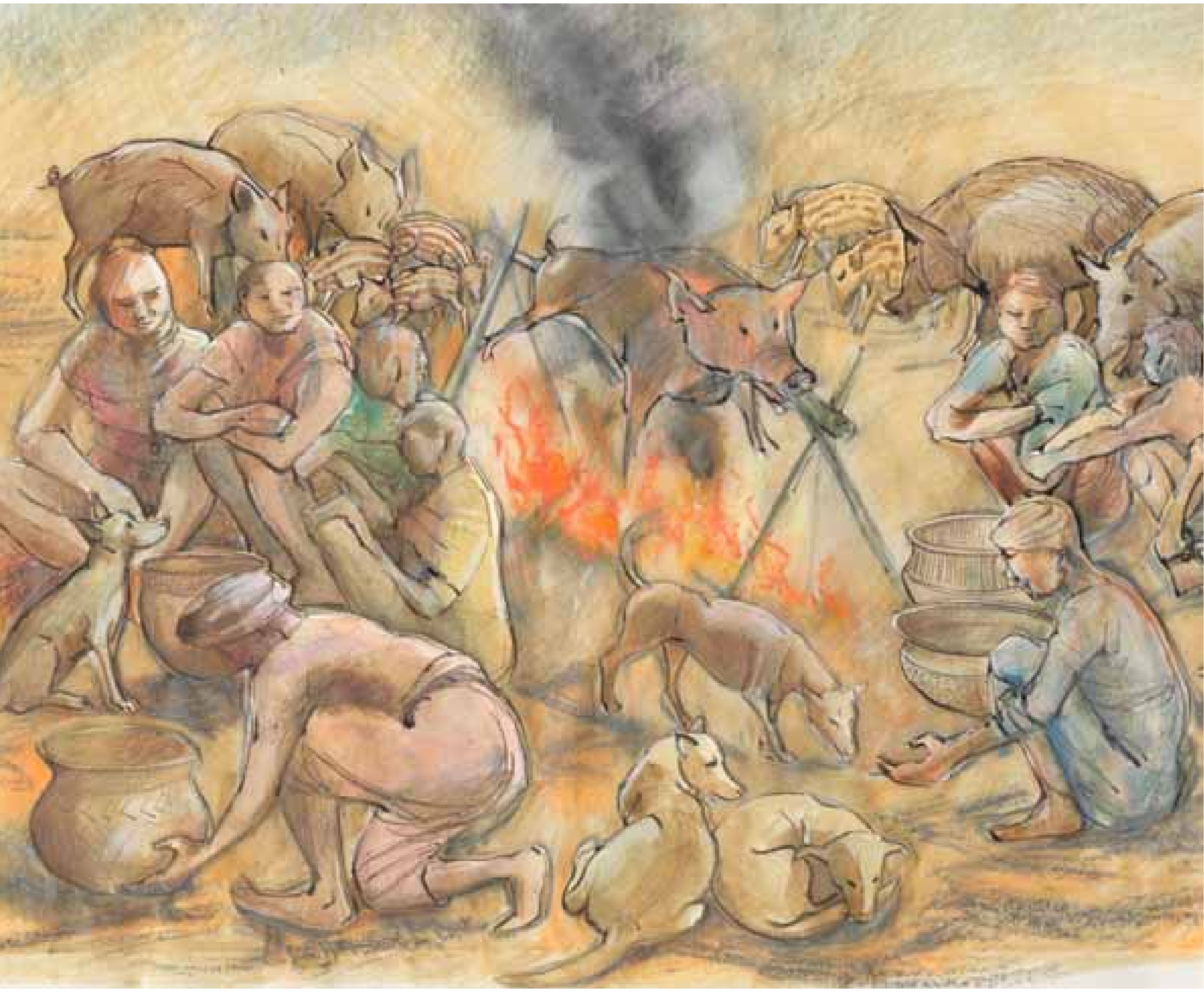
RESEARCH DEPARTMENT REPORT SERIES no. 29-2011 ISSN 1749-8775

REVIEW OF ANIMAL REMAINS FROM THE NEOLITHIC AND EARLY BRONZE AGE OF SOUTHERN BRITAIN (4000 BC – 1500 BC)

ENVIRONMENTAL STUDIES REPORT

Dale Serjeantson



ARCHAEOLOGICAL
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ENGLISH HERITAGE

