AML REPORT 4966

A comparative study of the Roman animal bone assemblages from Monson Street, and from Roman and later deposits at St. Mary's Guildhall, Lincoln.

by

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Introduction

The sites of St. Mary's Guildhall and Monson Street were both excavated during the 1982 season. Both sites lie to the south of the walled Roman city of Lindum, within the medieval suburb of Wigford. Because of the close proximity of the sites one to another, because some of the features excavated were contemporaneous, and because neither yielded particularly substantial bone assemblages, the two sites are discussed together in this report. Much of the information about the interpretation of features has been extracted from unpublished drafts of the excavation reports from Monson Street (Magilton, 1982) and St. Mary's Guildhall (Magilton and Stocker, 1982).

Monson Street consisted of basically Roman material from what has been described as 'opulent traders dwellings', but excavations during the last century revealed a number of early Roman cremations and inhumations (records suggest that during the early Roman period this area functioned as a cemetery). There was also a number of medieval rubbish pits and other architectural fragments cut into the Roman features (Magilton, 1982). The majority of the animal bone from Monson Street was late Roman in date, but the small amounts of early Roman and Medieval bone are recorded in Tables 3 to 6. In the tables, the phases are listed as follows:

MS1 - The early Roman cemetery (1st-2nd Centuries)

MS2 - Roman (2nd-3rd Centuries)

MS3 - Medieval

St. Mary's Guildhall was a multi-phase site having been occupied from Roman through to modern times (Magilton and Stocker, 1982). During the Roman period the site consisted of a number of artisan dwellings situated on the land between the Fosse Way and Ermine Street. After a long period of abandonment, the construction of the Guildhall, the 'Norman House' and other associated buildings marked the first architectural activity in the area. The later medieval period merely represents the continued occupation and adaptation of these buildings. For the purposes of this report, and because of the small amounts of bones involved, the site has been divided up into three main phases:

SMC1 - 1st-3rd century (Early and Late Roman)

SHG2 = 5th-12th century (Early Medieval)

SHG3 = 12th-16th (Late Medieval plus some Post-Medieval material)

In addition, there were a number of contexts which were unstratified, which are not referred to at any great length in the text, but which appear in some of the tables (SHGU/5).

From the site of Monson Street, a total of 1,420 bone fragments were retrieved of which 964 were identified to genus or species. From St. Mary's Guildhall 3,947 fragments were excavated of which 2,662 fragments were similarly identified. Preservation of the bone from both sites was reasonably good: there was a very low frequency of charred, gnawed and abraded bone and whilst much of it was fragmentary, it was fairly easy to establish the species to which most of the bones belonged

Because all of the bone bearing contexts were small, often containing fewer than a dozen bones, the record was made on small index cards. The following information was recorded:

1.Bone type and species

2.Portion of bone identified (i.e. long bones are divided up into six sectors, the proximal and distal articulations and four equal fractions of the diaphysis)

3.Epiphyseal fusion of selected bones of the major domesticates (after Silver, 1969)

4.The rate of dental attrition and tooth eruption in the domesticates (Grant, 1982: Payne, 1984: Hull and Payne, 1982)

5.The relative proportions of carcass components

6.Non-metrical traits, such as the presence and absence of a second premolar in the mandibles of cattle and sheep (Andrews and Noddle, 1975), and the postion of the nutrient foramen in sheep femora (Noddle, 1978).

7.The ratio of horned, to polled, to 'scurred' sheep

8.Distinctive butchery marks

9.Any signs of disease or injury.

In addition, where possible, measurements were taken on the more complete long bones, following the system first devised by von den Driesch (1976), and these are included at the end of the report and Tables (Biometry Archive).

The bones themselves are the property of the Trust for Lincolnshire Archaeology, and the notes and archive material for these two sites are stored within the Environmental Archaeology Unit, University of York.

Monson Street produced the remains of 14 different species of mammal, bird and fish (possibly 15 if the unstratified carnivore bone is fox rather than dog; Table 1). The greatest diversity of species was during the Roman phase, but this is hardly surprising, as this phase produced 82.7% of all identified bone (Table 3). Bones were distributed fairly evenly throughout the contexts with no concentrations of any one species in any one phase (Table 4).

St. Mary's Guildhall produced a total of 28 different species and a further two bird, and one fish bone which it was impossible to identify to species (Table 2). The greatest diversity of species was during the Later Medieval phase, although in total this did not produce as many identifiable bones as the Early Medieval phase (Table 3). It ought to be pointed out that many of the bones which were unstratified at the time of writing this report are probably of later medieval date. The presence of Turkey (Meleagris gallopavo) in Context 5016 implies that this context is at least 16th century in date.

