Food, Status and Complexity

in Saxon and Scandinavian England:

An Archaeozoological Approach

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Abstract

The period between the decline of Roman influence and the Norman Conquest in England (AD 450-1066) is recognised as a time of great change, from a largely subsistence-based economy to one more urban-oriented with growing political and social complexity. Little is understood of the human-animal interactions that existed in Saxon and Scandinavian England, and this thesis will use archaeozoological data with the aim of furthering the knowledge of social, political and economic hierarchies, cultural differences and debates regarding the nature of the urban context through the presence and spatial organisation of status, craft production and trade. To this end, both primary and secondary data were recorded from animal bone assemblages from English Saxon sites, and the subsequent relative species quantities, mortality profiles, carcass part representation, butchery and metrical data analysed. The resultant trends have illustrated the increasing social complexity and widening gap between the farming and elite classes, and evidence for cultural distinctions between the Danelaw and Saxon areas of England in the late Saxon phase. Combined with this is the demonstration of evolving economic pathways using the provisioning networks apparent between producer and consumer sites. This is core to the major changes that take place throughout the Saxon phase, from the largely self-sufficient population of the early phase, through the redistribution of animals and animal products in the middle Saxon phase, towards a fully commoditised market system by the time of the Norman Conquest.

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Chapter 1

Introduction: Research Questions and Context

1.1 Introduction

This thesis presents a detailed synthesis, analysis and interpretation of animal bone data recovered from archaeological sites in Saxon England. Archaeozoological assemblages such as these are crucial for the interpretation of relationships between past populations and the animals they used: the interactions between people and animals would have been integral to the daily life of the majority of the population who worked the land. Animal products would also have been central to those who worked with raw materials such as bone, antler and horn, and in the expression of status through the consumption, ownership, or procurement of particular species.

Pre-1980 archaeozoological investigations were largely descriptive and centred upon functional, site-specific questions (e.g. quantifications of taxa present and population structures of the main species). However, the usefulness of presenting such facts has been called into doubt without considering the effect of wider questions, and the role that

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archaeozoology can play in exploring facets of past life such as environment, diet and subsistence, social status, ethnicity, religion and rituals (MacDonald, 1991: 66). The practicability for synthesising early work was limited, particularly given the meagre gazetteer of excavated Saxon sites. However, the proliferation of excavations within England during the last thirty years, particularly following the publication of PPG 16 (Department of the Environment, 1990), has led to the growth of an extensive data set of faunal assemblages from Saxon sites. It is therefore timely for this review of the archaeozoology of Saxon England to take place.

This chapter has three major roles: firstly to explain the background to the thesis; secondly to provide the research context, identifying current views and approaches to the theme of food supply and production in the Saxon period in England, highlighting aspects of archaeozoology vital to the interpretation of faunal data; and thirdly, to define specific research questions underpinning the thesis, and outline the structure of the remaining chapters.

1.2 Background to the Thesis

This thesis forms part of the AHRC-funded 'Wallingford Burh to Borough Research Project' headed by Dr. Neil Christie, Dr. Oliver Creighton and Professor Helena Hamerow (Christie *et al.*, 2009). The project combines evidence from past excavations in Wallingford, which took place in the 1960s and 70s, with more recent work undertaken between 2002-2005 and 2008-2010, to help understand the landscape, evolution and context of this exceptionally wellpreserved Saxon burh, and explore the relationship between late Saxon and Norman urbanism in England. This PhD was included as a component designed to address two main areas of interest within the Wallingford Project: (i) the extent to which later Saxon burhs were provisioned, their complexity and urban function; and (ii) the presence of status and hierarchy within burhs prior to the Norman Conquest, with particular reference to the zones occupied by later Norman castles.

However, the remit of this doctoral thesis is necessarily broader. Based on the original objectives, there was a lack of background from earlier Saxon phases in which to contextualise middle and late Saxon interpretations. It was also realised early on that the results from the

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Wallingford excavations and the subsequent animal bone analysis would not be fully available in time to contribute to the dataset used for this research. In addition, the new (and older) work did not produce sizeable, period-relevant assemblages to enable Wallingford to form a notable part of this thesis. Therefore, the faunal remains from Wallingford, although analysed as part of the Project, and included as a contribution to the final monograph, are not a core focus to this thesis. Revised research questions are defined following the provision of background information to set the Saxon period into context.

1.3 Research Themes in Context: Background and Rationale

It is essential to frame the archaeozoological analyses and data in a coherent context by outlining current perceptions of early, middle and late Saxon England in terms of settlement and economic trajectories. Therefore, current theories regarding motivating economic, political and social forces at play throughout the period (*c*.AD 500 - 1066) will be identified, along with ways in which archaeozoological techniques can further our understanding. This detailed literature review will provide secure foundations for evaluating the major themes pertinent to the research aims. It also allows for identification of the key issues and assumptions, problem areas and specific gaps in knowledge that presently exist.

Initially, however, a consideration of the size of the population of Saxon England is essential. One of the major factors influencing the use of land is the size of the population: the greater the population, the greater the competition for resources and the nature of landed exploitation will be. Although the estimation of population in pre-census England is based largely on conjecture, there is general consensus that the population of Roman Britain was approximately 4 million - a figure which dropped substantially in the century following the Roman withdrawal and the fragmentation of the province (Dyer, 2003: 26). Few data on the Saxon population are available, but demographic estimations by Russell (1976) based on documentary sources, settlement patterns and geography have given the (very) rough approximations illustrated in Table 1.1. The extent of this hypothesised decline has been doubted by some, such as Esmonde Cleary (1995: 13), who suggests that it may not have been quite so marked.

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That there *was* a population decline, however, is not in dispute (Esmonde Cleary, 1995: 13). It is also claimed that there was a gradual rise until the mid-6th century when a series of plagues spread across Europe, causing renewed loss of numbers which only recovered toward the 9th century (Russell, 1976: 38-39). The population increase rose dramatically from that point, reaching perhaps 2 million by Domesday. Other impacts on the population came from famine, such as those of AD 890 (Hinton, 1990: 68), 1005 (Keynes, 2007: 155) and 1042 resulting in loss of livestock (Trow-Smith, 1957: 50) as well as war, notably between early Saxon tribes/ Kingdoms and later against the Viking threat. Indeed, the effect of the Danish army is detailed in the *Historia Regum* of 896, recording the slaughter of people, beasts of burden, sheep and oxen (Trow-Smith, 1957: 49). It is not within the scope of this thesis to assess such famines and conflicts, but these should be considered significant factors affecting the population, and its ability to farm effectively. When all these factors are taken into account, it is nonetheless clear that the population of Saxon England was considerably smaller than the preceding and succeeding periods, which would have meant, in practice, less competition for agricultural land.

1.3.1 The Early Saxon Phase (A.D. 450 – 650)

Society

The end of the Roman period would have had a significant impact upon the agricultural economy. The importance of surplus production to supply urban populations and armies through markets, tax and rent was suddenly removed, leading to a change in emphasis towards "a localized, economically under-developed society with little evidence for hierarchy or specialization" (Esmonde Cleary, 1995: 22). In such a society family and kinship determined status, links and allegiances between groups and access to good farmland would have been of prime importance (Härke, 1997: 141).

By the later 6th century England was divided into numerous kingdoms (Figure 1.1), and the general populace would have been obliged to supply the King with food in the form of tax, as well as service in times of war, in return for protection. The display of status between King, kinship groups and the household (i.e. both the family unit and their servants), resulted in a

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three-tier society of nobility, freemen and slaves (Härke, 1997: 141), but with a greater distinction between the nobility and lower classes, inferred from the construction of larger halls, greater quality and quantity of grave goods in high-status burials and a reduction in the relative numbers of grave goods representative of free men (Härke, 1997: 146). Allegiance and place in the hierarchy was reinforced through gift giving, wealth display of wealth and reward for service (Brookes, 2007: 26-28). The sense of community was of utmost importance, and the place of those within it was secured and reinforced by the use of feasting and food redistribution (Sykes, 2010: 183). This emphasis on feasting as a method of social separation is reflected in the likely importance of pastoral farming, particularly the status and wealth imbued upon cattle at this time, duly reflected in legal documents (Oosthuizen, 2005: 188).

One other group – the ecclesiastical – emerges from the late early Saxon phase. Missionaries from St Augustine successfully re-introduced Christianity to eastern England in the early 7th century, and ultimately brought about the conversion of the English (Chadwick Hawkes, 1982: 64). The significance of the development of the ecclesiastical system lies in the need of the clergy for surplus production, to support their work in a non-agrarian calling. Coupled to this are the close ties between the Church and aristocracy. It is suggested that this came about through a mutual need for Kings to show close ties to the Church in Rome, perceived intellectual wisdom, and access to writing skills for the perpetuity of laws. In return, the Church (both clergy and monks) received lands and security (Hinton, 1990: 36). Because of the rapid increase in church wealth, the religious orders were able to live as 'multi-functional' communities, evolving in economic and organisational complexity to a greater extent than the rest of society (Blair, 2005: 77-78).

Settlement

It has widely been asserted that the post-Roman to early-Saxon phase was marked by rural settlements of family groups, analogous both economically and socially, with no notable settlement hierarchy (Beckinsale, 1968; Dyer, 2003; Fowler, 2002; Hodges, 1988; Hooke, 1998; Murphy, 1994: 24; Vince, 1994). The majority of settlements were farmsteads inhabited by one household, or kin-based group, made up of between approximately 12 and 50 people, including a nuclear family and their servants, all of whom lived under one roof (Härke, 1997:

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157). Farmsteads were sometimes grouped together as hamlets (Cowie and Blackmore, 2008: 136). Fowler (2002:96) suggests that by the end of the phase (c. AD 650), each ruling class probably also had large permanent residences (e.g. Yeavering and Cheddar) that they visited sporadically.

With a lack of support from Rome, urbanism as a social and economic phenomenon disappeared (Powlesland, 1997: 104; Vince, 1994: 109). Roman towns remained and, although the extent of the 'evacuation' is not known, theories, summarised by Beckinsale (1968), Faulkner (2000) and Haslam (1985: 7-12), range from complete abandonment by 550, to the inclusion of a fragmentary 'slum' population, to some scale of continuing domestic and administrative occupation. Although some Roman towns, such as Wroxeter, continued to be inhabited in the form of timber buildings amidst the ruins (Fowler, 2002: 91), the nature of this settlement type is generally viewed in terms solely of an administrative and ecclesiastical capacity (e.g. Lincoln), with the elite laying claim to ruinous but dominant areas of the townscape (Clarke and Ambrosiani, 1995: 8; Hodges, 1988: 3; Vince, 1994: 108). If so, then the question of how such inhabitants were supplied must be raised. Were they administrators supplied by farms in the hinterland, or was it a population of farmers who worked the land surrounding the town, while making the most of the protection afforded by the Roman defences?

Economy, Agriculture and Husbandry regimes

The early Saxon period was based almost wholly on a rural society producing on a domestic level, synonymous with family-based subsistence settlements (Hodges, 1988: 4). There would be little inter-site movement, although some re-distribution between local groups may be expected (e.g. for the exchange of breeding stock). Wild animals may be present that were indigenous to the immediate area of the site (O'Connor, 1989b: 19), so faunal assemblages will also reflect the wider animal population, allowing for taphonomic differences (Meadow, 1980; Rackham, 1983).

The use of intensive cultivation and herding strategies may have been most suited to populations based on nuclear households, where tasks such as childcare would have been

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incompatible with the tending of far-off fields or herds. Rather, it may be expected that small plots of land close to the settlement were cultivated, and the small-scale herding of animals nearby would have been conducive to limited labour and resources, while at the same time allowing the production of a small surplus to provide for times of shortage (Bogaard, 2005: 179-180). This would have been compatible with a pre-existing infield/ outfield regime of the Iron Age and Romano-British periods, involving the intensive cultivation of small fields near to the settlement (infields), and extensive use of land further away (outfields), for grazing or nonintensive crop production (Oosthuizen, 2005: 166; van der Veen, 2005: 159).

Typically associated with this type of economy is the use of animals primarily for meat, rather than secondary products (Bogaard, 2005: 187), although it should be emphasised that three year old sheep, for example, could produce two seasons worth of fleece, before being culled for meat (O'Connor, 2010: 12). This has been observed at many early Saxon sites, where sheep and cattle came from herd structures of animals of all ages, indicative of a self-sufficient regime (Crabtree, 2010: 126; Sykes, 2006: 61) – animals kept for both meat and small scale secondary product production.

Potential for Further Analysis

Although much is known of the lives of the early Saxons, large gaps remain. It may be possible to illuminate further some of these areas of supposition through a systematic analysis of human-animal interactions, notably:

- The extent to which social hierarchy is manifested through food consumption and procurement. With the exception of recent work into the redistribution of deer remains by Sykes (2010) there is currently no archaeozoological evidence for feasting or food redistribution, which is at the heart of many of the major themes surrounding the economy of the early Saxon period.
- The limited variability of settlement types means that there may be little variation in the nature of animal husbandry; however, as noted above, the question of provisioning inhabitants of the former Roman towns is poorly understood, yet essential to understanding the nature of such settlements.

• Were early church and monastic sites self-sufficient or, given their setting on lands donated by royal patrons, provided for from outside?

1.3.2 The Middle Saxon Phase (AD 650-850)

Society and Politics

The increase in social hierarchies noted at the end of the last phase led to the varied kingdoms of early Saxon England being condensed into fewer, larger territories, facilitating consolidated control, through military organisation (Bassett, 2007: 53-57). These kingdoms (Mercia, Wessex, Northumbria, East Anglia, Sussex and Kent: Figure 1.2) were relatively politically stable (Hinton, 1990: 60). This stability acted as a platform from which a tributary society was facilitated, taking over from the kinship-based reciprocal redistribution of the previous phase (Hodges, 1988:4), reflecting the move to class-defined social and political hierarchies. The functions of these larger territories were two-fold: it meant that farmers within them could have a greater degree of security to farm; and the King or Queen had a population they could draw on when needed for military service.

Through tribute payments from their subjects, the ruling elite could take control of the redistribution of an agricultural surplus through the collection of food renders at estate centres, asserting their dominance over the labour force. Furthermore, documentary evidence suggests that Kings collected tolls and gave out exemptions, for example to a number of bishops, highlighting the role of the Church in trade during the middle Saxon phase (Middleton, 2005: 352). Nonetheless, Brookes suggests that there were also restricted markets outside the control of the elite, that took place on a regional basis (Brookes, 2007: 34).

From this phase on, those who worked the land were no longer free 'pioneers'; rather their land instead fitted into a framework of organisation (Fowler, 2002: 84). Settlement hierarchies developed rapidly during the late early- to middle Saxon phase and formed the basis for a network of producer and consumer sites, crucial for the provisioning of sites in the later Saxon phase (Brookes, 2003: 180). The farmers who worked the land provided food rents to the thegn in charge of the estate centre, who would then provide for the royal household as they toured their kingdom (Richards, 2007: 22).

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The mid-7th century was the time of a 'monastic boom' (Blair, 2005: 79), whereby monasteries were established by the English, providing a focus for local communities for learning and guidance that was accessible by the aristocratic and peasant classes alike (Blair, 2005: 80-83; Leyser, 1997: 180). The establishment of minsters was still closely linked to the aristocracy, both physically and socially (Blair, 2005: 85). They were formed on land granted by estate owners, and the monks and nuns within would have prayed for the benefactor in return (Holdsworth, 1995: 41). By the mid-9th century the Church was established fully in England, and bishoprics lay within each diocese (Holdsworth, 1995: 31). The stability and organisation of minster settlements would have set them apart from the aristocracy and general population, as a distinct part of the increasingly conspicuous hierarchy (Blair, 2005: 204).

Although the threat from the Vikings first originated at the end of the 8th century, there is little archaeological evidence for any major colonisation until the mid-9th century, at the beginning of the late Saxon phase. However, the minting of coins within wics was disrupted in the mid-8th century by sporadic attacks, possibly in response to the depletion of silver stocks by the Vikings (Hinton, 1990: 65-67; Richards, 2007: 33-34).

Settlement

Some authors propose that the relative economic importance of a settlement is largely dependent on its place in the distribution network (e.g. Brookes, 2003: 100). For example, in a study of their hinterlands, Palmer (2003: 51) notes that wics (see below), affluent ecclesiastical sites, and rural sites receiving traded goods were situated on trade routes (coasts, roads or rivers). Rural sites surrounding wics and inland trading sites would have had opportunities to supply goods to be traded, and therefore may also have held an economic advantage purely by association with such consumer sites.

At the lower end of any proposed settlement hierarchy remained the isolated farmsteads and hamlets. Hodges (1989:130) and Fowler (2002:109-121) note that these dispersed settlements formed the backbone of the large estates, and several would have provided render to one estate centre (Jones and Page, 2006: 81). Hamlets consisted of two to four farmsteads – each of which was an enclosed unit with a hall, sunken-feature buildings, possibly a granary and a

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well. These sites were vital for the collection of food taxes by the ruling class (Fowler, 2002: 71), which would be supplied to middlemen at the local estate centre (Aston, 1985: 35-36).

These estates would have incorporated marginal areas valuable for wood, grazing, pannage, wild fowling, fishing, hunting and transhumance (Dyer, 2003: 15-17; Hooke, 1998: 171; Miller and Hatcher, 1978: 3; Naylor, 2004: 10), as well as arable land. They had significant storage facilities which received food from the surrounding countryside, as well as supporting industry and craft production (Hodges, 1988: 4). By the 8th century, documentary sources hint that the large estates began to be divided up into smaller royal or ecclesiastical estates (Hooke 1998:54). Of the latter, the largest such as Wearmouth and Jarrow would have been quasi-urban in nature, housing a significant population of non-agrarian clerics and students (Holdsworth, 1995: 43). They were, however, probably of a nature comparable to the secular estates, and the land granted to the ecclesiastical institution by the local elite may have been worked in a similar way.

The distinction between secular and ecclesiastical estate centres in this phase is blurred, as churches were often built within royal estates (Fowler, 2002: 81; Loveluck, 2001; Richards, 2007: 181). Nonetheless, monastic sites were often more richly provisioned with stone churches than purely secular ones, although the general layout of the site would have been similar to that of the royal estate (Blair, 2005: 204), such as Hartlepool Monastery.

Between the 7th and 9th centuries there arose specialist trading settlements, or wics, indicated by coastal, riverside and industrial trading sites, on green-field or even extra mural areas of old Roman towns. These wics developed by royal patronage, and were used to restrict international trade to specific ports, thereby allowing taxes to be collected (Middleton, 2005: 354). Astill (1991: 101) emphasises their dependence, not only on international trade with northern Europe and the manufacture of goods, but also on trade within their immediate regions. There is a suggestion that some wics developed from small, seasonal trading sites, or regional coastal markets of the early 7th century, becoming busy commercial centres of international trade by the later 7th century where traders could stay, with a permanent native community to provide for them, as well as native artisans manufacturing goods on site

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(Blackmore, 2002: 283; Hodges, 1989: 56). Clarke and Ambrosiani (1995: 15-16) describe them as complementing local administrative centres and bishoprics, as some may have developed as central administrative places for the region (e.g. London and York), whereas others remained as commercial centres (e.g. Hamwic and Ipswich).

The extent to which the royal court inhabited wics is largely unknown, and although it is possible that high-status residences were present, evidence is scarce. Remains of royal residences have been postulated at Lundenwic and in or near Ipswich (Hodges, 1988:55), but none securely identified, indeed, their presence was later disputed by Hodges (2000: 122).

A second tier of trading sites has also been hypothesized, in the form of inland markets, or 'productive sites' (Hamerow, 2007: 228; Middleton, 2005: 314), which existed alongside coastal wics.

Economy, Agriculture and Husbandry

The need for the rural population to produce a surplus to supply estate centres with food rent in return for the lease of land itself marked the need for a widespread distribution network. The presence of a growing non-agrarian population within wics and minsters, as well as the royal court, required the estate centre to act as a redistribution centre. This mechanism involved the provision of food tax or render from outlying farms to the estate centre, where it was then redistributed to the aristocracy. The provisioning of ecclesiastical settlements with food renders presented to the itinerant Kings from their estates has recently been proposed, using the redistribution of various parts of deer carcasses (Sykes, 2010: 182).

There are some differences of opinion concerning the provisioning of wics: data from York, Hamwic and Ipswich have been used to suggest that animals were the product of food renders from estates tied to the wic (Bourdillon, 1994; Crabtree, 1994b; O'Connor, 1994); whereas the evidence from London is suggestive of a market economy (Vince, 1994); by contrast, Scull (1997: 282) tentatively describes the inhabitants of London and Ipswich as producing much of the food required in the surrounding fields themselves.

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Hodges (1989:142) indicates that the realisation that profits could be made by supplying a market and provisioning non-agricultural workers within towns, led to a fundamental change in the economy towards urbanisation and state formation, as those in power began to manage their agricultural surplus through intra-regional exchange. This change may have coincided with wics, yet Hodges himself notes that evidence for this change is scarce. Rather, he suggests that craft specialisation in wics was the beginning of a competitive market economy, the presence of a central power for the organisation, expansion and adaption of this economy was necessary before state formation and urbanisation could occur (Hodges, 1989).

Changes to the economic and political structure of middle Saxon society would have required an increased scale of agricultural production: redistributive systems and urbanisation was predicated upon the ability of rural producers to produce an agricultural surplus. This contributed to the emergence of trade centres (i.e. wics), and rural production centres based at high-status and ecclesiastical rural sites, where metal, glass and pottery were made (Astill, 2006: 236). Trade routes were established at this point on a significant regional scale, between village, estate and trading centre. Rural fairs and markets were important links in the trade networks of both ecclesiastical and royal estates, as Naylor (2004:134) notes, trade was mostly in bulk, utilitarian items and raw materials (including food, leather, horn, bone and antler), despite the emphasis given to prestige goods in the archaeological record. Wickham (1994:153) suggests that, after renders had been paid to a lord, farmers could then exchange any excess produce with neighbouring areas, through a local market system within a social network, running alongside the larger scale distribution networks between estate and wic. It is also suggested that monastic settlements, particularly those of the east and south east, were consumer-led, eager for the goods supplied through international trade (Blair, 2005: 204), and at such sites the range of imported items was only comparable to the wics themselves.

Agriculturally, the use of the infield/ outfield system continued in the middle Saxon phase, although there is some evidence for an evolution of this to a 'proto- open field system' at some sites within the 'central province' (Oosthuizen, 2005: 185). Here, increasing demands placed upon farmers by the king for food renders led to increased grain surplus production. This in turn may have led to the innovation of new agricultural systems, which could have been

accommodated by extending existing infields, while retaining the use of associated land for pastoral grazing (Oosthuizen, 2005: 188).

The introduction of seasonal transhumance in the middle Saxon phase has been postulated (Hooke, 1981: 321, 1998: 186; Hutcheson, 2006: 75), particularly in the northern areas under the Danelaw (Wickham, 1994: 152), reflecting practice in the Scandinavian home countries (Adalsteinsson, 1991: 285).

Previous studies of the animal bone evidence argued that wics were provisioned through the redistribution of food received as render or tax from rural settlements through estate centres (Bourdillon, 1994: 124; Middleton, 2005: 313; O'Connor, 2010: 14). Supply of wics at this time was by driving animals to the site where they were killed and butchered (Bourdillon, 1994: 123). For the wics themselves, there is debate about the extent of the decline of international trade during the 9th century, resulting from Viking attacks which ultimately led to the abandonment, shrinkage or re-location of wics. Traditionally it was argued that wics monopolised the trade networks in the 8th and 9th centuries (Hodges, 1989: 42). However, Brookes (2003: 26) and Naylor (2004: 13), argue that too much emphasis had been placed on the role of wics and emporia at this time, and that trade simply turned inwards, focusing instead on rural trading centres.

Potential for Further Analysis

Certain areas of current theory regarding the middle Saxon population remain in need of clarification which can be supplied by archaeozoological analysis :

- Although widely acknowledged that an increasingly complex social hierarchy was
 emerging, the nature of provisioning within and between the populations of various
 settlement types is poorly understood, and particularly the role of the ecclesiastical
 settlements as producers or consumers, and the role of wics as markets versus trading
 centres supplied by an external authority;
- Is it possible to identify increased surplus production on rural sites necessary to satisfy a redistributive system?

- Determining supply networks and differences in social status between sites: techniques can be employed to investigate the redistribution of animal carcasses, product specialisation, and the demand for particular species from the inhabitants of various site types;
- The intensification of craft production can also be tested archaeozoologically, through the supply and use of raw materials such as horn, antler and bone.

1.3.3 The Late Saxon Phase (AD 850 – 1050)

Society and Politics

The Viking threat increased significantly in the middle of the 9th century, eventually leading to the division of England into three main areas: Mercia, Wessex and the Danelaw (Figure 1.3) by the late 9th century. However, evidence from sculpture indicates that some areas of the Danelaw were more 'Danish' than others, particularly the northern area, with East Anglia showing no perceptible Scandinavian influence (Hinton, 1990: 71; Kershaw, 2010). A review of evidence for the ethnicity of Viking settlers suggested that, while the Danish settlers of the 9th, 10th and 11th centuries had a significant impact on the society and culture of the indigenous inhabitants of the North and East, the effect was not homogeneous. Rather, the display of 'Danishness' was manipulated by the elites of the Danelaw for particular political and cultural benefits, and generally there was widespread assimilation of the first wave of settlers into English culture by AD 1000 (Hadley, 2002).

By the mid-10th century Saxon kings had reclaimed the Danelaw, although many Scandinavian settlers remained. However, during the early 11th century renewed attacks from the Viking army stopped only after the payment of tribute. This came to an end by 1016 when the Danish King Knut was made King of England, and the succession of Danish kings continued until the Norman Conquest in 1066 (Richards, 2007: 26-48).

During the 10th century the large estates that existed in the middle Saxon phase were reparcelled by the King's administration and distributed to the Church and to aristocrats (Reynolds, 1999: 83). This became necessary with the development of a significant 'middle class' – the thegns – resulting from widening social hierarchies (Hooke, 1995: 99). Estate

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fragmentation continued, and the common pattern of rural settlement by the time of the Conquest was one of a thegn running an estate consisting of his manor, a village and land farmed by the peasant class. It has been suggested that the re-shaping of increasingly smaller estates presents a metaphor for the emergence of an elite class, more removed from the lower classes than previously (Sykes, 2010: 183).

Minster churches and monasteries were, by now, widespread. These had provided easy targets for plundering during early Viking attacks, and in the years after this they saw decline in wealth and size (Blair, 2005: 292, 320; Leyser, 1997: 177). Following the Viking settlement in the 10th century there was a rapid increase in the creation of local churches (at the expense of the minsters) by both Saxon and Viking benefactors, based on the Gregorian Rule (Blair, 2005: 506-507; Richards, 2007: 180). This provides a good illustration of the willingness for the new Viking population to embrace the status symbols of the Saxon elite, in this case as patrons to churches, requiring their conversion to Christianity (Blair, 2005: 293). The Church still held vast amounts of land and resources, but was also subject to the contraction of land holdings taking place on secular estates caused by the fragmentation of estates (Blair, 2005: 157), and by the Norman Conquest many were taken over by the new elite.

Settlement

Many of the smaller estates that now existed depended on a supply of surplus from farmsteads that had been increasingly nucleated until the settlements were large enough to be characterised as villages, under the control of a central manor (Hooke, 1998: 117; Jones and Page, 2006: 82). The nucleation of settlements occurred in a 'Central province' (Roberts and Wrathmell, 2000: 4) (Figure 1.4), synonymous with the open field system (see below), whereby large fields surrounded the settlement at their centre (Jones and Page, 2006: 4). Despite the move towards a more communal society, isolated farmsteads persisted in some regions where dispersed settlement continued into the second half of the 11th century at least, for example in eastern and south-western England (Hooke, 1995: 103-104).

Estate centres were still trading during the 9th and 10th centuries, being involved in manufacture and ecclesiastical functions as well as agricultural production and tax collection

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(Astill, 1991: 103). However, from the 10th century, estate centres with a secular base started to decline, as the collection of food renders was made redundant as coinage became increasingly widespread and urban markets grew. Ecclesiastical estate centres, however, continued to thrive.

During the 9th century, continuing attacks from the Danish army led Alfred to establish new defended settlements, or burhs, defined in the Burghal Hidage – documents listing 33 burhs and their sizes. Nearly all were within Wessex, although three were included from Mercia (Hill, 1969: 84). Their character varied: from the purely military (such as Portchester); to sites protecting existing estate centres (e.g. Oxford and Northampton); some burhs lay within re-defended former Roman towns (e.g. Winchester and Chester); but others were situated near the former wics (e.g. London and Southampton); and some were newly built (e.g. Wallingford and Bedford).

The non-military and larger burhs are generally perceived as 'urban' foundations. While the definition of what constitutes an 'urban' site varies in much of the literature, for this thesis it is their function supporting non-agricultural production and a population of non-farmers making them dependant on others for food that is key (Clarke and Ambrosiani, 1995: 3; Fowler, 2002: 91; Hodges, 1989: 142).

The Viking population of the Danelaw occupied former Mercian burhs (e.g. Norwich and Thetford) as well as forming new trading settlements (such as York and Lincoln), often extending their defences. Of particular note are the five Viking towns – Leicester, Derby, Lincoln, Nottingham and Stamford – which were built as defended settlements on (presumed) existing estate centres and, in the case of Leicester, a former Roman town (Richards, 2007: 101-102).

Many burhs and Danish towns grew quickly from the late 9th century, and contain evidence for wider trade connections (e.g. York, Lincoln and Chester) and internal industry (e.g. Northampton, Thetford and Norwich) - the latter relying on materials from their hinterlands. Northern and eastern urban sites grew more rapidly than those in the south and midlands, but by the 11th century southern towns also became intensely occupied throughout the country as

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trade again picked up (Astill, 1991: 112; Vince, 1994: 117-118). However, archaeologically, few burhs show intensive intramural activity in the 10th century; this only becomes evident from the 11th century (Reynolds, pers. com.).

Economy, Agriculture and Husbandry

In the late Saxon phase, the economies of town and country developed a closer, direct interaction in the later 9th century, made possible by the re-introduction of a market-based economy, and the royal drive to urbanisation (Hutcheson, 2006: 73). However, the documentary evidence indicates that in rural areas land leases continued to exert a demand for food rents from farmers (Trow-Smith, 1957: 57, 63).

Hodges (1988, 1989) proposes that the small-scale, local, rural markets held by royal and ecclesiastical estates evolved into competitive markets with regional distribution from the late 9th century (Astill, 1991; Astill, 2006; Pestell and Ulmschneider, 2003; Vince, 1994). Within burhs, the requirement of the population for food and raw materials and the subsequent exchange of manufactured items, has been described by Hodges (1989: 49) as operating within an interlocking central-place system, which was fully commercialised, unlike the smaller rural markets. As a result, by the later 10th century, royal control revived coinage as the major mode of exchange and tax collection, either through the acquisition of goods later sold for money, or to collect tax as coinage itself (Astill, 1991: 99; Haslam, 1985: 49).

Even though many of those living in burhs were employed in non-agrarian trades, a number of inhabitants were recorded in contemporary documents as being employed on the land (Trow-Smith, 1957: 49). Most burhs had lands attached that were in the hands of a few burgesses – "there was no sharp break between town and country" (Miller and Hatcher, 1978:9) – and from the 10th century many burghal plots were attached to rural manors (Beckinsale, 1968:13). Dyer (2003:67) also suggests that land close to the burh was used for gardens and limited agricultural production - some animals may have been kept in orchards, smallholdings and backyards such as dairy cows, sheep, goats, pigs and fowl (O'Connor, 1989b: 17; Wilson, 1994: 113). Nonetheless, as market economies evolved, the needs of craft workers and administrators necessitated a change in the agricultural regime, with an increased requirement

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for production and trade in food to supply the new population no longer devoted to working the land (Clarke and Ambrosiani, 1995: 167; Hodges, 1989: 130).

By the 10th century rising taxation through coinage led to greater control of the elite over the farming classes, implemented through village formation (Hodges, 1989: 164). This allowed an increasing area of land to be used for arable production, as the focus moved to profitable rather than sustainable farming. Pasture land potentially became marginalised and, in order to allow enough stock to be kept to manure the land, fallow field systems were introduced (Astill, 1991:113; Fowler, 2002:192). This marked the advent of open field systems in arable regions of the midlands (Hooke, 1998: 121), which developed in a belt from Northumberland and Durham, through the midlands and central southern England, finishing in Dorset and Hampshire (Dyer 2003:19). The open field system enabled an increase in productivity and the creation of a greater surplus to be marketed. It required the intensive cultivation of large fields close to the centre of a settlement, with one third of the land set aside each year for common grazing (Oosthuizen, 2005: 165-166). Outside this region people continued to live in hamlets or isolated farms, with a greater emphasis on pastoral farming and the continuing use of an infield/ outfield model (Oosthuizen, 2005: 185).

It has been suggested that sheep were more common in areas of open field agriculture (Sykes, 2007b: 29), but the reason for this could not be concluded absolutely, rather a mixture of agriculture, topography and cultural influences were hypothesised, although not critically examined.

One of the earliest documented livestock inventories of an ecclesiastical farm at Beddington, Surrey re-stocked at the turn of the 10th century, following Viking raids, listed the animals present as:

"9 full-grown oxen and 114 full-grown pigs and 50 wethers, besides the sheep and pigs the herdsmen have a right to have 20 of which are full-grown; and there are 110 full-grown sheep and 20 bondsmen and 20 flitches" (quoted in Trow-Smith, 1957: 50)

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Of particular interest in this passage is the small number of cattle recorded – enough for one plough team if pulling a heavy plough. This is common in inventories of this period along with the presence of only a few cows for breeding (Trow-Smith, 1957: 57). Also of note are the large quantity of pigs recorded. Further reference is made to the vast herds of pigs kept within woodland in the late 9th century, for example a bequest made of 2400 head from one ealdorman (Clutton-Brock, 1976: 378; Trow-Smith, 1957: 51). However, it has also been noted that pig numbers gradually decline in this phase, as more and more land is dedicated to arable farming (Trow-Smith, 1957: 55).

Potential for Further Analysis

The faunal record may allow the elucidation of particular aspects of late Saxon life, such as:

- The extent to which the Viking population of the Danelaw remained distinct from the native Anglo-Saxons through differences in diet and products.
- The increasing intensification of agriculture at this time, and the move to open field systems, as well as a better understanding of the extent to which social divisions were recognisable.
- Little work has been carried out into the provisioning of ecclesiastical sites, particularly given the move to more standardised minsters united under Gregorian rule.
- Was there a conflict of interest for the farmer, between producing for food rents and for a market? Analysis of animal bones may also help clarify the function of the early burhs as markets, or simply defensive outposts, if not directly the degree to which they were inhabited.
- The move towards the late Saxon market economy from one based on redistribution in the middle Saxon phase, would involve a significant shift in production and distribution networks, which could explain the recent observation that, during their early manifestation, burhs were only sparsely populated.

1.3.4 Previous Work

Prior to the start of this research, very little published work had been undertaken on the wider animal economy of the Saxon period. Two major syntheses existed. The first was on English

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animal bone assemblages from the Saxon period carried out over 30 years ago by Juliet Clutton-Brock (1976), including an evaluation of the documentary record. Only the faunal remains from five sites were available/ included, limiting the validity of conclusions drawn. The second was an evaluation by Naomi Sykes (2007b) of the effect of the Norman Conquest on the underlying economy of England which, although similar in scope to the basis of this thesis, concentrates on the later Saxon, Norman and Medieval periods. As such, the nuanced changes within earlier Saxon phases were not investigated in detail. However, it is an invaluable work, which revealed the ways in which the Norman aristocracy separated themselves from the indigenous population through the use of hunting, social differentiation, food preparation and consumption.

Regional analyses have also been undertaken. Several, by Pam Crabtree (1989a, 1994b, 1996b, forthcoming), focus on the Saxon settlements in East Anglia, based largely on data from West Stow, which served to show a general continuation in animal husbandry throughout the *'Adventus Saxonum'* with a move towards specialised wool production in the middle Saxon phase. Another on the northern region, where Sue Stallibrass (1995) catalogued the major findings from a small sample of sites, and concluded that cattle were more common on upland and northern areas, and sheep in the low-lying areas in the south of the region. In this paper is the suggestion that species diversity increases slightly from the Roman period, and that fish consumption proliferates. Saxon Wessex was scrutinised by Jennie Coy (1982), using faunal remains from Hamwic and Ramsbury, which focused more on the comparative methods utilised, and nutritional effects of different species to the diet. A review of animal bones from sites in south-west England by Bruce Levitan (1987) split sites into three groups depending on the predominance of one of the three major domesticates to show how local conditions can affect the site economy. Finally, a synthesis of six sites from Lincolnshire and Norfolk was carried out to compare differences between them by Polydora Baker (2002).

During the course of this research, however, four more up-to-date regional syntheses have been published. The first, an investigation into the provisioning and diet of Viking Age towns by Kris Poole (2008) focused on the likely effect that the influx of Viking people had on existing animal economies of the Danelaw. It led to the conclusion that there was little impact on

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relative species proportions, yet a change in husbandry regimes did occur, although the nature of this was not defined or explored in any detail (Poole, 2008: 107). Notably, evidence was presented to indicate that horses continued to be eaten by the Viking population at a time when the church in Saxon England had prohibited their consumption. The article ended with an explanation that the data set was too small to see clear trends, but indicates the potential of archaeozoological work, "to help elucidate what it was like to live and work within Viking-Age towns" (Poole, 2008: 111).

Secondly, a similar, though smaller-scale study was recently carried out by Pam Crabtree (2010) on early and middle Saxon period sites from England and France, with a focus on the role of innovation through increasing trade with France and the rise of monasticism. This, it suggested, led to a move from self sufficiency of the early Saxon phase to specialisation and an increase in surplus production in the middle Saxon phase, with particular emphasis on the use of sheep for wool, but also pig production from sites such as Wicken Bonhunt and St Albans Abbey. Contemporary sites "removed from major trade networks", however, continued to be self sufficient (Crabtree, 2010: 131). The discussion of these findings was concerned with understanding who the innovators were – what was the mechanism of change that encouraged the producers on self-sufficient sites to specialise? Crabtree concludes that innovations emerged within secular and ecclesiastical estate centres which either developed a need for specialist products, or were convenient depots for producers to use to disperse their goods through trade and exchange. This is a fairly radical, yet well argued concept, as Crabtree further suggests that it was the trade through estate centres which enabled the rise of wics, rather than the development of trade centres creating a demand for increased specialisation.

The third major archaeozoological interpretation of middle and late Saxon animal husbandry and redistribution was undertaken by Terry O'Connor (2010) using species abundance and mortality data from sites in Eastern and Southern England, Ireland, Norway, Russia, southern Scandinavia, Germany and Poland, collectively termed 'Viking Europe'. It concluded with the acknowledgement that wide variations in assemblages between sites *can* be useful in recognising regional patterns. As such, a prevalence of cattle husbandry in the Danelaw, compared to that of contemporary Saxon England is again noted, although, interestingly, it is

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not explained as a 'cultural' effect, as other Viking sites throughout Europe do not mirror this. The occurrence of high numbers of pigs on sites was shown to have a loose correlation to the degrees of latitude eastwards of the site: explanations of this, however, have less to do with geological location, and more to do with the provision of meat in areas otherwise agriculturally unsuited to the use of cattle and sheep (O'Connor, 2010: 13).

Finally, the detailed analysis by Keith Dobney *et al* (2007) of animal bones from the middle and late Saxon high-status site of Flixborough, which, as well as presenting an exemplary site report, included a chapter on the nature and character of the settlement in relation to other sites within England, using data from Sykes (2007b). Although lacking a definitive summary of findings, it does give a good overview of methods used to recognise aristocratic and ecclesiastical status.

As well as these wide ranging syntheses, several significant Saxon site reports have been produced in the last four decades, such as the high-status site at North Elmham Park (Noddle, 1980); early urban sites from London, (Armitage, 1982b), Hamwic and Southampton (Bourdillon, 1994; Bourdillon and Coy, 1980), York (O'Connor, 1984, 1989a, 1991, 1994), Lincoln (Dobney *et al.*, 1996; O'Connor, 1982), Exeter (Maltby, 1979), Hereford (Noddle, 1985b), Winchester (Serjeantson, 2009b), Northampton (Harman, 1985b) and Thetford (Jones, 1993); and rural sites of West Stow (Crabtree, 1989b) and Orton Hall Farm (King, 1996). These have yet to be synthesised in any systematic manner, and will provide core data for this thesis.

1.4 Research Questions and Structure of the Thesis

1.4.5 The Research Questions

This thesis presents the first systematic and critical review of an extensive corpus of animal bone data from sites throughout Saxon England, fitting within the research framework already established for the middle Bronze Age to late Iron Age (Hambleton, 1999), Roman (King, 1978; King, 1999a; King, 1999b) and Norman (Sykes, 2007b) periods. Although other syntheses have been carried out on Saxon assemblages, these have predominantly been on a local or regional scale. This examination of all currently available data will therefore aim to shed new light on

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the Saxon economy throughout England, and provide a benchmark for more detailed analyses to take place. From the areas of potential for further investigation presented above, the following revised research questions were identified as the primary aims of the PhD:

- 1. Can the role of the animal economy at particular site types, and thus the place of that settlement within a social, political and economic hierarchy be inferred?
- 2. What was the nature of the agricultural economy (e.g. what were animals used for) and food consumption patterns (e.g. who was eating what) in Saxon England?
- 3. Is there evidence for cultural differences between Viking and Anglo-Saxon regions and populations, and also within Viking and Anglo-Saxon kingdoms?
- 4. How were sites provisioned locally, regionally and nationally?
- 5. How do archaeozoological analyses feed into debates on the nature of the urban context through spatial organisation of status, craft production and trade?

The PhD is based upon the study of the available faunal record for Saxon England. Data were derived from primary sources (animal bones recorded by the author) and secondary sources (published site reports and grey literature). Primary analyses of species representation, mortality curves, morphological and body part analysis have been undertaken to understand the nature of diet, butchery, animal husbandry and stock improvements. Further interpretations build on this general understanding of the animal economy, requiring more detailed study to explore interactions between sites, both on a regional and settlement-specific level, taking advantage of nuanced methods such as spatial analysis to help understand how sites were provisioned, the extent of craft and industrial activity and the division of social status.

The key strength of this thesis is in the integration of animal bone assemblages from published and grey literature to produce a 'bottom-up' analysis of an abundant archaeological resource. It is a resource that is significant in its availability and potential to illuminate many aspects of a past society that reflect on the day-to-day choices of the population: decisions such as what to produce; what to kill; what to sell; what to keep back; and what to eat. Interpretations of the data can then be contextualised using documentary and archaeological sources, to challenge

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accepted understandings of the agricultural, social and political economies across the whole Saxon period, and the interactions between settlements.

1.4.6 Thesis Content

In order to address the research questions, Chapter Two defines the methods used to record and analyse the available data. The core of the thesis starts in Chapter Three, with a scrutiny of basic data for external variables such as the effect of the environment and site classification schema, which may affect the reliability of conclusions subsequently drawn from the data. Major interpretations of the animal economy of Saxon England follow in Chapter Four using basic archaeozoological data to investigate the diet of the population, butchery techniques, underlying animal husbandry, and the types of animals kept. From this point the questions become more specific: Chapters Five and Six present inter-site comparisons on both regional and settlement levels, investigating the economy and status of inhabitants of particular site types within more 'urban' environments. The final chapter will widen the discussion out, integrating conclusions from the core chapters, before placing the results in the wider context of current theories on the ways the Anglo-Saxon populations were affected by economic, social and political factors.

1.5 Conclusion

Although the precise mechanics remain disputed, there can be no doubt that the Anglo Saxon period witnessed evolving political change, resulting in the re-organisation of society on a number of levels :

- Social change from tribal, kin-based groups to the establishment of a distinct social hierarchy, whereby the gap between the general population and an expanding elite class increased significantly with time.
- Agricultural change from small, self-sufficient farmsteads, through a move towards surplus production in return for land leases and protection by the King, to a more intensive, nucleated, proto-feudal system, based on communal farming to maximise production and yields.

- Economic change, from a largely subsistence economy of isolated kin-based groups in the early post-Roman period, to a tributary regime, requiring re-distribution of goods through estate centres, to the development of a market economy by the time of the Norman Conquest.
- Religious change from a largely pagan population in the post-Roman phase, to the expansion and dominance of Christianity over the 7th century, with the church gaining strong influence politically and economically.
- Political and cultural change as territories expanded and new settlers migrated to England from Europe.

The value of this work will be in its ability to take direct evidence for the day-to-day use of animals in Saxon life and interpret it with regard to aspects of society, economy and agriculture, to provide insights into the diet, status, economy, craft, butchery and trade specialism's of the population of England in the Saxon period. There is great potential to understand how the lives of the English population changed over the 600 years of this period of history, as reflected in the animal economy and in the fundamental interactions between humans and animals.

Chapter 2

Methodology: The Data Set and Analytical Techniques

2.1 Introduction

Techniques used to acquire and understand the data underpinning the thesis will be defined in this chapter. Three aspects are covered: recording; analysis; and interpretation. All the methods used are tailored to meet the specific demands of the research questions, and the ways in which this is achieved will also be discussed, with reference to the major themes identified in Chapter 1.

Consideration must also be given to the choice of the source data. Methods used when analysing animal bone assemblages vary between specialists. They are dependent on numerous factors such as taphonomy, size of the assemblage, excavation conditions, time constraints, cost, theoretical approach, experience and methodological background of the archaeozoologist, as well as research questions specific to each project. To be able to conduct an inter-site analysis with any confidence, it is important to make the data comparable, and to

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that end, a number of criteria were set for the inclusion of a site and its assemblage in this study.

2.1.1 Sources

Raw data came from both primary and secondary sources. The majority were secondary sources from published site reports in books and region- or period-specific journals, although individual specialist archaeozoological reports were also consulted. These included the English Heritage Ancient Monument Laboratory (AML) series, grey literature and unpublished animal bone reports. Advantage was taken of recent advances in electronic sources, such as the internet based Archaeological Data Service (ADS) and OASIS databases, in particular the Review of Animal Bone Evidence from Central England (Albarella and Pirnie, 2008). Furthermore, the 'zooarch' JISC mail list was utilised to request grey literature from colleagues. Primary data came from a number of sites made available to the author: Staple Gardens, Winchester; Worcester Cathedral; and Longstanton, Cambridgeshire, as well as assemblages from site reports previously undertaken in a commercial capacity.

Due to time constraints, and to maximise the collection of comparable data using more up-todate methods of analysis, an arbitrary cut-off date was applied, whereby only site reports that had been compiled since 1975 were consulted.

2.1.2 Sample Size

For practical reasons, a lower limit had to be set on the size of assemblages to be included. Similar syntheses of Iron Age (Hambleton, 1999), Roman (King, 1984), Norman (Sykes, 2007b) and later medieval (Thomas, 2005) faunal remains have made use of different thresholds. King's study of Roman sites gave no specific limit, simply stating that the 'relevant deposits have sufficient quantities of bones to be useful' (1984: 189) upon further investigation this involved sites with more than 75 fragments of identified bone. Sykes used sites containing a minimum of 100 fragments identified to species (2007: 9), and Thomas defines a minimum of 250 (2005: 21). In Hambleton's investigation into the British Iron Age economy, she suggests that a minimum sample size of 300 identified fragments (100 per species investigated) is the

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most reliable, and the one least likely to produce outliers that are the result of small biased samples (Hambleton, 1999: 39). The most exclusive methodology was suggested by Perring (2002), who advocates the use of samples consisting of no less than 500 identified fragments.

Due to the paucity of excavated Saxon sites, and even fewer recorded faunal assemblages, a lower threshold was considered necessary for this study; namely a minimum of 100 identified fragments from the main domesticates (sheep, cattle, pig). Upon analysis of the data, the effect of small sample bias can be checked using criteria developed by Hambleton (section 2.3.2). In reality, however, some sites were recorded that are smaller even than 100 identified specimens (NISP). This permitted the inclusion of site reports specifically dealing with fish or birds, or those which may have used a minimum number of individuals (MNI) for the species count (therefore being incomparable with other sites), but contained useful secondary information, such as ageing, body part, metrical or butchery data. The reliability of sample size in faunal assemblage comparisons will be tested (section 2.3.2).

2.1.3 Phasing

Although it is preferable to treat the period from the decline of Roman influence to the period after the Norman conquest as a continuum, analysis is simplified if broader period groups are assigned. There are problems inherent at both ends of the dating spectrum: with the precise dating of sites, samples can become too small to identify broad-scale temporal changes; yet very broad categories spanning hundreds of years mean that the data may disguise subtle variation. The latter problem may be of particular note, as it has recently been suggested that changes in animal husbandry began in the later part of the early Saxon phase (Crabtree, forthcoming: Chapter 4). To reduce these problems, data will be split into sub-phases where such are given in the reports.

Five main phases are investigated, each broadly recognised by archaeologists and historians for the period in question (e.g. Fowler, 2002; Perring, 2002; Reynolds, 1999; Sykes, 2007b): Early Saxon (mid-5th to mid-7th centuries); Middle Saxon (mid-7th to mid-9th); Late Saxon (mid-9th to early-11th); Saxo-Norman (mid-9th to 12th centuries); and Norman (mid-11th to mid-12th). The next problem comes in assigning phases from site reports to these categories – but

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fortunately, because they are commonly used divisions, most site reports make use of them, or close variations thereof. Sites that spanned more than one phase were labelled as such e.g. early Saxon to middle Saxon.

2.1.4 Limiting factors

The data will provide information that must be recognised for its limitations. Because of the large number of sites investigated, there was insufficient scope to look at differences in taphonomy or preservation by site. It is accepted, however, that differences will exist that may bias some aspects of the faunal assemblage. For example, the survival or recovery of small bones from larger mammals as well as all bones from small mammals, fish, birds and very young animals, may vary between sites due to taphonomic history and recovery methods (Albarella and Thomas, 2002; Driver, 2004; Ervynck, 2004; Groenman-van Waateringe, 1994; Payne, 1972; Sykes, 2004). There is no easy way to compensate for these differences, so, where possible, only hand-collected data were recorded; although this may result in the loss of some evidence as detailed above, it will produce a more comparable data set.

A key bias that must be considered during interpretation is that bones from urban sites are likely to be better preserved, due to the organic waste from craft production creating a higher pH level, which results in better preservation of bone compared with rural areas of less intensive occupation (Clarke and Ambrosiani, 1995). Additionally, the very nature of early- and middle-Saxon dispersed settlements means that much of the archaeology is often poorly preserved, as buildings were frequently in use for short periods of time and were made of turf and wood which rarely survives well. However, on rural sites refuse was likely collected in a middlen and spread as manure on the fields, leading to a dearth of bones surviving in situ (Jones, 2005: 62).

A further limitation in the use of data from secondary reports lies in the methodological differences between specialists. This is a familiar problem within archaeozoology, and has been considered in detail by many authors (e.g. Grant, 2002b; Maltby, 1985; Rackham, 1983; Wilson, 1996). Although, in theory, the post-PPG16 (Department of the Environment, 1990), MAPII (English Heritage, 1991) and now MoRPHE (English Heritage, 2006) era has provided a

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framework within which methods could be standardised, this has not happened, and a number of methods are used, particularly regarding recording, quantification and ageing – a problem that is more obvious when older site reports are included (Dobney and Jaques, 2002: 8; Groenman-van Waateringe, 1994: 147; Wilson, 1996: 8), many of which are inclined only to record minimum numbers of individual species. The problem is less significant concerning quantification in recent reports, as nearly all record fragment numbers (which in itself will vary between the nature of the fragments recorded in the identification methodology), although frequently there is no identification of the bird assemblage to species. Some attempt has been made to standardise the recording of ageing data to reduce differences by using Hambleton's (1999) conversion of tooth wear methods (see section 2.2.6). Even so, it is sometimes unfortunate that data are lost when recorded in an incomparable form.

On a larger scale, dating earlier Saxon sites is made harder as everyday Saxon pottery was often of poor quality and friable (Hooke, 1998: 106; McCarthy and Brooks, 1988: 61-62). This may lead to an under-representation of such sites within the data set. Similarly, another problem has been foreseen, which relates directly to the objective regarding the re-use of areas by the Norman elite. Following the Conquest, the Norman imposition of sizeable castles in most urban settlements has meant that the archaeology from areas previously inhabited by the Saxon population (high-status or otherwise) will have been badly disturbed by subsequent re-planning and building works and so may not be coherently stratified.

Despite these limitations, their effect on the interpretation of data is likely to be minimal when considering large-scale inter-site trends.

2.1.5 The Data Set

An appraisal of the data set will be made here, to allow a basic idea of the scope of the project. A total of 348 records were made from 254 sites - multiple records being made for some sites if they spanned more than one phase (Table 2.1). The locations of sites used are given in Figure 2.1, where it can be observed that the majority are located in the southern and eastern counties, with no assemblages deriving from Cornwall, Cumbria, Lancashire, Nottinghamshire

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and Shropshire. This will, of course, provide a bias when investigating regional trends. To counter this, only regions with larger samples will be compared in Chapter 5.

2.2 Recording

Data were entered in a Microsoft Access database, to enable efficient and reliable manipulation during interpretation. A record was included for each phase of each site. On multi-phase sites this could involve several records. An example of the fields included in the database is given as Appendix A.

2.2.1 Basic Data

A computer-generated reference number was included to keep a record of the order in which sites were entered. A site name was given for each excavation, and if the site contained assemblages from more than one phase they were recorded as site a, site b and site c (for example, in the case of a site that spanned the early, mid and late Saxon phases), so that comparisons with contemporary sites could be made more easily.

Other basic data included the bibliographic reference for the bone report, and the county within which the excavation took place to make regional analysis easier, as well as the grid reference, geology and height above Ordnance Datum.

2.2.2 Site Information

Specific information regarding the site itself is influenced by the subjective interpretation made by the excavator within site reports – such as site type, interpretation of features (in the site information field) and phase (early Saxon, middle Saxon, Late Saxon and Norman).

The assignation of site type is highly variable, and the labelling of Saxon sites has been criticised as lacking a specific terminology by Perring (2002: 93). Commonly used references are drawn from: contemporary documents (e.g. *villa regia, monasterium, caput*), which can be ambiguous; retrospective labelling from medieval historians (e.g. palace, manor, market, village), which can carry assumptions regarding the nature of the terminology used; or a
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modern classification (e.g. 'productive site'), which can be too general. Perring advocates the use of terms based on quantitative analysis of the material culture from each individual site. Yet modern terms can be cumbersome, as for example *"sites with evidence for artefact production and discard comparable with those found on emporia" and "sites with sparse evidence for artefact discard" (Perring, 2002: 101).*

Although these describe what was actually retrieved from each site, an assumption is made that the excavated material was representative of the whole site (a problem that faces all excavations). A similar rejection of categorisation of settlements was put forward by Bourdillon, who when describing the archaeozoology of Hamwic states that:

"Environmentalists do not depend on the categories of social, political, military, legal or economic historians, all of whom have tried to define or describe what is meant by a town. One may simply start with what may not be called into question, that Hamwic was a large and concentrated settlement, and that its people disposed of great quantities of bones" (Bourdillon, 1994: 120).

Nonetheless, to enable inter-site analysis, each record explored in this thesis had to include a site type and the following broad categories were used to represent descriptions given in the site reports: Burh; Castle rural; Castle urban; Elite rural; Elite urban; Farmstead; Hamlet; High-status rural; High-status urban; Industrial rural; Industrial urban; Military; Proto urban domestic; Religious rural; Religious urban; Roman town re-used; Rubbish dump; Rural settlement; Rural village; Temporary occupation; Trading site; Urban defensive; Urban domestic; and Wic domestic. As they are based on the descriptions given in site reports, some of these labels are analogous, and will be amalgamated when comparing site types. This problem is further discussed in Chapter 3.

2.2.3 Basic Taphonomy

Two more fields were included to consider preservation and retrieval factors affecting the assemblage: those of condition (Good, Fair, Poor, Bad and Not Recorded), and presence of sieved samples (Yes – included in the fragment count; Yes – not included in the fragment

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count; No – none available; and Not Recorded). Both factors vary widely between specialists, and material from sieved samples is sometimes included with the hand-recovered material, and sometimes recorded separately. To standardise the assemblages it has been decided, where possible, to record only material that was recovered by hand, albeit with a loss of data resolution regarding the exploitation of small creatures, young animals and small fragments (Maltby, 1997). This criterion will open up the number of sites available for use, particularly as those from earlier publications rarely contained material from samples (Figure 2.2). A similar problem was encountered by Dobney et al (2007: 217) when a direct comparison was attempted between the Flixborough assemblage – which contained material from an unusually extensive sampling programme – with other (hand-collected or not so extensively sieved) contemporary sites. It was discovered that the additional numbers of bird bones made their site of Flixborough incomparable with other sites. However, statistical analysis of sites in the dataset showed the proportions of birds recorded in assemblages where sieved and unsieved material was not separated, compared with assemblages where bones from sieved samples were not included were not significant (t(172) = 0.50; P = no significance) – the proportion of bird bones in both sieved and unsieved assemblages was comparable.

2.2.4 Quantification of Species

The quantification of animal bone assemblages is widely disputed within archaeozoology. There are two principal methods by which taxa are quantified: NISP, the "number of skeletal elements and fragments thereof – all specimens – identified as to the taxon they represent"; and MNI "the minimum number of individual animals necessary to account all the kinds of skeletal elements found in the skeleton of a taxon" (Lyman, 2008: 27, 39). Both methods have numerous advantages and disadvantages that have been discussed at length elsewhere (e.g. Binford, 1977; Chaplin, 1971; Driver, 1992; Gilbert and Singer, 1982; Grayson, 1979; Klein and Cruz-Uribe, 1984; Lyman, 2008; Maltby, 1985; O'Connor, 2000; Payne, 1972; Reitz and Wing, 1999). The basic distinction between the use of these methods is that MNI presupposes that animals were killed, processed and deposited on the same site. This is valid for subsistence economies, but becomes less relevant when inter-site trading or a market economy appears, along with related specialist industries such as butchery, hide- and skin-processing and bone

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working, all of which involve the removal of parts of the carcass and deposition of waste in different areas, maybe even on different sites. NISP, however, simply provides a count of the fragments of bones recovered from a site – it does not take into account the increased likelihood that larger mammal bones (e.g. cattle and horse) and more fragile elements (e.g. skull, pelvis, scapula) will break into more fragments than bones of smaller mammals or more dense skeletal elements, or that some taxa have different numbers of bones; thus, the same bone can be counted multiple times. There is also variation between researchers recording systems, in what qualifies as a fragment.

Another method of quantification is MNE, or the 'minimum number of elements' present. This method was based on that of MNI, but developed by standardising the values to take into account the relative frequency of various bones within the body (Lyman, 2008: 234-237), and re-visited more recently by Grant (1984) and Davis (1992a). Even within this method different standards are employed, yet in principle only specific zones of each bone in the carcass are recorded. This method eliminates the fragmentation bias of NISP, and does not presuppose that complete carcasses were deposited on site.

As this study is based on an investigation into sites which are subject to more complex economic factors, such as redistribution and marketing, the use of MNI is considered redundant. While MNE is a preferable choice of quantification, it is little used in contemporary reports, and extremely rare in older reports. Given the different emphasis inherent in the three systems of quantification they are not directly comparable with each other, and NISP is the method of quantification most suitable for this study, as well as being the method most commonly used. Although some bias will occur, it is assumed that the level of bias is the same for all sites recorded, indeed "NISP is to be preferred over MNI as the quantitative unit used to measure taxonomic abundances" (Lyman, 2008: 81).

Not all species have been recorded, as the 'background species' (amphibians, rodents, snails), while extremely important for information regarding the immediate environment of sites (O'Connor, 1987: 196), are not pertinent to the research questions. Therefore, the NISPs of the main domestic species – cattle, sheep, pig, horse, dog, chicken, duck and goose – will be

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recorded from tables present in the specialist's report, along with the most common edible wild mammals – red, roe and fallow deer, rabbit, hare and wild boar. Fields are also available to record the presence of other wild and domestic mammals and birds that are less commonly found. Antler fragments were, where possible, excluded from the deer counts, as they are highly fragmentary, which may artificially inflate numbers, and it is often not possible to ascertain if they were naturally shed, or cut from a carcass. If antler was present it was noted in the comments field to enable analysis of antler working. The true proportions of wild and domestic goose or duck species are hard to establish, as many site reports do not make the distinction; in such reports where 'duck' or 'goose' is recorded, they may include wild or domestic species, or both. Given the diversity of wild bird species available for inclusion in the diet, it was impractical for them to be listed individually. Instead, the total number of wild birds were quantified, and the species present were listed.

Fish were recorded separately, as a list of species rather than a quantified number, as the poor preservation and retrieval of these small and often fragile bones make comparisons of numbers with other animals unreliable. Because of this, fish species were recorded when identified from sieved deposits.

Where identified, bones from associated groups (i.e. complete, or partial carcass(es)) were recorded as a count of one, to avoid artificial inflation of numbers. Sheep and goats are morphologically similar, although criteria exist to separate them specifically from particular bones. The majority of those identified to species were from sheep, so the widely used category of 'sheep/ goat' will be referred to throughout as 'sheep', although it is possible that a small number of goats were included in some assemblages.

2.2.5 Quantification of Anatomical Parts

As with species counts, body part representation data varies widely between specialists. The quantification of anatomical parts is closely associated with species quantification; the most common counts of body parts are NISP, MNI and restricted counts, similar to MNE. Frustratingly, many reports make no mention of the method used, or if any factors for correction have been undertaken to allow comparisons to be made between species with

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unequal numbers of skeletal elements (for example, cattle and sheep have one metapodial per leg, but pigs have four). A field was therefore included in this study of the count used in that particular report, so that the method of analysis can then be specified when all the data are recorded.

To simplify the database, a set number of elements that reflect the most commonly recorded areas of the skeleton from cattle, sheep and pigs were recorded: horn cores (cattle and sheep only), skull, mandible, vertebrae, scapula, humerus, radius, pelvis, femur, tibia, metapodials and phalanges. Numbers were recorded directly from the site report, where they were given for those particular anatomical elements. Particularly problematic are the counts for skull and vertebrae, as some reports do not include them, some specialists record only a limited zone of skull, or specific vertebrae, some include all fragments, and others make no distinction regarding what exactly is recorded. To counter this, a note was made, where possible, of what was recorded by the specialist, so that differences could be taken into account in the analysis.

2.2.6 Age Data

A number of methods are available for the ageing of mammal skeletons: fusion of the epiphyses (ends) of bones; and the rate of tooth wear and eruption. Fusion data may cause under-representation of very young animals, whose bones do not survive as well as those from mature individuals. Additionally, this method is only useful until an animal reaches maturity (approximately 48 months in cattle and 42 months in sheep and pigs), which restricts the age at death information available in economies utilising animals for their secondary products, where they are likely to be alive significantly longer than 3½ - 4 years (cattle can live 15-20 years).

Teeth are more likely to survive archaeologically than bones, and there is less bias towards older animals, although there may be some loss of deciduous teeth from young animals through poor retrieval methods. Most importantly, teeth continue to exhibit wear patterns throughout the animal's life, which makes them valuable for assessing the age of skeletally mature animals. For this reason, the use of fusion data has been omitted from this study; instead, tooth wear data will be used to compare mortality profiles between sites.

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There are many methods used to record tooth wear (e.g. Coy *et al.*, 1982; Grant, 1982; Habermehl, 1975; Halstead, 1985; O'Connor, 2003; Payne, 1973), however, the most commonly used are those of Halstead, Grant and Payne. All three of which provide diagrams to record the stage of eruption or wear on particular mandibular teeth (fourth premolar or molars). These are combined to give a wear stage, which can then be grouped and relative mortality patterns represented graphically. Advantages and disadvantages of the various approaches are discussed elsewhere (e.g. Hamilton, 1982).

A method has been developed to combine these methods, permitting a comparison of mortality profiles without assigning an absolute age to individual animals (Hambleton, 1999: 64). This is preferable, as modern age data regarding tooth eruption and wear cannot reliably be applied to past populations, due to differences in maturation, environment and nutrition. As such, cattle, sheep and pig mandible wear data are converted and recorded within Hambleton's nine stages A-I (Table 2.2). Tooth wear data were recorded as quantified (either as raw data or summary data) within individual site reports, providing the data could be converted into Hambleton's wear stages.

2.2.7 Metrical and Butchery Data

Butchery information is presented as descriptive prose in all site reports. Therefore, when records were made of a site report, the paragraphs referring to the butchery of animals were copied. As butchery data were not recorded consistently, it was annotated using a recording system, where trends in butchery from each site were entered, such as:

- specific butchery of the main domesticates (limb bones, skull, mandibles, vertebrae and horn cores);
- the occurrence of butchery on bones from other species;
- the presence of cut, chop, knife, saw and filleting marks;
- fragmentation;
- and longitudinal splitting.

This allowed the best method of analysis to be devised once all the data were available.

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Metrical data were copied directly from the site reports into a spreadsheet. Where available the lists of individual measurements for each species and anatomical element were used, although summary data in the form of tables giving only the minimum, maximum and mean measurements were also recorded (Table 2.3) when the raw data were not present. Wither and shoulder heights were recorded if the raw data were not available. Due to the small morphological differences in some bones of sheep and goat, and the small numbers of goat observed in the archaeological record, measurements of goat bones were not recorded so that metrical distinctions in the sheep population were easier to understand. However, it must be recognised that there is often no way of distinguishing between the two species, and the metrical data will, inevitably, contain data from both species.

2.3 Analysis

Once recorded, the data were subject to basic analytical methods, to provide a platform for more detailed investigation to be undertaken in the core chapters.

2.3.1 Statistical Analysis

Before describing the specific analytical methods employed, an overview of the principal statistical analyses used will be given, as these were often applied to more than one area of analysis. All statistical tests were carried out using PAST (PAleontological STatistics Version 1.99 - Hammer *et al.*, 2001), with further guidelines from Fletcher and Lock (1994). Statistical test employed for specific purposes are detailed in the appropriate section below.

The Kruskal-Wallis test is a method of testing the medians of 3 or more non-parametric samples, which is useful when testing differences in the sizes of animals spatially and temporally. The use of a non-parametric test was chosen, because polymodal ranges (arising from the presence of females, males and castrates in a population) will not affect the result.

Principal Component Analysis (PCA) is a multivariate tool that allows the strongest variables to be plotted as a scatter plot. This technique was used to identify groupings in the data, and to

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understand the causes of those groupings. It was primarily used to investigate differences in species representation.

Spearman's Rho (or Spearman's r_s) is a non-parametric test (i.e. for data that do not exhibit a normal distribution) used to evaluate correlation between the rank order of two variables, i.e. if one variable affects the other and vice versa, for example, whether sample size affects species diversity.

T-tests assess statistical significance of two sets of parametric data (i.e. those showing a normal distribution). This method can reveal associations between the means and variances of unrelated (non-paired) data sets, such as metrical data between phases.

Triplots were used to plot data on three axes. The software used was Tri-plot 1.4 (Graham and Midgley, 2000). They were used for investigating relationships between the abundance of cattle, sheep and pigs. An explanation for the interpretation of tri-plots is given in Appendix B.

2.3.2 Species Representation

Species proportions are nearly always presented in tabular form, and occasionally also graphically. A calculation of the meat and offal weight can be used to interpret an assemblage in terms of its potential for supplying a meat diet to the population using average meat weights for cattle (199kg), sheep (12.2kg) and pig (51.7kg), based on the minimum number of individuals, size and kill-off pattern (Vigne, 1992: 30).

One recognised problem with exploring patterns in species representation is that the number of species identified is correlated with sample size (Casteel, 1979; Grayson, 1984; Lyman, 2008: 192-194). Grayson (1984) and Byrd (1997: 55) employed regression analysis of a range of samples to investigate the effect of sample size on species diversity. When carried out on the Saxon data set these methods show a correlation between assemblage size and number of identified species for assemblages over 100 NISP (Figure 2.3). Spearman's r_s confirms this correlation ($r_s(297) = 0.63254$, *P*<0.001 for samples >100 NISP; $r_s(225) = 0.58389$, *P*<0.001 for Samples >300 NISP). However, this effect seems more pronounced for smaller assemblages, evident from the steeper curve, and fewer taxa observed in samples between 100 and 300

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NISP (Figure 2.4). This was borne out in the statistical analysis (where r_s (71) = 0.14298, P= not significant) – the number of species recorded was not influenced by sample size, because there were so few taxa present. This discovery has ramifications for the analysis of species diversity (i.e. comparing trends in the proportions different species). It is therefore suggested that comparisons into the numbers of species recorded between sites should not be carried out on assemblages under 300 NISP.

However, as cattle, sheep and pigs were recovered on all sites, and therefore do not have an association with sample size in the same way, it is likely that comparing a more restricted suite of domestic species should be possible between assemblages with a NISP as low as 100. Therefore, the relationship between the main domesticates was investigated, to see if smaller samples produced more diverse ranges of cattle, sheep and pigs (Figure 2.5). The outliers present were from a range of sample sizes, so it was deemed acceptable to include sites with only 100 NISP for the comparison of the main domesticates. Interestingly, the smaller samples produced greater quantities of sheep, whereas the larger samples had more cattle and pig bones. This may be due to the predominance of sheep on rural sites, combined with the likelihood that rural sites have smaller assemblages. This is sustained to some extent by a brief analysis of site type by sample size, where nearly 30% of rural sites – but only 17% of urban sites – contained NISP's of 100-300.

Some authors have narrowed the range of species used in the investigation of species proportions, to make a more reliable 'like-for-like' comparison. This is done to offset variables caused by differential preservation and recovery, for example, by comparing the relative numbers of horse and cattle (Maltby, 1994: 89), or wild bird species with domestic fowl and geese (Albarella and Thomas, 2002). However, for the purposes of this analysis, the following rules were chosen to make the assemblages comparable with one another and with others in the future:

 analysis of distributions of the main domesticates uses the values of cattle, sheep and pigs only;

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- horse and dog bones are analysed as a proportion of all domestic mammals (horse, dog, cattle, sheep and pig);
- wild and domestic birds and wild mammals are given as a proportion of the main domesticates (i.e. cattle, sheep and pig).

Species representation was analysed using Principal Component Analysis, tables, charts and triplots. The basic data are given in tabular form in Appendix C. It has been noted elsewhere that the majority of domestic sites contain less than 20% pig bones as a proportion of the cattle, sheep and pig assemblage (Locock, 1999b: 13), and a quick scan of the Saxon data set found this to be applicable. Therefore, the definition of greater than normal proportions of pigs in an assemblage, often used to infer status (see 2.4.2) will be set at ≥20%.

2.3.3 Anatomical Representation

As mentioned above (2.2.5), there is great variation in the way that anatomical elements are recorded. The most consistently recorded elements are those from the appendicular skeleton (i.e. limb bones). Given the greater disparity between the inclusion and ways of recording the axial skeleton (i.e. skull and vertebrae), these elements were discounted. However, mandibles and horn core fragments are commonly recorded, so these were included in the analysis, where appropriate. The relative proportion of anatomical elements present is affected by taphonomic processes such as butchery, gnawing, redistribution, preservation and recovery (Figure 2.6) (as defined in Binford, 1981; Lyman, 1994, 2008). Fragment representation is traditionally shown graphically as a proportion of the most commonly found bone, after taking into account the different quantities of the anatomical elements within a skeleton (Lyman, 2008: 232-233). The quantification of body parts from each Saxon site is given in Appendix D.

The effect of differential preservation of various elements has been described and quantified by Brain (1981: 23), who found that, in an assemblage where complete carcasses were disposed of, this would result in fragment representation similar to that shown in Figure 2.7. This pattern was observed during an ethnographic study of Hottentot butchery, consumption and disposal of goat carcasses which resulted in a sizeable assemblage of bones (Brain, 1981). The subsequently described hierarchy of bone elements resulted from carcasses that had

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undergone primary butchery, marrow extraction, cooking and eating. Bones of no further value at each stage were discarded to be chewed by dogs and rodents, weathered in a dry, hot climate and trampled by people and animals. It is recognised that this is not an ideal comparison of elements for cattle, sheep and pig carcasses discarded in the temperate climate of Saxon England, but can be used as a standard, against which differences between samples may be observed.

The relative proportions of both species or anatomical fragments on intra- and inter- site levels can be explored statistically using a range of tests. These include: a basic chi-squared test (Fletcher and Lock, 1991: 117); contingency tables (Lewis, 1986); a Kolmogorov-Smirnov test (Klein and Cruz-Uribe, 1984: 66); use of percentage similarity (PS), (O'Connor, 2003: 154); complex correspondence analysis based on the 'pie-slice' method originally devised for pottery analysis (Moreno-Garcia *et al.*, 1996); and the Shannon-Weiner information function (Allentuck and Greenfield, 2010: 20-22).

Both the Shannon-Weiner and PS methods are similar, objective methods of comparing diversity within an assemblage. However, the strength of the Shannon-Weiner method lies in its use for species diversity, whereas the interpretation of the relative presence of anatomical elements between assemblages would benefit from comparison with a standard. In this aspect, PS may be more useful, as it allows the direct comparison of an index between samples, where a score of 0 denotes no similarity, and a score of 100, the samples are identical. In this study, the PS will be calculated using data from Brain (1981: 275) as a standard, although the quantification of horn core fragments included horn as well, and did not note fragmentation, so horn core counts were excluded. Inter-species comparisons will not be possible (e.g. the proportion of sheep to cattle), as the preservation, recovery and processing of cattle, sheep and pig carcasses is likely to have varied throughout the period.