Research Department Report Series 29-2011

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SUMMARY

This review surveys the Neolithic and Early Bronze Age bone assemblages from c. 200 sites in southern Britain, summarising and synthesizing the data. Most assemblages are from Wiltshire, Dorset and Oxfordshire; other counties covered are Cornwall, Devon, Somerset, Gloucestershire, Hampshire, Berkshire, London (Middlesex), Surrey, East and West Sussex and Kent. Chapter 2 discusses the domestic animals, cattle, pig, sheep, goat, dog and horse. The focus is on animal husbandry, in particular traction and the milking of cows. Chapter 3 discusses the wild animals and the reasons why they might have been hunted or caught. Chapter 4 is concerned with how animals were butchered, cooked and consumed and examines the evidence for feasting. Chapter 5 looks at deliberately placed and possibly placed deposits of skulls, skeletons, bones in articulation and individual elements, and the possible motives which governed bone deposition at different times and in different places. Chapter 6 considers the extent to which micro-vertebrates and larger mammals reflect changes in vegetation and environment on a local and a wider scale. The implications of the findings for the economic and social life of the people living in southern Britain from the Early Neolithic to the end of the Early Bronze Age are discussed in Chapter 7 by period. The final chapter sets out recommendations for future research and excavation.

ACKNOWLEDGEMENTS

This research was funded by English Heritage and was conducted at the University of Southampton between 2009 and 2011. I would like to give my warmest thanks to those who have made helpful suggestions and especially those who have improved the text with their valuable comments: they include Umberto Albarella, Polydora Baker, Alistair Barclay, David Field, Jonathan Last, Peter Rowley-Conwy and Alasdair Whittle. I am also very grateful to those who have allowed me to refer to their unpublished work, including Robin Bendrey, Kate Clark, Jessica Grimm, Sheila Hamilton-Dyer, Jacqui Mulville, Adrienne Powell, and Naomi Sykes. Thanks too to Penny Copeland for her work on the illustrations and to Chris Evans for the distribution maps.

ARCHIVE LOCATION

The data in the appendices and some of the summary tables are available on-line via the ADS website at the following address:
http://archaeologydataservice.ac.uk/archives/view/neorev_eh_2011/

CONTACT DETAILS

Dale Serjeantson
Archaeology, School of Humanities, University of Southampton,
Southampton SO17 1BJ.
D.Serjeantson@soton.ac.uk

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1 INTRODUCTION

1.1The importance of animals

Recent research into the Neolithic of Britain has rightly placed much emphasis on the domestic and wild animals and their importance in human life. We are still uncertain about the relative contribution of animal and plant foods to the everyday diet of people in the Neolithic and Early Bronze Age, but animals, especially domestic animals, were clearly crucial to the economic life of the earliest farmers in southern Britain. More recently, we have also become more aware of how animals were the focus of many of the important rituals of communal life. This has led to a greater interest in whether aspects of social life such as feasting can be interpreted from the study of deposited bones. Animal remains can therefore contribute to the reconstruction of many aspects of life in Neolithic and Early Bronze Age Britain.

This review of the excavated animal bones from the Neolithic and Early Bronze Age of southern Britain will focus on these questions of economic and social activity. It will also contribute to understanding the wild and domestic animals themselves and the changing environment between 4000 and 1500 BC. Together with the data in the appendices, it is intended as a resource for archaeologists, zooarchaeologists, excavators, county archaeologists and other curators and policy makers. They can see what has been found, and from that gain some idea of what may be discovered in future excavation and research. It also provides a guide for tackling the recovery and analysis of animal remains from the Neolithic and Early Bronze Age.

This is one of the series of regional reviews which cover the different types of environmental evidence from archaeological sites and palaeoenvironmental deposits. It complements the reviews of the animal remains from excavations of the Late Bronze Age and Iron Age in southern Britain (Hambleton 2008; Hambleton and Baker 2009) and the East Midlands (Albarella and Pirnie 2008).

1.2 Data and scope

1.2.1 Periods and dates

The Neolithic in the British Isles is believed to have begun very late in the 5th millennium BC (Gkiasta et al 2003, fig. 10), but there are very few sites with dates before 3700 BC in southern Britain, and only a handful at which animal bone assemblages have survived. The earliest dated sites from which animal bones have been recovered in our region date from the second quarter of the 4th millennium onwards. The period discussed here ends with the Early Bronze Age, which has been taken here to last until about 1500 BC. I have assigned the assemblages included in the review to six time periods: Early Neolithic, Early-Middle Neolithic, Middle Neolithic, Late Neolithic, Late Neolithic/Early Bronze Age and Early Bronze Age (Table 1.1). The approximate dates for each sub-period are taken from surveys which have formed part of English Heritage's regional review frameworks and from research by Cleal (2005); Whittle et al (2007) and by Hey and Barclay (2007).

The process of assigning animal bone assemblages to time periods was extremely difficult because they were originally dated by a variety of means based on monument type, pottery, early (and possibly unreliable) radiocarbon dates, uncalibrated dates and finally calibrated radiocarbon dates. Radiocarbon dates for the period continue to be revised (e.g Bayliss and Whittle 2007; Healy 2008; Bradley et al 2010), so recently published radiocarbon dates were preferred over the date from the original publication. In addition to – or in the absence of – an up-to-date radiocarbon date, I have taken into account the monument and feature type and the associated pottery. These are noted in Appendix 1 in those cases where the information was available.

