

**Norwich Castle:
Excavations and
Historical Survey,
1987–98
Part II: c.1345 to Modern**

by Elizabeth Shepherd Popescu

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Cover illustration

Reconstruction of the Norwich Castle area c.1792, demonstrating the effect of levelling and the creation of new roads across the Cattle Market. *Painted by Nick Arber*

Iron plate armour

by Quita Mould
(Fig.8.60)

Many fragments (minimum 51) of sheet with round-headed rivets or rivet holes were recovered, a small quantity (18 minimum) may be fragments of plate armour: many of these came from the barbican well (Chapter 9.III) or pit fills of similar date (*e.g.* SF5184). In addition, two small plates from a jack of plate, a padded protective jacket worn by the common soldiery during the 16th century were found (see discussion of pieces from Beeston Castle, Eaves in Ellis 1993, 161–164). The skirts and collars of some jacks of plate were filled with chain armour rather than plates. The occurrence of fragments of chain armour in the backfill of the well is discussed in Chapter 9.III.

SF5184 Rectangular plate with slightly curved profile and three round-headed rivets remaining. L 77mm w 38mm. 10524, fill of pit 10899, Period 5.1, G1/97

SF6057.1 Two jack plates with cropped corners and central hole. L 30mm w 23mm 90677, fill of pit 90702, Period 5.2, G9/82

IV. ZOOLOGICAL AND BOTANICAL EVIDENCE

Mammal and Bird Bone

by Umberto Albarella, Mark Beech and Jacqui Mulville
(Plate 8.11)

Assemblage Summary

A total assemblage of 1,165 mammal, bird and amphibian bones and teeth (NISP) was hand collected from late medieval/transitional deposits at the Castle Mall site, with an additional 171.5 bones from Site Riddled Samples (SRS) and 116 from Bulk Samples (BS). The large assemblage from the barbican well shaft, detailed separately, amounts to 14,607 mammal bones/bone fragments and 3,888 bird bone fragments (see Moreno Garcia, Chapter 9.IV and Part III). The range of taxa recorded from non-well shaft deposits at Castle Mall is indicated in Table 8.22. A further 218 bones and teeth (NISP) were identified at the Golden Ball Street site (see Curl, Part III). Full details of the complete mammal and avian bone assemblages from both sites are given in Part III.

Refuse Disposal

Most of the refuse attributable to this period came from pit fills, although ditch fills of 16th-century date were evident at the Golden Ball Street site. The few partial animal skeletons recovered are indicated in Table 8.23, although this does not include half a pig carcass which was located in Area 9. In addition, 15 partial dog skeletons and 16 partial cat skeletons were recovered from the barbican well. At least some of these animals appear to have been deposited into the well while still alive (see Chapter 9.IV).

Craft Waste

The most significant craft waste of the period came from fills of the barbican well and is detailed in Chapter 9.IV.

Elsewhere on the site, a pit fill containing a significant group of sheep horncores, metapodia and phalanges (pit 11048, Plate 8.11) at ?Property 49 provides evidence for the deposition of tanning/tawing waste and is summarised in Chapter 8.III, with further details given in Part III. This group of 21 horncores is remarkable for their general small, female-like, size (although they may represent early castrated wethers).

Taxa	Hand collected	SRS	BS	Total
Cattle (<i>Bos taurus</i>)	312.5	41	11.5	365
Sheep/goat (<i>Ovis/Capra</i>)	477**	41.5	43	561.5
sheep (<i>Ovis aries</i>)	(193)	(4)	(5)	(202)
goat (<i>Capra hircus</i>)	(1)	-	-	(1)
Pig (<i>Sus domesticus</i>)	121.5*	18	15	154.5
Equid (<i>Equus</i> sp.)	1.5	-	-	1.5
Dog (<i>Canis familiaris</i>)	10*	4	-	14
Cat (<i>Felis catus</i>)	35*	0.5	10.5*	46
Red deer (<i>Cervus elaphus</i>)	+	-	-	+
Fallow deer (<i>Dama dama</i>)	-	4.5	-	4.5
Hare (<i>Lepus</i> sp.)	3	-	-	3
Rabbit (<i>Oryctolagus cuniculus</i>)	22.5	7	12	41.5
Rat (<i>Rattus</i> sp.)	-	1	-	1
House/wood mouse (<i>Apodemus/Mus</i>)	-	-	1	1
Domestic fowl (<i>Gallus gallus</i>)	119*	38	19	176
Goose (<i>Anser anser</i>)	48*	11	1	60
Duck (<i>Anas</i> sp.)	9	2	1	12
Turkey (<i>Meleagris gallopavo</i>)	1	-	-	1
Little Grebe (<i>tachybaptus ruficollis</i>)	1	-	-	1
Swan (<i>Cygnus</i> sp.)	1	-	-	1
Pochard/Tufted duck (<i>Aythya ferina/fuligula</i>)	+	-	-	+
Coot (<i>Fulica atra</i>)	1	1	-	2
Grey partridge (<i>Perdix perdix</i>)	-	-	1	1
Crane? (<i>?Grus grus</i>)	+	-	-	+
Rook/Crow (<i>Corvus frugilegus/corone</i>)	1	-	-	1
Pigeon (<i>Columba</i> sp.)	-	1	-	1
Bird	1	-	-	1
Amphibian	-	-	1	1
Total	1,165	171.5	116	1,452.5

Sheep/Goat also includes the specimens identified to species. Cases where only 'non-countable' bones were present are denoted by a '+'. Pig metapodia and ruminant half distal metapodia have been divided by two, while carnivore and lagomorph metapodia have been divided by four. Due to the difficulty in distinguishing between upper and lower incisors in equids and upper and lower canines in carnivores, all have been recorded and then divided by two. All totals which include material from partial skeletons are denoted by '*': this material is described in further detail in Table 8.23. The figure denoted '**' includes a 'special' group of 169 sheep metapodia and phalanges.

Table 8.22 Numbers of mammal, bird and amphibian bones and teeth in Period 5 at Castle Mall by collection category (NISP), excluding the assemblage from the barbican well

<i>Period</i>	<i>Area/Group</i>	<i>Context</i>	<i>Related feature</i>	<i>Collection method</i>	<i>Species</i>	<i>Notes</i>
5.1	1/97	10976	pit 10899	hand	cat	20 bones
5.1	1/97	10976	pit 10899	BS sieve	cat	4.5 bones
5.1	9/61	90765	pit 90766	hand	dom. fowl	10 bones
5.2	9/73	90171	pit 90261	hand	pig	6 bones
5.2	9/94	92716	pit 92715	hand	dog	5 bones

The number of bones and teeth given are the number of countable specimens from each skeleton

Table 8.23 Summary of partial animal skeletons found within Period 5 features (excluding barbican well)

Comparison with the Barbican Well Assemblage

Animal bones recovered from the upper fills of the well within the castle barbican date to the mid 15th to early 16th century and are therefore contemporary with the assemblage from Period 5.2 across the remainder of the site. The well assemblage was analysed by Marta Moreno García and is described and discussed in Chapter 9.IV and Part III. The results of analysis have been compared with those from the remaining assemblage.

The total weight of bird bones in the barbican well is substantially higher (4.3%: sieved and hand-collected) than the Period 5 assemblage (1.3%: hand collected; Part III, Fig.10). However, when the NISP count is considered the difference is not that evident. Bird bones represent 21% of the total number of mammal and bird fragments from the barbican well (this count includes both material hand-collected and from sieving) and between 15% and 30% (depending on which type of recovery is considered; Part III, Fig.14) from the rest of the site in Period 5. The relatively higher weight of bird bones from the barbican well is partly the result of the inclusion of material from sieving (where a larger number of bones are expected) and partly due to the higher number of bones from the larger goose. The abundance of goose bones in the well deposit can be attributed to the high numbers of *carpometacarpi*, which are probably the by-product of some industrial activity (see Moreno García).

The MNI percentage of the main domestic mammals from the barbican well has been compared to the rest of the site for Period 5. A larger number of pigs (30% versus 16%) and a smaller number of cattle (20% versus 39%) were found in the well. However, the counts were very similar when the frequency of taxa calculated through a 'diagnostic zone' system (hand-collected + sieved material) adopted by Moreno García was compared to our NISP (which is also a 'diagnostic zone' system). In general more similarities than differences emerge from the comparison between the well assemblage and that from the rest of the site. The minor differences can be attributed to factors such as differences in preservation, recovery or quantification methods which are of minor archaeological interest.

Wild species are poorly represented both in the barbican well and in the rest of the Castle Mall assemblage. A number of hare and rabbit bones were, however, recorded from the well. It is interesting to note that for the rest of the site, the largest number of lagomorph bones were also found in Period 5 (see Part III, Tables 3–6).

General Comments

It is notable that nine out of the sheep horncores from the group associated with tanning waste have clear thumb prints. This condition is commonly found in archaeological sites and has been associated with environmental stresses such as malnutrition or breeding in elderly animals, which may cause calcium resorption (Hatting 1983, Albarella 1995). Its occurrence in about 25% of the horncores from Period 5 suggests that the condition of these sheep may have been poor. Their rather small size may also be associated with a low plane of nutrition (see Davis 1996). A similar occurrence of depressions (23%) was found by Moreno García (Part III) in her study of the mid/late 15th to early 16th century fills of the barbican well and by Curl in her analysis of the material from Golden Ball Street (Part III).

Variations in animal size and age at death are apparent in a range of species during this period and are fully detailed in Part III. Evidence from Period 5 deposits at both Castle Mall and Golden Ball Street indicates that the shift towards culling of juvenile cattle may have occurred earlier in Norwich than in other parts of the country.

Fish Bone

by Alison Locker

In this period of some two centuries there was a large assemblage of fish bones of which 61% came from a single context, the barbican well. The fills of this large feature, most of which are dated to Period 5.2 are discussed separately in Chapter 9.IV. The summary shown below (Table 8.24) excludes the fish from the barbican well and is collated from a variety of features including pits and linear features some of which are discussed in the full report (Part III).

