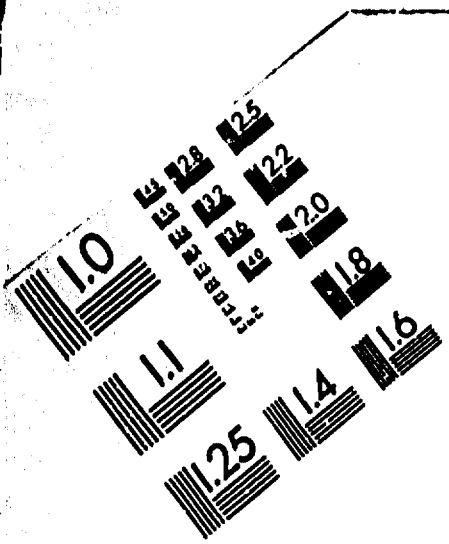

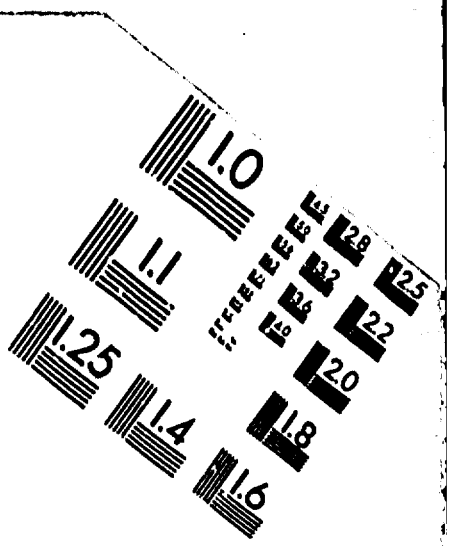

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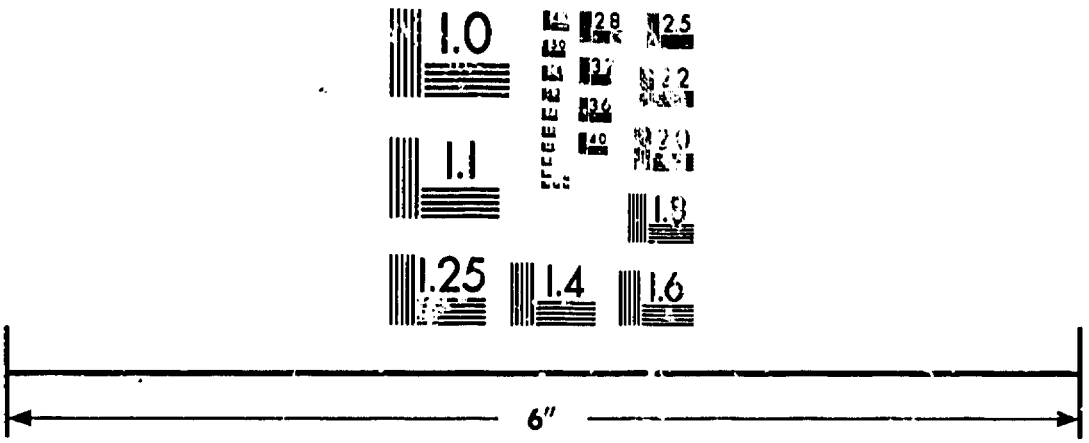

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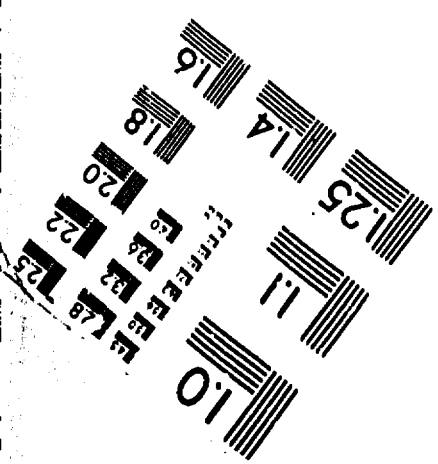

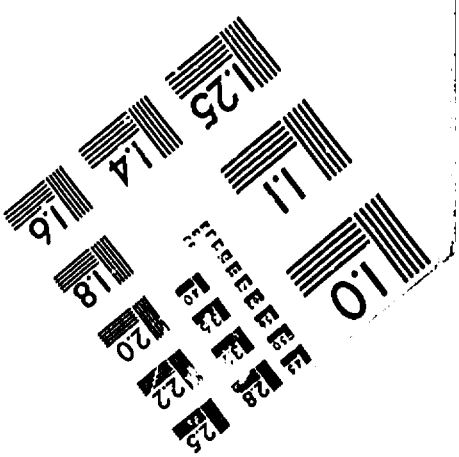

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ENVIRONMENTAL EVIDENCE

MEDIEVAL AND POST-MEDIEVAL ANIMAL BONES AND MARINE SHELLS by BOB WILSON, PHILIP ARMITAGE, ROGER JONES AND PROFESSOR B. MARPLES

Introduction

These reports largely describe post-medieval bones and shells excavated at adjacent sites within St. Ebbe's Parish in the south-western quarter of Oxford. Most bones and shells were recovered during 1968-1972 from both rescue and salvage operations. These included an extensively dug area at 31-34 Church Street (Site A), a series of narrow trenches at Greyfriars (Site B), and isolated pit groups at Westgate (Site W). Two other sites at Littlegate and Selfridges produced no post-medieval bones of interest.

Archaeological problems reduced the value of detailed analysis, but collectively the animal remains give a valuable insight into urban life at this period. Certainly this material is the only sizeable collection from the City to be described until now.

Acknowledgements

Mark Robinson identified some of the molluscs and the crab claws.

Post-medieval bones and shells from Church Street (Site A) by Bob Wilson

Only the skeletons and the general character of the bones and shells were given proper attention. The superficial treatment was conditioned by 1) limited time available, 2) incomplete or lack of vertical stratigraphy and 3) recognisable redeposition of bones as well as pottery e.g. in A F56 and A F1003.

Analysis was confined to contexts producing large quantities of bones. However even the selected groups of bone contained residual pottery equalling or exceeding 30% of the sherd totals, in A F17, A F41, A F1023, A F1529 and A F2531. Nevertheless some aspects of tenement environments are worth discussion.

Table 7 Fragment frequency of post-medieval bones and shells at Church Street (Site A), Oxford.

Feature number	41	1528	2531	2504	1529	1023	1001	17	60	54	56		
Century date	16th	16th	16th	late 16th	early 17th	mid 17th	mid 17th	mid-late 17th	mid 18th	early-mid	19th	Total	%
Cattle	23	36	60	33	80	55	15	104	93	16	14	529	32.1
Sheep	35	39	104	75	118	56	18	157	216	21	9	848	51.5
Pig	5	16	32	11	35	16	3	17	42	10	8	195	11.9
Horse	1	-b	-	-	-	-	-	1	1	-	-	3	0.2
Dog	-	-	-	-	1	-	-	2	5	-	-	8	0.5
Cat	-	-	-	-	1[a]	1	-	2[d]	-f	1	-g	5	0.3
Fallow deer	-	1	2	-	1	1	-	-	-	-	-	5	0.3
Rabbit	-	7	11	5	1	2	1	6	5	-	2	40	2.4
Hare	-	-	1	-	-	-	1	4	-	-	-	6	0.4
Black rat	-	-c	2	-	-	-	-	4	-	-	-	6	0.4
	64	99	212	124	237	131	38	297	362	48	33	1645	
Unidentified	33	109	477	305	345	109	68	688	468	57	32	2691	
Burnt bone	-	1	4	4	8	6	3	1	15	-	-	42	
Oyster	12	37	201	160	144	7	-	14	4	2	4	585	35.6
Mussel	-	-	39	-	20	-	-	-	-	-	-	59	3.6
Cockle	-	-	88	4	1	-	-	1	-	-	-h	94	5.7

a cat (34), b small find, c Hedgehog (13), d Kitten (15), e 2 polecats/ferrets (26), f Cat (13), g 2 cats (23), h also claw of edible crab (Cancer pagurus)

Table 8, Percentages of head, foot and body elements of sheep and cattle at Church Street (Site A)

Sheep						
feature	1529	2504	2531	1023	17	60
n	118	75	104	56	157	216
head	53	36	22	25	27	31
foot	10	12	15	11	22	16
body	37	52	63	64	50	54
Cattle						
n	80	33	60	55	104	93
head	25	-	25	29	27	16
foot	25	-	15	29	37	42
body	50	-	60	42	37	42

Fragment numbers. Results are given in Tables 7 and 8. Certain animals are characteristic of post-medieval bones and shells :- fallow deer, rabbit, black rat Rattus rattus, cockle Cerastoderma edule, mussel Mytilus edulis, and crab Cancer pagurus. No bones of brown rat Rattus norvegicus were identified. Bones of red and roe deer, pig and hare appear less numerous than in medieval deposits.

In Table 8 the bones of the main meat carcass of sheep and cattle are common except among cattle bones in 17th-century pits A F1023 and A F17 and in 18th-century pit A F60. Cranial remains of sheep and calves were better represented in the early 17th-century pit A F1529. There is a low incidence of cattle horn cores and sheep metapodials which are associated with early stages of carcass preparation. It is concluded that most bones passed through tenement kitchens, except possibly the skull waste in A F1529 which may be waste from a butcher's shop.

