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The Animal Bones From Five Sites At Ipswich

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Date:- 31/05/83
Sites:- Vernon St. (7402)
Lower Brook St. (5502)
Elm St. (3902)
7501
4302
Key Words:- Animal Bone

Archaeological Summary

The 29,928 animal bones discussed here were recovered from three main sites and two small sites in Ipswich.
(1) Vernon Street 7402 In the northern part of the site a series of 19th. century features were associated with terraced housing overlying a medieval sand extraction pit; in the southern part of the site a large Middle Saxon ditch four metres wide and two metres deep contained 11224 fragments of animal bone, and three Mid-Saxon pits: contexts 155 cut by ditch 90, 237 cutting ditch 90 and 281 adjacent to ditch 90.
(2) Lower Brook Street 5502. Here a medieval cemetery belonging to the chapel of St. Edmund de Pountenay, overlaying backyard areas of the Saxon town. Twenty Middle and Late Saxon pits were found, part of a substantial late Saxon cellared building (370) and a Late Saxon timber lined well.
(3) Elm Street 3902. These excavations revealed a series of at least three phases of Saxo-Norman activity. Phase 1: a north south ditch seven metres wide and two metres deep which is interpreted as a Late Saxon town defence (0465) and a pit (150). The ditch contained traces of human skeletal material in the upper layers and traces of a revetment survived on the inner lip. Phase 2: cut through the final filling of the ditch was a cellared building with a stepped entrance down to the lower floor (0505). Phase 3: after being abandonned, the backfilled cellar was in turn cut by Saxo-Norman rubbish pits (84,124,260,176). Immediately to the west of this complex, a shallow north south ditch was revealed, probably uncompleted and possibly dating from the 12th. century.
At the western extremity of the site, contractors excavations revealed a third north south ditch, up to 5 metres deep, believed to represent the documented medieval town defence of 1204. Meagre traces of other medieval activity were revealed, chiefly at the southern end of the excavated area.
(4 and 5) The remaining two sites were labelled 7501 and 4302. Site 7501 contained contexts 31000 (Middle Saxon) and 80000 (11th. century); site 4302 contained bones from contexts 26000 and 68000 (11th/12th century).

Introduction

29,928 animal bones were recovered from three main and two minor Anglo-Saxon and Saxo-Norman sites in Ipswich, of these 28,220 were stratified. For a summary of features containing animal bones see Table 1. The unstratfied material is not discused.The bones were recorded using Jones et al. (A.M. Laboratory Report No. 2333). Identification was facilitated by reference to the modern comparative collection held in the Ancient Monuments Laboratory Department of the Environment. The data was recorded onto computer punched paper tape and loaded onto the Geisco Time Sharing computer service; at a later stage it was moved on to Research Machines 380Z and a Cromemco Z-2H0S micro-computers. The following archives are available at the Ancient Monuments Laboratory 23 Savile Row London W1:- Hard-copy, microfiche, IBM format 8 inch disc, Cromemco five and one quarter inch diskette and on half inch magnetic tape (1600 bpi 9 track IBM). The animal bone material is currently stored by the Ancient Monuments Laboratory and may be traced through it at a later date.

The animal bones from all the sites were recorded in 1977 and were initially treated as one group. The data was subsquently divided into the following groups :- All sites and phases, Middle Saxon, Late Saxon and 11th. and 12th. century. In addition the bones from ditch 90 were further divided from the Middle Saxon group in order to establish whether this assemblage followed the same trends as the material from the other Midddle-Saxon deposits. This was found to be so and the two groups are therefore here discussed as one assemblage.

Table 1. Summary of the archaeological features.

	Pits	Ditch	Cellared building	Well
Middle Saxon				
Vernon Street, Stoke (7402)	4	ditch 90		
Lower Brook Street (5502)	many		1	1
site 7501	1.			
Late Saxon				
Lower Brook Street			1	1
Elm Street (3902)	1	town ditch	1	
11th/12th centuries				
Elm Street	4			
site 7501	1			
site 4802	1			

The bulk of the bone was recovered by hand; however soil from eight contexts was processed by froth flotation and the residues recovered in 1mm mesh sieves. The bird and small mammal bones thus retrieved are also included in this discussion; the fish bones from the Middle Saxon contexts at Vernon Street and Brook Street form the subject of a separate report. The bone was generally in good condition with unweathered surfaces and recent breaks were few in number.

Table 2. Number of identified bones from Ipswich all sites and phases.

SPECIES	NUM BONES	PERCNTAGE
CATTLE (BOS SP. DOMESTIC)	4101	14.5
LARGE MAMMAL	32	0.1
SHEEP (OVIS SP. DOMESTIC)	570	2.0
GOAT (CAPRA SP. DOMESTIC)	91	0.3
OVICAPRID SP DOMESTIC	1383	4.9
PIG (SUS SP.)	2224	7.9
HORSE (EQUUS SP.)	59	0.2
RED DEER (CERVUS ELAPHUS)	4	
FALLOW DEER (DAMA DAMA)	1	
ROE DEER (CAPREOLUS CAPREOLUS)	7	
LARGE UNGULATE	4068	14.5
SMALL UNGULATE	3480	12.3
DOG (CANIS SP. DOMESTIC)	156	0.5
CAT (FELIS SP. DOMESTIC)	137	0.5
UNIDENTIFIABLE MAMMAL	10738	38.1
FOWL (GALLUS SP. DOMESTIC)	458	1.6
GOOSE (ANSER SP. DOMESTIC)	194	0.7
UNIDENTIFIABLE BIRD	179	0.6
FOX (VULPES VULPES)	1	
COMMON SHREW(SOREX ARANEUS)	7	
COMMON VOLE(MICROTUS ARVALIS)	2	
HOUSE MOUSE(MUS MUSCULUS)	1	
DOMESTIC DUCK(ANAS SP.)	8	
MALLARD(ANAS PLATYRHYNCHOS)	4	
TEAL(ANAS CRECCA)	1	
DUCK(AYTHYA SP.)	6	
GOSHAWK(ACCIPITER GENTILIS)	1	
RED GROUSE(LAGOPUS LAGOPUS)	1	
CRANE(GRUS GRUS)	1	
PIGEONS(COLUMBIDAE)	1	
DOMESTIC PIGEON(COLUMBA (DOMESTIC))	7	
MEADOW PIPIT(ANTHUS PRATENSIS)	1	
CARRION CROW(CORVUS CORONE)	1	
RAVEN(CORVUS CORAX)	2	
FROG/TOAD(RANA SP./BUFO SP.)	249	0.9
UNIDENTIFIED SMALL MAMMAL(RODENTIAE)	18	
DOMESTIC DUCK/MALLARD(ANAS SP.)	14	
DUCK(ANAS SP.)	7	
TOTAL NUMBER OF SPECIES 38		
TOTAL NUMBER OF BONES 28,220		