2.3.4 Ageing Data

As only tooth wear data were recorded, the production of cumulative mortality profiles was achieved by plotting the proportion of the herd culled at each of the eight stages defined by Hambleton (1999). Plots are given in Appendix E. Mortality profiles were considered where at

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least ten mandibles with recorded wear stages were present. Where age classes were missing in the original site report, the latest stage was plotted e.g. if a stage was given as A/B, the point was plotted as stage B. It should be recognised that these mortality profiles do not reflect herd demographics, not least because the assemblages are time averaged. However, plotting the age data in this way permits differences in mortality to be observed over space and time.

2.3.5 Metrical Data

Husbandry regimes would also have affected the selective breeding, or 'improvement' of animals to suit their use for specific products. Defining animals of particular breeds from animal bones is ambiguous at best (Trow-Smith, 1957: 45), yet it is possible to observe changes in size and shape of the bones of the main domesticates between sites, regions or phases.

The analysis of metrical data can be a means to many ends, but the two most pertinent to this research are size and shape and sexual polymorphism:

i) Size and Shape

A recent study has investigated cultural changes in animal husbandry between the late Iron Age and early Roman periods (Albarella *et al.*, 2008) in terms of biometrical data. Measurements were analysed using log ratios (Davis, 1996; Simpson *et al.*, 1960) to examine size variation between individual measurements taken on the same axis of a specific bone using a known standard. Albarella *et al* (2008) validated the significance of the results for samples over 10 individual measurements with the Mann-Whitney U-test. Using these methods, as well as indices commonly used to calculate wither- and shoulder heights of cattle, horses, pigs and sheep (Kiesewalter, 1888; Matolcsi, 1970; Teichert, 1975; von den Driesch and Boessneck, 1974), a sense of the size and shape of animals can be gained. Unfortunately, due to restrictions in the data, and standards used for comparisons, only length and width data will be included in this study – data on depth was too limited.

For the purposes of this research, log ratios for each site were calculated, as a comparison of particular measurements from Saxon sites with a known standard based on the mean of a known population (Table 2.4). For cattle, the standard was taken from animals from middle

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Iron Age Balkesbury (Maltby, 1995), sheep from a modern Soay population (Davis, 1996) and pigs, from modern wild boar (Payne and Bull, 1988). The measurements were compared using the following formula:

log10 (x/standard)

Where x= archaeological measurements (Simpson et al, 1960); for standard see Table 2.4

The results were tested using an unpaired t test. Metrical data were also presented as a distribution plot showing the smallest, greatest and mean measurements for each available sample, these findings are given in Appendix F.

ii) Sexual Polymorphism

Another use for metrical data is in the distinction between males, females and/ or castrates in sexually dimorphic animals. The most promising of these is the measurement taken on the acetabulum of the pelvis (Greenfield, 2006; Grigson, 1982), although very few sites report this measurement. Other very sexually dimorphic bones are the metapodia. Work conducted by Thomas (1986) using Principal Components Analysis suggests that ratios between metacarpal distal breadth: breadth of medial condyle, and breadth of medial condyle: other condyle measurements are reliable discriminants of sexual composition in large samples. Problems are inherent, particularly relating to the splaying of distal metapodia noted in animals used for traction (Bartosiewicz *et al.*, 1997); however, the plough work done by Saxon cattle, particularly in the early and middle epochs was with a light ard (Fowler, 2002: 183-184), which was less likely to cause such pathologies as the later 'heavy plough' (Holmes, forthcoming-e).

Unfortunately, neither pelvis or condyle measurements are commonly recorded. Instead, as metacarpals are the most sexually polymorphic bones, and frequently well preserved in sheep and cattle (Bartosiewicz, 1987: 49; Higham, 1969: 66; Thomas, 1986: 83), a slenderness index was utilised: for cattle this was (shaft diameter/ greatest length)*100 plotted against (distal breadth/ greatest length)*100; and for sheep (shaft diameter/ greatest length)*100 plotted against greatest length. The metapodia of females tend to be short and slender; those of entire males short and robust; and castrates long and slender (Higham, 1969: Table II) as

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illustrated in Figure 2.8 (Davis, 2000: 373). However, the interpretation of data relating to sexual polymorphism may be blurred by the mixing of animals from different landraces – those brought together from different stock from different locations (Bartosiewicz, 1987: 48).

2.3.6 Butchery

Analysis was carried out to investigate trends in the methods used to butcher animals, by plotting the frequency of each type of butchery mark and the ways in which the carcass was disarticulated and jointed to observe trends between regions and phases.

2.3.7 Spatial Analysis

Sites were mapped using ArcGis 9.3, to establish a basic framework of the location of sites for each phase. Onto this were plotted relative proportions of species, age profiles and carcass parts, to explore the distributions of these elements between regions, and within wics and burhs.

2.4 Interpretations and Signatures

Animal 'signatures' have been used to help classify the nature of Saxon sites, whereby a single species, or group of species recorded from a number of sites, and compared against expected abundances for particular site types (Dobney *et al.*, 2007; O'Connor, 2001; Sykes, 2004). Most notably this has been done for the determination of high-status and ecclesiastical sites. However, it is also possible to use signatures to help define what animals were used for prior to being culled, and to identify areas of specialisation within a site. It is important to note, however, that although certain species can be used to infer a particular site type when found in combination with other signature species and archaeological criteria, the same is not true of isolated findings of signature species. For example, although birds of prey are often recovered from high-status sites, the finding of a single goshawk bone does not make that site high-status by association.

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2.4.1 Defining Deposits

There are many pathways through which bones are deposited on archaeological sites. Animals may die of disease or old age, and be buried as a complete carcass, either in a distinct grave, or with refuse from other origins. Some may be accidental inclusions, such as frogs and rodents which fall into pits, or small animals caught and killed by cats. Others are the result of anthropogenic processes such as butchery, tanning or horn removal and may be disposed of in discrete deposits, or again piled in with more general refuse. Another group belongs to those animals killed for ritual, or sacrificial purposes, then deposited in significant places, or with other, more general refuse (MacKinnon, 2004: 24-29). The largest group, however, results directly from food preparation and meal waste, which is disposed of in one of several stages, either by the butcher, from the kitchen, or from the table, and as such may enter the archaeological record as part of industrial waste deposits, from general refuse dumps, or as rubbish thrown away in the backyard. The refuse from food is indicative of the diet of a population, or even a household, but how can we distinguish between food and other types of animal bone waste?

The first clue available to archaeozoologists is the nature of the deposits themselves – articulated skeletons are likely to be the result of natural deaths or ritual depositions: the fact that an animal has been discarded as a complete carcass means it was probably not eaten. Some smaller animals, such as rabbit, birds, suckling pig, however, are more likely to have been cooked and taken to the table whole, in which case they will be deposited as nearly complete carcasses (Driver, 2004: 248). Background species such as rodents, amphibians, reptiles and some birds are most likely to have become part of the animal bone assemblage by means other than human intervention, such as pit falls and cat kills, and will also be recognised as complete or partial skeletons. Larger species such as cats, dogs and horses, may not have been regularly eaten, yet played an important roles such as pest control, guarding, herding, hauling and transport; these may also be expected to be disposed of with minimal disarticulation.

Animals that are part of the human food chain, however, will be treated differently. After slaughter, all elements from these animals will be redistributed in some way. The majority will

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be from domestic deposition related to meal-time refuse, yet a few select trades working directly with animals or their products, create bone waste and will be represented archaeologically. However, the latter can be distinguished from 'domestic' refuse. Distribution analysis of various carcass parts of cattle, sheep and pig can be used to understand where various activities took place. The best represented trades from such deposits are those relating to primary butchery, hide processing and bone, horn and antler working (O'Connor, 2003: 143). The summary of these specific activities given in Table 2.5 is based on data from early medieval urban contexts (e.g. Albarella, 2003: 77; Gidney, 2000: 71-76; MacGregor, 1989: 110; Serjeantson, 1989: 129-146; Wilson, 1996: 60-62).

The study of a large assemblage of waste from a middle Saxon bone-working workshop (Driver, 1984) showed a strong preference for bones from certain species (horse and cattle), and anatomy (metapodials, tibiae, radii and mandibles) given the larger working areas that such bones present. The relative abundance of horse bones and cattle and horse metapodia at this workshop compared to domestic sites is testament to their nature as animals/ bones that are commonly least butchered, possibly due to the prohibition of horse meat by this phase, and the low meat value of metapodials (Driver, 1984: 399-400). Furthermore, there was also selection of bones from mature animals, that would have provided dense bone, and of male cattle, which have slightly larger bones than females (Driver, 1984: 401). This has implications for the interpretation of faunal assemblages from domestic sites - if particular limb bones from mature male cattle and the majority of horses were specifically selected as raw materials for artefact production, there will be a skew against such animals in domestic assemblages. This may lead to an assumption of animal husbandry which is incorrect – i.e. that animals were smaller, younger, female and contained fewer horses than was the case if the bones used for raw materials are taken into account. This particular taphonomic phenomenon has been noted elsewhere (Driver, 1984: 402; Maltby, 1979: 38-40), and must be borne in mind in the interpretation of faunal assemblages.

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2.4.2 Status

Differences in the way status is displayed through food is dependent on the social complexity of the population. Van der Veen (2003: 415) suggests that in simple, egalitarian societies, there will be little variation in the staples of everyday food although the head of such a society may receive the first choice of meat. Luxury consumption is rarely seen, except during feasts, where large quantities of food are eaten by a large number of people. Luxury consumption in this case is a symbolic event, focusing on a significant quantity of food, and may be applied to the social structure of the early and even middle Anglo-Saxon period. However, within societies such as this, with little marked social stratification, dietary differences were probably also discernible by the giving and sharing of particular foodstuffs (Curet and Pestle, In Press).

In the case of hierarchical societies, which can demand aspects of provisioning, differentiation is increasingly seen in the consumption of luxury foods, and may be expected in the increasingly complex later middle and late Saxon phases. In the late Saxon phase, three broad classes of society are documented – warriors (elite), ecclesiastical (monks) and workers (peasants) (Ervynck, 2004: 215). Much effort has been expended to recognise the differences between them in the faunal record. These methods rely largely on the identification of 'luxury' foods, that are more commonly associated with the upper echelons of secular and religious society. For example, Sykes (2007b) has eloquently shown that a number of factors were employed to elevate the status of the new Norman aristocracy: the use of the hunt to procure diverse wild species; restricting the availability of wild animals through: the introduction of forest law; eating the 'best' cuts of meat, including new, exotic species such as fallow deer and peafowl; as well as the introduction of new social boundaries denoted by rituals, language and etiquette (Sykes, 2007b: 92-93).

The social significance of luxury goods has been summarised by a number of authors (e.g. Curet and Pestle, In Press; Driver, 2004; Ervynck, 2004; Grant, 1988, 2002a; O'Connor, 2003; Pigiere *et al.*, 2004; van der Veen, 2003) and the salient points, with particular reference to archaeozoological material, are noted below.

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- Redistributed foods under the control of the elite may be expected to be recorded in low frequencies on all sites in the distribution network, but in greatest numbers on high-status sites (Curet and Pestle, In Press).
- Restriction of procurement by the elite class, either by price or law the use of hunting to emphasise the control of land and wild animals belonging to the Norman elite is well documented (e.g. Almond, 2003; Cummins, 1988; Sykes, 2007b: 56).
- Difficulty in procurement, either in the ways by which food can be obtained or the scarcity of the animal itself –during the Saxon period this was true of hunting and hawking. Although in earlier phases it was the landholder's right to hunt on their own land, this was a prohibitively expensive and time-consuming activity (Almond, 2003: 40; Dyer, 2003: 18; Hooke, 1998: 157). Rare or exotic animals may have been acquired as imported goods which, although possibly abundant at the place of origin, might be rare at the place of consumption, thus the cost of transportation as well as limited availability makes them the more expensive (Ervynck *et al.*, 2003: 431).
- 4. Capacity to signal complex social messages, setting the consumer apart from those of lower rank – again best seen in the use of hunting by the elite. The presence of very large cattle in some areas is suggested by Dobney *et al.* (2007) to display status, as the larger the animal the more effort would have been required to feed it.
- 5. Abundance this may take two forms the first is that of sheer quantity of food, particularly from protein sources which are more time-consuming and expensive to cultivate compared to vegetables. Pigs are the least cost-efficient meat source in an agrarian economy (Ervynck, 2004: 218-219), and wild birds would have provided little nourishment for the energy expended in their capture (Albarella and Thomas, 2002: 26-27). Secondly is the abundance of good quality food, for example from tender, young animals, or the best cuts of meat, such as that from the back and upper limbs which is generally more tender than meat from the neck or extremities (Ervynck *et al*, 2003; Grant, 2002; O'Connor, 2003), although evidence for the consumption of pigs trotters and heads has also been found in high-status sites (Wilson, 1989: 245). Whilst the presence of very young animals may indicate a preference for more tender food (Pigiere *et al.*, 2004: 242), Grant (2002a: 21) warns that in some cultures mutton is

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preferable, and it is hard to tell if an animal has been cooked in a certain way, or with certain spices or wine, to make it more desirable. Nevertheless, juvenile animals slaughtered before their optimum meat-bearing age will result in a loss for the producer of working animals, thereby making them more expensive (Ervynck *et al.*, 2003: 433). In both these cases, food remains will be recognised archaeozoologically on many site types, but in greater proportions on high-status sites (Curet and Pestle, In Press).

6. Diversity of diet through the consumption of greater numbers of wild species and/ or fish, at a time when much of the general population could rarely expect to eat meat from domestic animals (Banham, 2004: 53) is also often true of high-status sites.

Certain problems exist when evaluating the presence of luxury items in the faunal record. For example, geographical location will affect the presence of high-status goods, with areas around major trading routes having better access to luxury goods and imported items (Loveluck, 2001: 111). Away from such areas, however, the acquisition of such goods becomes rarefied and inland sites may be better differentiated on the basis of the presence of small numbers of luxury items. Therefore, the ease of availability of goods will need to be considered when assessing a site.

Another problem is in the changing perceptions of luxury goods, as the status of an object is relative and contextualised, and will change through time. A luxury item that becomes attainable by many then becomes commonplace, maybe even a necessity, and so the sense of status will shift to another item (Van der Veen, 2003: 409). There are a number of ways that this occurs: from social emulation, creating a demand for an object which is subsequently supplied, to changes in technology. For example, van Neer and Ervynck (2004: 209-211) note that the change in technology that occurred to allow the large scale salting of herring in the 12th century meant that a previously rare, luxury good on inland sites was now available to a larger proportion of the inland population, and thus its previous status diminished.

Other difficulties in recognising the presence of luxury foods in the archaeological record have been noted. For example, Ervynck *et al.* (2003: 433) explains that the presence of luxury items

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lacking bones such as filleted meat and cartilaginous fish, will leave no trace in the archaeological record, and that the analysis of deposits containing probable luxury items should be carried out with other evidence such as ceramic and botanical remains. Most informative was an investigation carried out by Driver (2004) into the spatial distribution of animal bone remains from the back-yard of a single house in an English medieval urban context from Southampton. Within this area were several zones characteristic of certain types of waste – for example, those bones removed before cooking (larger mammal bones), and those from carcasses consumed at the table (chicken and young pig), from which he concludes that care must be taken when assigning social status to small assemblages, as those produced within one household can be extremely variable (2004: 248).

Ecclesiastical sites are less well defined archaeozoologically, although Ervynck (2004: 216-217) and Dobney *et al* (2007: 224) suggest they may be typified by a dearth of game species and pork, with an emphasis on fish, cattle and sheep. Settlements of the lower classes will likely have very few wild species, as the population will consume mainly cattle and sheep (Ervynck, 2004: 217). A summary of the signatures that may represent sites of different status is given in Table 2.6, which will be tested during the course of this research.

2.4.3 Animal Husbandry

The term 'animal husbandry' here encompasses the various methods by which people breed and raise animals for their primary products (e.g. meat, skin, marrow, horn), and/ or secondary products (e.g. milk, wool, manure, traction). The husbandry regime will differ depending on the products realised, and typical trends that may be observed in animal bone assemblages will be summarised below. For this thesis the discussion will centre on the main domesticates (cattle, sheep and pig), with other animals included as appropriate.

Below is a review of the main archaeozoological indicators for the use of animals for secondary products and meat production. The profiles given are specific to that product (Table 2.7), whereas in reality it is possible that mixed regimes were practiced, where animals were utilised for a range of products, such as using female cattle for milk production, and rearing male animals for beef production (McCormick, 1992).

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i) Meat

Meat would have been provided by all animals at the end of their life, but the most costeffective production of animals purely for meat is to cull those nearing maturation (between 2 ½ and 3 ½ years of age) - when they produce most meat in relation to the cost of feed and shelter (Noddle, 1990: 35; Ryder, 1983: 186; Trow-Smith, 1957: 54, 61). It must be remembered that on producer sites a breeding population of older animals would also be required.

Meat can be removed from the bones at the primary butchery stage or during processing, for example, when being made into sausages, or cured, in which case only a restricted suite of bones will be recovered from the archaeological record at the domestic site where the meat was consumed (McCormick, 2002: 26).

ii) Milk

In a milk-based economy, a large number of very young animals (lambs or calves) may be expected together with a substantial base of older females calving and being milked and a few older males as breeding stock (Legge, 1981: 42). However, others (McCormick, 1991b: 57, 1992: 201; Noddle, 1990: 37) maintain that the culling of lambs or calves is not always necessary for milk production, as humans can compete with the young animal, or wean them early, after allowing a week of suckling to establish lactation.

iii) Power

The ard required only two animals, and it has been suggested by some that the heavy plough would have required between 4-12 in a team (Bökönyi, 1995: 59; Fowler, 2002: 222; Noddle, 1990: 38; Trow-Smith, 1951: 68). In either case, more cattle would be necessary to allow for animals in training, 'spares' and breeding stock. The keeping of such teams has been described as "the equivalent of a modern farmer investing in a multi-purpose tractor and fittings" (Fowler, 2002: 222). Cattle used for ploughing would have been skeletally mature, as oxen were not trained at the plough until they were four years of age, and then they would have worked for an average of four further years (Salisbury, 1994: 20). A good indicator of the use

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of cattle for traction comes from pathologies to the lower limbs that occur as a result of excess loading of the joints (Bartosiewicz *et al.*, 1997; Holmes, forthcoming-e; Noddle, 1990: 38).

iv) Wool

Sheep can produce a clip of wool suitable for cloth production in their second year (Ryder, 1981: 187), and go on providing fleece until old age. The non-intensive exploitation of sheep for wool may not be noticed as a particular phenomenon in the archaeological record, as wool could be collected from any sheep on the farm used for milk or meat production. Once wool became an important resource, however, it could be recognised in a flock profile of largely mature male castrates, with a few breeding ewes and rams (Davis, 2002: 23).

v) Breeding

The presence of neonatal fatalities has long been recognised as direct evidence for the breeding of animals within or close to the site in question (O'Connor, 1989b: 17; Vince, 1994: 116). In early pastoral communities the rate of loss of animals in the first year of life is between 13% and 60% of lambs, and around 25% of piglets, due to disease and natural mortality of the weak (Noddle, 1990: 35).

2.4.4 Producer, Consumer and Distribution Sites

Archaeozoological techniques are invaluable when debating the strategies by which food and raw materials were procured. Site provisioning is closely connected to the economy of the site in its nature as a net producer or net consumer of animals and animal products. Producer sites are those on which animals are bred and raised, either for their primary products (meat, skin or horn) or secondary products (milk, wool, power and manure) (Davis, 1987: 155-162). Consumer sites are those where primary or secondary products are utilised, either through the consumption of meat or milk, or use of raw materials in manufacture. A site can be both consumer and producer, as in self-sufficient economies, whereby animals are bred, raised, slaughtered and eaten on site, being used for secondary products as required (Maltby, 1994: 85).

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One of the most important distinctions to make when considering the Saxon economy is between net producer and net consumer sites. Wilson (1994: 105) has considered the marketing of animals within and around medieval Oxford, and suggests using a subsistence economy as a base-line for judgements regarding mortality patterns of animals from producer sites that were supplied through a market (or tributary system) to a consumer settlement. Wapnish and Hesse (1988), in their study into the urbanisation of the Bronze Age Levant confront a problem similar to the one associated with the provisioning of Saxon 'urban' sites: using mortality profiles to investigate the specialisation of animal husbandry, and the evidence for exchange networks. They suggest the following signatures: in a self-sufficient economy animals will be present at all ages from the herd or flock; producer sites will typically have birthing casualties as well as older animals culled from the breeding stock; and consumer sites will have a large proportion of market age animals, and very few of breeding age (Wapnish and Hesse, 1988: 84).

The provision of goods to a net consumer or redistribution site is dependent on surplus production, which can be interpreted in one of two ways: a supply of excess animals and products by the net producer sites; or a specific demand for particular goods from the net consumer site that is catered for by producers. The latter is a possibility when considering the ambiguity between the middle Saxon aristocratic preference for a meat diet over that of the farmer, which was based mostly on vegetable and grain products, suggesting that the presence of animals in the food rent *"may reflect aristocratic taste rather than the balance of the peasant economy: pastoral goods here would appear, not as the principal economic resource of the peasantry, but only their principal surplus product"* (Wickham, 1994: 139).

Conversely, by the time a market economy emerges in relation to the supply of late Saxon 'urban' settlements, O'Connor (1989b: 15) suggests that the meat provided had little to do with demands for food from inhabitants, but more to do with rural economy and what excess stock there was to get the best return as wool and corn prices fluctuated. Some attempt to ascertain whether rural producers were free to produce the most profitable stock was made by O'Connor (1992: 102-105). He suggests that this is discernible through the mortality profiles of animals, comparing the proportion of old animals used for secondary production, which had

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paid for their living costs, against younger animals which were too young to have been significantly productive, instead being slaughtered during the 'investment' phase of life. Another element of the animal economy which should be borne in mind is the keeping of part of the flock for insurance purposes on net producer sites, in case of hard winters, disease or food shortages (O'Connor, 1992: 104), which may be reflected in the culling of excess animals after winter, seen archaeozoologically in a number of animals culled before reaching their 1st year.

Other interpretations of site types based on patterns in the faunal remains are given by Clark (1987), involving the connections between exchange mechanisms and the necessary stockraising strategies and their recognition in the faunal record. The most pertinent of these are the interpretations of self-sufficient family groups, through various stages of inter-regional exchange, culminating in a full market exchange (Table 2.8), which may be directly comparable to the animal bones from Saxon sites. The presence of an economy based on the redistribution of food has also been proposed, where the 'filter' placed on the available goods may be recognised through restrictions in supply (Crabtree, 1996a: 64; O'Connor, 2001: 55), leading to a small range of species, and a predominance of those which give the greatest quantity of meat (i.e. pigs and cattle). The recognition of such a distribution network has been further described (Zeder, 1991), which may include three aspects of the animal economy:

- a restriction in the species available for consumption;
- a focus on a specific age group;
- and the provisioning of specific carcass parts.

This was used as a basis for research into the provisioning of an early urban site of Titris Hoyuk, Turkey (Allentuck and Greenfield, 2010), where evidence was presence for the indirect distribution of animal products to the site from elsewhere. They suggested, however, that there was capacity for animals to be supplied from various age groups and in the form of a wide range of anatomical elements (Allentuck and Greenfield, 2010: 23).

The greatest problem to acknowledge throughout the analysis, is that with more complex distributions of animals, the true animal husbandry regime of a producer site is likely to be

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distorted by the animal bones of urban sites, as the presence of animals in towns is *"the end point of a very long and complex series of processes beginning with the birth and rearing of the original livestock at a farm or farms possibly far removed"* (O'Connor, 1988: 75). Other limiting factors include the likelihood that different producers will meet different needs of different consumers within the same settlement; and the increased depositional complexity of urban sites. However, caution should be followed when making statements regarding rural animal husbandry based on assemblages from consumer sites (e.g. Locock, 1999a: 10), if a study can facilitate a comparison of assemblages from both consumer, producer and distribution sites within a region (as in this case), it may be more feasible to make such an assessment (Maltby, 1994: 85).

2.4.5 Use of Space Within a Settlement

In the last thirty years or so, research questions asked of archaeozoological material have moved on from those simply regarding diet and husbandry, towards those aimed at recognising areas of different activity within a particular site. Animal bones can be used to understand human use of space, distinguishing between specialist working and domestic areas. This was based largely on the work of archaeologists such as Binford (e.g., 1981; 1984) and Hodder (1976) who used ethnographic research to investigate the spatial functioning of sites. The emphasis on using animal bones in spatial analysis in Britain was introduced by Wilson (1989; 1996), who used modern data on refuse disposal to understand the intra-site relationship between domestic and butchery areas of past populations, building on Maltby's (1985: 49-57) critical evaluation of the factors affecting the differential deposition of carcasses within an archaeological site.

At the simplest level, spatial analysis of animal bones takes the form of plotting aspects of faunal remains such as species representation and anatomical representation for a particular phase on the site plan. It has been successfully used to identify the central, domestic area of the medieval town of Oxford, for example (Holmes, forthcoming-b; Wilson, 2003). Modern surveys can include the use of Geographic Information Systems (GIS), which can be used to explore trends from the impact of the landscape and topography on animal behaviour (Byerly

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et al., 2005), to fragmentation patterns of bone (Marean *et al.*, 2001). Of greatest relevance to the use of spatial analysis on Saxon sites, is Nardini and Salvadori's work on the visualisation of faunal assemblages from several sites (Nardini and Salvadori, 2003: 139). A similar approach is being carried out on a multi-period rural settlement to investigate the changing focus of the settlement (Holmes, forthcoming-d). From these studies, it is becoming clear that there are three main types of refuse disposal that may be reflected by animal bone assemblages:

- areas for the deposition of waste from specific crafts or trades;
- domestic areas;
- zones of differing status.

It is important to identify areas where the deposition of waste from specific industries – butchery, hide-processing and craft or industrial processing – has taken place. The separation of specialist production and domestic areas is vital, as the analysis of domestic deposits are dependent on the presence of contemporary, 'average' deposits, not butchery or industrial waste (Maltby, 1994: 88; O'Connor, 2003: 87). However, the nature of butchery or hideprocessing waste (in the quantity of waste and undesirable smell resulting from it) is likely to mean that it was not disposed of in the immediate vicinity of domestic areas, and it may be expected that dumps of such deposits will occur well away from the general area in which it was created, probably outside the boundary of the settlement (Rixson, 1989: 58). Waste from craftsmen may be much less in both bulk and unpleasantness, and therefore perhaps disposed of nearer to the place of origin. This is based largely on supposition, and will only be confirmed or rejected by the investigation of anatomical elements within different urban deposits.

Although certain distributions of anatomical elements may be indicative of specific trades, this is not always the case, and often the presence of agglomerations of certain elements could be the result of more than one specialised craft. For example, dumps of cattle horn cores could be waste from a horner, yet they may just as likely be from a butcher or hide processor (Prummel, 1978: 400), who may or may not remove horn cores or the horn itself to be sold to horners. This introduces the need for a more holistic approach to any explanation, where an apparently industrial deposit should be interpreted alongside a number of other factors such as features

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(e.g. tanning pits), other remains within that deposit (sheep metapodia), and other artefacts that may relate to the craft (O'Connor, 2003: 73; Serjeantson, 1989: 133). Additionally, it is probable that crafts such as horn and bone working were so closely linked to other trades by providing raw materials, that they were carried out in an area near to butchers and hide processors, so that the raw materials were close to hand, as evident in medieval York, Oxford and Northampton (Wilson, 1996: 61-62). This has implications for spatial patterning, suggesting that a whole area of a site may be distinguished only as one used predominantly by craft and industry in general, rather than being purely domestic.

To identify central or peripheral areas of a site further analysis of spatial patterning may be used to define domestic areas, and even individual houses. Wilson (1996) has extensively investigated trends in the disposal of bones at many sites from prehistoric to medieval periods with consistent results that may be applicable to Saxon sites. For example, he illustrated differences in central and peripheral areas within medieval Oxford by looking at distributions of smaller fragments from medium-sized mammals (sheep and pig). Wilson (1996) found that finer debris will be more likely to remain as domestic refuse at its origin (i.e. as food waste associated with the domestic centre), whereas larger fragments and bones from larger mammals (horse and cattle) are cleaned, or scavenged, from a living area, to areas of general refuse on the periphery of a site.

Finally, as food eaten in households of varying social standing (e.g. the elite, ecclesiastical or peasant classes) may also be reflected in the disposal of refuse (see section 2.4.2). For example, the presence of hunted species in the urban environment can be used to reflect the buying power of the inhabitants, and therefore illustrate areas of higher status (O'Connor, 1989b: 22). Several incidences of archaeozoological deposits specifically attributed to households of higher or lower social standing, and religious preferences have been noted from sites of Saxon to post medieval date (Daróczi-Szabó, 2004; Gidney, 2000; Groenman-van Waateringe, 1994; Ijzereef, 1989; Scott, 1996). However, this is dependent on the assumption that such material was deposited near to the household from which it originated.

Chapter 3:

Site Classifications: Their Relevance from an Archaeozoological Perspective

3.1 Introduction

As this research involves comparisons between particular site types, it is necessary to first investigate the validity of such definitions. There is insufficient space for a re-classification of sites based on groupings in the data, although this would be an alternative, more rigorous, approach to the problem of defining site typologies. Instead, this chapter will be used to check the validity of existing site classifications prior to the analysis of the data. By comparing the archaeozoological profiles of settlements of the same site type, a critical assessment will be made regarding whether classifications are sufficiently consistent to permit their aggregation for the purposes of assessing temporal and geographic variation across Saxon sites. Because this investigation is not concerned directly with trends in the animal economy or provisioning networks, groupings in site types will be observed using *the frequency of sites within each respective classification containing signature species* detailed in Chapter 2.4.2 rather than comparing the quantified data from each site.

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The descriptions given in each site report were used to label sites in the data set (Table 3.1), as described in the Methodology (Chapter 2.2.2). The classifications used here fall into two categories: the first is the distinction between rural and urban sites; and the second is more specific to the site types of each particular period. The majority of those sites in the latter category are described as 'domestic', unless they are recorded as having a specific function or status. As noted in Chapter 1.6, sites labelled as urban are, for the most part, not fully functioning urban centres with all the social, legal, administrative, ritual, symbolic, military, distributive, economic and industrial aspects associated with Roman or medieval towns (as defined by Dyer, 2003: 58; Perring, 2002: 10). It is, however, a convenient label for sites that contain a population not employed full time in the agrarian economy.

The proportion of rural to urban sites (Figure 3.1) clearly increases between the early, middle and late phases. This reflects mounting social complexity (see Chapter 1.3), progressing from an almost exclusive rural settlement pattern in the early Saxon phase, to a greater concentration in populations, where c.60% of sites were recorded as urban from the late Saxon phase (even if the vast bulk of the population remained in the countryside.

More specific site classifications are illustrated in Figure 3.2, showing that the early Saxon phase is characterised by very few high-status, religious and industrial sites. Settlements within Roman towns were included as a distinct site type, as their exact nature has not yet been established. The middle Saxon phase is represented by the greatest variation in diversity and nature of recorded settlement types: wics and other trading sites appear, and religious, highstatus and industrial sites occur in greater proportions. From the late Saxon phase burhs and Danish towns are founded, as well as military sites in the Norman phase, but trading, highstatus, religious, and industrial sites persist through to the Norman phase.

It is probable that many of the functions recorded as individual sites actually existed together on a single site, particularly in the middle and late Saxon phases. This was recently noted at Flixborough (Dobney *et al.*, 2007; Loveluck, 2001) where large scale excavations revealed evidence for high-status secular and ecclesiastical inhabitants, as well as craft activities. Accordingly, some of the sites labelled here as industrial, high-status, trading or ecclesiastical

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may in fact have been part of the same site type, which included aspects of all these functions within spatially distinct areas of one settlement.

Five variables will be analysed to assess the distinctiveness of site classifications: environment; regionality; status; agricultural economy; and re-distribution. The first will be investigated to understand the environmental factors likely to affect the types of animals kept in a particular area; the second to give an understanding of any apparent regional differences, particularly in the middle and later Saxon period, when the country becomes more widely divided; the latter three aspects will be considered by phase, in terms of urban-rural distinction and site type (defined above), using animal bone 'signatures' (Chapter 2.4) relevant to the aspect being investigated.

As this is an investigation into the reliability of site classifications, data will be represented in terms of the presence of signature species on each site type, rather than abundance. Investigations into more nuanced differences between sites will come in later chapters.

3.2 Environment

Before attempting to use archaeozoological data to produce site classifications it is necessary to consider the extent to which environmental factors influence the range of species present and the nature of their exploitation. The role of landscape, topography, geology and climate in the siting of a settlement, and on the type of agriculture practised has been debated widely, varying from the view that the type of farming carried out depended principally on such factors (Wickham, 1994:130; Fowler, 2002:51; Brookes, 2003:101), to the proposition that the population was less influenced, and general methods of mixed agriculture occurred on all types of landscape, regardless of environment (Carver, 1994: 5). There is evidence that good agricultural land was the focus of settlement, and that the lowlands were most densely populated (Figure 3.3), which is consistent with the proposal given in Chapter 1.3, where it was suggested that low population pressure meant minimal competition for prime agricultural land. It is thus likely that the interaction between topography, geology, climate and human activity on land use is closely related, if factors relating to competition and the need to colonise marginal land are reduced (Ellis and Mellor, 1995: 216).

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The height of a site can often determine the animal husbandry practiced, with greater limitations posed as the altitude increases. Land becomes more suitable for pastoral activities rather than arable, as it gets higher (Ellis and Mellor, 1995: 218). Sheep prefer well drained soil, given their propensity to get foot rot and liver fluke in waterlogged conditions (Goodwin, 1989: 173,194), and are well suited to the tough environment and poor vegetation found on upland sites (Batey, 1988: 117; Grigg, 1989: 230; Ryder, 1983: 710). By contrast, lowland areas are traditionally more suited to arable production and raising cattle (Grigg, 1989: 42), particularly zones close to river valleys, given their need for a plentiful supply of water and good pasture. Land use is also dependant on the underlying geology – during the Saxon period woodland was located mostly on damp clay soils, whereas heath was more common on sand or gravels, and arable land of lowland areas is often on alluvium (Gelling, 1974: 98; Hooke, 1981: 180). It may be assumed that soils were cultivated that would provide the best yields for arable production, such as loams, silts and loess (Limbrey, 1975: 243-244). The geology categories used are described in Table 3.2; all heights above Ordnance Datum (AOD) and geology types were included within a 1km radius of each site.

3.2.1 Climate

Despite limited data sets, the climate of Roman England has been described as warm and dry, with high sea levels (Lamb, 1981: 57). From c.AD 500 this changed, leading to colder summers and a generally wetter climate, with little improvement before A.D. 650-700, coinciding with the middle Saxon phase, when summers became increasingly warmer and drier, and winters colder. This trend continued into the middle of the late Saxon phase, when a climactic optimum was reached (Briffa and Atkinson, 1997: 106; Lamb, 1981: 61). However, these small fluctuations in climate would probably have had little impact on non-intensive farming methods, or the livestock themselves.

3.2.2 Geology

The effect of both superficial geology (soil types), and the bedrock (underlying rock types) on the proportion and type of species present was investigated. The proportion of sites recorded

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on various geologies were consistent through time (Figure 3.4), where 50-68% were situated on soils resulting from water deposits, and 52-66% on a porous bedrock. Of the other soil types, fairly similar proportions of sites were found on coarse grained (9-12%), medium grained (9-15%) and glacial deposits (5-16%). Fewer sites were located on fine-grained soils (4-7%) and peat (1-7%). Sites were situated slightly more frequently on poor draining rock types (19-28%) than medium draining types (15-24%), and only one site in the early phase was on volcanic rock. Such consistency through time is not too surprising, as the soils which accumulated through water action would produce prime agricultural land (Limbrey, 1975: 244), while porous geology would have afforded good drainage, properties that are desirable when siting a settlement. Peat and clay areas were less commonly used, as they present poor agricultural land, being either very acidic or poor draining and hard to work, respectively (Limbrey, 1975: 244).

A more detailed look at the effect of the underlying geology on the proportions of domestic animals (cattle, sheep and pig) found on sites showed little variation (Figure 3.5), although in the late Saxon phase sheep were recorded on sites predominantly situated on water deposits with a porous bedrock, which may reflect the tendency for sheep to fare best in well-draining conditions. However, there is nothing to indicate deliberate preference for a particular species on a particular geology type.

3.2.3 Topography

Sites were recorded according to their height above (or below) ordnance datum and the proportion of the main domesticates on each site are illustrated in Figure 3.6. To observe nuances in the majority of sites, outliers i.e. the minority of sites located above 120m AOD, were excluded to make trends in the majority easier to recognise.

A consistent pattern exists in the early Saxon phase, where species proportions were similar on sites at all heights. Cattle were generally found in greater numbers than sheep, which, in turn were more common than pigs. From the middle Saxon phase onwards, however, a change occurs whereby sheep are found in increasingly high numbers at higher altitudes, and cattle are correspondingly present in lower proportions, compared to their almost exclusive

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predominance in assemblages on lowland sites. This change is notable on sites over 60m AOD in the middle Saxon phase and Norman phase, over c.62m AOD in the late Saxon phase, and over 40m AOD in the Saxo-Norman phase. In all phases, the proportion of pigs does not seem to be affected by altitude. This trend was tested using Spearman's rs, which resulted in a correlation between the proportion of cattle (when given as a % of the cattle and sheep assemblage) and height of the site, at 99% significance for the middle, late and Saxo-Norman phases (Table 3.3).

Although sheep are linked with pastoral upland economies, uplands are defined as land over the 240m (800ft) (Allaby, 1983: 1; Darvill, 1986: 4), or 305m (1000ft) (Milward and Robinson, 1980: 9; Roberts, 1955: 1) contour (Figure 3.7). Thus, 60m is not high enough to be indicative of upland sheep farming – only one site from the whole dataset could be classed as an upland settlement (Yeavering), at c.310m AOD. This trend may therefore reflect the use of lowland areas for growing crops, which may be associated with higher numbers of cattle, through their use for traction (Fowler, 2002: 223).

If the data do not reflect the predominance of sheep in upland farming, perhaps they indicate a preference for sheep farming on more hilly areas. Sites were therefore plotted to see if there was a relationship between a predominance of sheep on sites with a greater difference in height within a one kilometre radius of the site (Figure 3.8). Results indicate a very weak correlation with this premise, where, from the middle Saxon to Saxo-Norman phases, sheep were more common on sites with a greater difference in the surrounding topography. This suggests that sheep were more likely to be kept on sites in hilly areas.

In all phases the majority of sites excavated were situated below 60m AOD, a proportion which increased with time (Figure 3.9). This is likely a result of the increasing nucleation of sites that occurred between the middle Saxon and Norman phases (Hooke, 1995: 98), resulting in a greater density of sites on lower agricultural land. The remaining land, above 60m AOD, would therefore become marginal to the main settlement, and may reflect the transhumance of sheep to new pastures for summer grazing. Short distance, 'vertical transhumance' is described by Wickham (1994: 132, 152-153), and Hutcheson (2006: 75) as existing from the 7th

century, as a part of the agrarian economy of estates with suitable pasture lands. This suggests that these areas may well have been less useful for arable production, and more suited to sheep grazing.

One other possibility may be in the deliberate provisioning of sites with sheep or cattle. Figure 3.10 a-c shows the proportion of sheep recorded at urban and rural sites against their height AOD. In the middle Saxon phase the very nature of wics, focused on the low-lying areas of coast or major rivers, corresponds to a greater prevalence of cattle, with a higher number of sheep on rural sites situated on higher ground. Such a relationship is not apparent in the late Saxon and Saxo-Norman phases.

Whatever the cause, the presence of sheep in higher numbers on more elevated sites, and cattle on lowland sites has implications for any possible trends seen in site classifications, and so this factor must be taken into account in all further analyses.

3.3 Regionality

Regional differences in the animal species recorded was also considered, as another factor that could affect general site distinctions noted in England as a whole. For this analysis, all sites with 100 or more bones from cattle, sheep or pigs were interpreted using Principal Component Analysis (PCA) by phase and region (Figure 3.11).

Given the changes to administrative regions between phases, the definitions of regions also varied. Therefore, to simplify the data and render broad regional patterns visible, 'macroregions' were defined for the numerous kingdoms of the early Saxon phase and shires in the Norman phase. Defined according to their location in the north, east, Mercia and Wessex. The late Saxon phase was further split to include sites from within the Danelaw. In reality, the regional boundaries were most likely fluid, particularly given the long chronology between phases, and especially in the early phase (Hooke, 1998: 45).

There are no apparent regional trends in species abundance during the early phase (Figure 3.11a). However, the PCA (Figure 3.11b) indicates that there is a definite grouping between sites from Wessex and Northumbria in the middle phase, and the northern Danelaw

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(Yorkshire, Lancashire, Cumbria, Durham and Northumberland) in the late Saxon phase (Figure 3.11c). During the middle Saxon phase, sites from Wessex generally have more pig and cattle than sites from Northumbria. With the creation of Danelaw in the late Saxon phase there is an increased emphasis on cattle husbandry in the north, bringing about a reversal of the trend noted in the previous phase, given that Wessex sites now contain more pigs and sheep. Sites from the midland and eastern Danelaw are also distinct from the northern area around the Danish capital, although there is some overlap between northern and eastern Danelaw sites. This is reflected in fewer sheep from the eastern region, and fewer cattle from midland areas. Sites in Mercia span the whole range of species proportions in both phases, and indicate far less regional specialisation.

During the Saxo-Norman phase, cattle were more common in the north and central midland regions, and cattle, sheep and pigs were found in similar proportions in the east-midlands and east (Figure 3.11d). Although there is less data for the Norman phase, cattle are again the most common of the main domesticates in northern counties (Figure 3.11e), as well as in the east, while sheep once again become more common in midland areas.

Although there are apparent trends in the relative proportions of species kept in the north and south in the middle and late Saxon phases, and in the north, east and midland areas in the Saxo-Norman and Norman phases, many are not consistent between phases, and sites from other regions contain more varied species proportions. This may be indicative of local husbandry preferences, or specialisation undertaken by farmers within a particular area, regardless of political boundaries. However, if the general areas where certain species predominate in later phases are taken as a 'snapshot' in time (Figure 3.12), it is possible to draw a number of generalisations:

- The switch from a sheep-based economy in Northumbria in the middle Saxon phase to one focused on cattle at the start of the Danelaw in the late Saxon phase, suggests a cultural difference, which persists into the Norman phase.
- The move from an economy in Wessex based more on cattle and pig in the middle Saxon phase, to one where sheep become more important relative to cattle in the late

Saxon phase may reflect a move to wool or milk production or a growing preference for lamb. It must be noted that cattle numbers were still high in this area, but sheep and pig numbers were in the majority.

- The more fluid variations in species proportions in midland and eastern regions through time suggest changing husbandry needs which may be related to fluctuating cultural affiliations in these areas, from their inclusion in the Danelaw in the late Saxon phase, to an adjustment to smaller administrative blocks as they were re-absorbed into Saxon and Norman regions.
- The more variable species represented on sites in the early Saxon phase, and western and south-western areas, in the later phases could be an indication of scattered, isolated farming communities with little agricultural organisation.

A detailed investigation into the causes and nuances of these regional differences will be undertaken in Chapter 5.

3.4 Status

As noted in Chapter 2 (2.4.2), the social status of the inhabitants of a site can be observed in a number of ways (Table 2.5). Archaeozoologically, three areas of analysis will be considered using various signature species, that can be indicative of high-status sites: evidence for hunting through the presence of wild species; the consumption of animals which would not have been used for secondary products (pigs); and a procurement of the most desirable parts of the carcass – the meat-bearing bones.

3.4.1 Hunting

Hunting can be inferred through the presence of wild animals on a site that may have provided meat or fur for the inhabitants. This includes edible animals such as red and roe deer, hare, wild pig and wild birds, and others such as wolf, bear, fox and badger that would have provided pelts. For the purposes of this analysis, however, only the presence of animals likely to have been eaten will be investigated. As rationalized in section 2.3.2, the comparison of wild species was carried out on sites with a NISP of over 300 of the main domesticates, and the
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proportion of wild species calculated as a proportion of cattle, sheep and pig combined (reports which did not quantify or analyse bird bones were not included). Although this does not allow for taphonomic differences between species of different sizes – e.g. hare and red deer, or birds and mammals – calculations were made independently for each species to provide a like-for-like comparison. Smaller species such as birds and hare will often be underrepresented in the faunal record, but it is expected that, if they were present in greater numbers on sites where hunting was practised, they will be recorded more frequently in the animal bone assemblage. Another problem regards the separation of wild from domestic pigs. Since this is rarely reported, these data will not be included.

Other animals which may be drawn on to infer the occurrence of hunting on a site are those which were used to hunt, such as birds of prey. However, it must be stressed that an absence of these animals does not mean that hunting did not take place, as hares may be caught by snaring, birds in nets, and deer by spear or arrow (Almond, 2003). Conversely, their presence does not confirm hunting activity: many birds of prey occur naturally in the wild. That said, they do provide useful supplementary evidence. Birds of prey can be grouped into those traditionally used by the falconer, those more likely to be scavengers, and others which fall between the two latter categories, as defined by Yalden and Albarella (2009: 137), although for the purposes of this investigation, only falconry birds (sparrowhawk, goshawk, peregrine falcon and other falcon species) will be included.

i) Hunted animals

When the relative proportions of sites containing wild species are analysed (Figure 3.13), an increase in the wild species recovered from rural sites over time, and a corresponding decrease on urban sites is evident. In the early Saxon phase, wild species are found on all urban sites (i.e. within Roman towns), and red deer and wild birds continue to be recovered on a greater number of urban sites in the middle and late Saxon phases, although roe deer and hare occur chiefly on rural sites. In the Saxo-Norman and Norman phases, however, all wild species are more common on rural sites – implying a move of the elite population consuming wild animals from urban to rural contexts.

With regard to existing site classifications (Figure 3.14), in all phases many sites where wild species were recovered were domestic in nature, yet there is evidence for differences in the proportions of species recovered from sites of different classifications:

- In all phases, domestic sites generally contain least wild species. Given the smaller sample sizes from non-domestic site types, this suggests that such species were more likely to be recovered from sites with particular social or functional roles. However, during the Saxo-Norman phase, wild species were recorded from a greater proportion of domestic sites, perhaps indicating a change in their availability to the general population;
- In the early Saxon phase hare and wild birds were commonly recorded at Roman towns and high-status sites;
- There is a more varied pattern in the middle Saxon phase: red deer are recovered more often on high-status, trading, wic and burh sites; hares are not recovered from any of the urban sites (i.e. wic, trading or burh); roe deer and wild birds were also commonly recorded on high-status, trading and wic sites, but also on ecclesiastical and industrial sites;
- In the late Saxon phase, red deer and wild birds were recorded on all site types. Hare
 and roe deer, however, were more common on ecclesiastical and high-status sites. Of
 note is the presence of roe deer on all eight high-status sites;
- A large number of high-status, trading and ecclesiastical sites in the Saxo-Norman phase contain hare and deer species. Wild birds were recorded on similar proportions of all site types, although not on the trading site;
- During the Norman phase, a similar proportion of all sites contained red deer; hare and roe deer were recorded on more ecclesiastical and high-status sites; and wild birds at ecclesiastical sites.

That many of the site classifications show both presence and absence of hunted species suggests that there may have been a necessity for hunting to provide meat, or that they represent sites of different social status. In general, though, wild species were more likely to be recovered from high-status, ecclesiastical, industrial and trading sites.

ii) Birds of Prey

Only 25 examples of birds that may have been used for falconry were recorded from the entire data set. At each site generally only a maximum of one such species was observed. The general paucity of bones suggests that this method of hunting was not widely employed during the Saxon period.

The occurrence of birds of prey that may be used to hunt game was first plotted to look at differences between urban and rural sites (Figure 3.15). In all except the Saxo-Norman phase, these species are more commonly represented on rural, than urban sites, which is only consistent with the presence of hare and roe deer from the middle Saxon phase onwards, other wild species being recovered from urban sites during the early to late Saxon phases. However, it does reflect the predominance of wild species at rural sites during the Norman phase. This dichotomy implies that there is no relationship between the presence of birds of prey and the procurement of wild mammal species to supply urban sites in Saxon phases. However, the act of falconry itself should also be considered, given that it is more likely to take place in a rural context. It is therefore maybe not surprising that species indicative of such a sport occur less commonly on urban sites. It should, however, be reiterated that the early wics and burhs, although described as urban for the purposes of this section, would not have been as densely populated or built up as the later medieval towns that came after.

These trends between urban and rural sites are further explored, taking into account specific site types (Figure 3.16a-e). Only one example was recorded in the early Saxon phase, a sparrowhawk from a rural domestic site, but birds of prey became more common from the middle Saxon phase. They are consistently recovered from ecclesiastical sites, and in the Norman phase, this is the only site type on which they are recorded. Their presence on high-status sites is limited in all phases, and in the middle Saxon and Saxo-Norman phase they are found at a similar proportion of high-status, wic and burh sites. Only in the late Saxon phase do high-status and ecclesiastical sites show similar proportion of birds of prey.

As with the incidences of hunted animals, there is nothing to suggest that specific site types were regularly and consistently used for hunting, although signature species associated with

the sport are more often recorded from re-used Roman towns, ecclesiastical, high-status, wic, and industrial sites.

3.4.2 Non-Productive Animals

Another indicator of status is the ability to feed and keep animals that give no secondary produce (e.g. milk, wool, eggs). Pigs are a prime examples of animals which mature quickly and are good converters of food to meat (Grigg, 1989: 189). However, they are of limited use for secondary products, with the exception of manure. It is for this reason that they are often recovered in smaller numbers than the other two main domesticates – cattle and sheep - as they are fairly high cost animals in an agrarian economy which may necessitate the production of power, milk and wool over meat. These animals also show little variation between regions and environments as discussed above (section 3.2).

The proportion of urban and rural sites from which pigs were recovered from over 20% of the assemblage (see Chapter 2.5.11 for an explanation of this cut-off point) is given in Figure 3.17. This shows clearly the same changes observed in the hunted and hunting species, where there is a move from the predominance of these species from urban sites in the early and middle Saxon phases, until they are more common on rural sites from the Saxo-Norman phase. In the late Saxon phase they are present in similar proportions on both rural and urban sites.

When looked at in terms of site classifications (Figure 3.18), there are few consistent trends, although during the early Saxon phase, a high proportion of pigs were recovered on nearly all of the ecclesiastical and Roman town sites, but less often from high-status and domestic sites. In the middle Saxon phase they are most commonly recorded on high-status sites, wics and other trading sites. They remain predominant on high-status sites in the late Saxon phase, but also on ecclesiastical sites. Interestingly, in the Saxo-Norman phase, high numbers of pigs were noted on all industrial sites, as well as a high proportion of high-status, trading and domestic sites. By the Norman phase pigs are generally only recorded in high numbers on ecclesiastical and high-status sites. These patterns are reflective of those noted in the sites containing wild species and birds of prey, where high proportions come from high-status and wic sites, and, to a more varied degree, from ecclesiastical sites.

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3.4.3 Good Cuts of Meat

The final analysis regarding the apparent status of sites concerns the presence or absence of particular cuts of meat. Figure 3.19 shows the parts of the carcass of cattle, sheep and pig recovered from all sites. These were divided into seven categories which reflected the prevalence of particular anatomical elements at individual sites: all parts of the carcass present; meat bearing bones (upper limbs); heads and feet (indicative of primary butchery or skin processing); lower legs (poor meat bearing bones); head; horns; and dressed carcasses, where the feet and legs have been removed. The analysis of status is based on the assumption that the best meat parts are from the upper limbs, from which is considered the best quality meat today (see Chapter 2.3.3 and 2.4.2 for a full discussion of this aspect).

In all phases, the majority of sites contained all parts of the carcass, suggesting that animals were commonly butchered whole, with little movement of, or demand for, specific body parts between sites. This was particularly evident for the pig assemblage, although there was some evidence for a predominance of pigs heads on some sites, often coinciding with high-status sites, particularly in the late Saxon and Norman phases. Another trend of note is the high proportion of the best meat-bearing bones recorded on a number of high-status sites for both cattle and sheep from the late Saxon phase onwards, and at a trading site in the middle Saxon phase. Other than this, there is little patterning in the distribution of particular parts of the body to particular site types, apart from a general increase in the variation of deposits in the late Saxon phase.

3.5 Agricultural Economy

Modes of agricultural production are represented by animals of different age classes. Here, the differences between animal husbandry – those indicative of regimes based predominantly on meat production, secondary products or a mixed economy – will be examined, as described in Chapter 2.4.3. The term 'mixed economy' is used to describe one in which animals were used for small-scale secondary production, such as wool or milk, as well as meat. The proportion of species kept will also be analysed to investigate differences between sites. Pigs were kept for meat on all sites, so will not be investigated in terms of animal husbandry.

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3.5.1 Mode of Production

In the early Saxon phase cattle and sheep were generally kept for meat, with the exception of two sites, where cattle mortality curves are more indicative of a mixed husbandry (Figure 3.20). In the middle Saxon phase a reduction occurs in the proportion of sites where cattle were culled at the point of maturity, purely for meat – only seen on two urban sites – and not at all in subsequent phases. Instead, there is an increase in their use for mixed husbandry on all sites, as well as a gradual increase in the use of cattle for secondary products such as milk or traction through time. The proportion of older animals observed on rural sites also increases. Sheep evidently remain of great importance for meat production in all phases, and there is little difference between rural and urban sites, although in the late Saxon phase, the proportion of older animals – those used for secondary and mixed husbandry strategies are more common on urban sites.

When specific site types are investigated (Figure 3.21), it is clear that, in the middle Saxon phase, cattle of prime meat age were recovered from trading and wic sites, and those used for secondary products from domestic sites. However, the compromise in animals used for meat and secondary products is noted on all site types. In later phases, the majority of sites reflect the use of cattle for mixed purposes, although those reflecting purely secondary production were also recorded on a variety of site types.

In all Saxon phases sheep are found at ages consistent with the production of meat from all site types. In the middle- and late Saxon phases, sheep culled primarily for meat were recorded at all ecclesiastical and trading sites, from the late Saxon phase at all domestic sites, and in the Norman phase at high-status sites, too. Older sheep were recorded on urban sites – wics in the middle Saxon phase, and burhs and Danish towns in the late Saxon and Saxo-Norman phases, as well as industrial sites in the late Saxon phase, a Saxo-Norman high-status site and both Norman ecclesiastical sites.

Few trends exist between animal husbandry and site type. The presence of younger cattle on urban sites in the middle Saxon phase could mean that either those living in these early towns: were supplied with cattle surplus to the requirement of the wider agrarian economy; bred

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their own animals for meat; or that they could afford to buy in younger animals specifically for meat. However, sheep were generally older on urban sites, which indicates that they were used mainly for secondary production before being deliberately supplied to such sites. With these exceptions, though, cattle and sheep appear to be kept for products deemed important in a local context, rather than through the demand required by specific site types.

3.5.2 Species Representation

Great variation exists in the proportions of the three main domesticates recovered from urban and rural sites (Figure 3.22), and few trends observed. In all Saxon phases urban sites have higher numbers of pig and cattle than many of the rural sites, at which sheep are more common. In the Saxo-Norman phase, there is little difference apparent between urban and rural sites, yet by the Norman phase, rural sites have greater proportions of pig.

When more specific site types are examined using PCA, some inferences can be made, suggesting that some species were more- or less-likely to be recovered from particular site classifications (Figure 3.23):

- During the early Saxon phase more cattle and pigs were recovered from re-used Roman towns than other site types.
- Wics, other trading sites, and industrial sites in the middle Saxon phase, and industrial sites in the late Saxon and Saxo-Norman phases generally have high numbers of cattle, and greater quantities of pig than many other site types. Consequently they often have fewer sheep.
- Ecclesiastical sites in the middle Saxon phase tend to have more sheep than cattle, and high numbers of pigs. This is also true of these type of sites in the late Saxon phase, with the exception of the monastic site in Beverley, which has more cattle, reflecting the regional trend noted above (section 3.3).
- During the middle, late and Saxo-Norman phases, high-status sites generally show greater numbers of pigs than other sites.

 By the Norman phase the greatest distinction between site types can be noted, where high-status sites are distinguishable from domestic sites by the high numbers of pig bones.

3.6 Trade or Redistribution

Evidence for the trade or redistribution of animals is notoriously difficult to detect archaeologically (O'Connor, 1989b: 22), but the movement of specific body parts may be inferred - for example, in the case of craft workers, who require raw materials such as horn or long bones; or tawyers or tanners who need skins and hides. As noted above, the evidence suggests that animals were generally butchered whole on site, with little evidence for the movement of certain carcass parts between sites (Figure 3.19). Another method of investigating the redistribution of carcass parts was utilised, namely by comparing the percentage similarity of body parts from Saxon sites with a standard (section 2.3.3). The nearer the results to 100, the more likely the animals were to have been disposed of as complete carcasses. This reflects the previous pattern in the data, where carcass parts are observed to be similar to the standard – i.e. to have been from complete carcasses prior to butchery and disposal (Figure 3.24). However, there is an increase in the number of assemblages that are dissimilar to the standard with time, particularly on high-status sites, which reflects the greater proportions of meat-bearing bones from the upper limbs recorded from these sites as noted above. It is likely, therefore, that some redistribution of carcass parts from cattle and sheep did take place, a practice recorded in early and middle Saxon documents (Hooke, 1998: 50).

Some clues also exist for the movement of specific body parts to urban sites from the late Saxon phase onwards (Figure 3.25), which may reflect a growing urban specialisation in crafts, social stratification and spatial separation from the mid-9th century. This, in turn, indicates that some form of redistribution of bones was taking place, as sites with a disproportionate amount of cattle and/ or sheep horn cores begin to be recorded – as noted at Site 1092, Thetford, St James' Square, Northampton, and Friar St, Droitwich. The theme of redistribution will be investigated further in Chapter 5.

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3.7 Discussion

A wide range of methods were employed to investigate relationships between the major site types of the Saxon period, and it has become clear that, in all phases, there is great variety in the nature of the animal bone assemblages from various site types. Nonetheless, certain patterns did emerge, the most pertinent of which can be summarised thus.

3.7.1 Environmental Adaption versus Transhumance

That all but one site in the dataset were from lowland areas (below 240m AOD) suggests that, within Saxon England, population pressure was not so intense that upland areas were widely colonised. There is sufficient evidence to suggest that from the middle Saxon phase, the choice of domestic species kept on a site took into consideration the local environment. This is most noticeable in the predominance of cattle in low-lying, flatter areas, which would be ideal for the production of arable crops, and an increased proportion of sheep recovered from hilly sites at higher altitudes, which would be less favourable for arable production and better suited to keeping sheep. These two husbandry strategies are not mutually exclusive, and on most sites cattle and sheep are found together, suggesting that both were important during the Saxon period; however, it does imply that agricultural regimes were adapted to local environments.

An alternative explanation can be made on the premise that when arable production becomes more intense, taking up more fields close to the settlement, the need for pastoralism increases, whereby animals are herded further afield, away from areas of crop (Chang and Koster, 1986: 104; Fox, 1996: 7). This trend may also signal the use of transhumance (Hutcheson, 2006: 75; Wickham, 1994: 132, 152-153), or an 'infield/ outfield' method of agriculture (Fowler, 2002: 216). In both cases animals would be moved out to pastures marginal to the main settlement, while plough teams remained behind. It has been widely noted that many Saxon estates would endeavour to include a range of environments (e.g. wood, water, arable and pasture) for just such purposes (e.g. Fowler, 2002: 59).

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3.7.2 Urban – Rural Differences

Some change in the relative proportions of certain species on rural and urban sites over time is evident. Firstly, signatures traditionally associated with high-status sites —the proportion of wild mammals and birds, sites containing high numbers of pigs and younger cattle are more common on urban sites — i.e. re-used Roman towns in the early phase, and wics and trading sites in the middle Saxon phase. However, by the Saxo-Norman and Norman phases, these signature species become more common on rural sites. Potentially, this indicates a change in the nature of sites chosen by the ruling classes from the ruins of Roman towns in the early phase, to rural sites in the late Saxon phase, and rural castles in the Norman period. The re-use of Roman towns by a political elite has previously been suggested (Astill, 1991: 101; Carver, 1993: 57; Haslam, 1985: 8; Perring, 2002: 26), and this is reinforced by the nature of the animal bones recovered therein. This theme will be considered in further detail in Chapter 5.

3.7.3 Site Complexity

Early Saxon sites show little difference in the nature of the animal bone deposits, with the exception of the former Roman sites discussed above. There was more diversity in the classification of sites, and in variation of animal bone assemblages from the middle Saxon phase onwards. It has been suggested that, from the middle Saxon phase, some high-status and ecclesiastical sites may have had a number of functions (Dobney *et al.*, 2007), and the similarity of a number of signatures from an archaeozoological perspective reinforces this as a probability.

Links between high-status, ecclesiastical, industrial and trading sites are apparent, particularly in the high proportions of pigs and animals used in the hunt. A number of domestic sites were also recorded with these signatures which raises several possibilities: their mis-interpretation; local preferences; and resource availability, where wild species and pigs were abundant in the locality.

3.7.4 Specialisation

Specialisation within the animal economy can be suggested from the late Saxon phase. Evidence for the re-distribution of bones in urban deposits imply that increasing numbers of people were no longer involved in agricultural production, that goods were being made by craftsmen, and animals processed by butchers. Such specialisation has been noted elsewhere, as the emergence of a new class of society, who required food in return for money and/ or the emergence of producers who could supply food through a market (e.g. Clark, 1987: 184; Dobney *et al.*, 2007: 217), and marks the beginning of economic specialisation that comes with the market economy. This will be discussed in more detail in Chapter 5.

The apparent regional diversification of farming from the middle Saxon phase can also be used to indicate specialisation between areas, which led to the implementation of markets, where surplus from one area could be exchanged for one from another, an economy that would be increasingly desirable as coin tax became preferable (Wickham, 1994: 153).

3.8 Summary

This investigation into site classification confirms that distinct site types existed in the Saxon period. Although nuances produced by local preferences, spatial differences in the location of excavations within various sites, mis-identifications in the nature of the site type, and limitations caused by the surrounding environment may have lead to differences in faunal assemblage composition between sites, sufficient similarities in the zooarchaeological record of sites with the same classification in site reports exist to justify the utilisation of existing site typologies in the proceeding analysis. Particular aspects of social hierarchies may be further elucidated from more detailed investigation regarding the relationship between high-status, industrial, ecclesiastical and trading sites, compared to domestic sites. Cultural differences, too, have been highlighted, and these are worthy of further investigation, notably the distinction between Wessex and northern England.

Chapter 4:

Animals, Butchery and Diet

4.1 Introduction

This chapter will explore how animals were used throughout the Saxon period in England, using detailed analysis of animal bones to investigate wider patterns in the nature of the agricultural economy and food consumption behaviour. To this end, four main areas have been identified. Firstly, the animal husbandry of the period will be examined, using mortality data to determine when animals were killed and to reveal the emphasis of production. Investigating the extent to which the three main domesticates were used for wool, traction, meat and milk may go some way to understanding the basis and level of intensity of agriculture in this period. (Full details of how animal husbandry regimes are deduced from archaeozoological material are given in Chapter 2.4.3).

The second area is butchery. Investigation will be carried out into the implements and methods utilised in the butchering of animals, as well as the consistency and scale of butchery practice throughout the period – for example, were animals butchered opportunistically on site, or is there evidence for widespread, specialist butchery? Thirdly, biometric analysis will be

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conducted to identify changing conformation of domestic livestock (Chapter 2.3.5). If detected, the presence of different types of animal might reflect the intensity of animal husbandry, through specialisation, innovation, genetic isolation, or reduction in land availability.

Finally, the availability of livestock, including all edible domestic and wild species, will be evaluated, in order to understand their potential contribution to the diet of the population of various settlements in Saxon England. As determined in Chapter Two (2.4.1), it is likely that the majority of animal bones recorded originated as food waste, and therefore are indicative of Saxon diet. The three main domesticates (cattle, sheep and pig) were most influential in terms of meat consumption, with domestic fowl, duck and geese present to a lesser degree (Figure 4.1). Analysis of the relative proportions of these animals will clarify their influence on the diet of populations from particular site types and within culturally distinct regions.

Although several of these aspects were touched on in Chapter 3, here they will be investigated in more detail, and in consideration of what animals meant to the population of Saxon England. There are many limiting factors, but most problematic are the differences in density of animal bone assemblages. For example, there is a distinct weighting of the dataset towards eastern, midland and southern England (Figure 2.1), with far fewer suitable samples from western and northern regions. Therefore, the dataset will be examined as a whole to look at general trends in the areas identified above, in terms of social hierarchies, cultural differences, and the basis of the agricultural economy. Local differences in provisioning networks will be explored in Chapter Five.

4.2 Animal Husbandry

The animal husbandry of the three main domesticates can be revealed by mortality profiles constructed from tooth wear data (Appendix E), interpreted using Hambleton's (1999) conversion tables (Table 2.2). These will be used to compare the proportion of animals culled at different ages, and therefore the likely products they were kept for. Three main profile types were observed: a steep curve where the majority of animals were culled before reaching tooth wear stage F (cattle and sheep) or E (pigs) – indicative of meat production; a delayed mortality, where the majority of animals were alive until tooth wear stage G or older –

implying their importance for secondary products; or a stepped curve, where a number of animals are killed before tooth wear stage F, and again at around stage G or later – suggesting an economy where animals were used for both meat and secondary production. It is likely, however, that animals were used for a number of purposes within one site, for example, one and two year old sheep still produce wool despite being immature, and therefore not at optimum meat yield.

Sheep provided the greatest amount of useable data (Figure 4.2). Pig mandibles were generally recovered less often than sheep, but still in far greater numbers than cattle. The two most probable explanations for this are:

- either the larger cattle mandibles were more likely to be butchered than those of sheep and pig, which are smaller and more compact;
- or sheep and pig heads were more likely to be eaten, and therefore be retained in the domestic rubbish, whereas cattle heads were more likely to be disposed of with other butchery waste, elsewhere.

Relating to this latter point, it merits note that a general decrease in mandible numbers occurred over time. This may signify greater specialisation of butchery, whereby mandibles were discarded away from the main areas of habitation, and the sale or consumption of cheek meats on the bone and marrow from the mandible became a less popular choice (see also Chapter 4.3.3, below).

4.2.1 Cattle

Cattle may be expected to reach their full adult weight at around maturity, or stages E and F. Thus animals killed for meat would not survive beyond their fourth year, yet those used for secondary products may be kept until considerably older; for example, draught cattle would not be trained until full grown, then may be retained until they reached nine years of age or older (O'Connor, 1989b: 17). During the early Saxon phase (Figure 4.3a) the majority of cattle are culled between stages C and F, although three sites in the south-west and midlands (Fosset's Farm, Southend; Market Lavington, Wiltshire; and Oxford Science Park, Oxford)

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produce mortality curves indicative of animals culled at both prime meat age, and elderly animals used for secondary products.

The only sites where animals were recorded at ages consistent with meat production in the middle Saxon phase (Figure 4.3b) were wics (Fishergate, York and Anderson's Road, Southampton). The majority came from sites where they were used for both meat and secondary products, and at certain rural sites from East Anglia (Brandon, Suffolk and Wicken Bonhunt, Essex) the mortality curves from the latter are typical of animals used for more intensive secondary production, such as milk or traction, where nearly all animals were alive until tooth wear stage I.

A divergence of cattle husbandry exists in the late Saxon phase (Figure 4.3c). The first trend is described by animals culled at both prime meat age and older individuals that would have been used for secondary products, as observed on nearly all sites during this phase. Two curves, again from the east (both from Flaxengate, Lincoln), have an apparent emphasis on secondary production. The same trends are recognised for the Saxo-Norman phase (Figure 4.3d), where cattle at all but two sites were kept for mixed purposes – those from Harlington, London and Flaxengate, Lincoln, however, were used predominantly for secondary products. The few examples from Norman sites (Figure 4.3e) also come from mixed economies.

Older cattle could supply either traction or milk as a secondary product, the herd structure of cattle used for the latter being predominantly female; if traction was the main function, both male or female animals could be used. Data pertaining to the sexual polymorphism of cattle are given in Figures 4.4a-d, using measurements from the metacarpal, the most sexually dimorphic bone (Albarella, 1997: 38). The interpretation of these plots is made on groupings evident for more slender bones from females, robust bones from bulls, and a middle group of castrates whose metapodia are longer but more gracile than those of bulls (Higham, 1969: 64). For most sites two, or even three, groupings are evident in the measurements. When taken as individual sites the small samples sizes mean that little can be read into these groups, however, when considered together, and in comparison with data from the larger sites (Figure 4.5 a-c), certain trends emerge: At all sites a group of smaller, female, animals is represented;

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at around the 28-32 index on the horizontal axis is another distinct group, which are more likely to be castrated males; and a few larger animals which are bulls, with an index of around 35. These patterns fit with the large summary datasets from Flixborough (Dobney *et al.*, 2007: Figure 7.45), Ipswich and Brandon (Crabtree, forthcoming: Figures 4.1 and 4.8). These trends are consistent with the use of animals for meat, traction and breeding as well as small-scale milk production. Some of the larger sites provide more detailed insights; for example, during the early Saxon phase, the site of West Stow has a predominance of female animals, while castrates are in the majority at middle Saxon North Elmham Park. This implies that husbandry regimes were probably site specific, depending on the needs of, and demands placed upon each site. There is also a shift in the distribution of points to the right at each phase, suggesting that the number of castrates increases with time.

4.2.2 Sheep

During the early Saxon phase (Figure 4.6a), over 60% of sheep from all sites were culled at prime meat age – between stages B (2-6 months), and D (1-2 years) or E (2 years). In general, the remaining flock were culled before reaching tooth wear stage G (4-6 years). On the sites of Pennyland, Buckinghamshire, Eye Kettleby, Leicestershire and West Stow, Suffolk there was evidence for 9%, 6% and 7% of animals killed at tooth wear stage H (6-8 years) respectively, and only at the latter site were any sheep (3%) still alive until stage I (8-10 years). This implies that sheep were of greatest value for their meat, with a small proportion of the flock kept back as adults for breeding and probably wool or milk production.

At 12 of the 17 middle Saxon sites (Figure 4.6b) there is a similar cull of animals at ages suitable for meat production between stages B and F. Of these, over 65% of sheep from the rural site of Aelfric's Abbey, Eynsham were culled before they reached the end of tooth wear stage C (6-12 months). The mortality curves of sheep at the remaining sites (Friends Provident, Hampshire, Ipswich, Wicken Bonhunt and Brandon in Suffolk; and St Peter's Road, Northampton), are more consistent of a cull of some animals for meat and others after their use for secondary production. Even at these sites, nearly all animals died before reaching eight years of age.

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In the late Saxon phase, as previously, 12 out of the 17 sites show a primary cull of animals between stages C and F, which is consistent with meat production (Figure 4.6c). Mortality curves indicative of the use of sheep for both meat and small-scale secondary product came from burhs (Portchester Castle, Hampshire and St James's Square, Northampton) and Danish towns (Flaxengate, Lincoln and Bury Road, Thetford), of which those from the latter were more consistent, with more intensive secondary product production, as animals were not culled until old age – nearly 70% older than 8 years of age.

Animals were again more likely to be culled for meat between stages C and F in the Saxo-Norman phase (Figure 4.6d), as seen at two thirds of the sites recorded. On the remaining sites, mortality profiles were consistent with the cull of animals for a mixture of meat and secondary products, nearly all again from urban sites (St Peter's Road, Northampton; Harlington, London; Redcastle Furze, Norfolk; and Flaxengate, Lincoln), as well as the rural high-status site at Tempsford Park.

This pattern is reflected in the Norman phase (Figure 4.6e); where sheep killed primarily for meat were recorded at most sites, with a compromise between meat and secondary products noted on other sites – albeit ecclesiastical, rather than urban (Aelfric's Abbey and Canterbury Cathedral).

The use of metrical data for exploring the presence of ewes, rams and castrates was limited by the small number of published measurements. At West Stow in the early Saxon phase (Figure 4.7a) and Staple Gardens in the Saxo-Norman phase, bimodal distributions of ewes and wethers are apparent, comparable with the results given by Davis (2000: Figure 8) for unimproved Shetland sheep. Although trends from other sites are ambiguous, the presence of rams can be observed from individuals with a higher breadth to length ratio on the vertical axis, as seen at North Elmham in the middle Saxon phase, late Saxon Castle Mall, and Saxo-Norman Wilton. It is possible that these data may be recording the presence of goats (even though the measurements of specifically-identified goat bones were excluded from analysis), which have much shorter metapodials than sheep. However, goats are relatively rare compared to sheep and their metapodials are one of the easiest elements to distinguish

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between the two species (Boessneck, 1969). For this reason, it is most likely that the data do reflect populations of ewes and wethers. When the data are amalgamated for all sites from each phase (Figure 4.8a-c) there appear to be a greater number of wethers in the early Saxon phase, largely due to the West Stow dataset. The plots for the late Saxon and Saxo-Norman phases are more homogenous and skewed towards the female ratios apparent for the early Saxon phase, which may suggest a greater proportion of ewes in later flocks.

4.2.3 Pigs

As pigs are of most value for their meat, it may be expected that the majority will be culled before reaching maturity. This is true of most sites throughout the Saxon period (Figures 4.9ab), where nearly all animals are culled between stages C (7-14 months) and F (27-36 months), after which they are skeletally mature. A few older animals are often found, which are probably breeding stock, although they may also be wild pigs.