Articulated remains. A distinctive array of whole or part skeletons were found. Three of four cats died prematurely and may have been killed for their fur. None were obviously skinned. A cut mark shows on a tibia of a polecat or ferret - one of two skeletons in 17th-century pit A F17. The domestic or wild state of the polecats was not determined. Bones of a few-months-old hedgehog were found in the 16th-century pit A F1528 L2.

A post-medieval pig skeleton was found in A F90 L89. It gives interesting evidence of pig keeping on the tenements. The context is variously dated to the 16th and 19th centuries.

The pig was of moderate size (ra length-GL-171mm; dw 45mm) and probably female (small lower canines; mcIV GL 84; dw 20mm). The least

breadth of the parietal is 45mm and is greater than observed in medieval pig skulls and points to a post-medieval change of breed. Unfused proximal equiphyses of humerus and tibia and a fused distal radius indicate an immature animal aged about 42 months. The third molar was erupted and well worn.

Various bones were damaged by mechanical injuries or formed by metabolic disorder. Partially healed fractures of neural spines are evident on the 2nd, 10th and 12th thoracic vertebrae. The left sides of the first three lumbar vertebrae are fused together by massive osteosis. A rib condyle is partly fused to the 6th and 7th thoracic vertebrae. Further plate-like bone growth or metastatic ossification some 20cm square sheathed some of the ribs and probably formed in the abdominal wall.[1] The ventral end of one rib bears a healed fracture and slight osteosis shows on the sternum.

Some of this pathology might have been caused by maltreatment or, dubiously, an awkward fall. Two minor lesions suggest that some injuries were produced by traumatic attempts to escape from a pig sty. Small protusions of bone on the parietals indicate injuries from butting against walls or railings. The medial distal shaft of the left tibia bears a small pad of bone and seems an effect of the pig pulling against a tether around the hock. Evidently two methods were used to constrain the pig.

The pathology, the lack of butchery marks and the death of a sow near maturity suggests that it died from disease. Burial of a large corpse is likely to have been near where the pig was kept. Thus the skeleton seems to be evidence of rearing pigs on the tenements. Pig sties on the property are mentioned in 1834.[2]

---

1. J. Baker and D. Brothwell, Animal Diseases in Archaeology, (1980), 168-72.

2. A.J. Wood and H. Turner, St Ebbe's Documentary and Topographic Survey, forthcoming.

Prosperity. A general predominance of bones from the main meat carcass of animals suggests that superior and inferior cuts of meat were eaten and therefore may be a sign of moderate purchasing power of householders. The quantity of meat consumed per day would be a better measure of affluence but cannot be calculated from the bones.

Few species records indicate considerable affluence although the diet is a varied one. Shellfish were a common item of 16th-century food. Variety, however, could imply either the trimmings of luxury, or the intensive exploitation of animals by or for poor people. Possibly the percentages of skeletal elements of cattle in 17th- and 18th-century features show that species variety is not a sign of great affluence.

Prosperity might be deduced from an abundance of the bones of young animals - tenderness doubtfully being preferred to flavour - but only the 17th-century pit A F1529 is outstanding. However, in this feature it is largely the cranial debris which is from calves and young sheep, so once again the potential range of interpretation is wide. Each possible interpretation probably requires a detailed explanation beyond the quantity of bones in the feature.

Bones and Shells from Greyfriars (Site B) by Professor B. Marples

This collection of bones was excavated in 1969 and was divided into three groups: i) Material which pre-dates the church and belongs to the 13th-century or earlier. ii) Material contemporary with the church which was founded c 1244, up to c 1500. iii) A large group of post-medieval date. The first group of bones contains 70 identifiable and 111 unidentifiable fragments; the second 130 and 169 fragments respectively; and the third, 1946 identifiable and 1609 unidentifiable fragments.

Owing to the difficulty of separating sheep and goat bones all were classified as sheep, though in the post-church group some goat seems to be present, perhaps as many as 31 out of 829 bones. A record was made of bones showing cuts due to butchering, but there were very few obvious marks (visible on about 1% of the fragments). Most of these were vertebrae cut sagittally. About 1% were charred and only 2 out of nearly 4000 showed signs of having been chewed by dogs.

The pre-church group contains 61 bones of the main food animals, ox, sheep and pig, 4 of which were immature. They comprised 31%, 60% and 9% of the total respectively. The only point of interest was a fragment of a sheep skull having two horn bases on the same side of the head. In addition to these there is one bone each of human, horse and fowl and three of goose. Three oyster and one Helix shell are present.

In the group contemporary with the church there are 105 bones of ox, sheep and pig, 54%, 34% and 11% respectively, and only 4 bones are from immature animals. The friars seem to have eaten relatively more beef than their predecessors or successors, though the number of ox bones is inflated by the numbers of teeth and fragments of jaw. There are 13 human bones, derived from a grave which is included, and one each of cat, rabbit and roe deer. Of the

bird bones there were 6 of domestic fowl (one ulna had been broken and healed) and 3 of geese. Five oyster shells were present.

The post-church group is much the largest and consists of 1608 bones of ox, sheep and pig; 30%, 55% and 14% respectively. About 7% of the ox and sheep bones are immature and 30% of those of pig. Other mammals are present; 9 horse, 4 fallow deer, 5 dog, 42 cat, 7 rabbit and 4 hare. Domestic birds occur; 86 fowl, 17 duck, 15 goose, and of the wild birds there are 2 crow, 1 jackdaw, 2 magpie, 1 pigeon and 6 unidentified. One metatarsus of a fowl from an 18th-century pit had had the large spur sawed off some 5mm from the shaft. There are 5 fish bones which were not identified, but some are large and probably of marine species. There are 135 oyster, 10 Helix and 1 whelk (Buccinum) shells, and also 2 fragments of crab.

A number of human bones occurred at levels dated from the late 17th-century to the 19th; 36 were found in all, mostly in small numbers together. Forty-three came from a 19th- or late 18th-century pit, and there was the right ramus of a jaw in which the first molar was strongly worn down on the outer side, possibly by a clay pipe.

Six 18th-century examples were found of the distal half of the metacarpus of sheep which had been used for some scraping or polishing activity. The distal condyles had been partly or completely worn away, usually obliquely, leaving a smooth surface. Another 18th-century bone seems to have been used for polishing. This is the vertebra of an ox cut parasagittally and the surface ground smooth.

Further aspects of bones from Greyfriars (Site B) by Bob Wilson

This section complements that compiled by Professor Marples during the early 1970s. Investigation was intended to sort out bird bones for further identification, measure bones from better dated contexts, gather age data and examine large assemblages for signs of industrial activity. Bones from excavations during 1976 were few and of no obvious interest.

Fragment number results are summarised in Tables 9 and 10. Species records could include goat: sixteen post-medieval crania are from sheep, another might be from a goat or polycerate sheep. A whelk Bucinum undatum was found in B VII F5 and was associated with nineteenth century pottery.

Most groups of bones are not distinctive. Bones of the main carcass of sheep and cattle are relatively abundant and suggest that the bulk of debris is from household activity on the tenements - particularly sheep bones from the 17th-century pit B III F4 L2, although it contained a proportion of articulated phalanges of cattle. Sheep crania from 17th-century pit B IV F13 and two 19th-century features could be waste from butchers. The low quantities of cranial bones of cattle indicate an absence of rubbish dumped from slaughterhouses or tanneries. However horn cores of cattle were brought to the site specifically to line the sides of the late 18th-century pit B I F27 which may have been used as a cess pit. The horn cores are described by Philip Armitage in the following report. Age data is discussed generally in the last section and metric data will be dealt with in a later report.

Table 9 Fragment frequency of post-medieval bones and shell at Greyfriars (Site B).

Trench	IV	III	X	X	X	IV	VI		
Feature	13	4 L2	22	27	26	44	10		
Century date	17	17	18	18	18	19	19	total	%
cattle	26	83	26	29	82	16	53	325	29.5
sheep	39	253	20	32	128	112	101	685	53.9
pig	19	17	19	15	36	20	39	165	13.0
horse	2	-	-	1	-	-	1	4	0.3
dog	-	-	-	5	-	2	-	7	0.6
cat	-	-	7	1	12[a]	7	1	28	2.2
fallow deer	-	1	-	-	-	-	-	1	0.1
roe deer	-	-	-	-	-	-	1	1	0.1
hare	-	1	-	-	-	-	1	2	0.2
rabbit	-	-	-	-	1	2	-	3	0.2
identified	86	355	72	83	259	219	197	1271	
unidentified	29	192	76	75	199	231	386	1188	
burnt bone	2	2	1	-	5	8	6	24	
oyster	-	-	1	10	5	2	32	50	3.9[b]
domestic fowl	2	14	3	4	8	11	12	54	4.2
domestic goose	-	3	1	1	3	4	4	16	1.3
other domestic birds	-	1	-	-	1	2	-	4	0.3
wild birds	-	-	-	-	1	5	1	7	0.5

a Cat may be over-represented by bones from whole skeletons

b Expressed as percentage of mammal bones

c Claws of edible crab (Cancer pagurus) in B IV 13 and B IV F44

d Almost no bones except 336 horn cores of cattle in B I F27 (late 18th century)

