Small amount	Pit
	Phase 5	A439	Small amount	Pit
	Phase 5	A439	5 frogs	Pit
	Phase 5	A441	Small amount	Pit
	Phase 5	A605	Small amount	Pit
House 8	Phase 3	F(276) = 56	Small amount	
House 10	Phase 5	K113	Small amount	Slot
	Phase 7	G67	Small amount	(?) Tanning pit
	Phase 7	G68	Small amount	(?) Tanning pit

THE FISH BONES

by A K G Jones

Introduction

Apart from a few recovered by wet sieving soil samples sent to the Ancient Monuments Laboratory, London, fish bones were picked from the soil during excavation. The assemblage is therefore almost certainly biased in favour of large fish remains; some small species may have been completely overlooked. However, the presence of herring bones and other small fragments indicates that at least some of the spoil was thoroughly sorted.

The majority of the identifiable bones were vertebral centra, although a few head bones could also be ascribed to species. Broken fragments, fin rays, branchiostegals and ribs could not be assigned to species, but some have been attributed to a family. The collections of skeletons at the British Museum (Natural History) were used as reference material.

Herring, eel, cod and ling vertebrae are sufficiently distinctive to allow specific identification and a number of head bones from herring and cod confirm their presence. Two large salmonid vertebrae are either from salmon or large sea trout, whose vertebrae are identical in shape, size range and sculpturing. As these fish are also similar in their habits and eating qualities imprecise identification does not confuse the interpretation. The flatfish vertebrae are from a member of the Pleuronectidae, a family which includes flounder and plaice. A solitary dermal denticle or buckler betrayed the presence of thornback ray.

Discussion

The majority of the fish bones are from exclusively marine species. Eel and salmon/trout are the only species which may have been caught locally.

The predominance of salt water fish remains is particularly interesting as Northampton is over 60 miles from the coast. The bones are evidence of the importation of food-stuffs throughout the medieval period. Whether the marine species were imported fresh or preserved is not easily ascertained. Fish such as herring, young cod and flatfish may have been barrelled up whole and salted wet, in which case their skeletal remains would be indistinguishable from those of fresh fish.

When larger fish are preserved for human consumption the inedible portion is often discarded at the start of the process. For instance in the production of stockfish or klipfisk from large cod and ling, the head and entrails are removed and the carcass divided into manageable sections; thus all that is preserved is the flesh, vertebrae and associated bones. This was probably the practice in the medieval period, thus the presence of 50 ling vertebral centra without head bones in the Northampton material suggests that ling was imported preserved. Further evidence for the importation of ling comes from two recent excavations in East Anglia. Amongst fish bones from Kings Lynn (Wheeler 1977) and Great Yarmouth (Wheeler and Jones 1976) were large quantities of ling vertebrae but few head bones. Ling is rarely caught in the Wash or southern North Sea; it inhabits depths of 100-400 metres and is more common to the western English Channel, northern North Sea and northwards.

The situation is less clear for the cod, four head bones of which were recovered as well as 166 vertebral centra. The dentary from House 4, B246, measuring 6.3mm from the base of the tooth row to the angle of the bone across the proximal edge of the foramen (see Wheeler and Jones 1976: 209-216), comes from a fish whose gutted weight was about 2kg and which was about 0.60m long. A fish of this size may have been barrelled up whole. On the other hand many of the vertebrae are from large cod, some measuring more than 29mm across their articulating surface, (details of this measurement are given in Casteel 1976: 84), indicating a fish weighing in the order of 25 kg and around 1.5m long. Fish of this size are unlikely to have been preserved whole. Nevertheless, it may have been possible to import as fresh fish species which were abundant in the Wash and southern North Sea by means of shallow draught vessels on the River Nene.

The few herring and eel remains indicate fish of average size. Two salmonid vertebrae measuring 12.1 and 13.6mm across their articulating surfaces come from adult fish. The flatfish vertebrae measuring up to 6.2mm compare closely with those of a flounder whose gutted weight was about 400gm. No estimate of the thornback ray is possible because dermal denticles are not related to fish size.