In the late Saxon phase, there is a tighter grouping of mortality curves from all sites, where pigs are generally culled slightly earlier than in preceding phases – between tooth wear stage B (2-7 months), and D (14-21 months) (Figure 4.9c). Does this reflect a new, fast growing breed of pig, or a more widespread trend towards the consumption of young pigs? Since the Saxo-Norman and Norman phases (Figures 4.9d and e) see a return to a more varied pattern, it is unlikely that the introduction of a new breed did occur, or if so, it was short-lived. Rather, it may indicate a new type of husbandry that coincided with the rise of burhs and a more concentrated population within such settlements, which perhaps necessitated restrictions on space available for keeping pigs – the two sites from which slightly older pigs were recovered (at tooth wear stage E) being rural. As pigs are generally culled before reaching maturity, the sample sizes of fused (and therefore measured) bones was too small to investigate male and female populations.

4.3 Butchery

For the purposes of analysing butchery methods, only cattle, sheep and pigs will be included, as they are the most commonly butchered animals, although other animals were occasionally

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identified with butchery marks, most notably horse, dog, deer (particularly their antlers) and domestic and wild birds.

In reality little evidence for primary butchery deposits has been found in Saxon England, and certainly none on the scale of the Roman deposits recorded at Winchester (Maltby, 1994; Maltby, 2010) and Lincoln (O'Connor, 1982). Nonetheless, butchery data were recorded from 25% of all sites in the data set. The description and quantity of butchery marks varied between reports (Figure 4.10), largely due to taphonomic differences in preservation and gnawing, and methodological differences between specialists. Fewer bones in the middle Saxon phase are recorded with butchery marks than other phases, with the exception of the longitudinal splitting of long bones for marrow (Figure 4.11). This affects the extent to which butchery trends can be observed for this phase, because the high fragmentation of bones achieved by splitting will have rendered unidentifiable any underlying cut or chop marks.

4.3.1 Tools

Two main tools were consistently observed: the knife, commonly used for disarticulation and removing meat from the bones, and a chopper-type implement more useful for disarticulation and jointing larger carcasses. A third tool, the saw, was evidently used for more specialist functions, being almost exclusively recorded on horn, antler and worked bone offcuts (Figure 4.12). The saw is often regarded as a tool used by those in the craft or industrial trades (Bourdillon and Coy, 1980: 97; Crabtree, 1990a: 97), and not necessarily by the butcher, possibly for the reason suggested by Armitage (2004b: 106): a saw is likely to leave small pieces of bone with the meat, so would be less preferable to the use of a chopper (see 4.3.5 for further discussion).

The prevalence of these methods of butchery is given in Figure 4.13, which shows that in all but the late Saxon phase, chop marks are most common. This is due largely to the nature of the implement which is more likely to go through the periosteum (the membrane surrounding the bone), to leave a permanent mark on the bone itself, whereas more refined butchery using a knife is less likely to mark the bone's surface (Lapham, 2005: 90; Rixson, 1989: 56), and is recorded less frequently. Nonetheless, there does seem to be a slight decrease in the

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occurrence of chop and knife marks through time, and an increase in the use of the saw between the early and late phases – perhaps signalling an increase in craft activities (see 4.3.5), and possibly a less aggressive butchery method, where more care is taken by an increasingly specialised trade of full-time butchers, skilled enough to reduce the number of marks on the bones.

It is also commonly noted, though unquantified, that the use of a knife for disarticulation is a more common method of butchery on sheep than cattle (Crabtree, 1990a: 97; Maltby, n.d.-c: 8-11; O'Connor, 1982: 24). Conversely, cattle are often recorded as the most heavily butchered animals, both in terms of the fragmentation of bones, and the proportion of bones showing butchery marks (Hamilton-Dyer, 2005: 147; Pinter-Bellows, 2000: 181) (Figure 4.10). This should be expected given their size relative to the other two main domesticates, since their larger bones would require more butchery to break them into manageable -sized joints for cooking (Wilson, 1996: 28).

4.3.2 Slaughter

The expected forms of slaughter are either through a blow to the head (pole-axing), or bleeding by cutting the arteries in the neck. The latter will generally leave no trace on bone surfaces, although it is possible that cut marks may be made on the hyoid - which may also occur during the removal of the tongue (Rixson, 1989: 55); no such marks were recorded in the Saxon data set. The use of a poleaxe will leave a considerable hole in the skull, and this has been recorded at Coppergate, York. The propensity for skulls to be highly broken during this period (see 4.3.3), mean that such evidence is unlikely to survive.

4.3.3 Disarticulation, Jointing and Filleting

To aid the identification of areas of the body, and location and planes of butchery discussed in the text, refer to Figure 4.14 and Table 4.1.

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i) Head

Skulls of all three species were split in a posterior-anterior direction, and those of cattle were occasionally noted as 'smashed'. However, this is a rather tenuous distinction, as skulls are fragile and may easily become highly fragmented from taphonomic factors such as trampling, weathering and crushing. This also indicates that brain removal occurred, although the trend appears to decrease with time (Figure 4.15).

Horn cores were commonly removed from cattle, sheep and goat crania in all phases, and increasingly with time (Figure 4.16); this is likely to have been a result of skinning and/ or horn working practice (see 4.3.5, below).

Butchery of the mandible was more varied (Figure 4.17). Chopping through the diastema (front of the mandible) in an anterior-posterior direction to separate it into two (possibly during the splitting of the skull) was noted on all three species, but was most common on pigs. This, and the removal of the mandible at the ramus and/ or condyle where it articulates with the cranium, indicates that the mandible was commonly removed, either to give access to the tongue, or for the utilisation of the mandible in its own right for the cheek meats. The latter butchery method is accentuated by the presence of knife cuts resulting from filleting.

Disarticulation of the mandible from the skull and removal of the cheek meats are consistent in most phases, although butchery of all aspects of the mandible is more common in the early Saxon phase, seeming to increase again in the Saxo-Norman phase. These are the only two phases where the tooth row is chopped, to aid cooking the meat on the bone, or for marrow removal, and they coincide with the phases when cattle mandibles are most extensively butchered (Figure 4.18), which would require extra breakage to make them manageable for domestic cooking.

ii) Removal of the Head

Removal of the head was commonly achieved by cutting or chopping through the spine either at or between the occiput (base of the skull), atlas (1st neck vertebra) and axis (2nd neck vertebra). Removal of the head at the occipital and atlas is more often recorded in the early

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Saxon phase (Figure 4.19), whereas from the middle Saxon phase, there is increasing evidence for the butchery taking place between the atlas and axis.

iii) Splitting the Carcass

The method by which the carcass was cut up during the Saxon period has been discussed elsewhere (Armitage, 1982b: 98; Bourdillon, 2009: 66; Coy, 2009: 33; O'Connor, 1982: 16). In summary, this infers a move to axial butchery of the carcass – where animals were hung from the hocks, enabling a clean chop through the spine to form two equal halves – from the late 11th century. Prior to this, the animal was probably laid on the floor and the vertebrae chopped through in a paramedian plane, where the lateral process and part of the body of the vertebrae were chopped through on one side, leaving most, or all, of the body of the vertebrae and the lateral processes with the other half-carcass. The butchery recorded in the data set, however, indicates that both methods occurred from the beginning of the late Saxon phase (mid-9th century), with paramedian butchery more common early on, and a move to a predominance of axial butchery in the Saxo-Norman phase (Figure 4.120). Unsurprisingly, these two methods of butchery are often found together, since a slip of the chopper could easily be mis-interpreted in the faunal assemblage. Sites where axial butchery alone is recorded are all late Saxon or Saxo-Norman, although those where paramedial butchery is exclusively noted were middle Saxon.

Another method of removing the sides of meat from the carcass has also been recorded occasionally, in all phases, where the vertebrae are chopped through bilaterally from both sides, separating the body and spinous process. Transverse butchery of vertebrae occurs in all phases and relates to the chopping of the carcass into smaller parts ready for cooking, either as specific cuts, such as chops or steak, or by filleting the meat and using the bones for stock.

iv) Upper Limbs

Evidence for butchery of the appendicular skeleton is often noted as hard to define, given the high fragmentation of limb bones (see section 4.3.4). However, disarticulation of the fore limb (scapula, humerus, radius and ulna) and hind limb (pelvis, femur, tibia and tarsals) consistently occurred in the following places (Figures 4.21 and 4.22) in all phases:

- distal scapula removal of the shoulder joint;
- distal humerus and/ or proximal radius and proximal ulna to make a lower shoulder joint;
- ilium and/ or acetabulum of the pelvis and/ or proximal femur to remove the hind leg from the pelvis;
- distal femur to make a rump or leg joint;
- tibia shaft to make a shin joint;
- tarsals to remove the lower leg.

Such butchery marks would have split the carcass into joints more easily transported and cooked. Other sites of butchery were recorded, although less frequently, which also relate to the breaking up of the bones into pot-sized joints. The lack of standardisation need not signify an absence of a professional butchery trade (Seetah, 2006: 110), although given the dispersed nature of the population in the earlier Saxon phases, it is likely that butchery was done on a household level (O'Connor, 1989a: 159).

The presence of knife cuts on the shafts of all long bones is noted in most phases, and indicates the removal of meat from the bone. This can have implications for the presumption that faunal remains reflect evidence for meal waste. Products such as sausages and bacon, however, will leave no trace in the archaeological record at the place of consumption. However, filleting marks such as shaved bone from the shaft are not often recorded (Figure 4.11), and the presence of such bones amongst general deposits with those that do not show such butchery suggests that most waste comes from direct food refuse.

v) Lower Legs

Butchery of the lower legs (metapodials) suggests that many were disarticulated from the feet (phalanges) (Figure 4.23), particularly in the early Saxon phase, by being chopped through at the distal end. There is less evidence for their removal from the upper fore leg, although they would have been separated from the hind leg when the tarsals were cut through. The other commonly noted butchery method comes in the form of knife cuts on the metapodia, which is typical of skin removal (Lyman, 1994: 307-309). Little butchery was observed on phalanges, but nearly all came from knife cuts, and were probably the result of the skinning process.

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4.3.4 Marrow

One of the most consistent butchery trends of the early and middle Saxon periods was the longitudinal splitting of metapodia and, less often, limb bones, in a posterior-anterior direction (Figure 4.24) to remove marrow from the centre. This technique becomes less common from the late Saxon phase and may indicate a change in cuisine.

4.3.5 Animal Products as Raw Materials

As noted previously (Chapter 3.6), evidence is scarce for large, discrete dumps of carcass parts likely to have originated from craft-working (such as horn or antler objects) or industrial processing (such as tanning or tawying). Within the butchery reports, however, the inclusion of waste from antler-, bone- or horn-working was noted from a number of sites from all phases. The majority of these recorded incidences of craft waste have been ascertained from the use of a saw, combined with the particular fragmentation of elements, such as the removal of the ends of metapodia as seen at Castle Mall, Norwich, West Stow, Suffolk and the National Gallery, London. The presence of sawn antler, horn and bone has been recorded within other butchery reports, but not defined as direct confirmation for craft-working (Table 4.2).

At nearly all early and middle Saxon sites where evidence for craft-working has been recorded, antler working is implied (Table 4.2). This is only the case on solitary late Saxon (Coppergate, York) and Saxo-Norman (Castle Lane, Bedford) sites. This may indicate that, by the later phases antler-working had become a specialist trade, undertaken in spatially discrete areas, not dumped with more general refuse. Macgregor (1989: 113) has noted that antler objects were less common from the 11th century, yet the evidence presented here indicates an earlier reduction in the recovery of worked offcuts from the mid-9th century, possibly due to the increase in urban populations who would produce a readily-available supply of bone and horn.

Further signs for the use of raw materials come from the removal of horn cores. This can be undertaken for two reasons: the first occurs when the animal is skinned and the hide removed with the horns attached (Harman, 1996: 107; Wilson, 1996: 60), in which case such dumps are indicative of hide- or skin-processing; the second comes from the use of horn, which has to be

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removed from the horn core through rotting to break down the connective tissue holding the outer horn to the bone core; this process can be accelerated by immersion in water or an alkaline solution, and cutting the horn away from the base of the skull (Albarella, 2003: 73-74). Albarella suggests that saw marks on horn cores are indicative of removal of the outer horn, rather than removal with the hide, and is consistent with the premise that it was predominantly craft workers who used saws. It is likely that horns were sold to the horner directly from the butcher, or the tanner/ tawyer (Albarella, 2003: 73; Serjeantson, 1989: 139). Either case is indicative of further processing of raw materials, rather than direct evidence of food waste. It may, however, be suggested that sites where horn cores have been sawn are waste from horn workers, but those horns which have been chopped through at the base result from their removal with the skin or hide, and therefore represent tanning or tawying waste.

From the middle Saxon phase all evidence for worked materials comes from urban sites, with the exception of the rural ecclesiastical site of St. Aelfric's Abbey, Eynsham. Such an occurrence corresponds to the theory that growing urbanisation from the 9th century enabled a section of the population to specialise in product manufacture. The presence of waste from such activities in mixed deposits with domestic refuse, however, suggests that such trades remained small-scale, household industry and certainly no distinct dumps of antler-, horn- or bone-working debris have yet been recorded. This aspect of analysis will be investigated further in Chapter 6.

4.4 Animal Size and Shape

The greatest problems with data extraction so far relate to the metrical data, often given in site reports as a summary of maximum, minimum, mean, standard deviation and number of specimens. Summary data can be useful when displayed as box plots, and in the comparison of wither heights, which were calculated for the main domesticates using indices described by Fock (1966) and Matolcsi (1970) for cattle and Teichert (Teichert, 1969, 1975) for sheep and pigs (Figure 4.25).

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A minority of reports contained lists of raw measurements and to determine patterns in these more detailed data, log ratio scaling was employed (Chapter 2.3.5). This allows the relative size and shape of animals to be determined by comparing the ratios of lengths and widths of archaeological specimens against measurements from a standard animal or a population average (Table 4.3). For ease of reading the diagrams it should be noted that the closer a measurement is to the standard, the closer to zero it will be on the chart. If it is smaller, it will read as a negative measurement, and if larger, it will be on the positive side of the scale.

4.4.1 Diachronic Changes

The first area investigated was the presence of differences in the measurements of bones from cattle, sheep and pigs through time. As Figure 4.25 shows, there was a decrease in the wither heights of cattle and pigs between the middle and late Saxon phases, which was confirmed with a non-paired T-test giving results for cattle (t(17)=3.89, P<0.01) and pigs (t(5)=2.96, P<0.05). There was no apparent change in sheep wither heights, although the range of sizes increased from the late Saxon phase.

These changes in height were further investigated in individual measurements of the lengths and widths of selected bones (Table 4.4). This analysis mirrored the trends noted in wither heights, whereby cattle and pig bones decreased in size between the middle and late Saxon phases. However, there was a consistent decrease in the width measurements taken on sheep bones between the early and middle Saxon phases, and again between the late Saxon and Saxo-Norman phases. Although there was no difference in the length of radii measurements, which is consistent with the similarity of wither heights in all phases, the lengths of metacarpals changed diachronically from the middle and late Saxon phases. The difference in lengths of metapodials can be due to changes in sex ratios between males, females and castrates, and it may be that this is what is reflected in the t-tests. These trends were investigated in more detail using log ratio calculations to help understand nuances in these apparent changes.

A decrease in the lengths and widths of cattle limb bones occurs between the middle and late Saxon phases (Figure 4.26a-b). The shape of animals prior to- and subsequent to this size

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change does not exhibit marked differences, and indicates a period of major change in the cattle population, so that by the late Saxon and Saxo-Norman phases cattle were of similar stature to the middle Iron Age animals from Balksbury, against which they are compared (Maltby, 1995).

The decrease in size between the middle and late Saxon phases and late Saxon and Saxo-Norman phases is also notable in the log ratios of pig bones (Figure 4.27). Given the nature of pig husbandry – which results in few animals being kept as adults (i.e. most pigs are killed before becoming skeletally mature) considerably less metrical data exist for this species than for sheep and cattle. Despite this, it appears that Saxon pigs are significantly smaller than the wild boar standard against which they are compared. A number of animals are present of a comparable size to wild pigs, most notably those from Fosset's Farm (early Saxon), Staple Gardens (late Saxon and Saxo-Norman), Flixborough (middle and late Saxon), Site 1092 (late Saxon) and Castle Mall (Norman), where it is likely that wild pigs were present. If domestic pigs were breeding with wild animals, this apparently had little effect on their size.

Log ratio plots of the sheep data reflect the diachronic changes in both the lengths and widths of sheep limb bones observed in the T-test of selected measurements, with major changes occurring between the early and middle Saxon phases and late Saxon and Saxo-Norman phases – the relative shape and size of sheep in the middle and late Saxon phases being similar (Figure 4.28). Saxon sheep were generally slightly larger than the Soay population with which they are compared, which is a rather different finding to what may be expected, as Saxon sheep are often described as similar to primitive, native breeds (Clutton-Brock, 1976: 382; Ryder, 1983: 187).

In summary, then, there are consistent indicators for a shift in the size of cattle, sheep and pigs throughout the Saxon period. Cattle become shorter and less robust, and pigs become smaller between the middle and late Saxon phases, while sheep become shorter and less robust following the early Saxon phase and again after the late Saxon phase. Reasons for these changes could be due to a number of factors, such as: a shift in herd make up in the proportions of males, females and castrates, to one where more females are kept, being

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smaller in stature than entire males or castrates; genetic isolation, where consistent inbreeding, or little investment in new breeding stock, leads to a diminishing conformation; and poor husbandry through insufficient pasture leading to animals without enough nutrients to grow. Although the third possibility is beyond the scope of this investigation of metrical data, the first two possibilities will be investigated further below.

i) Increasing Female Populations

An increase in the numbers of castrated male cattle between the early and late Saxon phases has been observed in the sex ratios investigated above (4.2.1, Figure 4.5), and this corresponds to the presence of less robust animals (i.e. smaller widths). However, as castrates are also taller than cows and bulls, due to delayed fusion of long bones, it may be expected that there would be little corresponding increase in the lengths of bones, which is not observed here – in fact, the lengths of bones are seen to decrease in all tests, which suggests the involvement of another factor.

There is clear indication of bimodality in the sheep log ratio curves in the early and middle Saxon phases, suggesting a population of both males and females in these flocks, which were apparent in the analysis of sex ratios (see 4.2.2). There are less clear distinctions in later assemblages, both in the sex ratios and the log ratios – those from the late Saxon phase, are more indicative of a single population.

ii) Genetic Isolation

The second possibility – the presence of more than one breed of animal – is indicated by the curves in the cattle log ratio data. If one breed of cattle were represented, it may be expected that the data would show a bi- or even tri-modal distribution (relating to the presence of cows, castrates and bulls), but numerous spikes in the data imply that there are other causes at play. Particularly marked are the 'bumps' in the log ratio curve at the right hand side of the middle and late Saxon data sets, representing very tall animals. The cause of this was investigated using the log ratio of astragalus measurements. As one of the earliest bones to mature, the astragalus shows least sexual variation in cattle (Higham, 1969: 64, Table 61), sheep (Davis, 2000: 386, Table 6) and pigs (Payne and Bull, 1988: Table 2). Interestingly, given the small

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sample sizes, the greatest variation comes from the early Saxon cattle and sheep (Figures 4.30 and 4.31) measurements, implying the presence of more than one type of animal. From the middle Saxon phase the log-scaled measurements of cattle, sheep and pig astragali (Figure 4.30-32) present a smaller distribution on the line of a bell curve, suggesting the presence of a single population. The exception to this is the cattle distal breadth measurements which, in both the middle and late Saxon phases, indicate a small population of larger animals. Further investigation shows these measurements to have come from animals at Flixborough, a peculiarity that was commented on in the original site report, which Dobney *et al* suggested "represent different varieties of cattle, i.e. animals that had been selectively bred for particular characteristics" (Dobney *et al.*, 2007: 164).

The existence of apparently only one type or breed of each of the domestic animals implies little opportunity for the addition of new genetic material to the main domesticates throughout the Saxon period, with the exception of animals at Flixborough, which are unique in the entire dataset acquired for this research.

Summary

The decrease in size of animals in the late Saxon phase, particularly cattle and pigs has been recognised elsewhere (Sykes, 2007b: 50-54). Sykes' interpretation of changes in sheep breed suggested that more robust sheep were gradually introduced (which is not reflected in the astragalus measurements), while viewing the decrease in cattle size variously as caused by environment, disease and herd structure. However, as shown above, there is little evidence for the latter, and the environmental conditions were gradually improving towards a climactic optimum by the time of the Conquest.

An increase in cattle, sheep and pig sizes between the Iron Age and the Roman periods has been well documented (e.g. Albarella *et al.*, 2008: 1936; Crabtree, forthcoming; Maltby, 2010: 293-295), and others have implied that the larger domesticates in the early and middle Saxon phases were a continuation of these improved Roman stock levels (Bourdillon, 1994: 123; Maltby, 1981: 185-189), and the small data sets presented here do imply that the greatest range of cattle and sheep types occurred in the early Saxon phase. The nature of that

improvement, however, has recently been shown to have been one of a continuous, if piecemeal, introduction of stock (Albarella *et al.*, 2008: 1844), rather than the imposition of a single cultural 'package' by the earliest Roman populations. It is therefore suggested here that the presence of larger animals in the early Saxon phase is a continuation of the larger stock introduced by the Romans (Albarella *et al.*, 2008: 1844), producing genetic isolation following the break in contact with the Roman trade routes during the early Saxon phase. The decrease in size, therefore, is a general out breeding of imported stocks with smaller, native breeds.

4.4.2 Regional and Social Differences

The second area of investigation that has been raised, through the anomalous cattle recorded at Flixborough is the possible existence of regional or site-type variation in the size of Saxon animals.

i) Regional Variation

To investigate whether geographically distinct herds were present the log ratio data were compared using a Kruskal-Wallis test (Figure 4.5). In general there was no inter-regional difference in the size of cattle populations, with the exception of the late Saxon phase, where there were considerably more robust cattle (i.e. with wider limb bones) observed in the eastern region compared with those in the south. This likely reflects the presence of a different type of animal recorded at Flixborough in this phase, and may reflect the peculiarities of a high-status settlement (see below). A different result is apparent from the sheep and pig data, which imply differences between the measurements recorded in the eastern region and those from the midlands, south and north, where data areavailable. The only exceptions to this are in the lengths of sheep bones in the early Saxon phase and widths of sheep bones in the Saxo-Norman phase, both of which show no variation between regions.

ii) The Influence of Social Status

To investigate whether the social status of the inhabitants of particular settlements had an effect on the size of animals consumed, selected measurement were plotted by site type. Summary box plots were used, to maximise the data available (Figures 4.33-35); unfortunately, the data are severely limited, only a few high-status sites are represented, and no ecclesiastical

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settlements – the majority of sites are rural or urban domestic settlements. Although all sites in the early Saxon phase were rural settlements, a number of cattle and sheep measurements from Fossets Farm, Southend and Orton Hall Farm, Cambridgeshire were consistently larger than those on other sites, as well as sheep from West Stow, Suffolk and Pennyland, Buckinghamshire. This implies that these sites were breeding or otherwise acquiring some of the largest animals in the country at this time. Unfortunately, the small data set of pig measurements means that little can be inferred for this species.

The largest animals in the middle Saxon phase were consistently recorded at the only highstatus sites in the database for that phase – Flixborough, Lincolnshire and North Elmham Park, Norfolk – suggesting that cattle and sheep at such high-status sites were chosen especially for their attributes as large and robust animals. The rural site of Rose Hall Farm, Lincolnshire also contained cattle and sheep of a comparable size to those from the high-status sites, as were sheep at Gosberton, Norfolk, possibly forming part of the same supply network, which will be examined in further detail in chapter 5. The largest pigs were also recorded at Flixborough.

Again, in the late Saxon phase, animals from the high-status sites of Flixborough, North Elmham Park and Castle Mall, Norwich are some of the largest in the dataset, of which those from the rural sites of Flixborough and North Elmham Park are generally larger than animals from the urban high-status site at Castle Mall. Large cattle were also recorded at the rural site of The South Manor Area, Yorkshire and some of the biggest sheep were observed on urban sites, at Lincoln and Abbey Green, Chester. Also of interest is the industrial site, Site 1092, Thetford, which contained some of the longest cattle metapodials and largest pig bones.

There are few trends in the Saxo-Norman data, although cattle from the rural site at Harlington, London and urban site of Castle Lane, Bedford and sheep at Lincoln, Deansway, Worcester, Danesgate Lincoln and the rural site of Wilton, Salisbury, are consistently some of the largest. Interestingly, larger animals are better represented at many of the rural sites in this phase, than previously. The only measurements from the high-status site of this period – Pontefract Castle, Yorkshire – from cattle astragali were also the largest recorded.

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It is apparent from this analysis that high-status sites were consistently the source of larger animals than domestic site types. However, only a small number of cattle at Flixborough have been shown to be of a different breed, so what is causing the presence of larger animals at these sites? Are they bred specifically for size, or are there a greater proportion of males? To answer these questions, log ratios were plotted again, but were split into those from highstatus settlements (i.e. Flixborough and North Elmham Park in both phases and Castle Mall in the late Saxon phase), and those from all other sites.

From this, it is apparent that not only are the cattle from high-status sites largest, but there are more males in both the late Saxon and middle Saxon phases (Figure 4.36). The small number of animals on high-status sites that are considerably taller than all others represent the unique group from Flixborough. The width measurements divide into bimodal distributions, implying a large group of females, and a smaller, though considerable group of males at the high-status sites, and fewer males at other site types. This is further reflected in the plots of distal tibia breadths (Figure 4.37) for each phase.

Again, the data from non high-status sites is scarce in the middle Saxon phase; however, the data available for comparison of bone widths suggests that high-status sites had considerably more robust sheep than those from other sites (Figure 4.38). The late Saxon data are comparable for both high-status and other site types, yet there appear to be a greater proportion of the more robust sheep and pigs (Figure 4.39) on the former. This is reflected in the breadth of distal sheep tibiae (Figure 4.40), where the early Saxon plot shows a bimodal distribution, consistent with the presence of a large number of males, and a smaller group of females, as observed previously (Figure 4.8). The middle and late Saxon plots, however, indicate the presence of larger animals at high status sites, more comparable with the group of males in the early Saxon phase, and groups of smaller animals – possibly females on other site types.

iii) Trade and Contact

One further explanation for the presence of larger animals could be through the exploitation of trade links between these sites and those on the northern European seaboard.

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Archaeological evidence has indicated that Kent was one of the earliest areas to renew international trade from the mid-late 6th century, particularly with the Frankish kingdoms, a trend which spread from the eastern counties to others on the English coast with the founding of wics throughout the 7th and 8th centuries (Vince, 1994: 109-110). That Saxon links to their homeland facilitated this trade is evidenced by the concentration of luxury goods in Eastern counties originating from Germanic countries in the 5th and 6th centuries (Hodges, 1989: 108-110).

Measurements from Early Saxon cattle and sheep demonstrate that they were generally largest in early Saxon East Anglia (sites in Essex, Cambridgeshire and Suffolk) than their contemporaries elsewhere in the country. Crabtree (forthcoming) suggests that the reason for this is the established Roman settlement of Icklingham, which would have been a source of larger animals at the beginning of the Saxon period. However, there were many such sites throughout England, where the continuation of larger cattle is not observed, and it does not explain the consistent size difference throughout the Saxon period. Other explanations exist, such as a preference for larger cattle by those living in the east, or improved husbandry methods. Another alternative may be that new animals were introduced by the Saxons. Unfortunately, too few contemporary continental data exist, apart from Feddersen Wierde, Germany (Reichstein, 1991) (Table 4.7), from which it appears that the German cattle were small compared to many from English sites, although sheep were taller.

A greater number of sites were available for comparison in the middle Saxon phase – Dorestad, Netherlands (Prummel, 1983), Niens, Germany (Walthorn and Heinrich, 1999) and Ribe, Denmark (Hatting, 1991). The late Saxon phase (Figures 4.42 a-e) is represented by sites from Birka, Sweden (Wigh, 2001), Elisenhof, Germany (Reichstein, 1994), Hedeby, Denmark (Klein and Reichstein, 1977), Menzlin, Germany (Benecke and Prilloff, 1988), and summaries of data from the Swedish sites of Eketorp, Pollista, Sigtuna and Skedemosse given in the Birka report. To simplify comparisons, only data from the high-status sites of Flixborough and North Elmham Park are included from the English data set. These measurements were generally the largest of all English sites and so provide a benchmark against which to compare against the European data.

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During the middle Saxon phase (Figures 4.41a-d), cattle bones were of similar widths between the European and English sites, although the lengths of bones from English high-status sites were greater than the comparanda, which were more comparable to the animals from Brandon (Figure 4.33). Sheep from the English high-status sites were generally slightly smaller than those from European sites, although the measurements of distal tibia and metatarsal diaphysis were more comparable, and as these bones are the most sexually dimorphic, it may represent a greater proportion of males in the English sites. Data from the lengths of sheep long bones, however, indicates unequivocally that English sheep were shorter than their continental counterparts.

In the late Saxon phase (Figures 4.42a-e) cattle width measurements from North Elmham and length measurements from the earliest phase at North Elmham are generally comparable to the larger measurements from European sites, although those from Flixborough are the largest in all datasets, indicating a real distinction in the cattle kept at this site. Sheep in this phase are more comparable with many of the European sites than in the middle Saxon phase, though they are still not as tall, the difference is less notable, which implies there is some decline in the stature of sheep from these European sites, as there is little apparent change in the size or shape of the middle and late Saxon sheep populations in England. Pigs in this phase are also largest at Flixborough.

iv) Summary

This analysis clearly shows a preference for more robust sheep and cattle – probably males – by those occupying high-status sites. Whether this is due to their position in the East – reflecting a continuation of a husbandry regime producing larger animals from the early Saxon phase – or their nature as high-status sites, only the incorporation of a better dataset can discern. However, it is possible that the ownership of large cattle was used as a display of status in middle and late Saxon England. As symbolic icons, large animals would be easily visible to other elites and the peasant classes alike (DeMarrais *et al.*, 1996: 18), an attribute defined as 'symbolically potent', reflecting, "resources valued because they possess distinct culture-specific properties, meanings, or consequences" (Curet and Pestle, 2010: 417). This may be ascribed to the cattle within the Danelaw in the late Saxon phase; in Viking culture

cattle were extremely highly regarded (McCormick, 1991a: 42-43), and the largest beasts were recorded not only from high-status sites in the East, but also from the South Manor Area, Wharram in the North. Additionally, some of the largest sheep came from Chester, well outside the Danelaw within Saxon territory.

Also of note is the bias in the data caused by the greater quantity of measurements from highstatus sites in the middle Saxon phase, and almost no measurements from such sites in the Saxo-Norman phase may be at least partly responsible for the perceived decrease in cattle and pig measurements between the middle and late Saxon phases, and sheep between the late Saxon and Saxo-Norman phase.

4.5 Livestock

This section will investigate the animals available and utilised by the Saxon population, as evidenced by their remains found in the archaeological record.

4.5.1 Domestic Mammals

Cattle, sheep and pigs were the most common animals, with little change in species proportions over time (Figure 4.41). Pigs increase slightly from 17% to 22% of the main domesticates, with correspondingly fewer cattle, whose numbers drop from 52% in the early Saxon phase to 41% in the Norman phase. Following an increase in the overall proportion of sheep between the early and middle Saxon phases, sheep were present in a fairly consistent 35/36% of all assemblages, until another small increase evident in the Norman phase.

A further method of quantification is applicable, where the relative species proportions are converted into equivalent meat and offal weights (Vigne, 1992), as it is likely that the whole animal would have been butchered and eaten and the skin, bones and other raw materials utilised on site. As noted above (section 4.4), the types of animal kept in Saxon England are comparable with unimproved domestic breeds, similar to the small Iron Age cattle and Soay sheep. Given the relative carcass weights of these species, their proportions can be translated into the potential food available to the population (Figure 4.42). Although there are many

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problems with this method (Lyman, 2008: 89-93), the results nonetheless reflect that a vastly greater proportion of beef, then pork and a very small amount of lamb/ mutton was available for consumption.

When the presence of the main domesticates at various site types is considered (Figure 4.43), the most striking difference occurs between urban and rural sites, whereby cattle are recovered in greater proportions on urban sites in the early to late Saxon phases. In functional terms, this is perhaps not surprising as a concentrated population would require larger animals as the most effective way of supplying food: as noted above, cattle would have provided far greater quantities of meat per individual than pigs or sheep. Conversely, sites where cattle were found in smaller numbers were rural – this includes all ecclesiastical and high-status sites in the middle Saxon phase, six of the seven ecclesiastical sites, and ten of the 12 high-status sites in the late Saxon phase. Similar proportions of cattle and sheep on all site types in later phases indicates that less weight was given to the provisioning of sites with the most suitable meat animals. This may also indicate a decline in the purchasing power of the urban population, whereby they were provided with excess animals, rather than those that demanded the best price, economically or socially.

The other noteworthy distinction is the presence of pigs in greatest proportions on high-status sites in all phases. They are also prominent on wics and trading sites in the middle Saxon phase, urban sites in the late Saxon phase and industrial, urban and trading sites in the Saxo-Norman phase. The possibility that they were bred in urban environments will be explored in Chapter 6.

As noted in Chapter 3.3, differences exist in the species proportions between sites in the north and those in Wessex in both the middle and late Saxon phases, indicating regional variation in animal husbandry (Figure 3.11). This would have had an effect on the diet of the respective populations, where lamb would have been plentiful to supply those living in the north, and beef more available to those in Wessex in the middle Saxon phase. The change to cattle-based husbandry in the north in the late Saxon phase coincides with the Viking settlement of Danelaw, and could signify a cultural preference for beef, or an increased need for cattle
consequent to the intensification of arable farming. Similarly the keeping of more sheep in the south could have implications for an increase in wool production to supply emerging commercial centres (i.e. burhs), rather than a growing dietary preference for lamb or mutton.

Despite these regional nuances, beef would have remained the most available meat, and even at sites where sheep bones were recovered in over 75% of the assemblage mutton would have been consumed less often than beef (Appendix C). However, the few settlements where pigs were present in over 70% of the assemblage (St Albans, Pontefract Castle, Stafford Castle and Wicken Bonhunt) the populations within would have been provided with a comparable quantity of pork and beef.

While horse and dog bones were recovered in much smaller numbers, there is evidence that these animals were held in a different regard to the agricultural animals, as they are found more commonly in burial contexts (Crabtree, 1995; Hamerow, 2006). However, butchery marks have been recorded on both, and they are often recovered from domestic refuse deposits, implying that they occasionally contributed to the diet.

The mean representation of both horse and dog numbers are consistent through time, on average being recovered as 2%-3%, and 1% of the domestic mammal assemblage respectively (Figure 4.44). Nonetheless, there is greater variation in the numbers from individual sites in later phases – for example, horse numbers jump from a maximum proportion of 17%, 15% and 16% of domestic mammals in the early, middle and late phases, to 27% and 21% in the Saxo-Norman and Norman phases, respectively. Similarly, dog numbers increase from 4% in the early and middle phases to 19% in the late phase, 17% in the Saxo-Norman phase, and then decrease to 7% in the Norman phase. Given the consistent means of both these species, this indicates an increase in importance of these animals on just a small number of sites.

When investigated further, dogs were recorded in greater than normal numbers (c.17%) from an industrial site in Durham in the Saxo-Norman phase, perhaps indicating the disposal of skinned carcasses, and at two rural high-status sites (Emwell Street, Warminster and Castle Rising Castle, Norfolk) where dog bones were recovered from c.10% of the assemblage – here perhaps denoting hunting dogs (Cummins, 1988: 12-31).

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Horses were also found in large numbers from a very few sites. During the early and middle Saxon phases, from domestic sites at Melford Meadows, Brettenham (10%), Crowhall Park, Downham Market (14%), Anderson's Road, Southampton (15%), High Street, Ramsbury (15%), and Lordship Lane, Cottenham (11%). Given the predominance of horse on domestic sites in these phases, it may be that they more commonly formed part of the diet, prior to the proscription of eating horse flesh by Pope Gregory III in the 8th century (Grant, 2002a: 21; Wilson, 1973: 76), and the later widespread adoption of this rule in the 10th century (Brown, 2003: 38).

From the late Saxon phase, there is a change in the nature of those sites from which the greatest numbers of horse remains were recorded: such as industrial sites at St James' Square, Northampton (12%) and The Mound, Glastonbury (21%), where horses were possibly disposed of with other non-food waste, such as horn-working or skin-processing refuse (Harman, 1983); and the high-status sites of Hatton Rock, Warwickshire (16%) and Castle Acre Castle (12%) where their presence could be associated with the use of horses as status symbols and hunting. However, they were also recovered from the Tower of London (12%), Lindisfarne (15%), and Wirral Park, Glastonbury (21%).

4.5.2 Domestic Birds

Domestic birds are most commonly regarded as chicken, geese and ducks. It can be difficult to positively identify chicken from similar species (i.e. pheasant and guinea fowl), which are all included under the umbrella term 'domestic fowl'. However, it is likely that chickens were the most common of these species, as pheasant remains are rarely recorded prior to the medieval period (Yalden and Albarella, 2009: 101), and guinea fowl were not introduced until the 13th century, although there are, as yet, no positive identifications archaeologically (Yalden and Albarella, 2009: 208). It is also hard to distinguish wild from domestic geese and ducks, although they are often separated in site reports on the basis of size (e.g. Coy, 1989b: 31,35).

Domestic birds are relatively uncommon finds on the majority of Saxon sites, on average being recorded as proportions of less than 10% of the cattle, sheep and pig assemblage (Figure 4.45). The number of domestic birds from Saxon sites increases with time, from c.2% in the early

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Saxon phase to almost five times that number in the Saxo-Norman phase, before declining slightly in the Norman period. When the relative proportions of fowl, geese and ducks are investigated (Figure 4.46), the number of domestic fowl recovered from sites in the late Saxon phase increases at the expense of geese and ducks.

There is little variation in the proportions of domestic birds recovered from early Saxon sites, being recorded on both rural settlements and re-occupied Roman towns (Figure 4.47). The greatest distinction between sites can be observed in the middle Saxon phase, where they are most common on ecclesiastical and, to a lesser degree, high-status sites. They are also more often recovered from industrial and trading sites when compared to rural and urban domestic sites and wics. Differences are less obvious in later phases, though domestic birds remain most common on high-status sites, as well as urban sites.

4.5.3 Wild Mammals

The wild mammals most likely to have formed part of the Saxon-period diet are the indigenous red and roe deer, hare and wild boar. The distinction of the bones of wild and domestic pigs is rarely reported, although metrical analysis (section 4.4.2) has indicated their presence at a few additional sites (Table 4.6). Their incidence provides too small a sample to be used for further analysis, yet it should be noted that in the Norman phase three of the four sites on which they were identified were classified as high-status.

Of the other wild species, all were present on very few sites, and in very small numbers. Red deer were the most commonly recovered, followed by roe deer and hare. The average proportions increase slightly from the late Saxon phase (Figure 4.48). As hunting becomes a widely accepted sport and method of distinguishing the new elite in the Norman phase (Sykes, 2007b: 97), there is a dramatic increase in variability of proportions of all three species in the Saxo-Norman and Norman phases. Higher numbers of these species derive from a few discrete, usually high-status, sites such as Faccombe Netherton, Hampshire and Pontefract Castle, Yorkshire in the Saxo-Norman phase, and Cheddar palaces, Somerset, Stafford Castle, Staffordshire, Barnard Castle, Yorkshire, Goltho, Lincolnshire and Castle Acre Castle, Norfolk in the Norman phase.

Despite the documented availability of game species to the free population from the early to late Saxon period (Hooke, 1998: 157), venison and hare seem to have featured low on the menu, being virtually absent in the early Saxon phase (Figure 4.49). An increase in deer numbers can be observed on trading and industrial sites in the middle Saxon phase, yet by the late phase, deer begin to be more common on high-status sites and Danish towns, and both deer and hare become more frequently recovered from rural settlements and burhs.

Although red deer are the most common species recorded on sites in Saxon phases, by the Norman phase there is a clear preference for roe deer. Also of note is the decline of deer on industrial sites over time which reflects the move away from working antler in favour of horn and bone noted above (section 4.3.5).

4.5.4 Wild Birds

The number of wild birds from each site was recorded, where such data were available, but individual species were not quantified (see Chapter 2.2.4). Instead the presence or absence of each species was noted and categorised according to their habitat or nature:

Small birds	Garden passerine, thrush/ blackbird, pigeon/ dove
Game birds	Pheasant, grouse, capercaillie, quail, partridge, corncrake
Birds of prey	Eagle, kestrel, falcon, hawk, merlin, hobby, osprey, harrier
Scavengers	Crows, buzzard, kite, raven, magpie
Exotics	Peafowl, pelican
Water birds	Duck, geese, wader, crane/ stork, lapwing, swan
Seabirds	Gull, tern

It must be borne in mind that many of these are also background species, occupying the same environmental niche as human settlements. Consequently, they may have been incorporated into the archaeological record as natural mortalities or the incidental disposal of birds killed by cats or humans, for example, and disposed of with domestic waste.

Wild birds occur on fewer sites than domestic birds and wild mammals (Figure 4.50), but follow a similar trend through time to the latter, increasing in quantity from the late Saxon phase, which reflects the increase in hunting observed in the procurement of deer and hare.

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When the presence of edible wild birds on various site types is examined (Figure 4.51), all groups (except sea birds) are best represented at early Saxon former Roman towns than rural sites, while in the middle Saxon phase they are most common on ecclesiastical, high-status and wics/ trading sites. From the late Saxon phase the groups of edible wild birds become most often recorded on urban sites – burhs and Danish towns – accompanied by a decline of all but water birds, on ecclesiastical sites.

Water birds are ubiquitous throughout the period on all site types, and this may be largely due to the wide range of species within the group – encompassing as it does all species of ducks and waders, amongst others. To investigate further the nuances within this range, the presence of species from the main groups of water birds (ducks, waders, crane/ stork/ heron/ bittern, and swan) were recorded (Table 4.7). In the early Saxon phase, wild ducks are recorded on nearly all sites, yet swans and waders are more common on the re-used Roman towns, as well as at West Stow. In the middle Saxon phase, the longer-legged waders (crane, stork, heron and bittern) and swan are often recorded from high-status sites, yet the other water birds are found more commonly on all site types. In the late Saxon phase, wading species proliferate on burhs, ecclesiastical and high-status sites, whereas other water bird species are recorded on all site types. Waders are again more common at burh and high-status sites in the Saxo-Norman phase, although a high number were recorded at the rural site of Wraysbury.

The varying proportions in which small birds are found (Figure 4.51) suggests that they were not just a product of accidental deaths, i.e. they were deliberately caught. They are recorded more frequently at former Roman towns in the early Saxon phase, middle Saxon high-status and ecclesiastical sites and late Saxon and Saxo-Norman high-status sites. Although passeriformes (small perching birds) are common in the early and middle Saxon phases, numbers drop considerably in later phases (Table 4.8). The number of pigeons/doves increases sharply from the middle Saxon phase and continue to be commonly found into the Saxo-Norman phase. Turdus species (e.g. thrush and blackbird) are rare and decrease with time.

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Sea birds and game birds are less commonly recovered. The majority of sea birds came from coastal, or near-coastal, settlements, with the exception of: a gull and guillemot recovered from York in the middle and late Saxon phases, respectively; a gull from Oxford in the middle Saxon phase; and another from a late Saxon Cambridgeshire site. Gulls often fly inland, but their scarcity indicates that they were not particularly sought-after during this period, although some species became a delicacy in medieval England (Fisher, 1997). The same is true of the game birds. Despite being rare (Yalden and Albarella, 2009: 134), pheasant and partridge are recorded in all phases (Table 4.8), and grouse in all but the Saxo-Norman phase. The other species of game birds (capercaillie, corncrake and quail) are only rarely recorded.

The group of exotic species largely consists of peafowl, but includes the exceptional find of a pelican from the industrial site at The Mound, Glastonbury in the Saxo-Norman phase. Peafowl are recorded at isolated sites, from the middle Saxon rural site of Wicken Bonhunt, Essex, late Saxon Thetford (Knocker's site), and the Saxo-Norman high-status sites of Faccombe Netherton, Norfolk and Crown Car Park, Nantwich as well as the Mound, Glastonbury.

Birds of prey are also rarely recovered, and those most commonly found include those traditionally used for falconry (Yalden and Albarella, 2009: 137) i.e. goshawk, peregrine falcon and sparrowhawk, as well as scavenger species such as buzzard and red kite. Various species of owls and harriers are also recorded from middle Saxon phase sites and later, along with a number of finds of white tailed eagle in the early and middle Saxon phases.

Signature Species

Considerable work has been carried out into the use of birds as signature species. Sykes has defined six signature species (swan, bittern, grey heron, crane, grey partridge and woodcock) as specific to elite residences, based on their status in later medieval England (Sykes, 2004: 89). A similar method was used by Albarella and Thomas (2002) to investigate wildfowling and status, based on the presence of gannet, stork, heron, sparrowhawk, grey partridge, pheasant, capercaillie and crane. A restricted range of wild bird species was also used in a study by Dobney and Jacques using diversity of species, the prevalence of hawking and falconry birds, and potential avian prey species (Dobney and Jaques, 2002: 18). All of these studies accept the

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premise that wild birds are a luxury food in a farming-based society where their procurement is unnecessary for survival. Consequently, the consumption of wild birds is taken to indicate the presence of an elite who can afford, both in time and resources, to catch birds either directly through hunting, or indirectly through the employment of others (Ashby, 2002: 40; Serjeantson, 2009a: 316; van der Veen, 2003: 407). The validity of this assumption is reflected in the quantification of wild bird species from various site types (Figure 4.52), where the greatest numbers of wild birds are recorded at high-status sites (or re-used Roman towns in the early Saxon phase).

Three main methods of investigating signature species can be undertaken with this dataset. The first is the use of a diversity index, based on the number of wild bird species recorded for each site, grouped by site type (Figure 4.53). The results of this show a marked difference in the early and middle Saxon phases between the re-used Roman towns in the former, and trading and high-status sites in the latter, at which considerably greater numbers of species are identified than other, contemporary sites. In both these phases rural domestic sites have fewest recorded species, along with similar paucity observed at middle Saxon wics. During the late Saxon phase there is little difference in the range of mean diversity for all site types, although rural sites, Danish towns and industrial sites (all of which are within Danish towns) have the lowest species diversity– ecclesiastical and high-status sites the greatest. There is greater difference recorded in the Saxo-Norman phase, with a reversal in the trend previously observed on rural sites which are now the origins of greatest species diversity. burhs and ecclesiastical sites are the next best supplied with wild bird species, again Danish towns having less diversity than their Saxon counterparts.

Ecclesiastical sites have previously been described as having low species diversity (Dobney and Jacques, 2002: 9) implying that ecclesiastical populations may be less inclined to hunt or otherwise procure wild birds. This is not borne out by the data presented here. However, the diversity index does not take into account the type of species present and, as noted above (Figure 4.51), in the late Saxon phase there was a significant drop in the numbers of small birds and game birds recovered from ecclesiastical sites, and an increase in the number of sites from which water birds were recorded – a trend that continues into the Saxo-Norman phase. It may

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therefore be suggested that, from the middle Saxon phase, ecclesiastical sites typically contain a number of edible wild species, particularly (from the late Saxon phase) water birds. The disparity between these results and those from Dobney and Jacques' study is most likely due to two problems inherent in the nature of such synthetic studies. In the latter there was no separation of the ecclesiastical sites to phase, and the inclusion of non-edible species (exotics, birds of prey and corvids) skewed their results, suggesting that such species played a role apart from that of diet to signal status, which will be considered below.

The second method employed to explore signature species is the analysis of particular species of wild bird against site type. Because of their ubiquity, duck species were not included as possible signature species, neither were sea birds, as the distribution of these is most obviously affected by environmental factors. The frequency of 16 of the most commonly occurring species of wader (bittern, curlew, plover, lapwing, oystercatcher, snipe, woodcock), water birds (swan, diver, crane, heron and stork), small birds (pigeon/ dove) and game birds (partridge, pheasant and grouse) was calculated for each site type, and the results are given in Figures 4.54a-d. Many of these species are recorded from a number of site types, although the presence of swan, pigeon/ dove, woodcock, plover and grouse was more marked on early Saxon re-used Roman towns than other sites; heron and grouse were only recovered from middle Saxon high-status sites. Swan occurred most abundantly and partridge were only found at, high-status and ecclesiastical sites; there was no evidence for particular species to be preferentially recorded at high-status sites in the late Saxon or Saxo-Norman phases, although in the late Saxon phase heron and stork were only recovered from ecclesiastical sites, which also had the greatest prevalence of other water birds, particularly crane and curlew. By the late Saxon and Saxo-Norman phase partridge are only observed on rural and burh sites, which suggests they had lost the status apparent from middle Saxon assemblages. Also of note is the relatively high frequency of woodcock at burhs in the late Saxon and Saxo-Norman phases, which may imply a consumer demand. The prevalence of pigeon/ dove on all sites in all phases, indicates that this was a resource available to all.

The third and final method used to argue for the presence of signature species is in the evidence for hawking and falconry. There is little evidence for falconry in England prior to the

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middle Saxon phase, although there is some suggestion for this sport at the late Roman site of Great Holts Farm, Essex (Serjeantson, 2009a: 321). The first documentary evidence for hunting with birds in England comes from a letter from St Boniface to King Ethelbald of Mercia dated to AD 745-746 which recorded the gift of a hawk and two falcons to the King; shortly after this, another letter was sent from King Ethelbert of Kent to St Boniface, asking him to supply two falcons to hunt crane with (Oggins, 1981: 175-177, 2004: 38). The delivery of these birds may be expected to have occurred through one of the established coastal trading centres or wics. If so, the presence of a goshawk at Ipswich and a sparrowhawk at Lundenwic and later, at the urban centres of Exeter (sparrowhawk), Ipswich (peregrine), Thetford (kestrel), Winchcombe and York (goshawks), probably reflects the nature of goods they were trading (Table 4.10), rather than the status of the inhabitants (Dobney and Jaques, 2002: 16-17). In his highly informative work on the nature of Anglo-Saxon falconry, Oggins notes that the majority of literary and pictorial sources for falconry relate to the ruling classes, and members of the aristocracy, which reflects a bias in the nature of the sources themselves (Oggins, 1981: 193-194, 2004: 49). However, there is also some evidence for the presence of fowlers within the peasant population, as described in Aelfric's Colloquy who hunted with hawks that they took from the indigenous population and trained seasonally (Swanton, 1993: 111).

The documentary evidence given so far is reflected in the site types from which falconry birds are recovered (Figure 4.55). Numbers of falconry birds (goshawk, peregrine falcon and sparrowhawk) recorded from Saxon sites are incredibly small, although this is not surprising given the possibility that they were buried or cremated with their owners as recorded on contemporary European sites (Dobney and Jaques, 2002: 15; Serjeantson, 2009a: 323). Nonetheless, there is evidence for falconry from the middle Saxon phase, since not only is there an increase in the number of falconry birds, but they are recorded in greatest numbers on specific site types – ecclesiastical and high-status – into the Saxo-Norman phase. There is a decline over time in the proportion of ecclesiastical sites from which the main falconry species are recovered, and they are absent from this site type in the Saxo-Norman phase. This is consistent with a number of documents at the time, admonishing members of the clergy that they "be not too fond of sport, nor care too much for dogs or hawks", and that "a priest be not

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a hunter, or a hawker" (cited in Oggins, 2004: 43), although at the same time recognising that members of the religious orders did pursue such past times. There is a notable narrowing of the bird of prey species recorded from Saxon sites through time, whereas in the early and middle Saxon phases there are a number of buzzard and red kite and other species recorded on a variety of site types, by the Saxo-Norman phase, there are very few of these species in the archaeological record, which indicates the restriction of social boundaries, where only the aristocracy had access to these pursuits, compared with the apparently greater accessibility in previous phases (Oggins, 1981: 194).

This brings the argument around to the ambiguity in the evidence for actual species used in falconry and hawking. The birds traditionally used for falconry – the goshawk, sparrowhawk, peregrine and kestrel – are present from the middle Saxon phase. However, other large native species (i.e. buzzard and red kite) are conspicuous by their occurrence on similar site types to the typical falconry birds that is, trading sites, ecclesiastical and high-status sites. Although these birds have been considered to be scavengers, associated with urban sites (Mulkeen and O'Connor 1997: 441), it has been suggested elsewhere that both these species were used for hawking, either directly as in the case of a buzzard, or as a prey species or decoy as red kites were used for in the medieval period (Dobney and Jaques, 2002: 17-18). While there is no direct historical reference to the use of these species for hunting, it is entirely likely that they were tamed and trained for just such purpose. Furthermore, there is a similar correlation between other birds of prey and these sites, too, and harriers and white tailed eagles may have also been used for sport , because they are found on trading, ecclesiastical and high status sites throughout the Saxon period in proportions not too dissimilar to the other falconry species (Table 4.10).

A number of criteria for distinguishing hawking and falconry archaeozoologically have been described (Prummel, 1997), one of which is the presence of game which may have been caught by the birds of prey (ibid: 336). Such prey species have also been defined (Serjeantson, 2009a: Table 13.11), which are summarised in Table 4.10. Table 4.11 shows the available Saxon sites from which birds of prey have been recorded. Generally speaking, this shows that prey species are recorded on the majority of sites from which birds of prey are associated, including

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those not widely considered suitable for hunting with (i.e. buzzard and red kites). The fewest prey species are recorded at many of the wics, burhs and Danish towns, however, and this emphasizes the idea that the presence of birds of prey at these sites was for a different reason, namely trade, rather than hunting.

4.5.5 Fish

Fish species were only recorded using presence/ absence measures and not quantified for the reasons outlined in Chapter 2.2.4, combined with the fact that far fewer accessible fish bone reports exist than for mammal and bird bones and problems with taphonomy and collection. Consequently the data for fish is incomparable with that for mammals and birds and necessitates separate analysis. A list of species recovered, split into three categories – marine, freshwater and migratory – is given in Table 4.12.

Very few fish were recovered from early Saxon sites (Figure 4.56), andfreshwater, marine and migratory species were similarly abundant. The greatest number of species came from middle and late Saxon phases. Of these, more freshwater species came from the late Saxon phase, and marine species from the middle Saxon phase. Migratory species were found in similar quantities in middle, late and Saxo-Norman phases. Results of a large-scale project investigating the increase in fishing in the Saxon and medieval periods (Barrett, 2008; Barrett *et al.*, 2004b) differ from these findings, arguing that marine fish are far less common on sites preceding the late 10th century – prior to a fish 'event horizon' in the few decades either side of AD 1000. This difference can be explained by the restriction in quantification of this dataset: James Barrett *et al* (2008) used the NISP counts of comparable assemblages. What these data show is a greater variety of species in the middle Saxon phase, with more restriction of species, albeit present in greater quantities in the later Saxon and Norman phases.

The large number of marine species recorded in the middle Saxon phase were generally from the littoral, or coastal, zone (i.e. within 200m of the shore) on the continental shelf (Figure 4.57), of which a high proportion were sea floor-dwelling. The drop in diversity of marine fish species in the late Saxon phase coincides with an increase in species which could occupy both the littoral and oceanic zones, which increases again in the Norman phase. This phenomenon

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corresponds to the rise in off-shore fishing from the late Saxon phase (Barrett *et al.*, 2004a: 621) and implies a change in fishing methods. The presence of high species diversity from inshore and sea floor zones in low quantities suggests that fishermen were using lines from boats close to the shore, or the shore itself, or that they used weighted nets for small-scale trawling of inland waters and sea bed. A change then occurred in the late Saxon phase where a narrower range of species from deep water were caught in greater quantities, indicative of more discriminatory fishing. The use of drift nets at this time has been discounted (Barrett *et al.*, 2004a: 628), due to the narrow range of species caught, and the probability is that procurement was by line-fishing.

When the diversity of fish species recorded on various site types is examined (Figures 4.58a-d), a general paucity of fish on all sites in the early Saxon phase is evident, although the greatest numbers of fish species come from former Roman town sites. In the middle Saxon phase, there is an interesting dichotomy between a high number of freshwater fish recorded on high-status sites, and a greater number of marine fish on coastal wics and trading sites, as well as ecclesiastical sites, although numbers on the former site-type are bolstered by the assemblage from Hartlepool monastery, situated on the coast. Migratory species are also found in greatest proportions on high-status sites. From the late Saxon phase, the greatest number of fish species are recorded on urban sites (burhs and Danish towns), presumably in their capacity as market places for the distribution of a catch. This is reflected in the increase in marine species recovered from inland sites over 15km from the coast (Figure 4.59) which implies a thriving trade network such as that described in Aelfric's Colloquy, where the fisherman says he "sells his fish in the town, and sells all he can catch" (Swanton, 1993: 110), thus satisfing the urban demand for fish from AD 1000 (Barrett et al., 2004a: 630). Prior to this, in the middle Saxon phase, the majority of fish species came from coastal or near-coastal sites, which implies that fishermen supplied a relatively local market with a consistency that extends into later phases. Most probably many fish were preserved, either by salting, drying or smoking (Banham, 2004: 68; Barrett et al., 2004a: 630) – unless customers were expected to eat the whole catch immediately. This will have enabled wider (and slower) trading in fish inland.

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Although fish are common on ecclesiastical sites in all phases, in the Saxo-Norman phase there is a large increase. This phenomenon has been observed by Ervynck (2004) who suggested that this was a method used by the religious orders to distinguish their diet from the aristocracy; this may well be the case, given the apparent scarcity of fish recovered from highstatus sites in the same period. An additional explanation results from the Benedictine doctrine requiring increased fasting and a prohibition of meat in the diet of the monastic population from the 10th century (Brown, 2003: 38), whereby fish became a legitimate substitute (Banham, 2004: 64).

Despite the proximity of rivers, and therefore availability of fish to much of the rural population, very few fish remains come from such sites, indicating little time or inclination to consume fish. Freshwater fish species become most common on ecclesiastical sites from the Saxo-Norman period, which coincides with attempts to increase the availability and regulation of such species through the use of fishponds from the 11th century (Barrett *et al.*, 2004a: 628).

4.6 Discussion

This investigation into the animal economy has revealed a number of developments across the Saxon period. A more wide-ranging analysis of the social and economic implications of these trends will follow, based on the themes of food and diet, specialisation, supply and demand, and the social hierarchy.

4.6.1 Food and Diet

Previous analysis has indicated that Saxon animal bone assemblages are most likely to have resulted from the deposition of bones from all parts of the carcass (Chapter 3.6), and various parts of the animal are therefore subject to little redistribution, that may otherwise lead to the identification of specialist waste, such as that associated with Roman urban butchers (Maltby, 1989b), or medieval skin processing (Holmes, forthcoming-a). It may be safe to assume that animals brought to a site were fully utilised on site, for meat, marrow, skin, horn and bone, and so may be regarded as available to contribute to the diet and industry of the inhabitants of that site. This is examined in more detail in Chapter 6.

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i) Secondary Products versus Meat

The diet of the Saxon population is generally regarded to have been cereal- and vegetablebased, with meat making a small, and often rare contribution (Banham, 2004: 61; Fowler, 2002: 250; Grant, 1988: 139). This may be the case, but it is hard to quantify animal bone evidence as yields per annum, given the large time-scales encountered, the temporary and transient nature of many settlements, variations in refuse disposal, and problems directly comparing animal and plant remains (Davis and Beckett, 1999: 1; Grant, 1988: 139). Nonetheless, the archaeozoological evidence indicates that if crops made up the majority of the diet, it was on a fairly small scale in the early Saxon phase, as few sites contained cattle at ages suitable for secondary use such as traction, given the time required to train oxen, who were often not yoked before four years of age (Salisbury, 1994: 20). Accordingly, meat was perhaps more important to the early Saxon population than previously argued, or that arable cultivation was largely carried out using human power.

From the middle Saxon phase, the diet of the farm worker was more likely to reflect the goods produced as cattle were increasingly valuable for secondary products (traction and milk). As a result, the quality of beef would have been reduced, although sheep husbandry remained focused on younger sheep kept primarily for meat.

Investigation into the nature of these secondary products starts with dairy production. Documentary evidence indicates that sheep and cattle both contributed to the provisioning of dairy products in the Saxon period (Banham, 2004: 54; Hagen, 1992: 16), and it has traditionally been suggested that milk was predominantly recovered from sheep: the move to large herds of dairy cows not occurring until the 13th century (Campbell, 1992: 107; Noddle, 1990: 35-37; O'Connor, 1989b: 14). Some evidence, albeit based on a small data set has since been used to imply an increase in cows for dairy production in the late Saxon phase (Sykes, 2007b: 52). Grigg (1989: 213) also suggests that cattle were kept for summer milk production on a small-scale, with just two to three animals in a herd. While it is not suggested here that intensive dairy production occurred in the Saxon period, the analysis of metrical data indicates that cattle herds were predominantly female in all phases, implying that they are likely to have been used for milk on a scale previously not considered.

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Although horses were used for transport and hauling in the 8th and 9th centuries (Langdon, 1986:24), they were not widely introduced as draught animals until the medieval period (Clutton-Brock, 1976: 383; Smil, 2000: 125). Instead, cattle were the tractors of the Saxon period (Trow-Smith, 1957: 56). The earliest British plough was an ard, which consisted of a plough share that would, "pulverise and stir the soil" (Payne, 1957: 77). From the Roman, period, a few farmers made use of a plough with a coulter (to cut the soil) and mould board (to turn the soil), which could be used more effectively to turn heavy clay soils (Fowler, 2002: 185; Payne, 1957: 77). In post-Roman contexts there is little, if no, artefactual evidence for the use of heavy plough until the 10th or 11th centuries. Further work on the frequency of pathologies to the feet and legs of cattle, which may be expected to increase with the use of the heavy plough has likewise found no evidence that injuries increased throughout the Saxon period (Holmes, forthcoming-e). This suggests that ards were prevalent throughout the Saxon period; and even after the introduction of the heavy plough, the ard remained in use in northern and western Britain until modern times (Fowler, 2002: 203; Noddle, 1990:38).

The link between cattle and arable production is close, yet it is also possible for land to be broken up without animal power, and given the added requirements of cattle for grain and fodder when overwintering, for poorer households the luxury of using cattle for traction was not an option (Noddle, 1990: 37). Nonetheless, two or three animals may have been kept by each kinship group in the early Saxon phase to pull an ard.

ii) Variety as the Spice of Life?

Although the diet of much of the Saxon population may well have been plant-based, this study has shown that, on all sites, and in all phases, the three main domesticates provided the majority of the meat. Beef was most commonly available, with the exception of a handful of high-status sites where pork was obtained in similar quantities. Despite the gradual increase in sheep remains with time and a propensity towards more sheep on upland areas (see Chapter 3.2.3), the size of animals and corresponding meat weights suggest that mutton and lamb did not feature largely in the diet. This is reflected in a source from the reign of Aethelstan, where a "destitute Englishman on each of the royal estates was to receive one amber of meal and a

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shank of bacon or a wether worth fourpence every month" (cited by Hagen, 1992: 67) – thus equating a whole sheep to just one joint of bacon, highlighting the relative value of pork.

Other animals were eaten, though in extremely low numbers. As noted by Wilson (1973: 76) horsemeat was eaten in the early Saxon phase in England, declining in popularity until its documented prohibition by Pope Gregory III in A.D. 732. This is consistent with the archaeozoological data, which has revealed evidence to suggest that horsemeat was occasionally eaten in the early and middle Saxon phases, but rarely, if at all, in later phases. Wild mammals, domestic and wild birds also only provided meagre rations (Figure 4.60), particularly in the early Saxon phase. The consumption of domestic birds increased considerably between the early and middle Saxon phases until numbers peak in the Norman phase. Wild birds and mammals do not increase in availability until the Saxo-Norman phase, suggesting that their social significance was more profound (see below 4.6.2).

Seasonal animal-based additions to the diet would have included eggs, milk and cheese, the former readily available from any of the domestic bird species, and collected from wild ducks (Banham, 2004: 57). The evidence that both female cattle and sheep were kept, and at increasingly older ages, means milk could be provided for cheese-making, (ibid :55; Hagen, 1992: 68).

iii) What was Available?

The butchery of cattle, sheep and pigs in the Saxon period is consistent with the basic tenets of skinning, disarticulation, jointing and small-scale production of raw materials. However, there appears to be greater use made of the carcass in the early and middle phases, where skulls are more commonly smashed or split for brain removal, and long bones, particularly metapodia, split for marrow extraction: such activities decrease with time. This indicates that in the earlier phases, meat protein may have been more scarce, and so carcasses were utilised to maximum effect. It therefore may reflect a more thrifty attitude to meat production, where animals were used for 'everything but the squeal', a trend which declined in later phases. Sykes (2007b: 88) suggests, however, that long bones were split transversely in the Norman phase – a butchery practice which may or may not correspond to marrow extraction. An alternative proposal,

however, is that the increase in bone over antler as a raw material in the late Saxon phase led to less fragmentation of bone.

4.6.2 Specialisation of Animal Husbandry

i) Supply and Demand

On most sites in the Saxon period, there was little variation in the husbandry of sheep, which were either kept primarily for their meat, or for a mixture of meat and secondary products. While there is little archaeozoological evidence for intensive wool or milk exploitation, structural and artefactual evidence for wool processing and cloth production exists at many rural sites, such as sunken feature buildings and spindle whorls (Härke, 1997: 136-137). Moreover, a letter from Charlemagne to the king of Mercia in 796 specifically requested English-made cloaks (Ryder, 1983: 188). This, combined with the presence of both male and female sheep suggests that wool was produced, possibly collected on a small scale from young sheep in their second and third summers. There is evidence for more intensive production from isolated sites such as Bury Road in the late Saxon phase.

Cattle too, during the early Saxon phase, were bred purely for meat, consistent with an underlying economy based on small-scale production for settlements existing on a subsistence level. There is an increasing emphasis on secondary products over time. Traction would also have been important, given the increasing need to supply food crops to the populations of emerging towns.

The demand and subsequent trade in fish takes off in the late Saxon phase, seen in the increasing abundance of fish species in burhs and Danish towns. This co-incides with an increase in deep sea fishing. Prior to this, fish were procured from fishing closer to the shoreline, and were less common on inland sites.

ii) Butchers and Artisans

The best demonstration for specialist butchers comes from changes made to the way the carcass was split into sides: from the paramedial butchery of the middle Saxon phase to an increasingly common axial method, requiring the animal to be hung prior to butchery.

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However, the two methods are not mutually exclusive, and may represent the proliferation of the technique, based on the introduction of hooks for hanging.

The presence of butchery waste amongst more domestic, household rubbish throughout the Saxon period is indicative of small-scale butchery perhaps occurring on a household level for the smaller animals (sheep and pigs), and the presence of larger cuts of meat from larger animals (cattle) from a communally-owned animal. There are few recorded dumps of primary butchery waste, such as horns, skulls and feet, which also emphasises the local, small-scale nature of the butchery of animals.

Associated with this is refuse containing craft-working waste, also commonly recovered alongside domestic rubbish, again indicating the probable domestic-scale production of antler, bone and horn objects as and when required, rather than a market-led industrial process. However, from the middle Saxon phase, such waste is only recovered from urban situations, suggesting that specialist workers did exist, and were supported by the urban economy – a theme that will be revisited in Chapter 6.

4.6.3 The Social Divide

As the results of investigations into site classification (Chapter 3) indicate, certain aspects of social hierarchies may be further elucidated from more detailed investigation, particularly regarding the nature of high-status, industrial, ecclesiastical and trading sites compared to more commonplace domestic sites.

i) Diet Revisited

Observations have been made which hint at differences between the diet of occupants within settlements of various social standings. A number of authors (Bourdillon, 1994: 122; Ervynck, 2004: 218; Fowler, 2002: 240; O'Connor, 1994: 139) have suggested that peasant diets may have included beef and mutton, but few game species, and this has been borne out in the Saxon data, where wild species are consistently recorded in lowest numbers on rural domestic sites. A similar phenomenon has been described in self-sufficient societies, where food is locally produced, and consists largely of plants, but with some meat (van der Veen, 2003: 415).

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In contrast, high-status populations may be reflected in diets where meat is consumed in greater quantities, with the inclusion of more diverse species such as deer, pig and wild birds (Dobney *et al.*, 2007: 240; Ervynck *et al.*, 2003: 432; Grant, 2002a: 21). The other main category of food manifesting social standing relates to those living on ecclesiastical establishments, whose diet may be expected to become more structured from the 10th century, when rules concerning restrictions of eating meat were introduced (Leyser, 1997: 179). Further to these social divisions are particular trends noted on industrial, urban and trading sites.

Inhabitants of high-status and ecclesiastical sites enjoyed a far greater range of domestic and wild birds, pork and wild mammals (high-status sites) and fish (ecclesiastical sites). Additionally, former Roman towns, industrial sites, trading sites and wics from the early and middle Saxon phases also exhibited wider species diversity, particularly in the numbers of fish, wild mammals and wild birds recovered. Similarities between all these site types (except the former Roman towns) in the middle Saxon phase sets them apart from other sites, and demonstrates a link between them. This indicates either the presence of multi-function high-status sites, combining domestic and religious areas with areas set aside for trade and industry/ craft working all in one settlement, or the provisioning of separate sites from the same source.

From the late Saxon phase, the greatest ranges of species are recorded at high-status and ecclesiastical sites, which suggests a separation and move of industry and trade to the newly emerging urban centres, which have similar species diversity. The exclusivity of high-status sites becomes more notable in the Saxo-Norman phase. A narrowing of social stratification between sites can be observed by comparing the proportion of sites on which such species are recorded with the absolute numbers (Figures 4.50 and 4.60), from which it can be seen that these species are recovered on fewer sites from the Saxo-Norman phase, despite a corresponding increase in absolute numbers of species. The availability of particular animals – wild and domestic birds and wild mammals therefore becomes more restricted to particular sites from this phase.

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ii) Signalling Status

Previous archaeozoological analysis of changes around the Norman Conquest (Sykes, 2007b) have identified ways that the new elite, the Norman aristocracy, set themselves apart from the general population – achieved through an increase in hunting, new hunting rites, restriction of the landscape and a new etiquette regarding display and food consumption. Results discussed here concur but indicate some of the ways that the late Saxon elite distinguished themselves from others. Although not exclusive, the restriction of species such as pigs and wild birds to high-status sites started in the early Saxon phase; domestic birds in the middle phase; deer in the late Saxon phase; and hare in the Saxo-Norman phase.

Feasting was obligated as a way of paying render to the king in the early Saxon phase (Hagen, 1992: 72-77), although the refuse from feasting is hard to distinguish from accumulations of more general meal waste, and none have been identified archaeozoologically. Nonetheless, the presence of high-status signature species in re-used Roman towns implies that the inhabitants of these places were set apart from those of other settlements at this time.

The dearth of wild species in assemblages prior to the Saxo-Norman phase indicates that they were not highly sought after (Figure 4.50). The abundance of domestic birds, however, increased significantly in the middle Saxon phase, which might signify their consumption as a marker of status – as reflected by the abundance of these species on middle Saxon high-status and ecclesiastical sites. Trends in later phases suggest that it is the wild mammals which are recorded more commonly on high-status sites, and wild birds on ecclesiastical and high-status sites.

The right of the free population to hunt wild animals was propagated until the Conquest (Hooke, 1998: 154), when Forest Law was introduced making wild animals the property of the King (Sykes, 2007b: 56). However, the sudden increase in the abundance of wild species and horses on high-status sites from the Saxo-Norman phase indicates that this change may have occurred just prior to the Conquest. This may be explained by a law documented in the *Charta de Foresta*, of 1016 laid down by King Canute prohibiting the hunting by the peasant classes (Almond, 2003: 137), although the reliability of this document is in question. However, the

relative absence of wild species on rural and urban domestic sites in earlier phases when it was legal suggests that little effort was previously expended in the procurement of wild species by the population of these sites.

4.7 Summary

This chapter has revealed the limited nature of the Saxon diet, which would have varied little for the majority of the population. The differences noted in the previous chapter between site types have become more nuanced, and the beginnings of a relationship between the political and economic aspects of Saxon England and the use of animals for food, secondary products and status symbols is becoming more clear. The next chapter will continue this investigation, with specific reference to the provisioning of sites within particular regions, exploring links that may, or may not exist between sites and their hinterland regarding the supply and procurement of animals and animal products.

Chapter 5:

Provisioning and Foodways in Saxon England

5.1 Introduction

The general trends in animal husbandry and food availability discussed previously will, in this chapter, be considered in terms of the provisioning of various site types with animals and animal products. Provisioning is a term that describes the ways and means that a population procures its food and raw materials. The mechanisms by which this occurs can be viewed as a spectrum: at one end are sites which are entirely self-sufficient, and at the other are those wholly dependent on external sites for the production of animal-based food and goods, either through trade or taxation. In between are a variety of ways in which sites may interact with each other for the procurement of animal products, which encompass many social, political and economic mechanisms as the basis of trade and exchange (Costin, 1991: 2).

This chapter will therefore explore how site populations acquired their food and raw materials by considering differences and similarities between animal economies within specific regions,

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and any notable interactions between them. Analysis will proceed in the first instance on a regional basis, on the premise that sites will procure goods from their immediate hinterland. Three categories of economy are identified, although it must be emphasised that these are ideologically based, and will vary from site to site, depending on environmental, social, economic and behavioural variables:

- Net producer a site where animals are bred and raised, either for primary or secondary products;
- Distributor a site where animals or animal products are taken to be redistributed;
- Net consumer a site where animals and their products are eaten, and raw materials used for craft or industrial production.