Table 10, Percentages of head, foot and body elements of sheep and cattle at Greyfriars (Site B)

Sheep						
Trench	IV	III	X	X	IV	VI
Feature	13	4	?2&27	26	44	10
n	39	253	52	128	112	101
head	59	22	37	19	46	40
foot	-	13	12	18	14	9
body	41	65	52	63	40	51
Cattle						
n	26	83	55	82	76	53
head	-	7	24	17	6	30
foot	-	29	25	39	28	30
body	-	64	51	44	66	40

Preliminary Report on the Cattle Horn Cores from Greyfriars (Site B)

by Philip L. Armitage[1]

A total of 336 horn cores of cattle were recovered in 1969 during excavations carried out by the Oxford Archaeological Excavation Committee at the Greyfriars site, Oxford.[2] These horn cores formed the lining to a sub-rectangular pit B I F27 which contained organic material, probably cess, and 194 potsherds dating from the period c. 1770-1800. Apart from one vessel of c. 1820, all the glassware from the fill of the pit also dates from c. 1770-1800. A clay pipe from the pit is dated to c. 1740-1760. On this evidence, the horn cores should date between c. 1750 and 1820, but the late 18th century is the most probable period of their deposition.[3]

The entire collection of horn cores was presented by the Oxford Archaeological Unit to the British Museum (Natural History). Under the BM (NH) computer-based catalogue scheme, the specimens from Greyfriars have been assigned the following registration numbers :- ARC 1977. 5014 to 1977. 5061. Preliminary results of a detailed study are presented in this report.

State of preservation. Out of the 336 horn cores recovered from the cess pit, 261 (77.7%) are in a fair to good state of preservation, and the remaining 75 (22.3%) are in fair to poor condition. Table 11 gives details of the numbers of complete and broken cores in the assemblage.

All the cores are pale yellow in colour and many of them show evidence of pitting on the surface of the bone with associated brown staining (? chemical 'erosion' due to contact with the cess material in the pit).

---

1. Environmental Research Officer, Department of Urban Archaeology Museum of London and also attached to the Department Zoology, British Museum (Natural History).

2. Trench supervisor : Jeremy Haslam.

3. M. Mellor and R. Wilson, pers. comm.

Table 11 : Cattle horn cores from BI F27, Greyfriars, Oxford. Condition of specimens.

Age class [a]	Condition [b]	No.Specimens
JUVENILE	complete	1
	broken	3
SUB-ADULT	complete	1
	broken	23
YOUNG ADULT	complete (incl. virtually complete)	19
	broken	190
ADULT	complete (incl. virtually complete)	24
	broken	52
OLD ADULT	complete (incl. virtually complete)	12
	broken	11

KEY: (a) see M VI B9 for an explanation of these age classes

(b) Condition of specimen:

i) complete - intact, unbroken core attached to portion of frontal and parietal bone

ii) virtually complete - almost the entire length of the core remains intact except for the very tip, which has been broken off either in antiquity or during excavation. In this study, such specimens have been treated as 'complete' and the length of the outer curve estimated accordingly

iii) broken - the base and only between one third and one half of the core remains intact. In almost every case, the damage to the core occurred in antiquity.

NOTE: There are no sawn cores in the assemblage

Table 12 : Cattle horn cores from BI F27, Greyfriars, Oxford. Specimens showing evidence of skinning.

Age class [a]	No. of marks made by knife	Location of knife mark(s)
SUB-ADULT	2	base of skull in region of frontal-parietal suture
YOUNG ADULT	1	base of skull in region of frontal-parietal suture
YOUNG ADULT	6	across nuchal eminence
YOUNG ADULT	2	on surface of frontal bone
YOUNG ADULT	1	on surface of frontal bone
YOUNG ADULT	1	" " " " "
YOUNG ADULT	1	" " " " "
YOUNG ADULT	3	" " " " "
YOUNG ADULT	1	base of skull in region of frontal-parietal suture
YOUNG ADULT	1	" " " " " "
ADULT	1 3	on surface of frontal bone base of skull in region of frontal-parietal suture
ADULT	3 1	across nuchal eminence base of skull in region of frontal-parietal suture
OLD ADULT	2	base of skull in region of frontal-parietal suture
OLD ADULT	1	" " " " " "

NOTE: (a) see M VI B9 for an explanation of these age classes

Evidence for the removal of the hide. 14 specimens (4% of the total) have small, superficial cuts on the frontal bone and/or the back of the skull (Tables 12 & 13). These marks are recognised as having been made by a skinning knife and their location on the specimen clearly shows the way in which the skin was removed from the head: this involved cutting away the skin from around the base of each horn to allow the hide to be pulled free from the skull.

Table 13 : Cattle horn cores from B I F27 Greyfriars, Oxford. Evidence for the removal of the hide.

Age class [a]	Description	No.Specimens
JUVENILE	with knife marks	-
	without " "	2
	uncertain (see note b)	2
SUB-ADULT	with knife marks	1
	without " "	6
	uncertain (see note b)	17
YOUNG ADULT	with knife marks	9
	without " "	62
	uncertain (see note b)	138
ADULT	with knife marks	2
	without " "	24
	uncertain (see note b)	50
OLD ADULT	with knife marks	2
	without " "	4
	uncertain (see note b)	17

NOTES: (a) see M VI B9 for an explanation of these age classes

(b) In these specimens (in which either the horn core only has survived or the specimen is badly pitted) it is not possible to establish whether or not knife marks had originally been present

Marks made by a cleaver. All 336 specimens show evidence of having been 'hacked-off' the skull by means of a cleaver. The right and left horn cores (together with their outer sheaths and portions of the frontal and parietal bones) would have been removed separately by a sweeping blow delivered to the base of each horn in turn. The presence of two or more chop marks on the surviving portion of parietal bone indicates that often two or more blows with the cleaver were required before the horn was successfully detached from the rest of the skull.

Size of the cores. Fifty-seven specimens were measured using a flexible tape-measure and dial calipers (Mitutoyo No. 505-635, range 300mm, with dial graduations of 0.05mm), the points of measurement following those described by von den Driesch (1976).[1] The measurements taken are summarised in Tables 14-18.

The distribution for the basal circumference, (Table 19, M VI B8) was obtained by measurement of 267 cores (old adult, adult, and young adult; complete and broken specimens - the data from juvenile and sub-adult cores have been omitted).

1. A. von den Driesch, A Guide to the Measurement of Animal Bones from Archaeological Sites, Peabody Musuem Bulletin No. 1 (1976).

Tables 14-18 : Cattle horn cores from B I F27, Greyfriars, Oxford. Size of specimens (complete cores only). All measurements are given in mm.

Table 14 : OLD ADULT

	N	M	Range	SD	SE
Length of outer curve	12	309.4	212 - 410	69.8	20.2
Basal circumference	12	180.9	160 - 204	15.4	4.5
Min.diameter of base	12	49.9	42.6 - 57.4	5.3	1.5
Max.diameter of base	12	60.1	51.0 - 67.2	5.4	1.6

Table 15 : ADULT

	N	M	Range	SD	SE
Length of outer curve	24	292.1	200 - 400	59.3	12.1
Basal circumference	23	181.2	143 - 219	17.3	3.6
Min.diameter of base	23	50.9	38.5 - 64.5	5.7	1.2
Max.diameter of base	23	62.3	50.1 - 74.6	5.9	1.2

Table 16 : YOUNG ADULT

	N	M	Range	SD	SE
Length of outer curve	19	285.5	232 - 350	35.9	8.2
Basal circumference	19	175.4	152 - 196	12.8	2.9
Min.diameter of base	19	48.4	41.3 - 54.8	3.4	0.8
Max.diameter of base	18	61.0	52.6 - 69.0	4.7	1.1

Table 17 : SUB-ADULT

one specimen

Length of outer curve 209; Basal circumference 213; Min.diameter of base 61.8; Max.diameter of base 72.3

Table 18 : JUVENILE

one specimen

Length of outer curve 220; Basal circumference 190; Min.diameter of base 54.5; Max.diameter of base 63.0

KEY:
N = Number of specimens
M = Mean
Range = Observed size range (lowest and highest values of variate)
SD = Standard deviation
SE = Standard error of the mean

Table 19, Frequency distribution for the basal circumference of the horn cores from 8 I F27, Greyfriars, Oxford

Basal circumference class interval (mm)	Number of Specimens	
100-109	-	
110-119	-	
120-129	-	
130-139	-	Number of specimens = 267
140-149	2	Mean = 185.2mm
150-159	8	Range = 143-227mm plus 1 at 291mm
160-169	21	
170-179	66	Standard Deviation = 16.3mm
180-189	70	Standard error or the mean = 1.0mm
190-199	55	Distribution symmetrical but with one outlier at 291mm
200-209	25	
210-219	13	
220-229	6	
230-239	-	
240-249	-	
250-259	-	
260-269	-	
270-279	-	
280-289	-	
290-299	1	
300-309	-	

Age of the horn cores. Using the method of Armitage[1] the horn cores can be classified into the following five age classes on the basis of surface texture and appearance of the bone:-

Table 20 : Cattle horn cores from B I F27, Greyfriars, Oxford. Age classes.