A study of the dentition of the major domesticates (Tables 5 and 6) revealed no major distinctions between the two sites, or between phases. Cattle were almost exclusively adult, and in fact a fairly high proportion were at least 5-6 years of age at death. The sheep

Lincoln in that there were no very young individuals in the assemblage, and only few elderly sheep. 60% of the sheep were adult (3-4 years) and a further 27.4% were sub-adult. There were very few pig mandibles but with the exception of one, all were juvenile and sub-adult, which would seem to suggest that pigs were being killed between the ages of 1-2 years.

A study of the epiphyseal fusion in selected long bones seems to vindicate these findings (Table 7). The majority of cattle bones were from adult individuals, whilst the distribution of sheep and pig bones represents a greater diversity in age at death with a fairly high proportion of immature individuals.

When a simple carcass components analysis was attempted (Table 8) for cattle, sheep and pig, the most striking feature was the very high proportion of skull in all phases. In the case of pig, skull accounted for between 46% and 57% of all pig bones in both assemblages. (Only very small numbers of bones were involved, however). Cattle showed a fairly random spread of carcass components throughout all phases, but with a generally high percentage of skull fragments. In the late medieval period, horn cores accounted for a third of all cattle bones but this may be explained by the presence of a horn-workers shop somewhere in the vicinity. One feature from St. Mary's Guildhall (pit 2500) produced something in the order of 1,500 horn core fragments. They are discussed in a seperate report (Scott,

1986).

It is the distribution of sheep bones which is perhaps the most interesting feature of this analysis. Throughout all phases, except CMG3, the ratio of skull to other skeletal elements is markedly high. In the later medieval phase however, there is a very high proportion of metapodial (37.2%) which is spread throughout all contexts of this phase. This phenomenon has been observed elsewhere in later medieval deposits, e.g. at Aldwark, York, and can be interpreted in different ways. It could be that only selected joints of the sheep carcass were finding their way into these deposits i.e. the cheap and sinewy hock joints which may have been brought onto the site in bulk. Alternatively it could be that sheepskins were being brought onto site, the skins were then trimmed and the metapodials represent the waste from this process. As there is no other evidence for skinning activity in the area, this latter alternative seems the less likely.

Table 9 shows the ratio of horned to polled to scurred sheep from most of the recorded sites in Lincoln (studied by the author). Throughout all sites, the proportion of skulls possessing scurs was very small with no concentrations within particular phases (scurs usually, but not always represent 'ewes'). Of interest is the relatively high proportion of polled sheep in Roman levels (most notably at Monson Street and St. Marks). It is just conceivable that this represents a single sheep population (the sites lie very close to one another geographically), but it is unusual to say the least to

find such a high concentration of polled sheep in Roman levels. They become much more common in Lincoln after the Conquest, and increased in frequency during the Medieval period (O'Connor, 1982). This observation has not been matched by Roman material from York.

The few injured and diseased bones identified consisted of a domestic fowl tibiotarsus with a healed midshaft fracture, similarly a cat femur with a midshaft fracture that had healed at almost 45 degrees to the norm. There was a sheep horn core with so called 'Thumb prints', a sign of arrested growth, likely to have been caused by a short period or periods of malnutrition. The only other incidence of disease was a horse 1st phalanx with extensive boney growth about all facets of the shaft, but with no changes apparent in the articular surfaces. This is indicative of a condition known to vets as 'ringbone'.

Faced with two small sites (approximately 5,000 bone fragments in total), lying within fairly close proximity to each other, it seemed an ideal opportunity to compare and contrast the two. In terms of the assemblages themselves, it was also the most practical solution.

Monson Street contained basically Roman material, whilst St. Mary's Guildhall was a multi-phase site yeilding material from Roman through to Late Medieval levels.

Taking the Roman assemblages from both sites, the species varied little, and represented a typical picture of the exploitation of domestic animals with wild species represented at a very low frequency (roe deer, brown hare, mallard, pike). The human bone from Roman Monson Street was probably reworked from the Early Roman cemetery. Cattle was the most abundant species followed by sheep, with pig represented by only a very small number of bones.