Summary: all phases.

The numbers of bone fragments and species for each of the groups are presented in tables 2, 4, 13 and 15. The relative amounts of the principal species is shown in Table 3. In addition to the remains of cattle (Bos sp. domestic), sheep (Ovis sp. domestic) and pig, (Sus sp), bones of goat (Capra sp. domestic), horse (Equus sp.), dog (Canis sp. domestic) and cat (Felis sp. domestic), were not uncommon. Other species from which a few bones only were found are red deer (Cervus elaphus), fallow deer (Dama dama) , roe deer (Capreolus capreolus), and fox (Vulpes vulpes).

Table 3. The relative proportions of fragments of the principal species (expressed as a percentage of the total identified fragments).

	Cattle	O/C	Pig	Horse	Deer	Dog	Cat
Middle Saxon	38.49%	22.99%	24.1%	0.8%	0.14%	10.0%	1.4%
Late Saxon	58.9%	15.6%	15.9%	3.2%	0.0%	3.4%	2.9%
11th-12th cent.	37.2%	28.5%	25.4%	0.9%	0.0%	2.7%	0.0%

(O/C = sheep, goat and ovicaprid)

852 bird bones were recovered. In addition to 591 fragments of domestic fowl (Gallus sp. domestic) and goose (Anser sp. domestic) seven bones domestic pigeon (Columba sp. domestic) and thirty-five bones from a variety of wild birds were identified: mallard (Anas platyrhynchos), teal (Anas crecca), indeterminate wild duck (Anas sp. and Aythya sp.), crane (Grus sp), red grouse(Lagopus lagopus), carrion crow (Corvus corone), raven (Corvus corax), and a single bone of a goshawk (Accipiter gentilis). With the exception of three fragments of duck these were all from the Middle Saxon deposits. A total of 179 fragments were not identifiable.The species recovered in sieving were common shrew (Sorex araneus), common vole (Microtus arvalis), house mouse (Mus musculus), meadow pipit (Anthus pratensis), and frog or toad (Rana sp./ Bufo sp.). A single fragment of cetacean vetebrae was found at Vernon St. in context 90211

Table 4. Number of identified bones from Ipswich middle Saxon.

SPECIES	NUM BONES	PERCNTAGE
CATTLE (BOS SP. DOMESTIC)	3408	13.6
LARGE MAMMAL	32	0.1
SHEEP (OVIS SP. DOMESTIC)	469	1.9
GOAT (CAPRA SP. DOMESTIC)	75	0.3
OVICAPRID SP DOMESTIC	1265	5.0
PIG (SUS SP.)	1973	7.9
HORSE (EQUUS SP.)	27	0.1
RED DEER (CERVUS ELAPHUS)	4	
FALLOW DEER (DAMA DAMA)	1	
ROE DEER (CAPREOLUS CAPREOLUS)	7	
LARGE UNGULATE	3522	14.1
SMALL UNGULATE	3211	12.8
DOG (CANIS SP. DOMESTIC)	125	0.5
CAT (FELIS SP. DOMESTIC)	116	0.5
UNIDENTIFIABLE MAMMAL	9760	38.9
FOWL (GALLUS SP. DOMESTIC)	397	1.6
GOOSE (ANSER SP. DOMESTIC)	176	0.7
UNIDENTIFIABLE BIRD	179	0.7
FOX (VULPES VULPES)	1	
COMMON SHREW(SOREX ARANEUS)	7	
COMMON VOLE(MICROTUS ARVALIS)	2	
HOUSE MOUSE(MUS MUSCULUS)	1	
MALLARD(ANAS PLATYRHYNCHOS)	4	
TEAL(ANAS CRECCA)	1	
DUCK(AYTHYA SP.)	5	
GOSHAWK(ACCIPITER GENTILIS)	1	
CRANE(GRUS GRUS)	1	
PIGEONS(COLUMBIDAE)	1	
DOMESTIC PIGEON(COLUMBA (DOMESTIC))	7	
MEADOW PIPIT(ANTHUS PRATENSIS)	1	
CARRION CROW(CORVUS CORONE)	1	
RAVEN(CORVUS CORAX)	2	
FROG/TOAD(RANA SP./BUFO SP.)	249	1.0
UNIDENTIFIED SMALL MAMMAL(RODENTIAE)	18	0.1
DOMESTIC DUCK/MALLARD(ANAS SP.)	11	
DUCK(ANAS SP.)	8	
TOTAL NUMBER OF SPECIES 36		
TOTAL NUMBER OF BONES 25064		