The bulk sieved material is 77.6% of the assemblage, with site riddled at 12.6% and hand collected at 9.6%. This contrasts with the comparatively low proportion of fish from bulk sieving in the well despite the greater weight of whole earth samples sieved in the latter feature. These differences may reflect a greater density of fish in the non well samples and also a greater variety with 37 taxa from an assemblage of 1,811 identified bones compared with 28 in the larger sample by both weight and bone number from the well.

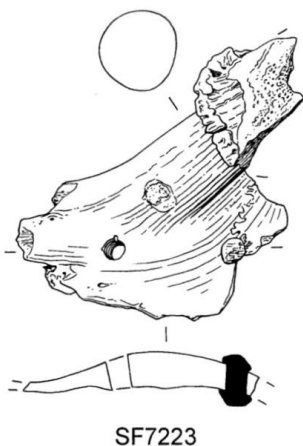
Using the bulk sieved sample minus the elasmobranchs herring are 35.3% by bones number and eel are 9.1%. Cod and large gadid together are 8.4%, whiting 6.5% and haddock 2% so the combined gadids, all important food fishes total around 17%. Sprat, a smaller

Unclassified

Antler object
by Julia Huddle
(Fig.10.75)

A fragmentary piece of antler pierced by two holes, one of which has an iron rivet in *situ* (SF7223), may have been used as a crude wall hook.

SF7223 Antler pedicle and part of burr and fragmentary piece of calvaria, which is pierced by two holes, one of which has an iron rivet. Probably fallow deer antler.
50077, makeup dump, Period 6.1, G5/52



SF7223

Figure 10.75 Antler object (SF7223). Scale 1:1

IV. ZOOLOGICAL AND BOTANICAL EVIDENCE

Mammal and Bird Bone

by Umberto Albarella, Mark Beech and Jacqui Mulville
(Plates 10.15–10.21, 10.23–10.32)

Assemblage Summary

A total assemblage of 1,829 mammal, bird and amphibian bones and teeth (NISP) was hand collected from post-medieval deposits at the Castle Mall site, with an additional 135.5 bones from Soil Riddled Samples (SRS) and 30 from Bulk Samples (BS). A further 185 NISP were identified at the Golden Ball Street site (see Curl, Part III, Chapter 6). The range of taxa recorded at Castle Mall is indicated in Table 10.43. Full details of the mammal and avian bone assemblages from both sites, including metrical and other data by species, are given in Part III, Chapter 3.

Refuse Disposal

Partial skeletons of the period are indicated in Table 10.44, although more are known from site records and photographs (e.g. the carcass of a large dog indicated in Plate 10.25). More bones than indicated in Table 10.44 presumably derive from complete, rather than butchered and dismembered skeletons. This is probably the case for many of the bones found in the barbican ditch fills (Period 6, Part III, Fig.9). A substantial number of complete horse, dog and cat bones was found in these contexts. Whilst not found in articulation it is probable that these bones derive from complete skeletons discarded in the ditch and subsequently reworked. Thus the archaeological evidence suggests that the illegal disposal of animal corpses (mainly horses) continued to be practised in spite of all prohibitions (see Chapter 10.1). Equids are rare in any period at Castle Mall, with the remarkable exception of the post-medieval period (Part III, Table 4). It is doubtful, however, that this is connected with changes in the economic system. The high number of horse bones in the late fills of the castle ditches (mainly the barbican ditch) is probably the consequence of the different disposal practises carried out in post-medieval times.



Plate 10.25 Dog skeleton 40046 of greyhound/deerhound-type found within upper fills of the barbican ditch, Area 4

<i>Taxa</i>	<i>Hand collected</i>	<i>SRS</i>	<i>BS</i>	<i>TOTAL</i>
Cattle (<i>Bos taurus</i>)	676.5	36	6	718.5
Sheep/goat (<i>Ovis/Capra</i>)	530.5	25.5	5.5	561.5
sheep (<i>Ovis aries</i>)	(135)	(1)	-	(136)
sheep?	(2)	-	-	(2)
goat (<i>Capra hircus</i>)	(1)	-	-	(1)
goat?	(2)	-	-	(2)
Pig (<i>Sus domesticus</i>)	148.5*	18.5	5.5	172.5
Equid (<i>Equus</i> sp.)	161.5	2	-	163.5
Dog (<i>Canis familiaris</i>)	82.5*	2.5	-	85
Cat (<i>Felis catus</i>)	84	4.5	-	88.5
Red deer (<i>Cervus elaphus</i>)	+	-	-	+
Fallow deer (<i>Dama dama</i>)	1	-	-	1
Hare (<i>Lepus</i> sp.)	1	0.5	-	1.5
Rabbit (<i>Oryctolagus cuniculus</i>)	16.5*	11*	3	30.5
Domestic fowl (<i>Gallus gallus</i>)	82*	21	8	111
Goose (<i>Anser anser</i>)	25	1	1	27
Duck (<i>Anas</i> sp.)	9	7	-	16
Turkey (<i>Meleagris gallopavo</i>)	1	-	-	1
Cormorant (<i>Phalacrocorax carbo</i>)	1	-	-	1
Grey partridge (<i>Perdix perdix</i>)	+	-	-	+
Woodcock (<i>Scolopax rusticola</i>)	-	1	-	1
Moorhen (<i>Gallinula chloropus</i>)	1	-	-	1
Snipe (<i>Gallinago gallinago</i>)	-	1	-	1
Black headed gull? (<i>Larus ?ridibundus</i>)	+	-	-	+
Parrot (<i>Psittacinae</i>)	2	-	-	2
Pigeon (<i>Columba</i> sp.)	1	-	-	1
Rook/Crow (<i>Corvus frugilegus/corone</i>)	1	-	-	1
Small corvid	1	-	-	1
Passeriform	-	1	-	1
Bird	3	2	-	5
Amphibian	+	1	1	2
Total	1,829	135.5	30	1,994.5

Sheep/Goat also includes the specimens identified to species. Cases where only 'non-countable' bones were present are denoted by a '+'. Pig metapodii and ruminant half distal metapodii have been divided by two, while carnivore and lagomorph metapodii have been divided by four. Due to the difficulty in distinguishing between upper and lower incisors in equids and upper and lower canines in carnivores, all have been recorded and then divided by two. All totals which include material from partial skeletons are denoted by '*': this material is described in further detail in Table 10.44.

Table 10.43 Numbers of mammal, bird and amphibian bones and teeth in Period 6 by collection category (NISP)

<i>Period</i>	<i>Area/Group</i>	<i>Context</i>	<i>Related feature</i>	<i>Collection method</i>	<i>Species</i>	<i>Notes</i>
6.1	1/87	10023	dog burial	hand	dog	10.5 bones + teeth
6.1	1/98	10521	pit 10766	hand	dog	3 bones
6.1	1/98	10850	dump	hand	dom. fowl	4 bones
6.2	1/103	10095	pit 10463	SRS sieve	rabbit	6 bones
6.2	9/41	91387	barbican ditch 91295	hand	pig	3 bones

The number of bones and teeth given is the number of countable specimens from each skeleton

Table 10.44 Summary of partial animal skeletons found within Period 6 features

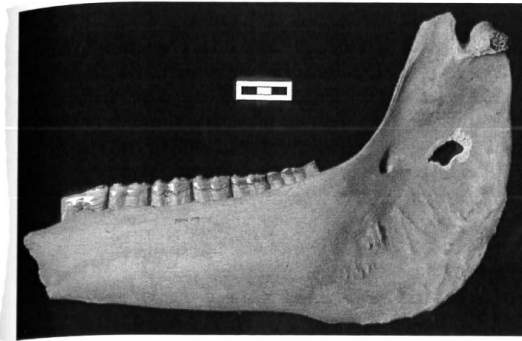


Plate 10.26 Horse mandible, bit wear from mid 17th-century barbican ditch fill 92776 (Period 6.2)

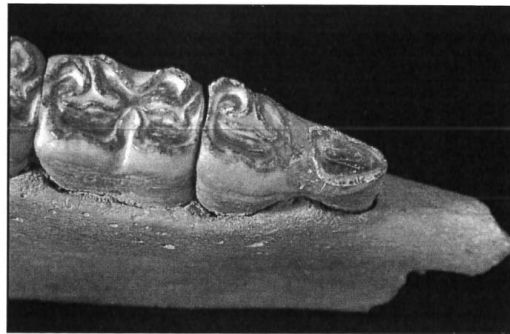


Plate 10.27 Horse mandible, bit wear from mid 17th-century barbican ditch fill 92776 (Period 6.2)

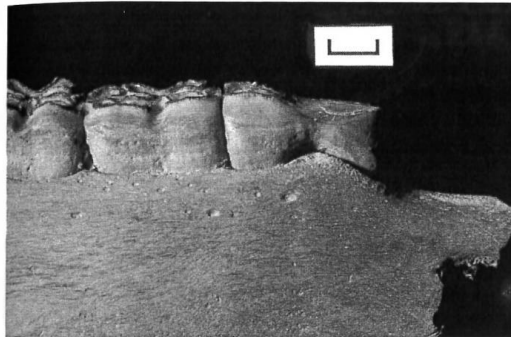


Plate 10.28 Horse mandible, bit wear from mid 17th-century barbican ditch fill 92776 (Period 6.2)



Plate 10.29 Horse mandible, bit wear from mid 17th-century barbican ditch fill 92776 (Period 6.2)



Plate 10.30 Dog skull, poodle-like



Plate 10.31 Dog skull, terrier-like

Most interesting was the presence of a peculiar pattern of wear on the anterior part of a second premolar in a post-medieval mandible from the barbican ditch (Plates 10.26–10.29) which, as is fully argued in Part III, may be attributable to bit wear.

Craft Waste

Evidence for bone, antler, horn and ivory working during the post-medieval period is detailed in Chapter 10.III.

For comments on skinning and butchery practices of the period, see Part III.