Table 47 shows the distribution of vertebral centra among the houses on the site. House 4 stands out with over 88 per cent. of all vertebrae, the majority found in contexts dated to the 15th century. This percentage is exaggerated by the group of 110 bones recovered from drain B148.

The distribution of fish by period (Table 48) shows herring to be the only marine species present in the earliest period of occupation. Cod, ling and flatfish appear between 1100 and 1400 but thornback ray is only present after 1500. The paucity of small boned fish is likely to relate to the methods by which bones were recovered rather than to the actual distribution of fish remains.

Notes on the biology and fishery of most of the identified species are given in Wheeler and Jones 1976: 218-220.

(Identification of individual bones is contained in the site archive and in the Fish Section of the British Museum (Natural History).)

Table 47 Distribution of fish vertebral centra

	Approximate date range				
	900-1100	1100-1400	1400-1500	+	Total
House 1	2	15	3		20
House 3			3		3
House 4		36	168	1	205
House 9		1			1
House 10	1	1			2
Total	3	53	174	1	231

Table 48 Distribution and relative abundance of fish bones by period

Fish	900-1100	1100-1400	1400-1500	+
Thornback ray (*Raja clavata* L.)				X
Herring (*Clupea harengus* L.)	X	X		
Salmon/trout (*Salmo salar* L./ *S. trutta* L.)	X		X	
Eel (*Anguilla anguilla* (L.))	X			
Cod (*Gadus morhua* L.)		XX	XXX	X
Ling (*Molva molva* (L.))		XX	XX	
Flatfish (*Pleuronectidae*)		X		

Key X = 1-10 bones present
XX = 11-50 bones present
XXX = 51 or more bones present

THE SHELLFISH

by G E Oakley

Four marine types are present: oysters, cockles, mussels and whelks. Freshwater mussels are represented by a few non-specific fragments. Marine shellfish were more popular at all periods, being found even in Middle Saxon deposits. Oysters particularly were conveyed at least 100km to the site, no doubt at considerable cost even in the 17th century, to be consumed between draughts of ale or wine as suggested by the group of glass and pottery drinking vessels and shells of some 30 oysters in C63 (House 7, Phase 7).

Shellfish from securely dated contexts are gathered into the same chronological groups as animal bones (p. 328) and separate counts of left and right valves of bivalves are given in Table 49.

Table 49 Numbers of shellfish

Group	House	Phases	Oyster		Cockle	Mussel		Whelk	Freshwater mussel
			Upper	Lower		L	R		
1	2	3A?							1
	8	3	6	4					
2	7	4				1			
	9	4							1
3	1	5	1	1	1				
	7	5	8	6				2	
	8	5-6							1
4	1	6A, 6Bi, 6Biv	4	7					
	3	6C-Di/6Di		1					1
	4	6B, 6C/?B, 6C, 6Di	69	60	2	9	2		
	7	6i		1					
	10	6A?, 6Aii, 6B	20	10					
4		Group total	93	79	2	9	2		1
5	10	7	22	16		7	3		
ungrouped									
	1	7		3					
	7	7	30	13		2			
	10	6B/C	2	3					
	N	4/5		2					

THE ENVIRONMENTAL ANALYSIS

by C A Keepax, M A Girling, R T Jones, J R B Arthur
P J Paradine and H Keeley

A limited number of soil samples were taken during excavation and only from those contexts where there was a good chance of organic material surviving through damp conditions. Nevertheless the soil conditions were such that even in the samples taken preservation was extremely poor. Results of all the sample analyses (Ancient Monuments Laboratory Report No. 2080) can be found in the site archive but only selected analyses, which positively contribute to the site's interpretation, are contained below. (JW.)

Many of the soil samples submitted were sorted in order to recover organic remains. They were treated by paraffin flotation and sorted under a binocular microscope. Some of the samples which did not contain insects were separated by water flotation and sieving. The insect remains were identified by direct comparison with modern reference material, then stored in alcohol.