Table 5. Distribution of anatomical elements of the principal species. Middle Saxon Phase

	cow	she	goa	o/c	pig	hor	red	fal	roe	dog	cat	bar	sar
skull	536	2	2	184	388		1			5	1	1	11
horn core	116	42	60	3									
antler							2						
mandible	365			206	348				2	11	5	2	8
hyoid	9			6						2		11	
scapula	215	36		91	218	2				2	8	2	2
humerus	197	28		81	168	3			3	6	11		
radius	202	86		119	76	3			1	3	7	1	
ulna	94	13		38	109					1	4	17	
metacarpal	193	31	9	89		2				1			
phalanx 1	164	7		6	28	2					17		
phalanx 2	47	1		4	6	1							
phalanx 3	66	1			13	1					6		
os coxae	272	60	1	119	140	1				3	7	4	
femur	197	9		58	53	2				6	10	1	35
patella	8			1									
tibia	216	104		96	115	4	1	1	1	9	11		1
fibula					79					2	8		
calcaneus	143	6		18	26	1				1	1		
astragalus	84	3		1	7						1		
centroquar	13										1	3	
metatarsal	157	39	1	103		2				1			
metapodial	3			2	201					11	13		
baculum										1			
rib										25	7	2406	2783
atlas	42		1	14	16					2		47	12
axis	22		1	7	16	1				2		20	13
cervical vert.					13					7		221	47
thoracic vert.	76			19	8	1				13		441	155
lumbar vert.				5						9	1	168	81
sacrum	1	1		1		1				1		27	8
caudal vert.												14	2
vertebra frag.										1		152	54

unidentified fragments 9776

[o/c = ovicaprid]

The middle Saxon bones

Fragment numbers of the species present are shown in table 4. and table 5.

In all a total of 14,899 bones from large and small ungulates and a further 9776 unidentifiable fragments was recovered from the Middle Saxon deposits. Of the 8164 fragments assignable to species. cattle are predominant (3413 fragments, or 38.5%), with pigs and ovicaprids being represented by almost equal numbers of fragments (1968 and 1810 fragments,or 24.1% and 22.4% of the total identifiable bones respectively). Seventy-five bones of goat were identified, of which sixty were horn cores. If the totals for goat and for those bones positively identified as sheep are combined, goat remains form 13.8% of the total; however if horn cores are omitted from this calculation the proportion of goat remains is only 3.4%. Numbers of goat horn cores thus appear to be disproportionate; possible reasons for this are discussed below. They do not necessarily indicate the numbers of goats consumed in the town. Dogs and cats together form a subsidiary group of 934

fragments; the proportion of horse bones in the assemblage is only 0.3% of the total fauna and lower than in the later Saxon and Medieval levels. Red deer, roe deer and fallow deer are together represented by twelve fragments only, of which seven bones and one worked antler base (not in table) were of roe deer. Fallow deer remains are not common in Anglo-Saxon contexts, but there is evidence that they had been introduced in England by the end of the Roman period (Armitage, Locker & Straker, forthcoming).

Fragmentation.

No parts of the skeleton of cattle, pig and sheep are noticeably lacking, (table 5.) and it is likely therefore that whole animals are represented in the sample. The degree of ancient fragmentation is recorded in Figs.1, 2 and 3. Fig. 1. combines the total bones assigned to both cattle and large ungulate; Fig. 2. combines the totals for all ovicaprids with the total fragments identified as small ungulate. The principal bones are divided into four size classes (75% to 100% complete, 50% to 75%, 25% to 50% and 25% and less) and expressed in a pie chart for each of the principal bones. In view of the fact that the smaller fragments may be overlooked in excavation the proportion of the smallest category may be underestimated but the relative fragmentation between bones and between species is indicated.

An examination of the different bone elements through the principal species reveals a certain degree of differential fragmentation, possibly reflecting the selection of certain bones for marrow extraction or bone working. Primary fragmentation, or initial butchery and tertiary fragmentation, either after discarding or in the ground was observed throughout. Secondary fragmentation was noticeably present on the following: long bones, skull, vertebrae and os coxae.

The humerus, radius, femur and tibia of cattle and sheep are highly fragmented, and somewhat less so in pig (Fig. 3.), possibly as a result of butchery or the breaking up of the bones for the extraction of marrow or the preparation of broths. The skulls of all species are highly fragmented, possibly due to the extraction of the brain, though the skull of large ungulates breaks easily and this high degree of fragmentation may have occurred after the bones were discarded. Mandibles however, particularly those of cattle and swine also tend to be broken up, possibly to extract the musculature of the head. Vertebrae and os coxae are likewise highly fragmented. The musculature associated with these bones is slight in comparison with the rest of the postcranial carcase.

The treatment of the metapodials appears to differ from that of the other long bones. A higher proportion of cattle metapodials were discarded without being fragmented (Fig. 1.). Such fragmentation as they have suffered may be the result of use in bone tool making, although only one bone tool from the site was produced from this bone element. Metapodials of pig , which are smaller than those of the other species are commonly complete. The least fragmented bones, in addition to the pig metapodials, are the phalanges and tarsal bones, indicating that after initial butchery they were not further processed.

The fragmentation pattern of the bones in ditch 90 is similar to that of the Middle Saxon assemblage as a whole. Fewer complete or virtually complete long bones were recovered from this feature, but these were not common in any areas of the site.