Dogs

A notable number of dog burials were recorded in this period and the bones recovered are notably different from those of earlier periods. A similar quantity of cats was also found. The dog skeletons include at least two deliberate interments, one at the top of the Castle Mound



Plate 10.32 Parrot coracoid and carpometacarpus from mid to late 17th-century fills of pit 80188, Open Area 39, ?Property (b) (Period 6.2)

associated with a group of 17th-century prison burials (Cemetery 5, Period 6.2) and the other with tenements in the southern part of the site (sk.10023, Period 6.1, noted in Table 10.44). Most dog bones of Period 6 belong to very small animals, although there are a few medium, large and very large specimens also present (Part III, Fig.42). The shape of the complete skulls found in Period 6 also confirms the wide variety of dog types. Comparison of these skulls with those in the reference collection of the Ancient Monuments Laboratory (London) indicates that one small rounded skull (Plate 10.30) was very similar to a poodle, whereas another small skull was similar to a beagle. A small-medium size skull was remarkably similar to a terrier (Plate 10.31) whilst a larger specimen resembled a robust version of a Labrador.

Foreign Contacts

The most unusual finds from the Castle Mall assemblage were two parrot bones (Plate 10.32), which probably belong to the same individual. Parrot bones have never been found before on an archaeological site in England. The Norwich Castle bones derive from the fills of a pit dated to the mid-late 17th century (pit 80188, Period 6.2). No other exotic finds were found in this pit, although seeds of pumpkin, a fruit of American origin, were found in a nearby pit of the same date (Murphy, below). Despite careful analysis of the bird bone collec-

tion of the Natural History Museum in Tring, it has not been possible to identify these bones to species or even genus level. These bones belong to a middle-large sized parrot, of about the same dimensions as an African grey parrot (*Psittacus*). Parrots are tropical and sub-tropical birds with some 200 species found on four continents (see further discussion in Part III). Although its place of origin remains unknown, the parrot demonstrates a connection between Norwich and exotic countries. The 17th century was certainly a period of intense travelling and trade and the fact that valuable exotic goods arrived in Norwich suggests that the city had not lost its importance as a centre of exchange and market. The presence of turkey bones from both Period 5 and Period 6 indicates that the species reached Norwich soon after their first recorded presence in England in 1541.

Diet, Economy and the Agricultural Revolution

One of the major contributions of the Castle Mall faunal research project is its contribution to the debate on changes in livestock (including the introduction of new breeds), diet and the economy during the post-medieval period. These are fully detailed in Part III, Chapter 3, with a summary presented in Chapter 13.

Fish Bone

by Alison Locker

Post-medieval deposits at Castle Mall produced a comparatively small fish assemblage mostly from Period 6.1 (late 16th century), with most of the hand collected and bulk sieved fish coming from this phase. The site riddled fish were of approximately the same number (40) from all three sub-periods. Twenty-one taxa were identified, the absence of those species commonly present but in low numbers was notable. Sea breams, gurnards, wrasse, grey mullets were among those missing. Table 10.45 shows the number of fish identified for the whole period.

The Bulk Sieved fish were 67.3% of all fish retrieved, Hand Collected 15.4% and Site Riddled 17.1%. By percentage of bony fishes in the BS material herring was 49.1%, cod and large gadid are 19.6%, eel 9.7%, whiting 3.3%, haddock and ling both 0.6%. The small flatfishes (plaice/founder and sole) are higher than earlier periods at 11.6%, while mackerel, which has featured consistently, though in small numbers, is at the higher end of its range at 1.5%

By 'portion' cod has increased from Period 5 to 77%, herring is 19%, whiting 3%, haddock and ling are 1%. This shows an increase of cod as the dominant food fish in this period as represented by these deposits. The size range of cod was between 65 to 125cm in length, but the sample was small (8) with 6 between 85 and 105cm.

Freshwater fish were few. Only tench is exclusively found in freshwater, eel, salmon and smelt migrate between fresh and salt water as part of their life cycles.

The barbican ditch produced a large quantity of mammal bones but few fish. These have been discussed in the full report (Part III), but Albarella has commented on the complete skeletons found in this feature and the lack of fish may reflect a different type of disposal, not typically household waste.

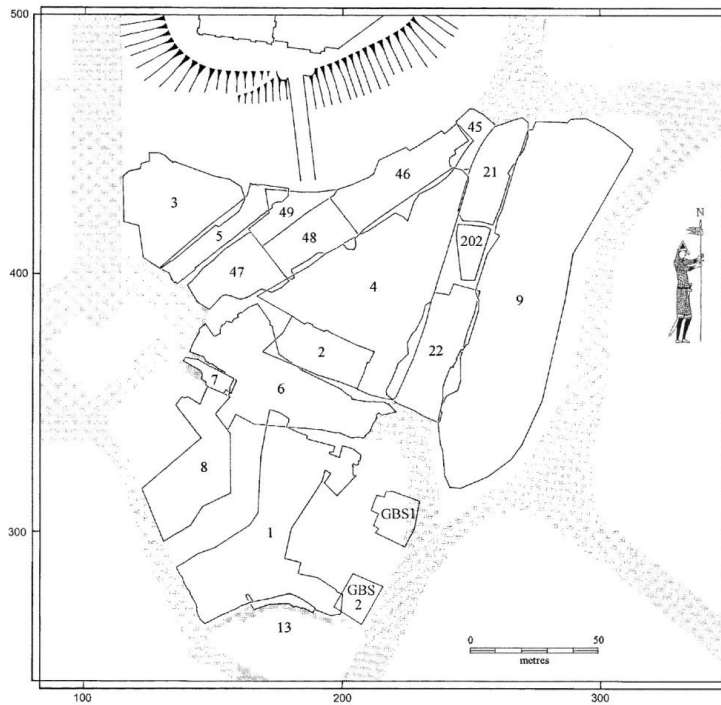


Figure 13.1 Location of excavation areas at Castle Mall and Golden Ball Street. Scale 1:2000

Mammal and Bird Bone at Castle Mall

by Umberto Albarella, Mark Beech and Jacqui Mulville (Figs 13.3–13.5 and Part III, Figs 4–9 on CD)

Summary

The large assemblage (800kg) of mammal and bird bone recovered from the Castle Mall site, detailed in Part III, Chapter 3, has been divided into six main periods that range in date from the late 9th or 10th to the 18th centuries AD (Late Saxon to post-medieval; see Chapter 1.IV for further definition). The assemblage is dominated by the major domesticates, such as cattle, sheep, pig and domestic fowl. Beef was consistently the main meat consumed, with pork making an important contribution to the diet in the early periods and mutton in the later periods. Meat supply derived from three main sources: some animals were bred on site, others were brought to the site on the hoof while pieces of dressed carcasses were purchased from the market. The local breeding of cattle and sheep may have died out in post-medieval times, whereas pigs continued to be reared within the city. The practice of intramural stock rearing confirms that open areas remained available, Norwich providing a mixture of rural and urban environments.

While the majority of remains represent butchery and kitchen refuse, many are also associated with craft and industrial activities such as bone-, horn-, antler- and leatherworking (see 'Occupations, Craft, Industry and Trade' below). Taken as a whole the bones indicate a variability in the quality of diet which is typical of urban sites. No evidence of high status faunal remains was found in Periods 2 and 3 when the castle was most active as a royal residence. The bones do not, therefore, appear

to represent the remains of banquets, royal or otherwise. The presence of two parrot bones in a 17th-century context points to the existence of trade with distant countries.

An increase in animal size and morphological changes are found in the post-medieval and, in some cases, the late medieval levels. These changes are related to the agricultural revolution and indicate the presence of improved breeds. A difference in the kill-off patterns in later periods attests to a change in use. Cattle, which had mainly been used for traction throughout the Middle Ages, became more important for meat production. Sheep remained extremely important for their wool, but their size increase after the 16th century suggests also an emphasis on mutton production. There is a particularly early increase in the size of domestic fowl which represents an original contribution that the Castle Mall assemblage can provide to the debate on the beginning of the agricultural revolution.

Species Present

Table 13.1 indicates the range of species present in all periods at Castle Mall, excluding the large assemblage from the barbican well (see Moreno García below). Part III, Chapter 3 contains discussions of analytical methodology and recovery biases, as well as species-specific details of anatomical distribution, ageing data, considerations of animal size, shape and sex, non-metric traits, abnormalities and pathologies, butchery practices and boneworking.