A detailed appraisal of the theories and recognition of provisioning networks was given in Chapter 2, but it should be stressed that the ways by which producer and consumer sites can be distinguished in the faunal record will vary depending on the scale of production and distribution networks in place (Clark, 1987; Costin, 1991; O'Connor, 1989b; Perring, 2002; Wilson, 1994). A site can be both producer and consumer within a self-sufficient economy, but the more complex an economy becomes, the greater the differentiation between consumer and producer sites. An urban economy, for example, necessitates almost all animal-based products to be bought in, requiring significant surplus production from the producer sites to satisfy consumer demand (Clark, 1987: 184). It is the production of surplus for the provision of rent or saleable products that can be observed archaeozoologically as an indicator of economic complexity (Crabtree, 1990b: 158) using a combination of methods:

- investigating where animals were bred and what they were used for, using mortality profiles;
- contrasting the relative availability of wild and domestic species and the diversity of diet;
- observing the demand for particular cuts of meat or raw materials through the use of body part representation.

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In Saxon towns there is some potential for animals to have been raised locally, as wics and burhs often included large areas of open space, and surrounding 'town' fields were tied to the settlement (Haslam, 1985: 22), although the extent to which these were used for raising animals is unknown. Certain animals such as pigs and domestic fowl were commonly raised in the back yards of medieval towns (Coy, 1989b: 32; Maltby, 1994: 98; O'Connor, 1989b: 17), and there is a strong likelihood that they were kept on a household level within wics and burhs.

Previous research has suggested that the most evolved system, present at the end of the Saxon period, was one where the producer dealt directly with the consumer for exchange of money or goods in a market economy; however, in the middle Saxon phase products were acquired as tax and redistributed through a middleman, or estate centre (see 1.3.2 for more details) thereby adding an extra dimension into the procurement of animal goods by a nonagrarian population (Costin, 1991).

The relative frequencies of cattle, sheep, pig, domestic birds, wild birds and wild mammals are given in Appendix C and patterning within the data was investigated using Principal Component Analysis (PCA). In some cases, where trends in wild species distributions were not clear, PCA was re-run removing outliers to investigate patterns in the majority of sites, removing the influence of atypical assemblages. Body parts have been illustrated as a proportion of the most common elements. If entire carcasses were deposited, the preservation and taphonomic factors acting upon them would mean that mandibles would survive best; thus, where mandibles are the most commonly recovered element, this may simply reflect preservation bias. Similarly, phalanges are often most susceptible to recovery and preservation bias, and so are expected to be recovered in low quantities. The preservation of limb bones included in the lower- and upper-leg categories is comparable, and these should be recovered in similar proportions if complete carcasses were disposed of on site.

As noted in Chapter 2.1.5, the number of sites producing animal bone data are not uniform throughout England, but are concentrated in particular regions. The case studies chosen will therefore be based on the areas with most data (Figure 5.1), yet also to give the best

geographic coverage. As south-western sites are particularly scarce in the archaeozoological record, they are omitted from this analysis. The five case studies include sites from the following counties (Figure 5.2, Table 5.1):

Region	Counties
Northern East Anglia	Norfolk, Suffolk, Cambridgeshire
North	Northumberland, Durham, Yorkshire
Midlands	Northamptonshire, Bedfordshire, Buckinghamshire, Oxfordshire
South	London, Surrey, Berkshire, Hampshire, Sussex, Kent
West	Gloucestershire, Somerset, Wiltshire, Worcestershire

Regions have been arbitrarily defined along county boundaries to give areas of similar size, containing a similar number of sites – the exception to this is the North, which is considerably larger. This and the West contain fewest sites. Included within each region are a variety of site types – enough, it is hoped, to help understand the interactions of urban and rural sites – and sites of differing status and function within their respective hinterlands. As this chapter is primarily concerned with evidence for provisioning consumer sites, identified as present in the middle and late Saxon phases, only sites from these phases will be analysed, hence early Saxon settlements will not be considered.

Each region will be considered separately, in terms of the species represented (Appendix C), mortality profiles (Appendix E), and the distribution of anatomical elements (Appendix D), where such data are available. It is unlikely that the arbitrary regional boundaries defined here were observed in the past, and sites either side of these boundaries can reasonably be expected to have interacted with each other; this issue will be deliberated further in the discussion. The key points to consider are: whether the inhabitants of settlements were self-sufficient, or if there is evidence for producer, consumer or distribution sites; the relationships that existed between site types; what was being procured, and produced; and was this due to demand or availability?

5.2 The North

Northern sites cluster on the eastern side of the region, reflecting the utilisation of lower-lying land, away from the Pennine mountain range to the west (Figure 3.7).

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5.2.1 Middle Saxon phase

The use of PCA shows three major groupings in the proportions of cattle, sheep and pig (Figure 5.3), between rural ecclesiastical, domestic and urban sites. Of these urban sites have the highest proportions of cattle (c.64%) than any other site types, followed by sheep (c.26%) and pig (10%). Three of the four rural sites (all from the village of Wharram) were also tightly grouped, having a high proportion of sheep (c.50%), then cattle (c.40%), then pig (c.10%); at the rural site of Cottam far more sheep were recorded. Ecclesiastical sites are more varied, but are distinct from other site types by the relatively higher proportions of pigs, although Hartlepool monastery was more comparable to Cottam. At Church Close, Hartlepool, the emphasis was on sheep, while at Church Walk, Hartlepool, and Wearmouth and Jarrow the assemblage was dominated by cattle.

Patterns in the relative proportions of wild species and domestic birds also show tight groupings for rural domestic sites and ecclesiastical sites, those from urban sites being more disparate. Rural domestic sites were represented by low numbers of domestic birds (c.3%), no wild birds and very few, if any, wild mammals. Ecclesiastical sites also feature very few wild species, but some wild birds were present on two of the four sites. They were also characterised by high proportions of domestic fowl, which was similar to the pattern from the wic site of Blue Bridge Lane, York.

Although there was limited body part data for northern sites, horn cores of cattle and sheep were only recovered from Fishergate, York (Figure 5.4), not from the rural site of Wharram. On both sites cattle were best represented by feet and lower legs, and less commonly by upper limbs and mandibles. Sheep feet were recovered in far smaller proportions – perhaps a product of recovery bias (see Chapter 2.1.4) – yet at Wharram there were considerably more mandibles, indicative of the disposal of complete carcasses. All body parts from pigs were recovered in similar proportions at Fishergate.

Mortality profiles (Figure 5.5) for cattle indicate the presence of both young and old animals at the rural domestic site of Wharram, reflecting their use for meat and secondary products. Younger animals, more consistent with a cull of those at prime meat-bearing age were

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recovered from urban Fishergate. Sheep ages were similar for all site types, with an emphasis on meat production.

5.2.2 Late Saxon phase

The preference for cattle in the Danelaw observed in Chapter 4 is well illustrated in the late Saxon phase: they are present in well over 60% of most assemblages. Only at three sites (Tenements, Durham; Blue Bridge Lane, York; and the South Manor Area, Wharram) did they comprise less than half the sample. Groupings observed by PCA are less defined than those of the previous phase (Figure 5.6), although pigs were present in greatest proportions on urban and ecclesiastical sites, and in lowest numbers on rural domestic sites, at which sheep were recovered in greatest numbers. The exception to this is Wearmouth and Jarrow which, while recorded as a rural domestic settlement in this phase, nonetheless has an archaeozoological profile more fitting an urban site, perhaps indicating a continuation in provisioning from its days as an ecclesiastical site. Urban sites of Tenements, Durham and Coppergate (d), York, are similar to ecclesiastical sites, characterised by high numbers of pigs and domestic fowl. Generally the proportions of wild species and birds were very low, although greater than the preceding phase, as these species were recovered from nearly all sites. Exceptions were observed at the rural domestic site at Wearmouth and Jarrow, where uncharacteristically large numbers of domestic fowl were recovered, again setting it apart from other rural domestic sites of this region. Tenements contained the greatest proportions of domestic birds, wild birds, wild mammals and pig remains than any other site, bringing into question the nature of this site, as such species diversity and high numbers of pig are more indicative of high-status sites (see Chapter 2.4.2). In order to investigate further the other sites from which the minor species were recovered, the PCA was run again, but with the outlying sites noted above, removed. This left a large cluster of urban and rural domestic sites, with the two ecclesiastical sites, both from Beverley, and industrial site at Coppergate, York, grouped outside, given their comparably large proportions of birds and wild mammals.

There were no suitable data for body part analysis, and the mortality profiles for cattle indicated the presence of younger cattle at prime meat age at urban sites, and older cattle

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more useful for secondary products on the rural domestic site of The South Manor Area, Wharram. The latter was the only site from which a sheep mortality profile was available, which was also representative of animals most likely to have been important for their meat (Figure 5.7).

5.3 The East

5.3.1 Middle Saxon phase

As noted previously (Chapter 3.2.3), most of the sites with the greatest number of sheep (Sedgeford, North Elmham and Bury St Edmunds), as well as being rural, were from the hilliest areas in the region. The only exception is Brandon, which is found on the lowlands. As with the northern region, there are distinct groupings between site types in the eastern zone. Rural domestic sites are best represented by high numbers of sheep (c.50-60%), and low numbers of cattle (c.30-45%) and pigs (c.5%) (Figure 5.8). Exceptions come from Crow Hall Park, Downham Market, which had a very high proportion of cattle and Brandon, where 19% of the main domesticates were pig. The economy at high-status sites was more varied: North Elmham Park recorded high numbers of pigs, to the extent that cattle, sheep and pigs were present in similar proportions; and Caister-on-Sea, Great Yarmouth had a high number of cattle, and similar proportions of sheep and pig, quantities of the latter still well above that observed on the majority of rural domestic sites. Sites from Ipswich also contained high proportions of cattle (c.45%), and similar numbers of sheep and pig (c.25-30%). Wild species were absent on the rural domestic sites where the proportions of sheep were greatest and pig was lowest, although at Brandon and Crow Hall Park, they were present, albeit in low numbers. Wild birds and mammals were also recorded at Ipswich and the two high-status sites, although wild bird species were not quantified at North Elmham Park. Domestic birds were present on all sites, with the lowest proportions at rural domestic sites, slightly greater numbers at Ipswich, and in greatest proportions at the high-status site (Caister-on-Sea).

Body part data indicate that cattle and sheep horn cores were recovered on all rural domestic sites, but not the high-status site at North Elmham Park (Figure 5.9). Body parts representative

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of the presence of complete carcasses were noted for all sites, although there were fewer cattle limb bones, and more feet from the high-status site.

The mortality profile for cattle (Figure 5.10) from Ipswich and the rural domestic site of Brandon indicate that those at the former site were slaughtered at a younger age, although both sites contained a significant proportion of old animals. On the majority of sites sheep were culled young to provide the best meat to size ratio, although those from Brandon were older, which could indicate a greater emphasis on secondary products.

5.3.2 Late Saxon phase

There were no distinct groupings observed in the PCA for the main domesticates in the late Saxon phase (Figure 5.11). However, the majority of sites were urban, with only three rural sites represented (two high-status and one domestic). The rural sites had fewer cattle and more sheep than most urban sites, and the high-status sites had some of the greatest proportions of pig. Within urban sites little variation occurred – cattle were generally present in greatest proportions (c. 50-60%), then sheep (c.20-30%), and pig (c.20-30%). The most notable exceptions were at Whitefriars Car Park, Norwich, and sites from Ipswich excavations between 1974-88, all featuring fewer cattle and more sheep; and a number of sites from Thetford – Bury Road, St Nicholas Street and Brandon Road, where pig numbers were lower. The increase in cattle from the mid Saxon phase mirrors the trend observed in the northern Danelaw during the Viking occupation, although to a slightly lesser extent; proportions of cattle in the north were generally over 60% of the main domesticates.

The minor species were again only rarely recovered, yet there was a slight increase in numbers compared to the middle Saxon phase, and they were present on the rural domestic site, a site classification from which they were absent previously. Unfortunately there was no quantification of the bird species from the only rural high-status site, but at the urban highstatus site at Castle Mall, Norwich and urban domestic Knocker's Site, Thetford, domestic and wild birds were recorded in greatest numbers, as were wild mammals at the latter. When these outliers were removed from the analysis it left a large group of urban and rural domestic

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sites, with the industrial Site 1092 and urban site from Ipswich 1974-88 separated by high proportions of domestic birds in their assemblages.

Cattle and sheep horn cores were recovered from urban sites (Figure 5.12), and their predominance on the urban industrial site, Site 1092, Thetford, indicates that horn working or hide processing was undertaken. Similar proportions of cattle body parts were recovered from Castle Mall, yet at both phases of the rural high-status site at North Elmham Park cattle lower limbs were most common. Patterns suggesting the deposition of complete carcasses were observed at Brandon Road, Thetford (cattle), North Elmham Park (sheep and pigs), Castle Mall (sheep) and Site 1092 (pigs). A predominance of sheep limb bones, and pig upper limb bones was noted at Brandon Road, and at Castle Mall more lower limb bones from pigs were recorded than may be expected if a complete carcass was deposited.

The mortality data (Figure 5.13) come only from urban sites. These show little variation in the mortality of cattle, the majority of animals were still alive at tooth wear stage G, suggesting their importance for secondary products. Sheep were all culled young, at prime meat age, except at Bury Road, Thetford, where the ages of death are more indicative of secondary product exploitation. At the industrial Site 1092, Thetford, the youngest calves and lambs were recovered, and given the noted evidence for skin processing at this site, it may be that small-scale vellum production was also taking place.

5.4 The Midlands

5.4.1 Middle Saxon phase

The Midlands area is largely situated on land over 60m AOD, as reflected in the high proportion of sites where sheep predominate. Unlike the previous regions discussed, there were few groupings in the species proportions between site types in this phase (Figure 5.14). The high-status site at Middleton Stoney and the ecclesiastical site at Aelfric's Abbey contained high proportions of pigs; but in general, rural sites contained slightly more sheep (c.35-60%) than cattle (c.20-40%) and fewer pig (c.15-20%). The discrepancy comes from the rural sites excavated at Yarnton, from which cattle are recovered in greatest numbers (56-60%), directly

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proportional to a reduction in the quantity of sheep. The species diversity of these sites is also low, although proportions of domestic birds and wild species were greatest at the ecclesiastical and high-status sites, the only other outlier is the rural domestic site at Saxon Palaces, Northampton which had a high number of domestic birds which, as noted previously is indicative of ecclesiastical sites in this phase.

At most sites the proportions of cattle, sheep and pig bones recovered was consistent with the deposition of complete carcasses (Figure 5.15). There was an under-representation of cattle and sheep mandibles at St Peter's Road, Northampton, and at Walton Lodge a larger number of cattle lower legs was recovered.

The mortality data (Figure 5.16) are scarce, although old sheep used for secondary products came from the rural site of St Peter's Road, and cattle of prime meat age, as well as young lambs from the rural ecclesiastical site of Aelfric's Abbey.

5.4.2 Late Saxon phase

Sheep remain more common in this phase in the Midlands than in other regions so far examined. Although groupings within the PCA are indistinct (Figure 5.17). Of the rural domestic sites those to the east of the region, at Raunds and Middleton Stoney, contained more cattle than sheep, a trend more comparable with that seen in the adjoining eastern region (5.3.2). Walton Lodge, Aylesbury, meanwhile, contained more sheep than cattle as did the ecclesiastical sites. Relative proportions of the main domesticates in the burhs (Northampton and Oxford) varied considerably, although cattle were generally recovered in similar proportions to sheep (c.25-45% and 30-55%, respectively), sheep were generally more common, with the exception of Marefair, Northampton, 113-119 High Street and St Aldates, Oxford where cattle predominated. Pig numbers were high at all site types (c.15-30%). Wild mammals were identified at nearly all sites, except rural settlements, where they were typically absent, although were recorded in greatest proportions from the ecclesiastical sites at Aelfric's Abbey. Wild birds were also rare, but these and domestic birds were found in highest numbers on urban sites, particularly Hinxey Hall and St Ebbes, Oxford. Once these outliers were removed from the PCA, a large grouping of urban sites occurred, with separate groups of

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rural domestic sites, which contained few birds and wild species, the ecclesiastical site of Vicarage Garden, Brixworth and both urban industrial sites, at which birds were even more scarce.

Body part representation (Figure 5.18) was indicative of the general deposition of complete carcasses of cattle, sheep and pigs. Horn cores were recorded in greatest proportions at the urban industrial site of St James Square, Northampton, while at Marefair, Northampton, there was a dearth of cattle and sheep mandibles. A higher proportion of lower limb bones was evident in the sheep assemblage from St Aldates, although this was from a very small sample (56 bones).

Mortality profiles were based upon the data from Aelfric's Abbey, from which both cattle and sheep were at prime meat age, as were the sheep from the burh at Oxford (Figure 5.19).

5.5 The West

5.5.1 Middle Saxon phase

Groupings are evident from the data (Figure 5.20), where sheep predominate at both the rural high-status site at Lower Slaughter, and the rural domestic site at Collingbourne, although fewer pigs were recorded at the latter. At the two sites from Ramsbury, cattle predominate, and sheep and pigs were recorded in similar, fairly high proportions. However, proportions of wild species and domestic birds are more diverse: although wild mammals were recovered in high proportions from rural sites at Ramsbury and Collingbourne, domestic birds were only noted at Collingbourne and Lower Slaughter, and low numbers of wild birds were present at all sites except Collingbourne.

Body part data were only recovered from the rural site of Cadley Road, where the proportions of cattle and sheep bones were consistent with the burial of complete carcasses (Figure 5.21). No mortality data were available.

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5.5.2 Late Saxon phase

Groupings exist in the PCA (Figure 5.22) for the main domesticates, particularly at the highstatus sites, where pigs and cattle are found in high proportions (c.30% and 45%, respectively). At other sites, both urban and rural, similar quantities of cattle (c.40%), sheep (c.50%) and pigs (c.10%) are recorded. The only exception was the rural domestic site of Church Road, Bishop's Cleeve, where cattle were present in 67% of the assemblage. Wild species and domestic birds were recovered from Winchcombe, and domestic birds only from Market Lavington.

In both the cattle and sheep body part analyses, a disparity exists in the proportions of mandibles recorded from sites in this region; generally there is little evidence for the deposition of these parts of the carcass, except at Mary le Port, Bristol, where they were present in high numbers (Figure 5.23). A difference was noted in the cattle and sheep bones from the two phases of the high-status site at Cheddar Palaces – in the later phase (early 10th to mid 11th century), cattle horns, foot and lower limb bones predominate, but upper limb bones were more common in the earlier phase (early 10th century). This latter pattern was noted in the sheep assemblage in both phases. The sheep bones from the urban site of Citizen House, Bath were largely from limbs. Again, no mortality data were available for this phase.

5.6 The South

5.6.1 Middle Saxon phase

Broad groupings can be observed in the PCA, between urban and rural sites, based on the proportions of main domesticates recorded (Figure 5.24). Sheep are present in similar, or greater quantities than cattle on rural domestic sites (40% and c.30-40%, respectively), and pigs in lower numbers (c.20-30%). The trading site at Sandtun, West Hythe, and urban site Church Lane, Canterbury fit the general pattern observed for rural domestic sites. Other urban sites, however, show a much greater proportion of cattle (c.50-70%) but similar proportions of sheep and pigs (c.10-30%). The only outlier is the rural site of Riverdene, Basingstoke, where pigs were recorded in nearly half the assemblage. Domestic birds and wild species were relatively uncommon on all sites; no wild birds were recorded at any rural sites, and were

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extremely rare on urban sites. Wild mammals were more likely to be recorded, and domestic birds were recovered on the majority of sites. The only outlier was the trading site at Sandtun, where high numbers of domestic and wild birds were found. Once this was removed from the PCA, the remaining points produced a large grouping of urban sites, with smaller groups of rural domestic sites on the periphery, reflecting the presence of slightly more of the minor species at these sites, than in urban settlements.

At most sites bones were recovered from all parts of the carcass of cattle, sheep and pig, in proportions that indicate that complete animals were disposed of (Figure 5.25). However, at Anderson's Road, Southampton there was an under-representation of cattle mandibles. The mortality profiles (Figure 5.26) indicate that on most sites cattle and sheep were bred for meat, although at Friend's Provident, Southampton, older sheep were also present.

5.6.2 Late Saxon phase

Figure 5.27 shows the groupings evident in the PCA between all site types in the South. At urban sites cattle predominate (c.40-50%), although not as markedly as in the previous phase. Sheep numbers increase slightly to between 30 and 50%, whereas pigs were less commonly recovered (c.20-25%). Sheep become increasingly frequent on rural sites (c.65-80%), in contrast to cattle (c.15-25%) and pigs (c.0-10%). Sheep predominated on all high-status and ecclesiastical sites, but on rural settlements pigs were the next most commonly recovered, followed by cattle, whereby the reverse is true of the *urban* ecclesiastical and high-status sites, where cattle were next most often recorded. The paucity of wild species and domestic birds enabled no groupings of the data, although numbers increase from the previous phase. The obvious outlier is the assemblage from Portchester Castle, where domestic and wild birds were recovered in extremely high proportions (80% and 20% respectively). However, once the outliers were removed, two groups became apparent – the urban domestic sites, and the high-status, ecclesiastical and rural site of Steyning, which had fewer domestic birds.

More variation is noted in the body parts recovered from late Saxon sites in the south, although generally trends are consistent with the deposition of whole carcasses (Figure 5.28). At the rural ecclesiastical site at Bishopstone, cattle and pig feet and lower legs were present

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in high numbers, although upper limb bones were more common in the sheep assemblage. The only other rural site was the high-status site of Faccombe Netherton, where there were fewer cattle and sheep mandibles than may be expected if the complete carcass was disposed of. Within urban sites, cattle horn cores, feet and lower limb bones were common; at Portchester Castle, and at 27, Jewry Street, and Victoria Street, Winchester there was a predominance of cattle upper limb bones; and at Staple Gardens and Chester Road, Winchester, more upper and lower limb bones were recorded. Anomalies in the sheep assemblage were also observed at the Winchester sites, where more lower limb bones than may be expected recovered at Staple Gardens, Western Suburbs and Victoria Road.

At both sites from which cattle mortality data were available, evidence emerged for the provision of some animals for their meat, and others that were older, being used for secondary products. Sheep mortality data at all sites were consistent with animals culled primarily for meat, although those from the high-status and ecclesiastical sites were youngest (Figure 5.29).

5.7 Discussion I: Producers vs. Consumers

As Costin (1991: 1) notes, "all economic systems have three components: production, distribution, and consumption", and the provisioning of a site with meat, meat products or raw materials is no exception. This section aims to discern such components of the supply chain. The presence of net producer or net consumer sites may be the most straightforward to distinguish, but it is the distributive sites which will be harder to recognise. The economics of Saxon England have been described in detail in Chapter 1, but to reiterate for the benefit of the following discussion: redistribution networks are widely described during the middle Saxon period, whether through royal vills, or estate centres (Brookes, 2007: 27; Dobney *et al.*, 2007: 237; Haslam, 1985: 13), although others suggest that food rents were taken from the producer sites directly to wics (consumer sites), to be redistributed at the point of use (Hodges, 1989: 136; Rackham, 1994: 127). In the late Saxon phase, redistribution is seen as taking place at urban and rural markets associated with burhs and later towns (Haslam, 1985: 22, 48; Hodges, 1989: 189; Hooke, 1998: 203), but also within the rural hinterland (Vince, 1994: 117). Others suggest that estate centres continue this role into the late Saxon phase (e.g. Astill, 1991: 109;

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Perring, 2002: 27). So, how well do the archaeozoological data summarised above translate into evidence for producer, consumer and redistribution sites? The first part of the discussion will focus on the presence of producer and consumer sites, and the second part seeks to understand the mechanics of distribution between the two.

5.7.1 Wics, Estate Centres and Payments in Kind

The presence of larger numbers of cattle on wics in the middle Saxon phase compared to those from rural settlements reflects a demand for meat from a concentrated population, and was noted in all regions where comparable urban and rural sites were recorded: i.e. York, Ipswich, London, Canterbury, and Hamwic. This implies either a widespread demand for the provision of cattle to wics, or a deliberate supply from rural sites.

The extent to which cattle were 'produced' by those living within the towns, or were brought in from surrounding areas is extremely difficult to define, and the best method of realising sites where animals were bred available for this study, is through the presence of neonatal fatalities (Table 5.3). It is likely that such evidence is under-represented in the faunal remains, as the porosity, lower density and small size of such young bones make them prone to poor recovery and preservation (Lyman, 1994: 239; Maltby, 1985: 36). Nonetheless, at many sites the presence of animals at tooth wear stage A (i.e. newborn) was not recorded at all, they were only observed at the rural domestic site of The South Manor Area, Wharram. Young animals at wear stages A and B were recorded on most site types, but these could have been veal calves, or young animals culled for vellum production, and not necessarily birthing mortalities. The provisioning of cattle to wics may be further clarified using other mortality data: at nearly all sites cattle were at optimal ages for meat production, although the data from rural areas was more indicative of a mixed regime, with both younger and older animals present. This phenomenon has been described by Maltby (1994: 90), Wapnish and Hesse (1988: 84) and Crabtree (1990b: 162) as indicating the selection of particular animals for provision to towns. However, the cattle at lpswich and the nearby rural site of Wicken Bonhunt were older animals that would have been used for secondary production, and may indicate that the economy of that region was geared towards the production of arable crops or
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dairy (see Chapter 4.2.1), or that there was lower demand for younger animals from the population of Ipswich. Even so, the cattle at Ipswich were still slaughtered at a relatively younger age than at Wicken Bonhunt.

A discrepancy exists at the Southampton sites, which are often quoted as being old animals, comparable with those from Ipswich (e.g. Hamerow, 2007: 221). However, a return to the original Melbourne Street site report confirms that, "notable for cattle are the large numbers of animals killed in middle to late adolescence, and the tailing off thereafter" (Bourdillon and Coy, 1980: 89) –consistent with the predominance of animals at optimum meat-bearing age recorded at other wics.

The prevalence of sheep on rural sites is noted in all regions, and although they were at prime meat age on the majority of sites, mortality profiles were more varied than those for cattle, particularly at rural sites. Moreover, a greater proportion of older animals culled after their use for secondary production was noted at rural sites in the Midlands and East, but also from the urban site at Friend's Provident, Southampton. This implies a supply of prime meat animals to urban sites, with rural sites exhibiting a more localised, individual approach to sheep husbandry. As with the cattle assemblage, the only direct evidence for neonatal sheep comes from rural sites, and although a few very young animals were recovered from some wics, these were generally in lower numbers than those observed on rural sites, and does give weight to the consumer status of wics.

Where species diversity is concerned, birds and wild mammals were recovered in low numbers from most site types, although they were least common on urban and rural sites (Figure 5.30), and recorded in greatest proportions on ecclesiastical and high-status sites. This is reflected in the outliers notable in the PCA, the majority of which came from high-status (e.g. Caister-on-Sea and Middleton Stoney) or ecclesiastical (e.g. Aelfric's Abbey, Wearmouth and Jarrow and Church Close) sites. Exceptions to this are seen in the antler-working deposits at Fishergate, York, and two rural sites in Wiltshire from which comparatively large proportions of red and roe deer were recovered, and outliers in the PCA observed at trading and wic sites at Blue Bridge Lane, York, Church Lane, Canterbury and Sandtun, Kent. Pigs were most common on

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high-status and urban sites, and recovered in similar quantities on ecclesiastical and rural sites (Figure 5.31).

The most consistent trend in the distribution of body parts is the prevalence of horn cores recovered at urban sites, particularly York, London, Windsor and Southampton; very few rural sites recorded horn cores, and even then they were only present in small numbers. This suggests that there was a trade in horn and/ or skins as a raw material from rural areas to the towns – something which has implications for the presence of an artisan population within urban settlements. Additionally, at the majority of sites body part data are indicative of complete carcasses being butchered.

So far the provisioning of urban and rural sites has been considered, but what of the other candidates for consumer status – rural ecclesiastical, high-status and industrial sites? Data sets for these sites were smaller, but often formed discreet groupings in the PCA, usually due to higher numbers of pigs in their assemblages. Most monastic settlements are consistent with patterns noted at rural sites, where young sheep are in the majority. The exception to this occurs at Wearmouth and Jarrow, Yorkshire, where the proportion of cattle was more in line with contemporary urban sites, and this may reflect its status as a centre for learning, as it housed a considerable scholarly and craftsman population (Cramp, 2005: 34), requiring provisioning with food from elsewhere. At high-status sites, similar proportions of all three of the main domesticates were recorded, breaking with the trend for other rural sites to be sheep-oriented.

5.7.2 Burhs, Markets and Churches

In the late Saxon phase cattle predominate on burh sites, and provisioning from external sources was again implied by the presence of neonatal mortalities only at one rural burh, and very small proportions of very young calves (Table 5.3). Mortality data were only available for one Northern rural site, from which older animals were recorded, indicative of their use for secondary products. This was in direct contrast to the urban sites of the region where animals were nearly all at prime meat age. Evidence from burhs elsewhere displays more of a compromise between the production of animals for meat, and their use for secondary

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products. In the East more old cattle were supplied to the burh population than in any other region, reflecting the presence of older cattle in the eastern region at this time (see 4.2.1). The absence of comparable mortality profiles from rural sites is unfortunate, as it represents a crucial piece of the jigsaw that is missing.

Sheep continue to predominate at rural sites, and the ageing data indicate that nearly all animals were at prime meat age. As with the cattle assemblage, evidence for the breeding of sheep generally only comes from rural sites (Table 5.3), although one neonatal animal was recorded at an urban industrial site.

Pigs were most common on high-status sites (Figure 5.31), but also ecclesiastical and some urban sites, although in the midland region they were present in similar, fairly high, proportions on all site types. Again wild and domestic birds and wild mammals are rare, but in the late Saxon phase domestic and wild birds were most often recorded on urban sites (Figure 5.30), being found in similar proportions on rural, ecclesiastical and high-status sites. Wild mammals were most common on ecclesiastical sites. These trends are noted in the outliers present in the PCA, where the greatest numbers of minor species were recorded at burhs and Danish towns (e.g. Knocker's Site, Thetford, Hinxey Hall and St Ebbes, Oxford, Tenements, Durham, Staple Gardens, Winchester and Portchester Castle); ecclesiastical (e.g. Aelfric's Abbey and Bishopstone); or high-status sites (Castle Mall, Norwich).

In rural areas, both high-status and ecclesiastical sites generally showed a prevalence of cattle and sheep upper limb bones, which suggests that feet, lower limbs, mandibles and horn cores were removed from these sites. These elements are commonly removed with the skins, and thus implies a movement of skins to urban areas, where such elements are more commonly recorded. Of note, however, are the two phases of Cheddar Palaces, where the low numbers of feet, lower limbs and horn cores from the earlier phase changes in the later phase, when these elements were recovered in far greater quantities, indicating the on-site processing of skins. Aspects of the movement of animal bones to, and within, the urban context, reflecting industrial processing such as butchery and skin processing, and craft working, such as bone, horn and antler-object manufacture will be discussed in more detail in Chapter 6.

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Ecclesiastical and high-status sites generally reflect the underlying regional trends for rural sites noted above. Thus, more cattle were recovered from the northern monasteries, but sheep were predominant elsewhere. However, more cattle were observed at high-status sites in the western region, despite the rural economy generally being based on sheep over cattle. Where comparisons were available, the sites with lowest proportions of young animals were nearly always high-status or ecclesiastical in nature.

5.7.3 Saxon vs. Danish provisioning

The cultural change that occurred in the north and east with the creation of the Danelaw is reflected in the high numbers of cattle observed on many sites in this region in the late Saxon phase. However, evidence from the Midlands reveals a marked contrast between the areas of Mercia and the Danelaw. Sites that lie well within the Danelaw – such as the rural sites of Raunds, Middleton Stoney and Higham Ferrers – are consistent with the trend for a preponderance of cattle. However, those on the border of the Danelaw, namely the urban sites within Northampton, are more in line with the pattern observed within Mercia, where sheep predominate. Thus, it seems that the population of the burh at Northampton were better connected with the economy of Mercia, and (potentially) received their livestock from sites outside the Danelaw. This has implications for the relationship between Danish and Saxon populations, which will be explored in Chapter 7.

The cultural trend for the consumption of more cattle in the northern Danelaw appears to be less prolific in areas further away from the Danish capital of York. Although cattle remain predominant in eastern areas, the relative proportion of sheep increases, which indicates that the population on the periphery of the Viking territories were influenced by other factors in their choice of food, and may reflect the presence of a sizeable Saxon population.

Despite generally low proportions of wild species on nearly all sites in the late Saxon phase, only high-status sites in the South and West and the burh at Portchester contained significant proportions of wild birds or mammals. This implies differences in elite expression between the Vikings and Saxons. However, the number of high-status sites is small, and higher proportions

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of wild mammals in the Eastern region were recovered from high-status sites, although not in such high proportions as the Saxon areas.

5.7.4 Pigs in Towns

The recovery of pigs in greater proportions on particular sites (urban, ecclesiastical and highstatus settlements), and their relative paucity on rural settlements has also been described in Roman contexts (Maltby, 1994: 97). Possible reasons for this are described as: specialist breeders on more 'romanised' rural sites, such as villas; importation of cuts of meat such as hams; or the rearing of pigs in towns, particularly to satisfy the Roman urban demand for pork.

The large scale trade in particular cuts of meat can be ruled out, since the presence of complete pig carcasses at most sites in all phases indicates that animals were slaughtered on site, or bought in as complete carcasses. However, the other two suggestions are equally reasonable – pigs could have been supplied to order, specifically from rural sites, or they could have been reared within towns themselves. Neonatal and very young animals that had died in the first seven months of life (Table 5.3) were recorded in small numbers at most site types for both phases, but for the middle Saxon phase, were not recorded at all on rural sites. The speciality of suckling pig (animals just a few months old) is recognised as a luxury food in the medieval period (Albarella, 2006: 83), yet there is little evidence to suggest that high numbers of very young pigs were eaten in any phase. Given that such animals probably were not bought in as a delicacy, these may rather be the casualties of a breeding population, meaning that animals were probably bred on most sites.

5.7.5 Overview

The above evidence for provisioning sites in Saxon England illustrates well the complexity of interactions existing between consumer and producer sites. Although there are exceptions to all patterns, and large variations in numbers, three main trends are identifiable which confirm the presence of rural producer and urban consumer sites within middle and late Saxon England:

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- 1. A predominance of sub adult cattle within urban centres in all phases indicates deliberate provisioning with animals that would have provided most meat for the inhabitants. The only exception to this is the Eastern sites, where more adult cattle were recovered, suggesting a greater emphasis on secondary products such as milk or traction from this area of Saxon England. Rural sites consistently show a preponderance of sheep, indicating either less demand for mutton from urban sites, or a greater profitability for rural populations in the provision of cattle. This further implies a demand for sheep products, either wool or milk, from the same urban populations, to necessitate the maintenance of such flocks in the hinterland, or that the requirement for manure on the fields was more significant than is currently understood.
- 2. Breeding of cattle and sheep occurred on rural sites; there was virtually no direct evidence for neonatal mortalities on urban sites. This contrasts with pigs, which appear to have been bred in wics or burhs in both phases. This suggests that the inhabitants of wics and burhs were both producers and consumers of meat products.
- 3. The high numbers of horn cores recovered from urban sites indicates a supply of skins and horn as a raw material in all phases. This has implications for the organisation of towns, and their function as a residence for an artisan population (for further detail see Chapter 6). From the middle Saxon phase, horn cores are recovered less frequently on rural settlements than urban sites, and indicates an organised trade in horn, which implies the presence of specialist horn workers within urban settlements.

In both phases, ecclesiastical sites are comparable to rural producer sites, both in the proportions of domestic species kept, and the presence of new-born fatalities, which suggests that they were self-sufficient. At high-status sites, however, there is no evidence for such birthing casualties, and the proportion of cattle in the middle Saxon phase is more comparable with urban sites. This may be used to reinforce their nature as consumer sites, being provided with animals as render, rather than coinage, at least in the middle Saxon phase.

Despite the perceived consistency in the provisioning of sites throughout the Saxon period, it would be idle to suggest that this reflects analogous distribution networks, as there are further

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trends which indicate a change in the scale and form of provisioning urban sites into the late Saxon phase. This coincides with the move towards a fully functioning urban economy, based on coinage that occurs by the 10th century (Hodges, 1989: 165), succeeding a redistributive economy. This move will be considered next.

5.8 Discussion II: The distribution framework

5.8.1 Tax as Tribute in the Middle Saxon Phase?

Studies of the animal bones from Hamwic (Bourdillon, 1980b) and York (O'Connor 1991) and secondary overviews (Hamerow, 2007; O'Connor 2001) have specifically considered the provisioning of wics. Their findings are similar, as all are sourced from the same basic data, and indicate that wics were supplied with complete animals from a narrow food base, provided by a "maintaining institution from resources that that institution generated or procured" (O'Connor 2001: 60). This implies that links will exist between the provisioning of both the wic and the 'maintaining institution', or high-status rural sites, as estate centres are described.

The wider parameters of this study have enabled a comparison of bones from a broad range of sites, to enable relationships between them to be observed, and the extent to which they reflect the criteria for redistributive networks (see 2.4.4). The results of this analysis indicate that similarities exist between the relative proportions of cattle, sheep and pigs on elite and urban sites. Higher numbers of cattle and pigs on rural high-status sites and wics, may indicate a relationship between the two site types – and given the historical background to the provisioning of wics, it is tempting to suggest that elite sites were receiving cattle and pigs as tribute from farms within their region, and then redistributing them to the inhabitants of trading centres as a controlled resource. This may be illustrated by the similarity in species proportions between the high-status site of Caister-on-Sea, and site of Ipswich. Unfortunately this was the only region in which contemporary high-status and wic sites had been excavated. Consistent with this is a discrepancy between the documented records of large herds of pigs kept in rural areas in the middle Saxon phase (Albarella, 2006: 77) and the relatively small proportions of pigs recovered from related sites (Clutton-Brock, 1976: 374). Could it be that

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pigs were bred on rural sites specifically to supply high-status estate centres, and thus not consumed locally?

Rural sites contained greatest proportions of sheep bones, but this species was also well represented on ecclesiastical sites, and although this could indicate that the latter were selfsufficient, it may also imply the direct provisioning of ecclesiastical sites from rural producer sites. Another possibility is that sheep were also sent to high-status sites as food rent, only to be redistributed to ecclesiastical sites from there.

Ageing data were less distinct, and direct comparisons between high-status and urban sites could not be made, because of the absence of data. However, both cattle and sheep were, with some noted exceptions, oldest on rural sites and youngest on high-status and ecclesiastical sites, with those at wics sitting between the two. This indicates a redistribution of specific stock, and retention of older animals by the rural population, implying that the demand for mutton and beef was sufficient for the best meat-producing animals to be redistributed – the youngest being supplied to high-status and ecclesiastical settlements. However, there was no apparent intensive production of secondary products, as even on most rural sites the majority of animals were culled before reaching old age.

Low species diversity on wics is generally regarded as being indicative of a redistribution network, where the occupants did not have the resources or opportunity to demand specific food types or to procure it for themselves, instead being dependant on the narrow range of species provided by estate centres (Hamerow, 2007: 221; O'Connor 1992: 105, 2001: 57). This is reflected to some extent in the proportions of domestic and wild birds and wild mammals, which are consistently recovered in lower numbers from urban sites, and greater quantities from high-status and ecclesiastical sites. If the dearth of such species on wics is attributable to the restriction in food provided by the redistributing network, it is notable that there is a comparable scarcity of such species on rural sites, where the opportune hunting of wild species may be expected. As it is widely accepted that it was the general rural population that provided food renders to the aristocracy (Astill, 1991: 103; Dobney *et al.*, 2007: 236; Miller and Hatcher, 1978: 22), it could be suggested that the lack of wild species on rural sites was

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because they handed such animals over to the elite, or that the rural population had little time or inclination to procure them, whereas the aristocracy did. Comparably lower numbers of pigs and domestic birds on rural sites, however, could signify a genuinely sparse diet, where there was little expectation for variation, and therefore little desire to procure wild species, reflected even in the diets of those on high-status sites, given the low numbers of wild species recorded.

Drawing on the criteria for the presence of animal products through indirect distribution, there is evidence for a restriction in species diversity and the focus on particular age groups within consumer sites (Zeder, 1991: 84). However, there is no suggestion of the supply of particular carcass parts, although this does not necessarily indicate the direct distribution of animals, just that they were provided as complete carcasses, or (more likely) on the hoof. Therefore supporting arguments can be made regarding the presence of high-status sites as redistribution centres – taking animals as tax from rural producer sites and passing them on to the population of wics (Figure 5.32).

However, there are significant gaps in the data which must be acknowledged. There is nothing in the data to suggest that animals were not marketed from rural sites directly to wics and other sites of an urban nature. The basis of previous arguments for the supply of food taxes to wics from estate centres came from the perceived lack of wild species and domestic birds on the former, compared to a relative abundance on the latter. This is not a particularly convincing argument as numbers of wild species are low even on high-status sites, and could simply reflect a genuinely restricted diet for the whole population, prior to the use of food for display of social status that was exemplified by the Normans (Sykes, 2007b: 89). However, one final piece of data supporting the provisioning of wics directly from estate centres is in the proportions of domestic birds recovered. Considerably more come from high-status and ecclesiastical sites, compared to rural and urban settlements. Does this show that the elite were restricting access to chicken, goose and duck? If rural sites were free to supply urban sites, it would not be difficult for them to breed domestic birds to sell, as seems to be the case in the late Saxon phase.

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5.8.2 Burhs and Danish towns

Less work has been done on the provisioning of late Saxon urban settlements with animals and animal products than for wics. However, evidence for the late Saxon phase sees a change in the underlying economies of high-status and ecclesiastical sites which contain similar proportions of cattle and sheep to rural domestic sites, although with greater numbers of pigs. This suggests that both ecclesiastical and high-status sites had closer ties to rural producer sites than urban sites, which continued to demand greater quantities of beef (Figure 5.33). It is this divergence in proportions of the major species from high-status and urban sites that implies a change in the provisioning of the latter – no longer dependant on the redistribution of goods from a controlling elite, the market economy based on coinage allowed the inhabitants of burhs and Danish towns to dictate their own demands. This is further exemplified by the increase in domestic birds recovered in urban assemblages.

Although mortality data were again disappointingly low, it seems evident that high-status sites still exerted a demand on the animals with which they were provisioned, as the youngest cattle and sheep were commonly recovered from such settlements. Animals on urban sites were more likely to be a mixture of animals raised for meat and those used for secondary products, suggesting greater variation in demand and supply, and possibly social status of the inhabitants of urban sites (this will be explored further in Chapter 6).

5.8.3 Overview

By comparing trends in various aspects of archaeozoological data between differing site types, likely forces of distribution for the middle and late Saxon phases can be postulated. Differences in provisioning indicates a change in the socio-political economy, which led to certain parts of the population of burhs gaining greater autonomy and choice in the goods they procured. It also meant that those on high-status sites had to source the animals they consumed directly from their own farms, rather than demanding the best from the surrounding population as tax. Previously the inhabitants of wics were possibly subject to greater restrictions in the food they had access to, particularly domestic birds and wild species.

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However, there is a suggestion that pigs were bred on these sites, yet so few domestic birds were recovered it is unlikely that these were reared in the middle Saxon urban environment.

5.9 Summary

The limitations of the data set can be understood more fully now, particularly the restricted mortality and body part information available, and the narrowing of site types in later phases, where fewer rural sites are available for comparison. One of the criticisms levelled at large-scale interpretive models is that intra-site variations often go unchallenged (Maltby, 1994: 85); this will be rectified in the next chapter, which will investigate the relationships between various sites within particular urban centres.

Referring back to the questions posed at the outset, there is strong evidence for producer (rural domestic and ecclesiastical sites, and probably high-status sites in the later phase) and consumer (urban and middle Saxon high-status) sites in the middle and late Saxon phases (Figures 5.32 and 5.33).

Although recent work has argued for more emphasis to be placed on the existence of a monetary-based economy in the middle Saxon phase (e.g. Naylor, 2004: 15), the data regarding the provisioning of wics during this phase do indicate some control of animals and animal products sent to such sites, most likely by redistribution from rural high-status sites in the hinterland. The data are more indicative of a market economy from the late Saxon phase, however, where producer sites in rural areas appear to be provisioning urban sites directly, the population of the latter showing preference for a greater range of foods.

As to what was being procured and produced, of the main domestic species, urban inhabitants had a concentrated demand for meat, and so were provisioned with beef and pork, whereas the dispersed rural population ate more mutton. Furthermore, there is evidence that cattle and sheep were bred on rural sites specifically to be sent to towns, rather than simply representing agricultural surplus. The data indicate that the inhabitants of urban sites may well have bred their own pigs within the urban setting from the middle Saxon phase. Other

evidence suggests that there was also deliberate provisioning of towns with raw materials

(horn, skins and antler) from this phase.

Chapter 6:

Zoning in the Urban Context: Evidence for Status and Specialisation in Early Urban Contexts

6.1 Introduction

This chapter will investigate how the space within wics and burhs was utilised in the middle and late Saxon phases. Using methods outlined in Chapter 2 (2.4.5), various aspects of the use of space which are reflected in the available archaeozoological data will be considered:

Firstly, the best indicators of status lie in the proportion of pig, domestic bird, wild bird and wild mammal bones in an assemblage, as well as meat from the youngest cattle and sheep, all of which are recorded in greatest proportions on high-status and ecclesiastical sites (Chapter 4.6.3). Therefore, species representation and mortality profiles will be used to explore areas of different social status through the likely diet of the inhabitants.

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Secondly, areas of specialisation may also be apparent. As noted in the previous chapter (5.7.5), there is evidence for an organised and extensive trade in horn cores to towns, and so the areas where horn, antler and other bones such as metapodia, which are useful for bone working, were deposited may indicate the proximity of craftsmen or skin processing. Similarly, concentrations of head and foot bones may imply the existence of butchery as a trade.

Thirdly, there may be some indication of deliberate spatial organisation. Another major trend in faunal assemblage patterning is the tendency for the bones of smaller animals, such as sheep and pigs, to be recovered from areas closer to the centre of a site, and those from larger animals such as horse and cattle to be found at the periphery of a site. This has been documented within prehistoric settlements and medieval urban environments, particularly Oxford (Holmes, forthcoming-b; Wilson, 1996), and the phenomenon will be investigated within a Saxon context. However, as it has been established that there is a link between pigs and higher status sites (Chapter 5.7.1), only the proportion of sheep from the total number of cattle and sheep bones will be plotted. It is also likely that the deposition of the bones of animals traditionally not eaten such as horse and dog is most likely to occur away from the main dumps of domestic food.

Investigation will focus on burhs and wics with data available from a number of excavations in various locations. This will not be a detailed analysis of individual sites, but an overview of what the faunal remains from sites within an urban setting can reveal of the organisation of the population and trades within. Obviously there are large gaps in the available data, and the probability that future excavations will add to, alter or refine any conclusions drawn is high.

Analysis will be based on data from middle Saxon wics (Figures 6.1-6.3, Table 6.1), and burhs and Danish towns from the late Saxon and Saxo-Norman phases (Figures 6.4-6.12, Table 6.2). Quantities in parentheses indicate the number of sites available for analysis

Site Type	Case Study
Wics	Southampton (6); London (11)
Burhs – new	Northampton (10); Oxford (8)
Burhs – re-used Roman towns	London (7); Winchester (11); Chester (5)
Danish towns	York (10); Norwich (6); Thetford (9)

The distribution of animal bones at sites within this dataset will be plotted using GIS.

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6.2 Wics

There was only sufficient data for analysis from two wics: Hamwic; and Lundenwic.

6.2.1 Status

Within Lundenwic, a grouping of sites lies towards the middle of the settlement: Maiden Lane (both Maiden Lane and 21-24 Maiden Lane b); Jubilee Hall; Peabody Site; James Street; and National Gallery Basement which have comparably high proportions of status indicator species – wild birds, wild mammals, domestic birds and pigs (Figure 6.13). Similarly, there are distinct, centrally-located sites at Hamwic where these animals predominate, namely at Friend's Provident, Cook Street, and Melbourne Street (Figure 6.14).

Unfortunately, as identified previously, insufficient mortality data were recorded and were insufficient to compare the use of animals between sites (Figure 6.15). The availability of body part data was also disappointingly small from Lundenwic (Figure 6.16). At Peabody Site, all parts of the cattle and sheep were recorded in quantities consistent with the deposition of complete carcasses although the proportion of pig lower legs is greater than may be expected, which suggests that pigs trotters were imported. More data were observed at Hamwic, with sheep and pigs generally recorded as whole carcasses from Melbourne Street and Friend's Provident, although at both there was an under-representation of cattle lower limb bones (metapodia). A reason for this is evident from the Anderson's Road assemblage, which consists largely of these elements (Figure 6.17).

6.2.2 Specialisation

The presence of a high number of metapodia at Anderson's Road, and their scarcity at other sites in Hamwic indicates the movement of particular elements within the town. At Anderson's Road it is evident that the reason for this accumulation was bone working, as the assemblage consisted of a large number of offcuts of cattle and horse long bones (predominantly metapodia), as well as a few from sheep or goats. This is consistent with findings from nearby SARC XIV where subsequent analysis by Driver (1984) identified horn cores, antler and long bones (predominantly cattle and horse), all of which had been sawn, and provided firm

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evidence of bone working. Furthermore, the majority of limb bones recorded were metapodia, which not only provide good surfaces for bone working, but also are more commonly discarded complete at the primary butchery stage (Driver, 1984: 401). Both horn cores and antlers were present at Melbourne Street, showing ample evidence for their use as raw materials for working. Long bones were also worked, including metapodia, but not as frequently as the previous sites.

At Lundenwic, primary butchery waste was recorded at The Treasury site, Whitehall (Reilly, 2008: 162), and although only one context at the Lyceum Theatre contained what would typically be labelled as such (i.e. containing head and foot bones), the assemblage was defined as a butchery deposit (Rackham and Snelling, 2004: 71). Horn-working refuse was recorded at James Street, although small scale antler- and bone-working was observed at most other sites (Lyceum Theatre, National Portrait Gallery, James Street), and it has been suggested that bone-working within Lundenwic was centred around the eastern part of the settlement (Blackmore, 2002: 289).

Further work on the spatial organisation of bone-working at Hamwic (Riddler, 2001: 63-66) has indicated four main areas of activity, all on the outskirts, at Clifford Street and Golden Green (not illustrated) in the north, just below Six dials, Six Dials itself, Cook Street, and SARC XIV. At Lundenwic, Riddler (2004) also specifies a centre of antler working at the Royal Opera House (not illustrated), where a large assemblage of antler offcuts was recovered, alongside a significant number of horn cores – interpreted as waste from horn-working. There is little current evidence for a bone-working workshop, although small scale waste was recorded at a number of sites. A cautionary note is sounded from both these pieces of work, that the presence of small quantities of horn, bone or antler-working waste from other sites have been described as "background noise", as they in no way reflect the large-scale processing noted at these specialist sites, rather being residual fallout from specific workshops (Riddler, 2001: 66, 2004: 145). However, they could also be considered evidence for craft working on a smaller scale.

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6.2.3 Spatial Organisation

Sheep were more common on peripheral sites in both wics (Figure 6.18), unlike the trend observed by Wilson (1996) at medieval urban sites (see section 6.1). It could be that refuse was disposed of in a more localised way, perhaps at a household level. Similarly, at both wics, sites on the periphery (i.e. National Gallery Extension and The Treasury in Lundenwic; Anderson's Road and SARC XIV in Hamwic) recorded greater proportions of horse and dog than more central assemblages (Figure 6.19). This is an exclusive pattern, as the more central Jubilee Hall in Lundenwic contained high numbers of dog bones.

6.3 New Burhs

The two burhs examined here are Oxford and Northampton, both of which were newly established as part of the defensive network of the 9th century, laid out to a deliberate plan, with large fields, possibly part of the royal estate, designated as 'town fields' (Haslam, 1985: 19-22).

6.3.1 Status

At both Northampton (Figure 6.20) and Oxford (Figure 6.21), the proportions of pigs and domestic birds were fairly uniform, with the exception of St James' Square, Northampton, an industrial site, which had consistently low proportions of these species. Hinxey Hall, Oxford, contained high proportions of pig, birds and wild mammal bones, consistent with the presence of high-status inhabitants, as does the site at Trill Mill Stream, although in lower proportions. However, when the mortality profiles are considered, the animals at Kingswell Street, Northampton were the youngest of all sites (Figure 6.22), and those from St James' Square were younger than animals at St Peter's Road, although the latter site was Saxo-Norman in date and increased slaughter ages were noted in this period (see Chapter 4.6.2). Data were too sparse from Oxford sites to make comparisons (Figure 6.23).

Body part representation comparisons can only be made within Northampton (Figure 6.24), as only St Aldates was available for analysis from Oxford. Mandibles or horn cores were recorded at very few Northampton sites. If complete carcasses were disposed of, mandibles would likely

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be the most common element. Instead, the majority of sites were dominated by the bones of upper limbs and, to a lesser extent, those from the lower legs; foot bones were also rare. At Kingswell Street, only sheep were recorded in proportions that indicate the disposal of complete carcasses. The pig assemblage is varied: the bones from St Peter's Road indicate an under-representation of feet and mandibles, whereas at Marefair, the deposition of complete animals was recorded.

At both sites the higher status species, and presence of youngest animals, came from sites towards the areas in which the later Norman castles were situated, possibly indicating that these areas were loci of high-status occupation prior to the Conquest.

6.3.2 Specialisation

The predominance of horn cores at St James' Square, and their near absence from all other sites in Northampton signifies the processing of skins or horns, which continued in the area into the medieval period (Shaw, 1996: 114). At other sites, the low numbers of mandibles, lower leg and foot bones suggests the faunal assemblage derives from food waste, and that primary butchery deposits were either disposed of elsewhere or that the heads and hooves were removed with the skins for processing at specialist sites, although no evidence for these has yet been identified. Alternatively, it could indicate the distribution of specific body parts bought in from elsewhere.

Very little evidence for industrial antler, horn or bone working was recorded. The largest group of antler offcuts came from Saxon Palaces, Northampton, where 71 fragments were recovered, indicating the presence of a craft worker in the vicinity. Even fewer antler offcuts came from other sites in the area (Marefair, Black Lion Hill and Chalk Lane), which may imply the presence of an industrial workshop in that part of the town, or that very small-scale, household-level working was being undertaken. There was no indication of horn-, bone- or antler-working waste from any of the sites in Oxford, consistent with other observations; where the presence of primary evidence for trades or craft working within late Saxon Oxford is limited to four sawn horn cores, indicative of horn working waste at Cornmarket (not illustrated Dodd, 2003: 42).

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Specialist tanners or tawyers and antler workers are represented at Northampton, but there is surprisingly little direct evidence for butchers, even if carcass representation from many domestic sites does imply a primary butchery stage, where head and hooves were removed from an animal prior to the supply of meat to a household. The presence of horners or bone workers is also limited from both new burhs.

6.3.3 Spatial Organisation

At Northampton and Oxford the proportions of sheep and horses were greater at the periphery of the sites examined (Figures 6.25 and 6.26) – dogs being fairly homogenous throughout the two burhs. Despite work undertaken on the spatial organisation of late Saxon – Medieval Oxford (Wilson, 2003: 362), which indicates a tendency for 'coarse' debris, i.e. the bones from larger animals / larger bone fragments, to be deposited at the outskirts, this was not found to be the case in this analysis. Rather, sites on the periphery showed higher concentrations of sheep than those in the centre (High Street and St Ebbes), and even when Wilson's methodology was followed (which does not allow for the likelihood that the proportion of pigs will be skewed by social status), the outcome was the same. Three additional sites (Logic Lane, Clarendon Hotel, and Selfridges) could also be added in, as these were summarised by Wilson (2003: 364). The results are shown in Figure 6.27, where the pattern is similar to that noted in Figure 6.25. The differences between this work and Wilson's findings may reflect a change in the deposition of refuse between the late Saxon and medieval phases, where the concentration of sheep only becomes greater near the centre of the settlement in the later period.

Similarities therefore exist in both burhs, suggesting that sheep, horses and craft-working waste were deposited with slightly more regularity at the periphery of the settlements.

6.4 Burhs in Re-Used Roman Towns

Winchester, Chester and London have been chosen to represent the burhs situated within former Roman towns. Evidence for their military beginnings can be seen in the circuit road situated inside the defensive walls, and it has been suggested that the interior layouts were

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originally large plots of land, property of either the secular or religious elite and tied to a rural estate (Haslam, 1985: 31-36). Unfortunately, the majority of sites available from Winchester are situated on the edge of the probable Saxon boundary (Figure 6.7), so comparisons between central and peripheral sites is difficult. However, this evidence provides an opportunity to examine more closely the type of activities taking place on the outskirts of the burh. At London there is a continuing habitation at the settlement of Lundenwic, as well as within the new burh, due in part to the foundation of the palace and abbey at Westminster east of the burh.

6.4.1 Status

In Winchester, the greatest proportions of birds and wild mammals were recovered from within (Staple Gardens and Jewry Street), although pigs were more commonly recovered from the extramural Western Suburb and Chester Road sites (Figure 6.28). At Chester, sites on the periphery (Hunters Walk and Lower Bridge Street) were the least well provisioned with species typical of a high-status diet (Figure 6.29), while those towards the centre of the town contained higher numbers of pigs, birds and wild mammals. At London (Figure 6.30) there were greater proportions of status signature species at the former wic site than within the burh, as particularly evident at Maiden Lane and Dorter Undercroft (Westminster Abbey). Inside the burh, however is a dichotomy: the central sites at Billingsgate Triangle and St Magnus contained more pigs and wild mammals, whereas at the Tower of London most domestic birds were recorded.

Mortality data were similar for all available sites within Winchester (Figure 6.31), although those from the Western suburbs contained the oldest animals. Ageing data were scarce from London (Figure 6.32). The youngest sheep came from St Magnus, which may have had higher status than sites to the east, where older animals were recovered, especially when combined with the more diverse species also recorded at this site.

At Winchester (Figure 6.33), parts of the carcass recovered in proportions likely to reflect the deposition of complete cattle were recorded at the extra mural sites of Western Suburbs (late Saxon) and Victoria Road, and of sheep at Jewry Street, Victoria Road, and Western Suburbs

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(Saxo-Norman). At nearly all other sites, there was a predominance of meat-bearing parts, although in the earlier phases of Western Suburbs and Staple Gardens there were more sheep lower legs, and in the later phase of Western Suburbs more cattle mandibles. Pigs were generally recorded in proportions reflecting the burial of all parts of the body. Body part data from London sites (Figure 6.34) indicated that at Billingsgate Triangle, proportions of cattle were consistent with the processing of complete carcasses, although at Harlington they were more consistent with animals that had undergone primary butchery, with very few feet and mandibles recorded. This latter pattern was also observed at Billingsgate Triangle, for the sheep assemblage.

Evidence for areas of particular status is ambiguous for these burhs, as there are varying patterns apparent in each. However, it seems that more species indicative of higher status areas were recorded within the walls of Winchester, as were a predominance of meat-bearing bones. At Chester high-status signature species were more common in the central areas, while at London they were associated with the palace and abbey at Westminster.

6.4.2 Specialisation

Evidence for hide-processing at Henley's Garage, Winchester was evidenced by high numbers of sheep and goat horn cores and cattle metapodia, although low numbers of horn cores also came from many sites on the town outskirts (Chester Road, Victoria Road, Western Suburbs), perhaps a reflection of the use of peripheral areas for dumping craft waste, rather than being the large dumps associated with specific areas of skin-processing or horn-working. No evidence for specific sites of bone- or antler-working have been excavated, although occasional finds have been recorded (Serjeantson, 2009b: 177). Within Chester, horn cores and metapodia from cattle were recovered from Crook Street, indicative of skin-processing waste, in the same area as the archaeological evidence for tanneries at Lower Bridge Street (Shaw, 1996: 112).

Direct evidence for craft-working waste is elusive, although it is clear that skin processing was carried out in both Winchester and Chester. Indirect evidence also exists for the provision of dressed carcasses to domestic sites in both Winchester and London, implying the evidence of

butchers, either within the burhs, or externally, who sent dressed carcasses to these early towns.

6.4.3 Spatial Organisation

The greatest proportions of sheep again appear on peripheral sites at Winchester and Chester (Figure 6.35), yet at London they were most common at the central site of St Magnus. At London and Winchester, horses and dogs were found in greatest proportions at sites on the outskirts of the settlements, although in Chester, their abundance was fairly homogenous (Figure 6.36).

The presence of small quantities of anatomical elements more typical of primary butchery (head, feet and lower legs) and skin processing or horn working (horn cores) in the extra-mural areas, and periphery of Winchester, suggests that these areas were used for general dumps of domestic, butchery and/ or craft waste.

6.5 Danish Towns/ Burhs

All three Danish towns analysed here (York, Thetford and Norwich) grew from earlier trading sites, developed by the Vikings in a linear pattern, distinct from the Saxon burhs even though Thetford and Norwich had their beginnings as Mercian burhs (Haslam, 1985: 25-30).

6.5.1 Status

Three sites within York consistently contained high-status signature species (Figure 6.37) – the later phases of Coppergate, in the centre of the Danish town, and Fishergate and Blue Bridge Lane on the outskirts. These sites stood out given the general paucity of such species throughout the rest of the town. Quantities were greater overall for these species at Thetford (Figure 6.38) and Norwich (Figure 6.39), and in the case of pigs, were fairly similar throughout each respective settlement. Exceptions apply, though, and at Knocker's Site and Mill Lane in the south of Thetford, high-status species were recorded in greatest proportions. Within Norwich, the picture is skewed somewhat by the three Saxo-Norman sites in the south of the burh (Greyfriars, Castle Mall and Dragon Hall), which have the greatest abundance of these

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signature species, but nonetheless reflect an area of higher status than the rest of the settlement.

Despite the shift through time towards more high-status species at Coppergate, the mortality data for cattle (Figure 6.40) are similar for all phases. At Thetford, data derive from a greater range of sites (Figure 6.41), which suggest that the youngest cattle were found at Redcastle Furze, and the oldest at Bury Road and Brandon Road. The youngest sheep came from Site 1092 and Brandon Road – while the oldest sheep were again recorded at Bury Road. Data were only available from one site in Norwich.

Carcass parts were recorded for sites in Thetford (Figure 6.42) and Norwich (Figure 6.43). At all sites for which data were recorded, horn cores were present, although usually in small quantities. There is variation between sites: at Brandon Road cattle and pigs were present in proportions consistent with the deposition of complete animals, although there was an under-representation of sheep mandibles; at Site 1092 sheep were represented by upper limbs and heads, and pigs predominantly by mandibles; Redcastle Furze, however, was characterised by sheep lower leg and mandibles. At Norwich there was slightly less variation, sheep were present at both Dragon Hall and Castle Mall as complete carcasses; and cattle and pigs at both sites have fewer upper limb bones than may be expected, and high proportions of lower legs and heads.

Again there was variation between the three settlements, higher status areas in York occurring both centrally and outside the limits, while at Norwich and Thetford these zones were more commonly located in one area of the town.

6.5.2 Specialisation

The body part data summarised above indicate deposits of primary butchery waste (lower legs and heads) at Dragon Hall and Castle Mall for cattle and pigs, Redcastle Furze for sheep, and possibly Site 1092 for pigs. Further, small specific dumps of head and foot bones have been recorded at Whitefriars Car Park and Brandon Road. Small primary butchery dumps were also

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observed in York – at Blake Street (not illustrated O'Connor 2004: 435) a group of cattle skulls, metapodia and phalanges; and at Coppergate a deposit of pig lower limbs.

Little evidence for craft workshops exists from any of the Danish towns, although exceptions exist. At Site 1092 in Thetford, a few sawn antler fragments, and a large number of split, polished and pierced cattle ribs, and goat, sheep and cattle horn cores were recovered, indicating the presence of craftsmen working with all three media. Within York, small quantities of craft-working waste came from many sites (Mainman and Rogers, 2004: 471), but large numbers of antler fragments were recovered from Coppergate, as well as bone-working waste, which was also recorded at Leadmill Lane (not illustrated MacGregor, 1982: 150), indicative of specialist workshops.

There was more evidence for specialist activities from the Danish towns than observed in the Saxon burhs, with evidence associated with workshops in both York and Thetford. Butchery was only in evidence in small, singular deposits – nothing to indicate specialist butchers, as recorded in Roman Winchester (Maltby, 2010: 285).

6.5.3 Spatial Organisation

In most Danish towns sheep were again distributed in greatest proportions towards the outskirts of the settlements (Figure 6.44). Horses and dogs (Figure 6.45) were more abundant at the central sites of Coppergate (earliest phase) and Skeldergate. There was little difference in the proportion of horses recovered from Thetford sites, although dogs were most common in the northern half of the town. Trends were hard to see at Norwich, as the greatest proportions of both dogs and horses were recorded at the Saxo-Norman sites, and it may be a phase-related pattern, rather than one of a spatial nature.

At York, the sites from which antler- and bone-working waste was recovered were central, yet the site in Thetford was more peripheral.

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6.6 Discussion

6.6.1 Zoning

It has been widely reported that the bone assemblages of middle Saxon wics are homogenous, and reflect no spatial differences (Bourdillon and Coy, 1980: 114; Clarke and Ambrosiani, 1995: 201; Riddler, 2001: 62). However, the evidence presented here goes some way to dispute this assumption. At Lundenwic non-food refuse such as dogs, horses, antler-, bone- and hornworking waste and sheep were deposited at the outskirts (Figure 6.46). In contrast, sites located more centrally generally contained greater proportions of high-status foods, such as pigs, wild birds, domestic birds and wild mammals. Such evidence suggests that the inhabitants of central areas of each wic were of elevated status, or wealth compared with those living in areas associated with craft production, allowing them access to a more varied diet. The population of peripheral areas ate more sheep, implying that lamb at this time was a lowstatus food.

Within burhs, the presence of pigs, domestic birds and dogs was fairly uniform throughout. Status indicators in this phase are more likely to be restricted to wild birds and mammals, given that pigs and domestic birds would probably have been kept by the inhabitants on a household level (Chapter 5.7.4). On that basis, it is evident that, within the new burhs (Northampton and Oxford) the greatest proportions of wild species come from sites close to the later imposition of a Norman castle. Burhs situated within Roman towns, however, paint a more complex picture: in London the area surrounding the palace and abbey at Westminster, outside the town walls, features the greatest proportions of these species; the data from Winchester are skewed given the absence of available sites from the centre of the town, but the two sites inside the walls suggest a greater proportion of wild species than the extra-mural sites; and at Chester, there was a concentration within the centre of the town, as observed in the wics, above. There was also much variation in Danish towns – at York high-status species were recovered from the later phase at Coppergate, an area close to the later Norman castle, as well as from Fishergate and Blue Bridge Lane, outside the town, in the area of the former wic, as noted at London. Given the squalor of the environment of York in the late Saxon phase

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(Ottaway, 1992: 155), it may be that the inhabitants of these extra mural sites were privileged to live in a more desirable location. At Norwich the higher status species were recovered in the area of the later Norman Castle, yet those from Thetford came from the more central area in the southern part of the town.

The highest proportions of horse bones were often recovered in conjunction with craft waste, particularly horn cores. Although there were very few deposits of craft-working offcuts, at Northampton there is evidence to suggest that antler-working was concentrated on the east side of the town, and horn-cores and horses, indicative of skin-processing waste, to the northwest. This latter trend also applies at Winchester, where horn cores and horse remains were recorded outside the town walls, yet at Chester, Thetford and York areas of skin-processing and craft working waste were recorded more centrally. At sites where evidence for craft working was available, fewer high-status species were recorded, and again this is coupled with higher numbers of sheep, indicating that these areas of Burhs and Danish towns were associated with lower status population.

6.6.2 Specialists in the Population

The accepted consensus regarding manufacture within wics is that, "the engine of activity was craft production on a significant scale", (Hodges, 1996: 297) and that at Hamwic "manufacturing of a wide range of materials ... was taking place throughout the settlement" (Ottaway, 1992: 125). The faunal evidence does reflect this, with a few offcuts of antler and bone observed on many of the excavated sites. However, the data presented above also demonstrate the existence of significant concentrations of antler-, bone- and horn-working waste, seen at Six Dials, SARC XIV and Anderson's Road in Hamwic, and antler waste at The Royal Opera House in Lundenwic. Riddler (2001, 2004) has suggested that these sites represent spatially distinct areas of craft working, rather than a piecemeal industry carried out all over the wic – the smaller assemblages at most other sites being residual material carried throughout the site by the movement of humans and animals. However, the presence of a separate class of household-scale craft working on a household level cannot be discounted.

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The presence of carcass parts from complete animals at Anglo-Scandinavian (late Saxon) York prompted O'Connor (1989a: 159) to suggest that:

"beasts were bought in and slaughtered as required and shared amongst several households, the role of butcher being taken by whomsoever in that particular neighbourhood had a sharp knife and a rough idea of how to use it."

This model can be attributed to the processing of cattle, sheep and pig carcasses from wics, too. However, there are isolated features at Lundenwic (The Treasury and Lyceum Theatre), Hamwic (Melbourne Street) and York where discreet dumps typical of a single butchering episode do exist, perhaps indicating the presence of a part-time butcher, or evidence of preparations for feasting.

The general trend at many burhs and towns in the Danelaw reflects the distribution of cattle and sheep that had undergone primary butchery, indicating that specialised butchers existed in the late Saxon phase. Despite such inferences from the carcass parts represented in domestic assemblages, there were very few distinct deposits of primary butchery waste, although at Winchester and Thetford sites on the outskirts contained more lower legs and heads, indicating either the disposal of primary butchery waste at the periphery of the settlements, or that the population in these areas were eating poorer parts of the carcass, as well as fewer species (see above).

Craft working and skin processing waste was less abundant than within the wics, although deposits were recorded at Northampton, Winchester, Chester, York and Thetford (Figure 6.47), which suggests that while specialists were working within burhs and Danish towns, it was perhaps not on the scale recognised in wics.

That deposits of horn cores were consistently recovered with the largest assemblages of horse bones suggests that these are the waste from skin processing. The skin of animals destined for the table (i.e. cattle and sheep) would be removed by the butcher and passed onto the tanner or tawyer. Conversely, the skin of horses would be removed at the site of processing, as the

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meat of these animals was not generally eaten – similar deposits have been recorded for medieval sites (Holmes, 2009a; Shaw, 1996).

6.6.3 Royal Seats, Trading Communities or Urban Centres?

Perhaps not surprisingly, this detailed analysis of data from wics, burhs and Danish towns has revealed much regarding the organisation of the population, and mechanics of the trades carried out within. Despite the limitations inherent in the data for the middle Saxon wics, trends noted were consistent: higher status sites were concentrated towards the centres of the settlement, where those who were part of the aristocracy or merchant classes perhaps lived; the workers, craftsmen and skin processors were more likely to have inhabited the outskirts, where the noise, smell and detritus of such industries could be kept on the peripheries.

The near absence of horn cores from rural and urban sites (Chapter 6.7.1) from the middle Saxon phase onwards indicates a controlled supply of horn from the hinterland to both wics and burhs, probably with the skin or hide attached, for the purpose of leather preparation and horn retrieval and working. Movement of selected long bones, for use in the manufacture of bone objects was also evident, coupled with evidence for large dumps of waste indicating workshops practising specific trades. Logistically, this suggests a central authority acquiring and re-distributing raw materials to the artisan population as required, or a market system where such goods were bought or traded. It has been suggested that at Hamwic, butchers existed which would have supplied meat, bone, hide, horn and hooves for specialist activities (Driver, 1984: 403). However, given the likelihood that animals were butchered on a smallscale, household level, this does not fit with the observations made here, and it seems more likely that horn cores, skins and sometimes lower legs were sent to the respective tradesmen following the slaughter of animals, either as a trade or through obligation.

Change comes with urban development: there is greater variability in the nature of the late Saxon evidence, although this may be due to sample sizes, as far more sites were available for analysis in this phase. Nonetheless, they still give a picture of settlements with distinct zones, potentially dependent on the form of the settlement itself:

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a) Expanding settlements

At York and London the greatest proportions of higher status signature species were recovered from areas in the former wics, at some distance from the new urban settlements. Archaeological evidence indicates that these towns developed in a piecemeal fashion, spreading out as the population grew (Haslam, 1985: 25; Ottaway, 1992: 143, 149). As these settlements expanded the higher status residents may have sought to distance themselves from the general population by living outside the 'urban sprawl', with craft working areas situated more centrally within the burh, as seen at York.

b) Planned settlements

Burhs where higher status areas were in the vicinity of the later Norman castles (Oxford and Northampton) had been built as a planned grid (Ottaway, 1992: 141-142), and high-status inhabitants lived more centrally, away from areas of craft working and skin processing on the outskirts, as seen at Northampton. It is unfortunate that the best known planned burh of Winchester has so few published data from the central areas, but these are consistent with the deposition of industrial waste in extra-mural areas.

Only at Northampton and London was there evidence for the specific re-distribution of horn cores to industrial sites. Elsewhere, at Winchester and Thetford, small numbers of horn cores were recorded on most sites, but no discrete deposits that could be interpreted as specific horn-working or skin-processing waste. Similarly, there were far fewer significant finds of bone or antler-working workshops.