By looking at the butchery marks on the cattle bones it was possible to establish patterns in the dressing and disposal of the carcass. At Monson Street, butchery was basically concentrated on the proximal femur and humerus which is consistent with the removal of the limbs as whole units. Other butchery marks were basically random.

At St. Mary's Guildhall the only apparent butchery was on the atlas and axis, which suggests the removal of the head. These findings are significant in that they present a different picture to that of the Roman sites of Holmes Granary/Warehouse and The Park. At these sites butchery consisted of the systematic removal of the vertebral column (a process known as 'chining', and identifiable by the removal of the transverse processes on either side of the centrum). There was also the comprehensive smashing up of long bones, presumably in an attempt to extract the bone marrow. In addition, there were concentrations of cut marks along the margins of the humerus distal articulation and the glenoid cavity of the scapulae.

The systematic disposal of cattle carcasses is a common feature of Roman town sites (Maltby, 1984). One possible explanation for this discrepancy in butchery techniques is that the cattle bones from the Park and West Parade (both sites close to the heart of Roman Lincoln) represent wholesale marketing and processing of cattle carcasses whereas the bones from Monson Street and St. Mary's Guildhall derived from less organised butchery and disposal. It should be stressed that these two assemblages were modest in size and thus these conclusions should be regarded as possibilities rather than probabilities.

There is too little medieval material from Monson Street with which to compare with contemporaneous material from St. Mary's Guildhall. At this site, during the Early Medieval phase, changes in the diet appear to have been slight with the same species represented

in similar proportions. The wild bird species represented are basically wetland species or those whose usual habitat is open agricultural land. This describes quite well the environment of Lincoln and its hinterland. The fish species must have been brought onto the site from the coast. In general there seems to have been comparatively little exploitation of wild species, and this possibly indicates that they played a fairly unimportant part in the diet at this date.

During the Late Medieval period the picture is very much the same, but with a greater diversity of bird species (many of which must be regarded as accidentals rather than food items). It was not possible to identify with certainty the small falcon species, but it was appreciably smaller than kestrel (Falco tinnunculus), even allowing for a large diversity in size within this species. The identification of songthrush (Turdus philomelus) attests to the fine preservation and hand collection of the bone on a site where sieving was not practised.

A single unstratified feature (5016) thought to be Late Medieval in date, and described as 'the packing and filling of a chimney flue' contained a bewildering selection of species including turkey (Meleagris gallopavo), Tawny Owl (Strix aluco) and Rabbit (Oryctolagus cuniculus). The single specimen of turkey is useful in providing a terminus post quem date for this flue packing.

St. Mary's Guildhall and Monson Street provided a useful opportunity to examine two sites which lie very close to one another, perhaps highlighting any subtle differences between the two sites. This appears to have been vindicated by dicrepancies in such things as differences in butchery technique and the proportions of polled to horned sheep. The number of bones involved is too small to allow broad firm conclusions to be drawn. However the findings have extended the archaeological record and have, in particular, raised questions about rubbish disposal in the Roman period and how variation in this disposal may reflect differences between areas of the city.

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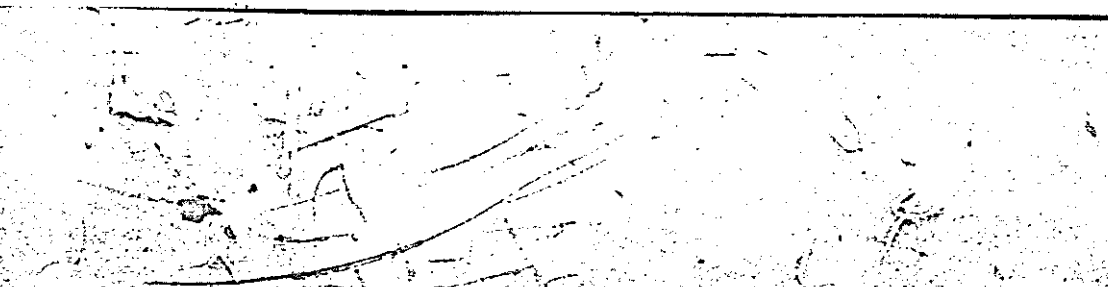

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Table 1. Monson Street - A list of the species represented

rly Roman Cemetery

e (Bos sp.)
(Ovis sp.)
Sus sp.)

man period

e (Bos sp.)
(Ovis sp.)
Sus sp.)
(Equus caballus)
(Capra hircus)
Felis domesticus)
(Mepo sapiens)
eer (Capreolus capreolus)
Canis familiaris)
ed (Anas platy rynchos)
tic fowl (Gallus gallus)
(Anas anas)

leval period

e (Bos sp.)
(Ovis sp.)
Sus sp.)
Boar (Sus scrofa)
ox (Canis/Vulpes)
Felis domesticus)
tic fowl (Gallus gallus)
(Anas anas)
(Meleva sp.)