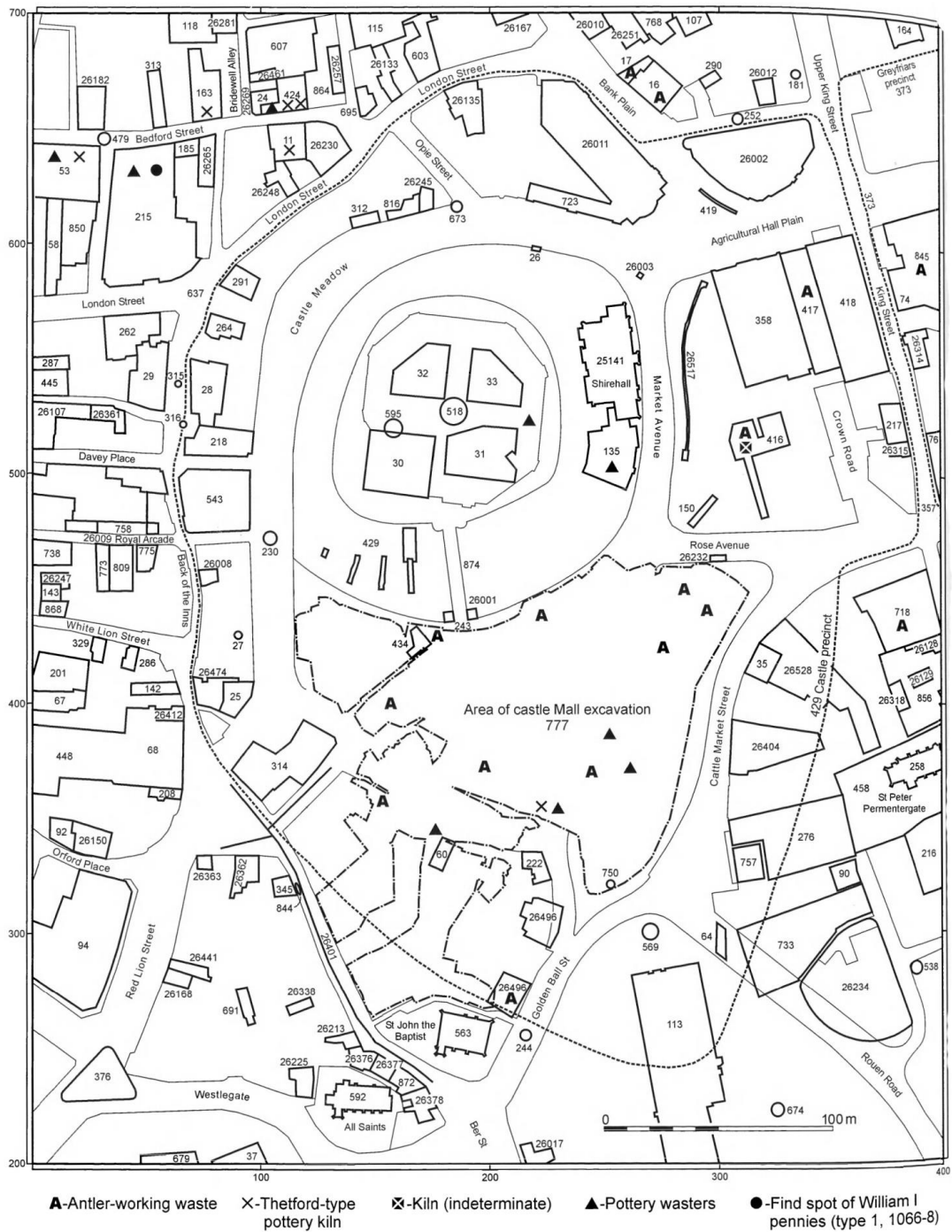


Figure 13.2 Location of previous excavations in the Norwich Castle area, showing position of Thetford-type war kilns and waste (see also Fig. 13.10) and other relevant find spots. Scale 1:2500

The Occurrence and Relative Importance of Different Species Over Time

As noted above, the Castle Mall animal bone assemblage, like those from most other medieval sites in Britain, is

dominated in all periods by the main domestic livestock — cattle, sheep, pig and domestic fowl. However, a variety of other mammals and birds was also found at the site (Table 13.1 and Part III, Tables 3–6). Some of these

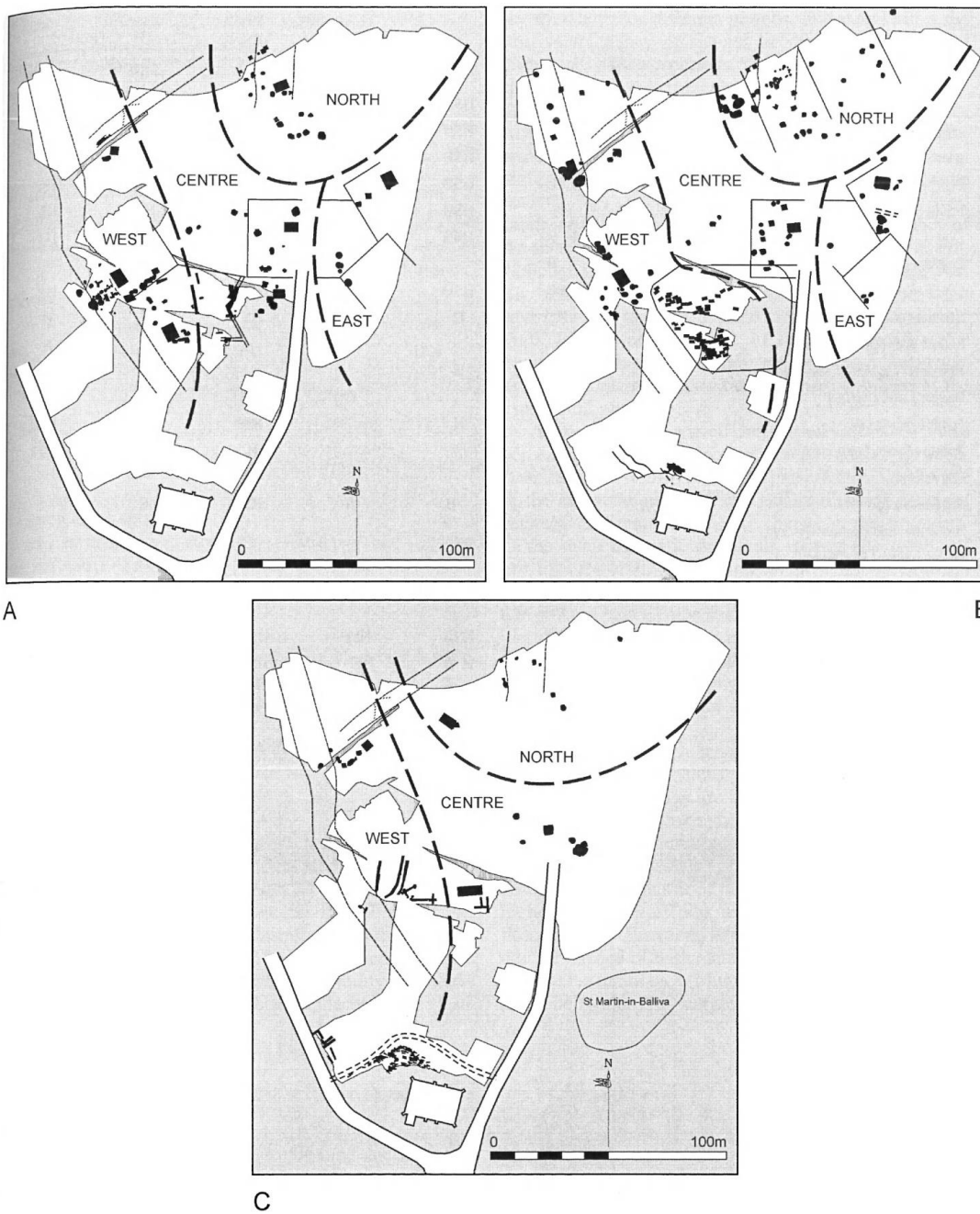


Figure 13.3 Spatial distributions used for analysis of animal bones in Period 1. A = 1.2 (10th to early 11th century); B = Period 1.3 (11th century); C. Period 1.4 (mid to late 11th century). Scale 1:2500

taxa may not have an anthropogenic origin, and certainly not all of them represent food animals. Nevertheless, it is obvious that most of the animals were associated with people and certainly the bulk of the bones originate from animals which were eaten.

Comparison between different periods

Although there are problems in combining information from different areas and types of context an attempt to compare the frequency of the main mammals and birds between different periods was undertaken. Only a few contexts clearly contained bone deposits which were different from the usual mixture of butchery, food and

Taxa	Period					
	1	2	3	4	5	6
Cattle (<i>Bos taurus</i>)	HSB	HSB	HSB	HSB	HSB	HSB
Sheep/goat (<i>Ovis/Capra</i>)	HSB	HSB	HSB	HSB	HSB	HSB
sheep (<i>Ovis aries</i>)	HSB	HSB	HSB	HSB	HSB	HSB
goat (<i>Capra hircus</i>)	H	HSB	H		H	H
Pig (<i>Sus domesticus</i>)	HSB	HSB	HSB	HSB	HSB	HSB
Equid (<i>Equus</i> sp.)	HS	HSB	HS	H	H	HS
Dog (<i>Canis familiaris</i>)	H B	HSB	HS	HS	HS	HS
Dog/fox (<i>Canis/Vulpes</i>)	B					
Cat (<i>Felis catus</i>)	HSB	HSB	HSB	HSB	HSB	HS
Red deer (<i>Cervus elaphus</i>)	H	H	H	HS	H	H
Fallow deer (<i>Dama dama</i>)	H		H			H
Roe deer (<i>Capreolus capreolus</i>)	H	H				
Badger (<i>Meles meles</i>)			B			
Hare (<i>Lepus</i> sp.)	SB	H		HS	HS	HS
Rabbit (<i>Oryctolagus cuniculus</i>)	H			H	HSB	HSB
Lagomorph				H		
Rat (<i>Rattus</i> sp.)		B	S	HS	S	
Rat/water vole (<i>Rattus/Arvicola</i>)	H					
House mouse (<i>Mus musculus</i>)			B			
House/wood mouse (<i>Apodemus/Mus</i>)	B	B		B	B	
Field vole (<i>Microtus arvalis</i>)	B					
Domestic fowl (<i>Gallus gallus</i>)	HSB	HSB	HSB	HSB	HSB	HSB
Goose (<i>Anser anser</i>)	HSB	H B	H	HSB	HSB	HSB
Duck (<i>Anas</i> sp.)	H B	HS	H	HSB	HSB	HS
Turkey (<i>Meleagris gallopavo</i>)					H	H
Little Grebe (<i>tachybaptus ruficollis</i>)					H	
Cormorant (<i>Phalacrocorax carbo</i>)						H
Grey heron? (<i>Ardea ?cinerea</i>)		H				
Swan (<i>Cygnus</i> sp.)		H			H	
Teal/Garganey (<i>Anas crecca/querquedula</i>)		S	B	H		
Pochard/Tufted duck (<i>Aythya ferina/fuligula</i>)					H	
Buzzard (<i>Buteo buteo</i>)	B					
Goshawk (<i>Accipiter gentilis</i>)	H					
Grey partridge (<i>Perdix perdix</i>)				H	B	H
Coot (<i>Fulica atra</i>)					HS	
Moorhen (<i>Gallinula chloropus</i>)						H
Woodcock (<i>Scolopax rusticola</i>)						S
Curlew (<i>Numenius arquata</i>)				S		
Snipe (<i>Gallinago gallinago</i>)						S
Crane? (<i>?Grus grus</i>)					H	
Small wader		B				
?Black headed gull (<i>Larus ?ridibundus</i>)						H
Pigeon (<i>Columba</i> sp.)	H	HS			S	H
Parrot (<i>Psittacinae</i>)						H
Rook/Crow (<i>Corvus frugilegus/corone</i>)					H	H
Small corvid	H		S	H		H
Turdid		SB				
Passeriform			H			S
Bird	B				H	HS
Amphibian	HSB	H B			SB	HSB
(Toad (<i>Bufo bufo</i>))	B					

Taxa present in hand-collected material are denoted as 'H', that in Site Riddled Samples as 'S' and sieved material from Bulk Samples as 'B'.