The higher proportions of sheep bones from settlement outskirts clearly do not fit with Wilson's theory of central-site indicators. There are two main explanations for this phenomenon: firstly, that the population living on the edges of the wic or burh were poorer, and could not afford as much beef as those living in the centre; secondly, the sites on the peripheries were more rural in nature (higher numbers of sheep being more typical of rural sites – chapter 5.8), and were perhaps farmsteads, supplying the settlement with food. The

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latter scenario is underpinned by the presence of 'town fields' on the outskirts of wics and burhs, which could have been used for just such a role (Haslam, 1985: 20,42), and this has been hypothesised for the site of the National Gallery Extension, lying just outside the suggested limit of Lundenwic (Rackham, 1989: 170). In either case, there is a definite implication for the marketing of beef either to the centre of settlements or to particular areas where more affluent inhabitants probably resided.

So, how does this tie in with the possible organisation of population and trade within wics, burhs and Danish towns? The evidence suggests that there was a tightly controlled distribution of animal products, and distinct areas inhabited by people of different status in both wics analysed. This implies that the social and economic organisation of the interiors was strictly ordered, with distinct areas for craft work. It is possible that the higher status areas of wics were populated by a merchant class, as the trading aspect of wics has been barely touched on here, being poorly represented in the archaeozoological data. Burhs and Danish towns appear to have been designed along more varied plans. There was less control of the redistribution of raw materials, yet the expansion of specialist trades included butchers, which implies an active market place.

6.7 Summary

The data presented above show that particular zones did exist within both wics and burhs, with areas for the well-off, another for craftsmen working in specific workshops, and, in the majority of late Saxon burhs and towns in the Danelaw, for specialist butchers. Further, the evidence signifies that there was a real need to supply the artisanal and aristocratic inhabitants with food, and the indicators are that some of this came from very local farmsteads.

Chapter 7:

Conclusions: Food, Status and Complexity in England AD 450 - 1066

7.1 Introduction

Preceding chapters have set out and critically appraised the archaeozoological evidence for key aspects of social, political and economic hierarchies, diet, specialisation and urbanisation. These will be used to address five wider aspects concerning Saxon archaeology:

- How is status reflected archaeozoologically, and what does the evidence suggest regarding social hierarchies throughout the Saxon period?
- 2. What type of agricultural production was being undertaken?
- 3. What methods of provisioning were implemented between various site types?
- 4. Is there evidence for the support of a non-agrarian, urban population within Saxon England?
- 5. How can the provisioning of late Saxon England advance ideas regarding cultural identities between the Saxon and Danish regions?

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These will be considered with specific reference to the current knowledge of Saxon England, and the value of animal bone remains for shedding new light on the population of England between AD 450 and 1066.

First, however, some consideration must be made of the problems and limitations encountered in the analysis so far. One of the biggest problems, reminiscent of criticisms of other, similar synthetic reviews (e.g. Maltby, 1994: 85) is the limited treatment of sites which appear as 'outliers' to any particular trend. Throughout the thesis, outliers have been subjectively identified as those sites which exhibit a particular value that is distinctly separate from the rest of the data. Although some explanation has been sought for the presence of these outliers, it could be argued that they have not been investigated as thoroughly as they would have been if a smaller area or more specific research question was investigated, and patterns in general trends not so pertinent. Table 7.1 presents the sites which have exhibited outliers in the most commonly investigated data (i.e. proportions of pigs and the minor species, ageing and body part representation).

These unusual sites still fit within the general trends observed so far, whereby the more select site types i.e. former Roman towns and those high-status, ecclesiastical, trading and industrial in nature are those more likely to contain exceptionally high numbers of minor species, compared to rural and urban domestic sites (Figure 7.1). Some of the nuances within these trends will be considered in detail in the following sections, such as the high number of pigs from Eastern sites and exceptionally large numbers of wild and domestic birds on middle Saxon ecclesiastical sites. It is likely that these outliers are caused by a combination of factors. The method of excavation, for example will have a considerable affect on the number of small bones from birds recovered; the underlying geology will also be influential, as smaller bones will be less well preserved than bones from larger animals. Coupled with this is the likelihood that the sites in the database represent different scales of provisioning – the inhabitants of high-status sites may well have a preference for the consumption of wild mammals and birds, but the most wealthy could have afforded a greater variety and quantity of such species than those at the poorer end of the scale. In effect, therefore, the outlying sites perhaps represent the most affluent and influential households, as well as the assemblages subject to the best

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preservation and recovery methods. It may also be used to suggest the mis-identification of particular site types, such as High Street, Ramsbury, Wiltshire, which has such high proportions of pig and wild mammal remains that it is more likely to be part of a larger, high-status complex, rather than just two phases of a small rural domestic and industrial site.

Taphonomic processes such as differential preservation and recovery will also have affected the wider results from the analysis, as well as the outliers, and detailed arguments relating to the affects of such factors have been given elsewhere (e.g. Lyman, 1994; Meadow, 1980). However, as is the case with the outliers above, the general pervasive trends observed between phases, regions and site types, suggests that the steps taken to make assemblages comparable (outlined in Chapter 2) have been largely successful. More problematic are the site formation processes that affect methods of rubbish disposal undertaken on various site types. For example, the use of middens would present a different taphonomic pathway to bones disposed of within, compared to those buried in pits, ditches and disused sunken-feature buildings, which are afforded greater protection from scavengers, weathering, trampling and scattering. Although numerous methods of waste disposal would have been utilised on all site types, it is probable that larger middens would have been more commonly used on rural sites with more available space, whereas sites with a more concentrated population would be more likely to dispose of refuse in such a way to make it more inconspicuous i.e. buried. This may lead to a skewing of results from urban sites, the assemblages of which may be better preserved than those on rural sites - and possibly cause a loss of data resolution in the latter.

This brings the discussion round to the third problem area – that is, the use and formation of sites themselves. For example, the similarities observed between many of the middle Saxon high-status, ecclesiastical, trading and industrial sites lends weight to the multi-functionality of estate centres. Despite these problems, a number of themes have risen to the fore, from which the understanding of the food, status and complexity of Saxon England between AD 450 and 1100 has been increased. These will be summarised below.

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7.2 Social Hierarchies

One of the biggest problems when assessing the status of inhabitants at a particular site is the mingling of food debris from the table of the most affluent, with that of their servants. Nonetheless, it may be presumed that the presence of particular signatures in the type of food consumed is indicative of a high-status presence. Following the decline of the Roman influence in England in the mid-5th century, many of the Roman towns were abandoned and allowed to fall into ruin, as evidenced by the 'black earth layers' that built up over former occupation surfaces. However, evidence for sporadic settlement within towns such as London, Canterbury, Wroxeter, Silchester, Gloucester and St. Albans has been identified (Snyder, 1998: 142-146). The use of former Roman towns has been proposed variously as foci for an elite, administrative or ecclesiastical population (e.g. Clarke and Ambrosiani, 1995: 12-15; Fowler, 2002: 91; Haslam, 1985: 10; Vince, 1994: 108). Archaeozoological evidence from Wroxeter was the most abundant, and indicated a signature similar to that of both contemporary high-status and ecclesiastical sites (i.e. Yeavering, Northumberland; Cadbury Congressbury, Somerset; and Bishopstone, Sussex), while smaller assemblages from former Roman towns of Baynard's Castle, London Bonners Lane, Leicester and Freeschool Lane, Leicester (Browning, 2011: not included in the dataset), and the Roman fort of Portchester were similar in the relatively high proportions of pig and wild species. Collectively this implies that some of the inhabitants of former Roman towns were eating a high-status diet, and it is likely that the remains of these ruinous towns attracted the elite of the Saxon population as a residence and focus for the surrounding community.

At the former Roman towns, and other early Saxon high-status sites the inhabitants consumed most beef and least lamb. This may be a reflection of the high regard in which cattle were kept, as it has been suggested elsewhere that the wealth of the ruling classes was tied up in the size of their cattle herds (Brunner, 1995: 28-29). In addition, it has been proposed that early Saxon rulers displayed wealth through feasting, at the same time confirming the allegiance of their followers (Dobney *et al.*, 2007: 236; Hagen, 1992: 76), and the consumption of cattle would have provided a significant amount of meat. However, no single, large deposits of obvious feasting waste has as yet been recorded from an early Saxon context, which is one

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of the major ways in which feasting may be recognised in animal bone assemblages, although evidence for this may easily be missed if the waste products are disposed of on a midden (Twiss, 2008: 419). Animal bone assemblages from former Roman towns were also the greatest source of fish, wild bird and wild mammal remains.

By the middle Saxon phase, social distinction between populations becomes more complex. A greater range of species is more commonly recorded, but it is the relative proportions of domestic birds which is greatest on ecclesiastical and, to a lesser extent, high-status sites in this phase. The relative proportions of individual domestic bird species (goose, domestic fowl/ chicken and duck) are similar in the assemblages of all site types, although geese are recorded in greatest numbers on rural and ecclesiastical sites, and duck on high-status and trading sites (Figure 7.2). It is the proportion of all domestic birds which produces such a significant quantity in the faunal assemblage, setting the diet of the populations of these sites apart from others, rather than a focus on any particular species. Does this represent a move towards a new trend in the display of wealth, manifested through the consumption of distinct species? Domestic birds are recorded in comparatively small quantities at early Saxon sites, and so the addition of relatively exotic species would have been a visible method of distinguishing the ecclesiastical and secular elite. Other species more commonly recorded on ecclesiastical sites in this phase are wild birds, which is also true of high-status sites, which are the only site types from which heron and grouse are recovered, with partridge only recorded on high-status and ecclesiastical sites. High-status sites also contain the greatest range of freshwater fish. Birds of prey are more prevalent on middle Saxon high-status and ecclesiastical sites, indicating the emergence of falconry as a sport. Preliminary findings also indicate that high-status sites are the source of some of the largest cattle, sheep and pigs.

The move towards younger sheep on urban, high-status and ecclesiastical sites and older sheep in rural settlements from the middle Saxon phase indicates that these animals were not demanded by market or estate centres, possibly because they were considered low-status animals and commanded low market value, or were too valuable for breeding.

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From the late Saxon phase, the prevalence of domestic birds and partridge on high-status and ecclesiastical sites diminishes, which perhaps represents the changing perception of a luxury good (van der Veen, 2003: 403). Indeed, by the late Saxon phase domestic birds are commonplace on all site types, and partridge particularly common on rural and urban domestic sites. The late Saxon elite created a new, socially conspicuous way of signalling their status, seemingly achieved through the consumption of a wider range of wild species: deer, particularly roe deer, water birds (such as crane, swan and waders) and pig on high-status sites; and water birds (particularly heron and stork) on ecclesiastical sites. It is likely that this indicates a refinement of the previous trend towards the consumption of particular, luxury species (Chapter 2.4.2). Birds of prey remain most common on high-status sites, as do the largest animals.

Increasing divisions in social hierarchies have been illustrated in all analyses into the status of the inhabitants of particular settlements in Saxon and Scandinavian England. This is aptly illustrated both by the greater proportions of wild species and domestic birds recorded in the faunal assemblages from the late Saxon phase, and the more limited range of sites from which they are recovered – specifically high-status, ecclesiastical settlements and burhs. During the middle Saxon phase, similarities were observed between assemblages from a greater range of sites - industrial, wic and other trading sites, as well as high-status and ecclesiastical sites. The separation of the secular and religious elite from the populations of urban centres in the late Saxon phase continued to be magnified in the Saxo-Norman phase where a considerable narrowing of signature species is observed. Wild species were restricted to high-status and, to a lesser extent, ecclesiastical sites, from which fish were also most abundant. After the Norman Conquest, the aristocracy employed additional means of distinguishing themselves from the majority through hunting and consumption rituals and the restriction of land and access to wild animals (Sykes, 2007b: 96-97). This is unsurprising, as the onus was on the invading force to display their superiority and power in order to keep their authority over their new subjects, exemplified in part by their castle building schemes (Haslam, 1985: 53). The distinction between sites of differing social status falls largely on the quantities of minor species – wild animals and domestic birds, rather than the proportions of the major
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domesticates. The emphasis on these species is therefore likely to be the most appropriate way to determine the status of the inhabitants of a site, using the faunal record.

7.3 Agricultural Production

7.3.1 Early Saxon Self-Sufficiency

Evidence presented in this thesis strongly supports the view that the early Saxon economy was self-sufficient. This is typically characterised by intensive mixed farming, where small scale production of crops and animals were undertaken close to the settlement (Bogaard, 2005: 179). Animals within such a regime will be utilised mainly for meat, and will be bred, culled, butchered and consumed on site. Certainly this is reflected in the animals of early Saxon sites, the majority of which were culled at prime meat ages, with carcass parts indicating the processing and deposition of complete animals on site. There is also some suggestion that cattle were utilised for small-scale milk production, given the predominance of females in the assemblages.

Powlesland (1997: 104) has argued that, following the collapse of the Roman urban economy, "a reversion to an 'Iron Age' type of rural economy has to be envisaged". This theory may hold some weight as, barring wholesale genocide by the incoming Roman or Saxon populations, the native Britons would have continuously farmed England from the Iron Age through to the post-Roman period. However, although it has been noted that the inhabitants of 'unromanised' sites were less likely to change their husbandry strategies than 'romanised' settlements (King, 1978: 227), there is some evidence that native farmers produced a surplus to provision the Roman military and urban sites (Hamshaw-Thomas, 2000: 168; Maltby, 1981: 194). Conveniently, the animal husbandry regimes of the Iron Age have been comprehensively synthesised by Hambleton (1999), and the early Saxon mortality profiles are comparable to those of Iron Age cattle, sheep and pigs (Hambleton, 1999: 69-79). However, the regional divide in Iron Age regimes between a predominance of cattle in the east of England, and sheep in the south (Hambleton, 1999: 89) was not apparent in the early Saxon data examined. Whether the presence of a subsistence economy was due to the native population reverting to

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a pre-Roman husbandry strategy, or whether it was simply because it was the most effective means of farming in a society based on household-level settlements, characteristic of both early Saxon and Iron Age periods, a self-sufficient economy does appear to characterise the nature of the early Saxon animal husbandry, though it is likely that a regime of mixed farming was practised throughout Saxon England, providing less risk in the case of drought or disease (Fowler, 2002: 216; Grigg, 1989: 179).

7.3.2 Wics as Instigators of Production

Given the location of the majority of wics and trading sites in coastal areas (Figure 7.3), Vince (1994: 116) proposes that there should be less variation in the husbandry of inland sites in the middle Saxon phase, as there would be less pressure on the rural economy of such areas to supply a non-agrarian population. This was investigated by grouping middle Saxon domestic, high-status and ecclesiastical rural settlements into those situated close to known wics (i.e. the counties of Yorkshire, Suffolk, Norfolk, Sussex, London, Essex and Hampshire), and those from inland sites (i.e. Oxfordshire, Wiltshire, Buckinghamshire, Durham, Gloucestershire, Lincolnshire and Northamptonshire). Interestingly, little variation emerged in the proportions of domestic species recorded on inland rural sites outside the hinterland of the wics (Table 7.2, Figure 7.4a). Those closer to wics are less consistent in the proportions of cattle, sheep and pig recorded, suggesting that some of these sites (e.g. Crow Hall Park, Norfolk; Cottam, Yorkshire; and Wicken Bonhunt, Essex) had particular demands placed on them, whereas others remained relatively unspecialised. The data from high-status and ecclesiastical sites (Table 7.2, Figure 7.4b) was similar, although there was a small sample size for the 'closer to wics' data.

A comparison of the proportions of the minor species brings a reversal of trends, whereby domestic settlements further away from wics show greater diversity of wild species in their assemblages (Figure 7.4c); those closer to wics have consistent, albeit low, proportions of these species. Moreover, there is again a greater difference between the proportion of minor species recorded on high-status and ecclesiastical sites (Figure 7.4d). Birds, both domestic and wild, are more common on sites further away from wics, whereas at sitescloser to wics wild mammal remains are more commonly recorded.

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Taken together, the evidence suggests that there was indeed a difference in the obligations placed upon rural sites situated close to middle Saxon wics and those further inland. Such differences imply that most inland populations had fewer demands placed upon their animal husbandry and agricultural production, allowing greater access to wild species. Some sites closer to wics apparently began to specialise in the proportion of cattle, sheep and pigs raised – possibly due to a demand from the wic populations. It is likely that other domestic sites close to wics, such as the National Portrait Gallery, London and Site 49, Wharram Percy, Yorkshire, continued to farm in similar ways to their inland contemporaries. Differences are more notable at high-status and ecclesiastical sites, where the inhabitants of inland sites had a more varied diet, including greater proportions of the minor species. This implies that these elite sites close to wics were either not provided with birds and wild mammals by the local producer sites, or that these species were used to provision wics instead. Although ageing data are scarce, the presence of older cattle from sites closer to wics (e.g. Brandon, Wicken Bonhunt and Wharram) supports the view that such sites modified their production and resources to supply the dependant populations of wics with meat and dairy products.

It has alternatively been proposed that estate centres brought about specialisation in production at the end of the early Saxon phase which led to exchange through local markets, before evolving into the sites of international trade (wics) (Crabtree, 2010: 133), rather than being instigated by the emergence of wics as consumer sites in the middle Saxon phase. The evidence from areas surrounding wics may well confirm this, yet the data presented here suggests that if this were the case, then the move to specialisation evident in areas close to the wics may be shadowed at inland sites. A small number of early Saxon sites could be split into sub-phases to further investigate the suggestion that specialisation began at the end of the early Saxon phase (Table 7.3). Data are scarce, and generally inconclusive. There is no evidence for increased redistribution of carcass parts, and little difference in the cull patterns throughout the early Saxon phase. No data exist for the most vital sub-phase – the late early Saxon phase, when Crabtree suggests that the move to specialisation began, although those sites that span the transition between the late early Saxon phase, and early middle Saxon phase indicate that cattle became increasingly used for both meat and secondary production.

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The apparent increased production of surplus commodities such as milk, wool and grain from rural sites in regions surrounding wics might have provided additional wealth to the elite of those areas. As a result, the natural progression for these areas – Wessex and East Anglia – to become more affluent, led to the acquisition of resources necessary for the burh-building projects of the late Saxon phase.

7.3.3 Late Saxon Intensification

By the late Saxon phase, in the midlands, an early form of open field agriculture was emerging, based on arable production in the 'central province' (Roberts and Wrathmell, 2000: 27). Settlements outside this area continued the traditional form of agriculture based on intensively cultivated 'infields' near to the settlement, and less intensively cultivated 'outfields' further away. The expansion of arable farming heightened demand for manure, and most probably sheep were grazed on fields away from the settlement in the day, before being housed in temporary pens on arable land at night (Oosthuizen, 2005: 184; Ryder, 1983: 672). It has been suggested that, as a result, sheep were kept in greater numbers in midland areas associated with the beginning of open field agriculture from the late Saxon phase (Sykes, 2007b: 29). However, archaeozoological support for this is lacking, as a comparison of the proportions of the main domesticates within and without the central region (Figure 7.5) shows not only that sheep were more common from sites within this zone in the middle Saxon phase (i.e. pre-open fields), but also that their numbers declined in this area in the late Saxon phase. Even if the spread of open field agriculture started in a smaller area consisting of the midlands and Cotswold area, there is again little difference in the proportion of sheep in these regions between the middle and late Saxon phases, and even a decline in numbers in the Saxo-Norman phase (Figure 7.6).

Of more consequence perhaps are the consistently higher numbers of pigs recorded in areas outside the midland and central province areas in all phases. The reason for this may be explained by the presence of larger areas of woodland, suited to the keeping of pigs for pannage, which occur outside the central province (Roberts and Wrathmell, 2000: Figure 24).

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While transhumance is less necessary in temperate regions (Greenfield, 1999: 15-16), the intensification of arable production around villages would cause animals to be herded further afield, particularly in the summer months when crops were growing (Kehoe, 1988: 393). If manure was to be utilised, the distance from the settlement that animals would be taken would be minimal – allowing them to return each night. Unfortunately, short distance transhumance in the Saxon period is hard to define as there would be little if any direct archaeological evidence for herders or their flocks on the more extensive fields (Grant, 1991: 14).

One final possible indication of an increase in arable production may be in the technological development of related tools – in this case the plough (van der Veen, 2010: 2). The presence of a Saxon mouldboard plough (Figure 7.7) has been the subject of discussion. Early commentators suggested that its use in Saxon England continued from the Roman period, despite an absence of archaeological finds (Payne, 1957: 69; Wilson, 1962: 66-67). Others have suggested that it was introduced by the Saxons (e.g. Trow-Smith, 1951: 35). However, caution has been advised by Oosthuizen (2005: 187), who argues that infield agriculture did not require a heavy plough, simply ample use of manure, and Fowler (2002: 182) finds no evidence for the use of a heavy plough until the 10th century at the earliest. Recent investigations into the incidence of pathologies on the phalanges of Saxon cattle has indicated they were not consistently used for heavy work with a plough (Holmes, forthcoming-e). However, the recent find of a coulter from a securely dated context at the high-status site of Lyminge, Kent (Pitts, 2011: 7), suggests that the technology was present, if not widespread, and may have been limited to use on elite estates, as they were in the Roman period (Fowler, 2002: 183-184; Wacher, 1998: 149).

7.3.4 Saxon Animals

But what of the animals themselves? Various strategies of stock improvement have been proposed. Armitage (1982a: 51-52) has suggested that cattle increase in size throughout the Saxon period, due to the selective breeding of plough teams. Bökönyi (1995:45) sees Saxon

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animal breeds as primitive, reflecting none of the Roman methods of improvement, and argues that the size of cattle and sheep decreased to resemble Iron Age breeds.

Investigation using log ratios reveals that cattle and pigs decreased in size between the middle and late Saxon phases, with a slight increase occurring from the Saxo-Norman phase. Sheep became smaller from the middle Saxon phase, but there is no evidence for a subsequent increase in size prior to the Norman Conquest. Sykes (2007b: 52) suggests that this decrease is due to an increased emphasis on female herd structure. However, the evidence provided in Chapter 4.2.1 indicates that female animals were already more common in cattle herds from the early Saxon phase, with an increase in castrates through time.

An alternative explanation must therefore be sought. If all the main domesticates were largest at the beginning of the Saxon period, then this surely intimates a continuation of stock already present at the end of the Roman period (Chapter 4.6.2). It is suggested here that, following the Roman withdrawal, there were probably far fewer opportunities for farmers to import stock to continue their already improved bloodline. Even with increasing trade opportunities in the middle and late Saxon phases, farmers appear either disinclined to import new stock, or unaware of the benefits, leading to a stagnation in stock improvement. This may reflect a preference for smaller stock, easier to manage than larger animals, or husbandry which did not allow animals to thrive, through poor nutrition, for example.

The appearance of the animals is elucidated by the metrical comparisons with known populations. It has been suggested that pigs were small and hairy with long legs, similar to wild boar, which may be related to the inter-breeding of wild and domestic pigs during the pannage season, when domestic pigs were allowed to roam in woodland (Clutton-Brock, 1976: 378; Trow-Smith, 1957: 52). The evidence here, however, shows that pigs were significantly smaller than the wild boar they were compared with. Sheep were similar in size, if not slightly larger than the Soay to which they were compared, and would have been small bodied, long-legged and have provided a minimal amount of meat. Cattle, despite starting out in the early Saxon phase considerably larger than the Iron Age assemblage with which they were compared, became similar in size to these small animals by the late Saxon phase.

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7.4 Provisioning and Foodways

By the middle Saxon phase, the animal bone evidence indicates the presence of a redistribution system, whereby rural sites were obliged to provide food render to the elite, who would then distribute this to workers in wics under their patronage. The difference between the nature of wics, focusing on external trade, and the towns of the late Saxon phase, which developed along market principles to provide goods for the surrounding area (Vince, 1994: 114) is also visible in the faunal record. Both wic and burh assemblages are dominated by cattle bones – a sensible provisioning strategy, allowing the delivery of a maximum amount of meat from the smallest number of animals. The procurement of a greater number of minor species by the burh populations, particularly chickens, geese and ducks may imply that these species were being bred within these settlements, alongside pigs, or that they were supplied direct from producer sites. The provisioning of burhs and Danish towns with more varied species, as well as the presence of animals from wider age ranges is consistent with a market economy, where the inhabitants of burhs and Danish towns were freely trading with those from the hinterland. As a result, rural producer sites began to provide meat from animals that were past their prime – they were more at liberty to dispose of their excess stock on the open market, rather than be restricted to a supply of animals at prime meat age. This coincides with increasing arable production, implying less land was available to produce large herds of young cattle, instead they were culled only after their use for milk and/ or traction.

The presence of higher proportions of sheep at peripheral sites in both wics and burhs is highly suggestive of the presence of either occupants of low status or farms, which provided some of the meat and raw materials to the urban inhabitants. 'Urban' farms have been hypothesised on the outskirts of Lundenwic (Blackmore, 2002: 3290-3291) in the earlier part of the middle Saxon phase, although no such settlements have been described at Hamwic or later burhs. The presence of 'town fields' (Haslam, 1985: 20) surrounding these settlements, however, must have been farmed, and it is likely that the resulting produce was used to supply the inhabitants – some of whom no doubt owned and farmed these lands.

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7.4.1 Ecclesiastical sites

One of the most poorly understood areas of Saxon archaeology defined in the introduction is the role of ecclesiastical sites in the provisioning network (Chapter 1.3). Trends have been elusive, as the number of ecclesiastical settlements represented archaeozoologically is small. Although the earliest churches were probably entirely under royal patronage (Blair, 2005: 75), by the middle Saxon phase they have been described as occupying a similar role to high-status estate centres (Astill, 1991: 103; Hodges, 1988: 4), and that they were instrumental in the move to surplus production (Naylor, 2004: 133). However, there is a clear distinction in the species proportions recorded on early and middle Saxon ecclesiastical and high-status sites (Table 7.4). In the early Saxon phase high-status sites are represented by high numbers of cattle, and the monasteries by sheep and pig, although the exceedingly high number of pigs at St Albans Abbey is anomalous (with the exception of the rural site of Wicken Bonhunt, Suffolk). A distinction is also noted in the middle Saxon phase, where cattle and pigs predominate on high-status sites, and sheep and domestic birds on ecclesiastical settlements. The proportion of wild birds is also far greater on ecclesiastical sites than on any contemporary rural settlement. Therefore, the provisioning of both ecclesiastical and high-status secular sites does differ and, although they are distinct from rural sites (Appendix C and Table 7.2), there is evidence that ecclesiastical sites occupy a different role to secular estate centres. The presence of fairly high numbers of neonatal animals at many ecclesiastical sites in both the middle and late Saxon phases (Table 5.2), suggests that they were sites where animals were bred and raised, rather than redistributed to trading sites.

Larger monastic estates were established in the 10th century (Fowler, 2002: 291) and grew in landed power, providing a specific spiritual function, rather than being estate centres (Astill, 1991: 113; Blair, 2005: 341). Archaeozoologically, the major differences in species recorded are in the lower relative abundance of domestic and wild birds; at Flixborough this coincides with the site's late Saxon monastic focus (Dobney *et al.*, 2007: 228). Ecclesiastical settlements continue to have more sheep than both high-status and rural domestic sites, more pigs and wild mammals than the latter, yet fewer than the former. Little evidence is available for redistributed carcass parts from ecclesiastical sites (all having relatively high percentage

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similarity scores), and this, coupled with the evidence for breeding also suggests that the occupants of ecclesiastical sites were responsible for farming and consuming much of their own food.

The quantity of sheep bones recorded on ecclesiastical sites are amongst the highest proportions of all site types, in all phases, and are often significantly greater than those recorded on high-status sites. The reason for this seems to have been fundamental to religious identity, and may be related to wool or dairy production – unfortunately there is little available metrical data to compare the flock make-up of these and other site-types.

7.4.2 Redistribution

Following recent work into the redistribution of deer remains between various site types (Sykes, 2010), a similar approach was undertaken to investigate whether movement of specific parts of cattle, pig or sheep carcasses occurred between sites. Principal Component Analysis (PCA) was used to look for groupings in the proportions of mandibles and limb bones on particular site types. Only one assemblage from a former Roman town was available for comparison with the many rural domestic sites from the early Saxon phase (Figure 7.8a). Although this former Roman site did sit to one side of the PCA for all species, sample sizes were small and there were no consistent trends in the data (Figure 7.9a). In the middle Saxon phase, there are clear groupings in the carcass parts recorded at high-status, wic and rural sites (Figure 7.8b). High-status sites consistently contain the greatest proportion of mandibles from all the main domesticates within their assemblages (Figure 7.9b). With this exception, the relative numbers of limb bones recorded on all site types are similar.

Although less distinct, groupings also exit in the late Saxon phase between high-status, urban (burh and Danish town), ecclesiastical and industrial sites (Figure 7.8c). Industrial sites have some of the greatest numbers of metapodia for all species, and fewest hind limb bones (pelves, femora and tibiae). However, they also have some of the greatest proportions of fore limb bones (scapulae, humeri and radii). All industrial sites are from Danish towns (Lincoln, Thetford and Northampton), where correspondingly lower numbers of (cattle and sheep) fore limbs, and greater numbers of hind limb bones are recorded from domestic sites (Figure 7.9c).

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Another notable trend is for high-status sites to contain some of the greatest proportion of cattle bones of all site types, yet mandibles and the bones of the axial skeleton (pelves and scapulae) are recorded in lowest numbers, which suggests that the inhabitants were buying in joints of meat. Scapulae are poorly represented in the sheep and pig assemblages from high-status sites, but there are more mandibles and tibiae, and fewer limb bones than observed in the cattle assemblage. Also of note are the high numbers of sheep and pig phalanges, yet low numbers of mandibles from ecclesiastical sites, and the apparent movement of sheep and, to a lesser extent, pig metapodia into burhs, industrial sites and Danish towns, possibly with their skins.

In the Saxo-Norman phase, there is no discernible re-distribution of cattle carcass parts, although high-status sites again have the greatest quantities bones from the appendicular skeleton and fewest phalanges – implying that some of the meat consumed by the inhabitants was bought into high-status sites as joints of meat. Sheep and pig mandibles were recorded in highest numbers at rural sites, whose populations also consumed fewest of the best meatbearing bones. The elements least common on urban and high-status sites (mandibles, scapulae, pelves, metapodia and phalanges) were recorded in slightly higher proportions on the single rural site available for comparison, and it is tempting to suggest that this is where the primary butchery took place; however, one site does not make a trend.

Thus, in general, some evidence indicates the redistribution of carcass parts between sites. In the middle Saxon phase, this is only seen in the apparent preference for cheek-meats or tongue by the high-status population. Given the likely movement of animals 'on the hoof', and the provisioning of other parts of the head (i.e. horn cores) to wics, this suggests that these were bought in as a delicacy. It is also pertinent to note that there was a bias towards mandibles in deer assemblages at elite sites (Sykes, 2010: Figure 3). Much more varied and widespread redistribution is seen in the late Saxon phase, again consistent with the change in economic systems, allowing greater choices for the population.

Perhaps one of the most illuminating results of this thesis is the evidence for the controlled redistribution of raw materials from both rural and urban domestic sites to specialist craft

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workers. This is best illustrated in the movement of horn cores to wics, burhs and Danish towns, possibly with skins attached, to provide materials for tanning and horn working. However, there is also evidence from Hamwic for the deliberate provisioning of workshops with fresh limb bones, rather than those scavenged from general refuse (Driver, 1984: 403). This phenomenon is most clear-cut in the middle Saxon phase, indicating again the presence of a controlled collection and redistribution system, most likely based at estate centres. The redistribution appears less strict in the late Saxon phase, and horn cores are also recorded at high-status and ecclesiastical sites, indicating the widening sphere of output: a move to craft and industrial production to provide for emerging markets has been demonstrated at Flixborough, Lincolnshire (Loveluck, 2001: 96). A decline in the use of antler as a resource in the late Saxon phase suggests two things: firstly, that antler was deliberately provided to middle Saxon wics; and secondly that there was a decline in demand in the late Saxon phase. This may have been due to the increase in populations within the burhs and Danish towns in this phase, providing a ready source of bone for craft production (see Chapter 4.6.2).

The association between horse remains and industrial sites – especially those related to skin processing – reflects the differential treatment of food and non-food animals. Tanners or tawyers would be provided with skins from cattle and sheep, the rest of the carcass being used for food. Horses, though, are not eaten as commonly as the major domesticates, and it is likely that old animals were sent to tanners who removed the skins directly. Limb bones from horses were also distributed to bone-working sites in the middle Saxon phase (Driver, 1984: 399), presumably directly from the skin processor – thereby removing them from the archaeological record.

There is little evidence for a standardised butchery profession during the Saxon phase, although the identification of such is likely to be difficult as, "even today … the difference in standards of skill and variations in methods of cutting are considerable" (Rixson, 1989: 55). However, trends in butchery have been noted in earlier periods, although not universally (Maltby, 2010: 285). Specialist butchery, if present in the Saxon period would have begun in the urban context. However, no indication exists for specialist butchery in middle Saxon wics, where animals seem to have been butchered on a small-scale, ad hoc basis to supply an

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individual household or group of households with meat. The occasional find of a deposit of primary butchery waste does suggest that this activity was sometimes carried out on several animals at once, as with the deposit of young pig remains and primary waste from other animals from Aldwych, London (Blackmore, 2002: 291), perhaps the result of feasting, or a seasonal cull of pigs prior to winter. In the late Saxon burhs there is little direct evidence for specialist butchery deposits, although fewer head and foot bones were recorded from domestic sites within burhs implying that butchers did exist at this time.

One clear trend is the splitting of bones for marrow in the early and middle Saxon phase – a practice greatly reduced by the late Saxon phase, explained as a change in tastes (Sykes, 2007b: 88-89). However, given that this move coincides with the possible late Saxon drop-off in antler-working, possibly in connection with a preference for bone for object manufacture, implies a relationship between the two. Either marrow was less utilised because the long bones were sent to be worked, or a move away from consumption of marrow freed a greater number of bones for working, therefore reducing the emphasis on antler as a raw material.

7.5 Urbanisation

The basis of what is considered to be an urban site in this thesis has been the presence of a large population, the majority of which carry out non-agrarian work. But to what extent is this apparent in the archaeozoology of Saxon urban centres – wics and burhs?

The data presented from wic sites (Lundenwic and Hamwic) indicate that they were planned settlements with spatially distinct areas for higher status inhabitants – possibly merchants or aristocratic benefactors – situated centrally, with areas for the production of goods in more peripheral locations. The scale of this production is poorly understood from the small amount of available data; although large, specialised workshops are present in Hamwic, there is no such evidence at Lundenwic. The consistent incidence of small quantities of worked horn and bone offcuts in nearly all middle Saxon archaeozoological assemblages throughout both settlements indicates that small-scale craft production took place on a household level. Either way, the focus of wics as sites of manufacture and trade is supported by the animal bone data.

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Although there was greater variation in the siting of spatially distinct areas in burhs, there are, nonetheless, areas of high-status, domestic and specialist craft workers visible in the faunal remains. The existence of specialist butchers can also be inferred for the first time in the late Saxon phase, despite the lack of large deposits of primary butchery waste. Similarly, there is only evidence for small-scale craft working, although the data for the presence of skin processing or horn workers within burhs suggest that these sites were often situated towards the outskirts. These features of the urban economy, present for the first time in late Saxon burhs, become fully integral to the medieval urban landscape and a monetised economy: deposits of meat bearing bones defining domestic sites; the population buying their meat from specialist butchers; butchers in turn supplying skin workers and craftsmen with raw materials; and skin workers and craftsmen creating a market place for the trade in goods and food.

7.6 Cultural Differences

Is there evidence from the archaeozoological data to support the accepted view of an influx of new populations from Europe – the Angles, Saxons and Jutes in the early Saxon phase, and the Vikings in the late Saxon phase? Can differences relating to diet help understand the speed with which acculturation occurred?

7.6.1 Early Saxon Saxons

The *De Excidio*, composed by the monk Gildas in the 6th century describes the presence of Saxon mercenaries (from the Germanic countries) employed by the Romans to secure Britain in the absence of Roman political control, who later rebelled and took control of parts of eastern Britain (Dark, 2000: 35). A number of authors suggest that the extent of the Saxon control was limited to the eastern counties in the first instance, with later clashes being more successful so that by the 7th century they had taken control of England, running the Anglo-Saxon kingdoms and re-converting the pagan Britons to Christianity, from a power-base in Kent (Dark, 2000: 47; Snyder, 1998: 249-250).

While this *Adventus Saxonum* has been implied in the archaeozoological record through the predominance of pigs in the east, for example at West Stow, providing a 'starter package' for

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the newly arrived Saxons (Crabtree, 1989a: 210), no regional differences in the animal husbandry of early Saxon England have been observed in this synthesis. The proportions of pigs from West Stow are high (c.20-33%), and similar proportions have been observed at Botolphs, Bramber, Sussex (37%), Cadbury Congresbury, Somerset (44%) and Saxon County School, Shepperton, Surrey (31%), of which the majority of sites (i.e. West Stow, Botolphs and Saxon County School) are within the region likely to have been colonised by the Saxons.

7.6.2 Late Saxon Vikings

The high value, both in status and wealth, traditionally attributed to cattle in Viking culture may explain the significantly greater numbers of cattle observed within the Danelaw. It is well documented that the group of Vikings which colonised Iceland in the 870s successfully raised cattle, despite the poor quality of the land for arable production, which meant that the grain and fodder required to keep cattle herds had to be traded (Adalsteinsson, 1991: 285; Wickham, 1994: 135-136).

The move away from sheep towards cattle in the late Saxon Danelaw region is mirrored in an increase in sheep numbers in Wessex, where cattle had previously predominated in the middle Saxon phase. It is possible that this reflects a consolidation of Saxon cultural identities in the south and Danish in the north and east, the Saxons possibly trying to set themselves apart from the Vikings. Alternatively, a move towards non-intensive wool production in Wessex could also explain increased numbers of sheep.

Interestingly, although East Anglia formed part of the Danelaw, the preference for cattle is not evidenced as strongly as in the northern Danelaw. While there was a definite increase in cattle proportions and decrease in sheep observed in East Anglian assemblages, it was not to the extent of that in the north. The trend observed in the middle Saxon phase for what may be specialist farms continued into this phase, with isolated sites such as Harlington, London, containing predominantly old cattle, and Bury Road, Thetford, containing old sheep which suggests that the underlying trend for this region continued.

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The shift towards cattle production in the Danelaw has in fact been viewed by both Poole and Sykes as due to other factors, namely a slower uptake of the sheep-based farming that originated in the central midlands, with the predominance of cattle in the north a continuation of a previous regime (Poole, 2008: 105; Sykes, 2007b: 29). This can be discounted, because the move *away* from sheep only occurred in the late Saxon/ Viking phase, and although sheep do become slightly more common with time, it is not indicative of a widespread sheep-based economy. O'Connor, too, observes the predominance of cattle on urban sites within the Danelaw, but argues that this may be due to deliberate provisioning of urban sites, and may not be reflected in the rural data (1989a: 15).The evidence provided in this thesis does indicate that this is the case – that the Scandinavian influence in the Danelaw led to a deliberate increase in cattle on both rural and urban sites.

7.7 Summary

The use of archaeozoological data has been invaluable in the investigation of the provisioning of food to the population of Saxon England, in defining the status of that population, and in observing the complexity of the relationships between the two. Differences in species proportions and the redistribution of carcass parts between sites and whole regions have been used to illustrate the social and cultural status of the inhabitants. Changes in the economic and political structure of the Saxon way of life are reflected in the ways that sites are provisioned – ranging from the self-sufficient early Saxon farmers, to the redistribution of food received as tax, both to the secular elite, ecclesiastical and wic populations, and to the emergence of a commoditised market place at the close of the study period. Furthermore, the organised provisioning of raw materials to specialist craft-workers has also been implied – a trend that was vital for the move to an autonomous market.

7.8 Next Steps

Despite the significant progress made into the understanding of the Saxon foodways and way of life, there is considerable room for improvement and refinement in the directions for future research to take. The most important of these is the need for more data – a regrettable lack of

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good quality mortality and body part data exists, to the extent that some areas of the country are entirely without representation of these aspects of the animal economy. Therefore, the importance of Saxon sites for the national record requires emphasis. Compared to the vast databases of Roman and medieval animal bone reports, the proportion of Saxon sites is tiny, and so the publication of related animal bone reports is of the utmost priority.

Particular aspects of this research are in need of further investigation, and five of these have been identified as particularly pertinent:

- What was the role of former Roman towns in the early Saxon phase? The data indicate that they were inhabited by an elite, but the mechanics of their provisioning and even the intensity of their use is poorly understood.
- 2. Is the apparent inability of the Saxon population to continue the improvement of stock from the large Roman animals reflected in other areas of the agricultural economy? Were there aspects of animal husbandry and diet that continued in the Saxon period that reflect native or Roman methods?
- There is a tantalising glimpse of the links between Europe and England in the size of stock observed at sites in eastern England, which deserve better comparisons with Germanic and Scandinavian data.
- 4. The move to a market economy in the late Saxon phase was not instantaneous. It has been suggested that in the early years following the building of burhs, these sites were largely empty, with only a sparse population (Reynolds, pers. com.). Unfortunately, the dating of many sites available to this thesis was not precise enough to investigate this suggestion, but a re-investigation of sites from within burhs may allow more focused research to take place.
- 5. Some of the remarks into the nature of the economy of late Saxon burhs implied that this was a phase that saw the beginning of a market-based system that evolved into that of the medieval phase. Comparisons between the provisioning of food and raw materials to the inhabitants of burhs and medieval towns may be beneficial to understand the extent to which this was so.

6. When considering the origins of animals – both within the distribution network, and the introduction of new stock from elsewhere (including overseas), more accurate conclusions could be made by comparing the strontium and oxygen isotope signatures of bones to help understand where animals spent their early years.

Appendix A

Example of entries from the database

Appendix A

		(19/~) ,	Table Tools		sites : Database (Access 2000 file format) - Microsoft Access	Contraction in the local division of the loc						O X
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	± 15	52 Northampton rd, Brixworth	Reilly, 1995	Northamptonshi	120m OD. Sandy silt with gravel and clay. At top of gentle slope, incr	Rural Settlement	5th - 8th c	Early Saxon	Middle Saxon	129	50	
	± 15	53 Marefair, northampton a	Harman, 1979	Northamptonshi	clay and sand. Timber buildings, post holes.	Rural Settlement		Middle Saxon		193	176	1
	± 15	54 St Helen's Avenue, Benson	Hamilton-Dyer, 2004	Oxfordshire	49m OD, terrace gravel deposits nr r thames to west. 3 sfb's, 2 enclo	Rural Settlement	m6-7th	Early Saxon		227	147	
	± 15	55 Lincoln College, Oxford	Charles, 2003	Oxfordshire	65m OD, gravel terrace of the thames. Pits, timber building with clay	Urban Domestic	m-l 11th	Norman		218	385	
	± 15	56 Marefair, northampton b	Harman, 1979	Northamptonshi	clay and sand. Surfaces, post holes,	Burh		Late Saxon		140	122	4
	± 15	57 Wolverton Turn enclosure, stony	Sykes, 2007	Buckinghamshire	c.79m OD, near top of a ridge that slopes gently to s and sw towards	Rural Settlement	m5-9th	Early Saxon	Middle Saxon	211	335	1
	± 15	58 Pitstone, bucks	Hambleton, 2005	Buckinghamshire	c.120m OD, sloping to NE. Chalk. 4-6 Sfb's, rubbish and cess pits, re-i	Rural Settlement	5-7th	Early Saxon	Middle Saxon	105	103	
	± 15	59 Walton Lodge, Aylesbury	Sadler, 1989	Buckinghamshire	c.82m OD, limestone and sand, post holes, shallow features, gullies,	Rural Settlement	7-8th	Middle Saxon		142	175	
	± 16	60 Chicheley, Bucks	Jones, 1980	Buckinghamshire	c.70m OD, clay, situated above brook, part way up slope of chichele	Farmstead	L7-8th	Middle Saxon		70	106	
	± 16	61 Cadley rd, Collingbourne Ducis	Hamilton-Dyer, 2001	Wiltshire	135-129m OD, valley floor, 100m e of r Bourne. Chalk with a small a	Rural Settlement	e8th-10th	Middle Saxon		377	573	
	± 16	62 Market field, Steyning	O'Shea, 1993	Sussex	greensand, clay and loam. spur between two streams, draining to the	Farmstead	L9th-10th	Late Saxon		806	2159	4
e	± 16	63 Bishopstone, Sussex	Gebbels, 1977	Sussex	44-50m OD, on south facing slope of rookery hill. Chalk, and patches	Religious Rural	5th-6th	Early Saxon		35	55	
ar	± 16	64 Aelfric's Abbey, Eynsham a	Ayres et al, 2003	Oxfordshire	calcareous gravel terrace on clay,c.66m OD between confluence of	Rural Settlement	L5-m/m7th	Early Saxon		230	291	. 1
2	± 16	65 Aelfric's Abbey, Eynsham b	Ayres et al, 2003	Oxfordshire	calcareous gravel terrace on clay,c.66m OD between confluence of	Religious Rural	M/L7-l9th	Middle Saxon		385	1039	4
Ei.	± 16	66 Aelfric's Abbey, Eynsham c	Ayres et al, 2003	Oxfordshire	calcareous gravel terrace on clay,c.66m OD between confluence of	Religious Rural	10-11th	Late Saxon		403	600	3
Jat	± 16	67 Aelfric's Abbey, Eynsham d	Ayres et al, 2003	Oxfordshire	calcareous gravel terrace on clay,c.66m OD between confluence of	Religious Rural	e11th	Late Saxon		260	322	. 2
vio	± 16	68 Aelfric's Abbey, Eynsham e	Ayres et al, 2003	Oxfordshire	calcareous gravel terrace on clay,c.66m OD between confluence of	Religious Rural	1066-12th c	Norman		665	460	6
Na	± 16	69 26-42 Lower Bridge St, Chester	Morris, MG, 1985	Cheshire	sandstone, clay and sand. Re-use of earlier cellar, SFB, pits. Tanning	Industrial Urban	1000-1100	Late Saxon	Norman	66	26	1
	± 17	70 Church Lane, Canterbury	King, 1982	Kent	Pits, 1st cutting of streets within the roman walls	U <mark>r</mark> ban Domestic	7-10th	Middle Saxon		64	66	
	± 17	71 Canterbury Lane, Canterbury	Marples, 1983	Kent	occupation layer on gravel and cobble surface over dark earth.	Urban Domestic	850-950	Late Saxon		99	63	
	± 17	72 Canterbury Castle, Canterbury	King, 1982	Kent	rubbish pits	Urban Domestic	1000-1080	Late Saxon	Norman	78	91	
	± 17	73 Canterbury Cathedral, Canterbur	Driver, 1990	Kent	surface / midden beneath cobble surface and from cobbled surfaces	Religious Urban	1050-1150	Norman		1560	996	5
	± 17	74 North Manor, Wharram	Richardson, 2004	Yorkshire	chalk and clay, on terrace on bank of stream and plateau on w side (Rural Settlement	5-9th	Early Saxon	Middle Saxon	82	148	1
	± 17	75 Mucking	Done, 1993	Essex	gravel terrace above Thames estuary. 100ft OD. 53 Post hole buildin	Hamlet	m5th-8th	Early Saxon	Middle Saxon	1520	333	3
	± 17	76 The Orchard, Walton Rd, Aylesbu	Hamilton-Dyer, 2004	Oxfordshire	84m OD, ridge running sw-ne. Clay on limestone. Halls, sfb's.	Rural Settlement	6-8th	Middle Saxon		195	214	1
	± 17	77 Site 39, Wharram	Stevens, 1992	Yorkshire	clay with flints. Sfb	Rural Settlement		Middle Saxon		182	161	
	± 17	78 Sites 94 and 95, Wharram	Pinter-Bellows, 1992	Yorkshire	clay with flints. Backfilling of sfb, pit and midden creation	Rural Settlement	8th	Middle Saxon		280	365	
	± 17	79 Crook Street, Chester	Cartledge, 1994	Cheshire	sandstone. Within roman town. Timber buildings, pits, post holes	Burh	10-11th	Late Saxon		391	52	1
	± 18	80 Goss Street, Chester	Cartledge, 1994	Cheshire	sandstone. Within roman town. Robbing and demolition of roman b	Burh	10-11th	Late Saxon		303	41	. 1
		91 Huntaria Malk Chantar	Castladas 1004	Chashira	andstana Mithin comentaria Daving (nech so used comen stand) .	Ducels	10 11+6	Lata Cavan		224	22	
Datash	eet View	1 13 01 343 K NO FRE									Num Lock	D A K

Figure A1.1: Screen shot of the database used to record animal bone data from Saxon site reports - 1

Appendix A

		un - e> -) ₹	1.00		Table Tools		sites : Database (Acc	ess 2000 file form	nat) - Microsoft Acc	ess				_ 0 _	X
C	Н	ome Create	External Data	Database Tools	Datasheet										0
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-		NISP Pig N	IISP Horse	NISP Dog N	NISP Red Deer NISI	Roe Deer NISP Fall	ow Deer NISP Hare	NISP Rabbi	NISP Wild Pig	NISP Wild Mammals	Other Mammals	NISP Goose N	ISP Chicken NI	SP Duck NIS	SP 🗸 🔺
	Ŧ	16	22	0	1	0	0	0	0	0	0	0	2	0	
	Ŧ	130	22	0	1	0	0	0	0	0	0 cat	21	12	5	
	Ŧ	64	14	1	2	1	0	0	0	0	0	3	13	5	
	Ŧ	58	2	4	1	0	0	0	0	0	0	3	27	1	
	Ŧ	55	4	3	3	0	0	0	0	0	0	1	9	0	
	+	117	83	20	1	0	0	0	0	1	0 cat	6	33	0	
	Ŧ	39	8	0	0	0	0	1	0	0	2 deer	0	0	0	
	+	65	10	0	0	0	0	1	0	0	0	0	0	0	
	+	13	1	8	0	0	0	0	0	0	0	1	1	0	
	+	66	19	4	18	29	0	0	0	0	0 cat, badger	21	74	0	
	+	429	33	2	0	0	0	0	0	0	0 cat, deer present not	(0	0	0	
e	(+	24	3	0	1	1	0	0	0	0	0 cat,	3	6	0	
ar	Ŧ	121	20	5	5	7	0	2	0	0	0 cat	18	16	0	
2	Ŧ	434	16	3	7	12	0	1	0	0	0 cat	122	280	38	
<u>e</u> .	Ŧ	356	21	3	5	36	0	0	0	0	0 cat	22	54	10	
P	Ŧ	261	6	0	4	47	0	8	0	0	0 cat	11	29	9	
-	Ŧ	675	12	2	8	41	0	20	1	0	0 cat	30	113	9	
Na	+	27	2	0	0	0	0	0	0	0	3 deer	0	0	0	
	Ŧ	30	2	5	0	7	0	0	0	0	0	0	0	0	
	Ŧ	46	0	0	9	1	0	0	0	0	0	1	10	0	
	+	65	22	6	0	0	0	0	0	0	0	0	0	0	
	+	518	14	17	1	17	0	0	0	0	2 cat, cetacean	6	50	7	
	Ŧ	18	13	2	0	0	0	0	0	0	0	5	7	0	
	Ŧ	311	254	20	79	0	0	0	0	0	0 cat	0	0	0	
	Ŧ	105	5	5	4	0	0	6	0	0	0 fowl, goose, duck, wa	0	0	0	
	Ŧ	42	5	0	0	0	0	0	0	0	0	5	8	0	
	Ŧ	66	14	4	0	0	0	0	6	0	0	8	12	0	
	+	123	1	1	2	1	0	0	0	0	0 cat	1	14	0	
	Ŧ	172	6	8	6	0	0	0	0	0	0 cat	2	14	2	
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Figure A1.1 continued: Screen shot of the database used to record animal bone data from Saxon site reports - 2

Appendix A

		P2 -) =	Table	Tools		sites : Data	base (Acces	s 2000 file	format)	Microsoft Access	
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	Ŧ	0	0		y, not included	1 - 🔳 -	1				
	+	5	2 thrush, duck		nr	1				birds by bramwell	
	+	5	0		nr	1					
	+	1	2 Golden plover	herring, eel, cod	y, not included	1					
	Ŧ	0	0		nr	1				birds by bramwell	
	Ŧ	0	2 corvid		y, included	1	1			horse includes 2 partially compl	
	Ŧ	0	0 chicken and goose pre	2	y, included						
		0	0 chicken and goose pre	2	nr	1					
	Ŧ	0	0		n						
	+	0	0		y, included	1	1	1	1		
	Ŧ	0	0 chicken, goose, pigeor	r	y, included						
e	Ŧ	0	0	eel, whiting	nr	1				fish by Jones	
an	Ŧ	0	0		y, not inc	1	V		1		
-	Ŧ	38	39 corvid, crane, buzzard	, ray, eel, pike, bullrout, per	y, not inc	1	1		1		
io	Ŧ	10	0 corvid, crane, kite/spa	a eel, pike	y, not inc	1	1		1		
Jat	+	9	18 lapwing, snipe, woodd	pike, tench, gadid, perch	y, not inc	1	1		1		
Vi C	Ŧ	9	31 duck, goshawk, crane,	elasmobranch, ray, roker,	y, not inc	1	1		1		
Na	Ŧ	0	0		nr						
	Ŧ	0	0		nr						
	Ŧ	0	0	yes, not specified	nr	1		1	1		
	Ŧ	0	0 present but not quant	i	nr	1					
	+	7	6 sparrowhawk	none	n	1	~	~	1		
	Ŧ	0	0		n	1	1	1	1		
	+	0	0 fowl, goose, plover pr	flatfish	nr	1		1			
	+	0	0		nr						
	Ŧ	0	0		nr				11		
	Ŧ	0	0		nr	1	1	1			
	+	0	0		nr		1	~			
	+	2	2 woodcock, pigeon		nr		V	V			
ŀ	Record: 14	(1 of 349) N	No Filter Search	4		a lineal	THE REAL	(INSE)	. Junit		
Datash			Search					17			Number Carl M

Figure A1.1 continued: Screen shot of the database used to record animal bone data from Saxon site reports - 3

Appendix A

P-)-	2.			Table	e roois			Sites	, Dutubu	Je viece	.55 2000	me tonna	U WII	TOSOILACC	635						A DESCRIPTION OF				
2	Home Create External D	ata Da	tabase Tools	s Dat	asheet																				
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	1 Melbourne St, Southam	% alive	94	94	82	60	45	17	0	0	0	95	95	81	63	35	9	0	0	0	98	98	80	40	27
	2 The Castle, Barnard Cast	n	0	0	0					0	0	0	3	0	10	11	14	10	1	0	0	0	0	0	0
	3 Dragon Hall, Norwich a	n	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0
	4 Dragon Hall, Norwich b	n	0	0	0	0	0	0	0	0	0	0	0	0	5	6	3	7	2	0	0	0	0	0	0
	5 West Stow a	n	35	5	44	78	26	32	20	27	26	24	62	480	235	117	148	102	50	36	13	9	5	9	18
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	7 Castle Mall, Norwich b	n	0	0	0	3	3	1	4	1	5	0	2	2	5	8	3	6	0	1	0	0	2	9	3
	8 Castle Mall, Norwich b	n	0	0	0	0	0	0	0	0	0	3	3	3	7	9	5	0	1	0	0	0	0	0	0
	9 Brandon Rd, Thetford a	n	0	0	1	11	1	2	4	2	14	0	2	2	16	15	15	11	2	0		0	8	11	
	10 Brandon Rd, Thetford b	n	0	0	2	4	3	6	3	3	4	0	1	1	20	18	18	21	5	1		0	9	17	
	11 Flaxengate, Lincoln a	n	0		0			0	2	9		0		1	1		8	12			0		2	0	
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	15 Citizen house, Bath b	n	0	0	0	0	0	0	0	0	0	3	3	3	7	8	5	0	1	0	0	0	0	0	0
	16 St Peters Rd, Northampt	n	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1	1	3	1		2	1	0	0
	17 St Peters Rd, Northampt	n	1	1	1	1	5	3	7	14	0	0	2	0	1	8	4	13	18	2		2	4	5	3
	18 Faccombe netherton a	n	0	0	0	1	0	1	1	0	0	0	2	4	2	5	1	4	0	0		1	3	9	
	19 Faccombe netherton b	n	0	0	1	1	2	0	5	2	4	1	1	2	0	4	2	1	0	0		9	2	7	
	20 Melford Meadows, Bret	n	0	0	2	2	2	2	2	2	0	0	1	0	3	3	0	3	0	0	0	0	0	0	0
	21 Redcastle Furze, Thetfor	n	1	0	2	1	0	1	2	0	0	0	3	12	12	1	12	5	0	0	0	0	0	0	0
	22 Redcastle Furze, Thetfor	n	0	0	0	1	0	0	1	0	0	0	2	3	15	8	18	20	12	0	0	1	0	5	0
	23 Hartigans, Milton Keyne	n	0	0	0	5	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	24 Flixborough a	n	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	25 Flixborough b	n	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	26 Billingsgate triangle	n	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	27 Bonners Lane , Leicester	n	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	28 Hartlepool Monastery	n	0	0	0	0	0	0	0	0	0	6	5	11	4	4	11	9	1	0	0	0	0	0	0
	29 Copeshill rd, Lower Slau	n	0	0	0	4	0	2	1	0	0	0	0	4	0	1	1	0	0	0	0	0	0	0	0
	30 Sherborne House, Lechl	n	0	0	5	6	0	0	3	0	0	0	3	4	1	1	2	3	0	0	0	0	0	0	1
	31 Anderson's road, Southa	n	0	0	0	2	6	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	32 Old Down Farm, Andove	n	0	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	33 Nettleton Top	n	0	0	0	2	1	0	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0
	34 St James' Square, North	n	0	0	2	2	0	0	1	3	0	0	0	1	1	3	2	6	0	0	0	0	0	1	0
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Figure A1.2: Screen shot of the database used to record ageing data from Saxon site reports

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B7 Guildford Castle MNI 1 2 2 1 1 3 0 1 1 4 B8 Trowbridge a NISP 0	86 Fishergate, York a	MNE	83	120	24	79	52	165	131	126	173	132	166	211	34	61	21	32 ?	33	83
88 Trowbridge b NISP 0	87 Guildford Castle	MNI	1	2	2	1	1	3	3	2	3	4	5	1	1	3	0	1	1	4
Iss NISP 0 <td>88 Trowbridge a</td> <td>NISP</td> <td>0</td>	88 Trowbridge a	NISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90 Withon, Salisbury a MNE 0 4 2 1 9 5 12 8 5 7 10 4 5 17 2 1 8 8 91 Withon, Salisbury b MNE 7 7 2 1 5 7 8 5 5 8 10 7 2 1 9 10 92 Lincoln a MNI 37 70 10 4 6 8 11 13 2 2 18 9 6 9 8 2 4 4 11 13 13 5 5 6 4 94 Lot's Hole MNE 44 107 17 33 68 94 78 62 55 73 76 36 6 75 9 3 30 2 26 95 Lake End Road MNE 45 152 16 18 105 66 62 98 66 77 41 18 27 2 3 31 10 12 <th< td=""><td>89 Trowbridge b</td><td>NISP</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></th<>	89 Trowbridge b	NISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91 Wilton, Salisbury b MNE 7 7 2 1 5 7 8 5 5 8 10 7 25 8 1 9 10 92 Luncoina MNI 37 70 0 12 17 29 30 11 17 30 2 2 8 1 3 13 5 5 6 4 93 St Aldates, Oxford MNE 4 8 3 4 8 9 8 4 6 8 11 3 2 6 2 0 5 6 96 Harrold, Bedfordshre NISP 8 41 2 40 27 23 27 20 21 60 6 7 8 4 2 3 30 14 66 77 8 4 2 9 9 44 11 17 23 20 66 7 8 4 2 9 44 1 17 23 10 10 1 17 13	90 Wilton, Salisbury a	MNE	0	4	2	1	9	5	12	8	5	7	10	4	5	17	2	1	8	8
92 Lincoln a NNI 37 70 10 12 17 29 30 11 17 30 2 2 18 1 10 8 93 St Aldates, Oxford NISP 3 15 10 4 5 6 9 8 2 4 4 1 33 13 53 5 6 94 Lot's Hole MNE 44 8 3 46 9 8 62 73 76 36 66 75 9 3 22 26 96 Harrold, Bedfordshire NISP 8 84 10 12 4 8 66 73 76 36 66 75 9 3 22 26 97 Harston Mill, Cambridgeshire - NISP 3 10 12 4 8 7 8 67 48 4 2 10 0 11 3 11 98 Lev Kitley NISP 3 10 12 4 8 7 18 67 48 4 2	91 Wilton, Salisbury b	MNE	7	7	2	1	5	7	8	5	5	5	8	10	7	25	8	1	9	10
93 St Aldates, Oxford NISP 3 15 10 4 5 6 9 8 2 4 4 1 3 13 5 5 6 4 94 Lot's Hole MNE 44 8 3 4 8 9 8 62 55 73 76 66 67 9 3 22 22 96 Harrold, Bedfordshire NISP 8 84 12 2 40 27 23 27 20 21 20 13 6 27 23 27 20 21 20 13 6 27 23 27 20 21 20 13 6 77 3 16 18 16 66 67 68 67 48 4 27 30 01 11 17 3 16 31 31 30 14 46 7 88 67 48 67 48 42 27 44 1 13 13 10 12 14 43	92 Lincoln a	MNI	37	70			12	17	29	30	11	17	30	2	2	18		1	10	8
94 Lot's Hole MNE 4 8 3 4 8 9 8 4 6 8 11 3 2 6 2 0 5 6 95 Lake End Road MNE 44 107 17 33 68 94 78 62 55 73 76 36 67 79 9 3 22 25 96 Harrold, Bedfordshire NISP 8 8 12 2 40 27 23 27 20 13 20 13 18 273 30 14 66 77 96 Harrold, Bedfordshire NISP 45 10 12 4 8 8 7 8 66 7 8 4 2 10 0 1 3 11 13 11 14 14 14 10 11 13 11 11 2 3 61 3 14 14 14 14 14 14 14 14 14 14 14 14 14	93 St Aldates, Oxford	NISP	3	15	10	4	5	6	9	8	2	4	4	1	3	13	5	5	6	4
95 Lake End Road MNE 44 107 17 33 68 94 78 62 55 73 76 96 66 75 9 3 22 26 96 Harrold, Bedfordshire NISP 8 84 101 106 66 62 98 69 51 66 77 8 66 77 8 67 8 6 77 8 6 77 8 6 77 8 6 77 8 67 8 6 77 8 6 77 8 6 77 8 4 118 27 73 74 7	94 Lot's Hole	MNE	4	8	3	4	8	9	8	4	6	8	11	3	2	6	2	0	5	6
96 Harrold, Bedfordshire NISP 8 84 12 2 40 27 23 27 20 21 20 13 6 27 2 3 19 9 97 Harston Mill, Cambridgeshire & NISP 45 152 16 18 00 66 62 98 69 51 67 41 18 273 30 14 66 77 98 Kettleby NISP 50 077 314 12 63 86 32 50 44 4 2 9 44 41 1 17 22 100 Gosberton NISP 1 11 2 3 6 4 3 4 4 2 7 4 1 4 4 2 0 3 3 3 3 3 3 4 9 6 7 12 7 11 5 2 4 4 2 0 3 3 3 3 3 3 3 3	95 Lake End Road	MNE	44	107	17	33	68	94	78	62	55	73	76	36	6	75	9	3 2	22	26
97 Harston Mill, Cambridgeshire k NISP 45 152 16 18 105 66 62 98 69 51 67 41 18 273 30 14 66 77 98 Harston Mill, Cambridgeshire k NISP 3 10 12 4 8 8 7 8 67 8 4 2 10 0 1 3 11 99 Eye Kettleby NISP 50 77 314 12 63 86 32 50 42 67 48 4 2 9 44 42 0 1 3 11 99 Eye Kettleby NISP 1 11 2 3 6 4 3 4 4 2 6 1 4 2 0 1 102 102 103 11 11 2 3 1 11 2 1 13 6 103 11 11 13 13 14 14 14 14 14 13 13	96 Harrold, Bedfordshire	NISP	8	84	12	2	40	27	23	27	20	21	20	13	6	27	2	3 1	19	9
98 Harston Mill, Cambridgeshiret NISP 3 10 12 4 8 8 7 8 6 7 8 4 2 10 0 1 3 11 99 Eye Kettleby NISP 50 77 314 12 63 86 32 50 42 67 48 22 9 44 41 1 17 22 100 Gosberton NISP 1 12 63 64 3 4 42 7 4 1 4 2 0 2 2 2 101 Hay Green, Terrington St. Clem NISP 1 9 3 1 9 6 7 12 7 11 5 2 44 7 2 6 13 102 Stope Gardens, Winchester a MNE 40 12 7 3 12 14 21 9 3 23 24 <td< td=""><td>97 Harston Mill, Cambridgeshi</td><td>e a NISP</td><td>45</td><td>152</td><td>16</td><td>18</td><td>105</td><td>66</td><td>62</td><td>98</td><td>69</td><td>51</td><td>67</td><td>41</td><td>18</td><td>273</td><td>30</td><td>14 f</td><td>66</td><td>77</td></td<>	97 Harston Mill, Cambridgeshi	e a NISP	45	152	16	18	105	66	62	98	69	51	67	41	18	273	30	14 f	66	77
99 Eye Kettleby NISP 50 77 314 12 63 86 32 50 42 67 48 22 9 44 41 1 17 22 100 Gosberton NISP 1 11 2 3 6 4 3 4 4 2 7 4 1 4 2 0 2 2 101 Hay Green, Terrington St. Clem NISP 0 5 10 2 3 1 9 3 7 1 5 6 1 20 9 2 7 5 102 Rose Hall Farm, Walpole St. An NISP 2 13 9 3 4 9 6 7 11 5 2 44 7 2 6 104 103 Staple Gardens, Winchester MNE MNE 3 1 7 3 45 58 34 29 44 36 10 53 51 31 86 4	98 Harston Mill, Cambridgeshi	e t NISP	3	10	12	4	8	8	7	8	6	7	8	4	2	10	0	1	3	11
100 Gosberton NISP 1 11 2 3 6 4 3 4 4 2 7 4 1 4 2 0 2 2 101 Hay Green, Terrington St. Clem NISP 0 5 100 2 3 1 9 3 7 1 5 6 1 20 9 2 7 5 102 Rose Hall Farm, Walpole St. An NISP 2 13 9 3 4 9 6 7 11 5 6 1 20 9 2 7 5 103 Staple Gardens, Winchestra MNE MNE 40 22 37 67 40 52 60 41 34 45 53 15 51 13 66 104 104 Staple Gardens, Winchestra MNE MNE 8 1 7 3 12 14 22 2 64 15 7 11 8 17 106 50 5 11 4 2 2 3 30 6 25 25	99 Eye Kettleby	NISP	50	77	314	12	63	86	32	50	42	67	48	22	9	44	41	1 1	17	22
101 Hay Green, Terrington St. Clem NISP 0 5 100 2 3 1 9 3 7 1 5 6 1 20 9 2 7 5 102 Rose Hall Farm, Walpole St. An NISP 2 13 9 3 4 9 6 7 11 5 2 44 7 2 6 13 103 Staple Gardens, Winchester a MNE 40 22 37 67 40 52 60 41 34 45 53 12 69 94 69 133 66 104 104 Staple Gardens, Winchester a MNE 35 11 31 57 33 45 58 34 29 44 36 10 53 51 31 86 47 69 105 Worcester Cathedral MNE 8 11 7 31 12 14 21 9 3 2 2 3 5 4 5 7 11 4 8 <t< td=""><td>100 Gosberton</td><td>NISP</td><td>1</td><td>11</td><td>2</td><td>3</td><td>6</td><td>4</td><td>3</td><td>4</td><td>4</td><td>2</td><td>7</td><td>4</td><td>1</td><td>4</td><td>2</td><td>0</td><td>2</td><td>2</td></t<>	100 Gosberton	NISP	1	11	2	3	6	4	3	4	4	2	7	4	1	4	2	0	2	2
102 Rose Hall Farm, Walpole St. An NISP 2 13 9 3 4 9 6 7 12 7 11 5 2 44 7 2 6 13 103 Staple Gardens, Winchester a MNE 40 22 37 67 40 52 60 41 34 45 53 12 69 94 69 133 66 104 104 Staple Gardens, Winchester b MNE 35 11 31 57 33 45 58 34 29 44 36 10 53 51 31 86 47 69 105 Worcester Cathedral MNE 8 1 7 3 12 14 21 9 3 23 28 5 4 5 7 11 8 17 106 Stonea grange, Cambridgeshin MNE 4 3 32 2 38 38 89 - 52 127 108 School lane, Fulbourn MNE 4 <td>101 Hay Green, Terrington St. C</td> <td>em NISP</td> <td>0</td> <td>5</td> <td>10</td> <td>2</td> <td>3</td> <td>1</td> <td>9</td> <td>3</td> <td>7</td> <td>1</td> <td>5</td> <td>6</td> <td>1</td> <td>20</td> <td>9</td> <td>2</td> <td>7</td> <td>5</td>	101 Hay Green, Terrington St. C	em NISP	0	5	10	2	3	1	9	3	7	1	5	6	1	20	9	2	7	5
103 Staple Gardens, Winchestera MNE 40 22 37 67 40 52 60 41 34 45 53 12 69 94 69 133 66 104 104 Staple Gardens, Winchester b MNE 35 11 31 57 33 45 58 34 29 44 36 10 53 51 31 86 47 69 105 Worcester Cathedral MNE 8 1 7 3 12 14 21 9 3 23 28 5 4 5 7 11 8 17 106 Stonea grange, Cambridgeshirt MNE 4 3 3 2 2 3 5 11 0 2 127 107 Bishopstone, Seaford MNE 22 35 20 33 30 66 225 29 38 38 89 - 52 127 108 School lane, Fulbourn MNE 0 2 1	102 Rose Hall Farm, Walpole St.	An NISP	2	13	9	3	4	9	6	7	12	7	11	5	2	44	7	2	6	13
104 Staple Gardens, Winchester b MNE 35 11 31 57 33 45 58 34 29 44 36 10 53 51 31 86 47 69 105 Worcester Cathedral MNE 8 1 7 3 12 14 21 9 3 23 28 5 4 5 7 11 8 17 106 Stonea grange, Cambridgeshir, MNE 4 4 3 3 2 2 3 5 4 5 7 11 8 17 106 Stonea grange, Cambridgeshir, MNE 4 4 3 3 6 25 25 29 38 38 89 6 52 127 107 Bishopstone, Seaford MNE 4 1 2 0 1 2 1 1 3 2 28 38 88 89 0 1 4 14 14 14 14 14 14 14 14 14 14 14 14 14 <t< td=""><td>103 Staple Gardens, Winchester</td><td>a MNE</td><td>40</td><td>22</td><td>37</td><td>67</td><td>40</td><td>52</td><td>60</td><td>41</td><td>34</td><td>45</td><td>53</td><td>12</td><td>69</td><td>94</td><td>69 1</td><td>.33 (</td><td>66 J</td><td>104</td></t<>	103 Staple Gardens, Winchester	a MNE	40	22	37	67	40	52	60	41	34	45	53	12	69	94	69 1	.33 (66 J	104
105 Worcester Cathedral MNE 8 1 7 3 12 14 21 9 3 23 28 5 4 5 7 11 8 17 106 Stonea grange, Cambridgeshir/ MNE 4 4 3 3 2 2 3 5 11 0 4 8 107 Bishopstone, Seaford MNE 22 35 20 33 30 6 25 25 29 38 38 89 0 55 127 10<	104 Staple Gardens, Winchester	b MNE	35	11	31	57	33	45	58	34	29	44	36	10	53	51	31	86 2	47	69
106 Stonea grange, Cambridgeshir, MNE 4 4 3 3 2 2 3 5 11 4 4 8 107 Bishopstone, Seaford MNE 22 35 20 33 30 6 25 25 29 38 38 89 5 5 10	105 Worcester Cathedral	MNE	8	1	7	3	12	14	21	9	3	23	28	5	4	5	7	11	8	17
107 Bishopstone, Seaford MNE 22 35 20 33 30 6 25 25 29 38 38 89 52 127 108 School lane, Fulbourn MNE 4 1 2 2 0 1 2 1 1 3 2 2 1 0 2 0 1 4 109 Kingswell Stand Woolmonger MNE 0 2 1 4 2 2 2 0 2 0 1 4 109 Kingswell Stand Woolmonger MNE 0 2 1 4 2 2 2 0 2 1 0 2 0 1 4 109 Kingswell Stand Woolmonger MNE 0 2 1 4 2 2 2 0 2 13 7 12 5 3 110 Brandon NISP 176 796 578 241 366 521 528 737 561 581 504 416 321 204 93 622 <td< td=""><td>106 Stonea grange, Cambridges</td><td>nire MNE</td><td></td><td>4</td><td></td><td></td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>3</td><td>5</td><td></td><td></td><td>11</td><td></td><td></td><td>4</td><td>8</td></td<>	106 Stonea grange, Cambridges	nire MNE		4			4	3	3	2	2	3	5			11			4	8
108 School lane, Fulbourn MNE 4 1 2 2 0 1 2 1 1 3 2 2 1 0 2 0 1 4 109 Kingswell St and Woolmonger MNE 0 2 1 4 2 2 2 5 1 2 0 2 1 1 4 109 Kingswell St and Woolmonger MNE 0 2 1 4 2 2 2 5 1 2 0 2 13 7 12 5 3 110 Brandon NISP 176 796 578 241 366 521 528 737 561 581 504 416 321 204 93 622 92 1756 1111 Western Suburb, Winchestera NISP 91 158 196 321 128 78 77 124 61 77 65 67 47 141 115 252 106 60	107 Bishopstone, Seaford	MNE		22	35		20	33	30	6	25	25	29	38	38	89		5	52 1	127
109 Kingswell St and Woolmonger MNE 0 2 1 4 2 2 2 5 1 2 2 0 2 13 7 12 5 3 110 Brandon NISP 176 796 578 241 366 521 528 737 561 581 504 416 321 2064 973 662 925 1756 111 Western Suburb, Winchester a NISP 91 158 196 321 128 78 77 124 61 77 65 67 47 141 115 252 106 60	108 School lane, Fulbourn	MNE	4	1	2	2	0	1	2	1	1	3	2	2	1	0	2	0	1	4
110 Brandon NISP 176 796 578 241 366 521 528 737 561 581 504 416 321 2064 973 622 925 1756 111 Western Suburb, Winchester a NISP 91 158 196 321 128 78 77 124 61 77 65 67 47 141 115 252 106 60	109 Kingswell St and Woolmong	er MNE	0	2	1	4	2	2	2	5	1	2	2	0	2	13	7	12	5	3
111 Western Suburb, Winchester a NISP 91 158 196 321 128 78 77 124 61 77 65 67 47 141 115 252 106 60	110 Brandon	NISP	176	796	578	241	366	521	528	737	561	581	504	416	321 20	064 5	73 6	22 92	25 17	756
	111 Western Suburb, Wincheste	ra NISP	91	158	196	321	128	78	77	124	61	77	65	67	47	141 1	15 2	.52 10	06	60

Figure A1.3: Screen shot of the database used to record carcass parts data from Saxon site reports

Appendix B

How to read a triplot

Take readings so that a line drawn from the point to the corresponding proportion of each species meets the axis parallel to the tick marks:



Thus, point A represents an assemblage comprising approximately 60% cattle, 30% pig and 10% sheep.