Age class	Suggested age range (years) [a]	Description of core	No.specimens
1. JUVENILE	1 - 2	whole of core is comprised of soft 'spongy' bone	4
2. SUB-ADULT	2 - 3	whole of surface comprised of soft porous bone	24
3. YOUNG ADULT	3 - 7	porous bone around base and forming tip, rest of core becoming more compact but surface still feels rough to the touch	209
4. ADULT	7 - 10	bony substance of core is in a transitional phase between age classes 3 and 5	76
5. OLD ADULT	over 10	surface of core, including the tip, has become hard and compact	23

NOTES: (a) Suggested age range: The values given for each of the five classes are tentative and refer only to male and female cores; any core from a castrated animal will probably be of greater age than that shown. This is because, if the normal practice of castrating a bull calf at 10 to 20 days after birth is carried out, the growth pattern is much affected and the onset of maturation of the skeleton (including the horn core) is delayed.

1. P.L. Armitage, 'A system for ageing and sexing the horn cores of cattle from British post-medieval sites (17th to early 18th century) with special reference to improved British Longhorn cattle', in B. Wilson, C. Grigson and S. Payne (eds.), Ageing and Sexing Animal Bones from Archaeological sites, B.A.R., British Series 109 (1982), 37-54.

Sex of the cores. The sex of the individual cores still remains to be determined.

Breeds of cattle represented. The relatively high values of the coefficient of variation for the length of the outer curve in the old adult and adult groups (22.6 and 20.3 respectively) indicate that the collection of horn cores from Greyfriars is heterogeneous in composition : a 'pure' (homogeneous) sample would be expected to have a coefficient of variation between 4 and 10.[1] The relatively high variability within the Greyfriars material can in part be ascribed to the presence of male, female and castrated animals, but it also indicates that more than one breed is represented.

Although it is known that Longhorn, Glamorgan, Sussex, Devon, Hereford, Alderney and Shorthorn cattle were all kept in Oxfordshire in the late 18th and early 19th century,[2] none of these breeds can be identified from the Greyfriars' assemblage. Indeed, it is not even possible to subdivide the assemblage into the broad categories, 'short', 'medium' and 'long horned', as there appears to be continuous variation; with the shortest core (length of curve 200mm) and the longest core (length of curve 410mm) representing the extremes of a range of horn core types within which a graded series of specimens of varying lengths occurs. One explanation for this continuity in the lengths of the specimens is that the assemblage contains examples of crossbred cattle. According to the observations made by Young in

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1. G.G. Simpson, A. Roe and R.C. Lewontin, Quantitative Zoology, New York (1960), 91.

2. A. Young, General View of the Agriculture of Oxfordshire (1813), Newton Abbot (1969), 270-283, 287-298. Facsimile edition.

1813, many of the livestock farmers in Oxfordshire favoured the practice of crossing Longhorn cattle with Shorthorn.[1] In addition, British livestock farmers of the late 18th and early 19th century occasionally crossed Shorthorn cattle with middle horned breeds (e.g. the Devonshire breed).[2] In both of these crosses, the horn confirmation of the hybrid animal was often intermediate to that of the parent stocks. The difficulties of classifying such cattle of 'mixed pedigree' were succinctly described by Martin[3]:-

'Each of these sections ('short horn', 'middle horn' and 'long horn', commonly used to describe cattle) is subdivided into various families or breeds, distinguished by minor but not unimportant peculiarities; and these breeds are not only numerous, but are continually blending, improving, or deteriorating, according to the skill of the breeder, and the object at which he aims. Some breeds, by no means destitute of value, especially in dairy counties, are of such mingled origin, that like mongrels among dogs, it is difficult to assign them very definitely to any section ...'

It is important to note that the sample of horn cores taken from the lining to the pit does not include cores from the improved Leicester Longhorn. The skulls of these highly modified Longhorn cattle are easily recognised by the shape of the frontal eminence which is convex, producing a dome-shaped forehead, and by their extremely long horn core which curves sharply downwards and then inwards towards the nose, forming a distinctive bow

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1. A. Young, General View of the Agriculture of Oxfordshire, (1813 reptd. 1969), 275, 277 and 278

2. G. Garrard, A Description of the Different Varieties of Oxen Common in the British Isles, (1800), 2 volumes, no page numbers

3. W.C.L. Martin, The Ox, London (1847), 56

configuration. Apart from the one specimen described below, all the specimens from Greyfriars have a frontal bone that appears flat, or only very slightly convex, when viewed from the back of the skull, and the horn core stands outwards from the head throughout its length, the end curving gently forwards. Only in one specimen (length of outer curve 389mm) is the core curved downwards, producing a configuration which may be described as an 'incipient bow'.

The improved Longhorn cattle with bow horns are not described in the literature until 1800[1] when they began largely to replace the older breed of Longhorn whose horns were outwardly curved. This information substantiates the majority of the dating evidence that the horn cores were deposited before the 19th century.

Source of the horn cores. The cattle horn cores used in the construction of the lining to the cess pit could have been obtained from one of three sources :

i) slaughteryards (butchers' shambles)

ii) horn-workers' premises

iii) tanneries

Of the three, the most likely source for the Greyfriars' material is a tannery. Pictorial evidence showing that tanners bought hides of cattle which still had the horns attached is provided by (1) an early nineteenth-century engraving of the 'skinmarket' at Leadenhall in the City of London[2] and (2) a photograph of a modern leather market.[3] In early modern times

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1. G. Garrard, A Description of the Different Varieties of Oxen Common in the British Isles, (1800), no page numbers. Also W.C.L. Martin, The Ox, (1847), 57 and 58; W. Youatt, Cattle: Their Breeds, Management and Diseases, London (1860), 188-197.

2. R. Wilkinson, Londina Illustrata, London (1825).

3. A.O. Cooke, A Day with Leather Workers, London (1917), opposite p.17.

two tan-yards existed to the south-west of the Greyfriars site. The earlier of the two tan-yards was located between Littlegate, the back of Paradise Square, the Trill Mill Stream and Church Street; and was operational during the 17th and 18th century. The second tannery, which was active in the late 18th and early 19th century, stood on the Bricknell-Eykyn property which lay south of the can-yard in the Littlegate area, which it replaced sometime in the late 18th century.[1] As the date of the Greyfriars deposit spans the period c. 1750-1820 (M VI B2) either of these two tan-yards is a candidate for the source of the horn cores.

Disposal and use of horn cores. During preparations of the hide in readiness for the tanning process, the tanner would cut out the horns from the skin and sell them to the horn-worker; either in the raw state (i.e. still on the bony core) or after removal of the core.[2] If the latter procedure was followed, the tanner soon accumulated a large quantity of horn cores which might be thrown away along with the other unwanted waste from the tannery. Evidence of the connection between tanners and cattle horn cores is shown by the discovery made in the bed of the lake dug in the grounds of St. Michaels Manor, St. Albans, of traces of a 16th-century tannery. During the drought of July 1976, this lake dried up revealing the structural remains of a tannery, comprising the footings for timber buildings, two large rectangular conjoined pits and a smaller oval pit filled with oak bark and cattle horn cores.[3]

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1. R.J. Morris, 'The Friars and Paradise: an essay in the building history of Oxford, 1801-1861', Oxoniensia, (1971) xxxvi, 72-98.

2. F.J. Fisher, A Short History of the Worshipful Company of Horners, London (1936).

3. C. Saunders, 'A Sixteenth century tannery in St Albans,' Hertfordshires Past, iii (1977), 9-12.

Sometimes the tanner would find a use for the horn cores. A story that appeared in an old Hertfordshire newspaper dating between 1840-1850 describes how one of the tanners in St. Albans constructed on his property a wall out of cattle horn cores.[1]

'In a dark narrow lane leading from St. Albans to the back meads watered by the river Veron (sic) the way to Sheffield Mill is to be observed, although almost concealed by the obtrusion of ivy and other parasitical plants, a curious old wall, which upon a close examination, proves to be composed wholly of the asseous (sic) remains of the horns of cattle. This singular structure has the appearance of being of very great antiquity, but no person living in the neighbourhood can give any correct account of its origin. Rumour asserts that some centuries ago a tanner resided near the spot, who purchased a plot of meadow land contiguous to his factory to build upon, and that, either in a spirit of eccentricity or from penurious motives, with a view to avoid the expense of bricks etc., caused the wall in question to be erected from an accumulation of horns which he had lying by him in his tanning yard for many years.'

The inhabitants of London's suburbs in the mid eighteenth century also often built their garden walls out of earth and cattle horn cores.[2] In Essex[3] and Middlesex[4] too, cattle horn cores were used by certain farmers in the construction of land drains.

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1. The story is repeated by P. Mundy, 'A wall of horns at St. Albans', Home Counties Magazine, vi (1904), 159.

2. P. Kaln, Visit to England, London (1748 reptd. 1892). Translated from the Swedish by J. Lucas.

3. T. McKenny Hughes, 'On the more important breeds of cattle which have been recognised in the British Isles in successive periods', Archaeologia, lv (1896), 30-31.

4. P. Armitage, R. Coxshall & J. Ivens, 'Early agricultural land drains in the former parishes of Edmonton and Enfield', The London Archaeologist, iii (15) (1980), 408-415.

It becomes clear that cattle horn cores were readily available and widely exploited during the late 17th and 18th centuries as a building material in place of more expensive brick and stone.