Table 13.1 Presence of mammal, bird and amphibian taxa in all levels at Castle Mall

Period	Element	Cattle % MNI	Sheep/Goat % MNI	Pig % MNI
Period 1	incisors	4%	4%	8%
	<i>astragalus</i>	20%	9%	8%
Period 2 and 3	incisors	4%	7%	7%
	<i>astragalus</i>	24%	3%	7%
Period 4	incisors	6%	3%	15%
	<i>astragalus</i>	25%	10%	-*
Period 5	incisors	5%	2%	14%
	<i>astragalus</i>	9%	7%**	5%
Period 6	incisors	3%	1%	5%
	<i>astragalus</i>	14%	6%	6%
Pits (all periods)	incisors	5%	2%	11%
	<i>astragalus</i>	17%	6%**	10%
Ditches (all periods)	incisors	4%	1%	7%
	<i>astragalus</i>	17%	11%	-***

% MNI is calculated as follows:

incisors: [MNI of incisors/ (MNI incisors + MNI premolars + MNI 1st and 2nd molars + MNI 3rd molar)] x 100

astragalus: [MNI astragalus/ (MNI femur + MNI tibia + MNI astragalus + MNI calcaneus + MNI metatarsi)] x 100.

* – not calculated due to small sample size

** – a 'special' group with many sheep metatarsi has been excluded from this count

*** – no pig astragali out of 37 hind-limb bones

Table 13.2 Percentages of small elements in different periods at Castle Mall

working refuse found in most urban medieval sites. Only one of these 'special' assemblages — a pit full of sheep horncores, metapodia and phalanges from Period 5 — was large enough to severely bias the analysis of taxon frequency, and it was excluded from this comparison.

Another consideration was the possibility that variation in the recovery rate of hand-collected bones had

occurred between different periods. This could affect the relative frequency of species and thus create artificial differences between periods. The problem was tackled by calculating the relative number of small elements (incisors and astragali) within each period (Table 13.2, left). Although the small elements were heavily underrepresented no major changes could be noted between different periods. Thus it can be assumed that roughly the same recovery bias affects the hand-collected assemblage in all periods and that no large differences in the frequency of the species due to differential recovery occur as a result. Although not the most numerically frequent species (Part III, Tables 8 and 9), cattle, due to their large size, must have provided the bulk of meat in most periods at Castle Mall. Whilst the frequency of cattle remained stable throughout the Castle Mall chronological sequence, in the later periods sheep became more common at the expense of pig.

Although many varied factors are affecting these percentages, they still demonstrate an interesting trend. Despite possible differences in preservation, in the use of the archaeological features and in disposal practices between different periods, the change in the frequency of the main domestic mammals reflects the results of previous research. Several authors have noted a country-wide trend (e.g. Grant 1988; Albarella and Davis 1996) for a high frequency of pigs in early medieval periods and an increase in the importance of sheep, probably connected to the rise of the wool industry, in the late Middle Ages. A decline in the number of pigs in late medieval times has been identified in another area of Norwich, Fishergate (G. Jones 1994).

The presence of a large number of pig bones has been linked to high status sites (Grant 1988, Albarella and Davis 1996). Pigs are typically 'meat animals' and are thus expected to be more common on sites with a higher meat consumption. Periods 2 and 3 at Castle Mall are those associated with the most active period of castle life, and thus it is possible to speculate that the higher frequency of pigs in these periods is an indication of status. However, as will be discussed below, no other evidence of high status, either from the animal or the plant assemblages (Murphy, 'Plant Remains' below), could be found. This suggests rather that the decrease in

Hand-collected bones and teeth

	Period 1.2–1.3		Period 1.4		Total	
	n	%	n	%	n	%
Cattle	421	57	119.5	37	540.5	51
Sheep / Goat	150	20	86	27	236	22
Pig	162	22	114.5	36	276.5	26
Total	733		320		1,053	

SRS and BS bones and teeth

	Period 1.2–1.3		Period 1.4		Total	
	n	%	n	%	n	%
Cattle	70.5	35	8		78.5	33
Sheep / Goat	48	24	17		65	27
Pig	83	41	14.5		97.5	40
Total	201.5		39.5		241	

Table 13.3 Period 1 — numbers and percentages (NISP) of the main taxa in pre-Conquest (Period 1.2 and 1.3) and pre/post-Conquest contexts (Period 1.4) at Castle Mall

	Period 1			Period 2			Period 3			Period 4			Period 5			Period 6								
	Ditch	Pit	%	Ditch	Pit	%	Ditch	Pit	%	Ditch	Pit	%	Ditch	Pit	%	Ditch	Pit	%						
Cattle	14	45	448	37	124	38	144	35	33	39	16	53	116	37	32	27	17	49	277	28	254	36	234	37
Sheep/Goat	10	32	185*	15	59	18	62	15	18	21	9	30	96	31	21	18	6	17	439	45	184	26	226	35
Pig	4	13	258*	21	35	11	88	22	21	25	3	10	29	9	19	16	4	11	105*	11	65*	9	66	10
Equid	2	7	35*	3	10	3	14	3	3	4	-	0	2	1	4	3	-	0	2	<1	111	16	13	2
Dog + Cat	1	3	129*	11	75*	23	52*	13	9	11	2	7	27*	9	8	7	3	9	53*	5	100	14	34*	5
Domestic fowl	-	0	166*	14	21	7	47	12	1	1	-	0	44	14	33*	28	5	14	98*	10	1	<1	64	10
Total	31	1,221	407	324	324	85	30	117	314	35	974	715	637											

Corrections for the number of metapodia (see Part 3, Table 44) have not been carried out for this table. Only hand-collected material is included.

* These figures include bones from partial skeletons (see Table 13.5 for details).

Table 13.4 Frequencies of main taxa (NISP) in ditch and pit fills at Castle Mall

<i>Period</i>	<i>Area/ Group</i>	<i>Context</i>	<i>Related feature</i>	<i>Collection method</i>	<i>Species</i>	<i>Notes</i>
1.2	9/109	90469	pit 90504	BS sieve	cat	16.5 bones
1.2	9/109	90398	pit 90504	hand	dom. fowl	12 bones
1.2	9/109	90366	pit 90389	hand	pig	3 bones
1.2	22/138	22023	pit 22015	hand	goat	10 bones + teeth
1.2	22/145	22110	pit 22111	hand	cat	13 bones + teeth
1.3	9/109	90354	pit 90516	hand	horse (juvenile)	10 bones
1.3	9/109	90354	pit 90516	SRS sieve	cat	4.5 bones
1.3	9/109	90491	pit 90516	hand	goshawk	4 bones
1.3	9/109	90501	pit 90516	hand	dog	13.5 bones
1.3	9/109	90506	pit 90516	hand	horse (juvenile)	6 bones
1.3	9/109	90506	pit 90516	hand	cat	18 bones + teeth
1.4	9/63	90227	pit 90292	hand	dog	5 bones
1.4	2/11	40002	pit 40003	BS sieve	dom. fowl	5 bones
1.4	2/11	40047	pit 40003	hand	pig	13 bones
2.1	2/5	20168	pit 20167	hand	cat	15 bones
2.1	2/7	40319	pit 40320	hand	dog	16.5 bones + teeth
2.1	5/47	49192	pit 49193	hand	cat	25 bones
2.2	2/2	20152	ditch 20129	hand	dog	14 bones
2.2	2/2	20163	ditch 20129	hand	dog	17.5 bones
2.2	2/4	40185	ditch 40285	hand	cat	5 bones
4.1	8/16	80268	ditch 80301	hand	cat	4.5 bones
4.2	2/28	40416	ditch 40928	SRS sieve	cat	8 bones
4.2	8/28	80112	pit 80113	hand	dom. fowl	7 bones
4.2	45/1	45183	pit 45196	hand	dom. fowl	13 bones
4.2	45/1	45183	pit 45196	hand	small corvid	11 bones
5.1	1/97	10976	pit 10899	hand	cat	20 bones
5.1	1/97	10976	pit 10899	BS sieve	cat	4.5 bones
5.1	9/61	90765	pit 90766	hand	dom. fowl	10 bones
5.2	9/73	90171	pit 90261	hand	pig	6 bones
5.2	9/94	92716	pit 92715	hand	dog	5 bones
6.1	1/87	10023	dog burial	hand	dog	10.5 bones + teeth
6.1	1/98	10521	pit 10766	hand	dog	3 bones
6.1	1/98	10850	dump	hand	dom. fowl	4 bones
6.2	1/103	10095	pit 10463	SRS sieve	rabbit	6 bones
6.2	9/41	91387	barbican ditch 91295	hand	pig	3 bones

The number of bones and teeth given in the notes are the number of countable specimens from each skeleton (see also Part 3, Tables 2–4).

Table 13.5 Catalogue of partial skeletons found within all periods at Castle Mall

the number of pig bones in later periods is a consequence of a genuine change in the animal economy noted at a countrywide level. This question is discussed further in the section ‘Comparison with Other Sites’.