Appendix C

Species Representation from all sites

*NISP= cattle, sheep pig total; all species proportions are given as a % of the total NISP

Early Saxon Sites	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
		2620	25.2	52.0	40.7	Deer	Deer	0.1	0.4	0.1	0.1	Bird
Barnsley Park	High Status Rural	3630 8255	35.3 58.0	52.0	35.0	0.2	0.2	0.1	0.4	0.1	0.1	0.3
Somerset		0255	50.0	7.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yeavering	High Status Rural	933	97.7	1.5	0.8	0.0	0.0	0.1	0.0	0.0	0.0	0.6
Upwich, Droitwich	Industrial Rural	286	19.6	74.1	6.3	4.5	0.0	0.0	0.0	0.0	0.0	0.0
Bishopstone, Sussex	Religious Rural	114	30.7	48.2	21.1	0.9	0.9	0.0	5.3	2.6	0.0	0.0
Bonners La, Leicester	Roman Town	175	44.0	34.3	21.7	0.6	0.0	0.0	0.6	1.1	0.0	1.7
Viroconium, Wroxeter a	Roman Town	2319	65.0	17.2	17.7	0.8	0.2	0.2	1.8	0.0	0.0	1.6
Viroconium, Wroxeter b	Roman Town	4057	54.7	19.8	25.5	1.9	0.4	0.4	2.6	0.0	0.2	1.9
Viroconium, Wroxeter d	Roman Town	2071 7261	58.4	19.0	22.0	1.0	0.5	0.5	4.5	0.0	0.1	2.7 1.4
Aelfric's Abbey, Eynsham	Rural Domestic	642	35.8	45.3	18.8	0.8	1.1	0.2	2.5	2.8	0.0	0.0
Audlett drive, Abingdon	Rural Domestic	173	52.6	38.7	8.7	0.0	0.0	0.0	1.2	0.6	0.6	0.0
Barton Court Farm,	Rural Domestic	1304	28.9	43.9	27.1	0.8	0.1	0.1	4.6	3.6	0.4	0.0
Abingdon												
Baynard's Castle	Rural Domestic	327	52.3	17.7	30.0	0.6	2.4	0.3	0.0	0.0	0.0	0.0
Botolphs, Bramber	Rural Domestic	266	42.5	20.7	36.8	3.8	0.0	0.0	0.8	0.4	0.0	0.0
Cadbury Congresbury	Rural Domestic	1050	46.7	9.0	44.3	0.7	0.3	0.0	0.0	0.0	0.0	0.3
Caythorpe pipeline, North	Rural Domestic	448	36.6	54.5	8.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Humberside												
Deansway, Worcester	Rural Domestic	461	47.5	33.8	18.7	0.2	0.0	0.0	2.4	0.0	0.0	0.2
Distillery site,	Rural Domestic	154	61.0	26.6	12.3	1.3	0.0	0.0	1.3	0.0	0.0	0.0
Hammersmith	Pural Domostic	2/0	51 <i>I</i>	38.6	10.0	0.0	0.0	0.0	1 2	0.4	0.0	0.0
water	Nulai Domestic	249	51.4	56.0	10.0	0.0	0.0	0.0	1.2	0.4	0.0	0.0
Eve Kettleby	Rural Domestic	2321	63.9	27.3	8.9	0.6	0.0	0.0	0.5	0.1	0.0	0.0
Fossets Farm, Southend	Rural Domestic	1351	80.1	6.2	13.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Harlington, London	Rural Domestic	255	58.4	25.5	16.1	0.0	0.0	0.0	3.1	0.4	0.0	0.0
Hartigans, Milton Keynes	Rural Domestic	195	85.6	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kings Meadow La, Higham	Rural Domestic	157	51.0	28.7	20.4	0.0	0.6	0.0	1.9	1.3	0.0	0.0
Ferrers Manston rd Pamagato	Pural Domostic	216	21.6	54.4	12.0	1 2	0.0	0.0	20	16	0.0	0.6
Market Lavington	Rural Domestic	1040	55.0	26.6	18.4	0.1	0.0	0.0	3.8 1.0	1.0	0.0	0.0
Wiltshire	Nurui Domestic	1040	55.0	20.0	10.4	0.1	0.2	0.0	1.0	1.1	0.1	0.0
Melford Meadows,	Rural Domestic	479	60.8	29.2	10.0	0.6	0.0	0.0	0.4	1.3	0.0	0.0
Brettenham												
Middleton Stoney	Rural Domestic	413	38.3	32.4	29.3	0.7	0.2	0.0	2.4	0.5	0.0	0.0
Mill st, Wantage	Rural Domestic	174	54.0	40.2	5.7	0.6	0.0	0.0	1.1	0.6	0.0	0.6
Mundham, Norfolk	Rural Domestic	528	60.6	16.3	23.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Nettleton Top	Rural Domestic	546	84.4	9.5	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Wintles	Rural Domestic	827	52.6	35.8	11.6	0.0	0.0	0.0	0.5	0.5	0.0	0.6
Old Down Farm, Andover	Rural Domestic	290	43.1	48.3	8.6 4 2	0.0	0.0	0.0	4.8	0.0	0.0	0.0
Orton Hall Farm	Rural Domestic	515	59.2	23.5	4.5 17 3	0.0	0.0	0.0 5.8	0.5	0.1	0.1	0.0
Pennyland, Milton Keynes	Rural Domestic	2394	48.9	37.3	13.8	0.0	0.0	0.1	2.8	1.0	0.0	0.2
Poundbury, Dorchester	Rural Domestic	3432	50.0	42.1	7.9	2.3	5.2	0.9	0.1	0.0	0.0	0.2
Quarrington, Lincs	Rural Domestic	1019	62.8	26.3	10.9	0.4	0.0	0.0	1.9	0.8	0.0	0.0
Redcastle Furze, Thetford	Rural Domestic	813	50.1	37.0	12.9	0.0	0.0	0.0	3.3	0.6	0.0	0.2
Saxon County School,	Rural Domestic	312	35.6	33.7	30.8	0.0	0.0	1.9	2.2	0.0	0.0	0.0
Shepperton a												
Sherborne House,	Rural Domestic	427	60.0	35.4	4.7	0.0	0.0	0.0	3.7	2.3	0.2	0.5
Lechlade	Rural Domostia	124	10.0	26.6	16.6	0.0	0.0	0.0	07	0.2	0.0	0.2
Spicer's warehouse,	Rural Domestic	454	40.8	50.0	10.0	0.0	0.0	0.0	0.7	0.2	0.0	0.2
Snong Hill Norfolk	Rural Domestic	731	86.7	10 3	3.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
St Helen's Avenue. Benson	Rural Domestic	438	51.8	33.6	14.6	0.5	0.2	0.0	3.0	0.7	1.1	0.0
-,												
Stonea grange,	Rural Domestic	807	40.3	50.8	8.9	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Cambridgeshire												
Walton vicarage,	Rural Domestic	1445	41.7	35.4	22.9	0.0	0.0	0.0	1.4	3.0	0.0	0.2
Aylesbury												
West Stow a	Rural Domestic	7701	33.0	45.2	21.9	0.1	0.1	0.1	1.5	1.4	0.0	0.4
West Stow b	Rural Domestic	17430	27.6	39.8	32.6	0.1	0.0	0.0	2.2	0.8	0.1	0.2
vvest Stow c	kurai Domestic	1558	33.6	46.7	19.8	0.1	0.1	0.0	1.1	1.9	0.9	0.3

Hartlepool

Brandon

Ducis

Market

Clement

Hartlepool Monastery

Wearmouth and Jarrow

Cadley rd, Collingbourne

Cresswell Field, Yarnton

Crow hall park, Downham

Hay Green, Terrington St.

Chicheley, Bucks

Cottam, Yorkshire

Friars Oak, Hassocks

Religious Rural

Religious Rural

Rural Domestic

Rural Domestic

Early- Middle	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
Harston Mill	<u> </u> !	4114	13 5	13.6	12.9	Deer 0.1	Deer 0.1	0.0	0.0	0.0	0.1	Bird
ndíston ivilli,	1	4114	45.5	45.0	12.5	0.1	0.1	0.0	0.0	0.0	0.1	0.3
Chanter House St Albans	Religious Rural	730	18.6	11 5	69.9	03	5.6	0.0	32	15	0.4	0.4
Ahhou	Neligious Natur	,	10.0	11.5	05.5	0.5	5.0	0.0	J.2	1.5	0	U
Portchester Castle	Roman Town	425	67.5	17.4	15.1	2.1	1.2	0.0	7.3	7.5	0.5	1.4
Abbots Worthy	Rural Domestic	1053	47.7	42.1	10.3	1.8	0.0	0.0	6.6	1.6	0.0	0.0
Harrold, Bedfordshire	Rural Domestic	906	53.3	28.0	18.7	1.5	0.2	0.0	1.4	0.9	0.0	0.0
Kings Meadow La. Higham	Rural Domestic	194	49.0	24.2	26.8	0.0	0.0	0.5	4.1	0.5	0.0	0.5
Forrers	Nului Domestic		1010	£	20.0	0.0		0.2	1	0.2	0.0	1
Langham Rd and	Rural Domestic	149	48.3	36.2	15.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burystead, Raunds									1			1
Mucking	Rural Domestic	2164	70.2	15.4	14.4	3.7	0.0	0.0	0.0	0.0	0.0	0.0
North Manor, Wharram	Rural Domestic	248	33.1	59.7	7.3	0.0	0.0	0.0	2.8	2.0	0.0	0.0
Northampton rd,	Rural Domestic	195	66.2	25.6	8.2	0.5	0.0	0.0	1.0	0.0	0.0	0.0
Brixworth									1			1
Pitstone. bucks	Rural Domestic	247	42.5	41.7	15.8	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Saxon palaces,	Rural Domestic	358	25.4	52.0	22.6	0.0	0.0	0.6	3.1	4.2	0.3	2.0
Northampton									1			1
Wilton. Salisbury	Rural Domestic	738	59.9	31.6	8.5	0.4	0.0	0.1	0.3	0.4	0.0	0.0
Wolverton Turn enclosure.	Rural Domestic	663	31.8	50.5	17.6	0.2	0.0	0.0	5.0	0.9	0.0	0.3
stony stratford	Nului Domestic		0110	00.0	17.5			0.0	1		0.0	1
Storry Strationa	1	'			1				1			
Bantham	Trading	921	43.4	36.6	20.0	0.5	0.1	0.1	3.7	0.0	0.1	0.2
Early-Late	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
						Deer	Deer		I			Bird
Beech House hotel,		3445	76.4	14.9	8.7	0.4	0.1	0.0	0.0	0.0	0.0	0.0
Dorchester on Thames	1	'	1		/				1			1
Worcester Cathedral	Religious Urban	1061	46.0	29.6	24.4	0.4	0.8	0.1	2.1	0.3	0.1	0.1
Sandtun, Kent	Rural Domestic	183	38.8	52.5	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maxey, Cambs	Rural Domestic	444	43.7	43.0	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Saxon Sites	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
	!	<u> </u>			!	Deer	Deer		 			Bird
Chalkpit Field North,	1	185	13.5	75.7	10.8	0.0	0.0	0.0	27.6	7.0	0.5	1.1
Sedgeford	1	!	1		/				1			1
Site 127 Bury St Edmunds		144	26.4	48.6	25.0	0.0	0.0	0.0	4.9	1.4	0.0	0.0
Hunter St School, Chester	Burh	957	77.6	5.7	16.6	0.7	0.0	0.0	0.3	0.0	0.0	0.0
21-24 Maiden La and 6-7	Domestic	227	72.7	11.9	15.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Exchange Court	·		L						 			L]
Caister-on-Sea, Great	High Status Rural	490	62.2	22.0	15.7	2.7	0.2	0.2	10.6	3.3	3.7	1.6
Yarmouth	1	!	1		/				1			1
Copeshill rd, Lower	High Status Rural	325	34.2	45.8	20.0	0.3	0.0	0.0	3.7	1.5	1.5	0.3
Slaughter	1	'	1		1				1			1
Flixborough	High Status Rural	18173	36.6	36.5	26.9	0.0	0.4	0.2	23.7	15.7	1.2	8.2
Middleton Stoney	High Status Rural	865	41.3	30.6	28.1	0.5	0.0	0.3	9.2	0.6	0.3	0.9
North Elmham Park	High Status Rural	7599	31.9	39.4	28.7	0.0	0.6	0.0	0.0	0.0	0.0	0.0
High St, Ramsbury	Industrial Rural	835	40.6	29.6	29.8	2.4	5.0	0.0	0.0	0.0	0.0	0.4
Blue bridge La, York	Industrial Urban	1011	63.0	27.4	9.6	0.0	0.1	0.0	17.5	6.2	0.2	1.2
SARC XIV, Southampton	Industrial Urban	8910	70.3	20.3	9.5	0.0	0.0	0.0	0.9	0.3	0.0	0.0
Aelfric's Abbey, Eynsham	Religious Rural	1858	20.7	55.9	23.4	0.4	0.6	0.1	15.1	6.6	2.0	2.1
Church Close, Hartlepool	Religious Rural	2138	28.7	55.0	16.4	0.0	0.0	0.0	11.3	12.2	0.0	1.7
Church walk (76),	Religious Rural	114	47.4	38.6	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

18.2

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52.2 19.3

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Middle Saxon Sites cont'd	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
						Deer	Deer					Bird
High St, Ramsbury	Rural Domestic	1107	40.4	27.7	31.9	1.4	2.8	0.0	0.0	0.0	0.0	0.1
Marefair, northampton	Rural Domestic	499	38.7	35.3	26.1	0.2	0.0	0.0	2.4	4.2	1.0	0.4
National Gallery Basement	Rural Domestic	1606	29.6	41.2	29.3	0.1	0.1	0.0	2.8	1.9	0.1	0.0
National Portrait Gallery	Rural Domestic	4189	38.7	44.9	16.3	0.0	0.0	0.0	2.1	2.6	0.0	0.0
Quarrington, Lincs	Rural Domestic	1022	57.8	36.0	6.2	0.0	0.0	0.1	1.5	0.6	0.0	0.0
Riverdene. Basingstoke	Rural Domestic	169	29.0	24.3	46.7	2.4	0.6	0.0	0.6	0.6	0.0	0.0
Rose Hall Farm, Walpole	Rural Domestic	320	45.0	48.8	6.3	0.0	0.0	0.0	1.9	1.9	0.3	0.0
St. Andrew												
Saxon palaces,	Rural Domestic	465	22.2	62.8	15.1	0.0	0.2	0.2	3.9	2.8	2.4	0.4
Northampton												
Sedgeford, Norfolk	Rural Domestic	684	29.1	62.9	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 39, Wharram	Rural Domestic	385	47.3	41.8	10.9	0.0	0.0	0.0	2.1	1.3	0.0	0.0
Sites 94 and 95, Wharram	Rural Domestic	711	39.4	51.3	9.3	0.0	0.0	0.0	1.7	1.1	0.0	0.0
St Peters Rd, Northampton	Rural Domestic	478	33.9	47.7	18.4	0.0	0.0	0.2	0.4	0.8	0.0	0.2
The Orchard, Walton Rd,	Rural Domestic	514	37.9	41.6	20.4	0.8	0.0	1.2	0.0	0.0	0.0	0.0
Aylesbury The south manor area	Rural Domestic	3354	3/1 0	563	8 8	0.1	0.0	0.1	11	03	0.0	0.0
Wharram		5554	54.5	50.5	0.0	0.1	0.0	0.1	1.1	0.5	0.0	0.0
The Treasury, Whitehall	Rural Domestic	137	41.6	39.4	19.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0
Walton Lodge. Avlesbury	Rural Domestic	382	37.2	45.8	17.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Wicken Bonhunt, Essex	Rural Domestic	29950	17.2	12.9	70.0	0.1	0.5	0.0	10.3	6.8	0.6	0.3
Worton, Yarnton	Rural Domestic	167	60.5	24.6	15.0	0.0	0.0	0.0	2.4	0.6	0.0	0.0
Yarnton all	Rural Domestic	542	56.8	28.8	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fishergate, York	Trading	13012	63.8	26.3	10.0	10.8	0.0	0.0	4.6	1.7	0.0	0.3
Lake End Rd	Trading	4100	51.4	17.2	31.4	0.2	0.4	0.0	4.8	1.6	1.6	0.9
Sandtun, West Hythe	Trading	251	36.3	43.4	20.3	0.0	0.0	0.0	12.4	5.2	0.0	10.4
Church La, Canterbury	Urban Domestic	160	40.0	41.3	18.8	0.0	4.4	0.0	0.0	0.0	0.0	0.0
Lot's Hole	Urban Domestic	385	50.9	28.8	20.3	0.0	0.0	0.0	2.6	1.0	0.3	0.5
21-24 Maiden La and 6-7	Wic	1409	50.7	15.7	33.6	0.5	0.0	0.0	1.3	0.0	0.0	0.0
Exchange Court												
Anderson's Rd,	Wic	618	83.0	10.4	6.6	0.0	0.0	0.0	0.2	0.2	0.0	0.0
Southampton												
Cook St, Southampton	Wic	4702	61.0	16.5	22.5	0.1	0.1	0.0	2.1	1.3	0.0	0.1
Friend's Provident,	Wic	3891	62.4	19.8	17.8	0.9	0.1	0.0	2.1	1.3	0.0	0.0
Southampton												
Ipswich 1974-88	Wic	10164	45.1	23.0	31.8	0.3	0.2	0.0	4.3	1.2	0.1	0.1
Ipswich	Wic	7734	44.1	30.4	25.5	0.1	0.1	0.0	5.1	2.3	0.2	0.2
James St, London	Wic	1684	55.5	13.8	30.7	0.7	0.0	0.0	0.6	0.2	0.0	0.0
Jubilee Hall, Covent	Wic	1544	54.6	21.8	23.6	0.4	0.1	0.0	1.6	0.9	0.0	0.1
Uvceum Theatre Eveter St	Wic	3681	673	173	15 /	0.4	0.0	0.0	0.5	0.5	0.0	0.0
Maiden La	Wic	5306	5/ 6	16.2	29.4	0.4	0.0	0.0	15	1.2	0.0	0.0
Melhourne St	Wic	45455	52.6	32.1	15.3	0.5	0.0	0.0	1.5	0.8	0.1	0.1
Southampton		13 133	52.0	52.1	10.0	0.2	0.0	0.0	1.0	0.0	0.0	0.1
National Gallery Extension	Wic	462	67.1	24.5	8.4	0.4	0.0	0.0	0.0	0.2	0.0	0.0
Peabody site	Wic	4878	47.0	23.0	30.1	0.4	0.0	0.0	1.2	1.5	0.0	0.1
Six Dials, Hamwic	Wic	100	54.0	32.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle-Late	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
Hereford City	Burh	2636	62 5	18.8	18 7	3.2	0.3	0.0	0.0	0.0	0.0	0.0
Portchester Castle	Burh	4055	47.7	32.1	20.1	3.7	3.1	0.0	0.0	0.0	0.0	0.0
Upwich. Droitwich	Industrial Rural	307	20.5	67.4	12.1	0.0	0.0	0.3	0.3	1.0	0.0	0.0
Church Close, Whissonsett	Rural Domestic	212	35.4	54.7	9.9	0.0	0.0	0.0	18.4	12.7	0.5	2.8
Eastgate, Beverley	Rural Domestic	385	60.8	27.0	12.2	0.0	0.5	0.0	1.8	1.0	0.3	0.0
*Yarnton all phases	Rural Domestic	660	55.9	30.3	13.8	0.0	0.0	0.0	1.2	2.1	0.0	0.0
Trowbridge	Rural Domestic	1475	48.7	28.1	23.2	0.7	1.3	0.0	1.4	0.5	0.0	0.3
Bennett's Works, Bedford	Urban Domestic	120	52.5	32.5	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle-Norman	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
Alma Rd, Romsey		273	60.4	29.7	9.9	0.0	0.0	0.0	1.5	1.5	0.7	ыrd 0.0

Late Saxon Sites	Site Type	NISP*	Cattle	Sheep	Pig	Red Deer	Roe Deer	Hare	Fowl	Goose	Duck	Wild Bird
Chalkpit Field North.		1969	29.5	49.5	21.0	0.1	0.9	0.0	4.2	1.4	0.3	1.2
Sedgeford		1000	2010	.5.0		0.1	0.0	0.0			0.0	
113-119 High st. Oxford	Burh	552	52.2	28.6	19.2	0.2	0.2	0.0	2.0	0.7	0.2	0.2
27. Jewry St. Winchester	Burh	314	44.9	36.6	18.5	0.0	0.6	0.0	6.4	0.0	0.3	0.0
Abbey Green. Chester	Burh	865	72.7	7.3	20.0	0.7	0.2	0.1	0.5	0.1	0.2	0.2
All Saints Church. Oxford	Burh	926	30.6	42.9	26.6	0.1	0.2	0.2	9.0	0.8	0.0	0.9
Benham's Garage, Taunton	Burh	636	58.8	38.1	3.1	0.2	0.0	0.0	0.9	0.2	0.2	0.0
Black Lion Hill.	Burh	276	39.9	42.4	17.8	0.0	0.0	0.0	9.4	0.7	0.4	0.0
Northampton												
Bristol Castle	Burh	328	45.7	26.2	28.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
Chalk La. Northampton	Burh	5252	31.2	56.4	12.4	0.1	0.0	0.1	7.5	1.2	0.1	0.2
Chester Rd. Winchester	Burh	1118	41.9	32.1	25.9	0.1	0.1	0.4	6.0	0.2	1.1	0.0
Citizen house. Bath	Burh	377	37.9	48.5	13.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Crook St. Chester	Burh	566	69.1	9.2	21.7	0.4	0.2	0.0	2.5	0.2	0.0	0.0
Danesgate Lincoln	Burh	912	38.0	42.2	19.7	0.1	0.0	0.0	1.0	0.9	0.0	0.0
Flaxengate Lincoln	Burh	1361	58.0	31.2	10.7	0.0	0.0	0.0	1.0	0.5	0.1	0.2
Goss St. Chester	Burh	516	58.7	79	33.3	1.2	0.0	0.0	2.1	0.1	0.1	0.2
Hinvey Hall Oyeen st	Burh	766	20.5	44 A	35.5	0.3	1.6	0.0	18 5	0.4	0.4	6.9
Ovford	Duin	,00	20.5		55.1	0.5	1.0	0.4	10.5	0.7	0.4	0.5
Huntor's Walk Chostor	Burb	112	75.6	5.0	10 5	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Included 5 Walk, Chester	Burb	1/1552	22.0	25.6	20.6	0.5	0.0	0.0	1.9	1.5	0.0	0.0
Ipswich 1974-00 D	Duill	6601	35.0	22.0	20.0	0.0	0.0	0.0	4.0	1.5	0.1	0.2
Ipswich	Duill	676	40.9 E 0 0	20.9 22 E	50.2	0.2	0.1	0.0	2 1	0.0	0.1	0.5
Ipswich	Durn	1690	58.9	25.5	12.0	0.0	0.0	0.0	3.1	0.5	0.5	0.1
	burn Bul	1089	01.4	20.0	12.0	0.5	0.0	0.0	5.7	1.1	0.2	0.5
Marefair, Northampton	Burn	317	44.2	38.5	17.4	0.9	0.0	0.0	2.8	0.3	0.0	0.0
Mary-Le-Port, Bristol	Burn	1488	44.4	48.1	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Portchester Castle	Burh	891	49.3	30.0	20.8	4.8	2.7	0.2	57.4	16.5	7.0	20.1
St Aldates, Oxford	Burh	454	43.6	33.5	22.9	0.0	0.2	0.0	0.0	0.0	0.0	0.0
St Ebbes, Oxford	Burh	2167	24.7	57.7	17.5	0.0	0.4	0.2	17.5	1.8	1.2	0.0
Staple Gardens,	Burh	2421	31.9	51.0	17.1	0.2	0.1	0.5	9.3	0.8	0.5	0.5
Winchester												
Trill Mill Stream, Oxford a	Burh	382	39.8	39.3	20.9	0.5	0.5	0.3	3.1	2.1	0.5	0.8
Trill Mill Stream, Oxford b	Burh	252	27.8	56.7	15.5	0.0	0.4	0.0	7.5	0.4	0.0	0.0
Victoria Rd, Winchester	Burh	1736	44.1	37.8	18.1	0.2	0.1	0.1	4.1	0.2	0.1	0.1
Western Suburb,	Burh	18399	47.9	27.5	24.6	0.0	0.0	0.0	1.9	0.1	0.1	0.0
Winchester												
Winchcombe	Burh	931	36.8	55.0	8.2	0.0	0.2	0.0	3.9	0.5	0.0	0.2
Blue bridge La, York	Danish Town	171	48.5	33.9	17.5	0.6	0.0	0.0	4.1	0.0	0.0	0.6
Brandon Rd, Thetford	Danish Town	3020	49.2	34.8	16.0	0.0	0.0	0.0	3.3	1.2	0.5	0.0
Bury Rd, Thetford	Danish Town	7057	67.5	21.4	11.2	0.0	0.0	0.0	3.8	0.5	0.2	0.3
Coppergate, York a	Danish Town	3101	72.8	19.9	7.4	0.5	0.1	0.0	1.3	0.4	0.0	0.2
Coppergate, York b	Danish Town	2779	63.7	28.0	8.3	0.7	0.0	0.0	2.4	0.9	0.0	0.1
Coppergate, York d	Danish Town	12646	57.4	21.9	20.7	0.3	0.0	0.0	5.8	1.7	0.1	0.6
Knocker's site, Thetford	Danish Town	573	56.4	26.0	17.6	3.1	0.5	0.0	15.0	2.6	0.5	1.7
Micklegate, York	Danish Town	1035	70.2	14.4	15.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mill La, Thetford	Danish Town	1126	48.7	23.1	28.2	0.1	0.3	0.1	5.5	1.0	0.4	0.1
Skeldergate, York	Danish Town	1101	73.9	18.3	7.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0
St nicholas st, Thetford	Danish Town	191	58.6	30.4	11.0	0.0	0.0	0.5	0.0	0.5	0.0	0.0
St Saviourgate, York	Danish Town	463	66.1	27.9	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walmgate, York	Danish Town	248	76.6	16.5	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Whitefriars car park,	Danish Town	275	33.5	38.2	28.4	0.7	0.4	0.0	0.0	0.0	0.0	0.0
Norwich												
21-24 Maiden La and 6-7	Domestic	398	43.7	25.6	30.7	1.8	0.0	0.0	2.3	0.0	0.0	0.0
Exchange Court												
Cheddar Palaces a	High Status Rural	3239	42.9	26.3	30.8	1.6	1.4	0.0	0.0	0.0	0.0	0.0
Cheddar Palaces b	High Status Rural	919	45.3	23.1	31.7	0.1	2.4	0.0	0.0	0.0	0.0	0.0
Faccombe netherton	High Status Rural	1138	25.0	39.5	35.6	2.5	4.9	1.6	5.4	1.3	0.2	2.3
Flixborough	High Status Rural	9151	39.4	35.7	24.9	0.0	0.5	0.1	15.3	9.2	0.9	4.5
Goltho a	High Status Rural	145	71.0	22.1	6.9	0.7	1.4	0.0	0.7	0.7	0.7	0.0
Goltho b	High Status Rural	563	41.6	27.0	31.4	1.4	8.3	0.2	6.4	2.7	0.9	0.4
Hatton Rock, Warwickshire	High Status Rural	250	51.6	30.8	17.6	0.0	0.0	0.0	0.8	0.0	0.4	0.0
	-											
North Elmham Park b	High Status Rural	3415	30.6	45.2	24.2	0.0	0.5	0.0	0.0	0.0	0.0	0.0

Late Saxon Sites cont'd	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
						Deer	Deer					Bird
North Elmham Park c	High Status Rural	917	31.6	33.4	35.0	1.4	0.5	0.1	0.0	0.0	0.0	0.0
Stafford Castle	High Status Rural	292	15.4	14.7	69.9	15.1	2.1	2.4	7.2	0.7	8.6	17.1
Castle Mall, Norwich	High Status Urban	1182	49.3	23.0	27.7	0.0	0.2	0.1	20.7	2.1	0.8	0.9
Kintbury Square, Kintbury	High Status Urban	229	32.8	45.9	21.4	0.4	1.3	0.0	0.9	0.4	0.0	0.0
Coppergate, York	Industrial Urban	11540	61.9	25.0	13.1	0.3	0.0	0.0	3.3	0.8	0.0	0.5
Fishergate, Norwich	Industrial Urban	1571	55.8	21.7	22.5	0.1	0.0	0.1	3.7	1.0	0.1	0.1
Flaxengate, Lincoln	Industrial Urban	9883	59.0	29.4	11.6	0.0	0.0	0.0	2.0	1.1	0.2	0.4
Site 1092, Thetford	Industrial Urban	1963	46.8	33.1	20.1	0.2	0.0	0.0	8.6	2.1	0.6	0.3
St James' Square,	Industrial Urban	415	48.0	44.6	7.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Northampton												
The Green, Northampton	Industrial Urban	910	35.3	49.7	15.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0
Aelfric's Abbey, Eynsham c	Religious Rural	1359	29.7	44.2	26.2	0.4	2.6	0.0	4.0	1.6	0.7	0.0
Adfric's Abboy, Eynsham d	Poligious Pural	010	20.0	20.2	21.0	0 5	E C	0.0	2.1	1 2	1 1	2 1
Aeime's Abbey, Eynsham u	Religious Rurai	845	50.8	38.2	51.0	0.5	5.0	0.9	5.4	1.5	1.1	2.1
Bishopstone, Seaford	Religious Rural	5371	16.7	53.1	30.2	0.0	0.3	0.3	15.1	1.2	0.7	1.1
Lurk La, Beverley a	Religious Rural	3658	59.1	24.1	16.8	0.0	0.8	0.0	1.5	2.5	0.1	0.3
Lurk La, Beverley b	Religious Rural	3222	59.6	20.2	20.1	0.0	1.1	0.2	1.0	0.5	0.0	0.2
Vicarage Garden,	Religious Rural	457	38.7	49.0	12.3	0.0	0.0	0.2	0.0	0.0	0.0	0.2
Brixworth	-											
Dorter Undercroft,	Religious Urban	2719	35.8	58.6	5.6	0.1	0.1	0.0	0.8	0.1	0.1	0.2
Westminster Abbey												
Church rd, Bishop's Cleeve	Rural Domestic	251	67.3	23.5	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Easton La, Winchester	Rural Domestic	196	12.8	83.2	4.1	0.0	0.0	0.0	0.0	0.5	0.0	1.0
Langham Rd and	Rural Domestic	990	45.9	36.9	17.3	0.0	0.1	0.0	0.7	0.0	0.1	0.0
Burystead, Raunds												
Longstanton	Rural Domestic	286	34.3	51.4	14.3	0.0	0.0	0.3	3.5	1.7	0.0	0.3
Market field, Steyning	Rural Domestic	3394	23.7	63.6	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Market Lavington,	Rural Domestic	131	40.5	48.1	11.5	0.0	0.0	0.0	4.6	1.5	0.0	0.0
Wiltshire												
Mawgan Porth, Cornwall	Rural Domestic	1120	45.2	51.5	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middleton Stoney	Rural Domestic	285	43.9	35.4	20.7	0.0	0.0	0.0	2.1	0.0	1.1	0.0
Ribblehead	Rural Domestic	130	63.8	33.8	2.3	1.5	0.0	0.0	1.5	0.0	0.0	2.3
Steyning	Rural Domestic	2652	23.5	66.7	9.8	0.0	0.0	0.0	2.3	0.7	0.9	0.4
The south manor area,	Rural Domestic	1721	37.5	53.3	9.2	0.0	0.3	0.0	0.9	0.4	0.0	0.0
Wharram												
Ufton Nervet	Rural Domestic	142	26.8	73.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walton vicarage,	Rural Domestic	2005	36.2	44.0	19.8	0.0	0.0	0.0	2.8	0.9	0.1	0.2
Aylesbury												
Wearmouth and Jarrow	Rural Domestic	598	78.4	13.7	7.9	1.2	0.0	0.0	14.5	7.9	0.3	0.8
West Cotton, Raunds	Rural Domestic	109	42.2	32.1	25.7	0.0	0.0	0.0	4.6	3.7	0.9	3.7
Canterbury La, Canterbury	Urban Domestic	208	47.6	30.3	22.1	4.3	0.5	0.0	4.8	0.5	0.0	0.0
Tonomonto Durbara Cit	Urban Dam setie	104	12.4	17 4	10.2	4 4	2.2	<u> </u>	20.0	0.0		2.2
Tenements, Durnam City	Urban Domestic	184	42.4	1/.4	40.2	1.1	2.2	0.5	29.9	9.2	0.0	3.3

Saxo-Norman Sites	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
						Deer	Deer					Bird
Church End, Cherry Hinton		286	35.7	43.4	21.0	0.3	0.3	0.0	3.5	0.3	0.0	0.0
Harston Mill,		337	42.4	38.9	18.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cambridgeshire												
Silver st, Glastonbury		1483	32.5	54.3	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-27 High St, Bedford	Burh	569	65.2	17.2	17.6	0.2	0.0	0.0	1.4	0.2	0.0	0.0
Billingsgate triangle	Burh	214	39.3	47.7	13.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Castle La, Bedford a	Burh	124	52.4	23.4	24.2	0.0	0.0	0.0	0.8	0.8	0.0	0.0
Castle La, Bedford b	Burh	829	51.7	30.5	17.7	0.0	0.1	0.0	0.7	0.4	0.4	0.5
Deansway, Worcester	Burh	500	35.0	43.4	21.6	0.0	0.0	0.0	2.4	1.4	0.0	0.2
Goldsmith st III, Exeter	Burh	902	46.0	36.1	17.8	0.2	0.0	0.3	0.0	0.0	0.0	0.0
Goldsmith st I-II, Exeter	Burh	698	45.8	38.0	16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Henley's Garage,	Burh	530	43.8	41.1	15.1	0.0	0.0	0.0	3.8	0.0	0.2	0.2
Winchester		0074	40.4		22 2							
Ipswich 1974-88	Burh	9371	42.1	29.4	28.6	0.2	0.1	0.3	6.9	0.9	0.1	0.2
Kingswell St and	Burn	426	32.2	57.0	10.8	0.0	0.0	0.0	13.1	0.2	0.0	0.5
Woolmonger St,												
Northampton	Dumb	1007	20.2	42.0	107	0.1	0.1	0.0	F 2	2.2	0.5	0.2
Saxon palaces,	Burn	1867	39.3	42.0	18.7	0.1	0.1	0.2	5.2	2.2	0.5	0.2
Northampton	Dumb	2019	FF 0	22.6	21 F	1 2	0.2	0.0	0.6	0.0		0.5
St Magnus	Durn	2018	55.9	22.0	21.5	1.5	0.5	0.0	9.0	0.9	0.0	0.5
St Ividgrius St Datars Dd. Narthamatan	Durn	2442	27.5	21.9	20.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0
St Peters Rd, Northampton	Burn	2442	43.4	39.5	1/.1	0.3	0.1	0.1	4.5	1.9	0.2	0.0
Stanla Cardons	Purb	1011	25.4	45.2	10.4	0.2	0.2	0.2	10.4	10	0.4	0.4
Staple Galuelis,	buill	1011	55.4	45.Z	19.4	0.2	0.5	0.5	10.4	1.0	0.4	0.4
Winchester Trickovist, Evotor	Purb	021	16.2	25.2	10 C	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Victoria Rd Winchostor	Burb	1279	22.0	55.2	10.0	0.0	0.0	0.2	0.0	1.0	0.0	0.0
Wostorn Suburb	Durh	1270 7705	32.0	JO.J	9.5 21 0	0.0	0.0	0.4	2.0	1.0	0.9	0.2
Winchostor	buill	1105	50.0	41.0	21.0	0.0	0.0	0.0	2.9	0.2	0.1	0.1
Milicilestei Danesgate Lincoln	Danish Town	1181	31.8	51.2	16.9	0.0	0.0	0.0	2.6	1 /	0.3	0.2
Dragon Hall Norwich	Danish Town	108	35.2	25.0	39.8	0.0	0.0	0.0	2.0	0.9	0.5	0.2
Elavengate Lincoln	Danish Town	183/15	16.9	12 8	10.3	0.0	0.0	0.0	17	15	0.0	0.5
Lincoln	Danish Town	224	39.3	42.0	11.6	0.0	0.0	0.0	3.6	5.8	1 3	0.5
Redcastle Furze Thetford	Danish Town	848	36.9	45.5	17.6	0.4	0.0	0.0	2.5	0.7	0.0	0.0
Castle Rising Castle	High Status Rural	193	35.2	34.2	30.6	0.0	1.6	0.5	21.2	3.6	0.5	6.2
Emwell St. Warminster	High Status Rural	236	69.9	20.3	9.7	0.0	0.4	0.0	2 5	0.0	0.0	0.0
Faccombe netherton	High Status Rural	1176	28.3	31.6	40.1	52.0	20.9	2.5	53.5	13.9	0.2	10.7
Guildford Castle	High Status Rural	267	29.6	47.2	23.2	0.4	0.4	0.0	4.1	0.0	0.0	1.5
Pontefract Castle	High Status Rural	394	4.1	17.0	78.9	1.3	3.3	1.3	0.0	0.0	0.0	0.0
Trowbridge	High Status Rural	1740	35.6	44.3	20.1	0.7	0.8	0.5	5.5	1.9	0.2	0.7
Castle La, Bedford	High Status Urban	248	50.0	32.3	17.7	0.4	0.0	0.4	2.0	1.2	0.0	0.8
The Mound, Glastonbury	Industrial Rural	606	28.9	41.4	29.7	0.8	1.2	0.0	2.8	2.0	0.2	3.8
26-42 Lower Bridge St,	Industrial Urban	119	55.5	21.8	22.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chester												
Friar St, Droitwich	Industrial Urban	336	41.7	30.7	27.7	0.3	0.3	0.0	8.3	1.2	0.0	0.3
Greyfriars, Norwich	Industrial Urban	638	34.5	24.0	41.5	0.0	0.0	0.0	2.2	1.4	0.0	0.0
Mill La, Thetford	Industrial Urban	421	55.8	24.0	20.2	0.0	0.5	0.5	4.8	2.4	3.3	0.2
Little Chester, Derby	Military	126	54.0	30.2	15.9	1.6	0.0	2.4	0.0	0.0	1.6	13.5
Tower of London	Military	239	59.8	35.6	4.6	0.4	0.0	0.0	0.4	0.0	0.0	0.0
Barking Abbey	Religious Urban	617	41.3	28.8	29.8	0.6	0.6	0.0	5.7	3.6	0.8	3.2
Dorter Undercroft,	Religious Urban	2542	35.4	47.4	17.1	0.1	0.5	0.2	6.8	0.3	1.4	0.0
Westminster Abbey												
Fishergate, York	Religious Urban	1922	53.3	34.3	12.3	7.8	0.2	0.1	8.3	2.1	0.1	1.4
Harlington, London	Rural Domestic	675	59.4	25.8	14.8	0.3	0.6	0.1	0.1	0.0	0.0	0.0
Lower School, Elstow	Rural Domestic	248	41.5	37.9	20.6	0.4	0.0	0.0	0.8	0.4	0.0	0.0
School La, Fulbourn	Rural Domestic	113	38.9	43.4	17.7	0.0	0.0	0.9	1.8	1.8	0.0	0.0
Wearmouth and Jarrow	Rural Domestic	472	48.7	28.4	22.9	0.4	0.2	0.2	25.8	10.2	0.0	1.5
Wilton, Salisbury	Rural Domestic	1183	40.7	54.1	5.2	0.1	0.0	0.0	2.3	0.3	0.2	0.0
Wraysbury	Rural Domestic	4720	41.0	28.2	30.8	0.0	0.0	0.0	6.3	1.4	0.0	2.5
St Martin-at-palace plain,	Trading	3766	40.5	29.3	30.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Norwich												
Bartholemew St, Newbury	Urban Domestic	170	34.7	40.6	24.7	0.0	0.0	0.6	14.1	6.5	0.0	0.6
Canterbury Castle,	Urban Domestic	234	33.3	38.9	27.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canterbury												

Norman Sites	Site Type	NISP*	Cattle	Sheep	Pig	Red	Roe	Hare	Fowl	Goose	Duck	Wild
						Deer	Deer					Bird
Wirral Park, Glastonbury		591	29.6	39.9	30.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Castle Acre Castle a	High Status Rural	1137	49.8	27.5	22.7	0.3	1.1	1.1	6.7	0.4	1.0	0.0
Castle Acre Castle b	High Status Rural	5075	26.1	33.5	40.4	0.0	2.2	5.3	3.5	0.7	0.6	0.3
Cheddar Palaces	High Status Rural	426	64.3	22.3	13.4	2.8	1.2	0.0	0.0	0.0	0.0	0.0
Goltho	High Status Rural	601	24.3	54.6	21.1	1.3	4.0	1.5	9.5	7.8	0.7	0.0
Lurk La, Beverley	High Status Rural	5485	46.2	34.4	19.3	0.0	0.8	0.2	3.6	1.1	0.0	0.4
Stafford Castle	High Status Rural	1613	23.1	16.1	60.9	9.3	7.3	5.0	21.9	2.0	3.8	10.0
The manor, Old Windsor	High Status Rural	195	22.6	56.9	20.5	0.0	0.0	0.0	13.3	0.0	0.0	0.0
Castle Mall, Norwich	High Status Urban	1090	45.5	27.2	27.3	0.0	0.3	0.2	13.9	3.9	0.9	0.6
Oxford Castle	High Status Urban	484	28.3	52.5	19.2	0.0	0.0	0.0	6.0	0.4	0.0	0.0
Empire cinema, Bedford	Industrial Urban	297	34.3	53.2	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aelfric's Abbey, Eynsham	Religious Rural	1800	36.9	25.6	37.5	0.4	2.3	1.1	6.3	1.7	0.5	1.7
Canterbury Cathedral,	Religious Urban	3074	50.7	32.4	16.9	0.0	0.6	0.0	1.6	0.2	0.2	0.2
Canterbury												
St Mary's, Wantage	Rural Domestic	154	53.9	33.8	12.3	0.6	0.0	0.6	3.2	2.6	0.0	0.6
Brandon Rd, Thetford	Urban Domestic	4021	43.7	39.2	17.1	0.0	0.0	0.0	4.1	1.7	0.2	0.1
Citizen house, Bath	Urban Domestic	2428	42.1	45.9	11.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Coppergate, York	Urban Domestic	1736	63.1	22.2	14.7	0.0	0.0	0.0	2.9	0.9	0.0	0.7
Dragon Hall, Norwich	Urban Domestic	537	37.1	45.4	17.5	0.4	0.2	4.3	36.9	5.2	2.2	1.7
Eastgate, Beverley	Urban Domestic	374	55.1	32.6	12.3	0.0	0.3	0.0	2.7	1.9	0.5	0.0
General Accident, York	Urban Domestic	213	65.3	19.2	15.5	0.9	0.0	0.0	5.2	0.9	0.9	2.3
GSIII, Exeter	Urban Domestic	3777	40.6	42.5	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GSI-II, Exeter	Urban Domestic	3225	38.2	48.0	13.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
High St, Exeter	Urban Domestic	204	51.5	27.9	20.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lincoln College, Oxford	Urban Domestic	661	33.0	58.2	8.8	0.2	0.0	0.0	4.1	0.5	0.2	0.3
Saxon palaces,	Urban Domestic	3593	38.4	49.4	12.2	0.1	0.0	0.3	8.7	5.5	0.2	0.3
Northampton												
Tenements, Durham City	Urban Domestic	270	54.1	26.7	19.3	0.0	1.1	0.0	9.3	1.9	0.0	0.0
West Parade, Lincoln	Urban Domestic	1260	49.7	44.6	5.7	0.1	0.0	0.0	2.0	1.0	0.0	0.0

Appendix D

Carcass Parts for Cattle, Sheep and Pig

Cattle, sheep and carcass part representation by phase. Data are presented for individual sites (n)= number of sites. Skull and vertebrae elements are not included because of wide discrepancies in methods used to identify, count and include them. Proportions are given as a % of the most common element - metapodials are derived from metacarpal and metatarsal counts divided by 2; phalanges are standardised by dividing by 4. Data is recorded from assemblages with >50 elements recorded by NISP and >30 elements recorded by MNE.



Figure D1.1: Cattle carcass parts from early Saxon sites



Figure D1.1: Cattle carcass parts from early Saxon sites



Figure D1.1: Cattle carcass parts from early Saxon sites


Figure D1.2: Cattle carcass parts from middle Saxon sites



Figure D1.2: Cattle carcass parts from middle Saxon sites



Figure D1.2: Cattle carcass parts from middle Saxon sites



Appendix D1.3: Cattle carcass parts from late Saxon sites



Appendix D1.3: Cattle carcass parts from late Saxon sites



Figure D1.3: Cattle carcass parts from late Saxon sites



Figure D1.3: Cattle carcass parts from late Saxon sites



Figure D1.3: Cattle carcass parts from late Saxon sites



Figure D1.4: Cattle carcass parts from saxo-Norman sites



Figure D1.4: Cattle carcass parts from saxo-Norman sites



Figure D1.4: Cattle carcass parts from saxo-Norman sites



Figure D2.1: Sheep carcass parts from early Saxon sites



Figure D2.1: Sheep carcass parts from early Saxon sites



Figure D2.1: Sheep carcass parts from early Saxon sites



Figure D2.2: Sheep carcass parts from middle Saxon sites



Figure D2.2: Sheep carcass parts from middle Saxon sites



Figure D2.2: Sheep carcass parts from middle Saxon sites



Figure D2.3: Sheep carcass parts from late Saxon sites



Figure D2.3: Sheep carcass parts from late Saxon sites



Figure D2.3: Sheep carcass parts from late Saxon sites



Figure D2.3: Sheep carcass parts from late Saxon sites



Figure D2.3: Sheep carcass parts from late Saxon sites



Figure D2.4: Sheep carcass parts from Saxo-Norman sites



Figure D2.4: Sheep carcass parts from Saxo-Norman sites



Figure D2.4: Sheep carcass parts from Saxo-Norman sites



Figure D2.4: Sheep carcass parts from Saxo-Norman sites



Figure D3.1: Pig carcass parts from early Saxon sites



Figure D3.1: Pig carcass parts from early Saxon sites



Figure D3.2: Pig carcass parts from middle Saxon sites



Figure D3.2: Pig carcass parts from middle Saxon sites



Figure D3.3: Pig carcass parts from late Saxon sites



Figure D3.3: Pig carcass parts from late Saxon sites



Figure D3.3: Pig carcass parts from late Saxon sites



Figure D3.3: Pig carcass parts from late Saxon sites



Figure D3.4: Pig carcass parts from Saxo-Norman sites



Figure D3.4: Pig carcass parts from Saxo-Norman sites


Figure D3.4: Pig carcass parts from Saxo-Norman sites

Appendix E

Mortality Data

Cattle, sheep and pig mortality profiles by phase. Data are presented for individual sites, based on the interpretation using Hambleton's conversion method (Hambleton, 1999: 64). The mortality curves are cumulative, so based on the proportion of the population that died at a particular wear stage. (n)= number of sites. Only sites where ten or more wear stages were available have been included.



Figure E1.1: Cattle mortality profiles from early Saxon sites



Figure E1.2: Cattle mortality profiles from middle Saxon sites



Figure E1.3: Cattle mortality profiles from late Saxon sites



Figure E1.3: Cattle mortality profiles from late Saxon sites



Figure E1.4: Cattle mortality profiles from Saxo-Norman sites



Figure E2.1: Sheep mortality profiles from early Saxon sites



Figure E2.2: Sheep mortality profiles from middle Saxon sites



Figure E2.2: Sheep mortality profiles from middle Saxon sites



Figure E2.3: Sheep mortality profiles from late Saxon sites



Figure E2.3: Sheep mortality profiles from late Saxon sites



Figure E2.4: Sheep mortality profiles from Saxo-Norman sites





Figure E2.4: Sheep mortality profiles from Saxo-Norman sites







Figure E3.1: Pig mortality profiles from early Saxon sites









Figure E3.2: Pig mortality profiles from middle Saxon sites



Figure E3.3: Pig mortality profiles from late Saxon sites



Figure E3.3: Pig mortality profiles from late Saxon sites



Figure E3.4: Pig mortality profiles from Saxo-Norman sites

Metrical Data

Minimum, maximum and mean measurements given for cattle, sheep and pig from sites where such data was available.Measurements are taken from von den Driesch (1979).






































Appendix F























Appendix F







































































































































































































































Definitions of key terms

Early Saxon phase: mid-5th – mid-7th centuries A.D.

Middle Saxon phase: mid-7th – mid-9th centuries

Late Saxon phase: mid-9th – early-11th centuries

Saxo-Norman phase: mid-9th – 12th centuries

Norman phase: mid-11th – 12th centuries

Burh – defended settlements built by Alfred from the late 9th century to protect Wessex and western Mercia from Viking attack.

Domestic – within the site types given throughout the thesis, 'domestic' is a term used for sites with no particular function (e.g. industrial), or status (e.g. high-status or ecclesiastical). Domestic sites may be either rural or urban.

Emporia - an alternative term for wics

Expansion – the increase in land under cultivation (van der Veen, 2005: 158)

Extensive cultivation/ herding – large scale farming, with little labour input. Ranging herds over large distances (Bogaard, 2005: 179)

Distribution site – a site which collects food as tax from a producer site and re-distributes it to consumer sites. Synonymous with estate centres.

Estate Centres – Important during the middle Saxon period as centres of production and manufacture, collection points for agricultural produce from local farms, sites of minster churches and facilitating the redistribution of goods.

Hinterland –the area surrounding a consumer site from which the mainstay of the inhabitant's food and raw materials is procured. This could be directly outside the settlement; or the
villages, hamlets or farmsteads further afield. The links between an urban site and its rural providers has been described by coherently by Perring (2002:11) as a 'patchwork' of settlements with ties of kinship and patronage as well as economic networks, rather than a blanket zone around a site.

Intensive cultivation/ herding – relatively high labour to area i.e. small-scale, high yield. Animals kept close to the settlement, and used for high labour products (Bogaard, 2005: 179).

Mixed economy – a husbandry strategy where animals are kept for secondary products, but with a cull of animals for meat occurring as well.

Net consumer site – a site which mainly consumes food and raw materials procured from elsewhere.

Net producer Site – a site which mainly produces animals for the supply of another site.

Urban – this term is not applied in the sense of what would be recognised as towns today, as the populations and extents of Saxon urban settlements, either in their guise of wics, burhs or Danish towns, were far smaller than those seen in modern towns. 'Urban' is also used in this thesis to represent the population of a site which is not purely agrarian in nature.

Wic – trading centres established in the 7th century on coastal or estuarine sites in southern and eastern England, forming a network of ports with others in northern Europe, from Scandinavia to France.

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Food, Status and Complexity

in Saxon and Scandinavian England:

An Archaeozoological Approach

Volume 2: Figures and Tables

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Abstract

The period between the decline of Roman influence and the Norman Conquest in England (AD 450-1066) is recognised as a time of great change, from a largely subsistence-based economy to one more urban-oriented with growing political and social complexity. Little is understood of the humananimal interactions that existed in Saxon and Scandinavian England, and this thesis will use archaeozoological data with the aim of furthering the knowledge of social, political and economic hierarchies, cultural differences and debates regarding the nature of the urban context through the presence and spatial organisation of status, craft production and trade. To this end, both primary and secondary data were recorded from animal bone assemblages from English Saxon sites, and the subsequent relative species quantities, mortality profiles, carcass part representation, butchery and metrical data analysed. The resultant trends have illustrated the increasing social complexity and widening gap between the farming and elite classes, and evidence for cultural distinctions between the Danelaw and Saxon areas of England in the late Saxon phase. Combined with this is the demonstration of evolving economic pathways using the provisioning networks apparent between producer and consumer sites. This is core to the major changes that take place throughout the Saxon phase, from the largely self-sufficient population of the early phase, through the redistribution of animals and animal products in the middle Saxon phase, towards a fully commodotised market system by the time of the Norman Conquest.

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Chapter 1:

Introduction: Research Questions and Context


Figure 1.1: Approximate areas occupied by the major early Saxon kingdoms (after Reynolds, 1999)



Figure 1.2: Areas occupied by the major middle Saxon kingdoms (after Reynolds, 1999)



Figure 1.3: Areas occupied by late Saxon kingdoms (after Reynolds, 1999)



Figure 1.4: Areas of open field systems. Light shaded areas show the central province (after Roberts and Wrathmell, 2000). Dark shaded areas show areas that should also be included (Jones and Page, 2006)

Table 1.1: Population estimates at specified times (after Russell, 1976)

Date	High Roman	A.D. 500	A.D. 650	A.D. 1000
Estimated population (in millions)	4	0.5	0.5	2

Chapter 2:

Methodology: The Data Set and Analytical Techniques



Figure 2.1: Location of sites from all phases (see Table 2.1 for a description of sites by county)







Figure 2.3: The effect of sample size (NISP) on the number of species recorded (Ns), showing regression curve (after Byrd, 1997)



Figure 2.4: The effect of sample size (NISP) on the number of species recorded (Ns), showing regression curve, for samples of less than 2000 NISP (after Byrd, 1997). Line drawn to show the 300 NISP cutoff



Figure 2.5: Triplot to show differences in species proportions of cattle, sheep and pigs between sites with a NISP of 100-300 (black) and those with a NISP of >300 (red).

Figure 2.6 see next page







* Meat, skin, horn and bone

Figure 2.6: Chart to illustrate taphonomic factors affecting archaeozoological assemblages



(Distal Breadth/ Greatest Lenght)/100

Figure 2.8a: Approximate sets that will indicate the presence of bulls, cows and castrates using metacarpal measurements (after Albarella, 1997).



Greatest Length

Figure 2.8b: Approximate sets that will result from the calculation of the slenderness index when ewes, rams and castrates are present in an assemblage (after Davis, 2000: 389).

Table 2.1: All sites included in the data set, by county

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
23-27 High St, Bedford a	Bedfordshire	Maltby, n.d.	Middle Saxon		Urban	Burh
23-27 High St, Bedford b	Bedfordshire	Maltby, n.d.	Late Saxon	Norman	Urban	Burh
Bennett's Works, Bedford a	Bedfordshire	Grant, 1986	Middle Saxon	Late Saxon	Urban	Domestic
Bennett's Works, Bedford b	Bedfordshire	Grant, 1986	Norman		Urban	High Status
Castle Lane, Bedford a	Bedfordshire	Maltby, n.d.	Late Saxon	Norman	Urban	Burh
Castle Lane, Bedford b	Bedfordshire	Maltby, n.d.	Late Saxon	Norman	Urban	Burh
Castle Lane, Bedford c	Bedfordshire	Maltby, n.d.	Late Saxon	Norman	Urban	High Status
Castle Lane, Bedford d	Bedfordshire	Maltby, n.d.	Late Saxon	Norman	Urban	High Status
Empire Cinema, Bedford	Bedfordshire	Grant, 1983	Norman		Urban	Industrial
Harrold, Bedfordshire	Bedfordshire	Maltby, nd	Early Saxon	Middle Saxon	Rural	Domestic
Lower School, Elstow	Bedfordshire	Holmes, 2005	Late Saxon	Norman	Rural	Domestic
Tempsford Park a	Bedfordshire	Hutchins, 2005	Middle Saxon		Rural	High Status
Tempsford Park b	Bedfordshire	Hutchins, 2005	Late Saxon	Norman	Rural	High Status
Abbey Wharf, Reading	Berkshire	Соу, 1997	Early Saxon	Late Saxon	Rural	
Bartholemew St, Newbury	Berkshire	Соу, 1997	Late Saxon	Norman	Urban	Domestic
Kintbury Square, Kintbury	Berkshire	Hamilton Dyer, 1997	Late Saxon		Urban	High Status
Lake End Rd	Berkshire	Powell, 2002	Middle Saxon		Urban	Trading Site
Lot's Hole	Berkshire	Powell, 2002	Middle Saxon		Urban	Domestic
The Manor, Old Windsor	Berkshire	Anthony, 2005	Norman		Rural	High Status
Ufton Nervet	Berkshire	Westley, 1974	Late Saxon		Rural	Domestic
Wraysbury	Berkshire	Соу, 1989	Late Saxon	Norman	Rural	Domestic
Chicheley, Bucks	Buckinghamshire	Jones, 1980	Middle Saxon		Rural	Domestic
Hartigans, Milton Keynes	Buckinghamshire	Burnett, 1993	Early Saxon		Rural	Domestic
Pennyland, Milton Keynes	Buckinghamshire	Holmes, 1993	Early Saxon		Rural	Domestic
Pitstone, Bucks	Buckinghamshire	Hambleton, 2005	Early Saxon	Middle Saxon	Rural	Domestic
Walton Lodge, Aylesbury	Buckinghamshire	Sadler, 1989	Middle Saxon		Rural	Domestic
Walton Vicarage, Aylesbury a	Buckinghamshire	Noddle, 1976	Early Saxon		Rural	Domestic
Walton Vicarage, Aylesbury b	Buckinghamshire	Noddle, 1976	Late Saxon		Rural	Domestic
Wolverton Turn enclosure, Stony Stratford	Buckinghamshire	Sykes, 2007	Early Saxon	Middle Saxon	Rural	Domestic
Church End, Cherry Hinton	Cambridgeshire	Baxter, 2001	Late Saxon	Norman		
Harston Mill, Cambridgeshire a	Cambridgeshire	Jones et al, n.d.	Early Saxon	Middle Saxon		
Harston Mill, Cambridgeshire b	Cambridgeshire	Jones et al, n.d.	Late Saxon	Norman		
Longstanton	Cambridgeshire	Holmes, in prep	Late Saxon		Rural	Domestic
Lordship Lane, Cottenham a	Cambridgeshire	Higbee, 1998	Middle Saxon		Rural	Domestic
Lordship Lane, Cottenham b	Cambridgeshire	Higbee, 1998	Late Saxon	Norman	Rural	Domestic
Maxey, Northants	Cambridgeshire	Seddon et al, 1964	Early Saxon	Late Saxon	Rural	Domestic
Orchard Lane, Huntingdon	Cambridgeshire	Albarella, 1996	Late Saxon	Norman	Urban	Domestic
Orton Hall Farm	Cambridgeshire	King, 1996	Early Saxon		Rural	Domestic
School Lane, Fulbourn	Cambridgeshire	Holmes, 2008	Late Saxon	Norman	Rural	Domestic
Spicer's Warehouse, Sawston	Cambridgeshire	Holmes, 2009	Early Saxon		Rural	Domestic
Stonea Grange, Cambridgeshire	Cambridgeshire	Stallibrass, 1996	Early Saxon		Rural	Domestic

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
26-42 Lower Bridge St, Chester	Cheshire	Morris, MG, 1985	Late Saxon	Norman	Urban	Industrial
Abbey Green, Chester	Cheshire	Cartledge, 1994	Late Saxon		Urban	Burh
Crook St, Chester	Cheshire	Cartledge, 1994	Late Saxon		Urban	Burh
Crown Car Park, Nantwich	Cheshire	Fisher, 1986	Late Saxon	Norman	Urban	High Status
Goss St, Chester	Cheshire	Cartledge, 1994	Late Saxon		Urban	Burh
Hunter St School, Chester	Cheshire	Cartledge, 1994	Middle Saxon		Urban	Burh
Hunter's Walk, Chester	Cheshire	Cartledge, 1994	Late Saxon		Urban	Burh
Mawgan Porth, Cornwall	Cornwall	Clutton-Brock, 1976	Late Saxon		Rural	Domestic
Little Chester, Derby	Derbyshire	Harman, 2002	Late Saxon	Norman	Urban	Military
Bantham	Devon	Соу, 1981	Early Saxon	Middle Saxon	Urban	Trading Site
Benham's Garage, Taunton	Devon	Levitan, 1979	Late Saxon		Urban	Burh
Goldsmith St III, Exeter	Devon	Maltby, 1979	Late Saxon	Norman	Urban	Burh
Goldsmith St I-II, Exeter	Devon	Maltby, 1979	Late Saxon	Norman	Urban	Burh
High St, Exeter	Devon	Maltby, 1979	Norman		Urban	Domestic
Trickay St, Exeter a	Devon	Maltby, 1979	Late Saxon	Norman	Urban	Burh
Poundbury, Dorchester	Dorset	Buckland-Wright, 1987	Early Saxon		Rural	Domestic
Church Close, Hartlepool	Durham	Huntley and Rackham, 2007	Middle Saxon		Rural	Ecclesiastical
Church Walk (76), Hartlepool	Durham	Huntley and Rackham, 2007	Middle Saxon		Rural	Ecclesiastical
Hartlepool Monastery	Durham	Rackham et al, 1988	Middle Saxon		Rural	Ecclesiastical
Sadler Street, Durham City a	Durham	Rackham, 1979	Late Saxon		Urban	Domestic
Sadler Street, Durham City b	Durham	Rackham, 1979	Norman		Urban	Domestic
Wearmouth and Jarrow a	Durham	Noddle et al, 2006	Middle Saxon		Rural	Ecclesiastical
Wearmouth and Jarrow b	Durham	Noddle et al, 2006	Late Saxon		Rural	Domestic
Wearmouth and Jarrow c	Durham	Noddle et al, 2006	Late Saxon	Norman	Rural	Domestic
Wearmouth and Jarrow d	Durham	Noddle et al, 2006	Norman		Rural	Ecclesiastical
Barking Abbey	Essex	Hamilton-Dyer, 2002	Late Saxon	Norman	Urban	Ecclesiastical
Fossets Farm, Southend	Essex	Grimm, 2007	Early Saxon		Rural	Domestic
Mucking	Essex	Done, 1993	Early Saxon	Middle Saxon	Rural	Domestic
Wicken Bonhunt, Essex	Essex	Crabtree, 1996	Middle Saxon		Rural	Domestic
Barnsley Park	Gloucestershire	Noddle, 1985	Early Saxon			
Church Rd, Bishop's Cleeve	Gloucestershire	Lovell et al, 2007	Late Saxon		Rural	Domestic
Copeshill Rd, Lower Slaughter	Gloucestershire	Hambleton, 2006	Middle Saxon		Rural	High Status
Sherborne House, Lechlade	Gloucestershire	Maltby, 2003	Early Saxon		Rural	Domestic
Winchcombe	Gloucestershire	Levitan, 1985	Late Saxon		Urban	Burh
Riverdene, Basingstoke	Hamphsire	Hamilton-Dyer, 2003	Middle Saxon		Rural	Domestic
Staple Gardens, Winchester a	Hamphsire	Holmes, 2009	Late Saxon		Urban	Burh
Staple Gardens, Winchester b	Hamphsire	Holmes, 2009	Late Saxon	Norman	Urban	Burh
27, Jewry St, Winchester	Hampshire	Bourdillon, 2009	Late Saxon		Urban	Burh
Abbots Worthy	Hampshire	Соу, 1991	Early Saxon	Middle Saxon	Rural	Domestic
Alma Rd, Romsey	Hampshire	Grimm, 2007	Middle Saxon	Norman		
Anderson's Rd, Southampton	Hampshire	Knight, 2006	Middle Saxon		Urban	Wic
Chester Rd, Winchester	Hampshire	Bourdillon, 2009	Late Saxon		Urban	Burh
Cook St, Southampton	Hampshire	Bourdillon, 1993	Middle Saxon		Urban	Wic

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
Cowdery's Down	Hampshire	Maltby, 1983	Early Saxon		Rural	Domestic
Easton Lane, Winchester	Hampshire	Maltby, 1989	Late Saxon		Rural	Domestic
Faccombe Netherton a	Hampshire	Sadler, 1990	Late Saxon		Rural	High Status
Faccombe Netherton b	Hampshire	Sadler, 1990	Late Saxon	Norman	Rural	High Status
Friend's Provident, Southampton	Hampshire	Hamilton-Dyer, 2005	Middle Saxon		Urban	Wic
Henley's Garage, Winchester	Hampshire	Serjeantson and Smith, 2009	Late Saxon	Norman	Urban	Burh
Melbourne St, Southampton	Hampshire	Bourdillon and Coy, 1980	Middle Saxon		Urban	Wic
Old Down Farm, Andover	Hampshire	Bourdillon, 1980	Early Saxon		Rural	Domestic
Portchester Castle a	Hampshire	Grant, 1976	Early Saxon	Middle Saxon	Urban	Re-used Roman Town
Portchester Castle b	Hampshire	Grant, 1976	Middle Saxon	Late Saxon	Urban	Burh
Portchester Castle c	Hampshire	Grant, 1976	Late Saxon		Urban	Burh
SARC XIV, Southampton	Hampshire	Driver, 1984	Middle Saxon		Urban	Industrial
Six Dials, Hamwic	Hampshire	Bourdillon and Andrews, 1997	Middle Saxon		Urban	Wic
SOU25, Southampton	Hampshire	Driver, 1987	Late Saxon	Norman	Urban	Burh
Victoria Rd, Winchester a	Hampshire	Bourdillon, 2009	Late Saxon		Urban	Burh
Victoria Rd, Winchester b	Hampshire	Serjeantson and Smith, 2009	Late Saxon	Norman	Urban	Burh
Western Suburb, Winchester a	Hampshire	Соу, 2009	Late Saxon		Urban	Burh
Western Suburb, Winchester all	Hampshire	Соу, 2009	Late Saxon	Norman	Urban	Burh
Western Suburb, Winchester b	Hampshire	Соу, 2009	Late Saxon	Norman	Urban	Burh
Hereford City	Herefordshire	Noddle, 1985	Middle Saxon	Late Saxon	Urban	Burh
Chapter House, St Albans Abbey	Hertfordshire	Crabtree, 1983	Early Saxon	Middle Saxon	Rural	Ecclesiastical
Canterbury Castle, Canterbury	Kent	King, 1982	Late Saxon	Norman	Urban	Domestic
Canterbury Cathedral, Canterbury	Kent	Driver, 1990	Norman		Urban	Ecclesiastical
Canterbury Lane, Canterbury	Kent	Marples, 1983	Late Saxon		Urban	Domestic
Church Lane, Canterbury	Kent	King, 1982	Middle Saxon		Urban	Domestic
Manston Rd, Ramsgate	Kent	Hamilton-Dyer, 1997	Early Saxon		Rural	Domestic
Sandtun, Kent	Kent	Clutton-Brock, 1976	Early Saxon	Late Saxon	Rural	Domestic
Sandtun, West Hythe	Kent	Murray, 2001	Middle Saxon		Urban	Trading Site
Bonners Lane, Leicester	Leicestershire	Levitan, 2004	Early Saxon		Urban	Re-used Roman Town
Empingham West, Rutland Water	Leicestershire	Morrison, 2000	Early Saxon		Rural	Domestic
Eye Kettleby	Leicestershire	Knight, forthcoming	Early Saxon		Rural	Domestic
Anchor Church, Crowland	Lincolnshire	Holmes, 2004	Middle Saxon	Norman	Rural	Ecclesiastical
Danesgate, Lincoln a	Lincolnshire	Holmes, nd	Late Saxon		Urban	Burh
Danesgate, Lincoln b	Lincolnshire	Holmes, nd	Late Saxon	Norman	Urban	Danish Town
Flaxengate, Lincoln a	Lincolnshire	O'connor, 1982	Late Saxon		Urban	Burh
Flaxengate, Lincoln b	Lincolnshire	O'connor, 1982	Late Saxon		Urban	Industrial
Flaxengate, Lincoln c	Lincolnshire	O'connor, 1982	Late Saxon	Norman	Urban	Danish Town
Flixborough a	Lincolnshire	Dobney et al, 2007	Middle Saxon		Rural	High Status
Flixborough b	Lincolnshire	Dobney et al, 2007	Late Saxon		Rural	High Status
Goltho a	Lincolnshire	Jones and Ruben, 1987	Late Saxon		Rural	High Status
Goltho b	Lincolnshire	Jones and Ruben, 1987	Late Saxon		Rural	High Status
Goltho c	Lincolnshire	Jones and Ruben, 1987	Norman		Rural	High Status
Gosberton	Lincolnshire	Baker, 2002	Middle Saxon		Rural	Domestic

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
Lincoln a	Lincolnshire	Dobney et al, 1997	Late Saxon		Urban	Burh
Lincoln b	Lincolnshire	Dobney et al, 1997	Late Saxon	Norman	Urban	Danish Town
Nettleton Top	Lincolnshire	Berg, 1993	Early Saxon		Rural	Domestic
Quarrington, Lincs a	Lincolnshire	Rackham, 2003	Early Saxon		Rural	Domestic
Quarrington, Lincs b	Lincolnshire	Rackham, 2003	Middle Saxon		Rural	Domestic
School Lane, Old Leake	Lincolnshire	Holmes, 2004	Late Saxon	Norman	Rural	Domestic
St Nicholas School, Boston	Lincolnshire	Giorgi and Rackham, 1996	Middle Saxon		Rural	Domestic
West Parade, Lincoln	Lincolnshire	Scott, 1999	Norman		Urban	Domestic
21-24 Maiden La and 6-7 Exchange Court a	London	Hamilton-Dyer, 2004	Middle Saxon			Domestic
21-24 Maiden La and 6-7 Exchange Court b	London	Hamilton-Dyer, 2004	Middle Saxon		Urban	Wic
21-24 Maiden La and 6-7 Exchange Court c	London	Hamilton-Dyer, 2004	Late Saxon			Domestic
Althorpe Grove, Battersea	London	Locker, 1983	Early Saxon	Late Saxon	Rural	
Baynard's Castle	London	King, 1980	Early Saxon		Rural	Domestic
Billingsgate Triangle	London	Levitan, 1980	Late Saxon	Norman	Urban	Burh
Distillery site, Hammersmith	London	Ainsley, 2008	Early Saxon		Rural	Domestic
Dorter Undercroft, Westminster Abbey a	London	Pipe, 1995	Late Saxon		Urban	Ecclesiastical
Dorter Undercroft, Westminster Abbey b	London	Pipe, 1995	Late Saxon	Norman	Urban	Ecclesiastical
Harlington, London a	London	Grimm, 2009	Early Saxon		Rural	Domestic
Harlington, London b	London	Grimm, 2009	Late Saxon	Norman	Rural	Domestic
James St, London	London	Armitage, 2004	Middle Saxon		Urban	Wic
Jubilee Hall, Covent Garden	London	West, 1988	Middle Saxon		Urban	Wic
Lyceum Theatre, Exeter St	London	Rackham and Snelling, 2004	Middle Saxon		Urban	Wic
Maiden Lane	London	West, 1988	Middle Saxon		Urban	Wic
National Gallery Basement	London	West, 1989	Middle Saxon		Rural	Domestic
National Gallery Extension	London	Rackham, 1989	Middle Saxon		Urban	Wic
National Portrait Gallery	London	Armitage, 2004	Middle Saxon		Rural	Domestic
Peabody Site	London	West, 1989	Middle Saxon		Urban	Wic
Prospect Park, Harmondsworth	London	Ainsley et al, 2008	Early Saxon		Rural	Domestic
St Magnus	London	Armitage, 1979	Late Saxon	Norman	Urban	Burh
St Mary Cray, Kent Rd	London	Ainsley et al, 2008	Early Saxon		Rural	Domestic
The Treasury, Whitehall	London	Ainsley et al, 2008	Middle Saxon		Rural	Domestic
Tower of London	London	Nicolaysen, 1985	Late Saxon	Norman	Urban	Military
Brandon Rd, Thetford a	Norfolk	Jones, 1993	Late Saxon		Urban	Danish Town
Brandon Rd, Thetford b	Norfolk	Jones, 1993	Norman		Urban	Domestic
Bury Rd, Thetford	Norfolk	Grimm, 2006	Late Saxon		Urban	Danish Town
Caister-on-Sea, Great Yarmouth	Norfolk	Harman, 1993	Middle Saxon		Rural	High Status
Castle Acre Castle a	Norfolk	Lawrance, 1987	Norman		Rural	High Status
Castle Acre Castle b	Norfolk	Lawrance, 1982	Norman		Rural	High Status
Castle Mall, Norwich a	Norfolk	Albarella et al, 1997	Late Saxon		Urban	High Status
Castle Mall, Norwich b	Norfolk	Albarella et al, 1997	Norman		Urban	High Status
Castle Rising Castle	Norfolk	Jones et al, 1997	Late Saxon	Norman	Rural	High Status
Chalkpit Field North, Sedgeford a	Norfolk	Poole, nd	Middle Saxon			
Chalkpit Field North, Sedgeford b	Norfolk	Poole, 2007	Late Saxon			