Table 2 - St. Mary's Guildhall - A list of the species represented.

n

(Bos sp.)
Ovis sp.)
s sp.)
lis domesticus)
are (Lepus europaeus)
Homo sapiens)
Equus caballus)
nis familiaris)
c fowl (Gallus gallus)
Anas anas)
(Anas platyrhynchos)
sox lucius)

y Medieval

(Bos sp.)
Ovis sp.)
s sp.)
Equus caballus)
nis familiaris)
lis domesticus)
r (Cervus elaphus)
apra hircus)
c fowl (Gallus gallus)
Anas anas)
uck species cf. Garganey (Anas querquedula)
(Anas platyrhynchos)
dus morhua)
ish species (Pisces)

r Medieval

(Bos sp.)
Ovis sp.)
s sp.)
nis familiaris)
lis domesticus)
rat (Rattus rattus)
Equus caballus)
apra hircus)
c fowl (Gallus gallus)

Goose (Anas anas)
small duck species cf. Garganey (Anas querquedula)
small falcon species cf. Merlin (Falco columbarius)
Bird species (Aves)
Mute swan (Cygnus olor)
cf. Songthrush (Turdus philomelus)
Mallard (Anas platyrhynchos)
small duck species (Anas/Aythya)
Corvid species (Corvidae)
Feral pigeon (Columba livia)
Golden plover (Pluvialis apricaria)
Jackdaw (Corvus monedula)
Plaice (Pleuronectes platessa)
Cod (Gadus morhua)

4. Unstratified

Cattle (Bos sp.)
Sheep (Ovis sp.)
Pig (Sus sp.)
Horse (Equus caballus)
Dog (Canis familiaris)
Cat (Felis domesticus)
Goat (Capra hircus)
Rabbit (Oryctolagus cuniculus)
Goose (Anas anas)
Domestic fowl (Gallus gallus)
Jackdaw (Corvus monedula)
Turkey (Meleagris gallopavo)
Tawny owl (Strix aluco)
Cod (Gadus morhua)

Table 3. The total numbers of fragments within each phase.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
MS1	0	6	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	10	3	13	0	1
MS2	11	452	303	7	0	0	1	65	1	87	2	0	0	1	0	0	1	14	7	2	954	463	1417	11	3
MS3	0	108	69	0	0	0	0	9	1	1	0	0	0	0	0	0	1	6	3	0	189	67	256	1	0
Tot.	11	560	373	7	0	0	1	76	2	88	2	0	0	1	0	0	2	20	10	2	1153	533	1686	12	4
CS1	8	162	151	0	0	0	0	29	0	7	1	1	0	1	0	0	1	6	3	1	371	180	551	1	6
CS2	21	605	346	1	2	0	0	43	0	4	4	0	0	0	0	0	5	28	14	2	1075	628	1703	6	11
CS3	3	268	319	1	0	0	0	46	0	113	24	0	0	0	5	0	6	87	38	47	957	388	1345	6	8
C/S	12	88	122	1	0	0	0	5	0	9	2	0	4	0	0	0	1	6	2	7	259	89	348	0	5
Tot.	44	1123	938	3	2	0	0	123	0	133	31	1	4	1	5	0	13	127	57	57	2662	1285	3947	13	30

Key
1.Horse
2.Cattle
3.Sheep
4.Goat
5.Red deer
6.Fallow deer
7.Roe deer
8.Domestic pig
9.Wild pig
10.Cat
11.Dog
12.Brown hare
13.Rabbit
14.Human
15.Other mammal
16.Amphibian
17.Fish
18.Domestic fowl
19.Goose
20.Other bird
21.Total identified
22.Total unidentified
23.Grand total
24.Abraded
25.Charred