The contents of each sample are listed with any relevant comments. Many of the differences in types of material present are probably due to variations in preservation. No samples contained abundant insect remains and those present were badly abraded and often almost transparent, indicating that the pigments had been leached away. It would seem that preservation conditions in these deposits were only marginally suitable for the survival of non-charred seeds and insects. It is therefore possible that the species lists obtained may be influenced by differential preservation. Many of the samples did not contain any non-charred organic material—these were presumably not preserved.

The species lists obtained from the samples are too limited to permit any ecological inferences about the site conditions etc.

Drying oven 1, House 10 (see page 97)
Sample 750898—from north wall of oven
124 seeds of *Sambucus nigra* L. (Elderberry)
Sample 750896—K69: ash level on floor of stoke hole
Approximately 70 charred grains were identified:

78%	Wheat *Triticum* spp.
14%	Barley *Hordeum vulgare* L.
8%	Oats *Avena* spp. including *Avena fatua* L. Wild oats
2	*Vicia sativa* L. Vetch
1	*V. tetrasperma* (L.) Schreb. Slender tare
1	*Galium aparine* L. Cleaver

One extremely good example of the rachis internode of the barley 'bere', the so-called four-row barley *Hordeum vulgare* was present.

Pit K189, House 10 (see page 92)
Samples 750884 and 757626
The seeds were identified as follows:
Sambucus nigra L. Elderberry 388 seeds and fragments, 3 carbonised seeds
Papaver sp. Poppy 17 seeds
Rubus sp. most likely *R. fructicosus* 127 seeds and fragments
Anthemis cotula L. Stinking mayweed 5 achenes
Lamium amplexicaule L. Henbit 4 nutlets
Juncus bufonius L. Toad rush 19 seeds
Triticum sp. Wheat 4 grains
Prunus spinosa L. Sloe 1 fruit (stone)
Most of these species are weeds of arable land and waste places. Some of the seeds are well preserved, resembling modern material but modern contamination to this extent would seem unlikely in this context.

The insects were identified as follows:

Coleoptera	
Silphidae	
Catops sp.	2
Staphylinidae	
Coprophilus striatulus (F.)	1
Trogophloeus sp.	2
Scarabaeidae	
Aphodius sp.	1
Bruchidae	
Bruchus rufimanus Boh.	3
Curculionidae	
?*Acalles* sp.	1

As *Aphodius* and *Coprophilus striatulus* are both found in dung, the latter also occurring in rotting vegetation, and *Catops* is often taken in carrion, these animal-associated species may indicate the presence of livestock. *Bruchus rufimanus*, the bean beetle, frequently found in imported beans, can breed in Britain. The species attacks growing crops of broad beans and horse beans, laying eggs on the developing pods and overwintering in stored beans or in sheltered places out of doors. Its presence indicates storage or cultivation of bean products at the site.

In addition to these insects which are represented by parts of the original exoskeleton, several body segments, probably of a millipede (Diplopoda) were recorded. The exoskeleton of this arthropod has been replaced by calcium carbonate, a process noted in several other archaeological sites in hardwater regions.

Phosphate analysis—Late Saxon Grubenhäuser (Samples 757615-22)
Several samples were taken from Layer K177 in Grubenhaus 2 and tested qualitatively for phosphate content. All readings were greater than *c.* 0.4% and half were greater than *c.* 0.8%. No control samples were provided. The high phosphate figures suggest occupation but it is impossible to distinguish between primary occupation deposits and dumped material and the results do not really clarify the function of the Grubenhaus.

A further sample was taken from Layer K185 in Grubenhaus 4 which also had a high phosphate content (>0.8%).

THE LAND MOLLUSCA

by J G Evans

There are 15 samples of large shells picked out during excavation together with a greater or lesser quantity of earth as well as one soil sample. The samples are divided into 5 groups.

Group 1
Phase 1 ditch, primary fill. Two lots of large snails (F316, SF2683, 2686).

Group 2
Phase 1 ditch, fill of recut. Four lots of large snails and one soil sample (A712 and F316, SF1606, 2660, 2661, 2672).