Table 1.1 Periods, dates and associated pottery for assemblages included in this review. The numbers of assemblages and number for which the number of identified specimens (NISP) was available are also shown. Based on data in Appendix 1

PERIOD	APPROX DATE BC	POTTERY TYPE(S)	N ASSEMBLAGES	N WITH NISP
Early Neolithic (ENEO)	*4000 – 3700*	*Carinated bowls, plain bowls*	*9*	*7*
Early/Middle Neolithic (EMNEO)	*3800 – 3300*	*Plain bowls, decorated bowls (Abingdon, Windmill Hill, Hembury)*	*85*	*69*
Middle Neolithic (MNEO)	*3300 – 2900*	*Impressed wares (Peterborough, Ebbsfleet, Mortlake, Fengate)*	*15*	*14*
Late Neolithic (LNEO)	*3000 – 2200*	*Grooved ware*	*42*	*34*
Late Neolithic/Early Bronze Age (LNEO/EBA)	*2400 – 1800*	*Beakers*	*27*	*20*
Early Bronze Age (EBA)	*2000 – 1500*	*Food vessels, Collared urns*	*27*	*21*
TOTAL			*205*	*165*

Following Bayliss and Whittle (2007) and Healy (2008), I have included the construction phase of all long barrows and causewayed enclosures in the period designated 'Early-Middle Neolithic'. Consequently few assemblages were assigned to the 'Early Neolithic' (Table 1.1); they comprise some 'pre-enclosure' and 'pre-barrow' horizons as well as a few others. The number of 'Early-Middle Neolithic' assemblages is large, reflecting the many long barrows and causewayed enclosures in our region where bone survived well. The assemblages grouped as 'Middle Neolithic' are those with Peterborough Ware and other impressed wares; they include the cursuses and some early ring ditches and henges, including the Phase 1-2 henge ditch at Stonehenge. The 'Late Neolithic' assemblages include those with Grooved Ware, as well as some with more than one type of late pottery. Some authors regard Beaker sites as 'Latest Neolithic' while others place them in the Early Bronze Age (Cleal 2005); here they have been designated 'Late Neolithic/Early Bronze Age'. 'Early Bronze Age' assemblages have been taken as those from sites which precede the use of Deverel-Rimbury pottery; most in our area are round barrows with Collared Urns or Food Vessels. Some Beaker sites may overlap with these in time.

Despite the best efforts of excavators to assign features and their contents to dates and culture types, the possibility of mixing and residuality in animal bone assemblages is ever-present. Pollard (2001) makes the point that of eleven sites in the Avebury region, all but one has some Neolithic bowls, all but one has some Peterborough Ware, all but one have some Grooved Ware sherds and all but two have some Beaker sherds. In this review, if the archaeologist or zooarchaeologist made it clear that a deposit contained material from more than one period, the assemblage was omitted.

1.2.2 Geographical distribution of sites

The location of sites is shown in Figures 1.1 and 1.2. Wiltshire has by far the greatest number (Table 1.2) with the large number in the vicinity of Stonehenge and Avebury yielding many well-preserved bone assemblages. Dorset and Oxfordshire have more than ten sites each; other counties have fewer than ten. There are no sites with securely dated animal bone assemblages in Devon or Cornwall.

The bedrock is also shown in Figures 1.1 and 1.2. It is clear that the distribution of sites correlates with the geology and soils. The calcareous soils over the limestone and chalk bedrock of Dorset, Oxfordshire and Wiltshire can preserve bone well, though water percolation through shallow deposits will destroy bone even on such soils. It is partly for this reason that there are fewer assemblages from some counties even where the bedrock is chalk or limestone. Though many sites in Sussex have been excavated, bone was recovered in quantity only at North Marden, and there the author described the bones as in very poor condition. Survival of bone on sites on the floodplain and gravel terraces of the Upper Thames is patchy and unreliable, as at Yarnton (Hey et al 2003), but it can be good in the lower reaches of the Middle Thames in Berkshire and Surrey, as at Runnymede. The absence of assemblages from Cornwall is particularly frustrating, since the county has so many important Neolithic sites (Pollard and Healey 2008). The absence of bones from Cornwall, Devon, much of Surrey and north-east Hampshire is however to be expected, as bone does not survive in areas where the bedrock gives rise to acidic soils. There are some areas of shell-sand in the Scilly Isles and western Cornwall which sometimes preserve bone, but no unmixed animal bone assemblage from the Neolithic and Early Bronze Age has survived from that part of the world.