Table 6. Fusion of bones of cattle, sheep and goat and pig. Numbers of fused, unfused and fusing bones are shown. Middle Saxon phase.

anatomy	cattle			sheep and goat			pig		
	unfused	fusing	fused	unfused	fusing	fused	unfused	fusing	fused
scapula	11	2	129	3	0	40	24	4	7
p. humerus	9	3	13	4	0	2	10	1	0
d. humerus	9	0	103	7	2	62	30	8	75
p. radius	3	1	117	4	1	109	7	0	57
d. radius	16	2	48	21	1	28	18	0	3
p. ulna	3	0	71	12	0	28	41	0	31
d. ulna	1	0	1	2	0	4	7	0	0
d. metacarpal	16	0	64	30	2	26			
phalanx 1	13	6	139	3	1	8	15	0	29
phalanx 2	3	1	41	1	1	4	1	0	6
p. femur	33	4	36	16		4	10	0	2
d. femur	15	3	24	10	2	4	28	0	3
p. tibia	15	4	29	19	0	7	15	2	
d. tibia	39	3	72	19	10	85	38	7	87
p. fibula							21	0	1
d. fibula							41	1	1
calcaneus	38	3	40	12	2	17	15	3	19
d. metatarsal	7	1	42	19	2	28			
d. metapodial							104	1	49

Ageing

Investigation of the age of death of the principal food animals based on tooth eruption and wear and on fusion of the epiphyses (table 5.)is of particular interest in an early urban settlement such as Middle Saxon Ipswich, urban contexts since it may give an indication of whether the stock were reared in the town or were brought into the town from the rural hinterland for consumption in the town. The teeth of cattle, swine and sheep and goat were assigned where possible to stages of eruption and wear following the notation of Grant (1975). Cattle teeth were then assigned to eight eruption and wear stages, pig teeth to seven stages and sheep to eight stages (Tables 7, 8 and 9). These stages are based on the eruption of the permanent molars; the later stages also take into account wear on the third permanent molar. The last column in each table shows the number of teeth at each stage

Table 7. Stages of eruption and wear of cattle teeth from Middle Saxon Ipswich.

	DPM4/PM4	M1	M2	M3	MS n	LS n	11th n
1 M1 unerupted	b				1		
2 M1 erupting	c-i	g-5			4		
3 M1 worn, M2 unerupted		a-e	2		1		
4 M2 erupting	j-k	f-g	g-5		7	1	1
5 M2 worn, M3 unerupted	k-2	h-j	a-f		7	1	
6 M3 erupting	l	g-h	g-5		11		1
7 M3 worn (a-f)	l/2-e	g-k	g-k	a-f	9		
8 M3 worn (g+)	g	k-m	j-k	g-k	15	2	1

MS=Middle Saxon LS=Late Saxon 11th=11th and 12th centuries

Relatively few mandibles derive from cattle slaughtered before the stage at which M2 starts to erupt, but the numbers increase in the next stages, 4, 5 and 6 in the table. These animals are still immature, but are past the first year of life (Andrews, 1982; Brown, 1916) Animals of breeding age and plough oxen fall into the last two dental stages. In general the ages suggested by the dentition indicate that a fairly high proportion of the cattle selected for slaughter at Ipswich was at an optimum age for meat .

Table 8. Stages of eruption and wear of sheep and goat teeth from Middle Saxon Ipswich.

	DPM4/PM4	M1	M2	M3	MS	LS	11th
1 M1 unerupted	f-h	2			2	0	0
2 M1 erupting	e-g	3-5			8	0	0
3 M1 in early wear	g-h	a-f	1-2		35	1	0
4 M2 erupting	g-n	e-f	3-5		3	0	0
5 M2 in early wear	j-n/e-g	g-h	a-e		15	0	0
6 M3 erupting	i-n/e-g	g-h	f-h	3-5	8	1	0
7 M3 in early wear	e-	g-h	e-h	a-f	20	1	2
8 M3 in full wear	h-k	h-m	g-	g-j	8	2	2

MS=Middle Saxon; LS=late Saxon; 11th = 11th and 13th centuries.

The great majority of animals slaughtered before M2 has begun to erupt but with wear on M1 are sheep or goats. These are animals in the first year of life, and and were thus killed at an earlier age than cattle; about 10% of the lambs are in the first few months of life.The whole age range is however present in these animals, implying that herds of sheep were kept in close proximity to the town, although there is no very great proportion of sheep in the oldest age ranges. This is thought to be an indication of flocks which are kept for wool production, and was a characteristic of the sheep remains from the site of North Elmham (Noddle 1975) in the Late Saxon period.

Table 9. Stages of eruption and wear of pig teeth.

	DPM4/PM4	M1	M2	M3	MS	LS	11th
1 M1 erupting	c-e	3-5			3		
2 M1 in early wear	d-i	a-c	2				
3 M2 erupting	c-i/2	b-f	3-5		18	1	2
4 M2 in early wear	3-d	c-j	a-c	2	6	2	2
5 M3 erupting	a-f	f-k	b-e	3-5	24	1	3
6 M3 in early wear	b-f	j-m	e-j	a-c	30		1
7 M3 worn	f-g	j-n	g-k	d-k	22		

The slaughter rate of the pigs show a more even distribution between the age stages than that of cattle and sheep; as is commonly found with pig remains from archaeological sites, a small proportion only (here 19%) fall into the oldest age group.

Estimations have been made of the size of the cattle using the metacarpal and metatarsal, the limb bones which survive complete in the greatest numbers. Bone length has been compared from Melbourne Street, Southampton, (Bourdillon & Coy, 1977) and from the Anglo-Saxon levels of West Stow (Ancient Monuments Laboratory report 3191)

Table 10. Measurements of cattle metacarpals and metatarsals length(mm)

	mean	range	s.d	n
Ipswich	187.9	207.0-162.0	12.04	15
withers height	1150			
West Stow	182.65	209.1-165.4	13.9	46
Melbourne St	189.8	224.8-171.9	9.8	42
Metatarsal length (mm)				
Ipswich	214.2	230.0-*	9.03	19
withers height	1167			
West Stow	214.1	236.9-192.6	10.25	38
Melbourne St.	211.8	228.0-195.5	9.8	32

If the height at the withers is calculated (Fock, 1966) the average heights obtained show that the beasts from the three site were similar in size.