Group 3
Phase 3, 'destruction levels' of mortar mixers. Six lots of snails (F56, F293, lower portion of F131, SF2342, 2382, 2421, 2427, 2454, 2528).

Group 4
Phase 4, occupation level, immediately overlying mortar mixer waste. One lot of large snails (F131, SF2900).

Group 5
Possibly Phase 5 but could be Phase 4, level immediately overlying F131 (see Group 4). Two lots of large snails (F133, SF2789, 2882).

The results of analysis are presented in Table 50. The soil sample is disappointing, being totally devoid of shells apart from literally half a dozen non-apical fragments. The absence of shells is a little surprising, particularly in view of the fact that (a) the soil contained visible calcareous material in the form of limestone fragments, and (b) there was a large number of small snails in the earth adhering to the shells picked out during excavation from Group 2. Nevertheless, this is a phenomenon which is not unique to this site, others on limestone and limestone gravels—e.g. Peterborough, Arbury Road (Cambridge), Rainsborough, Butcombe (Somerset), and various sites in the Welland Valley—showing the same thing. It is likely that the phenomenon is linked in some way to the preservational properties of the soil, for limestone breaks down both physically and by solution more slowly than chalk. The shells which were extracted were in an excellent state of preservation and had probably been protected in pockets of higher than normal calcium carbonate content. An additional factor may be the habitat of the snails when alive, differences in lime content controlling the abundance of animals before they ever become incorporated into the soil.

In interpreting the assemblages, both the composition of the fauna in terms of species, and the banding patterns of *Cepaea* need to be taken into account. The species falls more or less into two ecological groups (Evans 1972), namely those which live in relatively damp, shaded places, and those which prefer open, dry habitats. In the former category, *Carychium, Acanthinula, Arianta, Discus, Vitrea, Oxychilus* and *Retinella* are the main species. *Cepaea hortensis* can live in a variety of places but when occurring in conjunction with *Cepaea nemoralis* it is normally restricted to shaded habitats. Open-country forms include *Pupilla, Vallonia costata* and *Vallonia excentrica*, and *Helicella*.

The banding of *Cepaea* requires some explanation. Both *C. nemoralis* and *C. hortensis* are polymorphic—that is they occur in a number of different forms, the main variation being in the number of colour bands encircling the shell. It has been shown (Cain and Sheppard 1950) that the frequency of banding in a given population is related to habitat and is controlled by the chief predator of *Cepaea*, the song thrush. Thus banded shells are generally to be found in grassland situations where the bands provide the same sort of protective coloration as occurs in, for example, the zebra. In the same way, unbanded shells are more normal in woodland where they merge well with the monotonous leaf cover. But almost always mixed populations occur. The maximum number of bands on the body whorl is five and these are numbered from top to bottom. In scoring absence is indicated by a zero sign and fusion of bands by brackets (Table 51).

Group 1
The fauna consists of shade-loving species only. Open-country forms are absent. Both here and in Group 2 species such as *Carychium, Discus, Arianta* and *Vitrea* are common.

Group 2
The snails are more numerous but basically the same as for Group 1. There is an example of an open-country species, *Pupilla*, but this has little or no ecological significance.

The environment represented by the Group 1 and 2 faunas is difficult to interpret, the more so as the conditions in a ditch are not necessarily those of the surrounding land. One can say that there was an absence of disturbance by grazing animals or arable farming, and it is probable, in view of the predominance of shade-loving species, that there was a vegetation of dense scrub or woodland.

The fauna gives little clue to the problem of dating the deposits, although the absence of *Helix aspersa* (present elsewhere on the site—Group 4), a species not introduced into the British Isles until early Romano-British times, suggests a prehistoric date.

Group 3
There are few shells other than those of *Cepaea*. But the absence of *Arianta* and paucity of *Cepaea hortensis* by comparison with their abundance in Groups 1 and 2, together with the occurrence of the open-country species, *Vallonia costata* and *V. excentrica*, indicate an open environment. The sample is not large enough to solve the problem of whether the site was occupied or derelict but one would expect a shade-loving fauna to have accompanied dereliction and an open-country fauna continued occupation, so perhaps the latter is suggested.