Table 4 - The frequency of species from Monson Street and St. Mary's Guildhall.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
MS1	0	2	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
MS2	7	43	38	4	0	0	1	20	0	2	1	0	0	1	0	0	1	7	4	2	53
MS3	0	7	6	0	0	0	0	4	1	1	0	0	0	0	0	0	1	4	1	0	8
SMG1	5	41	52	0	0	0	0	15	0	3	1	1	0	1	0	0	1	4	2	1	74
SMG2	6	53	50	1	1	0	0	26	0	2	4	0	0	0	0	0	3	16	9	2	63
SMG3	2	42	33	1	0	0	0	22	0	7	8	0	0	0	0	0	1	5	17	10	51
SMG-U/S	5	15	15	1	0	0	0	5	0	2	2	0	3	0	0	0	1	4	2	2	22

Key
1.Horse
2.Cattle
3.Sheep
4.Goat
5.Red deer
6.Fallow deer
7.Roe deer
8.Domestic pig
9.Wild pig
10.Cat
11.Dog
12.Brown hare
13.Rabbit
14.Human
15.Other mammal
16.Amphibian
17.Fish
18.Domestic fowl
19.Goose
20.Other bird

Table 5. Ponson Street - The dentition of the major domesticates
(The butlers give tooth wear scores following Grant, 1982)

Cattle

Context	R/L	Dp4	P4	M1	M2	M3	P2	no P2	rod M3	Phase
219	L	-	-	-	15	14	x	-	-	MS2
29	R	15	-	12	7	-	x	-	-	"
"	R	-	-	15	14	-	x	-	x	"
"	L	-	12	-	13	12	x	-	-	
203	L	-	-	-	-	13	-	-	-	"
"	L	-	9	-	15	13	x	-	-	"
"	L	-	10	13	12	-	x	-	-	"
7	R	-	-	15	14	-	x	-	-	"
89	R	-	12	-	14	13	x	-	-	"
1	R	-	8	-	-	-	x	-	-	MS3
"	R	-	12	16	15	14	x	-	-	"
"	L	-	12	18	-	-	-	x	-	"
65	R	-	14	16	15	14	x	-	-	"
11	L	-	11	14	-	-	x	-	-	"

Sheep

Context	R/L	Dp4	P4	M1	M2	M3	P2	no P2	Rod M3	Phase
143	L	-	13	13	12	,1	x	-	-	MS1
29	L	17	-	12	11	4	x	-	-	MS2
203	L	-	10	13	12	7	x	-	-	"
26	L	-	13	15	13	12	x	-	-	"
7	L	-	10	12	11	7	x	-	-	"
101	L	-	11	10	-	-	x	-	-	"
"	R	-	-	-	13	12	-	-	-	"
149	L	12	-	3	-	-	x	-	-	"
89	L	-	12	12	11	9	x	-	-	"
65	L	17	-	11	10	5	x	-	-	"
201	R	-	9	11	10	5	x	-	-	"
"	R	-	14	17	13	12	x	-	-	"
8	L	-	13	17	14	13	x	-	-	"
7	L	-	13	17	14	13	x	-	-	"
7	R	-	13	13	-	-	x	-	-	"
11	R	-	3	11	10	-	x	-	-	"
29	L	-	12	13	12	-	x	-	-	"
"	R	-	11	12	11	9	x	x	-	"
"	R	-	11	12	11	9	x	-	-	"
1	L	-	-	-	-	14	11	-	-	MS3
66	R	-	10	12	11	10	x	-	-	"
"	R	-	11	12	11	-	x	-	-	"
"	L	-	10	13	12	10	x	-	-	"

Pig

Context	R/L	M/F	Dp4	P4	P1	M2	M3	Phase
7	L	-	18	-	9	6	-	MS2
147	R	-	-	12	17	13	9	"
29	R	F	-	8	10	7	5	"
1	R	F	-	9	10	8	-	MS3
5	L	R	-	-	10	6	-	"
+	R	-	-	10	16	9	-	"

Table 6. St. Mary's Guildhall - The dentition of the major domesticates
(As Table 5)

Cattle

Context	R/L	Dp4	P4	M1	M2	M3	P2	no P2	red M3	Phase
2038	L	-	11	15	14	13	-	x	-	SMG2
2053	R	-	11	14	13	12	x	-	-	"
2046	L	-	8	13	12	8	x	-	-	"
827	L	-	10	-	-	-	x	-	-	"
"	L	-	10	-	-	-	x	-	-	SMG3
2029	R	-	12	17	16	15	x	-	-	"