The Greyfriars pit lining is obviously a further example of the use of horn cores. There are, as far as I am aware, only three other British archaeological sites where horn core lined pits have been discovered, these are :

1) Cutler's Gardens, City of London. Excavated by the Department of Urban Archaeology, Museum of London, 1978 and 1979. Eighteen pits were found whose sides were lined with cattle horn cores laid in neat courses, separated by layers of clay. Pits dated to late 17th and early 18th century.
2) Crosswall, City of London. Excavated by the Department of Urban Archaeology, 1979. One horn core lined pit observed in section, another in plan. Both pits provisionally dated 17th to 18th century.
3) Gardiners' Corner, City of London. Excavated by Inner London Unit, 1980. Parts of two horn core lined pits (17th to 18th century) observed in section.[1]

Research into these pits from London has so far failed to discover their function, but they were probably associated with some as yet undetermined industrial process. Each of the pits discovered at Cutler's Gardens was filled with a dark silt. Chemical analysis of a sample of this fill taken from one of the pits provided evidence of bronze-casting.[2] None of the

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1. R. Whytehead, pers. comm.
2. Dr. J. Evans, pers. comm.

pits at Cutler's Gardens, Crosswall or Gardiners Corner contained cess material.

Unlike the Greyfriars' pit, the source of the horn cores used in the construction of the London pits is not believed to be the tannery. During the late 17th and early 18th century, the tanning industry of London was located some distance from Cutler's Gardens, Crosswall and Gardiners Corner, south of the River Thames on the Surrey side.[1] It seems highly unlikely that the horn cores recovered from these three sites could have originally come from London's tan-yards. The cores instead probably came from the numerous horn-working premises that were concentrated at this time in the eastern parishes of the City (mainly along Petticoat Lane, renamed today, Middlesex Street).[2]

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1. See O.H.K. Spate, 'The growth of London, AD 1660-1800' In, H.C. Darby (editor) An Historical Geography of England before AD 1800, Cambridge (1963), 529-548.

2. F.J. Fisher, (1936), A Short History of the Worshipful Company of Horners

Bones and Shells from Littlegate (Site D) by Bob Wilson

Small quantities of bones were collected from the excavation. Only three contexts were large enough to be worth recording, and there was little of interest except that foot bones of sheep and cattle are more abundant than usual in the pre-city wall phase. Although the samples were small, they indicated a mixture of domestic debris and waste from fat or glue extraction in the 12th and 13th centuries.

Table 21 Fragment frequency of animal bone and shell.

Date	late 12th-early 13th cent.		16th cent.	
Trench	I	I	I	
Feature	51	26	5	total
sheep	23	21	11	55
cattle	12	31	11	54
pig	5	4	2	11
horse	2	-	-	2
cat	6	-	-	6
Total	48	56	24	128
unidentified	24	30	32	86
oyster shell	2	-	-	2
domestic fowl	4	3	-	7
domestic goose	-	1	-	-
human	1	-	-	-

Table 22 Percentages of head, foot and body debris of sheep and cattle in two 12-13th century features.

	sheep	cattle
n	44	43
head	20	2
foot	41	56
body	39	42

Table 23, Frequency of bones and shells in contexts at Westgate (Site W), Oxford

	medieval features						post-medieval	
Feature number	97	35	46	31			80	22
Century date	11-12th	12th	12th	13th	total	%	17th	18th
cattle	25	18	23	12	78	40.4	13	43
sheep	32	29	10	19	90	46.6	2	60
pig	10	7	4	1	22	11.4	-	13
horse	-	1	1	-	2	1.0	-	-
cat	-	1	-	-	1	0.5	-	13
rabbit	-	-	-	-	-	-	-	1
fallow deer	-	-	-	-	-	-	-	A
totals	67	56	38	32	193		15	130+A
unidentified	46	63	16	44	169		5	108
burnt				1	1		1	
oyster	76	2	-	-	78	40.4[a]		27
domestic fowl	-	1	2	4	7	3.1		6
domestic goose	-	-	-	3	3	1.6		-
wild bird	-	2	-	-	1	0.5		1

a As percentage of identified mammal bones

A = shed antler

F30 (12th century) contained a mandible of roe deer

Medieval and post-medieval bones from Westgate (Site W) by Bob Wilson

Bones salavaged from features at Westgate were examined briefly to discover anything of interest. Records of the debris were limited to the few features which provided moderate quantities of bones. Fragment number results are given below in Tables 23 and 24.

Salvage recovery of bones might affect results in Table 23 where bones of sheep, pig and smaller mammals are less abundant e.g. W F80. The chief interest of the bones is the high proportion of cranial debris of sheep from 18th-century W F22, and possibly among early medieval bones, and may indicate waste from butchers' stalls or shops in the area.

Table 24 Frequencies of head, foot and body elements of sheep at Westgate (Site W)

Feature number	97	35	46	31	total	%	22	%
Sample size (n)	32	29	10	19	90		60	
head	21	5	4	5	35	39	40	67
foot	5	12	2	3	22	24	8	13
body	6	12	4	11	33	37	12	20

Bird Bones from Church Street (Site A)

by Roger Jones, Alison Ruben and Bob Wilson [1]

The results are summarised in Table 25. Items of interest are a tibiotarsus of Smew (Mergus albellus), a species which has not been identified previously from regional deposits, and 7 bones of tawny owl (Strix aluco - also recorded at Site B). Single tibiotarsi of relatively late introductions, the turkey (Meleagris gallopavo - also at Site B) and the peacock (Pavo cristatus - an immature specimen) were present among other debris, but the evidence of their contexts is less certain.

A F17 (mainly L2012) yielded 61% of the bird bones. This indicates a relatively direct dumping of food waste into the feature, although the bones of owl indicate a different origin of some debris.

Table 26 indicates that about 25% of domestic fowl were killed relatively young. Bones from females and containing medullary bone, which is associated with egg shell formation, are relatively abundant (62% of 45 tibiotarsi) while those of identifiable males are few (<3% of 37 tarso-metatarsi.) The unsexable proportions probably include females slaughtered out of the egg laying season. The numbers of sexed female bones differ greatly between A F17 L2012 and other contexts, but the sample sizes are too small to detect a significant difference with a chi-squared test using a 2 x 2 contingency table.

In general, only one bone (0.2% of the domestic fowl bones) shows any pathology: exostosis of a coracoid midshaft (L2012). Further exostosis occurs on a jackdaw humerus (A F1001). Healed fractures are evident in the humerus and radius of tawny owl - a captive pet?

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1. Identifications and notes were provided by Roger Jones with the assistance of Alison Ruben (Ancient Monuments Laboratory, London). Bob Wilson tabulated the information and wrote the report.

Table 25 Fragment frequency of post-medieval bird bones at Church Street (Site A), Oxford.

Feature number	1528	2531	2504	1529	1023	1001	17	60	54	56		
Century date	16th	16th	16th	17th early	17th mid	17th mid	17th mid-late	18th mid	19th early-mid		total	%
Domestic fowl	18	52	7	20	15	-	330	15	1	5	463	70.5
Domestic goose	3	10	9	3	6	1	62	3	2	-	99	15.1
Dom./wild duck (Anas sp.cf. platyrhynchos)	5	2	16	10	2	-	-	-			35	5.3
Smew (Mergus albellus)					1	-	-	-			1	0.2
Lapwing (Vanellus vanellus)					-		15	-			15	2.3[a]
Pigeon/dove (Columbidae)					1	-	-	-			1	0.2
Tawny owl (Strix aluco)					-	-	7	-			7	1.1[a]
Jackdaw (Corvus monedula)					3	6	4	1			14	2.1
Rook Corvus frugilegus							4				4	0.6
Carrion crow (Corvus corone)							16				16	2.4[a]
Thrush (Turdidae)							-			2	2	0.3
Indet	2	42	10	13	5	2	45	6	3	-	128	
Total	28	106	42	46	33	9	483	25	6	7	785	

a Possibly over represented by fragmentation or bones of an individual.
Also recorded: Partridge (Perdix perdix) F27, L37 - 16th Century.
Peacock (Pavo cristatus) F1005 - an undated context
Turkey (Meleagris gallopavo) F57 - mid-late 18th century

Butchery marks show on the bones of fowl, goose, smew and turkey. Only 1% of fowl and 3% of goose have butchery records, so there are too few bones to determine whether members of the crow family were killed and eaten at this period.

It is useful to express the number of bird bones as a percentage of the indentified mammal bones. Depending on whether data from A F17 are excluded (former %) or not (latter %), the following figures are obtained: domestic fowl 9.9 - 28.1%; goose 2.7 - 6.0%; duck 2.6 - 2.1%; and wild birds 1.0 - 3.6%. For the purposes of comparison with other collections the percentages, particularly of fowl and of wild birds, appear distorted by bones from A F17.

Conclusions

1. Species representation in the collection is probably biased by differential recovery.
2. Five less well dated bones indicate that pigeon or dove should be represented better in the results.
3. Lapwing, owl and crow are probably over represented (Table 25).
4. Allowing for 2 and 3 the abundance of wild species appears similar to that at the Hamel, Oxford [1] but post-medieval species seem fewer and more closely associated with urban environments than at earlier sites.
5. Compared with the Hamel, domestic fowl are more abundant than goose and this indicates
   - i) a change from medieval diet, or
   - ii) differences in the husbandry of species at each site or at different periods.