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
Church Close, Whissonsett	Norfolk	Holmes, nd	Middle Saxon	Late Saxon	Rural	Domestic
Creake Rd Allotment, Burnham Market	Norfolk	Baker, 2000	Middle Saxon	Late Saxon	Urban	Trading Site
Crow Hall Park, Downham Market	Norfolk	Curl, 2008	Middle Saxon		Rural	Domestic
Dragon Hall, Norwich a	Norfolk	Murray and Albarella, 2000	Late Saxon	Norman	Urban	Danish Town
Dragon Hall, Norwich b	Norfolk	Murray and Albarella, 2000	Norman		Urban	Domestic
Fishergate, Norwich	Norfolk	Jones, 1994	Late Saxon		Urban	Industrial
Greyfriars, Norwich	Norfolk	Moreno-Garcia, 2007 and Nicholson, 2007	Late Saxon	Norman	Urban	Industrial
Guildhall St, Thetford	Norfolk	Hutton MacDonald, 1999	Late Saxon		Urban	Danish Town
Hay Green, Terrington St. Clement	Norfolk	Baker, 2002	Middle Saxon		Rural	Domestic
Kilverstone, Norfolk	Norfolk	Higbee, 2006	Early Saxon		Rural	Domestic
Knocker's site, Thetford	Norfolk	Jones, 1984	Late Saxon		Urban	Danish Town
Melford Meadows, Brettenham	Norfolk	Powell and Clark, 2002	Early Saxon		Rural	Domestic
Mundham, Norfolk	Norfolk	Leach and Morris, 2008	Early Saxon		Rural	Domestic
North Elmham Park a	Norfolk	Noddle, 1980	Middle Saxon		Rural	High Status
North Elmham Park b	Norfolk	Noddle, 1980	Late Saxon		Rural	High Status
North Elmham Park c	Norfolk	Noddle, 1980	Late Saxon		Rural	High Status
Redcastle Furze, Thetford a	Norfolk	Wilson, 1995	Early Saxon		Rural	Domestic
Redcastle Furze, Thetford b	Norfolk	Wilson, 1995	Late Saxon	Norman	Urban	Danish Town
Rose Hall Farm, Walpole St. Andrew	Norfolk	Baker, 2002	Middle Saxon		Rural	Domestic
Sedgeford, Norfolk	Norfolk	Clutton-Brock, 1976	Middle Saxon		Rural	Domestic
Site 1092, Thetford	Norfolk	Jones, 1984	Late Saxon		Urban	Industrial
Spong Hill, Norfolk	Norfolk	Bond, 1995	Early Saxon		Rural	Domestic
St Barnabas Hospital, Thetford	Norfolk	Jones, 1984	Late Saxon		Urban	Danish Town
St Martin-at-Palace Plain, Norwich	Norfolk	Cartledge, 1988	Late Saxon	Norman	Urban	Trading Site
St Nicholas St, Thetford	Norfolk	Hutton MacDonald, 1999	Late Saxon		Urban	Danish Town
Whitefriars Car Park, Norwich	Norfolk	Cartledge, 1983	Late Saxon		Urban	Danish Town
Black Lion Hill, Northampton	Northamptonshire	Harman, 1985	Late Saxon		Urban	Burh
Chalk Lane, Northampton	Northamptonshire	Harman, 1981	Late Saxon		Urban	Burh
Kings Meadow Lane, Higham Ferrers a	Northamptonshire	Albarella and Johnstone, 2000	Early Saxon		Rural	Domestic
Kings Meadow Lane, Higham Ferrers b	Northamptonshire	Albarella and Johnstone, 2000	Early Saxon	Middle Saxon	Rural	Domestic
Kingswell St & Woolmonger St, Northampton	Northamptonshire	Armitage, 2008	Late Saxon	Norman	Urban	Burh
Langham Rd and Burystead, Raunds a	Northamptonshire	Davis, 2009	Early Saxon	Middle Saxon	Rural	Domestic
Langham Rd and Burystead, Raunds b	Northamptonshire	Davis, 2009	Late Saxon		Rural	Domestic
Marefair, Northampton a	Northamptonshire	Harman, 1979	Middle Saxon		Urban	Domestic
Marefair, Northampton b	Northamptonshire	Harman, 1979	Late Saxon		Urban	Burh
Middleton Stoney a	Northamptonshire	Evans, 2007	Early Saxon		Rural	Domestic
Middleton Stoney b	Northamptonshire	Evans, 2007	Middle Saxon		Rural	High Status
Middleton Stoney c	Northamptonshire	Evans, 2007	Late Saxon		Rural	Domestic
Northampton	Northamptonshire	Locker, 1985	Early Saxon		Rural	Domestic
Northampton Rd, Brixworth	Northamptonshire	Reilly, 1995	Early Saxon	Middle Saxon	Rural	Domestic
Saxon Palaces, Northampton a	Northamptonshire	Harman, 1985	Early Saxon	Middle Saxon	Rural	Domestic
Saxon Palaces, Northampton b	Northamptonshire	Harman, 1985	Middle Saxon		Rural	Domestic
Saxon Palaces, Northampton c	Northamptonshire	Harman, 1985	Late Saxon	Norman	Urban	Burh

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
Saxon Palaces, Northampton d	Northamptonshire	Harman, 1985	Norman		Urban	Domestic
St James' Square, Northampton	Northamptonshire	Harman, 1983	Late Saxon		Urban	Industrial
St Peters Rd, Northampton a	Northamptonshire	Harman, 1979	Middle Saxon		Rural	Domestic
St Peters Rd, Northampton b	Northamptonshire	Harman, 1979	Late Saxon	Norman	Urban	Burh
St Peter's Walk, Northampton a	Northamptonshire	Armitage, 1999	Late Saxon		Urban	Burh
St Peter's Walk, Northampton b	Northamptonshire	Armitage, 1999	Late Saxon	Norman	Urban	Burh
The Green, Northampton	Northamptonshire	Harman, 1996	Late Saxon		Urban	Industrial
Vicarage Garden, Brixworth	Northamptonshire	Coy et al, 1977	Late Saxon		Rural	Ecclesiastical
West Cotton, Raunds	Northamptonshire	Albarella and Davis, 1994	Late Saxon		Rural	Domestic
Holy Island Village, Lindisfarne	Northumberland	Allison et al, 1985	Late Saxon	Norman	Rural	Domestic
Yeavering	Northumberland	Higgs and Jarman, 1977	Early Saxon		Rural	High Status
113-119 High St, Oxford	Oxfordshire	Maltby, 2000	Late Saxon		Urban	Burh
Aelfric's Abbey, Eynsham a	Oxfordshire	Ayres et al, 2003	Early Saxon		Rural	Domestic
Aelfric's Abbey, Eynsham b	Oxfordshire	Ayres et al, 2003	Middle Saxon		Rural	Ecclesiastical
Aelfric's Abbey, Eynsham c	Oxfordshire	Ayres et al, 2003	Late Saxon		Rural	Ecclesiastical
Aelfric's Abbey, Eynsham d	Oxfordshire	Ayres et al, 2003	Late Saxon		Rural	Ecclesiastical
Aelfric's Abbey, Eynsham e	Oxfordshire	Ayres et al, 2003	Norman		Rural	Ecclesiastical
All Saints Church, Oxford a	Oxfordshire	Wilson, 2003	Late Saxon		Urban	Burh
Audlett Drive, Abingdon	Oxfordshire	Levitan, 1992	Early Saxon		Rural	Domestic
Barton Court Farm, Abingdon	Oxfordshire	Wilson et al, 1986	Early Saxon		Rural	Domestic
Beech House hotel, Dorchester on Thames	Oxfordshire	Grant, 1981	Early Saxon	Late Saxon		
Codrington Library, Oxford	Oxfordshire	Sykes, 2007	Late Saxon		Urban	Burh
Cresswell Field, Yarnton	Oxfordshire	Mulville, 2004	Middle Saxon		Rural	Domestic
Hinxey Hall, Queen St, Oxford	Oxfordshire	Wilson et al, 1983	Late Saxon		Urban	Burh
Lincoln College, Oxford	Oxfordshire	Charles, 2003	Norman		Urban	Domestic
Mill St, Wantage	Oxfordshire	Maltby, 1996	Early Saxon		Rural	Domestic
New Wintles	Oxfordshire	Noddle, 1975	Early Saxon		Rural	Domestic
Oxford Castle	Oxfordshire	Marples, 1976	Norman		Urban	High Status
Oxford Science Park, Littlemore	Oxfordshire	Ingrem, 2001	Early Saxon		Rural	Domestic
St Aldates, Oxford	Oxfordshire	Armour-Chelu, 2003	Late Saxon		Urban	Burh
St Ebbes, Oxford	Oxfordshire	Wilson et al, 1989	Late Saxon		Urban	Burh
St Helen's Avenue, Benson	Oxfordshire	Hamilton-Dyer, 2004	Early Saxon		Rural	Domestic
St Mary's, Wantage	Oxfordshire	Holmes, 2009	Norman		Rural	Domestic
The Orchard, Walton Rd, Aylesbury	Oxfordshire	Hamilton-Dyer, 2004	Middle Saxon		Rural	Domestic
Trill Mill Stream, Oxford a	Oxfordshire	Wilson, 2003	Late Saxon		Urban	Burh
Trill Mill Stream, Oxford b	Oxfordshire	Wilson, 2003	Late Saxon		Urban	Burh
Worton, Yarnton	Oxfordshire	Mulville, 2004	Middle Saxon		Rural	Domestic
Yarnton a	Oxfordshire	Mulville, 2004	Middle Saxon		Rural	Domestic
Yarnton b	Oxfordshire	Mulville, 2004	Late Saxon	Norman	Rural	Domestic
Viroconium, Wroxeter a	Shropshire	Hammon, 2005	Early Saxon		Urban	Re-used Roman Town
Viroconium, Wroxeter b	Shropshire	Hammon, 2005	Early Saxon		Urban	Re-used Roman Town
Viroconium, Wroxeter c	Shropshire	Hammon, 2005	Middle Saxon		Urban	Re-used Roman Town
Viroconium, Wroxeter d	Shropshire	Hammon, 2005	Middle Saxon		Urban	Re-used Roman Town

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
Bristol Castle	Somerset	Levitan, 1987	Late Saxon		Urban	Burh
Cadbury Congresbury	Somerset	Noddle, 1970	Early Saxon		Rural	Domestic
Cadbury Congresbury, Somerset	Somerset	Noddle, 1992	Early Saxon		Rural	High Status
Cheddar Palaces a	Somerset	Higgs et al, 1979	Late Saxon		Rural	High Status
Cheddar Palaces b	Somerset	Higgs et al, 1979	Late Saxon		Rural	High Status
Cheddar Palaces c	Somerset	Higgs et al, 1979	Norman		Rural	High Status
Citizen house, Bath a	Somerset	Grant, 1979	Late Saxon		Urban	Burh
Citizen house, Bath b	Somerset	Grant, 1979	Norman		Urban	Domestic
Mary-Le-Port, Bristol	Somerset	Noddle, 1985	Late Saxon		Urban	Burh
Silver St, Glastonbury	Somerset	levitan, 1982	Late Saxon	Norman		
The Mound, Glastonbury	Somerset	Darill and Coy, 1985	Late Saxon	Norman	Rural	Industrial
Wirral Park, Glasonbury	Somerset	Darvill and coy, 1977	Norman			
Stafford Castle a	Staffordshire	Sadler and Jones, 2007	Late Saxon		Rural	High Status
Stafford Castle b	Staffordshire	Sadler and Jones, 2007	Norman		Rural	High Status
Brandon	Suffolk	Crabtree, forthcoming	Middle Saxon		Rural	Domestic
Bury St Edmunds AML 3270	Suffolk	Locker, 1981	Early Saxon	Late Saxon	Rural	
Ipswich 1974-88 a	Suffolk	Crabtree, 1994	Middle Saxon		Urban	Wic
Ipswich 1974-88 b	Suffolk	Crabtree, 1994	Late Saxon		Urban	Burh
Ipswich 1974-88 c	Suffolk	Crabtree, 1994	Late Saxon	Norman	Urban	Burh
Ipswich 1974-88 d	Suffolk	Crabtree, 1994	Late Saxon		Urban	Burh
Ipswich a	Suffolk	Jones and Serjeantson, 1983	Middle Saxon		Urban	Wic
Ipswich b	Suffolk	Jones and Serjeantson, 1983	Late Saxon		Urban	Burh
Ipswich c	Suffolk	Locker and Jones, 1983	Middle Saxon		Urban	Wic
Ipswich d	Suffolk	Locker and Jones, 1983	Late Saxon		Urban	Burh
Mill Lane, Thetford a	Suffolk	Albarella et al, 1995	Late Saxon		Urban	Danish Town
Mill Lane, Thetford b	Suffolk	Albarella et al, 1995	Late Saxon	Norman	Urban	Industrial
Site 127 Bury St Edmunds	Suffolk	Murphy, 1996	Middle Saxon			
West Stow a	Suffolk	Crabtree, 1989	Early Saxon		Rural	Domestic
West Stow b	Suffolk	Crabtree, 1989	Early Saxon		Rural	Domestic
West Stow c	Suffolk	Crabtree, 1989	Early Saxon		Rural	Domestic
Guildford Castle	Surrey	Sykes, 2005	Late Saxon	Norman	Rural	High Status
Saxon County School, Shepperton a	Surrey	Ayres, 2005	Early Saxon		Rural	Domestic
Saxon County School, Shepperton b	Surrey	Ayres, 2005	Late Saxon		Rural	Domestic
Bishopstone, Seaford	Sussex	Poole, nd	Late Saxon		Rural	Ecclesiastical
Bishopstone, Sussex	Sussex	Gebbels, 1977	Early Saxon		Rural	Ecclesiastical
Botolphs, Bramber a	Sussex	Stevens, 1990	Early Saxon		Rural	Domestic
Botolphs, Bramber b	Sussex	Stevens, 1990	Late Saxon	Norman	Rural	Domestic
Friars Oak, Hassocks	Sussex	Stevens, 2000	Middle Saxon		Rural	Domestic
Lewes Priory	Sussex	Stevens, 1997	Late Saxon		Urban	Ecclesiastical
Market field, Steyning	Sussex	O'Shea, 1993	Late Saxon		Rural	Domestic
Steyning	Sussex	Sykes, 2007	Late Saxon		Rural	Domestic
Hatton Rock, Warwickshire	Warwickshire	Noddle, 1973	Late Saxon		Rural	High Status
Stretton-on-Fosse	Warwickshire	Lambden and Rackham, 2002	Early Saxon		Rural	Domestic

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
Cadley Rd, Collingbourne Ducis	Wiltshire	Hamilton-Dyer, 2001	Middle Saxon		Rural	Domestic
Emwell St, Warminster	Wiltshire	Freke and Smith, 1997	Late Saxon	Norman	Rural	High Status
High St, Ramsbury a	Wiltshire	Соу, 1980	Middle Saxon		Rural	Industrial
High St, Ramsbury b	Wiltshire	Соу, 1980	Middle Saxon		Rural	Domestic
Market Lavington, Wiltshire a	Wiltshire	Bourdillon, 2006	Early Saxon		Rural	Domestic
Market Lavington, Wiltshire b	Wiltshire	Bourdillon, 2006	Late Saxon		Rural	Domestic
Tidworth	Wiltshire	Hamilton-Dyer, 2002	Early Saxon	Middle Saxon	Rural	Domestic
Trowbridge a	Wiltshire	Bourdillon, 1993	Middle Saxon	Late Saxon	Rural	Domestic
Trowbridge b	Wiltshire	Bourdillon, 1993	Late Saxon	Norman	Rural	High Status
Wilton, Salisbury a	Wiltshire	Grimm, 2008	Early Saxon	Middle Saxon	Rural	Domestic
Wilton, Salisbury b	Wiltshire	Grimm, 2008	Late Saxon	Norman	Rural	Domestic
Deansway, Worcester a	Worcestershire	Nicholson and Scott, 2004	Early Saxon		Rural	Domestic
Deansway, Worcester b	Worcestershire	Nicholson and Scott, 2004	Late Saxon	Norman	Urban	Burh
Friar St, Droitwich	Worcestershire	Locker, 1995	Late Saxon	Norman	Urban	Industrial
Upwich, Droitwich a	Worcestershire	Meddens, 1997	Early Saxon		Rural	Industrial
Upwich, Droitwich b	Worcestershire	Meddens, 1997	Middle Saxon	Late Saxon	Rural	Industrial
Worcester Cathedral	Worcestershire	Thomas and Holmes, 2010	Early Saxon	Late Saxon	Urban	Ecclesiastical
Blue Bridge Lane, York a	Yorkshire	Rowland, 2004	Middle Saxon		Urban	Industrial
Blue Bridge Lane, York b	Yorkshire	Rowland, 2004	Late Saxon		Urban	Danish Town
Caythorpe Pipeline, North Humberside	Yorkshire	Stallibrass, 1996	Early Saxon		Rural	Domestic
Coppergate, York a	Yorkshire	O'Connor, 1989	Late Saxon		Urban	Danish Town
Coppergate, York b	Yorkshire	O'Connor, 1989	Late Saxon		Urban	Danish Town
Coppergate, York c	Yorkshire	O'Connor, 1989	Late Saxon		Urban	Industrial
Coppergate, York d	Yorkshire	O'Connor, 1989	Late Saxon		Urban	Danish Town
Coppergate, York e	Yorkshire	O'Connor, 1989	Norman		Urban	Domestic
Cottam, Yorkshire	Yorkshire	Dobney et al, 1999	Middle Saxon		Rural	Domestic
Eastgate, Beverley a	Yorkshire	Scott, 1992	Norman		Urban	Domestic
Eastgate, Beverley b	Yorkshire	Scott, 1992	Middle Saxon	Late Saxon	Rural	Domestic
Fishergate, York a	Yorkshire	O'Connor, 1991	Middle Saxon		Urban	Trading Site
Fishergate, York b	Yorkshire	O'Connor, 1991	Late Saxon	Norman	Urban	Ecclesiastical
General Accident, York	Yorkshire	O'Connor, 1988	Norman		Urban	Domestic
Lurk Lane, Beverley a	Yorkshire	Scott, 1991	Late Saxon		Rural	Ecclesiastical
Lurk Lane, Beverley b	Yorkshire	Scott, 1991	Late Saxon		Rural	Ecclesiastical
Lurk Lane, Beverley c	Yorkshire	Scott, 1991	Norman		Rural	High Status
Micklegate, York	Yorkshire	O'Connor, 2004	Late Saxon		Urban	Danish Town
North Manor, Wharram	Yorkshire	Richardson, 2004	Early Saxon	Middle Saxon	Rural	Domestic
Pontefract Castle	Yorkshire	Richardson, 2002	Late Saxon	Norman	Rural	High Status
Ribblehead	Yorkshire	Rackham, 1977	Late Saxon		Rural	Domestic
Site 39, Wharram	Yorkshire	Stevens, 1992	Middle Saxon		Rural	Domestic
Sites 94 and 95, Wharram	Yorkshire	Pinter-Bellows, 1992	Middle Saxon		Rural	Domestic
Skeldergate, York	Yorkshire	O'connor, 1984	Late Saxon		Urban	Danish Town
St Saviourgate, York	Yorkshire	O'Connor, 2004	Late Saxon		Urban	Danish Town
The Castle, Barnard Castle	Yorkshire	Jones et al, 1985	Norman		Urban	High Status

Site Name	County	Reference	Phase from	Phase to	Urban/ Rural	Site Type
The South Manor Area, Wharram a	Yorkshire	Pinter-Bellows, 2000	Middle Saxon		Rural	Domestic
The South Manor Area, Wharram b	Yorkshire	Pinter-Bellows, 2000	Late Saxon		Rural	Domestic
Walmgate, York	Yorkshire	O'Connor, 2004	Late Saxon		Urban	Danish Town

Sheep w	ear stages			
Payne	Age	Payne Definition	Grant Definition	Grant MWS
Α	0-2 mth	m3/p4 unworn	m3/p4 <=a	1-2
В	2-6 mth	m3/p4 in wear, M1 unworn	m3/p4 >=b, M1 <=a	3-7
С	6-12 mth	M1 in wear, M2 unworn	M1>=b, M2 <=a	8-18
D	1-2 yrs	M2 in wear, M3 unworn	M2>=b, M3<=a	19-28
E	2-3 yrs	M3 in wear, post cusp unworn	M3 b-d	29-33
F	3-4 yrs	M3 post cusp in wear, M3 pre[][]-	M3 e-f	34-37
G	4-6 yrs	M3 [][]-, M2 [][]	M3 = g, M2 = g	39-41
н	6-8 yrs	M3 [][]-, M2 post [][]	M3 = g, M2 >=h	42-44
I .	8-10 yrs	M3 post [][]-	M3>=h	45 and over

Table 2.2: Conversion table for tooth wear stages (after Hambleton, 1999: 64)

Cattle wear stages

Halstead	Age	Halstead Definition	Grant Definition	Grant MWS
A	0-1mth	m3/p4 unworn	m3/p4 <=a	1-3
В	1-8mth	m3/p4 in wear, M1 unworn	m3/p4 >=b, M1 <=a	4-6
С	8-18mth	M1 in wear, M2 unworn	M1>=b, M2 <=a	7-16
D	18-30mth	M2 in wear, M3 unworn	M2>=b, M3<=a	17-30
E	30-36mth	M3 in wear, post cusp unworn	M3 b-d	31-36
F	young adult	M3 post cusp in wear, M3 <g< td=""><td>M3 e-f</td><td>37-40</td></g<>	M3 e-f	37-40
G	adult	M3 = g	M3 = g	41-43
н	old adult	M3 = h or j	M3 = h-j	44-45
1	senile	M3 = k or above	M3>=k	46 and over

Pig wear stages

	Age	Hambleton Definition	Grant Definition	Grant MWS
А	0-2 mth	m3/p4 unworn	m3/p4 <=a	0-1
В	2-7mth	m3/p4 in wear, M1 unworn	m3/p4 >=b, M1 <=a	2-8
С	7-14mth	M1 in wear, M2 unworn	M1>=b, M2 <=a	9-17
D	14-21mth	M2 in wear, M3 unworn	M2>=b, M3<=a	18-32
Е	21-27mth	M3 in wear, post cusp unworn	M3 b-d	33-42
F	27-36mth	M3 post cusp in wear, M3 <g< td=""><td>M3 e-f</td><td>43-46</td></g<>	M3 e-f	43-46
G	adult	M3 = g	M3 = g	46 and over
н	old adult	M3 = h or j	M3 = h-j	
I .	senile	M3 = k or above	M3>=k	

Table 2.3: Metrical data available from site reports as summary data and those where
all measurements were available as raw data

Summary Data	All Measurements
Anderson's Road Southampton	23-27 High Street Bedford
The Castle, Barnard Castle, Yorkshire	Abbey Green, Chester
Brandon Road, Thetford	Alma Road, Romsey
Brandon, Suffolk	Barnsley Park, Gloucestershire
Bury Road, Thetford	Burnham Market, Norfolk
Canterbury Cathedral, Canterbury	Cadbury Congresbury, Somerset
Castle Lane, Bedford	Cadley Road, Collingbourne Ducis
Castle Mall, Norwich	Castle Lane, Bedford
Coppergate, York	Castle Mall, Norwich
Deansway, Worcester	Church End, Cherry Hinton
Dorter Undercroft, London	Danesgate, Lincoln
Eye Kettleby, Leicestershire	Dragon Hall, Norwich
Fishergate, York	Exeter
Friends Provident, Southampton	Faccombe Netherton, Hampshire
Hereford City	Fossetts Farm, Essex
Lake End Road, Berkshire	Harlington, London
Lurk Lane, Beverley	Harrold, Bedfordshire
Melbourne Street, Southampton	Mill Lane, Thetford
Melford Meadows, Brettenham, Norfolk	Mucking, Essex
North Manor, Wharram	Mundham
Peabody Site, London	Nettleton Top, Lincolnshire
Pennyland, Milton Keynes	North Elmham Park, Norfolk
Pontefract Castle, Yorkshire	Old Down Farm
Sites 94 and 95, Wharram	Orton Hall Farm, Cambridgeshire
South Manor, Wharram	Silchester
James Street, London	Stonea Grange, Cambridgeshire
Staple Gardens, Winchester	Wearmouth and Jarrow
Thetford	West Stow, Suffolk
Winchcombe, Wiltshire	Wilton, Wiltshire
Flixborough, Lincolnshire	Chalkpit Field North, Sedgeford
Hay Green, Norfolk	Knocker's Site, Thetford
Rose Hall Farm, Norfolk	Langham Road and Burystead, Raunds
St Magnus, London	Lincoln
	Site 1092, Thetford

Table 2.3a: Standard cattle measurements used for the calculation of log ratios (from Maltby, 1995). Measurement codes follow von den Driesch (1976). Table 2.3b: Standard sheep measurements used for the calculation of log ratios (from Davis, 1996). Measurement codes follow von den Driesch (1976).

Bone	Measurement	Standard	n
Astragalus	Bd	37.80	8
Astragalus	DI	32.94	9
Astragalus	GLI	57.83	9
Astragalus	GLm	50.94	7
Calcaneum	GL	83.88	2
Humerus	Bd	75.42	9
Humerus	вт	67.31	14
Metacarpal	Bd	55.08	3
Metacarpal	GL	181.80	3
Metacarpal	SD	30.83	3
Metatarsal	Bd	50.40	4
Metatarsal	Вр	43.85	4
Metatarsal	GL	193.35	2
Metatarsal	SD	23.50	2
Radius	Bd	66.15	4
Radius	Вр	73.21	16
Radius	GL	264.50	3
Radius	SD	37.05	2
Scapula	GLP	59.04	7
Scapula	SLC	43.03	9
Tibia	Bd	53.94	11
Tibia	Вр	85.70	1
Tibia	GL	295.00	1
Tibia	SD	34.10	1

Bone	Measurement	Standard	n
Scapula	SLC	18.9	19
Scapula	GLP	31	19
Humerus	SD	14.3	19
Humerus	BT	26.8	19
Humerus	HT	17.9	19
Humerus	HTC	13.5	19
Radius	GL	136.6	19
Radius	Вр	30	16
Radius	SD	15.8	19
Metacarpal	GL	111.8	19
Metacarpal	BFp	21.2	19
Metacarpal	SD	12.6	19
Metacarpal	BFd	23.6	19
Femur	SD	15.6	19
Tibia	GL	184.8	19
Tibia	SD	10.9	19
Tibia	Bd	25.1	19
Tibia	Dd	19.5	19
Calcaneum	GL	52.4	19
Astragalus	GL	26.7	19
Astragalus	Bd	17.6	19
Astragalus	DI	14.7	19
Metatarsal	GL	121.4	19
Metatarsal	SD	10.9	19
Metatarsal	BDd	22.7	19

Table 2.3c: Standard pig measurements used for the calculation of log ratios (from Payne and Bull, 1998). Measurement codes follow von den Driesch (1976).

Bone	Measurement	Standard
Scapula	GLP	42.6
Scapula	SLC	29.8
Humerus	Bd	50
Humerus	ВТ	35
Humerus	нтс	22.5
Radius	ВрР	34.2
Radius	Bd	41.3
Pelvis	LAR	36.3
Femur	DCP	30.3
tibia	BdP	34.6
Calcaneum	GLP	95.2
Astragalus	GLI	48.7

Table 2.5: Bones that may be indicative of specialist crafts or trades as waste

Stage of Processing	Activity	Anatomy	Disposal
Primary butchery	Head removal	Skull	Butcher's refuse
Primary butchery	Feet removal	Metapodia / phalanges	Butcher's refuse /
			redistributed/ sold to bone
			worker
Primary butchery	Skulls halved for brain removal –	Skull	Butcher's refuse
	larger animals (e.g. cattle)		
Primary butchery	Skulls for brain removal – smaller	Skull	Redistributed/ sold to
	animals (e.g. calves and sheep)		customer – domestic waste
Primary butchery	Skin or hide removal with or	Horn cores /	Redistributed/ sold to hide
	without horns, with or without	metapodia /	processor
	metapodia, with or without	phalanges. With or	
	phalanges	without knife marks	
Primary butchery /	Horns removed	Bony horn cores. May	Redistributed/ sold to horner /
Skin processing		be chopped or sawn	butcher's waste / hide
			processor's waste
Bone/ antler/ horn	Craft production	Bone/ antler/ horn	Bone worker's refuse
working		core offcuts	
Secondary butchery	Marrow extraction	Long bones	Butcher's refuse / domestic
			waste
Secondary butchery	Jointing of meat – small animals	Limb bones	Redistributed/ sold to
	(e.g. pig or sheep)		customer – domestic waste
Secondary butchery	Filleting of meat – larger animals	Limb bones	Butcher's waste / sold to bone
	(e.g. cattle)		worker
Small animals	Animals cooked whole (e.g. fowl,	Complete skeleton	Redistributed/ sold to
	piglets)		customer / home produce –
			domestic waste

Interpretation	Signature	Specific archaeozoological analysis
High status site	High proportions of pigs	
	Younger animals	Cattle and sheep at Hambleton stage C-F; pigs B-E
	Hunted species - species diversity	Wild mammals and birds
	Hunting species	Birds of prey, dogs, horses
	Good cuts of meat	Upper limb bones
Ecclesiastical site	High proportion cattle and/ or sheep	
	High proportion fish	
Lower classes	High proportion staple foods	Cattle and sheep

Table 2.6 Identification of signature elements to help in the interpretation of particular aspects of sites of different status

Breeding Meat Milk Power Wool High incidence of Old animals (tooth Cattle Animals nearing old females (tooth Neonatal and first wear stage G-I) year deaths (tooth maturity (Cattle wear stage G-I); and sheep at tooth possibly very wear stage A-C, Old animals (tooth wear stage E-F; young males particularly stage Sheep wear stage G-I; pigs C-E) (stage A-C) A) ?castrates) Pig ---

Table 2.7: Signature mortality profiles expected under particular animal husbandry regimes. Wear stages follow Hambleton, 1999: 64.

Criteria	Mode of Production	Settlement Type	Archaeozoological Data	Methods of Analysis
Self- Sufficient Site	Domestic	lsolated kin-based farmstead	Animals bred, raised, worked, culled on site / range of ages or may be peaks in mortality depending on focus of agriculture	Anatomical Representation / Mortality Data
Producer Site	Tributary / Tax / Market	Dispersed farms / Hamlet / Nucleated settlement / Village	Surplus production of meat, milk, wool, intensification of arable production requires more draught animals / animals bred, raised, worked on site / some or all culled on site / some possibly provided on the hoof/ Specialist provision - removal of certain age groups, use for secondary production	Anatomical representation / Mortality data / Butchery data /
Consumer Site	Tributary / Tax / Market	Ecclesiastical or Royal estate centre / Wic / Burh	Animals and raw material received from elsewhere / may be a predominance of young males if the site can demand best otherwise, may be old animals past best working age / if received as dressed carcasses or joints of meat may be anomalies in skeletal elements recovered / where specialised activities taking place may see concentration of raw material refuse / no breeding fatalities / different deposition of butchery and domestic refuse	Anatomical representation / Mortality data / Butchery data / Spatial representation
Distribution Site	Tributary / Tax	Ecclesiastical or Royal estate centre / Rural trading site	Acting as middleman between producer and consumer sites / may be consuming food as it arrives or may produce own / any mix of producer or consumer assemblages	Anatomical representation / Mortality data / Butchery data /

Table 2.8: Data that may be indicative of various site types and modes of production

Chapter 3:

Site Classifications: Their Relevance from an Archaeozoological Perspective



Figure 3.1: Proportion of rural and urban sites recorded by phase. Urban sites include any site likely to have had a non-agrarian population, such as burhs, wics, trading sites, and those within former Roman towns.



Figure 3.2: Proportion of recorded site types by phase



Figure 3.3: Height of sites in the dataset. (n)= number of sites.



Figure 3.4: Proportion of sites situated on superficial and underlying bedrock geologies (n)= number of sites.



Figure 3.5a: Proportion of cattle, sheep and pig recorded from early Saxon sites on various geologies.



Figure 3.5b: Proportion of cattle, sheep and pig recorded from middle Saxon sites on various geologies.



Figure 3.5c: Proportion of cattle, sheep and pig recorded from late Saxon sites on various geologies.



Figure 3.5d: Proportion of cattle, sheep and pig recorded from Saxo-Norman sites on various geologies.



Figure 3.5e: Proportion of cattle, sheep and pig recorded from Norman sites on various superficial and bedrock geologies.



Figure 3.6a: Relative proportion of the main domestic species by height above Ordnance Datum. All early Saxon sites included with a NISP >300



Figure 3.6b: Relative proportion of the main domestic species by height above Ordnance Datum. All middle Saxon sites included with a NISP >300



Figure 3.6c: Relative proportion of the main domestic species by height above Ordnance Datum. All late Saxon sites included with a NISP >300


Figure 3.6d: Relative proportion of the main domestic species by height above Ordnance Datum. All Saxo-Norman sites included with a NISP >300



Figure 3.6e: Relative proportion of the main domestic species by height above Ordnance Datum. All Norman sites included with a NISP >300



Figure 3.7: Map of England showing land over 60m AOD and upland areas (over 240m AOD - Roberts, 1955)



Figure 3.8: The proportion of sheep (as a % of the cattle and sheep assemblage) recorded on each site, by the difference in height.



Figure 3.9: Proportion of sites with a NISP >300 for cattle, sheep and pig found below and above 60m OD.



Figure 3.10a The proportion of sheep (as a % of sheep and cattle) from middle Saxon sites at various heights above Ordnance Datum. Blue= urban sites (wics), and black= rural sites.



Figure 3.10c The proportion of sheep (as a % of sheep and cattle) from Saxo-Norman sites at various heights above Ordnance Datum. Blue= urban sites (wics), and black= rural sites.



Figure 3.10c The proportion of sheep (as a % of sheep and cattle) from Saxo-Norman sites at various heights above Ordnance Datum. Blue= urban sites (wics), and black= rural sites.



Figure 3.11a: Principal components analysis of cow, sheep and pig for early Saxon phase regions.



Figure 3.11b: Principal component analysis of cow, sheep and pig proportions for middle Saxon regions.



Component 1

Figure 3.11c: Principal components analysis of cow, sheep and pig for late Saxon phase regions.



Component 1

Figure 3.11d: Principal components analysis of cow, sheep and pig for late Saxon-Norman phase regions.



Figure 3.101e: Principal components analysis of cow, sheep and pig for Norman phase regions.





Figure 3.13: Proportion of urban and rural sites from which wild species have been recorded. (n)= number of sites



Figure 3.14a: Proportion of early Saxon site types from which wild species have been recorded. (n)= number of sites



Figure 3.14b: Proportion of middle Saxon site types from which wild species have been recorded. (n)= number of sites



Figure 3.14c: Proportion of late Saxon site types from which wild species have been recorded. (n)= number of sites



Figure 3.14d: Proportion of Saxo-Norman site types from which wild species have been recorded. (n)= number of sites



Figure 3.14e: Proportion of Norman site types from which wild species have been recorded. (n)= number of sites



Figure 3.15: The proportion of urban and rural sites from which birds of prey have been recovered. Including the species most likely to have been used for falconry (falcon spp., Peregrine falcon, kestrel, goshawk and sparrowhawk). All sites were included except those where birds were present, but not recorded to species. (n)= number of sites



Figure 3.16a: Proportion of various early Saxon site types from which birds of prey have been recovered. (n)= number of sites







Figure 3.16c: Proportion of various late Saxon site types from which birds of prey have been recovered. (n)= number of sites



Figure 3.16d: Proportion of various Saxo-Norman site types from which birds of prey have been recovered. (n)= number of sites



Figure 3.16e: Proportion of various Norman site types from which birds of prey have been recovered. (n)= number of sites



Figure 3.17: The proportion of urban and rural sites from which pigs have been recovered as more than 20% of the main domesticates. (n)= number of sites



Figure 3.18: The proportion of specific site types from which pigs have been recovered as more than 20% of the main domesticates. (n)= number of sites



Figure 3.19a: The proportion of carcass parts recovered from cattle, sheep and pigs in the early Saxon phase. (n)= number of sites. Less detail is given for this phase, as all sites with relevant data were rural domestic settlements.



Figure 3.19b: The proportion of carcass parts recovered from sites in the middle Saxon phase. (n)= number of sites.



Figure 3.19c: The proportion of carcass parts recovered from sites in the late Saxon phase. (n)= number of sites.



Figure 3.19d: The proportion of carcass parts recovered from sites in the Saxo-Norman phase. (n)= number of sites.



Figure 3.19e: The proportion of carcass parts recovered from sites in the Norman phase. (n)= number of sites.



Figure 3.20a: Husbandry strategies on urban and rural sites from which mortality profiles of cattle have been identified. Based on sites with wear stages from at least 10 mandibles. Mixed = animals culled at wear stages indicative of animals culled at ages reflecting their use for both meat and secondary production; secondary products= majority of animals culled after wear stage G; meat= majority of animals culled before reaching wear stage F.



Figure 3.20b: Husbandry strategies on urban and rural sites from which mortality profiles of sheep have been identified. Based on sites with wear stages from at least 10 mandibles. Mixed = animals culled at wear stages indicative of animals culled at ages reflecting their use for both meat and secondary production; secondary products = majority of animals culled after wear stage G; meat = majority of animals culled before reaching wear stage F.



Figure 3.21a: Husbandry strategies on middle Saxon sites from which mortality profiles of cattle and sheep have been identified. Based on sites with wear stages from at least 10 mandibles. (n)= number of sites. Mixed = animals culled at wear stages indicative of animals culled at ages reflecting their use for both meat and secondary production; secondary products= majority of animals culled after wear stage G; meat= majority of animals culled before reaching wear stage F.



Figure 3.21b: Husbandry strategies on late Saxon sites from which mortality profiles of cattle and sheep have been identified. Based on sites with wear stages from at least 10 mandibles. (n)= number of sites. Mixed = animals culled at wear stages indicative of animals culled at ages reflecting their use for both meat and secondary production; secondary products= majority of animals culled after wear stage G; meat= majority of animals culled before reaching wear stage F.



Figure 3.21c: Husbandry strategies on Saxo-Norman sites from which mortality profiles of cattle and sheep have been identified. Based on sites with wear stages from at least 10 mandibles. (n)= number of sites. Mixed = animals culled at wear stages indicative of animals culled at ages reflecting their use for both meat and secondary production; secondary products= majority of animals culled after wear stage G; meat= majority of animals culled before reaching wear stage F.



Figure 3.21d: Husbandry strategies on Norman sites from which mortality profiles of cattle and sheep have been identified. Based on sites with wear stages from at least 10 mandibles. (n)= number of sites. Mixed = animals culled at wear stages indicative of animals culled at ages reflecting their use for both meat and secondary production; secondary products= majority of animals culled after wear stage G; meat= majority of animals culled before reaching wear stage F.



Figure 3.22a: The proportion of cattle, sheep and pig recorded on early Saxon urban and rural sites with a combined NISP of >100. For a demonstration of how to read triplots see Appendix B



Figure 3.22b: The proportion of cattle, sheep and pig recorded on middle Saxon urban and rural sites with a combined NISP of >100. For a demonstration of how to read triplots see Appendix B



Figure 3.22c: The proportion of cattle, sheep and pig recorded on late Saxon urban and rural sites with a combined NISP of >100. For a demonstration of how to read triplots see Appendix B



Figure 3.22d: The proportion of cattle, sheep and pig recorded on Saxo-Norman urban and rural sites with a combined NISP of >100. For a demonstration of how to read triplots see Appendix B



Figure 3.22e: The proportion of cattle, sheep and pig recorded on Norman urban and rural sites with a combined NISP of >100. For a demonstration of how to read triplots see Appendix B



Component 1

Figure 3.23a: Early Saxon principal component analyis of cow sheep and pig ratios by site type.



Figure 3.23b Middle Saxon principal component analyis of cow sheep and pig ratios by site type.



Figure 3.23c: Late Saxon principal component analyis of cow sheep and pig ratios by site type.



Figure 3.23d: Saxo-Norman principal component analyis of cow sheep and pig ratios by site type.



Figure 3.23e: Norman principal component analyis of cow sheep and pig ratios by site type.



Figure 3.24a: Percentage similarity (PS) between fragment representation from various early Saxon site types with a standard (after Brain, 1981). Based on samples with NISP >50, or MNE >30.


Figure 3.24b: Percentage similarity (PS) between fragment representation from various middle Saxon site types with a standard (after Brain, 1981). Based on samples with NISP >50, or MNE >30.



Figure 3.24c: Percentage similarity (PS) between fragment representation from various late Saxon site types with a standard (after Brain, 1981). Based on samples with NISP >50, or MNE >30.



Figure 3.24d: Percentage similarity (PS) between fragment representation from various Saxo-Norman site types with a standard (after Brain, 1981). Based on samples with NISP >50, or MNE >30.



Figure 3.24e: Percentage similarity (PS) between fragment representation from various Norman site types with a standard (after Brain, 1981). Based on samples with NISP >50, or MNE >30.



Figure 3.25: Percentage similarity (PS) between fragment representation from various site types with a standard (after Brain, 1981). Based on samples with NISP >50, or MNE >30.

Matilda Holmes

Table 3.1: Site types used to classify the data set taken from site reports, by phase. Shaded areas refer to those phases used throughout the rest of the chapter

Site description given in	Urban/	Site Type	Early Saxon	Early- Middle	Early-Late	Middle Saxon	Middle- Late	Middle Saxon-	Late Saxon	Saxo- Norman	Norman
original report	Rural			Saxon	Saxon		Saxon	Norman			
Rural Village	Rural	Domestic	8	1	1				2	2	
Rural Farmstead	Rural	Domestic	2			4			2		
Rural Settlement	Rural	Domestic	36	10	1	25	3		11	9	1
Rural Site	Rural	Unclassified			3						
Hamlet	Rural	Domestic		1					1		
Urban Domestic	Urban	Domestic				3	1		2	3	13
High Status Rural	Rural	High status	2			6			8	5	5
High Status Urban	Urban	High status							2		2
Castle Rural	Rural	High status							2	2	2
Castle Urban	Urban	High status								3	2
Religious Rural	Rural	Ecclesiastical	1	1		5		1	6		2
Religious Urban	Urban	Ecclesiastical			1				2	3	1
Industrial Rural	Rural	Industrial	1			1	1			1	
Industrial Urban	Urban	Industrial				2			6	4	1
Trading Site	Urban	Trading		1		3	1			1	
Wic	Urban	Wic				15					
Burh	Urban	Burh				2	2		34	21	
Roman Site Re-Use	Urban	Roman site	5	1							
Viking Town	Urban	Domestic							16	5	
Temporary Occupation						2					
Rubbish Dump		Domestic				1			1	1	
Military	Urban	Military								2	
None Given			1	1	1	1		1	1	3	1
Total			56	16	7	70	8	2	96	65	30

Table 3.2: Definitions of soil and bedrock types included in the analysis

Category	Water deposits	Fine grained	Medium grained	Coarse grained	Glacial deposits	Peat
Soil types	alluvium,	brickearth, clay	sand	gravel	till	peat
	lacustrine, river					
	terrace, marine,					
	crag group					
Fertility	good	good	moderate	poor	moderate	poor
Drainage	moderate	poor	good	good		poor

Category	High draining	Medium draining	Poor draining	Volcanic
Bedrock	chalk, gravel,	siltstone	mudstone,	mafic lava
	sandstone,		conglomerate,	
	limestone,		coal, ironstone	
	dolomite			
Drainage	good	moderate	poor	poor

Table 3.3: Calculation of Spearman's rs for rank correlation of height and proportion of cattle (as a % of cattle and sheep) using PAST (Hammer *et al*, 2001), and critical values from Fletcher and Lock (1994)

			Saxo-			
	Early	Middle	Late	Norman	Norman	
Spearman's rs	0.20407	-0.41701	-0.51205	-0.48174	-0.3677	
n	36	50	70	36	21	
Critical value at 5%	0.33	0.279	0.235	0.33	0.436	
95% correlation	N	Y	Y	Y	Ν	
Critical value at 1%	0.427	0.363	0.307	0.427	0.556	
99% correlation	N	Y	Y	Y	Ν	

Chapter 4:

Animals, Butchery and Diet



Figure 4.1: The most common domestic mammals (cattle, sheep and pig) as a proportion of all mammals recovered from all sites, and the domestic birds (goose, duck and fowl) as a proportion of all birds recovered.



Figure 4.2: Proportion of teeth in mandibles recovered from the total cattle, sheep or pig assemblage. Number of mandibles taken from those suitable for toothwear data (i.e. those containing two or more molars)



Figure 4.3a: Early Saxon cattle mortality curves showing tooth wear data (Hambleton, 1999). Minimum sample size of 10 mandibles per site. Full data given in Appendix E.



Figure 4.3b: Middle Saxon cattle mortality curves.



Figure 4.3c: Late Saxon cattle mortality curves.



Figure 4.3a: Saxo-Norman cattle mortality curves.



Figure 4.3e: Norman cattle mortality curves.



(Bd/GL)*100 (mm)

from early Saxon sites to investigate Sexual polymorphism (after Albarella, 1997). SD= shaft diameter; GL= greatest length; Bd= distal breadth.

Figure 4.4a: Plots of cattle

metacarpal measurements





Figure 4.4c: Plots of cattle metacarpal measurements from late Saxon sites.









Figure 4.6a: Early Saxon sheep mortality curves showing tooth wear data (Hambleton, 1999). Minimum sample size of 10 mandibles per site. Full data given in Appendix E.







Figure 4.6c: Late Saxon sheep mortality curves.



Figure 4.6d: Saxo-Norman sheep mortality curves.



Figure 4.6e: Norman sheep mortality curves.



Figure 4.7a: Plots of sheep metacarpal measurements from early Saxon sites to investigate sexual polymorphism (Davis, 1999: 389). SD= smalles diameter of shaft; GL= greatest length.



Figure 4.7b: Plots of sheep metacarpal measurements from middle Saxon sites.







Figure 4.7d: Plots of sheep metacarpal measurements from Saxo-Norman sites.





Figure 4.9a: Early Saxon pig mortality curves showing tooth wear data (Hambleton, 1999). Minimum sample size of 10 mandibles per site. Full data given in Appendix E.







Figure 4.9c: Late Saxon pig mortality curves.







Figure 4.9e: Norman pig mortality curves .



Figure 4.10: numbers of anatomical elements recorded with butchery marks. (n) number of reports available. Highest point= maximum; lowest point= minimum; X= mean.



Figure 4.11: Proportion of recorded butchery discussed below by phase. (n)= number of available reports . * circle= occipitale/ axis butchery; diamond= atlas



Figure 4.12: Recorded occurrance of saw marks. (n) number of reports containing butchery data







Figure 4.14: Sites of common butchery referred to in the text. See Table 4.1 for description of limb bone butchery. Illustrations A-C courtesy of http://digital.library.wisc.edu/1711.dl/Science.VetAnatImgs and D after Coutureau, 1976.



Figure 4.15: Proportion of skull butchery by species. (n) number of reports where butchery was recorded.



Figure 4.16: Proportion of sites where horn core removal is noted. (n) number of reports where butchery was recorded.



Figure 4.17: Proportion of mandible butchery by species. (n) number of reports where butchery was recorded.



Figure 4.18: Proportion of specific butchery marks noted on mandibles. 1chopped vertically through the diastema; 2- chopped through the ramus and/ or articular condyle; 3- knife marks; 4- chopped through the tooth row. (n) number of reports where butchery was recorded.



Figure 4.19: Proportion of butchery marks relating to the removal of the head. 1at the occipitale (base of the skull); 2- at the atlas (1st cervical vertebra); 3- at the axis (2nd cervical vertebra). (n) number of reports containing butchery data.



Figure 4.20: Proportion of specific butchery marks noted on vertebrae. 1- axial butchery only; 2- paramedial; 3- bi-lateral; 4- transverse butchery. (n) number of reports containing butchery data.



Figure 4.21: Proportion of specific butchery marks noted on fore limb bones. For key to butchery series see Table 4.1. (n) number of reports containing butchery data.



Figure 4.22: Proportion of specific butchery marks noted on hind limb bones. For key to butchery series see Table 4.1. (n) number of reports containing butchery data.



Figure 4.23: Proportion of specific butchery marks noted on lower limb bones. For key to butchery series see Table 4.1. (n) number of reports containing butchery data



Figure 4.24: Proportion of sites from which longitudinal splitting of bones occurred. (n) number of reports containing butchery data



Figure 4.25: Wither heights for the main domestic species by phase. Using indices by Fock (1966) and Matolcsi (1970) for cattle, and Teichert (1975a) for sheep and (1975b) for pigs. (n)= number of sites .



Figure 4.26a: Cattle log10 ratios for radius and metapodial lengths, using data from Iron Age cattle (Maltby, 1995) as a standard. The closer the measurement to 0, the more similar the population is to the standard.


Figure 4.26b: Cattle log10 ratios for humerus, radius, tibia and metapodial widths, using data from Iron Age cattle (Maltby, 1995) as a standard. The closer the measurement to 0, the more similar the population is to the standard.

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Figure 4.27: Pig log10 ratios for humerus, radius, tibia and metapodial widths, using data from Payne and Bull (1988) as a standard. The closer the measurement to 0, the more similar the population is to the standard.



Figure 4.28a: Sheep log10 ratios for radius, tibia and metapodial lengths, using data from modern soay sheep (Davis, 1996) as a standard. The closer the measurement to 0, the more similar the population is to the standard.



Figure 4.28b: Sheep log10 ratios for humerus, radius, tibia and metapodial widths, using data from modern soay sheep (Davis, 1996) as a standard. The closer the measurement to 0, the more similar the population is to the standard.



Fig 4.30: Cattle log ratio calculations for the astragalus. GLI= Greatest lateral length; Bd= Distal breadth.









Fig 4.31: Sheep log ratio calculations for the astragalus. GLI= Greatest lateral length; Bd= Distal breadth.



Fig 4.31 continued









Fig 4.32: Pig log ratio calculations for the greatest lateral length of the astragalus.









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R Nettleton Top

R Deansway

R West Stow

R Eye Kettleby

R Mundham R Fossets Farm

R Hay Green

H Flixborough

U Victoria Rd

. U Bury Road

U Winchcombe

U Abbey Green

U Knocker's site

H Castle Mall

U Brandon Rd

U City Defences I Site 1092

H Flixborough

. Church End

U Dragon Hall

U Deansway

U Kingswell St

U Castle Lane

R Harlington

I Mill Lane

R Wilton

U Staple Gardens

U Lincoln

U Staple Gardens

H North Elmham Park

H North Elmham Park c

H North Elmham Park b

R Brandon

R Barnsley Park

R Orton Hall Farm

R Melford Meadows

170

×

Early

Middle

Saxo-Norman

×

×

×

~×

×

×

×

190

210

230



Figure 4.34: Plots of the minimum, maximum and mean measurements of selected sheep bones. H= high status; R= rural; U= urban; I= industrial

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R Nettleton Top R Old Down Farm

R Old Down Farm R Fossets Farm R Barnsley Park R Eye Kettleby R Pennyland R Orton Hall Farm R West Stow

R Cadley rd R Sites 94 and 95 R Brandon W Melbourne St H Flixborough U 23-27 High Street R The south manor area W Friend's Provident H North Elmham Park R Gosberton R Rose Hall Farm

U Lurk Lane U Staple Gardens U City Defences U Abbey Green U Bury Road H Castle Mall U Brandon Rd U Knocker's site R The south manor area L Site 1092

H North Elmham Park b

. Church End U Dragon Hall R Wilton R Harlington U Staple Gardens U 23-27 High Street I Mill Lane U Castle Lane

I Site 1092 H Flixborough U Lincoln

. Church End

U Danesgate





Figure 4.34 continued



selected pig bones. H= high status; R= rural; U= urban; I= industrial



Figure 4.36: Cattle log10 ratios from high-status and non high-status sites.



Figure 4.37: Plots of the breadth of distal cattle tibiae, split into those from high-status sites, and those from other sites.





Figure 4.38: Sheep log10 ratios from high-status and non high-status sites.



Figure 4.39: Pig log10 ratios from high-status and non high-status sites.



Figure 4.40: Sheep tibia distal breadth measurements for high-status and other site types.



Figure 4.41: mean % main domesticates from all sites/ phase. (n)= number of sites







Figure 4.43: Relative proportions (NISP) of cattle, sheep and pig from various site types (n)= number of sites



Figure 4.44: Variation in the maximum, minimum and mean (x) numbers of horse and dog, as a proportion of the total cow, sheep, pig, horse and dog assemblage. (n)= number of sites.



Figure 4.45: Proportion of domestic birds as a % of the domestic mammal assemblage (cattle, sheep and pigs). (n)= number of sites where birds were recorded.



Figure 4.46: Relative proportions of domestic birds recovered from sites in Saxon England. (n)= number of sites where birds were recorded.



Figure 4.47: mean proportion of domestic birds (chicken, goose and duck), as a % of cattle sheep and pigs, recovered from various site types. (n)=number of sites



Figure 4.48: Variation in the maximum, minimum and mean numbers of the main wild mammals recovered from all sites. Given as a % of cow, sheep and pig. (n)= number of sites.





Figure 4.50: Average proportions of the minor species for each phase as a proportion of the total cattle, sheep and pig. * numbers for wild birds have been multiplied by 100 to make trends visible.



Figure 4.49: Relative proportions of wild mammals, as a proportion of the cattle, sheep and pig assemblage. Where bar values are given, these quantify proportions for that site type.









Figure 4.51: Percentage of sites where the major groups of edible wild birds were recorded. (n)= number of sites.



Figure 4.52: Mean NISP of wild bird species per site for broad site types. Data taken from sites where birds (domestic and/ or wild) were quantified (n)= total number of sites.









Figure 4.53: Diversity indices for sites where edible wild bird species were recorded. (n)= number of sites. N.B. 1= lowest possible score, where 1 wild bird species was recovered.







Figure 4.54b: Percentage of middle Saxon sites from which possible signature species of wild bird have been recovered. (n)= total number of sites where bird remains were recorded.



Figure 4.54c: Percentage of late Saxon sites from which possible signature species of wild bird have been recovered. (n)= total number of sites where bird remains were recorded.



Figure 4.54d: Percentage of Saxo-Norman sites from which possible signature species of wild bird have been recovered. (n)= total number of sites where bird remains were recorded.



Figure 4.55: Percentage of site types from which falconry birds (goshawk, sparrowhawk, peregrine falcon, kestrel and falconidae), scavengers (buzzard and kites) and other bird of prey species (owl, harriers, white tailed eagle, raptor) have been recorded. (n)= total number of sites where bird species were recovered.



Figure 4.56: Number of species present on sites by phase. (n)= number of sites where fish were recorded



Figure 4.57: Proportion of species from particular ocean zones. Littoral= near shore (0-200m); Sea floor= fish that live on the sea floor, generaly also littoral; Oceanic= off shore (>200m); and those which may occupy both littoral and oceanic habitats.



Figure 4.58a: Minimum, maximum and mean number of fish species recorded from broad early Saxon site types. (n)= number of sites where fish were recorded.



Figure 4.58b: Minimum, maximum and mean number of fish species recorded from broad middle Saxon site types. (n)= number of sites where fish were recorded.



Figure 4.58c: Minimum, maximum and mean number of fish species recorded from broad late Saxon site types. (n)= number of sites where fish were recorded.



Figure 4.58d: Minimum, maximum and mean number of fish species recorded from broad saxo-Norman site types. (n)= number of sites where fish were recorded.



Figure 4.59: Average number of marine species recorded at sites varying distances from the coast.



Figure 4.60: Proportion of sites from which domestic birds (chicken, goose and duck), wild birds and wild mammals (deer and hare) were recorded.
Fore Limbs		Description
Scapula	1	hole in shaft
	2	spine removed
	3	chopped through at the distal end/ glenoid cavity
	4	chopped through shaft
	5	chop marks made parallel to spine
	6	knife marks
Humerus	7	chopped through at the distal end
	8	knife marks on the distal end
	9	chopped at the proximal end
	10	chopped through shaft
	11	knife marks
Radius	12	chopped at the proximal end
	13	knife marks
	14	chopped at the shaft
	15	chopped at the distal end
Ulna	16	chopped at the proximal end
	17	chopped at the olecranon/ articular surface
	18	knife marks at the proximal end
	19	knife marks on the shaft
	20	chop marks on the shaft
Hind Limbs		Description
Pelvis	21	chopped acetabulum
	22	knife marks acetabulum
	23	chopped ilium
	24	chopped ischium
	25	chopped pubis
	26	knife marks
Femur	27	chopped proximal end
	28	chopped shaft
	29	chopped distal end
	30	knife marks
Tibia	31	chopped proximal end
	32	chopped shaft
	33	chopped distal end
	34	knife marks
Tarsals	35	chopped astragalus
	36	knife marks astragalus
	37	chopped calcaneum
	38	knife marks calcaneum
Howerlimbe		Description

Table 4.1: Key to butchery recorded on limb bones

Lower Limbs		Description
Metapodia	39	chopped proximal end
	40	chopped shaft
	41	chopped distal end
	42	knife marks
Phalanges	43	chopped
	44	knife marks

Table 4.2: Evidence for antler, horn and bone working waste from Saxon sites, and sites where sawing is noted

Site	Phase	Recorded as	Nature of waste
West Stow, Suffolk	Early Saxon	Antler, horn and bone working	Antler, cattle and sheep horn cores, sheep and horse tibia, pig fibula, sheep astragalus, deer, cattle, sheep and horse metapodia and horse and cattle phalanges
Sherborne House, Lechlade	Early Saxon	Horn working	Sheep horn cores
Melbourne St, Southampton	Middle Saxon	Antler, horn and bone working	Cattle, sheep and goat horn cores, long bones, antler
Lyceum Theatre, London	Middle Saxon	Antler working	Antler
St James's Street, London	Middle Saxon	Horn and Antler working	Cattle and sheep horn cores, antler
National Gallery Basement, London	Middle Saxon	Antler, horn and bone working	Antler, sheep horn cores, cattle and deer metapodia
Fishergate, York	Middle Saxon	Antler working	Antler offcuts
Portchester Castle	Early-late Saxon	Horn and Bone working	Cattle and sheep horn cores, 'bone tool working wate'
Winchcombe	Late Saxon	Bone working	Humerus and radius
27, Jewry Street, Winchester	Late Saxon	Horn working	Cattle, sheep and goat horn cores
Coppergate, York	Late Saxon	Antler working	Antler offcuts
Castle Mall, Norwich	Saxo-Norman	Bone working	Cattle and sheep metapodia. Cattle femoral heads
Wilton, Salisbury	Early-Middle Saxon	Butchery	Sawn horn
Western Suburb, Winchester	Late Saxon	Butchery	Sawn horn
Aelfric's Abbey, Oxfordshire	Early-Norman	Butchery	Sawn horn
Castle Lane, Bedford	Saxo-Norman	Butchery	Sawn antler
Western Suburb, Winchester	Saxo-Norman	Butchery	Sawn horn
SOU25, Southampton	Saxo-Norman	Butchery	Sawn horn

Anatomy	Abbreviation	Measurement		
Scapula	GLP	Length of glenoid process		
	SLC	Smallest length of the neck		
Humerus	Bd	Greatest breadth of the distal end		
	вт	Greatest breadth of trochlea		
	НТС	Height of trochlea		
Radius	Bd	Greatest breadth of the distal end		
	Вр	Greatest breadth of the proximal end		
	GL	Greatest length		
Tibia	Bd	Greatest breadth of the distal end		
	Вр	Greatest breadth of the proximal end		
	GL	Greatest length		
Astragalus	Bd	Greatest breadth of the distal end		
	GLI	Greatest length of the lateral half		
	GLm	Greatest length of the medial half		
	SD (D1)	Greatest depth of the lateral half		
Calcaneus	GL	Greatest length		
Metacarpal	Bd	Greatest breadth of the distal end		
	Вр	Greatest breadth of the proximal end		
	GL	Greatest length		
	SD	Smallest breadth of the diaphysis		
Metatarsal	Bd	Greatest breadth of the distal end		
	Вр	Greatest breadth of the proximal end		
	GL	Greatest length		
	SD	Smallest breadth of the diaphysis		

Table 4.3: Abbreviations used in the measurements given as log ratios (for illustrations see von den Driesch, 1976)

Cattle	T value	Sample	d.f	Significance
Metacarpal GL				
Early-Middle	-0.629	120	118	n
Middle-Late	2.989	192	190	Y 1%
Late-Saxo-Norman	0.811	193	191	n
Metacarpal Bd				
Early-Middle	1.258	106	104	n
Middle-Late	1.495	211	209	n
Late-Saxo-Norman	1.408	255	253	n
Tibia Bd				
Early-Middle	-0.035	81	79	n
Middle-Late	1.589	270	268	n
Late-Saxo-Norman	1.827	258	256	n
Radius Bd				
Early-Late	2.5107	78	76	y 2%
Late-Saxo-Norman	-1.3702	78	76	n
Humerus Bd				
Early-Late	3.5537	25	23	y 1%
Late-Saxo-Norman	-1.4991	41	39	n
Astragalus GLI				
Early-Middle	-1.654	94	92	n
Middle-Late	3.646	399	397	Y 0.1%
Late-Saxo-Norman	4.262	412	410	Y 0.1%

Table 4.4: unpaired T Test for two samples. D.f. =
degrees of freedom. Significance given to highest
level. n= no significant difference between populations

Sheep	T value	Sample	d.f	Significance
Metacarpal GL				•
Early-Middle	2.245	138	136	Y 5%
Middle-Late	1.828	129	127	n
Late-Saxo-Norman	-2.226	163	161	Y 5%
Metacarpal Bd				
Early-Middle	-2.352	137	135	Y 2%
Middle-Late	0.9402	227	225	n
Late-Saxo-Norman	7.209	173	171	Y 0.1%
Tibia Bd				
Early-Middle	-3.283	151	149	Y 1%
Middle-Late	1.366	678	676	n
Late-Saxo-Norman	4.298	725	723	Y 0.1%
Radius GL				
Early-Middle	-1.082	82	80	n
Middle-Late	2.015	129	127	n
Late-Saxo-Norman	1.469	103	101	n
Radius Bp				
Early-Middle	-1.775	105	103	n
Middle-Late	0.725	318	316	n
Late-Saxo-Norman	2.464	324	322	Y 2%
Humerus BT				
Early-Middle	-2.514	74	72	Y 2%
Middle-Late	1.278	340	338	n
Late-Saxo-Norman	2.288	235	323	Y 5%

Table 4.5 continued

Pig	T value	Sample	d.f	Significance
Tibia Bd				
Early-Middle	0.1493	28	26	n
Middle-Late	1.665	152	150	n
Late-Saxo-Norman	1.685	166	164	n
Astragalus GLI				
Early-Middle	1.38	20	18	n
Middle-Late	1.415	80	78	n
Late-Saxo-Norman	1.751	84	82	n
Radius Bp				
Middle-Late	2.758	67	65	y 1%
Late-Saxo-Norman	2.702	83	81	y 1%
Humerus Bd				
Early-Late	2.9541	28	26	y 1%
Late-Saxo-Norman	-1.2147	46	44	n

Table 4.5: results of the Kruskal-Wallis test used to compare the log ratios of cattle, sheep and pig limb bones from various regions.

ES CL	Sample	East	Midlands	South
East	95	0.000	0.584	0.926
Midlands	8	1.000	0.000	0.796
West	6	1.000	1.000	0.000
Н		0.313		
p(same)		0.086		

LS CL	Sample		East	South	
East		478		0.000	0.137
South		14		0.137	0.000
н				2.199	
p(same)				0.138	

SN CL	Sample		midlands	East	South	ı
midlands		24	0.000		0.806	0.604
east		44	1.000		0.000	0.593
south		23	1.000		1.000	0.000
н			0.766			
p(same)			0.858			

ES CW	Sample	East	Midlands	South
East	258	0.000	0.808	0.348
Midlands	24	1.000	0.000	0.567
South	55	1.000	1.000	0.000
н		0.936		
p(same)		0.626		

MS CW	Sample	East		South	
East	480		0.000	C	.919
Midland	12		0.919	C	.000
н			0.011		
p(same)			0.918		

LS CW	Sample	East	South
East	1078	0.000	0.000
South	116	0.000	0.000
н		19.860)
p(same)		0.000	

SN CW	Sample	East	Midlands	South
East	173	0.000	0.150	0.093
Midlands	78	0.451	0.000	0.011
South	174	0.278	0.033	0.000
н		7.328		
p(same)		0.026		

ES= early Saxon MS= middle Saxon LS= late Saxon SN= Saxo-Norman

CW= cattle widths CL= cattle lengths Table 4.5 continued

ES SL	Sample	East	South
East	210	0.000	0.195
West	6	0.195	0.000
н		1.669)
P (same)		0.196	5

LS SL	Sample	East	South
East	412	0.000	0.000
South	59	0.000	0.000
н		27.150)
P(same)		0.001	L

SN SL	Sample	East	South	
East	36		0.000	0.013
South	40		0.013	0.000
н			6.032	
P(same)			0.014	

ES SW	Sample	East	Midlands
East	204	0.000	0.000
Midlands	28	0.000	0.000
н		16.960	
P(different)		0.000	

MS SW	Sample	East	South
East	250	0.000	0.000
South	13	0.000	0.000
н		15.540	
P(same)		0.000	

LS SW	Sample	East	North	South
East	944	0.000	0.000	0.000
North	72	0.000	0.000	0.467
South	235	0.000	1.000	0.000
н		141.500		
P(same)		0.000		

SN SW	Sample	East	South		Midlands
East	168	0.	000	0.900	0.601
South	195	1.	000	0.000	0.589
Midlands	5	1.	000	1.000	0.000
н		0.	305		
P(same)		0.	859		

ES= early Saxon MS= middle Saxon LS= late Saxon SN= Saxo-Norman

SW= sheep widths SL= sheep lengths Table 4.5 continued

LS PIG	Sample	East	South
East	306	0.000	0.000
South	51	0.000	0.000
Н		68.400	
P(same)		0.000	

SN PIG	Sample	East	South
East	56	0.000	0.000
South	61	0.000	0.000
н		14.110	
P(same)		0.000	

LS= late Saxon SN= Saxo-Norman

Phase	Site Name
Sites where wild pigs ha	ve been postively identified in the site report
Early Saxon	Viroconium, Wroxeter
Early-middle Saxon	Wolverton Turn enclosure, stony stratford
Middle Saxon	Viroconium, Wroxeter
Middle Saxon	Fishergate, York
Middle Saxon	Lake End Road
Middle Saxon	Flixborough
Middle Saxon	Lot's Hole
Late Saxon	Lurk Lane, Beverley
Late Saxon	Stafford Castle
Late Saxon	Flixborough
Late Saxon	Bury Road, Thetford
Late Saxon	Coppergate, York
Late Saxon-Norman	Fishergate, York
Norman	Lurk Lane, Beverley
Norman	Stafford Castle
Norman	General Accident, York
Sites where wild pigs hav	ve been identified by metrical analysis (section 4.4.2)
Early Saxon	Fossets Farm, Southend
Late Saxon	Staple Gardens, Winchester
Late Saxon	Site 1092, Thetford
Late Saxon-Norman	Staple Gardens, Winchester
Norman	Castle Mall, Norwich

Table 4.6: Recorded and inferred incidences of wild pigs

Table 4.7: Presence of particular water bird species from sites where wild birds were recorded.