Bearing in mind the criteria to be observed in the estimation of the relative numbers of animals represented on urban sites, it is possible to make some tentative comparisons of the relative amounts of meat obtainable from the principal species in the Ipswich Middle Saxon assemblage, by using comparisons based on the numbers of fragments identified. As a rule this is only possible when the sample may be shown to represent complete animals, or when the species to be compared are of of similar numbers, as it has been shown that the behaviour of the minimum numbers index varies depending on the size of the sample (Grayson 1981). In the asemblage under discusssion it is possible to derive a minimum number for the principal species from the mandibles which can be aged (see below): 55 of cattle, 95 of sheep and goats and 117 of swine in the Middle Saxon period. When percentages derived from these figures are compared with percentages derived from fragment numbers, and with figures for meat weights based on those used in the analysis of bone from the contemporary Anglo-Saxon town of Hamwih (Bourdillon and Coy 1981), the following pattern emerges (Table 11.) The meat weights employed are 275 kg for cattle, 87.5 kg for pig and 37.5 kg for sheep.

Table 11. Fragments, minimum numbers and estimated meat weights

	1	2	3	4	5	6	7
	fragment nos	%	minimum numbers based on jaws	%	fragments per MNI	meat weight	%
cattle	3413	38.5	28	20.7	121.7	7700	32.5
pig	1968	24.1	59	43.7	33.4	5162.5	35.2
sheep and goat	1810	22.4	48	35.6	37.7	1800	12.3

Remains of swine form only 24.1% of the total of the principal domestic animals (col.2), but the figures for minimum numbers of animals represented by the remains and the figures for meat weights suggest that pigs were more commonly eaten than the fragment numbers taken in isolation would suggest. Col.5 shows that the number of fragments which survived from each cow or ox slaughtered was higher than the equivalent figure for sheep and pig. Poor survival of the post-cranial remains of swine has been noted at many other sites. However calculated the proportion of pig remains in the Ipswich Middle Saxon assemblage is high, but this is found on other Anglo-Saxon sites in eastern England, such as West Stow. It should be stressed that the figures in columns 3 and 6 represent only one interpretation of the bone data and that other interpretations are possible.

Table 12. Anatomical distribution of domestic fowl and goose bones. All phases.

	Middle Saxon		Late Saxon		11th/12th centuries	
	fowl	goose	fowl	goose	fowl	goose
skull	3	1				
mandible		3		1		
coracoid	35	16	1		1	
furcula	17	9	1			
scapula	25	15				1
humerus	52	42	5	2	3	
radius	20	16	4		1	3
ulna	44	7	1		3	2
carpometacarpus	6	7			1	1
sternum	10	14				1
os coxae	5	5	1			
femur	54	7	4		2	
tibiotarsus	76	17	5	1	3	1
fibula		2				
tarsometatarsus	44	11	2	1	5	
phalanx		2				
synasacrum	5	2				
total	397	176	24	5	20	9
unidentified bird	179		0		0	

Birds

791 bird bones were recovered from middle Saxon contexts, of which 612 were identifiable. Of the identified bird bones 65% are from domestic fowl and 29% from domestic geese. The anatomical distribution of the fowl and goose bones is shown in table 12. In addition seven bones of domestic pigeon were recovered from these levels, and fifteen bones of mallard may also derive from domestic birds. Most of the remaining bird species identified are of waterfowl which could have been snared, trapped or taken with hawks in the vicinity of Ipswich. A single bone of crane was found. Cranes have not nested in East Anglia since AD 1600 (Snow, 1971), but their remains are not uncommonly found in archaeological bird assemblages. The goshawk is thought to have occurred in England until the early nineteenth century (Sharrock, 1976), but today the few birds known are thought to have escaped from falconers. It is not possible to distinguish wild birds morphologically from birds kept for hawking. The carrion crow and the raven were scavengers in towns. The single bone of a meadow pipit was found in a pit which contained the remains of small mammals and amphibians.

Table 13. Number of identified bones from Ipswich late Saxon.

SPECIES	NUM BONES	PERCNTAGE
CATTLE (BOS SP. DOMESTIC)	398	24.8
SHEEP (OVIS SP. DOMESTIC)	38	2.4
GOAT (CAPRA SP. DOMESTIC)	7	.4
OVICAPRID SP DOMESTIC	69	4.3
PIG (SUS SP.)	119	7.4
HORSE (EQUUS SP.)	23	1.4
LARGE UNGULATE	279	17.4
SMALL UNGULATE	152	9.5
DOG (CANIS SP. DOMESTIC)	25	1.6
CAT (FELIS SP. DOMESTIC)	20	1.2
UNIDENTIFIABLE MAMMAL	442	27.6
FOWL (GALLUS SP. DOMESTIC)	24	1.5
GOOSE (ANSER SP. DOMESTIC)	5	.3
DOMESTIC DUCK(ANAS SP.)	1	.1
DOMESTIC DUCK/MALLARD(ANAS SP.)	2	.1
RED GROUSE	1	.1

TOTAL NUMBER OF SPECIES 16
TOTAL NUMBER OF BONES 1605

Table 14. Distribution of anatomical elements of the principal species. Late Saxon phase.