A substantial increase in the number of pigs was noted in the later part of Period 1 (Period 1.4, Table 13.3), namely in the immediately pre-Conquest or early post-Conquest period. This again could be interpreted as a consequence of the high status that the site acquired with the erection of the castle, but it is more probably due to some change in animal exploitation or in the use of the site which was brought about by the arrival of the Normans (although see further comments in ‘Comparisons with Other Sites’ below).

Another expected trend is a decrease in cattle, relative to horse, in late medieval and post-medieval times (Albarella and Davis 1994). In Norfolk in particular, horses increased in importance very early, already during the Middle Ages (Langdon 1986). Equids are rare in any period at Castle Mall with the remarkable exception of the post-medieval Period 6 (Part III, Table 4). However, it is doubtful that this is connected with changes in the economic system. The high number of horse bones in the late fills of the castle ditches (mainly the barbican ditch) is probably the consequence of the different disposal practices carried out in post-medieval times. Historical evidence of the illegal disposal of horse skeletons in the castle ditches is abundant (*e.g.* see Tillyard, Chapters 8.I and 10.I). Horses are typical farm animals and are

generally not common in urban sites: they were used in towns, but they were generally bred or slaughtered elsewhere. Very low frequencies of horse bones have also been noted for the other Norwich sites of Alms Lane (Cartledge 1985), St Martin-at-Palace Plain (Cartledge 1987) and Fishergate (G. Jones 1994).

Among the main domestic birds, domestic fowl represents by far the most common species, with goose relatively common and duck only occasionally present. A slight increase in the importance of goose was noted after Saxon times: a possible consequence of minor cultural and economic changes. Slightly higher percentages of goose bones have been found in the 10th–12th-century levels at Fishergate (Norwich) (G. Jones 1994) and Thetford (G. Jones 1993), although this may only reflect differences in the efficiency of recovery.

Spatial analysis

Bone assemblages within each period have so far been considered as single units. However, the possibility must be considered that variation occurs between different areas of the site and types of context. This analysis is aimed at the identification of possible differences and similarities in use of the site in different areas and to assess to what extent these affect the frequency of the species in different periods.

Due to the nature of the archaeological evidence the analysis of lateral variation in animal bone distribution in terms of a comparison between different 'activity areas' could only be undertaken for Period 1 (Fig.13.3). (See Chapter 4.IV for a general comparison of these areas and Albarella *et al.*, Chapter 4.III for the distribution of horncores and antlers. The frequency of the main domestic taxa is presented for each area in Fig.4.109.) For other periods the comparison was limited to the study of the contrast between the contents of pit and ditch fills.

Although bones were recovered from floors, external layers and other contexts, the majority of the Castle Mall animal bones derive from pit and ditch fills (Table 13.4). The assemblages from Periods 2, 3, 4 and 6 are more or less evenly distributed between these two types of context, whereas bones from Periods 1 and 5 derive almost entirely from pits, with the exception of the small groups from the Late Saxon buildings. Differences between the distribution of bone in ditches and pits have been noted by several authors (Maltby 1982; Coy 1983; Wilson 1994). Wilson (1994) also suggested that ditches have a tendency to contain higher frequencies of the bones of larger animals (cattle and horses). If the small, and possibly misleading, assemblages are ignored this tendency is confirmed at Castle Mall (Table 13.4). Although the difference is not striking, cattle bones are regularly relatively scarcer in pit fills. The figure for Period 6 must be carefully considered as the percentages are affected by the high number of equid and carnivore bones presumably derived from complete bodies discarded in the barbican ditch.

The main difference between ditch and pit fills is the larger number of domestic fowl bones in the latter contexts. This is particularly evident for Period 6. The large number of chicken bones in pit fills can be associated with the possibly more 'domestic' nature of these features and with the fact that their small bones are more easily tolerated in the vicinity of domestic activities. No major differences in the recovery rate could be noted between ditch and pit fills.

Variation in the frequency of taxa between different types of contexts thus occurs but is not particularly striking and does not severely affect the interpretation of differences between periods. However a slight under-representation of cattle in Periods 1 and 5, which are found mainly in pit contexts, must be taken into account. The hypothesis that the higher number of bird bones in Period 4 is due to a genuine change in diet/economy rather than the nature of the excavated deposits (Table 13.4 above) is confirmed.

A high concentration of partial skeletons was found in a series of pits in the eastern part of the settlement in the 11th century (Open Area 8, G9/109, Periods 1.2–1.3, Figs 4.22 and 4.43 and Part III, Fig.4 on CD, Table 13.5) suggesting that in Late Saxon times these pits were used to dispose of dead bodies. The contexts then remained undisturbed, as indicated by the presence of bones in articulation. More bones than indicated in Table 13.5 presumably derive from complete, rather than butchered and dismembered skeletons. This is probably the case for many of the bones found in the barbican ditch fills (Period 6, Part III, Fig.9 on CD). A substantial number of complete horse, dog and cat bones was found in these contexts (*e.g.* Plate 10.25). Whilst most were not found in articulation it is probable that they derive from complete skeletons discarded in the ditch and subsequently reworked. Thus the archaeological evidence suggests that illegal disposal of animal corpses (mainly horses) continued in spite of all prohibitions (Tillyard, Chapter 10.I).

Comparison with the barbican well assemblage

A comparison of the barbican well assemblage with the faunal assemblage from the remainder of the Castle Mall site is given in Chapter 8.IV.

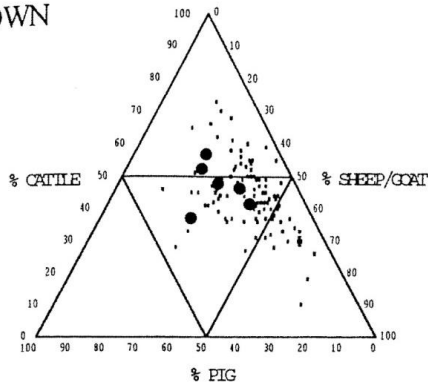
Comparison with other sites

The comparison of the frequency of species between different sites is one of the most difficult tasks in zooarchaeology (King 1978; Payne 1985; Albarella 1995). Differences in butchery patterns, waste disposal, preservation, excavation strategies (especially recovery) and quantification methods can severely affect the frequency of taxa and therefore the interpretation of variation between sites.

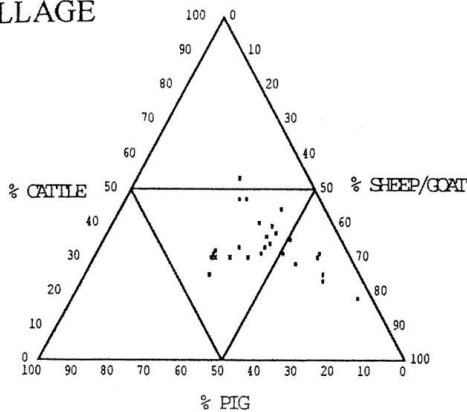
Two possible approaches can be adopted. One possibility is to compare two assemblages, trying to take into consideration all possible biases which may have affected the frequency of species at the two sites. Once this 'background noise' has been eliminated differences and similarities are interpreted on the basis of environmental and economic factors. This is the approach that has been adopted in the comparison of the barbican well with the rest of the site (see Chapter 9.IV).

The other approach is to examine a large number of assemblages, without exploring in detail all the variables which can affect the frequency of species in each assemblage. It is then possible to observe whether, despite all biases, general trends can still be detected. This approach has successfully been undertaken by King (1978 and 1984) who analysed a large number of Roman sites and succeeded in identifying patterns of regional variation within Europe. More recently Albarella and Davis (1994 and 1996) have applied a similar method to medieval and post-medieval England. By considering a large number of sites from across the country some of the trends initially

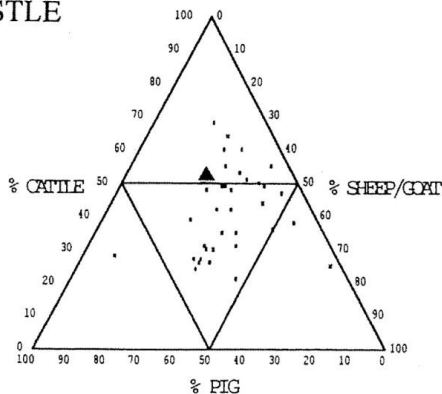
TOWN



VILLAGE



CASTLE



Town: ● = Castle Mall, Periods 1.4, 1.1-3, 3, 4, 5 and 6 (left to right)
 Castle: ▲ = Castle Mall, Period 2

The inner triangle assists the reading of percentages in the appropriate direction, e.g. the left outer triangle on the pig axis represents greater than 50% (as does the top triangle on the cattle axis and the bottom right triangle on the sheep/goat axis). Points located within the innermost triangle indicate sites where none of the three major species form more than 50% of the total

Figure 13.4 Comparison of town, village and castle zooarchaeological assemblages in England

suggested by Grant (1988), such as the higher number of pig bones in early medieval and high status sites, were confirmed. Naturally many exceptions to these general trends occur; this method therefore cannot be used to determine the status or the cultural context of an individual site.

The latter approach has been used to compare Castle Mall with other contemporary sites in England. The list of sites taken into account can be found in Part III, Table 14 and includes a larger number of sites than originally used by Albarella and Davis (1996). In particular Saxon sites and important sites in the same geographic area as Norwich and within the city itself have been added. The list is far from complete, but the majority of the main Saxon to post-medieval sites have been incorporated. The sites have been divided on the basis of their type of settlement (Fig.13.4): towns, villages and castle. This division is very approximate, as the status of a site is not always clear, urban castles occur (Castle Mall is an example), monastic sites and manor houses are not easily assigned to one of these categories, *etc.* However, the aim, as stated above, is only the identifications of broad trends. Castle Mall has been considered as a 'town' in Periods 1, 3, 4, 5, and 6 and a 'castle' in Period 2, when the excavated features are more closely associated with the castle.