Group 4
There are far too few shells here to make any useful ecological conclusions, but taken at face value the fauna is consistent with Groups 3 and 5 (rather than 2 and 1).

Group 5
This fauna definitely indicates open-country, with the high abundance of the two *Vallonia* species indicating a grassland cover. There is no reason why this and Group 3 should not belong to the same snail population. This is certainly not a fauna of dereliction.

Cepaea band formulae
Throughout, banded *Cepaea* predominate, unbanded and mid-banded being sparse (Table 51). There is perhaps a greater variety of banding patterns in the ditch samples (Groups 1 and 2) but the significance of this is uncertain. The interesting point, however, is that the predominance of banded shells, even in the faunas indicating shade, suggests that the general environment was open-country. This is an important conclusion and stresses the value of collecting both soil samples and the larger snails: the latter seldom occur in sufficient quantity in the soil samples for band scoring to be done.

Comparison with Blackthorn

The fauna from another site in Northampton may be mentioned by way of comparison. At Blackthorn Iron Age site (Williams 1974a: 63) the snail fauna indicated quite open conditions. *Cepaea nemoralis* (523 shells) predominated, there being only one shell of *Cepaea hortensis* and none of *Arianta*. Banded shells constituted 80%. The conclusion that 'this fauna reflects unequivocably an environment of dry grassland, unshaded by woody vegetation' may be amended. It is equally possible that the fauna reflects a rather damp habitat although still very open. The xerophile, *Helicella itala*, is virtually absent, and there are five examples of a marsh species, *Succinea*; it was suggested that the latter might have been brought to the site with rushes for flooring, but on reconsidering the fauna I now feel that they may in fact have been living on the site. This conclusion is important in the interpretation of the St Peter's Street ditch faunas; these may now be seen as almost certainly indicating shaded conditions and not simply an environment of tall, dank grassland such as may have been present in the Blackthorn ditch.

Table 50 Land mollusca

	Group 1	2	3	4	5
Carychium tridentatum (Risso)	13	15			
Succinea cf. *pfeifferi* Rossmässler		1			
Cochlicopa lubricella (Porro)		1			
Cochlicopa spp.	3	7			
Pupilla muscorum (Linné)		1			4
Acanthinula aculeata (Müller)	5	3			
Vallonia costata (Müller)			1		23
Vallonia excentrica Sterki			3		10
Ena obscura (Müller)		1			
Marpessa laminata (Montagu)	1	1			
Clausilia bidentata (Ström)		1			
Cecilioides acicula (Müller)		3			
Arianta arbustorum (Linné)	6	15			
Cepaea hortensis (Müller)	4	15	1		
Cepaea nemoralis (Linné)	14	34	19	4	26
Cepaea spp.	25	52	11	4	3
Helix aspersa Müller					1
Hygromia liberta (Westerlund)	10	16	2		20
Helicella itala (Linné)					1
Punctum pygmaeum (Draparnaud)		1			1
Discus rotundatus (Müller)	13	14			
Vitrea crystallina (Müller)	7	2			
Vitrea contracta (Westerlund)	25	16			1
Oxychilus cellarius (Müller)	8	24	1		2
Retinella pura (Alder)	5	5			
Retinella nitidula (Draparnaud)	8	8			
Vitrina pellucida (Müller)		1			
Agriolimax spp.	1				1

Table 51 Banding formulae in *Cepaea*

	Group 1	2	3	4	5
Cepaea hortensis					
12345 (five-banded)	3	9			
00000 (unbanded)	1	6	1		
Cepaea nemoralis					
12345 (five-banded)	7	21	17	4	19
10345 (four-banded)					1
1(23)45	1				
(123)45		1			
(12)(345)		1			
00345 (three-banded)	3	1			
00300 (mid-banded)	1	7			4
00000 (unbanded)	2	3	2		2

Note: Numbers linked by brackets indicate fusion of bands; 0 = absence.

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