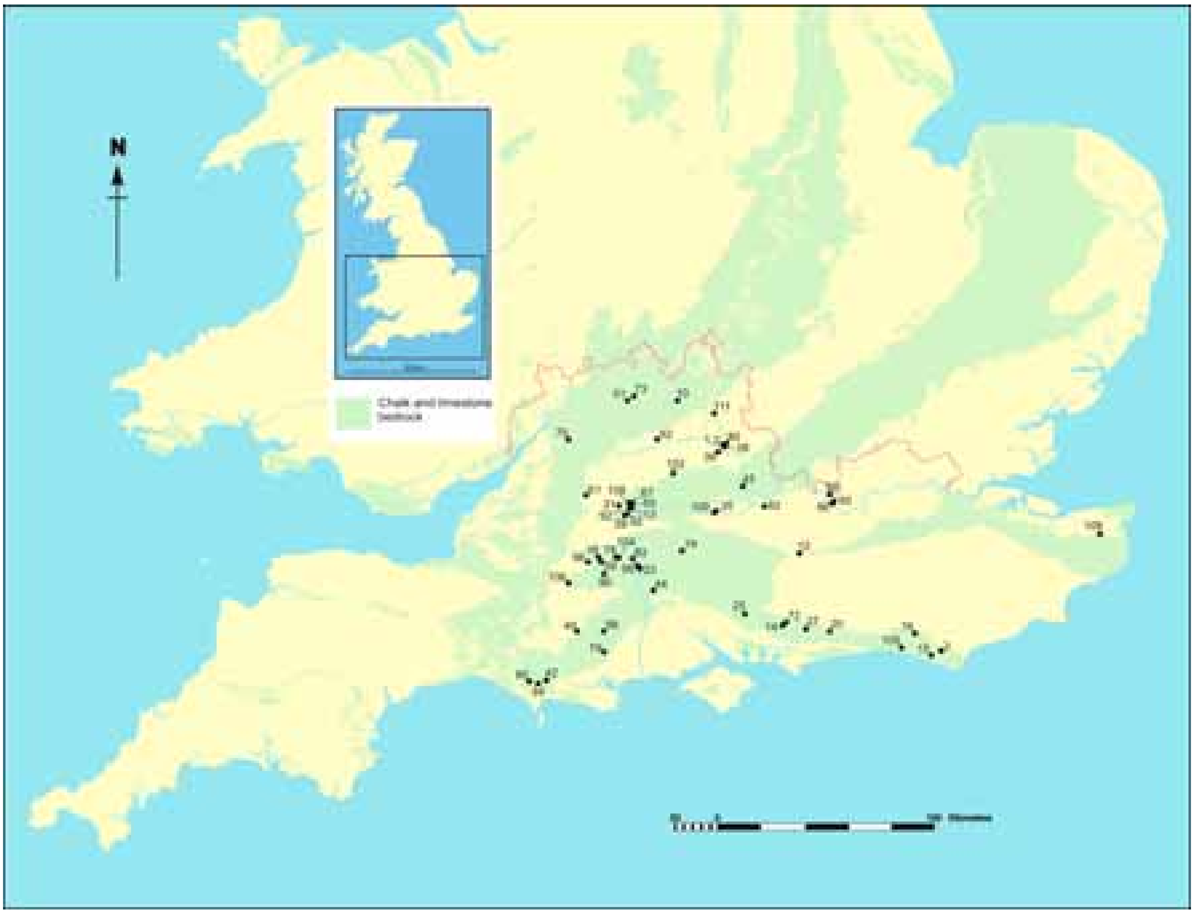

Figure 1.1 Location of sites included in the review: Early and Middle Neolithic. Site name and number listed in Appendix 1. Areas with chalk and limestone bedrock are also shown (bedrock data based upon DiGMapGB-625, with the permission of the British Geological Survey. Reproduced with the permission of the British Geological Survey ©NERC. All rights Reserved. Illustration prepared by Chris Evans, English Heritage)