The Castle Mall assemblage is located within the main cluster of urban sites, which tend to be characterised by a high frequency of cattle (in most cases above 40%) and a relatively small number of pig bones. An exception is Period 1.4, which stands out as having a higher percentage of pig (Fig.13.4). In general there is a higher variability in castle sites, but even though many exceptions occur they tend to have a larger number of pigs. This is not evident at first sight, but if a line is drawn separating sites with more than 20% pig from the others, this group would contain 49% of the castles, 32% of the villages and only 16% of the towns. With its 25% pigs, Castle Mall Period 2 is within the >20% pig category. It is not until Period 4 that the pig frequency at Castle Mall drops below 20%. This suggests that the relatively high percentage of pigs in the early phases is not a consequence of status, but is a feature of the early medieval economy.

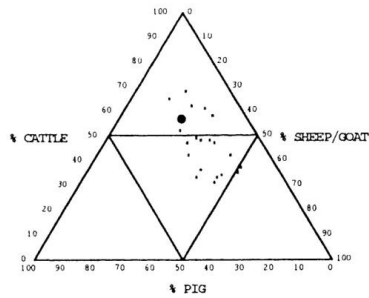
This can be better illustrated by dividing the assemblages by chronological period (Fig.13.5). The frequencies of sites with more than 20% pigs are distributed as follows: Saxon 38%, early medieval 38%, middle medieval 33%, late medieval 26% and post-medieval 8%. For sheep the frequency of sites with more than 40% of this species is: Saxon 29%, early medieval 28%, middle medieval 38%, late medieval 43% and post-medieval 62%. The steady decrease of pig and increase of sheep are countrywide phenomena and the Castle Mall assemblage — apart from the unusual Period 1.4 (see above) — lies well within the main distribution of sites for each period.

Environment and Economy at Castle Mall: the Evidence of the Animal Bones

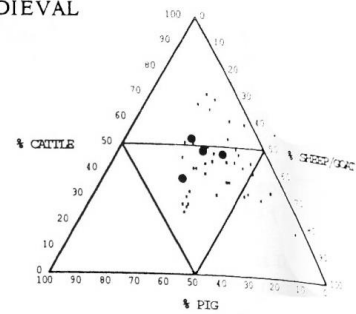
Food Provision

One of the most interesting findings from the Castle Mall animal bones was the evidence of on-site breeding. The

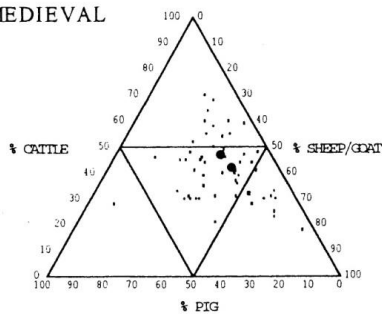
SAXON



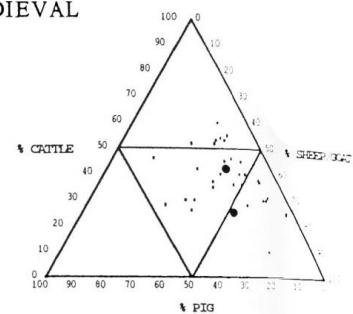
EARLY MEDIEVAL



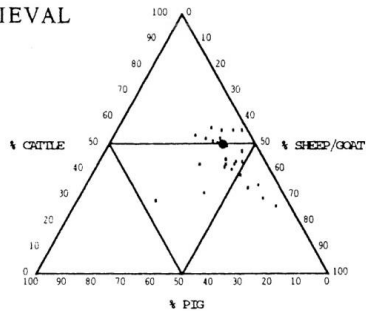
MIDDLE MEDIEVAL



LATE MEDIEVAL



POST MEDIEVAL



The inner triangle assists the reading of percentages in the appropriate direction. *e.g.* the left outer triangle on the pig axis represents greater than 50% (as does the top triangle on the cattle axis and the bottom right triangle on the sheep/goat axis). Points located within the innermost triangle indicate sites where none of the three major species form more than 50% of the species total.

Points marked by large circles indicate various phases belonging to Castle Mall: Saxon (Periods 1.1-1.3); early medieval (Periods 1.4, 2 and 3) (from left to right); middle medieval (Periods 4 and 5); late medieval (Period 5) and the barbican well (from top to bottom); post-medieval (Period 6).

Figure 13.5 Comparison of Late Saxon, early, middle and late medieval and post-medieval zooarchaeological assemblages in England

main evidence for this is the presence of neonatal bones of the main domestic animals: cattle, sheep, pig, horse and domestic fowl. These bones are not very abundant, but this is likely to be a result of their small size and fragility which cause poor preservation and recovery. Neonatal cattle and sheep bones are more common in early periods, whereas newborn pig bones were more commonly found in Periods 5 and 6.

Stock breeding within the town may be unexpected, as towns are primarily considered to be consumer sites. In fact animals were reared in the area of Castle Mall confirming other evidence that the town was not fully urbanised until at least post-medieval times (much of the excavated area forming the castle baileys from the Norman period onwards). These rural areas within the walls were

probably used as pasture rather than cultivated land. as the evidence from the plant remains suggests that 'most grains were imported to the site as semi-cleaned prime product at all periods' (Murphy, 'Plant Remains' below). The absence of local agriculture is also suggested by the presence of large numbers of latrine pit assemblages, these indicate that there was no need to use human sewage locally as manure or 'night soil' (Murphy, 'Plant Remains' below).

The scarcity of cattle and sheep neonatal bones in post-medieval times implies that breeding of these animals in the town gradually died out, or became much reduced. This is consistent with the growth of the Norwich population and the increasing urbanisation of the castle surroundings. However, pig breeding continued. This is

not surprising as pigs need much less space and could be raised in house courtyards and fed with household food scraps (see also Hudson and Tingey 1910, 205–206 and Moreno García, Part III, Chapter 4).

The evidence from Castle Mall contrasts with that found in other Late Saxon and early medieval towns, such as Southampton (Bourdillon 1994) and York (O'Connor 1994). In these sites the presence of all skeletal parts of the livestock body, combined with the absence of neonatal bones, was taken as evidence that animals were imported to the site on the hoof. In other words, the breeding of animals took place elsewhere but the slaughtering and primary butchery occurred in town. Can it therefore be suggested that Norwich had more open areas and was less urbanised than Southampton and York? This does not seem probable. It is more likely that these differences are due to assemblages coming from different areas of the town. There probably were areas in Southampton and York where stock rearing occurred. It is also possible that Norwich in Late Saxon times still had a rather rural aspect. In the subsequent medieval period the presence of the castle and its earthworks contributed to the fact that much of the area was not developed and retained 'open land' characteristics suitable for animal pasturing (see Parts I and II). The north-east bailey in particular (the Castle Meadow) continued in use as rough pasture. Full details of the use of the castle baileys for animal grazing (e.g. the trampling of herbivores attested by micromorphology; see MacPhail, Part I) and the various phases of the post-medieval and later Cattle Market are given throughout Parts I and II of this report.

The town and the castle were probably only partly supplied with products derived from local breeding. Norwich had an important market and, as already noted, the arrival of livestock on the hoof is historically well attested. Moreover the evidence from the distribution of body parts indicates that, although complete carcasses were present, selected cuts of meat were also sometimes imported or just distributed. For example, the presence of a high number of sheep scapulae in the post-medieval fills of the barbican ditch can be interpreted as the acquisition of selected parts of the carcass, not necessarily from the countryside but perhaps from butchers elsewhere in the town.

Diet

Isotopic analysis of the human remains from the Late Saxon cemeteries at Castle Mall is detailed by Bayliss *et al* in Part I, Chapter 4.IV, allowing broad consideration of the contribution that animal products make to the diet compared to cereals. The direct evidence for dairy products is poor. The kill-off patterns of cattle and sheep within Norwich do not suggest a particular emphasis on milk production, but the situation might have been different in the countryside, and milk and dairy products could regularly have been sold in urban markets. It is however possible to find historical sources describing the difference in the patterns of animal protein consumed by urban and rural populations, and the rich and the poor. Those in towns ate more meat than those living in villages, although for both cereals would have made a significant contribution to the diet, and by the early 15th century cereal foods accounted for 63% of the diet. Fish (Locker these volumes; Locker 2001) and dairy products were also an important food source, and the latter formed

the major source of animal protein for peasants and artisans (Dyer 1989).

Even taking into account the obvious over-representation of cattle bones, it is quite clear that beef was the most consumed meat during all periods. Pork was particularly important in Late Saxon and early medieval times. Mutton was also consumed but was of secondary importance to the main use of the sheep, which was the production of wool. Horse and dog meat may occasionally have been eaten, perhaps in periods of crisis, but the flesh of these animals was more likely to have been used to feed dogs.

Chicken and goose meat provided a secondary but constant contribution to the diet. This probably increased in post-medieval times when these birds began to be bred specifically for their meat, rather than for eggs or feathers. The contribution of wild game to the diet was negligible. Venison and wildfowl were only very occasionally eaten, perhaps in special circumstances and only by the more wealthy townfolk.

Status

The presence of a royal castle in Periods 2 and 3 might lead to the expectation that evidence of high status would be found in these periods. In fact this was not the case and the typical high status animals, such as deer and wild birds, are as rare during the castle phases as they are in earlier and later times. Continuity, rather than change, could be observed in the transition from Period 1 to 2. Thus it appears that the excavated features, even if belonging to the castle, did not contain refuse from royal banquets or those of castle officials. This is not surprising as visits of the king, for example, were only very occasional (Tillyard, Chapters 5.I, 6.I and 7.I) and may have left traces in other areas of the castle, untouched by this excavation. The findings from the plant remains are consistent with the animal bone results: no exotic species or any other indication of high status was observed (Murphy, 'Plant Remains' below).