Sheep

Context	R/L	Dp4	P4	M1	M2	M3	P2	no P2	Red M3	Phase
2029	R	15	-	12	10	-	x	-	-	SMG1
160	R	-	12	13	12	11	"	"	-	"
853	L	-	-	11	10	4	"	"	-	"
855	L	-	10	12	11	-	"	"	-	"
2053	L	-	13	15	13	12	"	"	-	"
2041	L	-	11	12	11	0	"	"	-	"
"	L	-	13	13	12	11	"	"	-	"
2074	L	12	-	9	-	-	"	"	-	"
2030	L	-	4	11	10	-	"	"	-	"
2053	L	-	12	16	13	12	"	"	-	SMG2
2053	L	-	13	15	14	13	"	"	-	"
853	L	-	11	13	12	9	"	"	-	"
"	L	-	14	16	15	14	"	"	-	"
"	L	-	13	16	13	12	"	"	-	"
2038	L	-	12	13	12	11	"	"	-	"
161	L	13	-	9	-	-	"	"	-	"
60	L	-	11	13	12	7	"	"	-	"
"	L	-	13	-	-	-	"	"	-	"
113	L	-	11	12	-	-	"	"	-	"
113	L	-	5	11	10	4	"	"	-	"
124	L	-	14	16	14	13	"	"	-	"
"	L	17	-	12	11	-	"	"	-	"
"	L	-	12	13	12	11	"	"	-	"
"	L	-	11	14	12	11	"	"	-	"
"	R	-	6	12	11	8	"	"	-	"
"	R	-	12	12	11	9	x	-	-	"

-	R	-	12	13	12	11	X	-	-	-
124	R	-	5	11	10	5	-	-	-	-
299	L	12	-	11	-	-	X	-	-	-
-	R	-	11	12	11	10	X	-	-	-
5021	L	-	16	17	16	14	X	-	-	-
139	R	-	12	-	14	11	X	-	-	SHG3
130	R	13	-	11	9	-	X	-	-	-
-	L	17	-	12	10	-	X	-	-	-
127	L	-	10	12	11	9	-	X	-	-
2920	L	-	12	12	11	9	X	-	-	-
-	R	18	-	10	-	-	X	-	-	-
2903	L	-	12	14	12	10	X	-	-	U/S
-	R	-	12	14	12	11	X	-	-	-

[illegible]

Context	D/L	H/F	Dp4	P4	H1	H2	H3	Phase
200	L	-	-	-	-	0	5	SHG1
[illegible]	L	F	15	-	7	3	-	SHG2
[illegible]2	L	F	-	7	12	7	4	-
[illegible]	L	F	-	8	13	8	-	-
42	L	F	-	-	10	7	-	-
43	L	-	-	7	14	7	3	SHG3
[illegible]	L	F	-	-	9	6	-	U/S

Table 7 - Monson Street and St. Mary's Guildhall - Epiphyseal fusion.

	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF	F	UF
[illegible]	29	0	15	2	0	1	2	1	5	2	4	5	16	2	2	4	0	2	1	1	2	2	0	1	0	3	0	1
[illegible]	3	0	9	1	4	0	0	5	4	0	3	1	11	6	4	3	0	3	2	0	1	3	0	1	0	0	0	0
[illegible]	24	0	20	0	7	6	5	11	10	0	6	2	19	1	3	4	1	9	2	0	0	3	0	0	0	0	0	1
[illegible]	15	0	0	0	6	3	2	10	20	1	26	4	12	2	6	5	0	18	6	0	2	4	0	3	0	6	2	1
[illegible]	0	0	2	0	0	0	1	7	7	0	15	3	11	6	0	0	1	5	0	0	0	0	0	0	0	1	0	0

[illegible]

[illegible]
[illegible] fusing (distal humerus, proximal radius, phalanges 1+2)
[illegible] fusing (distal metacarpal, distal metatarsal, distal tibia, tuber calcis)
[illegible] fusing (proximal humerus, distal radius, olecranon tuberosity, proximal+distal femur, proximal tibia)
[illegible]

[illegible]
[illegible] fusing (proximal radius, distal humerus)
[illegible] fusing I (phalanges 1+2, distal metacarpal)
[illegible] fusing II (distal tibia, distal metatarsal, olecranon tuberosity, proximal femur, tuber calcis)
[illegible] fusing (distal radius, proximal humerus, distal femur, proximal tibia)

[illegible]
[illegible] fusing (distal humerus, proximal radius)
[illegible] fusing I (distal metacarpal, distal tibia)
[illegible] fusing II (distal metatarsal, tuber calcis)
[illegible] fusing (Olecranon tuberosity, proximal humerus, distal radius, proximal femur, distal femur, proximal tibia)
[illegible]