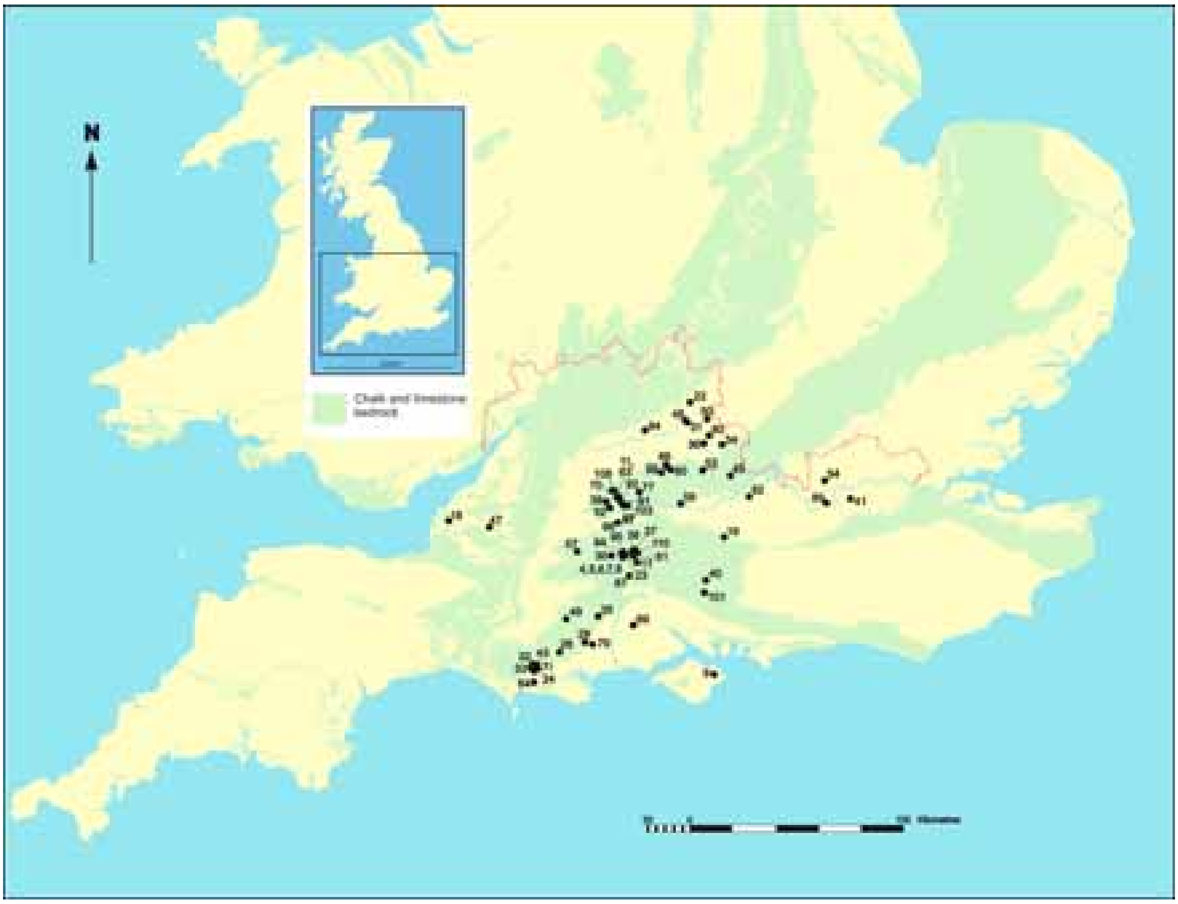

Figure 1.2 Location sites included in the review: Late Neolithic and Early Bronze Age, as Figure 1.1 (bedrock data based upon DiGMapGB-625, with the permission of the British Geological Survey. Reproduced with the permission of the British Geological Survey ©NERC. All rights Reserved. Illustration prepared by Chris Evans, English Heritage)

Table 1.2 Number of sites and assemblages per county, based on data in Appendix 1. The counties with most sites (Wiltshire, Dorset and Oxfordshire) have large areas of chalk or limestone which preserve bone well. See also Figures 1.1 and 1.2

COUNTY	N SITES	N ASSEMBLAGES
Berkshire	7	9
Dorset	17	42
East Sussex	4	4
Gloucestershire	5	7
Hampshire and Isle of Wight	8	9
Kent	1	1
London (Middlesex)	1	1
Oxfordshire	16	38
Somerset	2	2
Surrey	6	10
West Sussex	3	3
Wiltshire	46	78
TOTAL	116	205

1.2.3 Assemblages

The data collected for this review consists of records from specialist bone reports, excavation reports and research papers on vertebrate remains from excavated sites of the Neolithic and Early Bronze Age in southern England. The sites included are listed in Appendix 1. The primary unit is the assemblage, with several sites having more than one discrete assemblage. Bibliographic references to reports and research papers are in Appendix 2; where an assemblage is mentioned in the text, it can be assumed that the reference is to the original bone report. The database contains records of approximately 200 assemblages from just over 100 sites (Table 1.1).

Criteria for inclusion: As one of the aims of this review is to examine the social significance of animals, isolated deposits which appeared to have been deliberately placed were included, even if these were described only anecdotally, as well as those assemblages where animal bones were quantified. Individual deposits which were not quantified were given the value '1' in the 'Total' field in Appendix 1 and omitted from Appendix 3. No minimum was set for assemblage size.