Some findings, such as the evidence for falconry in the 11th century, or a rather high proportion of pig bones in Late Saxon to early medieval periods — roast pork was 'the most consistent source of more delicate meat' (Dyer 1989, quoted by Serjeantson forthcoming) — or even the presence of exotic species, such as a parrot in a 17th-century pit fill, may hint that some evidence of high status is indeed present. However, this is not necessarily related to the castle, but is more probably a consequence of the variation and inequality of the distribution of the wealth within towns (Dyer 1989). For instance, the parrot might have belonged to a rich merchant (Plate 10.32; see 'Foreign Contacts', Chapter 10.IV and 10.VI) and, as discussed elsewhere in this report (Chapter 4.IV, 'Hunting'), the goshawk was not necessarily a bird associated with the highest aristocracy.

Use of Space and Disposal Practices

As these volumes have demonstrated, the topography of the site changed enormously in different periods, and any comparison between periods also entails comparisons between different types of sites. Whatever the type of building present or the organisation of the space, in all periods the animal bones mainly derived from pits and ditches that were filled with a mixture of food and industrial refuse.

		<i>Period 1–2+3</i>	<i>Period 2+3–4</i>	<i>Period 4–5</i>	<i>Period 5–6</i>
Cattle	Age	stable	stable	<i>decrease</i>	stable
	Size	stable	stable	increase??	<i>increase</i>
	Shape	stable	stable	?	<i>change</i>
Sheep	Age	stable	stable?	<i>increase</i>	stable
	Size	stable	stable	stable	<i>increase</i>
	Shape	stable	<i>change</i>	stable	<i>change</i>
Pig	Age	stable	?	?	<i>decrease</i>
	Sex	stable	stable	stable	stable
	Size	stable	stable	stable?	<i>increase</i>
	Shape	stable	stable	stable	<i>change</i>
Domestic fowl	Age	stable	stable	stable	<i>decrease</i>
	Sex	stable	stable	<i>change</i>	stable
	Size	stable	stable	<i>increase</i>	stable
Goose	Age	stable	stable	stable?	<i>decrease</i>

Table 13.6 The main domesticates: changes in age, shape and size over time

In Period 1 the site was loosely organised as a settlement with several ‘properties’ (Fig.13.3; see Part I, Chapter 4.IV). Although no obvious division between domestic and industrial areas could be detected, lateral variation occurred in the distribution of the animal bones. Not only did the frequency of different species vary in different areas, but also for the type of handicraft — in particular horn- and antlerworking. The significance of this variation is not completely understood but it might be related to the disposal of food refuse on site, and to the spatial distribution of different workshops.

From Period 2 onwards, most of the features excavated consist of the outer and inner ditches of the castle and pit groups associated with the developing tenements surrounding the castle, both within and outside the Castle Fee, as well as a few minor structures. Some differences in the contents of ditches and pits have been noted, which are probably due to the different use of these two types of features. Ditches may have mainly been used for large scale dumping of the town refuse, whereas pits were associated with small scale domestic activities. In particular, the disposal of the carcasses of dead animals in the barbican ditch (see Part II, Chapter 10) seems to have been common practice during late medieval and post-medieval times. Many complete horse bones were found in the ditch, but they were not in articulation, which suggests that these are not primary deposits and that reworking of the barbican ditch fills occurred at some stage.

A lower frequency of gnawing marks in later periods probably indicates a prompter burial of bone refuse and thus a more organised system of waste disposal. This would have become necessary as the density of population increased and is consistent with the increasing urbanisation of the town in late and post-medieval times as suggested above.

Animal Economy and the Agricultural Revolution: the Castle Mall Contribution

The type of animals and the husbandry techniques found in the Late Saxon and medieval periods at Castle Mall are both consistent with other archaeological sites in England and with information from historical sources. It has also

become apparent that the age, sex and size of the animals are inter-related factors which must all be considered in any study of the evolution of husbandry techniques.

From the late 9th/10th century (Period 1) to at least the mid 14th century (Period 4) the principal uses of the main domestic stock at Castle Mall and throughout the country were probably as follows: cattle were mainly exploited for traction, sheep were a precious source of wool, pigs provided almost exclusively meat (and fat) and domestic birds produced eggs and feathers. All animals were at some point eaten, but in some cases their flesh may have represented only a secondary product. This is obviously an over-simplification, because variation occurred across the country and in some periods other products may have become predominant, but in very broad terms these were the main uses of the animals.

In medieval times, partly due to the primitive techniques then available and partly due to the type of animal use, the livestock was of a relatively small size. This is well attested by historical sources and has been confirmed by the study of the Castle Mall animal bones. However, this does not mean that the animals were all identical across the country. Variation occurred and even if it is not yet possible to talk of genetic breeds in the modern sense, regional types were present (Trow-Smith 1957). The high homogeneity of the medieval sheep, in particular, has hitherto been emphasised in the zooarchaeological literature. However, using a technique which allows the comparison of different measurements on the same axis (Davis 1996), it appears that the medieval sheep at Castle Mall, even being of roughly the same size, show some shape variation between periods. This suggests that the homogeneity of the medieval sheep might have been overemphasised due to the way the measurements have been examined to date.

After a period of relative stability which lasted for several centuries, some major changes in the type of use and in the size and shape of the animals occurred between the end of the Middle Ages and the beginning of the modern period. When exactly did these changes occur? The evidence available from other sites suggests that many of these changes had already begun during the 16th century (Davis 1997). This is consistent with the

	<i>medieval</i>	<i>late medieval - post-medieval</i>
Cattle	TRACTION, meat, milk	MEAT, milk (traction in limited areas)
Sheep	WOOL, meat, milk	WOOL, MEAT, milk
Pig	MEAT, fat	MEAT, fat
Goat	milk, meat	-
Horse	traction	TRACTION
Domestic fowl	EGGS, meat	MEAT, eggs
Goose	FEATHERS, meat	MEAT, feathers

Table 13.7 The main domesticates: changes in use over time

view of some historians who suggest that the 'agricultural revolution' was an earlier and more gradual phenomenon than often claimed (see for instance Kerridge 1967). Unfortunately the 16th century at Castle Mall is either poorly represented or not securely dated, therefore this animal bone assemblage cannot provide a major contribution to the question of when livestock improvement began. However, interesting data have been found concerning the changes in husbandry techniques and consequent modifications of animal size and shape that the agricultural revolution brought about.

Before entering into a detailed discussion of the exploitation of the main species at Castle Mall it will be useful to summarise the data for age, sex, size and morphology (Table 13.6).

Details of how these results were obtained and their interpretation are presented in the relevant sections of Part III and will not be repeated here. This concluding section will make some very general comments. In both cattle and sheep, variation in the kill-off patterns precede size and morphological changes. In the case of cattle it is plausible to assume that a new type of animal use, more specifically aimed at the production of meat, was associated with a different kill-off pattern and led to the selection of larger beasts. The situation for sheep is more complex, as changes in size and mortality do not go in the same direction. The shift towards older animals is evidence that wool production was increasing in importance, whilst the size increase suggests that large animals capable of producing more mutton were also being selected. In fact the two changes do not go together, but they are perfectly compatible, because large sheep can also produce good quality wool. Many of the best 'wool' breeds, such as the Lincoln Longwool, are actually very large (Keith Dobney, pers. comm.).

The situation is different for pig where both the main changes are concentrated in the post-medieval period. The use of pig for meat and lard production continued and the only reason for these changes was to increase productivity. It is probable that this was achieved by the importation of new stock, which was larger, faster growing and could thus be killed at an earlier age.

The role of domestic fowl has been neglected in the study of changes connected to the agricultural revolution. However, the Castle Mall evidence suggests that already in Period 5 (*i.e.* almost certainly during the course of the 15th century) these birds had been subject to a size increase: possibly the consequence of selective pressure towards higher meat production. This improvement was

successfully completed in the subsequent period, where an age decrease implies the increasing importance of meat. The evidence from Castle Mall alone is not enough to suggest that the increased size of domestic fowl represents one of the first results of the agricultural revolution, but it certainly provides a stimulus for further investigation of this question on other sites.

Now that it has been demonstrated how the Castle Mall animals changed, it is appropriate to summarise the innovations in their type of use. The following table illustrates this by taking into account both the Castle Mall data, and what is known from the rest of the country, from both historical and archaeological sources. The animal products or uses of greater importance have been indicated in capital letters (Table 13.7).

Certainly, these changes did not all occur contemporaneously and in some areas they did not happen at all. In addition some of the data presented above are still under debate. Nevertheless, it is only by trying to generalise that the Castle Mall data can be put in a wider context and contribute to the history of animal husbandry in Britain. One general consequence, which is clear from the above table and concerns most animals, is that the agricultural revolution gave rise to a much greater emphasis on meat production. This was probably caused by the growth of the urban population which required an increasingly larger meat supply.

Norwich was one of the largest medieval towns in Britain and a very important market place (the development of which has been outlined in Chapters 4–11). Any study of the economic history of England must consider this town which had the advantage of being situated in a convenient position for contacts with the continent. The Low Countries, from where so many technological and economic innovations originated, have always had close contacts with the Norfolk area. If improvements in either the animals or husbandry techniques occurred, it is to be expected that they began earlier in Norfolk than in many other parts of the country. Potentially, the Castle Mall data can contribute to current understanding of the economic development of the town and of the country as a whole. At the same time there may be more animal bones recovered from secure 15th- to 17th-century contexts in the city. Information from such contexts may provide answers to the important question of when improvement started which could not be firmly established in this report.

The Barbican Well Assemblage

by Marta Moreno García

The most significant single faunal assemblage from the site was recovered from mid/late 15th- to early 16th-century fills of the barbican well which has been discussed in Chapter 9.IV, with a summary of species present given in Table 9.13. Full details of this important group are given in Part III, Chapter 4 and the feature is located in Fig.9.2. The evidence will not be repeated here but, in summary, the excellent preservation and recovery of the barbican well animal bone has allowed a detailed study of the relative occurrence of the main domestic taxa of the period in question. Analysis of this important assemblage (comprising 131kg of mammal bone and 6kg of avian bone) has gone some way to fulfil the vital need for well preserved and well recovered late medieval