Table 8 - Monson Street and St. Mary's Guildhall - Carcass components.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
13	51	9	27	13	20	32	13	40	7	32	6	14	12	24	25	2	26	12	3	2	6	4	4
4	7	11	10	6	11	11	1	31	0	21	5	5	14	18	19	1	25	7	0	0	7	6	2
0	37	29	37	26	30	33	34	113	0	42	19	19	32	33	39	3	52	11	1	3	10	6	4
14	14	19	14	16	29	9	9	43	4	15	28	18	29	17	90	24	36	9	5	2	6	5	5

Table 9 - The ratio of polled to horned to scurred sheep from various sites in Lincoln.

Site	Phase	Horned	Polled	Scurred
1.Monson St.	Roman	3	4	2
	Medieval	1	0	1
2.St. Mary's Guildhall	Roman	0	1	0
	Early Med.	5	0	0
3.West Parade	Roman	1	0	0
	11th century	34	1	0
	12th century	13	4	0
	13th century	11	5	0
	post medieval	1	2	2
4.The Park	Roman	0	1	0
5.Lucy Tower St.	Roman	8	0	0
6.Malmo Grainwarehouse	Pre-Roman	1	1	0
	Roman	5	0	1
	Post-Roman	3	0	0
7.St. Marks	Roman	17	9	1
Total Roman		34	12	4

Biometry Archive
(Codes for measurements follow von den Driesch,1976).

Cattle Horn cores

Site	Context	R/L	GL	GB	LB	BC	Phase
MS	165	R	-	59.3	42.2	162	MS2
-	79	R	-	58.6	39.4	161	-
-	26	R	-	60.9	40.6	181	-
-	5	L	-	41.1	38.1	119	-
-	-	R	161	44.7	35.3	130	-
-	7	L	-	58.7	47.9	174	-
-	-	R	-	50.9	40.2	154	-
-	-	R	-	53.1	38.9	155	-
-	55	R	-	62.0	44.9	179	-
-	7	L	-	35.6	29.1	112	-
-	-	L	138	39.3	33.1	119	-
-	11	L	-	45.2	35.6	132	-
-	29	L	-	52.8	37.2	149	-
-	-	R	-	56.7	39.6	160	-
-	29	L	247	59.8	44.5	163	-
-	-	L	-	41.6	30.9	121	MS3
-	-	R	-	59.4	47.5	172	SMG1
SMG	103	R	-	69.7	51.6	193	SMG2
-	133	R	132	40.9	33.4	122	SMG3
-	61	R	-	36.6	29.9	109	-
-	29	R	-	42.6	31.8	119	-
-	-	R	-	75.1	51.6	212	-
-	87	L	-	61.2	42.9	178	-
-	-	L	-	46.8	34.2	137	-
-	127	R	-	57.2	36.5	154	-
-	-	R	-	65.6	46.6	182	U/S
-	142	R	187	60.9	49.7	186	-
-	106	L	-				

Cattle Metacarpal

Site	Context	R/L	GL	Bp	Dp	Sd	Bd	Phase
MS	29	L	188.3	51.2	32.5	39.1	52.6	MS2
-	-	R	186.4	62.4	37.4	35.9	62.6	-

Cattle Metatarsal

Site	Context	R/L	GL	Bp	Dp	Sd	Bd	Dd	Phase
MS	29	R	201.8	42.5	41.6	24.4	49.4	29.1	MS2

Sheep metacarpal

Site	Context	R/L	Gl	Bp	Sd	Bd	Phase
SHG	373	R	122.9	19.7	12.4	22.4	SHG1
"	2850	L	126.9	24.5	15.6	27.9	SHG2
"	5021	R	122.8	21.2	13.3	23.8	SHG3
"	5022	R	115.2	21.7	12.4	23.7	"
"	"	R	120.3	21.7	12.6	24.1	"
"	5024	L	109.2	21.7	12.3	24.2	"
"	"	R	117.3	21.8	12.9	23.3	"
"	5022	R	122.6	22.2	12.1	23.4	"
"	"	R	126.2	22.8	13.7	25.6	"
"	"	R	120.7	23.2	14.7	24.7	"