I have made some judgements about which records to include in Appendix 3, in other words, contra Albarella and Pirnie (2008), I have 'sanitised' the data. These are as follows:

1 For skeletons and part-skeletons, the total number of elements was included.

2 Most analysts do not identify rib and vertebra fragments to species, so – with the aim of making assemblages comparable as far as possible – ribs and vertebra fragments were excluded even where they were identified to species.

3 Isolated teeth were included, except where they were obviously from a single jaw.

4 Intrusive and probably intrusive species were omitted. All records of rabbit were omitted, as the rabbit is still regarded as a Norman introduction (Sykes and Curl 2010).

5 Fox and badger, both of which burrow into archaeological deposits, were included unless the report indicates that they were probably intrusive.

6 Birds and fish were omitted from Appendix 3. They are discussed in Chapter 3.

7 Following Jewell (1958), stoats and weasels as well as rodents and other micro-mammals were omitted from Appendix 3 as these may well be prey of birds or burrowing species. The micro-vertebrates are discussed in Chapter 6.

This means that the total in Appendix 3 does not always correspond with the total number of identified bones in the published reports.

Comparisons between assemblages are based on NISP, i.e. the number of identified specimens (bones). NISP has some disadvantages for comparing quantities of bones between large assemblages but it is the only measure which is recorded almost universally so was the best one to use here. NISP was recorded in about three-quarters of the assemblages and the data for the main mammals from these assemblages are set out in Appendix 3. The first report on the Durrington Walls fauna used minimum number of individuals (MNI) as the basic unit of comparison so it is MNI rather than NISP which is quoted in Appendix 3. A non-standard method of quantification was used for the Windmill Hill outer pits (Davis 2000) which also makes totals difficult to compare with other sites. The 'comments' field in Appendix 3 indicates where skeletons and part-skeletons were present. It also indicates if the identification of a key species was uncertain.

Only sixty-six assemblages out of the total have more than 100 identified bones and of these just six have more than 1000 identified bones (Table 1.3). Small numbers of identified bones sometimes reflect the fact that few were deposited, but sometimes reflect other factors. The recent trend is to study bones in small discrete assemblages, as in the recent excavations by Alasdair Whittle and others at Windmill Hill. The fact that a small area of a site was excavated, or that preservation was poor, may also result in small assemblages, as discussed below. The assemblages with more than 1000 identified bones are from Hambledon Hill, Windmill Hill, Runnymede, the palisade enclosures at West Kennet and the henges at Durrington Walls and Mount Pleasant. As well as being excavated on a large scale, these were all sites where large quantities of bone were deposited or discarded, where the bone was well preserved and also where assemblages were not (or have not yet been) subdivided for analysis.

Table 1.3 Assemblage size shown in four size classes, based on data in Appendix 3

Assemblage size	*N assemblages*
10,000 – 1,000	*6*
999 – 500	*10*
499 – 100	*50*
99 – 2	*99*
Total	*165*

1.3 Major sites

Twenty-five sites have more than one assemblage, either because they have material from more than one period, or because the material is from different and distinct features. Nearly twenty separate assemblages were distinguished at Hambledon Hill and Windmill Hill though at both sites most deposits were broadly contemporary. There were 18 distinct assemblages from Barrow Hills Radley which was a multi-period site. The sites which are particularly complex because of the large numbers of bones and/or large numbers of contexts are summarised here.

Windmill Hill (WH): The causewayed enclosure at Windmill Hill was excavated between 1925 and 1939 by Alexander Keiller (Keiller and Smith 1965) and again in 1988 by Alasdair Whittle and colleagues (Whittle, Pollard and Grigson 1999a). Grigson reported on the fauna from both excavations. The priorities for the study of the bone assemblage changed over time for the excavators as well as for the bone analyst. The first report focussed on what were then the current topics of interest: whether the cattle and pigs were wild or domestic, their size and the ratio of the sexes. This pioneering research has not been superseded. By the second campaign archaeologists had come to recognise that placed deposits were potentially significant for understanding the actions and intentions of those using the sites, so special deposits were put at the centre of the analysis. The assemblages from each individual area were described separately. More than 2000 identified bones are discussed from the two campaigns.

Durrington Walls: This large-scale excavation took place in the late 1960s (Wainwright and Longworth 1971). Animal remains were recovered from the perimeter ditch, two circular posthole structures and a midden in the interior. The number of bones recovered was approximately 8500. At the time of excavation, the significance of the animal bones for interpreting site activities in addition to animal husbandry was not well appreciated. Harcourt (1971, 338) wrote 'No differences were apparent between the [various Neolithic] features, so they have been treated as a single group'. A re-examination by Richards and Thomas (1984) claimed that there were contrasts between the assemblages from the interior and exterior of the henge, but their conclusion has since been questioned – see Chapter 4.