   Analysis of the medieval debris from Site A should clarify these alternatives.

1. D. Bramwell and R. Wilson in N. Palmer 'A Beaker Burial and Medieval Tenements in the Hamel, Oxford' Oxoniensia, xlv (1980 M II F08-09.

6. Many female but few male domestic fowl reached maturity. While the immature bones probably include those of males, the proportions of the sexes overall may be biased toward females. The emphasis of husbandry may be on egg production, and some marketing of immature males, perhaps as capons. Possibly many of the fowls were kept on the tenements.
7. The overall relative abundance of bird remains is similar to that at the Hamel, but is greater than in local Iron Age and Romano-British collections.

Table 26 Age and sex data of domestic fowl

	immature (porous) bones				sexed bones			
	tit		tmt		certain females [a]		probable males [b]	
	n [c]	%	n	%	n	%	n	%
A F17 L2012	42	21	38	26	33	79	29	4
other contexts	17	29	11	18	12	17	9	0

a presence of medullary bone in tibiotarsi (tit)

b presence of spur or spur scar on tarso metarsi (tmt)

c n = total number of mature and immature bones

Bird bones from Greyfriars (Site B) and Westgate (Site W)

by Roger Jones and Bob Wilson

Identification lists and notes were made by Roger Jones. The results are summarised in Tables 27 and 28. Of particular note is a large ulna (B III F4 L2) which closely resembled that of a North American turkey (Meleagris gallopavo) and seems a useful record of the introduction of the species to England. Associated pottery indicates that the bone dates to the early - mid 17th century. An endemic species, the tawny owl (B IV F44) also has no previous archaeological record in Oxfordshire.

Some pathology occurred among the domestic fowl. An ulna midshaft (B X F27) has a healed fracture and the proximal joint shows erosion and deposition of bone. Most interesting are two tarsometatarsi (B IV F44) with sawn off spurs both showing signs of healing. These bones date to the early to mid 18th century or possibly, with intrusive material, to the early 19th century. Almost certainly, the truncation of spurs occurred during the preparation of birds for cock fighting with metal spurs. A stuffed fighting cock possessing these features is on display at the Somerset Rural Life Museum, Glastonbury, Pls. 9, 10.[1]

Where compared to results from excavations at the Hamel, Oxford[2] the species lists appear diminished by limited recovery of small bones. The identifications at least indicate that, apart from members of the crow family (Corvidae), wild birds are scarcely represented in post-medieval deposits. Species such as crow, magpie and jackdaw may be typical because of their ecological affinity to rubbish dumps, gardens or buildings of towns.

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1. B. West, 'Spur development: recognising caponised fowl in archaeological material', in Ageing and Sexing Bones from Archaeological Sites, eds. B. Wilson, C. Grigson and S. Payne, B.A.R., British ser. clx (1982), 255-61.

2. D. Bramwell and R. Wilson in N. Palmer, 'A Beaker Burial and Medieval Tenements in the Hamel, Oxford', Oxoniensia xlv, 1980, M II F08.

Table 27 Frequency of bird bones at Greyfriars (Site B)

Trench	IV	III	X	X	X	IV	VI	
Feature	13	4 L2	22	26[c]	27[c]	44	10	Post-medieval
Period	17th Cent.		18th Century Contexts					total
domestic fowl	2	14	3	8	4	11	12	42
goose[a]	-	3	1	3	1	4	4	12
turkey[a] (*Meleagris gallopavo*)	-	1?	-	-	-	-	-	1?
duck[a] (*Aras sp.*)	-	-	-	1	-	2	-	3
pigeon/dove	-	-	-	-	-	1	-	1
tawny owl (*Strix aluco*)	-	-	-	-	-	2	-	2
magpie (*Pica pica*)	-	-	-	-	-	1	-	1
jackdaw[b] (*Corvus monedula*)	-	-	-	-	-	1	-	1
crow (*Corvus corone*)	-	-	-	-	-	-	1	-
rook (*Corvus frugilegus*)	-	-	-	1	-	-	-	1
								64

a Probably domesticated species

b Also in B VII F4 (18th century)

c Possibly some early 19th-century bones.

Table 28 Frequency of bird bones at Westgate (Site W)

Feature	35	46	31	22
Period	12th Century		13th Cent.	18th Cent.
domestic fowl	1	2	2	6
goose	-	-	2	-
merlin/ male kestrel[a]	2	-	-	-
crow	-	-	-	1

a *Falco columbarius/F. tinnunculus*

F26, otherwise unrecorded, contained one bone of domestic duck (*Anas sp.* 18th century).

Plate 10, Legs of fighting cock with sawn off spurs and metal replacements (Somerset Rural Life Museum, Glastonbury). Left: an 15th- to 19th-century metatarsus from Greyfriars, Oxford (J. Barrett, Museum of London).

Post-medieval age date, butchery and rubbish disposal in the survey area
by Bob Wilson

Details of livestock slaughtering will be discussed in a later report by comparison with comprehensive data of medieval bones from Church Street. However the general trends of the information on slaughtering ages are interesting because post-medieval butchery affected the way in which rubbish accumulated on these sites.

Cattle. Seven of eight post-medieval mandibles are from calves about one or two months of age: the fourth deciduous premolars were in wear; the first molars had not erupted. Meagre records elsewhere in the county also indicate that bones of calf heads are typical of late urban deposits and that mandibles of older cattle are less evident than among medieval debris. However the presence of the calf mandibles differs markedly from the high percentages of fused epiphyses among limb bones in both medieval and post-medieval deposits (e.g. Table 29).

The meat consumed from the main carcass was derived from a greater proportion of older cattle than the post-medieval mandibles show. It appears that most meat joints and calf heads are represented in normal refuse but as concluded for the Hamel, Oxford[1], and sites in Exeter, Devon[2], skulls of more mature cattle are dumped elsewhere in more special deposits.

Heads of older cattle were probably separated from carcasses at slaughter houses. After the horns were struck off each remaining head seems to have been dumped or processed leaving little archaeological trace

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1. R. Wilson in N. Palmer, 'A Beaker Burial and Medieval Tenements in the Hamel, Oxford', Oxoniensia, xlv (1980), M II E10.

2. M. Maltby, The Animal Bones from Exeter 1971-1975, (1979), 32, 38.

Table 29, Percentages of fused epiphyses in period totals of epiphyses.

		Church Street		Greyfriars		Church Street	Westgate
century		16th	17th	17th	18-19th	18-19th	18th
cattle	n	49	70	52	58	39	15
	%	73	71	83	69	79	67
sheep	n	77	94	84	97	89	16
	%	96	84	76	86	84	81
pig	n	16	44 [a]			54 [a]	
	%	31	30			37	

[a] combined totals for each period

Post medieval percentages for uncommon species are:

	horse	dog	cat	rabbit	hare	fallow deer
n	3	14 [b]	94[bc]	41[bc]	6 [b]	3
%	100	43	16	46	50	100

[b] excluding metapodial bones

[c] including bones from individual skeletons

from extracted items such as tongue, brawn or lard which might have reached tenement households. Occasional loose teeth indicate that these heads were smashed up in quasi-industrial processes. Calves' heads, however, appear cooked in tenement kitchens leaving the bones relatively intact.

Sheep. Data of sheep mandibles from Oxford[1] suggested that during the 11th to 16th centuries there was an increase in the average age at which sheep were slaughtered. Limited post-medieval evidence indicates that this trend does not continue, and slaughtering ages fluctuate about the late medieval pattern. Both epiphyses (Table 29) and mandibles (not shown) show that most sheep were killed relatively mature, e.g. with the third molar in wear, although cranial debris from younger sheep is disproportionately represented among 16th-early 17th-century features, particularly A F1529 at Church Street.

Pig. The pattern of killing most pigs relatively young does not appear to change during medieval and post-medieval times. There is no obvious discrepancy in the sources of age data to suggest any special distribution of meat joints from pig carcasses. This is not surprising, since pigs were reared chiefly for household consumption and did not yield industrial products like horn which might alter the pattern of butchery. The home consumption of pigs from tenement sites would also contribute to a normal distribution of carcass bones.

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1. R. Wilson in N. Palmer, 'A Beaker Burial and Medieval Tenements in the Hamel, Oxford', Oxoniensia, xlv (1980), Fiche II E12.

VI D6 - D14 Blank

PLANT REMAINS FROM THE CHURCH STREET TENEMENTS (SITE A) AND THE OXFORD CASTLE BARBICAN DITCH by A.P. BROWN and M.A. ROBINSON

Extensive soil sampling took place during the excavations at 31-34 Church Street.[1] The samples were almost all from pits, the predominant category of feature on the site. These were late Saxon to medieval unlined pits, cutting the limestone gravel of the Summertown - Radley Terrace or other pits, and stone-lined post-medieval pits. None of the samples was waterlogged. The waterlogged 14th- mid 15th-century fill of the Barbican ditch and two large associated pits at Oxford Castle were also sampled. The details of the excavation of the Oxford Castle Barbican ditch, including a list of wood identified from these deposits, has already been published.[2] An investigation of these samples has given an insight on certain aspects of past living conditions and diet in St. Ebbe's. This account has been written by M. Robinson.