anatomy	cow	sheep	goat	o/c	pig	horse	dog	cat	lar ung	small ung
skull	72				17	7	1	1	24	2
horn core	11	6	5							
mandible	47			10	22	5	1	1	8	1
hyoid									2	
scapula	19	2			9	1	1	3		
humerus	27	2		6	9	1	3	4		
radius	33	12	1	6	5	1	2	1		
ulna	12	1	1	2	3		1			
metacarpal	6	1		9						
phalanx 1	9	1			1	2				
phalanx 2	6									
phalanx 3	6									
os coxae	45			10	9		2	1		
femur	17			5	2		2	3		
patella						1				
tibia	24	9		8	15	2	5	6		
fibula					1					
calcaneus	20	1					1			
astragalus	10				1					
centroquartal	1									
metatarsal	30	9		4		1				
metapodial					11		3			
rib									162	129
cervical vert.	1				2	1	1		26	5
thoracic vert.									28	12
lumbar vert.									14	5
sacrum									1	
vertebra frag.									14	4

unidentified fragments 455

The Late Saxon bones

Altogether 1604 bones of the late Saxon period were examined, of which 571 were identified to species (tables 13 and 14.). The most striking feature of this group is the increase in the number of cattle bones (58.9% of the total identifiable bones) and the drop in the numbers of pig and ovicaprid remains, although these are still represented in equal proportions (15.9% and 15.6% respectively). In addition to the horn cores one radius and one ulna of goat were recovered. It is notable that in this very small sample, bones of dogs and cats are as common as bones of horse. Five bones of domestic goose and twenty-four bones of domestic chicken were present. Their anatomical distribution is shown in table 14 . One bone of domestic duck and two more which could be of domestic duck or mallard were also present.

Table 15. Number of identified bones from 11th and 12th century.

SPECIES	NUM BONES	PERCNTAGE
CATTLE (BOS SP. DOMESTIC)	295	19.0
SHEEP (OVIS SP. DOMESTIC)	63	4.1
GOAT (CAPRA SP. DOMESTIC)	9	.6
OVICAPRID SP DOMESTIC	49	3.2
PIG (SUS SP.)	132	8.5
HORSE (EQUUS SP.)	9	.6
LARGE UNGULATE	267	17.2
SMALL UNGULATE	117	7.5
DOG (CANIS SP. DOMESTIC)	6	.4
CAT (FELIS SP. DOMESTIC)	1	.1
UNIDENTIFIABLE MAMMAL	556	35.8
FOWL (GALLUS SP. DOMESTIC)	32	2.1
GOOSE (ANSER SP. DOMESTIC)	13	.8
DOMESTIC DUCK(ANAS SP.)	2	.1
DOMESTIC DUCK/MALLARD(ANAS SP.)	1	.1
TOTAL NUMBER OF SPECIES 15		
TOTAL NUMBER OF BONES 1552		

Table 16. Distribution of anatomical elements of the principal species.

11th and 12th century

anatomy	cow	sheep	goat	o/c	pig	horse	dog	large ung	small ung
skull	2						1		
horn core			4						
mandible	4			1	5		2		
hyoid	1								
scapula	4				2				
humerus	3			3	4				
radius	1			2	8				
ulna	3				3				
metacarpal	3	5							
phalanx 1	2					1			
phalanx 2	1								
phalanx 3	1								
os coxae	4			4	1				
femur	4				3				
tibia	5	4			6				
calcaneus	2				3				
astragalus					1				
metatarsal	1	3							
metapodial					7				
rib								51	24
cervical vert.					1			4	
thoracic vert.								4	3
lumbar vert.								1	4
sacrum									2
vertebra frag.								2	

unidentified fragments 118

11th-12th century.

This period yielded a total of only 1553 bones (table 13 and 14.). Of those bones assignable to species, the relative fragment percentages of cattle and ovicaprids have returned to the almost exactly the same proportions as in the Middle Saxon period, but the amount of pig has increased significantly to almost double the amount represented in the Late Saxon period. Other species are confined to only horse and dog, both in very minor numbers.

Evidence for bone working in Ipswich.

In middle Saxon Ipswich and also in the small samples of bones from the later periods horn cores of goat are more common than other post-cranial remains. This phenomenon has been noted at other urban sites, such as 's-Hertogenbosch (Prummel, 1978) and St. Peter's Street, Northampton, (Harman, 1979). There is documentary evidence that in medieval times horn cores were left attached to the hide, and only removed when the hide was brought to the town for processing (Prummel, 1978 ;Schmid, 1973. The horn was used by hornworkers, and the horn cores then discarded. The goat horn cores from Ipswich were, with one exception, chopped out of the skull; one horn core of goat, one of sheep and one of cattle from the Middle Saxon phase had however been sawn.

Also in the middle Saxon deposits (Vernon St context 90333) there were small but significant numbers of ovicaprid metatarsals and metacarpals which were the waste product of some process. These bones were found in a number of clear stages. First stage bones had a hole punched through the centre of the proximal joint surface, second stage bones were split axialy from the distal end so as to remove one of the distal condyles and part of the shaft of the bone. Compression or chop marks were visible on the medial surface of the remaining condyle. Third stage bones had both of the distal condyles removed. Occurence of this last stage was not frequent. The same procedure was found on a very small number of cattle metapodials from the same context. None of the split off condyles were recovered in the animal bone collection or in the bone object collection. We suggest that these bones were first hammered onto a spike then a wedge or axe was knocked between the condyles, one condyle then split away and passed to a further process and the remaining bone on the spike was generally discarded.

Pathology

The number of pathological bones for a collection of this size was very low and is not described here. Information on these bones is available through the archive.

Conclusions

The bones from middle Saxon Ipswich appear to be a mixture of domestic rubbish, butchery waste and discards from horn and bone working.

The age at death of the cattle, ovicaprids and pig suggest that these were slaughtered at optimum age for meat consumption.

The relative abundance of pig, fowl and goose are typical of Anglo Saxon towns as is the mixture of manufacturing waste and domestic rubbish.