Hambledon Hill (HH): The causewayed enclosure and the other sites on Hambledon Hill were excavated between 1974 and 1986 by Roger Mercer (Mercer and Healy 2008a, 2008b). English Heritage funded an extended excavation campaign, as the hilltop was becoming eroded by ploughing. The animal bones were studied by Legge in the 1980s with the collaboration of students at the Extra-Mural Department at Birkbeck College. There were altogether more than 7000 identified bones. The focus of the animal bone report was cattle husbandry, based on relative numbers, ageing, size and sex ratio of the cattle. The assemblage also provided material for a pioneering study of taphonomy. The discussion of assemblages from individual contexts is relatively limited as a consequence of the delays in the post-excavation analysis and publication.

Runnymede Bridge: In the Neolithic period Runnymede was a settlement by the river on the floodplain of the Thames. After an initial rescue campaign (Needham 1991) research excavations were carried out in the 1980s on behalf of the British Museum. One area of the research excavations has been published (Needham and Spence 1996). In contrast with nearly all other sites discussed in this review, Runnymede had a rich spread of well-preserved settlement material but few pits, ditches or other features. Though final dating and phasing is not complete, the Neolithic material is all thought to belong to what is included here as the Early-Middle Neolithic. The bones from the rescue excavation were studied by Done. The very large assemblage from the research excavations was recorded by Serjeantson with the assistance of Mary Iles and Kevin Rielly, following protocols established by Serjeantson (1991; 1996). Altogether more than 10,000 identified bones have been recorded from Neolithic areas of the site. Research papers have been published on various aspects of the bone assemblage, including site formation processes (Serjeantson 1991) and the status of the fish remains (Serjeantson et al 1994). Some unpublished data on tooth eruption and wear has been included in this review (Appendices 4 and 5). In Appendix 3 bone numbers from the unpublished areas of the site are split into two main areas – those from Area 19 to the south-east and the remainder from other area to the north-west – because preliminary analysis had suggested that the assemblages from the two areas were different in character (Serjeantson 2006).

Barrow Hills, Radley (RBH): The site at Barrow Hills is a series of prehistoric and later features on a gravel ridge which extends from the eastern end of the Abingdon causewayed enclosure to the village of Radley. Barrow Hills was excavated from the 1930s onwards by Abingdon Area Archaeological and Historical Society and later by Oxford Archaeology Unit. The barrows had been levelled by medieval ploughing and the whole site was threatened by destruction from gravel quarrying and house building (Barclay and Halpin 1999, fig. 1.4). The animal bones were identified by Bruce Levitan. The assemblages from each of nineteen features are described separately in the excavation report. The excavated features include ring ditches, barrows and flat graves from the earlier Neolithic, the Late Neolithic and the Early Bronze Age. The features with Grooved Ware at Barrow Hills were designated Late Neolithic/Early Bronze Age in the published report but for this review have been included with other Grooved Ware sites as 'Late Neolithic'. The only assemblage with bones in any quantity is a Grooved Ware pit group. The small number of bones from the other features is sometimes the result of destruction in the ground but it is also clear that animal bones were never placed in some of the features. We know this because human burials did survive from all periods, as did placed deposits of red deer antler.

1.4 Research questions

A number of the debated topics relating to the Neolithic of southern Britain can be addressed by the study of the animal remains. These include questions of origins, mobility, trade and exchange as well as the activities of daily life.

1.4.1 Mesolithic-Neolithic transition

The first of these, highlighted in each of the Regional Resource Frameworks, is the nature of the arrival of the Neolithic way of life in southern Britain. The question of whether it took place as a result of a movement of people ('demic diffusion') or whether the farming way of life was adopted by a local Mesolithic population ('trait adoption diffusion') has been contested for the past 30 years. The long-standing view has been that – because it involved a radical change to the hunter-gatherer way of life and the adoption of many new skills – agriculture and animal husbandry were brought to the British Isles by a colonising population as a complete package. This view was challenged in the 1980s by Dennell (1983) who argued that agriculture had been adopted by the local Mesolithic population. This alternative interpretation was taken up by many scholars and has been widely expounded over the past 20 years (eg Whittle 2003; Thomas 2008). The radiocarbon dating research programmes of the past twenty years have up to now failed to find solid evidence for a transitional period in southern Britain during which there were contemporary sites with Mesolithic culture and way of life and Neolithic sites with agriculture, animal keeping and pottery side by side (eg Gkiasta et al 2003). Excavation has also up to now failed to identify sites in which elements of the two cultures are mingled, as in the Netherlands (Zeiler 1997; Tresset 2003). This has led some to return to the traditional view that it was people – with their animals, seeds, skills and social organisation – rather than ideas which crossed the channel to Britain (eg Sheridan 2003).