					Long	
Early Saxon	Site Type	Duck	Goose	Wader	Legs	Swan
Barnsley Park, Gloucestershire	Rural	3				
Barton Court Farm, Abingdon	Rural			1		
Cadbury Congresbury, Somerset	Rural	1				
Deansway, Worcester	Rural					
Eye Kettleby, Leicestershire	Rural					
Manston rd, Ramsgate	Rural					
Mill st, Wantage	Rural				1	
Orton Hall Farm, Cambridgeshire	Rural			1		
Oxford Science Park	Rural					
Pennyland, Milton Keynes	Rural	1	1			
Poundbury, Dorchester	Rural	2				
Sherborne House, Lechlade	Rural				1	
Spicer's Warehouse, Sawston	Rural					
Walton vicarage, Aylesbury	Rural	1		1	1	
West Stow, Suffolk a	Rural	1		1	1	
West Stow, Suffolk b	Rural	1	1	3	1	1
West Stow, Suffolk c	Rural				1	
Viroconium, Wroxeter a	Re-Used Roman Town	1		1		
Viroconium, Wroxeter b	Re-Used Roman Town	2		3		
Viroconium, Wroxeter c	Re-Used Roman Town	1	1	3	1	1
Viroconium, Wroxeter d	Re-Used Roman Town	1		2		1
Bonners Lane, Leicester	Re-Used Roman Town	1				
					Long	
Middle Saxon	Site Type	Duck	Goose	Wader	Legs	Swan
Brandon, Suffolk	Rural			1	2	1
Gosberton, Lincs	Rural			1		
High Street, Ramsbury	Rural			1		
Marefair, Northampton	Rural	1				
National Portrait Gallery, London	Rural					
Saxon palaces, Northampton	Rural					1
St Peters Rd, Northampton	Rural				1	
Fishergate, York	Trading Site			1		
Lake End Road, Berkshire	Trading Site	1		2		
Sandtun, West Hythe	Trading Site			2	1	1
	Trading Site			-	-	
Cook St, Southampton	Wic	1		2	-	
Cook St, Southampton Friend's Provident, Southampton	Wic	1		2 1	-	
Cook St, Southampton Friend's Provident, Southampton Ipswich 1974-88	Wic Wic	1		2 1	-	1
Cook St, Southampton Friend's Provident, Southampton Ipswich 1974-88 Ipswich	Wic Wic Wic Wic	1 1 1		2	1	1
Cook St, Southampton Friend's Provident, Southampton Ipswich 1974-88 Ipswich Maiden Lane, London	Wic Wic Wic Wic Wic	1 1 1 1		2	1	1
Cook St, Southampton Friend's Provident, Southampton Ipswich 1974-88 Ipswich Maiden Lane, London Melbourne St, Southampton	Wic Wic Wic Wic Wic Wic	1 1 1 1		2 1	1	1
Cook St, Southampton Friend's Provident, Southampton Ipswich 1974-88 Ipswich Maiden Lane, London Melbourne St, Southampton Peabody site, London	Wic Wic Wic Wic Wic Wic Wic	1 1 1 1	1	2 1	1	1

					Long	
Middle Saxon	Site Type	Duck	Goose	Wader	Legs	Swan
Aelfric's Abbey, Eynsham	Ecclesiastical (rural)	2		1	1	
Church Close, Hartlepool	Ecclesiastical (rural)		1	1		
Hartlepool Monastery	Ecclesiastical (rural)		1	1		
Morison Hall, Hartlepool	Ecclesiastical (rural)					
Caister-on-Sea, Great Yarmouth	High Status (rural)	1	1			1
Copeshill rd, Lower Slaughter	High Status (rural)			1		
Flixborough, Lincs	High Status (rural)	2	1	4	2	1
Middleton Stoney, Northants	High Status (rural)				1	1
North Elmham Park, Norfolk	High Status (rural)	1		2	1	
Late Saxon	Site Type	Duck	Goose	Wader	Long Legs	Swan
Market field Stevning	Bural	Duck	Goose	Waaci	8-	Swan
Ribblebead Yorkshire	Rural					
Stevning Sussey	Rural				1	
Walton vicarage Avleshury	Rural			1	T	
Wearmouth and Jarrow	Rural	1		2		
West Cotton Baunds	Rural	1		2		
Abbey Green Chester	Burb			1		
All Saints Church, Oxford	Burh		1	2		
Chalk Lane Northampton	Burh		-	- 1		
Danesgate Lincoln	Burh			1		
Goss Street Chester	Burb			1		
Hinvey Hall Queen st Oxford	Burb	1	1	3	1	
Inswich 1974-88 h	Burb	1	1	5	1	
Inswich 1974-88 d	Burb				1	1
Inswich	Burh				1	1
Lincoln	Burb		1	1		
Many-Le-Port Bristol	Burb	2	-	1		
Portchastor Castle Hamps	Burb	2		0		
Stanle Gardens, Winchester	Burb	4		0	1	1
Trill Mill Stroom Ovford	Durh			1	T	1
Victoria Bd Winchostor	Durh		1	1		
Western Suburb, Winchester	Durh	1	T	1		
Winchcombo Gloucostorchiro	Burb	T		1		
Blue bridge lane. Vork	Danish Town		1	1		
	Danish Town	2	1			
Connergate Vork a	Danish Town	2				
Connergate, York a	Danish Town		1			
Connergate, York d	Danish Town		1	2	1	1
Knockor's site. Thetford	Danish Town	1	1	2	1	T
Micklegate Vork	Danish Town	T		T	1	
Milliano Thotford	Danish Town				T	
Tenements Durham City	Danish Town					
Connergate Vork c	Industrial (urban)		1	1		
Eishergate, Norwich	Industrial (urban)	1	T	Ţ		
Site 1002 Thetford	Industrial (urban)	1 2			1	
Sile 1092, Illeliolu	industriai (urban)	2			T	

					Long	
Late Saxon	Site Type	Duck	Goose	Wader	Legs	Swan
Aelfric's Abbey, Eynsham c	Ecclesiastical (rural)			1	1	
Aelfric's Abbey, Eynsham d	Ecclesiastical (rural)			4		
Bishopstone, Seaford	Ecclesiastical (rural)			4	2	
Lurk Lane, Beverley	Ecclesiastical (rural)	1				
Dorter Undercroft, Westminster	Ecclesiastical (urban)	1	1		2	
Lewes Priory, Sussex	Ecclesiastical (urban)					1
Faccombe netherton, Hamps	High Status (rural)					
Flixborough, Lincs	High Status (rural)	1	1	4	1	1
North Elmham Park, Norfolk b	High Status (rural)				1	
North Elmham Park, Norfolk c	High Status (rural)	1		1		
Stafford Castle	High Status (rural)			2		
Castle Mall, Norwich	High Status (urban)					
					Long	
Saxo-Norman	Site Type	Duck	Goose	Wader	Legs	Swan
Lordship Lane, Cottenham	Rural				1	
Wearmouth and Jarrow	Rural	1		1		
Wraysbury, Berkshire	Rural	1		3		
Botolphs, Bramber	Rural					
Bartholemew Street, Newbury	Burh					
Saxon palaces, Northampton	Burh					
SOU25, Southampton	Burh	2			1	
Western Suburb, Winchester	Burh			2	2	
Henley's Garage, Winchester	Burh					
Staple Gardens, Winchester	Burh			1		
Castle Lane, Bedford	Burh					
Ipswich 1974-88	Burh	1				
Deansway, Worcester	Burh			1		
Exeter	Burh			3		
Lincoln	Danish Town		1			
Dragon Hall, Norwich	Danish Town					
Danesgate, Lincoln	Danish Town			1		
The Mound, Glastonbury	Industrial (rural)					1
Fishergate, York	Ecclesiastical (urban)			1		
Barking Abbey	Ecclesiastical (urban)	1			2	
Faccombe Netherton, Norfolk	High Status (rural)					
Castle Rising Castle, Norfolk	High Status (rural)					
Trowbridge, Wiltshire	High Status (rural)		1	2		
Guildford Castle	High Status (rural)			1		
Castle Lane, Bedford	High Status (urban)					
Crown Car Park, Nantwich	High Status (urban)			1		

Category	Species	Early Saxon	Middle Saxon	Late Saxon	Saxo-Norman
Water Birds	Ducks (all)	15	11	19	6
	Mallard	8	5	5	3
	Pochard	1			
	Widgeon	2	1	7	
	Water Rail	1	1	1	
	Teal	3	4	1	3
	Smew			1	
	Goosander			1	
	Tufted Duck			1	
	Shelduck			1	
	Pintail			1	
	Geese	3	6	1	3
	Swan	3	7	5	1
	Diver		2	1	
	Moorhen/ Coot	1	1		
	Crane	3	8	13	4
	Heron	3	1	1	2
	Stork	1		1	1
	Waders (all)	15	20	46	17
	Bittern		1	1	
	Curlew		2	4	1
	Dunlin			2	
	Godwit			1	
	Golden Plover	1	2	4	1
	Lapwing	1	1	3	1
	Oystercatcher		1	2	
	Plover	4	2	7	1
	Redshank	1		2	1
	Snipe	2	1	3	2
	Wader spp.	2	3	2	2
	Whimbrel			1	
	Woodcock	4	7	14	8
Small Birds	Perching birds	12	17	5	7
	Turdus spp.	6	7	4	1
	Columba spp.	9	19	23	17
Sea Birds	Gull spp.	1	4	6	3
	Guillemot		1	1	
	Tern		1	1	
	Cormorant			1	
	Osprey				
	Gannet		1		
Game Birds	Pheasant	2	2	2	1
	Grouse	2	1	5	
	Capercaille			1	
	Quail	2			
	Partridge	2	2	2	4
	Corncrake	1			1
Exotics	Peafowl		1	1	2
	Pelican				1

Table 4.8: Recorded occurrance of bird species throughout the Saxon period

Category	Species	Early Saxon	Middle Saxon	Late Saxon	Saxo-Norman
Birds of Prey	Goshawk		1	5	2
	Peregrine Falcon		1	1	1
	Sparrowhawk	1	4	3	4
	Kestrel			1	
	Buzzard	3	5	6	2
	Red Kite	1	6	4	
	Kite		1	1	
	Harrier		2	2	2
	White Tailed Eagle	1	3		
	Barn Owl	2			
	Owl		2	2	
	Falcon			1	1
	Raptor		2	1	

Table 4.9: Presence of particular game bird species

Early Saxon	Site Type	Pheasant	Grouse	Capercaille	Quail	Partridge	Corncrake
Barnsley Park, Gloucs	Rural	1				1	
Spicer's Warehouse, Sawston	Rural	1					
Viroconium, Wroxeter c	Re-used Roman Town		1		1	. 1	. 1
Viroconium, Wroxeter d	Re-used Roman Town		1		1		
Middle Saxon	Site Type	Pheasant	Grouse	Capercaille	Quail	Partridge	Corncrake
Fishergate, York	Trading	1					
Aelfric's Abbey, Eynsham	Ecclesiastical (rural)					1	
Flixborough, Lincs	High Status (rural)	1	1				
Middleton Stoney, Northants	High Status (rural)					1	
Late Saxon	Site Type	Pheasant	Grouse	Capercaille	Quail	Partridge	Corncrake
Ribblehead, Yorkshire	Rural					1	
Walton vicarage, Aylesbury	Rural					1	
Tenements, Durham City	Rural		1	. 1			
Ipswich	Burh		1				
Lincoln	Burh	1					
Staple Gardens, Winchester	Burh	1					
Coppergate, York d	Danish Town		1				
Coppergate, York c	Industrial (urban)		1				
Flixborough, Lincs	High Status (rural)		1	·			
Late Saxon	Site Type	Pheasant	Grouse	Capercaille	Quail	Partridge	Corncrake
Wraysbury, Gloucestershire	Rural					1	1
Staple Gardens, Winchester	Burh	1				1	
Castle Lane, Bedford b	Burh					1	
Castle Lane, Bedford c	High Status (urban)					1	

Table 4.10: Prey species of the major birds of prey recovered from Saxon sites (after Serjeantson, 2009)

Species	Natural prey	Main prey when trained
Eagle	Mammals to 4kg (fox, hare, rabbit); birds to 1.2kg (grouse, ptarmigan), carrion	Wolf, small deer
Goshawk	Birds to 1.2kg (pigeon, thrush, pheasant, grouse, partridge); mammals to 1.5kg (rabbit)	Heron, goose, bustard, crane, hare, rabbit, pheasant, partridge pigeon
Sparrowhawk	Birds to 500g (woodpigeon, trush, grouse)	moorhen, partridge
Peregrine Falcon	Birds to 600g (pigeon, grouse, thrush)	pheasant, partridge
Kestrel	Mammals to 100g (voles); small birds; insects	
Buzzard	Mammals to 500g (rabbit); birds to 600g; carrion	Rabbit, moorhen, squirrel

Table 4.11: Presence of birds of prey and prey species

			Falc	onry l	Birds		Sc	aveng	ers		C	thers				Prey		
Early Saxon Viroconium, Wroxeter c Viroconium, Wroxeter d Barton Court Farm, Abingdon Cadbury Congresbury Pennyland, Milton Keynes West Stow	Site Type Re-used Roman town Re-used Roman town Rural Rural Rural Rural	Goshawk	Peregrine	* Sparrowhawk	Kestrel	Falconidae	* * * Buzzard	* Red Kite	Kite	Harrier	* White Tailed Eagle	* * Barn Owl	lwo	Raptor	* * * * * Small Birds	Heron/ * Stork/ Crane/ Bittern	* * Game Birds	* * * * * Hare
Middle Saxon	Kurui																	
Aelfric's Abbey, Eynsham	Ecclesiastical (rural)						*								*	*	*	*
Church Close, Hartlepool	Ecclesiastical (rural)			*											*			*
Hartlepool Monastery	Ecclesiastical (rural)			*											*			
Wearmouth and Jarrow	Ecclesiastical (rural)												*		*			
Flixborough	High status (rural)						*	*		*			*	*	*	*	*	*
North Elmham Park	High status (rural)			*			*	*							*	*		*
High Street, Ramsbury	Industrial (rural)							*										
Brandon	Rural		*				*								*	*		*
Crow hall park, Downham Market	Rural										*							
Gosberton	Rural									*								
Fishergate, York	Trading site						*	*						*	*		*	*
Lake End Road	Trading site										*				*			*
Sandtun, West Hythe	Trading site								*						*	*		
Ipswich	Wic	*													*	*		
Maiden Lane	Wic			*														
Peabody site	Wic							*										
Lot's Hole								*			*							

Table 4.11 continued

			Falc	onry E	Birds		Sc	aveng	ers		(Others				Prey		
Late Saxon Chalkoit Field North, Sedgeford	Site Type	* Goshawk	Peregrine	Sparrowhawk	Kestrel	Falconidae	* Buzzard	Red Kite	Kite	Harrier	White Tailed Eagle	Barn Owl	Owl	Raptor	Small Birds	Heron/ Stork/ Crane/ Bittern	Game Birds	Hare
Longstanton	Rural													*				*
Exeter as whole	Burh			*											*			
lpswich 1974-88 c	Burh			*						*					*	*		*
· Victoria Rd, Winchester	Burh					*												*
Ipswich 1974-88 b	Burh					*									*			
lpswich 1974-88 d	Burh		*							*						*		*
Portchester Castle	Burh							*							*			*
Winchcombe	Burh	*																
Bury Road, Thetford	Danish town							*										
Coppergate, York	Industrial (urban)	*													*		*	*
Site 1092, Thetford	Industrial (urban)						*									*		
Aelfric's Abbey, Eynsham	Ecclesiastical (rural)								*							*		
Bishopstone, Seaford	Ecclesiastical (rural)			*									*		*	*		*
Vicarage Garden, Brixworth	Ecclesiastical (rural)				*													*
Flixborough	High status (rural)						*	*		*			*		*	*	*	*
Goltho	High status (rural)						*											*
North Elmham Park b	High status (rural)			*			*								*	*		
North Elmham Park c	High status (rural)			*				*							*			*
Stafford Castle	High status (rural)	*													*		*	*
Castle Mall, Norwich	High status (urban)	*					*								*			*

Table 4.11 continued

			Falc	onry l	Birds		Sc	aveng	ers		(Others				Prey		
Saxo-Norman	Site Type	Goshawk	Peregrine	Sparrowhawk	Kestrel	Falconidae	Buzzard	Red Kite	Kite	Harrier	White Tailed Eagle	Barn Owl	Owl	Raptor	Small Birds	Heron/ Stork/ Crane/ Bittern	Game Birds	Hare
Barking Abbey	Ecclesiastical (urban)									*						*		
Faccombe netherton	High status (rural)	*													*			*
Castle Lane, Bedford	High status (urban)		*														*	*
Mill Lane, Thetford	Industrial (urban)			*											*			*
Little Chester, Derby	Military			*														*
Lordship Lane, Cottenham	Rural						*									*		
Wraysbury	Rural	*					*								*		*	

					5	Saxo-				
	Species	Early	Middle	Late	I	Norman	Norman			
Freshwater	Barbel			3	1	3				
	Bream			6	3	5	1			
	Burbot			2	5	1	1			
	Carp		1	3	6	3	2			
	Chub			2	5	5	1			
	Cyprinid		1	5	3	6	2			
	Dace			2	5	5	1			
	Grayling			1	3					
	Gudgeon			2	1	1	1			
	Perch		3	3	3	2	4			
	Percidae			1						
	Pike		7	8	15	6	7			
	Roach			9	8	1	2			
	Rudd		1	4	2	2				
	Ruffe				1					
	Stickleback			2	5	2	1			
	Tench		1	2	6	1	1			
	Trout			3	6	4	1			
Migratory	Eel		8 1	L8	19	20	7			
	Clupeidae			2		2				
	Flounder		1	9	5	4				
	Mullet			5	1	1				
	Pleuronectid			1	1					
	Salmon		1 1	L5	9	8	5			
	Shad			3	4	1				
	Smelt		1	3	6	4	1			
	Sturgeon			3	2	1	1			
	N sites		15 2	27	38	28	12			

Table 4.12: Number of sites from which various fish species were recovered

Table 4.12 con	tinued
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		Saxo-										
	Species	Early		Middle	Late		Norman	Norman	L	C)	F
Marine	Bass			6		2	3	1	Y			Y
	Brill			3			1		Υ			Y
	Bullrout			1					Y			Y
	Cod		1	14		20	13	10	Y			
	Conger			2		1	2		Υ	Y	<u>'</u>	
	Dab					1	1		Υ			Y
	Dogfish		1			1	1		Υ			Y
	Elasmobranch			1		2	1	1		Y	<u>'</u>	
	Flatfish		3	13		9	10	2	Y			Y
	Gadid			4		4	5	4	Y	Y	<u>'</u>	
	Garfish			2		1	1		Υ			
	Gilthead							1	Υ			Y
	Gurnard			4			3		Υ			Y
	Haddock			9		8	6	4	Υ			Y
	Hake			6		2	1		Υ			Y
	Halibut			1		1	1		Y	Y	1	Y
	Herring/ Sprat		4	11		21	17	4	Y	Y	1	
	John dory			1					Y			
	Ling			4		3	3	3	Y	Y	1	Y
	Mackerel			5		9	8	4	Υ			
	Pandora						1		Y			
	Piper						1		Y			
	Plaice		1	8		6	7	2	Y			Y
	Pollack			1			1		Y			
	Ray		2	8		10	5	1	Y			Y
	Roker/ Thornback ray			2		4	1	2	Y	Y	1	Y
	Saithe					1	2	1	Y	Y	'	Y
	Scad/ Horse mackerel			4		2	4		Y			
	Seabream			3		1	2		Y			Y
	Serranid						1					
	Shark						2			Y	'	
	Sole			2					Y			Y
	Triglidae								Y			Y
	Tunny					1	1		ľ	Y	,	
	, Turbot			1		4	4		Y			Y
	Whiting		1	8		4	4	1	Y			
	Wrasse		-	4		1	1	_	Y			
	N sites		15	27		38	28	12		33	10	20

L= littoral zone, O= oceanic zone, F= floor-dwelling (data from Froese and Pauly, 2000)

Chapter 5:

Provisioning and Foodways in Saxon England



Figure 5.2: Location of sites within each region. See Table 5.1 for site descriptions











Figure 5.3: Principal Components Analysis of the Northern region in the middle Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birdsdb (fowl, geese, duck), wild birds- wb and wild mammals- wm (deer and hare) as a proportion of the total number of cattle, sheep and pigs. D= domestic; T= trading; W= wic; E= ecclesiastical; U= urban; R= rural.



Figure 5.4: Body part representation for the Northern region in the middle Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia. Sites included with sample size >50.



Figure 5.5: Cumulative mortality curves for each available site in the Northern region, middle Saxon phase. Based on mandible wear stages given by Hambleton (1999). Taken from sample sizes of ≥10 mandibles.



Figure 5.6: Principal Components Analysis for the Northern region, late Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birds - db(fowl, geese, duck), wild birds- wb and wild mammals- wm (deer and hare) as a proportion of the total number of cattle, sheep and pigs. H= high status; I= industrial; D= domestic; T= trading; B= burh; E= ecclesiastical; U= urban; R= rural; V= Danish town.



Figure 5.7: Cumulative mortality curves for each available site in the Northern region, late Saxon phase. Based on mandible wear stages given by Hambleton (1999). Taken from sample sizes of ≥10 mandibles.



Figure 5.8: Principal Components Analysis for the Eastern region, middle Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birds - db(fowl, geese, duck), wild birds- wb and wild mammals - wm(deer and hare) as a proportion of the total number of cattle, sheep and pigs. H= high status; I= industrial; D= domestic; T= trading; W= wic; E= ecclesiastical; U= urban; R= rural.



Figure 5.9: Body part representation for the Eastern region, middle Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia. Sites included with sample size >50.



Figure 5.10: Cumulative mortality curves for each available site in the Eastern region, middle Saxon phase. Based on mandible wear stages given by Hambleton (1999). Taken from sample sizes of ≥ 10 mandibles.



Component 1

Figure 5.11: Principal Components Analysis for the Eastern region, late Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birds- db (fowl, geese, duck), wild birds- wb and wild mammals- wm (deer and hare) as a proportion of the total number of cattle, sheep and pigs. H= high status; I= industrial; D= domestic; T= trading; B= burh; E= ecclesiastical; U= urban; R= rural; V= Danish town.



Figure 5.12: Body part representation for the Eastern region, late Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia . Sites included with sample size >50.



Figure 5.13: Cumulative mortality curves for each available site in the Eastern region, late Saxon phase. Based on mandible wear stages given by Hambleton (1999). Taken from sample sizes of ≥10 mandibles.


Figure 5.14: Principal Components Analysis for the Midland region, middle Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birds (fowl, geese, duck), wild birds and wild mammals (deer and hare) as a proportion of the total number of cattle, sheep and pigs. H= high status; I= industrial; D= domestic; T= trading; W= wic; E= ecclesiastical; U= urban; R= rural.



Figure 5.15: Body part representation for the Midland region, middle Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia. Sites included with sample size >50.



Figure 5.16: Cumulative mortality curves for each available site in the Midland region, middle Saxon phase. Based on mandible wear stages given by Hambleton (1999). Taken from sample sizes of ≥10 mandibles.



Figure 5.17: Principal Components Analysis for the Midland region, late Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birds - db(fowl, geese, duck), wild birds- wb and wild mammals- wm (deer and hare) as a proportion of the total number of cattle, sheep and pigs. H= high status; I= industrial; D= domestic; T= trading; B= burh; E= ecclesiastical; U= urban; R= rural.



Figure 5.18: Body part representation for the Midland region, late Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia. Sites included with sample size >50.



Figure 5.19: Cumulative mortality curves for each available site in the Midland region, late Saxon phase. Based on mandible wear stages given by Hambleton (1999). Taken from sample sizes of ≥10 mandibles.



Figure 5.20: Principal Components Analysis for the Western region, middle Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birds- db (fowl, geese, duck), wild birds- wb and wild mammals- wm (deer and hare) as a proportion of the total number of cattle, sheep and pigs. H= high status; I= industrial; D= domestic; T= trading; W= wic; E= ecclesiastical; U= urban; R= rural.



Figure 5.21: Body part representation for the Western region, middle Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia. Sites included with sample size >50.



Figure 5.22: Principal Components Analysis for the Western region, late Saxon phase. Relative proportions of cattle, sheep and pig. H= high status; I= industrial; D= domestic; T= trading; B= burh; E= ecclesiastical; U= urban; R= rural.



Figure 5.23 Body part representation for the Western region, late Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia. Sites included with >50 in the sample.



Figure 5.24: Principal Components Analysis for the Southern region, middle Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birds- db (fowl, geese, duck), wild birds- wb and wild mammals- wm (deer and hare) as a proportion of the total number of cattle, sheep and pigs. H= high status; I= industrial; D= domestic; T= trading; W= wic; E= ecclesiastical; U= urban; R= rural.



Figure 5.25: Body part representation for the Southern region, middle Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia. Sites included with >50 in the sample.



Figure 5.26: Cumulative mortality curves for each available site in the Southern region, middle Saxon phase. Based on mandible wear stages given by Hambleton (1999). Taken from sample sizes of ≥ 10 mandibles.



Figure 5.27: Principal Components Analysis for the Southern region, late Saxon phase. A- relative proportions of cattle, sheep and pig; B- of domestic birds - db(fowl, geese, duck), wild birds- wb and wild mammals - wm(deer and hare) as a proportion of the total number of cattle, sheep and pigs. H= high status; I= industrial; D= domestic; T= trading; B= burh; E= ecclesiastical; U= urban; R= rural.



Figure 5.28: Body part representation for the Southern region, late Saxon phase. Feet= phalanges; lower legs= metapodia; upper legs= scapula, humerus, radius, pelvis, femur, tibia. Sites included with >50 in the sample.



Figure 5.29: Cumulative mortality curves for each available site in the Southern region, lateSaxon phase. Based on mandible wear stages given by Hambleton (1999). Taken from sample sizes of ≥10 mandibles.



Figure 5.30: Abundance of domestic birds (domestic fowl, goose, duck), wild birds and wild mammals (red and roe deer and hare) on various site types. % given as a proportion of the total cattle, sheep and pig count. (n)= number of sites from which such data was available. Sites from the western regions were not included, due to their anomalous nature (see section 5.7.1)



Figure 5.31: Abundance of pigs on various site types. % given as a proportion of the total cattle, sheep and pig count. (n)= number of sites .



Figure 5.32: Suggested provisioning networks for middle Saxon England



Figure 5.33: Suggested provisioning networks for late Saxon England

Table 5.1: Sites referred to on the location maps, by region.

North	Site Name	Midlan	ds	Site Name
1	Blue Bridge Lane, York		41	113-119 High St, Oxford
2	Church Close, Hartlepool		42	Aelfric's Abbey, Eynsham
3	Church Walk (76), Hartlepool		43	All Saints Church, Oxford
4	Coppergate, York		44	Black Lion Hill, Northampton
5	Cottam, Yorkshire		45	Chalk Lane, Northampton
6	Fishergate, York		46	Chicheley, Bucks
7	Hartlepool Monastery		47	Cresswell Field, Yarnton
8	Lurk Lane, Beverley		48	Hinxey Hall, Queen St, Oxford
9	Micklegate, York		49	Langham Rd and Burystead, Raunds
10	Ribblehead		50	Marefair, Northampton
11	Site 39, Wharram		51	Middleton Stoney
12	Sites 94 and 95, Wharram		52	Saxon palaces, Northampton
13	Skeldergate, York		53	St Aldates, Oxford
14	St Saviourgate, York		54	St Ebbes, Oxford
15	Tenements, Durham City		55	St James' Square, Northampton
16	The South Manor Area, Wharram		56	St Peters Rd, Northampton
17	Walmgate, York		57	The Green, Northampton
18	Wearmouth and Jarrow		58	The Orchard, Walton Rd, Aylesbury
East	Site Name		59	Trill Mill Stream, Oxford
19	Brandon		60	Vicarage Garden, Brixworth
20	Brandon Rd, Thetford		61	Walton Lodge, Aylesbury
21	Bury Road, Thetford		62	Walton Vicarage, Aylesbury
22	Caister-on-Sea, Great Yarmouth		63	West Cotton, Raunds
23	Castle Mall, Norwich		64	Worton, Yarnton
24	Chalkpit Field North, Sedgeford		65	Yarnton
25	Crow Hall Park, Downham Market	West		Site Name
26	Fishergate, Norwich		66	Bristol Castle
27	Hay Green, Terrington St. Clement		67	Cadley Rd, Collingbourne Ducis
28	Ipswich		68	Cheddar Palaces
29	Ipswich 1974-88		69	Church Rd, Bishop's Cleeve
30	Knocker's Site, Thetford		70	Citizen House, Bath
31	Longstanton		71	Copeshill Rd, Lower Slaughter
32	Mill Lane, Thetford		72	High Street, Ramsbury
33	North Elmham Park		73	Market Lavington, Wiltshire
34	Rose Hall Farm, Walpole St. Andrew		74	Mary-le-Port, Bristol
35	Sedgeford, Norfolk		75	Winchcombe
36	Site 1092, Thetford			
37	Site 127 Bury St Edmunds			
38	St Barnabas Hospital, Thetford			
39	St nicholas St, Thetford			
40	Whitefriars Car Park, Norwich			

Table 5.1 continued

South	Site Name
76	21-24 Maiden Lane
77	27, Jewry Street, Winchester
78	Anderson's Road, Southampton
79	Bishopstone, Seaford
80	Chester Rd, Winchester
81	Church Lane, Canterbury
82	Cook St, Southampton
83	Dorter Undercroft, Westminster Abbey
84	Easton Lane, Winchester
85	Faccombe Netherton
86	Friars Oak, Hassocks
87	Friend's Provident, Southampton
88	James Street, London
89	Jubilee Hall, Covent Garden
90	Kintbury Square, Kintbury
91	Lake End Road
92	Lot's Hole
93	Lyceum Theatre, Exeter Street
94	Maiden Lane
95	Market Field, Steyning
96	Melbourne St, Southampton
97	National Gallery Extension
98	National Portrait Gallery
99	Peabody Site
100	Portchester Castle
101	Riverdene, Basingstoke
102	Sandtun, West Hythe
103	SARC XIV, Southampton
104	Six Dials, Hamwic
105	Staple Gardens, Winchester
106	Steyning
107	The Treasury, Whitehall
108	Ufton Nervet
109	Victoria Rd, Winchester
110	Western Suburb, Winchester

Table 5.2: Sites with evidence for perinatal or neonatal animals (those at mandible wear stage A), and those that died before reaching Stage B (c.6-8 months). After Hambleton, 1999. Where no value is given at wear stage A, this was not recorded in the original report.

Cattle	Site	Туре	Sample	% Stage A	% Stage A+B
Middle Saxon	The South Manor Area	Rural domestic	85	1%	2%
	Brandon	Rural domestic	102	1	1%
	Wicken Bonhunt	Rural domestic	104	1	1%
	Lake End Road	Temporary Occupation	117	0%	10%
	Fishergate	Trading site	21	0%	10%
	Melbourne St	Wic	392		6%
Late Saxon	Aelfric's Abbey d	Rural ecclesiastical	10	10%	10%
	Bishopstone	Rural ecclesiastical	22	0%	5%
	Aelfric's Abbey c	Rural ecclesiastical	104	1	10%
	Coppergate d	Urban domestic	52	1	2%
	Site 1092	Urban industrial	14	1	7%
	Coppergate c	Urban industrial	29	1	3%

Sheep	Site	Туре	Sample	% Stage A	% Stage A+B
Middle Saxon	Chalkpit Field North		8	0%	3%
	Aelfric's Abbey	Rural ecclesiastical	98	0%	12%
	Hartlepool Monastery	Rural ecclesiastical	51	6%	11%
	National Portrait Gallery	Rural domestic	57	1%	3%
	Brandon	Rural domestic	100		3%
	Sites 94 and 95	Rural domestic	39	0%	3%
	The South Manor Area	Rural domestic	247	3%	13%
	Wicken Bonhunt	Rural domestic	100		9%
	Lake End Road	Temporary Occupation	89	0%	2%
	Fishergate	Wic	35	0%	1%
	Ipswich	Wic	97		5%
	Melbourne St	Wic	378		5%
	Friend's Provident	Wic	63		1%
Late Saxon	Chalkpit Field North		53	0%	4%
	Portchester Castle	Burh	45	0%	9%
	The South Manor Area	Rural domestic	164	1%	3%
	Aelfric's Abbey c	Rural ecclesiastical	124	4%	4%
	Aelfric's Abbey d	Rural ecclesiastical	18	0%	6%
	Bishopstone	Rural ecclesiastical	89	2%	13%
	Faccombe Netherton	Rural high status	18	0%	11%
	Brandon Rd	Urban domestic	63	0%	3%
	Danesgate	Urban domestic	7	0%	14%
	Castle Mall	Urban high status	50	0%	10%
	Flaxengate	Urban industrial	57	2%	2%

Figure 5.2 continued

Pig	Site	Туре	Sample	% Stage A	% Stage A+B
Middle Saxon	Aelfric's Abbey	Religious Rural	121		7%
	Brandon	Rural Domestic	90		31%
	St Peters Rd	Rural Domestic	9		22%
	The South Manor Area	Rural Domestic	74	0%	3%
	Wicken Bonhunt	Rural Domestic	301		5%
	Lake End Road	Temporary Occupation	136	1%	5%
	Ipswich	Urban Domestic	69		17%
	Melbourne St	Urban Domestic	355	2%	2%
Late Saxon	Chalkpit Field North		28	0%	4%
	Faccombe Netherton	High-Status rural	23		4%
	Flaxengate	Industrial Urban	38	8%	8%
	Site 1092	Industrial Urban	31		3%
	Bishopstone	Religious Rural	46	7%	20%
	The South Manor Area	Rural Domestic	35	0%	6%

Chapter 6:

Status and Specialisation in Early Urban Contexts



Figure 6.1: Location of Wics to be investigated.



Figure 6.2: Location of sites within Hamwic see Table 7.1 for site codes. Shaded area shows the likely extent of the wic, and lines show the position of roads (after Brisbane, 1988).



Figure 6.3: Location of sites within Lundenwic- see Table 7.1 for site codes. Shaded area shows the likely extent of the wic, and lines show the position of roads (after Blackmore, 2002).



Figure 6.4: Location of Burhs and Danish towns to be investigated



See Table 6.2 for site codes. The shaded areas show the likely extent of each burh, and lines show the position of roads and rivers. Where no shading is present, the map represents the area of the medieval town. Circles show the approximate location of the Norman castle.



See Table 6.2 for site codes. The shaded areas show the likely extent of each burh, and lines show the position of roads and rivers. Where no shading is present, the map represents the area of the medieval town. Circles show the approximate location of the Norman castle.



See Table 6.2 for site codes. The shaded areas show the likely extent of each burh, and lines show the position of roads and rivers. Where no shading is present, the map represents the area of the medieval town. Circles show the approximate location of the Norman castle.



Figure 6.13: Distribution of species considered to be status indicators from Lundenwic sites. Proportions given as a % of the total cattle, sheep and pig.



Figure 6.14: Distribution of species considered to be status indicators from Hamwic sites. Proportions given as a % of the total cattle, sheep and pig.



Figure 6.15: Cumulative mortality curves from sites in Lundenwic and Hamwic. Based on mandible wear stages given by Hambleton (1999). (n)= number of mandibles.



Figure 6.16: Body part representation from sites in Lundenwic, as a % of the most common element. Feet= phalanges; lower legs= metapodia; upper legs= mean of scapula, humerus, radius, pelvis, femur and tibia. (n)= number of elements.



Figure 6.17: Body part representation from sites in Hamwic, as a % of the most common element. Feet= phalanges; lower legs= metapodia; upper legs= mean of scapula, humerus, radius, pelvis, femur and tibia. (n)= number of elements.





Figure 6.18: Distribution of sheep from sites in Lundenwic and Hamwic. Proportions given as a % of the total cattle and sheep assemblage.





Figure 6.19: Distribution of horse and dog remains from sites in Lundenwic and Hamwic. Proportions given as a % of the total cattle, sheep, pig, horse and dog assemblage.


Figure 6.20: Distribution of species considered to be status indicators from Northampton sites. Proportions given as a % of the total cattle, sheep and pig assemblage.



Figure 6.21: Distribution of species considered to be status indicators from Oxford sites. Proportions given as a % of the total cattle, sheep and pig assemblage.



Figure 6.22: Cumulative mortality curves from sites in late Saxon and Saxo-Norman Northampton. Based on mandible wear stages given by Hambleton (1999). (n)= number of mandibles



Figure 6.23: Cumulative mortality curves from sites in late Saxon Oxford. Based on mandible wear stages given by Hambleton (1999). (n)= number of mandibles



Figure 6.24: Body part representation from sites in late Saxon and Saxo-Norman Northampton, as a % of the most common element. Feet= phalanges; lower legs= metapodia; upper legs= mean of scapula, humerus, radius, pelvis, femur and tibia. (n)= number of elements.



Figure 6.25: Distribution of sheep from new burh sites. Proportions given as a % of the total cattle and sheep assemblage.



Figure 6.26: Distribution of horses and dogs in new burh sites. Proportions given as a % of the total cattle, sheep, pig, horse and dog assemblage.



Figure 6.27: Distribution of sheep and pigs from Oxford. Proportions given as a % of the total cattle, horse, pig and sheep assemblage (after Wilson, 1996).



Figure 6.28: Distribution of species considered to be status indicators from Winchester sites. Proportions given as a % of the total cattle, sheep and pig assemblage.









Figure 6.29: Distribution of species considered to be status indicators from Chester sites. Proportions given as a % of the total cattle, sheep and pig assemblage.



Figure 6.30: Distribution of species considered to be status indicators from London sites. Proportions given as a % of the total cattle, sheep and pig assemblage.



Figure 6.31: Cumulative mortality curves from sites in late Saxon and Saxo-Norman Winchester. Based on mandible wear stages given by Hambleton (1999). (n)= number of mandibles



Figure 6.32: Cumulative mortality curves from sites in late Saxon and Saxo-Norman London. Based on mandible wear stages given by Hambleton (1999).



Figure 6.33: Body part representation from sites in late Saxon and Saxo-Norman Winchester, as a % of the most common element. Feet= phalanges; lower legs= metapodia; upper legs= mean of scapula, humerus, radius, pelvis, femur and tibia. (n)= number of elements.



Figure 6.34: Body part representation from sites in late Saxon and Saxo-Norman London, as a % of the most common element. Feet= phalanges; lower legs= metapodia; upper legs= mean of scapula, humerus, radius, pelvis, femur and tibia. (n)= number of elements.







Figure 6.35: Distribution of sheep from re-used Roman town burh sites. Proportions given as a % of the total cattle and sheep assemblage.



FG

CI

FG

•FG

CM

FG

CM

•





6 Dog

0

0.1 - 2.0 2.1 - 5.0

5.1 - 10.0

, ∮BT

ΤL

.1 - 10.0





Figure 6.38: Distribution of species considered to be status indicators from Norwich sites. Proportions given as a % of the total cattle, sheep and pig assemblage.



Figure 6.39: Distribution of species considered to be status indicators from Thetford sites. Proportions given as a % of the total cattle, sheep and pig assemblage.



Figure 6.40: Cumulative mortality curves from sites in late Saxon and Saxo-Norman York. Based on mandible wear stages given by Hambleton (1999). (n)= number of mandibles



Figure 6.41: Cumulative mortality curves from sites in late Saxon and Saxo-Norman Thetford. Based on mandible wear stages given by Hambleton (1999). (n)= number of mandibles



Figure 6.42: Body part representation from sites in late Saxon and Saxo-Norman Thetford, as a % of the most common element. Feet= phalanges; lower legs= metapodia; upper legs= mean of scapula, humerus, radius, pelvis, femur and tibia. (n)= number of elements.



Figure 6.43: Body part representation from sites in late Saxon and Saxo-Norman Norwich, as a % of the most common element. Feet= phalanges; lower legs= metapodia; upper legs= mean of scapula, humerus, radius, pelvis, femur and tibia. (n)= number of elements.



Figure 6.44: Distribution of sheep from Danish town sites. Proportions given as a % of the total cattle and sheep assemblage.



Figure 6.45: Distribution of horses and dogs in Danish town sites. Proportions given as a % of the total cattle, sheep, pig, horse and dog assemblage.



Figure 6.46: Location of sites showing evidence for bone (blue triangle), horn (green diamond) and antler-working (red circle) in wics, as well as the presence of highest proportions of sheep (orange circle), dog (open circle) and horse remains (purple cross).







Figure 6.47: Location of sites showing evidence for bone, horn and antler-working in Burhs. Blue triangle= bone; green diamond= horn; red circle= antler waste.





Figure 6.47 continued

Matilda Holmes

London	Code	Total	n csp	% cattle	% sheep	% pig	% horse	% dog	% domestic	% wild	% wild
						-		_	birds	birds	mammal
							ļ		I	ل ــــــــــ	<u>اا</u>
21-24 Maiden Lane and 6-7 Exchange Court a	Mla	228	227	73	12	15	0.4	0.0	0.0	0.00	0.44
21-24 Maiden Lane and 6-7 Exchange Court b	MLb	1412	1409	51	16	34	0.0	0.2	1.3	0.00	0.50
James Street	JS	1684	1684	56	14	31	0.0	0.0	0.8	0.00	0.71
Jubilee Hall, Covent Garden	JH	1580	1544	55	22	24	0.2	2.1	2.5	0.06	0.45
Lyceum Theatre, Exeter Street	LT	3683	3681	67	17	15	0.0	0.0	1.0	0.00	0.41
Maiden Lane	ML	5321	5306	55	16	29	0.2	0.1	2.8	0.11	0.53
National Gallery Basement	NB	1606	1606	30	41	29	0.0	0.0	4.8	0.00	0.19
National Gallery Extension	NE	469	462	67	24	8	0.6	0.9	0.2	0.00	0.43
National Portrait Gallery	NP	4194	4189	39	45	16	0.0	0.1	4.7	0.00	0.05
Peabody Site	PS	4892	4878	47	23	30	0.2	0.1	2.7	0.12	0.43
The Treasury, Whitehall	TT	141	137	42	39	19	1.4	1.4	0.0	0.00	1.46
Hamwic											
Anderson's Road	AR	727	618	83	10	7	15.0	0.0	0.3	0.00	0.00
Cook St	CS	4719	4702	61	16	23	0.3	0.1	3.4	0.11	0.17
Friend's Provident, St Mary's Stadium	FP	3907	3891	62	20	18	0.3	0.1	3.4	0.00	0.93
Melbourne St	MS	45527	45455	53	32	15	0.1	0.1	2.6	0.06	0.18
SARC XIV	SA	9243	8910	70	20	9	3.6	0.0	1.2	0.02	0.00
Six Dials	SD	100	100	54	32	14	0.0	0.0	0.0	0.00	0.00

Table 6.1: Species representation from wic sites

Total= sum of cattle, sheep, pig, horse and dog; n= sum of cattle, sheep and pig; all proportions given as % of n except dog and horse, which are a % of total

Table 6.2: Species representation from sites within a) late Saxon new burhs. Tot	tal= sum of cattle, sheep, pig, horse and dog; n= sum of cattle, sheep and pig;
all proportions given as % of n except dog and horse, which are a % of total.	

										% Dom.	% Wild	% Wild
Northampton		Phase	Total	n csp	% Cattle	% Sheep	% Pig	% Horse	% Dog	bird	bird	mammal
Black Lion Hill	BL		281	276	40	42	18	1.1	0.7	10.5	0.00	0.00
Chalk Lane, Northampton	CL		5309	5252	31	56	12	0.8	0.3	8.8	0.17	0.11
Marefair	MF	Late Saxon	324	317	44	38	17	1.2	0.9	3.2	0.00	0.95
St James' Square (industrial)	SJ		481	415	48	45	7	12.3	1.5	0.0	0.00	0.24
The Green (industrial)	TG		927	910	35	50	15	1.5	0.3	0.0	0.00	0.33
Kingswell St and Woolmonger St	KS		427	426	32	57	11	0.2	0.0	13.4	0.47	0.00
Saxon palaces	SP	Saxo-Norman	1893	1867	39	42	19	0.8	0.6	8.0	0.21	0.32
St Peters Rd	PR		2478	2442	43	40	17	1.0	0.4	6.5	0.00	0.49
										% Dom.	% Wild	% Wild
Oxford		Phase	Total	n csp	% Cattle	% Sheep	% Pig	% Horse	% Dog	% Dom. bird	% Wild bird	% Wild mammal
Oxford 113-119 High st	HS	Phase	Total 562	n csp 552	% Cattle 52	% Sheep 29	% Pig 19	% Horse 1.2	% Dog 0.5	% Dom. bird 2.9	% Wild bird 0.18	% Wild mammal 0.36
Oxford 113-119 High st All Saints Church	HS AS	Phase	Total 562 937	n csp 552 926	% Cattle 52 31	% Sheep 29 43	% Pig 19 27	% Horse 1.2 1.1	% Dog 0.5 0.1	% Dom. bird 2.9 9.7	% Wild bird 0.18 0.86	% Wild mammal 0.36 0.54
Oxford 113-119 High st All Saints Church Codrington Library, Oxford	HS AS CL	Phase	Total 562 937 85	n csp 552 926 85	% Cattle 52 31 32	% Sheep 29 43 39	% Pig 19 27 29	% Horse 1.2 1.1 0.0	% Dog 0.5 0.1 0.0	% Dom. bird 2.9 9.7 16.5	% Wild bird 0.18 0.86 0.00	% Wild mammal 0.36 0.54 0.00
Oxford 113-119 High st All Saints Church Codrington Library, Oxford Hinxey Hall	HS AS CL HH	Phase	Total 562 937 85 769	n csp 552 926 85 766	% Cattle 52 31 32 20	% Sheep 29 43 39 44	% Pig 19 27 29 35	% Horse 1.2 1.1 0.0 0.0	% Dog 0.5 0.1 0.0 0.4	% Dom. bird 2.9 9.7 16.5 19.6	% Wild bird 0.18 0.86 0.00 6.92	% Wild mammal 0.36 0.54 0.00 2.22
Oxford 113-119 High st All Saints Church Codrington Library, Oxford Hinxey Hall St Aldates	HS AS CL HH SA	Phase Late Saxon	Total 562 937 85 769 478	n csp 552 926 85 766 454	% Cattle 52 31 32 20 44	% Sheep 29 43 39 44 33	% Pig 19 27 29 35 23	% Horse 1.2 1.1 0.0 0.0 5.0	% Dog 0.5 0.1 0.0 0.4 0.0	% Dom. bird 2.9 9.7 16.5 19.6 0.0	% Wild bird 0.18 0.86 0.00 6.92 0.00	% Wild mammal 0.36 0.54 0.00 2.22 0.22
Oxford 113-119 High st All Saints Church Codrington Library, Oxford Hinxey Hall St Aldates St Ebbes	HS AS CL HH SA SE	Phase Late Saxon	Total 562 937 85 769 478 2202	n csp 552 926 85 766 454 2167	% Cattle 52 31 32 20 44 25	% Sheep 29 43 39 44 33 58	% Pig 19 27 29 35 23 18	% Horse 1.2 1.1 0.0 0.0 5.0 1.4	% Dog 0.5 0.1 0.0 0.4 0.0 0.2	% Dom. bird 2.9 9.7 16.5 19.6 0.0 20.4	% Wild bird 0.18 0.86 0.00 6.92 0.00 0.00	% Wild mammal 0.36 0.54 0.00 2.22 0.22 0.22 0.60
Oxford 113-119 High st All Saints Church Codrington Library, Oxford Hinxey Hall St Aldates St Ebbes Trill Mill Stream a	HS AS CL HH SA SE TMa	Phase Late Saxon	Total 562 937 85 769 478 2202 404	n csp 552 926 85 766 454 2167 382	% Cattle 52 31 32 20 44 25 40	% Sheep 29 43 39 44 33 58 39	% Pig 19 27 29 35 23 18 21	% Horse 1.2 1.1 0.0 0.0 5.0 1.4 3.7	% Dog 0.5 0.1 0.0 0.4 0.0 0.2 1.7	% Dom. bird 2.9 9.7 16.5 19.6 0.0 20.4 5.8	% Wild bird 0.18 0.86 0.00 6.92 0.00 0.00 0.00 0.79	% Wild mammal 0.36 0.54 0.00 2.22 0.22 0.22 0.60 1.31

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Table 6.2 continued. b) Burhs within re-used Roman towns

										% Dom.	% Wild	% Wild
Winchester		Phase	Total	n csp	% Cattle	% Sheep	% Pig	% Horse	% Dog	bird	bird	mammal
27, Jewry Street	JS		323	314	45	37	18	1.5	1.2	6.7	0.00	0.64
Chester Rd, Winchester	CR		1175	1118	42	32	26	2.6	2.3	7.2	0.00	0.63
Staple Gardens	SGa	Lata Sayan	2454	2421	32	51	17	0.9	0.4	10.7	0.54	0.83
Victoria Rd a	VRa		1815	1736	44	38	18	2.9	1.4	4.4	0.12	0.40
Western Suburb a	WSa		18618	18399	48	27	25	0.3	0.9	2.1	0.05	0.09
Easton Lane	EL		204	196	13	83	4	2.5	1.5	0.5	1.02	0.00
Henley's Garage	HG		537	530	44	41	15	0.6	0.7	4.0	0.19	0.00
Staple Gardens	SGb	Saxo-Norman	1853	1811	35	45	19	1.8	0.5	12.5	0.39	0.83
Victoria Rd b	VRb		1291	1278	32	59	9	0.9	0.2	2.8	0.16	0.39
Western Suburb b	WSb		7865	7785	37	42	22	0.4	0.6	3.2	0.13	0.01
										% Dom.	% Wild	% Wild
Chester		Phase	Total	n csp	% Cattle	% Sheep	% Pig	% Horse	% Dog	bird	bird	mammal
Abbey Green	AG		893	865	73	7	20	1.8	1.3	0.8	0.23	1.04
Crook Street	CS	Lata Sayon	568	566	69	9	22	0.2	0.2	2.7	0.00	0.53
Goss Street	GS	Late Saxon	530	516	59	8	33	1.1	1.5	3.5	0.39	1.16
Hunter's Walk	нw		450	442	76	5	19	0.2	1.6	0.9	0.00	0.45
26-42 Lower Bridge St (industrial)	LB	Saxo-Norman	121	119	55	22	23	1.7	0.0	0.0	0.00	0.00
										% Dom.	% Wild	% Wild
London		Phase	Total	n csp	% Cattle	% Sheep	% Pig	% Horse	% Dog	bird	bird	mammal
21-24 Maiden Lane	ML	Lata Sayan	424	398	44	26	31	0.0	6.1	2.3	0.00	1.76
Dorter Undercroft a (ecclesiastical)	DUa	Late Saxon	2740	2719	36	59	6	0.8	0.0	1.0	0.18	0.22
Billingsgate triangle	BT		214	214	39	48	13	0.0	0.0	0.0	0.00	0.47
Harlington	н		741	675	59	26	15	7.2	1.8	0.1	0.00	1.04
St Magnus	SM	Saxo-Norman	638	634	57	22	21	0.5	0.2	0.0	0.00	0.79
Dorter Undercroft b (ecclesiastical)	DUb		2547	2542	35	47	17	0.2	0.0	8.5	0.00	0.83
Tower of London (military)	TL		271	239	60	36	5	11.8	0.0	0.4	0.00	0.42

Table 6.2 continued. c) Danish towns

										% Dom.	% Wild	% Wild
York		Phase	Total	n csp	% Cattle	% Sheep	% Pig	% Horse	% Dog	bird	bird	mammal
Blue bridge lane	BB		173	171	49	34	18	1.2	0.0	4.1	0.58	0.58
Coppergate a	CGa		3173	3101	73	20	7	1.7	0.6	1.7	0.16	0.52
Coppergate b	CGb		2786	2779	64	28	8	0.1	0.1	3.3	0.14	0.72
Coppergate d	CGd		12753	12646	57	22	21	0.2	0.6	7.6	0.65	0.38
Micklegate	MG	Late Saxon	1035	1035	70	14	15	0.0	0.0	0.0	0.00	0.00
Skeldergate	SG		1123	1101	74	18	8	1.6	0.4	0.0	0.00	0.18
St Saviourgate	SS		463	463	66	28	6	0.0	0.0	0.0	0.00	0.00
Walmgate	WG		248	248	77	17	7	0.0	0.0	0.0	0.00	0.00
Coppergate c (industrial)	CGc		11655	11540	62	25	13	0.7	0.3	4.1	0.52	0.32
Fishergate (ecclesistical)	FG	Saxo-Norman	1951	1922	53	34	12	0.3	1.2	10.4	1.35	8.01
										% Dom.	% Wild	% Wild
Norwich		Phase	Total	n csp	% Cattle	% Sheep	% Pig	% Horse	% Dog	bird	bird	mammal
Whitefriars car park	WC		277	275	33	38	28	0.4	0.4	0.0	0.00	1.09
Castle Mall, Norwich (high-status)	CM	Late Saxon	1282	1182	49	23	28	3.4	4.4	23.7	0.93	0.25
Fishergate (industrial)	FG		1586	1571	56	22	23	0.9	0.0	4.8	0.06	0.19
Dragon Hall	DH		109	108	35	25	40	0.0	0.9	8.3	0.93	0.00
Greyfriars (industrial)	GF	Saxo-Norman	692	638	34	24	42	4.6	3.2	3.6	0.00	0.00
St Martin-at-palace plain (trading)	SM		3798	3766	40	29	30	0.4	0.4	0.0	0.00	0.27
										% Dom.	% Wild	% Wild
Thetford		Phase	Total	n csp	% Cattle	% Sheep	% Pig	% Horse	% Dog	bird	bird	mammal
Brandon Rd	BR		3091	3020	49	35	16	1.6	0.7	5.0	0.00	0.03
Bury Road	BU		7099	7057	67	21	11	0.3	0.3	4.4	0.33	0.01
guildhall st	GS		106	94	43	43	15	1.9	9.4	0.0	0.00	0.00
Knocker's site	KS	Late Saxon	619	573	56	26	18	4.2	3.2	18.2	1.75	3.66
Mill Lane a	MLa		1166	1126	49	23	28	2.1	1.4	6.8	0.09	0.44
St nicholas st	SN		209	191	59	30	11	4.8	3.8	0.5	0.00	0.52
Site 1092 (industrial)	S1		2085	1963	47	33	20	3.7	2.1	11.3	0.31	0.20
Redcastle Furze	RF	Savo-Norman	848	848	37	46	18	0.0	0.0	3.2	0.00	0.24
Mill Lane b (industrial)	MLb	Jaku-Inutrildii	438	421	56	24	20	2.3	1.6	10.5	0.24	0.95

Chapter 7

Conclusions: Food, Status and Complexity in England AD 500-1000



Figure 7.1: Proportion of site types where minor species have been recorded in exceptionally high numbers.



Figure 7.2: The mean proportion of domestic birds (as a % of the cattle, sheep and pig count) recorded on various middle Saxon site types. (n)= number of sites.



Figure 7.3: The location of the major Saxon wics, and possible inland trading sites (after Haslam, 1985)


Figure 7.4a: Principal Component Analysis of the main domestic species from domestic sites close to wics (black dots) and those further inland (blue squares).



Figure 7.4b: Principal Component Analysis of the main domestic species from high status and ecclesiastical sites close to wics (black dots) and those further inland (blue squares).



Figure 7.4c: Principal Component Analysis of the minor species from domestic sites close to wics (black dots) and those further inland (blue squares).



Figure 7.4d: Principal Component Analysis of the minor species from high status and ecclesiastical sites close to wics (black dots) and those further inland (blue squares).



Figure 7.5: Example of the use of a sheep fold to house sheep on arable fields overnight to aid in their manuring. From the Luttral Psalter.



Figure 7.6: The mean proportions of cattle, sheep and pig bones from sites within the proposed area of open field systems and those outside it. (n)= number of sites. Sites included where the total number of cattle, sheep and pig =>100.



Figure 7.7: The mean proportions of cattle, sheep and pig bones from sites within the midlands and cotswold area and those outside it. (n)= number of sites. Sites included where the total number of cattle, sheep and pig =>100.





Figure 7.9a: PCA of the relative proportion of carcass parts (mandible, scapula, humerus, radius, pelvis, femur, tibia, metapodia and phalanges) for cattle, sheep and pigs from early Saxon sites. Using data from sites with a minimum of 50 elements . Horn cores were not included.



Figure 7.9b: PCA of the relative proportion of carcass parts from middle Saxon sites.



Figure 7.9c: PCA of the relative proportion of carcass parts from late Saxon sites.



Figure 7.9d: PCA of the relative proportion of carcass parts from Saxo-Norman sites.



Figure 7.10a: Proportions of carcass parts recorded from early Saxon sites.



Figure 7.10b: Proportions of carcass parts recorded from middle Saxon sites.



Figure 7.10c: Proportions of carcass parts recorded from late Saxon sites.



Figure 7.10d: Proportions of carcass parts recorded from Saxo-Norman sites.

Table 7.1: Sites which may be considered as 'outliers', from which exceptionally high numbers of minor species were recorded. Total numbers given= sum of cattle, sheep and pig counts, counts of pig, wild mammal (red and roe deer and hare), domestic bird (goose, chicken and duck) and wild birds are given as a percentage of the total number of cattle, sheep and pig. Sites included for the pig counts include all those with over 100 NISP, and for other counts include all sites with over 300 NISP. Numbers in parentheses are the median from all sites in that phase - the median was chosen as it is not affected by outliers as much as using the mean.

			% Pig	% Wild	% Domestic	% Wild	Body Parts/
Early Saxon	Site Type	Total n	(15)	Mammal (0.47)	Bird (1.90)	Bird (0.19)	Ageing
Aelfric's Abbey, Oxfordshire	Rural domestic	642		2.18	5.30		
Barton Court Farm, Oxfordshire	Rural domestic	1304			8.59		
Baynard's Castle, London	Rural domestic	327	30	3.36			
Botolphs, Bramber, Sussex	Rural domestic	266	37				
Manston rd, Ramsgate, Kent	Rural domestic	316			5.38		
Oxford Science park	Rural domestic	515		7.18			
Poundbury, Dorset	Rural domestic	3432		8.45			
Saxon County School, Surrey	Rural domestic	312	31				
Sherborne House, Gloucestershire	Rural domestic	427			6.32		
West Stow, Suffolk	Rural domestic	17430	33				
Cadbury Congresbury, Somerset	High-status rural	1050	44				
Cadbury Congresbury, Somerset	High-status rural	8255	35				
Viroconium, Wroxeter a	Former Roman town	2319				1.55	
Viroconium, Wroxeter b	Former Roman town	4057		2.69		1.90	
Viroconium, Wroxeter c	Former Roman town	2871		2.51		2.68	
Viroconium, Wroxeter d	Former Roman town	7261		2.53		1.39	

Table 7.1 continued

			% Pig	% Wild	% Domestic	% Wild	Body Parts/
Middle Saxon	Site Type	Total n	(16)	Mammal (0.42)	Bird (3.38)	Bird (0.03)	Ageing
Brandon, Suffolk	Rural domestic	47214					Old cattle
Cadley rd, Wiltshire	Rural domestic	1016		4.63			
High Street, Ramsbury, Wiltshire, b	Rural domestic	1107	32	4.25			
Riverdene, Basingstoke, Hampshire	Rural domestic	169	47		17.65		
Wicken Bonhunt, Essex	Rural domestic	29950	70				Old cattle
Aelfric's Abbey, Oxfordshire	Ecclesiastical rural	1858			23.68	2.10	Very young sheep
Church Close, Hartlepool	Ecclesiastical rural	2138			23.48	1.73	
Caister-on-Sea, Norfolk	High-status rural	490		3.06	17.55	1.63	
Flixborough, Lincolnshire	High-status rural	18173			40.66	8.16	
Middleton Stoney, Northamptonshire	High-status rural	865			10.17		
High Street, Ramsbury, Wiltshire, a	Industrial rural	835	30	7.43			
Blue bridge lane, York	Industrial urban	1011			23.94	1.19	
Lake End Road, Berkshire	Trading site	4100	31				
21-24 Maiden Lane, London	Wic	1409	34				
lpswich 1974-88, Suffolk	Wic	10164	32				
James Street, London	Wic	1684	31				
Peabody site, London	Wic	4878	30				

Table 7.1 continued

			% Pig	% Wild	% Domestic	% Wild	Body Parts/
Late Saxon	Site Type	Total n	(18)	Mammal (0.40)	Bird (4.10)	Bird (0.18)	Ageing
Chalkpit Field North, Norfolk	Unclassified	1969				1.22	
21-24 Maiden Lane, London	Domestic	398	31				
Wearmouth and Jarrow, Durham	Rural domestic	598			22.74		
Aelfric's Abbey, Oxfordshire c	Ecclesiastical rural	1359		3.02			
Aelfric's Abbey, Oxfordshire d	Ecclesiastical rural	843	31	7.00		2.14	
Bishopstone, Sussex	Ecclesiastical rural	5371	30		17.02	1.10	
Cheddar Palaces, Somerset a	High-status rural	3239	31)Cattle radius
Cheddar Palaces, Somerset b	High-status rural	919	32				and) sheep tibia
Faccombe netherton, Hampshire	High-status rural	1138	36	8.96		2.28	
Flixborough, Lincolnshire	High-status rural	9151			25.42	4.46	
Goltho, Lincolnshire	High-status rural	563	31	9.95	9.95		
North Elmham Park, Norfolk	High-status rural	917	35				
Stafford Castle	High-status rural	292	70				
Castle Mall, Norwich	High-status urban	1182			23.69		
Site 1092, Thetford, Norfolk	Urban industrial	1963			11.31		Cattle horn cores
Goss Street, Chester	Burh	516	33				
Hinxey Hall, Oxford	Burh	766	35		19.58	6.92	
Ipswich 1974-88, Suffolk b	Burh	14552	31				
Ipswich 1974-88, Suffolk d	Burh	6691	30		11.04		
Portchester Castle, Hampshire	Burh	891		7.74	80.81	20.09	
St Ebbes, Oxford	Burh	2167			20.44		
Staple Gardens, Winchester, Hampshire	Burh	2421			10.66		
Tenements, Durham City	Burh	184	40				
Bury Road, Thetford, Norfolk	Danish town	7057					Old sheep
Knocker's site, Thetford, Norfolk	Danish town	573		3.66	18.15	1.75	

Table 7.1 continued

			% Pig	% Wild	% Domestic	% Wild	Body Parts/
Saxo-Norman	Site Type	Total n	(19)	Mammal (0.36)	Bird (4.95)	Bird (0.20)	Ageing
Wearmouth and Jarrow, Durham	Rural domestic	472			36.02	1.48	
Wraysbury, Berkshire	Rural domestic	4720	31			2.48	
Barking Abbey, Essex	Ecclesiastical urban	617	30		10.05	3.24	
Fishergate, York	Ecclesiastical urban	1922		8.01	10.41	1.35	
Castle Rising Castle, Norfolk	High-status rural	193	31				
Faccombe Netherton, Hampshire	High-status rural	1176	40	75.34	67.60	10.71	
Pontefract Castle, Yorkshire	High-status rural	394	79	5.84			
The Mound, Glastonbury, Somerset	Industrial rural	606	30			3.80	
Friar Street, Droitwich, Worcestershire	Industrial urban	334					Sheep horn cores
Greyfriars, Norwich, Norfolk	Industrial urban	638	42				
Mill Lane, Thetford, Norfolk	Industrial urban	421			10.45		
Kingswell St, Northampton	Burh	426			13.38		
SOU25, Southampton, Hampshire	Burh	2018			10.46		
Staple Gardens, Winchester, Hampshire	Burh	1811			12.53		
St Martin-at-palace plain, Norwich, Norfolk	Trading site	3766	30				
Dragon Hall, Norwich, Norfolk	Danish town	108	40				

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Table 7.2: Characteristics of middle Saxon rural domestic settlements situated near to sites of known wics, and those further away. Cattle, sheep and pig are
calculated as a % of the NISP, where the NISP =>100; domestic bird (chicken, goose and duck) and wild species proportions are calculated as a % of the NISP, but only
for sites with a NISP =>300. PS= percentage similarity of the carcasses; age profiles are summarised from those given in Appendix D.

	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	% Wild
Domestic sites not near wics	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	Bird
Cadley rd, Collingbourne Ducis	73	84		m	neat	1016	37.1	56.4	6.5	9.4	4.6	0.0
Chicheley, Bucks						189	37.0	56.1	6.9			
Cresswell Field, Yarnton						358	55.9	30.7	13.4	4.2	0.0	0.0
High Street, Ramsbury						1107	40.4	27.7	31.9	0.0	4.2	0.1
Marefair, Northampton	68	76	75			499	38.7	35.3	26.1	7.6	0.2	0.4
Quarrington, Lincs						1022	57.8	36.0	6.2	2.1	0.1	0.0
Saxon palaces, Northampton						465	22.2	62.8	15.1	9.0	0.4	0.4
St Peters Rd, Northampton	64	67	71	m	nix	478	33.9	47.7	18.4	1.3	0.2	0.2
The Orchard, Walton Rd, Aylesbury						514	37.9	41.6	20.4	0.0	1.9	0.0
Walton Lodge, Aylesbury	67	84				382	37.2	45.8	17.0	0.0	0.3	0.0
Worton, Yarnton						167	60.5	24.6	15.0			
Yarnton						542	56.8	28.8	14.4	0.0	0.0	0.0
Means	68	77.75	73	1	meat; 1		42.9	41.1	15.9	3.3	1.2	0.1
				m	nix							

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Table 7.2 continued

	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	% Wild
Domestic sites near wics	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	Bird
Brandon, Suffolk	72	82	67	2ry	mix	47214	28.5	52.2	19.3	6.6	0.4	0.1
Cottam, Yorkshire						394	13.2	83.2	3.6	2.5	0.5	0.0
Crow hall park, Downham Market						277	80.9	15.9	3.2			
Friars Oak, Hassocks						411	65.9	23.1	10.9	0.0	1.0	0.0
Hay Green, Terrington St. Clement		86			meat	222	46.8	49.1	4.1			
National Gallery Basement						1606	29.6	41.2	29.3	4.8	0.2	0.0
National Portrait Gallery					meat	4189	38.7	44.9	16.3	4.7	0.0	0.0
Riverdene, Basingstoke						169	29.0	24.3	46.7			
Rose Hall Farm, Walpole St. Andrew	71	87			meat	320	45.0	48.8	6.3	4.1	0.0	0.0
Sedgeford, Norfolk						684	29.1	62.9	8.0	0.0	0.0	0.0
Site 39, Wharram						385	47.3	41.8	10.9	3.4	0.0	0.0
Sites 94 and 95, Wharram	49	81			meat	711	39.4	51.3	9.3	2.8	0.0	0.0
The south manor area, Wharram				mix	meat	3354	34.9	56.3	8.8	1.4	0.3	0.0
The Treasury, Whitehall						137	41.6	39.4	19.0			
Wicken Bonhunt				2ry	mix	29950	17.2	12.9	70.0	17.6	0.5	0.3
Means	64	84	67	1 mix; 2	5 meat; 2		39.1	43.2	17.7	4.4	0.3	0.0
				2ry	mix							

Means

Table 7.2 continued

Ecclesiastical and high-status sites not near	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	% Wild
wics	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	Bird
Aelfric's Abbey, Eynsham (ecc)	90	81	68	meat	meat	1858	20.7	55.9	23.4	23.7	1.1	2.1
Church Close, Hartlepool (ecc)						2138	28.7	55.0	16.4	23.5	0.1	1.7
Church walk (76), Hartlepool (ecc)						114	47.4	38.6	14.0			
Copeshill rd, Lower Slaughter (HS)						325	34.2	45.8	20.0	6.8	0.3	0.3
Flixborough (HS)	79	83	78			18173	36.6	36.5	26.9	40.7	0.6	8.2
Hartlepool Monastery (ecc)					meat	198	18.2	73.7	8.1			
Middleton Stoney (HS)						865	41.3	30.6	28.1	10.2	0.8	0.9
Wearmouth and Jarrow (ecc)						288	59.0	26.0	14.9			
Means	84.5	82	73	meat	meat		35.8	45.3	19.0	21.0	0.6	2.6
[PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	% Wild
Ecclesiastical and high-status sites near wics	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	Bird
Caister-on-Sea, Great Yarmouth (HS)						490	62.2	22.0	15.7	17.6	3.1	1.6
North Elmham Park(HS)	71	87	77			7599	31.9	39.4	28.7	17.7	0.6	0.1

47.1

30.7

22.2

8.8

1.9

0.8

71

87

77

Table 7.3 Early Saxon settlements divided into sub-phase. Cattle, sheep and pig are calculated as a % of the NISP, where the NISP =>100; domestic bird (chicken, goose and duck) and wild species proportions are calculated as a % of the NISP, but only for sites with a NISP =>300. PS= percentage similarity of the carcasses; age profiles are summarised from those given in Appendix D.

	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	
Early Early (5-6th)	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Barnsley Park						3630	35.3	52.0	12.7	0.6	0.6	0.3
Bishopstone, Sussex						114	30.7	48.2	21.1			
Bonners Lane , Leicester						175	44.0	34.3	21.7			
Cadbury Congresbury, Somerset						8255	58.0	7.0	35.0	0.0	0.0	0.0
Deansway, Worcester						461	47.5	33.8	18.7	2.4	0.2	0.2
Empingham west, Rutland water						249	51.4	38.6	10.0			
Hartigans, Milton Keynes						195	85.6	14.4	0.0			
Kings Meadow lane, Higham Ferrers				Mix	Meat	157	51.0	28.7	20.4			
Melford Meadows, Brettenham	85.6	78.1		Meat	Meat	479	60.8	29.2	10.0	1.7	0.6	0.0
Orton Hall Farm	73.8	77.5	74.5			5529	64.8	31.0	4.3	0.6	0.0	0.0
West Stow	72.5	89	71.6			7701	33.0	45.2	21.9	2.9	0.2	0.4
				1 mix; 1								
Means	77.3	81.5	73.1	meat	Meat		51.1	32.9	16.0	1.4	0.3	0.2

	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	
Early-Mid Early (5-late 6th)	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Barton Court Farm, Abingdon						1304	28.9	43.9	27.1	8.6	1.0	0.0
Botolphs, Bramber						266	42.5	20.7	36.8			
Cadbury Congresbury						1050	46.7	9.0	44.3	0.0	1.0	0.3
Market Lavington, Wiltshire				Mix	Meat	1040	55.0	26.6	18.4	2.1	0.3	0.0
Middleton Stoney						413	38.3	32.4	29.3	2.9	1.0	0.0
Viroconium, Wroxeter						2319	65.0	17.2	17.7	1.9	1.2	1.6
Means				Mix	Meat		46.1	25.0	28.9	3.1	0.9	0.4

Figure 7.3 continued

	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	
Mid Early (6th)	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Eye Kettleby	74	79	70	Meat	Meat	2321	63.9	27.3	8.9	0.6	0.7	0.0
Old Down Farm, Andover						290	43.1	48.3	8.6			
Viroconium, Wroxeter						4057	54.7	19.8	25.5	2.8	2.7	1.9
West Stow	74	88.9	75.7			17430	27.6	39.8	32.6	3.1	0.1	0.2
Means	74	83.95	72.85	Meat	Meat		47.3	33.8	18.9	2.2	1.2	0.7

	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	
Mid-Late Early (6-7th)	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Audlett Drive, Abingdon						173	52.6	38.7	8.7			
Baynard's Castle	70.4					327	52.3	17.7	30.0	0.0	3.4	0.0
Nettleton Top	77.8					546	84.4	9.5	6.0	0.0	0.0	0.0
New Wintles						827	52.6	35.8	11.6	1.0	0.0	0.6
Oxford Science Park, Littlemore	71.3	82.1		Mix	Meat	515	59.2	23.5	17.3	1.2	7.2	0.2
Pennyland, Milton Keynes	79	86.8	73	Meat	Meat	2394	48.9	37.3	13.8	3.9	0.1	0.4
Redcastle Furze, Thetford	74.4	73.2	76.1		Meat	813	50.1	37.0	12.9	3.9	0.0	0.2
Sherborne House, Lechlade				Meat	Mix	427	60.0	35.4	4.7	6.3	0.0	0.5
Viroconium, Wroxeter c						2871	58.4	19.0	22.6	4.5	2.5	2.7
Viroconium, Wroxeter d						7261	58.9	17.7	23.4	1.8	2.5	1.4
				2 meat;	3 meat;							
Means	74.6	80.7	74.6	1 mix	1 mix		57.7	27.2	15.1	2.5	1.7	0.7

Figure 7.3 continued

	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	
Late Early (late 6-7th)	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Manston Rd, Ramsgate						316	31.6	54.4	13.9	5.4	1.3	0.6
St Helen's Avenue, Benson	74.1	73.3				438	51.8	33.6	14.6	4.8	0.7	0.0
West Stow	67.4	86	75.3			1558	33.6	46.7	19.8	3.9	0.1	0.3
Means	70.8	79.7	75.3				39.0	44.9	16.1	4.7	0.7	0.3

	PS	PS		Age	Age	NISP (cattle,				% Domestic	% Wild	
Transition early-middle Saxon (6-9th)	cattle	sheep	PS pig	cattle	sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Abbots Worthy	74.8	83.8		Mix	Mix	1053	47.7	42.1	10.3	8.3	1.8	0.0
Kings Meadow Lane, Higham Ferrers				Mix	Meat	194	49.0	24.2	26.8			
					1 mix; 1							
Means	74.8	83.8		Mix	meat		48.3	33.1	18.5	8.3	1.8	0.0

age profiles are summarised from those given in Appendix D.

Table 7.4: Animal bone data from high status and ecclesiastical sites. Cattle, sheep and pig are calculated as a % of the NISP, where the NISP =>100; domestic bird (chicken, goose and duck) and wild species proportions are calculated as a % of the NISP, but only for sites with a NISP =>300. PS= percentage similarity of the carcasses;

Early and early to middle Saxon PS NISP (cattle, % Wild PS % Domestic ecclesiastical sites Cattle % Cattle % Sheep % Pig Bird Mammal % Wild Bird Sheep PS Pig Age Cattle Age Sheep sheep, pig) Bishopstone, Sussex 114 30.7 48.2 21.1 Chapter House, St Albans Abbey 730 18.6 69.9 5.1 5.9 0.4 11.5 PS PS NISP (cattle, % Domestic % Wild % Pig Cattle % Cattle % Sheep Bird Mammal % Wild Bird Early Saxon high status sites Sheep PS Pig Age Cattle Age Sheep sheep, pig) 97.7 Yeavering 933 1.5 0.8 0.0 0.1 0.6 Cadbury Congresbury, Somerset 8255 58.0 7.0 35.0 0.0 0.0 0.0

	PS	PS	·			NISP (cattle,				% Domestic	% Wild	
Middle Saxon ecclesiastical sites	Cattle	Sheep	PS Pig	Age Cattle	Age Sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Church Walk (76), Hartlepool						114	47.4	38.6	14.0			
Hartlepool Monastery			ļ		Meat	198	18.2	73.7	8.1			
Wearmouth and Jarrow a			ļ		I	288	59.0	26.0	14.9			
Aelfric's Abbey, Eynsham b	90	82	68	Meat	Meat	1858	20.7	55.9	23.4	23.7	1.1	2.1
Church Close, Hartlepool			ļ		<u> </u>	2138	28.7	55.0	16.4	23.5	0.1	1.7
Mean							34.8	49.9	15.4	23.6	0.6	1.9
	PS	PS				NISP (cattle,				% Domestic	% Wild	
Middle Saxon high-status sites	Cattle	Sheep	PS Pig	Age Cattle	Age Sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Copeshill Rd, Lower Slaughter						325	34.2	45.8	20.0	6.8	0.3	0.3
Caister-on-Sea, Great Yarmouth			ļ		I	490	62.2	22.0	15.7	17.6	3.1	1.6
Middleton Stoney b			ļ		I	865	41.3	30.6	28.1	10.2	0.8	0.9
North Elmham Park a	71	87	77		I	7599	31.9	39.4	28.7	0.0	0.6	0.0
Flixborough a	79	83	78		I	18173	36.6	36.5	26.9	40.7	0.6	8.2
Mean	75	85	77		I	l	41.2	34.9	23.9	15.0	1.1	2.2

Table 7.4 continued

	PS	PS				NISP (cattle,				% Domestic	% Wild	
Late Saxon ecclesiastical sites	Cattle	Sheep	PS Pig	Age Cattle	Age Sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Vicarage Garden, Brixworth						457	38.7	49.0	12.3	0.0	0.2	0.2
Aelfric's Abbey, Eynsham d	68	72	80	Mixed	Meat	843	30.8	38.2	31.0	5.8	7.0	2.1
Aelfric's Abbey, Eynsham c	74	82	63	Mixed	Meat	1359	29.7	44.2	26.2	6.3	3.0	0.0
Lurk Lane, Beverley b					I	3222	59.6	20.2	20.1	1.6	1.2	0.2
Lurk Lane, Beverley a						3658	59.1	24.1	16.8	4.1	0.8	0.3
Bishopstone, Seaford	73	77	67	Mixed	Meat	5371	16.7	53.1	30.2	17.0	0.6	1.1
Dorter Undercroft					!	2719	35.8	58.6	5.6	1.0	0.2	0.2
Mean	72	77	70				38.6	41.1	20.3	5.1	1.9	0.6
	PS	PS				NISP (cattle,				% Domestic	% Wild	
Late Saxon high-status sites	Cattle	Sheep	PS Pig	Age Cattle	Age Sheep	sheep, pig)	% Cattle	% Sheep	% Pig	Bird	Mammal	% Wild Bird
Goltho a						145	71.0	22.1	6.9			
Hatton Rock, Warwickshire					I	250	51.6	30.8	17.6			
Stafford Castle a					I	292	15.4	14.7	69.9			
Goltho b	79	74	48		I	563	41.6	27.0	31.4	9.9	9.9	0.4
North Elmham Park c	64	79	63		I	917	31.6	33.4	35.0	0.0	2.1	0.0
Cheddar Palaces b	51	53			I	919	45.3	23.1	31.7	0.0	2.5	0.0
Faccombe Netherton a	72	63	56		Meat	1138	25.0	39.5	35.6	6.9	9.0	2.3
Cheddar Palaces a	50	48			I	3239	42.9	26.3	30.8	0.0	2.9	0.0
North Elmham Park b	70	84	70		ļ	3415	30.6	45.2	24.2	0.0	0.5	0.0
Flixborough b	84	84	69		ļ	9151	39.4	35.7	24.9	25.4	0.6	4.5
Kintbury Square, Kintbury					ļ	229	32.8	45.9	21.4			
Castle Mall, Norwich a	72	85	60		Meat	1182	49.3	23.0	27.7	23.7	0.3	0.9
Mean	68	71	46		I		39.7	30.5	29.7	8.2	3.5	1.0