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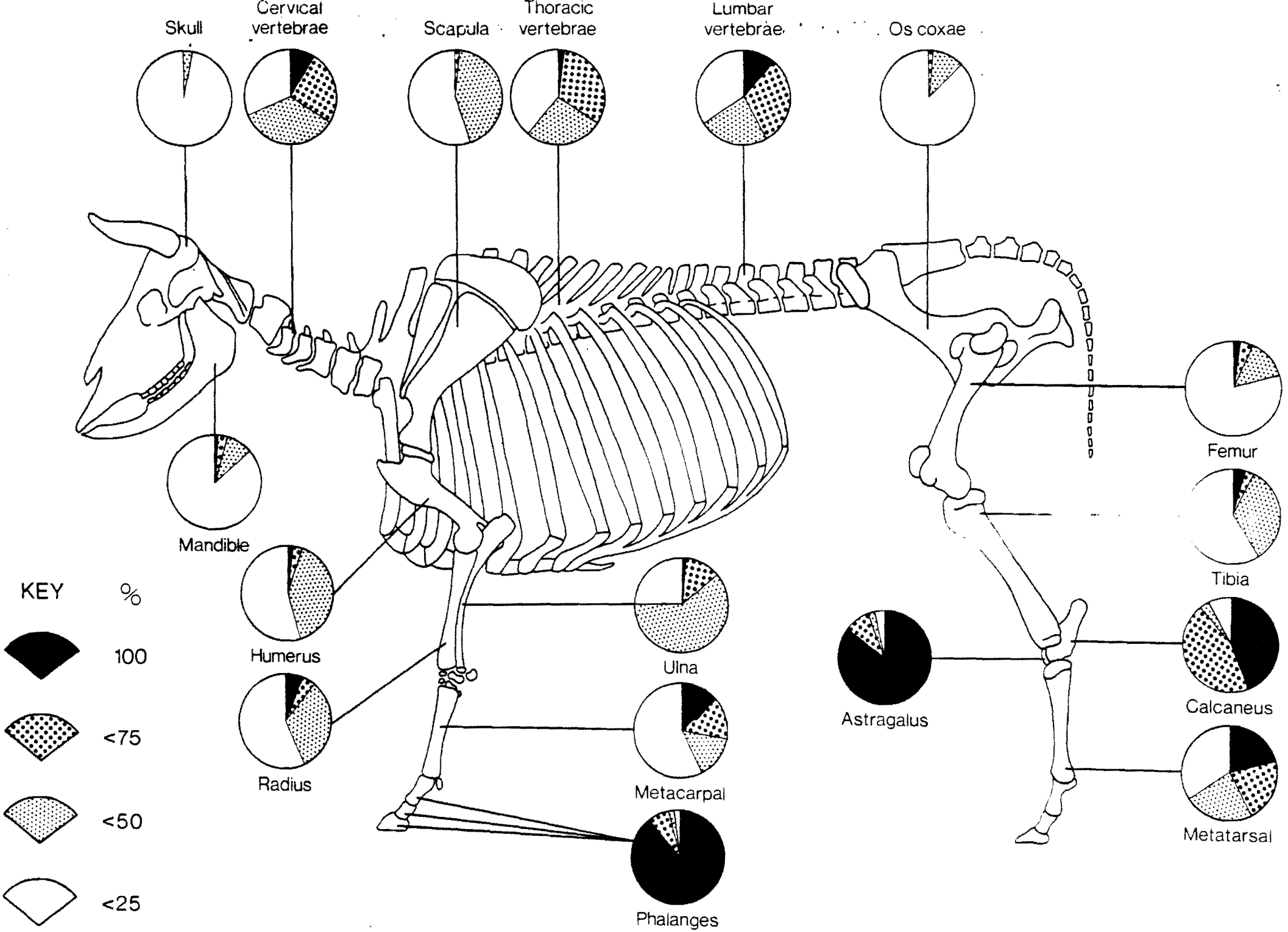