The Church Street Samples

70 samples, each of about 0.5l, were water-sieved and examined for recognisable plant material by A.P. Brown. The majority of the samples yielded nothing, or very scant remains. Only Rubus spp. and Sambucus nigra seeds were abundant in any of the samples. Carbonised grain was present, otherwise seeds were either badly decayed or mineralized. The species most frequently present are listed in Table 30.

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1. A.P. Brown in T.G. Hassall, 'Excavations at Oxford, 1968. First Interim Report,' Oxoniensia, xxxiv (1969), 17-18.

2. T.G. Hassall, 'Excavations at Oxford Castle, 1965-1973,' Oxoniensia, xli (1976), 250-2, 264, 271.

Table 30 Seeds Most Frequently Present In The Church Street Samples

Seeds		Percentage of samples containing the species
Rubus spp.	Blackberry/Raspberry	8
Rumex spp.	Dock	5
Sambucus nigra L.	Elder	37
Carex spp.	Sedge	11
Cereal grain		41

Single seeds of two species of particular interest were made from A F45, a mid-late 17th-century pit : Viola odorata L. (sweet violet) and Prunus avium L. or cerasus L. (cherry). This pit also contained abundant seeds of Rubus spp. The distribution of seeds within A F113, a 13th-century pit, was investigated by examining a sequence of 14 further samples. Seeds were sparse, but apparently even distributed throughout the various layers in the pit.

The original work on the Church Street samples described above was completed by A.P. Brown in 1970. Since then, there have been many advances in the study of botanical remains from urban archaeological sites. Therefore, nine more samples from the medieval and post-medieval pits were investigated. 1.5kg. of each sample was added to water, the flotant poured onto a 0.5mm aperture sieve, and then the residue washed onto another 0.5mm sieve. Residues and flotants were dried and then sorted for plant remains. Even though none of the pits was waterlogged, there was organic survival of seeds in some of the deposits. Seeds were also found to have been preserved by calcium phosphate mineralization and carbonisation. The results from eight of the samples are listed in Tables 31-33. Plant remains were absent from A F129, a 12th-century pit.

Table 31 : Organic Seeds from the Church Street Pits (Site A).

		Number of Seeds							
		F84	F77	F145	F53a	F53b	F41	F55	F57
Date of pit		11th	13th	13th	15th	15th	16th	late 17th	mid-late 18th
Chelidonium majus L.	Greater Celandine	-	-	-	-	-	1	-	-
Viola sp.	Violet	-	-	-	-	-	2	-	1
Atriplex sp.	Orache	-	-	-	-	-	-	-	8
Vitis vinifera L.	Grape	-	-	-	-	-	-	-	3
Rubus idaeus L.	Raspberry	-	-	-	-	-	-	-	79
R. fruticosus agg.	Blackberry	-	-	-	-	-	-	-	271
Rubus spp.	Raspberry and Blackberry	-	-	-	-	-	-	-	102
Fragaria sp.	Strawberry	-	-	-	-	-	-	-	4
Prunus sp.	Plum etc.	-	-	-	-	-	-	-	1
Euphorbia helioscopa L.	Spurge	-	-	-	-	-	-	-	2
E. peplus L.	Spurge	-	-	-	-	-	-	-	7
Ficus carica L.	Fig	-	-	-	-	-	2	-	34
Morus nigra L.	Black Mulberry	-	-	-	-	-	1	-	4
Sambucus nigra L.	Elder	2	9	1	1	-	15	1	4
Ignota		-	-	-	-	-	-	-	1
Total		2	9	1	1	0	20	1	521

Table 32. Mineralized Seeds from the Church Street Pits (Site A).

		Number of Seeds							
		F84	F77	F145	F53a	F53b	F41	F55	F57
Vitis vinifera L.	Grape	-	-	-	-	-	-	-	1
Prunus sp.	Plum etc.	-	-	1	-	-	-	-	-
Pyrus or Malus sp.	Pear or Apple	-	-	-	-	-	-	-	5
Ribes rubrum agg.	Red Currant	-	-	-	-	-	-	-	2
R. cf. nigrum L.	Black Currant	-	-	-	-	-	-	-	1
R. uva - crispa L.	Gooseberry	-	-	-	-	-	-	-	1
Ribes spp.	Currant	-	-	-	-	-	-	-	5
Foeniculum vulgare Mill.	Fennel	-	-	-	-	-	1	-	-
Umbelliferae gen. et sp. indet.		-	1	-	-	-	-	-	-
Ignota		2	-	-	1	-	-	-	10
Total		2	1	1	1	0	1	0	25

Table 33 : Carbonised Seeds from the Church Street Pits (Site A).

		Number of Seeds							
		F84	F77	F145	F531	F53b	F41	F55	F57
Bupleurum rotundifolium	Thorow-wax	-	-	1	-	-	-	-	-
Rumex sp.	Dock	-	-	2	-	-	-	-	-
Anthemis cotula L.	Stinking Mayweed	-	1	3	-	-	-	-	-
Lapsana communis L.	Nipplewort	-	-	1	-	-	-	-	-
Carex sp.	Sedge	-	2	-	-	-	-	-	-
Triticum aestivocompactum Schiem	Bread/Club Wheat	2	1	-	2	1	-	-	-
Triticum sp.	Wheat	2	-	-	-	1	-	-	-
Secale cereale L.	Rye	1	-	-	-	1	-	-	-
Hordeum sp.	Hulled Barley	1	-	-	-	-	-	-	1
Hordeum sp.	Barley	-	-	-	-	1	-	-	-
Avena sp.	Oats	1	-	1	-	-	-	-	-
Cereal gen. et sp. indet.		5	1	-	2	-	-	-	-
Ignota		-	-	3	2	-	-	-	-
Total		12	5	11	6	4	0	0	1

The results obtained from the additional investigation provide more detailed species lists but otherwise they are largely in keeping with those from the original work, therefore both sets of data will be considered together.

The most important aspect of the botanical investigations is that they aid in the interpretation of the uses of the numerous Church Street pits. The abundant pot sherds and bones from the pits shows that they were used for the disposal of domestic refuse. The presence of seeds preserved by calcium phosphate mineralization in most of the samples listed in Table 32 provides good evidence that either these features were used as cess pits or they had been back-filled with soil derived from cess pits. Calcium phosphate mineralization of organic remains is highly characteristic of cess pits in a limestone substrate,[1] in this case the Pleistocene gravel on which Church Street is situated. Apart from A F57, however, seeds preserved by calcium phosphate mineralization were not abundant. This is probably because the site was free-draining, another pre-requisite for the mineralization seems to be the prolonged presence of liquid sewage. Interestingly, the mineralized seeds in A F57 are those which are very susceptible to decay : Ribes spp. etc., whereas woody seeds such as Rubus spp. survived unaltered.

The general paucity of seeds from the samples means that it is not possible to detect changes occurring over the date range which the pits span, neither is it possible to detect differences between the two tenements. It is also unfortunate that in most of the deposits, the decay of organic remains was very advanced and only the most resistant

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1. F. Green, 'Phosphatic Mineralization of Seeds from Archaeological Sites,' Journal of Archaeological Science, vi (1979), 279-84; M.A. Robinson in M. Parrington, 'Excavations at Stert Street, Abingdon, Oxon.' Oxoniensia, xliv (1979), 23-4.

seeds survived. For instance the abundance of Sambucus nigra seeds probably only results from their robust nature rather than indicating that elderberries were collected for eating or dyeing.

The carbonised seeds were mostly cereals. A few charred weed seeds were discovered, including Bupleurum rotundifolium, at present a very rare cornfield species, but cereal chaff was not recorded. Most of the carbonised seeds had probably originated from ordinary domestic processes involving cereals, and it is possible that they were much reworked by repeated pit-digging.

Little dietary information is available from the medieval samples, although the unidentified mineralized umbellifer seed from A F77 is likely to have been a culinary herb. A F57, a mid 18th-century cess pit, contained a large assemblage of seeds, almost all from edible fruits which had probably passed through the human gut. Seeds from eleven species of fruit were present. While the most abundant seeds were from blackberry, highly valued species such as grape and black mulberry also occurred. The fig seeds are likely to have been from an imported variety of Smyrna fig because Adriatic varieties, the only sort of figs which fruit in the British Isles, do not have robust seeds. The strawberry seeds from A F57 were large, but they fell within the size range of reference material from a cultivated "alpine" variety of Fragaria vesca L. (wild strawberry). However, the non-native strawberries F. moschata Duch. and F. virginiana Duch. were being cultivated in Britain by the date of this context, and as reference seeds from them were unavailable, the identification has been left at the generic level. It is clear that the family which used A F57 were able to afford, or had access to, a rich variety of fruit to enliven their diet.

The seeds provide but slight information on the general environment of the site. Elder bushes probably grew on the highly organic and disturbed soils of the tenements along with a variety of other weeds. In contrast, the single 17th-century seed of sweet violet was perhaps from a plant grown for its flowers.

The Barbican Samples

Seven samples of waterlogged organic silts from the Barbican ditch (F5), and its associated pits (F28 and F60) were investigated. 0.2-0.4l of each sample was washed over a 0.1mm aperture sieve and then sorted for plant remains. Preservation of organic plant remains was excellent, and A.P. Brown's results are listed in Tables 34-35.[1]

The results from the samples are sufficiently similar that they can be considered together. The range of species present is typical of late medieval urban waterlogged deposits. It included both remains from plants growing in the immediate vicinity of the deposit and material brought to the site by man from a diverse range of habitats. It is not possible to establish from which particular source many of the species were derived, but the origins of some of the seeds can be postulated.