Sheep tibia

Site	Context	R/L	Gl	Bp	Sd	Bd	Phase
RS	29	R	189.8	36.1	13.4	24.3	RS2

Sheep metatarsal

Site	Context	R/L	Gl	Bp	Dp	Sd	Bd	Dd	Phase
RS	29	R	143.6	20.5	19.7	12.7	24.4	15.9	RS2
SHG	369	L	136.8	19.8	18.9	11.5	23.3	14.7	SHG1
"	"	R	140.7	19.7	19.7	11.0	23.3	16.0	"
"	373	R	137.8	18.7	19.1	10.4	22.9	16.1	"
"	5053	R	138.6	20.5	20.4	11.6	23.9	16.2	SHG2
"	5059	L	120.9	20.5	19.7	11.7	23.7	15.8	SHG3
"	5024	R	136.2	20.8	20.1	10.7	23.7	16.3	"
"	5022	R	118.7	18.7	18.6	9.9	20.7	14.0	"
"	"	L	131.5	18.9	18.8	10.8	22.1	15.3	"

Horse humerus

Site	Context	R/L	Gll	Glm	Bp	Dp	Sd	Bd	Bt	Dd	Phase
RS	218	L	-	-	-	-	-	65.8	62.1	61.2	RS2

Goat horn core

Site	Context	R/L	M/F	Gl	GB	LB	BC	Phase
RS	26	R	M	291	66.2	37.8	173	RS2
"	"	L	M	291	66.6	37.6	172	"
"	"	L	M	278	61.2	39.9	169	"

"	"	R	F	201	45.2	33.7	125	"

Cat humerus

Site	Context	R/L	Gl1	Bp	Sd	Bd	Phase
MS	211	R	86.1	13.7	5.4	15.4	MS2

Cat femur

Site	Context	R/L	Gl1	Gln	Bp	Dc	Sd	Bd	Phase
MS	211	L	93.9	93.3	17.1	8.2	6.7	15.2	MS2
"	"	R	104.0	103.1	22.6	10.9	7.8	19.3	"

Cat tibia

Site	Context	R/L	Gl	Bp	Sd	Bd	Phase
SMG	43	L	109.1	18.6	6.8	13.0	SMG3

Dog humerus

Site	Context	R/L	Gl1	Gln	Bp	Sd	Bd	Phase
SMG	5024	R	124.7	121.2	23.9	10.1	23.9	SMG3

Domestic fowl humerus

Site	Context	R/L	Gl	Bp	Sd	Bd	Phase
SMG	5024	L	75.1	21.9	7.3	16.2	SMG3
"	22	L	79.4	20.9	7.2	7.2	"
"	139	R	67.6	18.6	6.4	14.8	"
"	2001	R	88.2	25.4	8.4	18.7	"

Domestic fowl radius

Site	ontext	R/L	Gl	Bp	Sd	Bd	Phase
MS	37	R	69.1	5.3	3.3	7.1	MS2
"	201	L	68.7	4.9	2.9	6.9	"
SMG	2001	L	79.2	7.0	3.9	9.2	SMG3
"	"	R	79.4	7.1	4.0	9.2	

Domestic fowl femur

Site	Context	R/L	GL	GLp	Bp	SC	Sd	Bd	Phase
HS	?	R	77.2	72.3	14.5	6.3	6.9	14.7	HS3
SHG	2001	L	101.2	95.7	20.8	9.5	9.1	21.4	SHG3

Domestic fowl tibia

Site	Context	R/L	GL	Bp	SD	Bd	Phase
SHG	92	L	106.3	18.8	5.5	10.9	SHG3
"	2001	L	141.9	28.1	8.4	15.4	"

Domestic fowl tarsometatarsal

Site	Context	R/L	GL	Bp	Sd	Bd	Phase
HS	5	R	77.7	13.1	6.1	13.3	HS3
SHG	2001	L	99.2	17.2	9.8	17.5	"

Goose radius

Site	Context	R/L	GL	Bp	Sd	Bd	Phase
HS	1	L	145.8	7.6	4.9	10.6	HS3

Goose carpometacarpal

Site	Context	R/L	GL	Bp	Sd	Bd	Phase
HS	29	L	76.4	18.4	6.7	12.3	SHG2
SHG	2001	L	91.1	20.9	7.6	16.6	SHG3

Goose tibia

Site	Context	R/L	GL	Bp	Sd	Bd	Phase
SHG	2024	L	145.8	27.6	6.9	17.6	SHG2
"	2001	R	144.7	27.8	9.7	17.9	SHG3

Mallard radius

Site	Context	R/L	GL	Bp	Sd	Bd	Phase
HS	283	R	70.2	4.7	2.7	6.1	HS2