Fig. 1. Middle Saxon cattle and large ungulate fragmentation

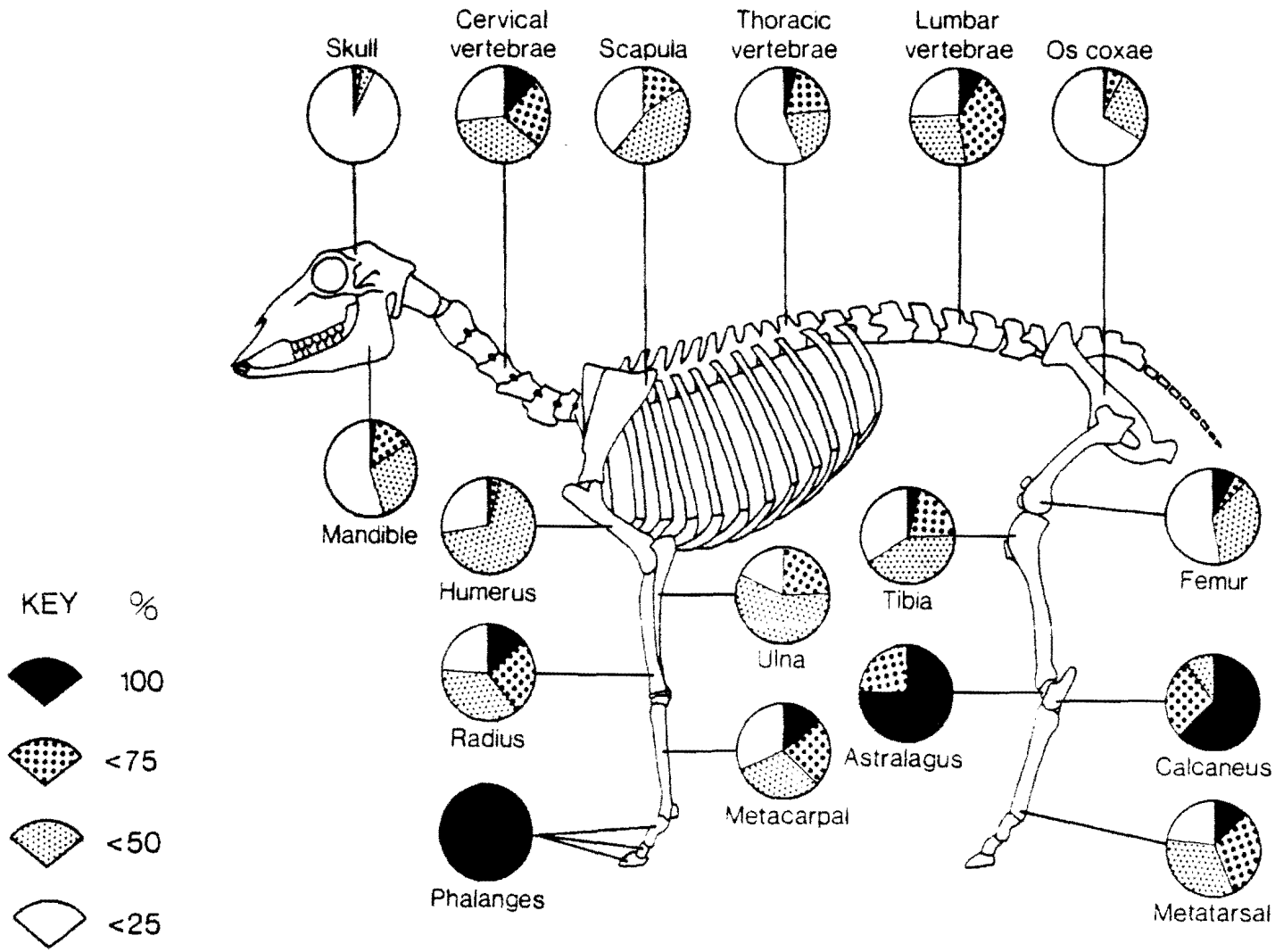

Fig. 2 Middle Saxon ovicaprid and small ungulate fragmentation

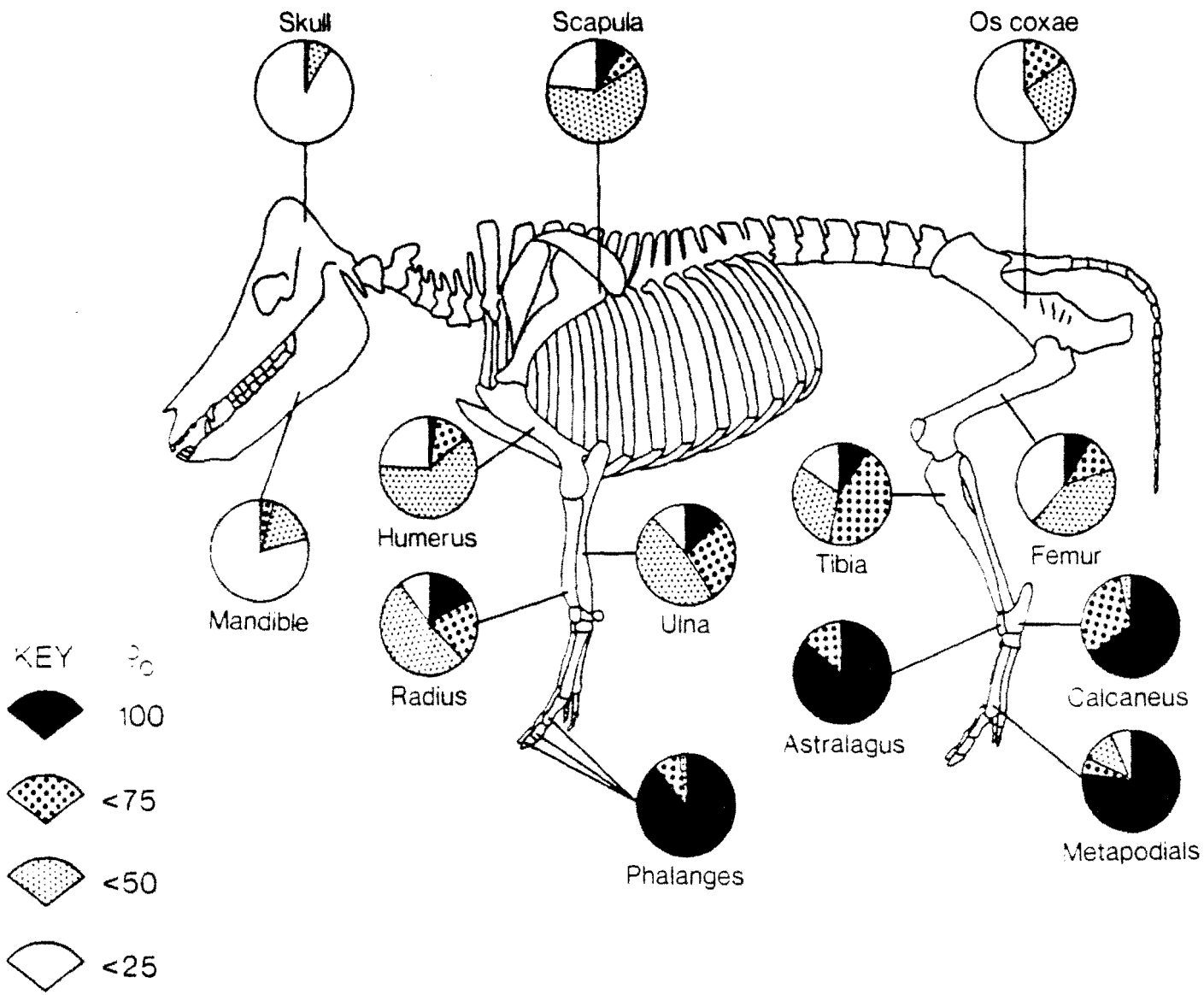

Fig. 3 Middle Saxon pig fragmentation