The presence of Chrysanthemum segetum, very much a cornfield weed, suggests crop cleaning debris had been dumped in the Barbican ditch. C. segetum is a species of acid soils, whereas the soils in the immediate vicinity of Oxford are basic. Seeds of Agrostemma githago, another species which is closely dependent upon arable agriculture, were abundant in some of the deposits. However, their seeds were in fragments, which seems to be characteristic of human sewage. The fragments probably originated from bread made with flour

1. Nomenclature for flowering plants follows A.R. Clapham, T.G. Clapham and E.F. Warburg, Flora of the British Isles (edn. 1962); nomenclature for bryophytes follows A.J.E. Smith, The Moss Flora of Britain and Ireland, (1978).

in which ground Agrostemma seeds were accidental contaminants, formerly a serious problem.[1] The raspberry, grape and fig seeds were also perhaps derived from a human sewage component to the deposits. The seeds of Rhinanthus sp., a haymeadow plant, could have been from hay brought into the town or they might be from the dung of grazing animals. The seeds of Centaurea nigra and many of the other grassland plants listed in Table 34 possibly had a similar origin. The box and yew leaves could have been from hedge clippings thrown into the deposits of they could have come from bushes growing nearby. It is probable that these bushes were being cultivated for ornamental purposes.

Perhaps rather surprisingly, seeds from Sambucus nigra and Urtica dioica, characteristic weeds of neglected areas around human settlement, were entirely absent. This might suggest that the sides of the Barbican ditch were not allowed to become completely overgrown with a tangle of vegetation. Various of the plants of disturbed ground, grassland and marshy places listed in Table 34 probably grew along the edge of the ditch and fringed the water in the bottom. There was no evidence for aquatic plants growing in the waters of the moat. All the mosses identified could have grown in the immediate vicinity of the Barbican on walls, bare ground and in grassy places.

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1. J.R.A. Greig, 'The Investigation of a Medieval Barrel - latrine from Worcester,' Journal of Archaeological Science, vii (1981), 273.

Table 34. Waterlogged Seeds from the Barbican Samples

		F5a	F5b	F5c	F5d	F28	F60a	F60b
Ranunculus S. Ranunculus sp.	Buttercup	r	r	-	r	-	-	r
R. flammula L.	Lesser Spearwort	-	-	-	-	-	-	r
Papaver cf.rhoeas L.	Poppy	-	-	-	r	-	r	-
Brassica or Sinapis sp.	Cabbage, Mustard or Charlock	-	·	-	a	r	-	-
Silene vulgaris (Moench) Garcke	Bladder Campion	r	r	r	f	-	-	-
Lychnis flos-cuculi L.	Ragged Robin	-	-	-	-	-	r	-
Agrostemma githago L.	Corn Cockle	r	o	o	f	a	f	r
Stellaria media gp.	Chickweed	-	-	-	r	-	r	-
Stellaria sp.	Stitchwort	r	-	-	-	-	-	-
Chenopodium album L.	Fat Hen	r	r	r	f	-	r	r
C. murale L.	Goosefoot	-	-	r	-	-	-	-
Chenopodium sp.	Goosefoot	-	-	-	-	-	r	-
Atriplex patula L.	Orache	r	-	-	-	-	-	-
Atriplex sp.	Orache	-	-	-	-	-	-	r
cf. Atriplex sp.	Orache	-	-	-	-	-	r	-
Linum usitatissimum L. or anglicum Mill.	True Flax or English Flax	-	-	-	-	r	-	-
L. catharticum L.		-	-	-	-	-	r	-
Vitis vinifera L.	Grape	-	-	-	r	-	-	-
Vicia or Lathyrus sp.	Vetch	-	r	r	r	-	-	-
Rubus cf. idaeus L.	Raspberry	-	r	-	-	-	-	-
Potentilla cf. erecta (L.) Rausch.	Commomn Tormentil	-	·	-	r	-	-	-
Anthriscus caucalis Bieb.		-	r	-	-	-	-	-
Conium maculatum L.	Hemlock	-	-	r	-	-	-	-
Polygonum aviculare agg.	Knotgrass	-	o	r	o	-	r	-
P. cf. bistorta L.	Bistort	-	-	-	r	-	-	-
P. convolvulus L.	Black Bindweed	o	r	-	r	r	-	r

Table 34.continued

Rumex acetosa L.	Sorrel	r	-	-	-	-	-	-
R. crispus L.	Dock	-	a	r	f	f	-	r
Urtica urens L.	Small Nettle	-	-	r	r	-	-	-
Ficus carica L.	Fig	r	-	r	-	-	-	r
Corylus avellana L.	Hazel	-	-	r	r	-	-	r
Anagalis arvensis L.	Scarlet Pimpernel	r	-	-	-	-	-	-
Myosotis sp.	Forget-me-not	-	-	-	-	-	-	r
Solanum nigrum L.	Black Nightshade	-	r	-	-	-	-	r
Rhinanthus sp.	Yellow Rattle	-	-	r	-	o	-	-
Prunella vulgaris L.	Self-heal	r	-	r	-	o	o	-
Ballota nigra L. or								
Marrubium vulgare L.	Black or White Horehound	-	r	-	-	-	-	-
Senecio viscosus L.	Stinking Groundsel	-	-	-	-	-	-	r
Anthemis cotula	Stinking Mayweed	-	r	-	-	r	-	-
Chrysanthemum segetum L.	Corn Marogold	r	-	-	-	-	-	-
Cirsium arvense (L.) Scop.	Creeping Thistle	-	r	-	r	-	-	-
Centaurea nigra L.	Knapweed	o	r	r	r	r	-	-
Lapsana communis L.	Nipplewort	r	-	-	-	-	-	-
Leontodon autumnalis L.	Hawkbit	-	-	-	-	r	r	r
Sonchus oleraceus L.	Milk Thistle	-	-	r	-	-	r	r
Crepis biennis L.	Hawk's-beard	r	-	-	-	-	-	-
Juncus effusus - type	Rush	-	r	-	-	-	r	-
J. cf. articulatus L.	Rush	r	r	-	r	-	o	f
Eleocharis S. Palustres sp.		-	-	-	-	r	r	r
Eleocharis sp.		r	-	-	-	-	-	-
Carex spp.	Sedge	r	-	r	-	-	f	o

Number of seeds : r 1-4, o 5-9, F 10-19, a 20-39

Table 35 : Other Plant Remains from the Barbican Waterlogged Samples

			F5a	F5b	F5c	F5d	F28	F60a	F60b
Taxus baccata L.	Yew	leaves	+	-	-	-	-	-	-
Buxus sempervirens L.	Box	leaves	-	-	-	-	-	-	+
Quercus sp.	Oak	twigs	-	-	-	+	-	-	-
Cereal		carbonised grain	-	+	-	+	+	-	+
Bryophyta	Mosses								
Tortula sp.			+	-	-	-	+	-	+
Thuidium tamariscinum (Hedw.) Br.Eur.			-	+	-	+	-	-	-
Homalothecium sp.			-	-	-	-	+	-	+
Pseudoscleropodium purum (Hedw.) Fleisch.			-	-	-	-	+	-	-
Eurhynchium sp.			+	+	-	+	-	-	-
Rhytidiadelphus triquertus (Hedw.) Warnst.			-	+	-	-	-	-	+

+ present

INSECT REMAINS FROM THE CHURCH STREET PITS, (SITE A) by M.A. Robinson

Insect fragments, preserved by calcium phosphate mineralization, were recovered from two of the post-medieval samples examined from plant remains.

Table 36. Minimum Number of Insects

	A F41	A F57
Coleoptera (beetles)		
Cercyon sp.	-	1
Hister sp.	-	1
Philonthus sp.	-	1
Trox scaber (L.)	-	2
Diptera (fly) puparia		
Fannia c. *scalaris* (F.)	-	16
Sphaeroceridae gen. et sp. indet.	9	9
Diptera gen. et sp. indet.	3	10

The insects confirm the other lines of evidence that indicated these contexts to be cess pits. *F. scalaris* is the latrine fly while the unidentified Sphaeroceridae were probably sewage flies. The Coleoptera from A F57 comprise a typical cess pit assemblage, with both carnivores, such as *Hister* sp., which would have fed on the fly larvae, and coprophagous species, including *Cerycon* adults.

PLANT MATERIAL ADHERING TO A COPPER ALLOY BOX (A SF1061 L39, Cat. No. 57)

by MARK ROBINSON

The plant material from inside the box consists of leaves and small stem fragments of Ulex sp (gorse). One fragment had been charred, the others had been preserved by the corrosion products of the copper alloy.

A subsequent examination of the box showed gorse leaves also preserved in the corrosion on its exterior. Therefore gorse was not the original content of the box, the box had merely been discarded (minus its lid) into soil which had partly burnt gorse in it.

A SF1061 L39. (For a description of the box see Copper Alloy Objects, Catalogue No. 57, M IV B8).

VI F5 - G13 Blank

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ENVIRONMENTAL EVIDENCE