The species, the types of cattle and other domestic animals, the nature of the animal husbandry and the degree of reliance on hunting all contribute to the debate on whether we are looking at a movement of people or at the spread of cultural traits.

1.4.2 Settlement and mobility

We are still uncertain about the nature of settlement in the Neolithic (Whittle 1998). Most models which have been proposed for Neolithic settlement in southern Britain agree that groups were not fully sedentary. The concept of a group which moves around within a territory, but which is 'tethered' to its locality is probably the most useful for this period (Whittle 2003). Few substantial houses have been found in southern Britain though a number have been found elsewhere in the British Isles (Rowley-Conwy 2003; Jones and Rowley-Conwy 2007). Those few which have been excavated (Sales Lot, Yarnton and White Horse Stone) have few or no animal remains. Dwelling places in southern Britain must have been insubstantial or at least left little trace. One of the roles of the long barrows is thought to have been to mark a territory to which people were tied by the presence of the ancestors and their familiarity with the land around and its resources. Causewayed enclosures and later henges will have served as a focus for larger territories where people came together to exchange cattle and other goods and to seek marriage partners. Barrow cemeteries on the other hand often marked a territorial border and, as we see in later chapters, there is little evidence from these as the focus of gatherings with feastings.

Settlement mobility could have been seasonal, annual or on a longer time scale. Ephemeral sites with small quantities of material (including food remains) suggest a short term occupation; just how short might be deduced from the animals killed and eaten. Seasonal mobility provides a natural rhythm for both hunters and herders. Some features of animal bone remains can suggest occupation (or its absence) in certain seasons. Domestic stock will have been born in spring (see Chapter 3 below) so the presence of newborn calves, piglets or lambs suggests spring or early summer occupation. Bands in dental cementum can sometimes suggest the season in which the animal was killed (Beasley 1987). Many species of birds are migratory, so their presence can be an indication of occupation in a certain season (Serjeantson 1998). Some authors have discussed the implications of their findings for seasonal occupation. Human mobility on a large scale is being explored by means of isotopic analysis of trace elements in bones and the same techniques are being applied to cattle (Viner et al 2010).

1.4.3 Farming and food

Despite some recent surveys (see Schulting 2008), there are still questions about what people in Neolithic Britain actually ate. What foodstuffs were eaten dictated how people farmed, managed their animals and lived their daily lives. For a long time it was taken for granted that people practised mixed farming from the Early Neolithic onwards, growing cereals as well as keeping animals, just as in continental Europe. Some authors then questioned this reliance on cultivated cereals, pointing out that remains of wild plants are recovered on Neolithic sites more often than cereals on sites in southern Britain (Moffett et al 1989). Certainly cereal remains are rare on Neolithic sites in southern England, but they are by no means absent (Jones and Legge 2008); a charred fragment of bread was even recovered at Yarnton (Hey et al 2003). Elsewhere in Britain there is abundant evidence for cereals in the Neolithic (Bishop and Rowley-Conwy 2010). The methods by which cereals were processed and consumed in the Neolithic means that there would have been few occasions for the seeds to become charred (Jones and Rowley-Conwy 2007). While it is likely that the first farmers in southern Britain grew and ate cereals, there are suggestions that these were less important as a source of food than the products of the domestic animals.

The ratio of plant to animal foods consumed has been estimated from the isotopic ratios in human bones. For example, the people buried in Hazleton North chambered tomb consumed a diet that was calculated to be 75 per cent of animal protein (Hedges et al 2008). This is a very high percentage, especially for agriculturalists in temperate climates. When the stable isotopes in the human remains from Hambledon Hill (Richards 2008) were compared with those of the other large mammals, humans came out surprisingly high in the trophic level, much higher than the herbivores but also higher than omnivores. This also suggests that a large proportion of the foods consumed was based on animal products (Figure 1.3). One piece of human bone from the Hambledon Hill sample gave a result in the spectrum for a vegetarian diet. This raised the possibility that some individuals avoided or were prevented from eating meat, but the fragment is now thought to have been from the limb bone of a red deer rather than a human (A. J. Legge, personal communication 6/6/1999).

These results of these chemical analyses confirm the importance of animals as providers of food, but do not answer the question of whether meat or milk was the principle animal food. The question of whether people milked their cows and consumed the milk products has been debated since the 1980s (Legge 1981a; Clutton-Brock 1981a; McCormick 1992; Halstead 1998; McCormick 1998). To some extent, this debate has been resolved by studies of lipid residues in pottery. Analysis of absorbed organic residues in the fabric of pottery from a wide range of prehistoric sites in Britain has shown that dairy products from ruminants – researchers could not distinguish the residues of cattle from those of sheep or goats' milk – were present in sherds from all the sites examined and from early and late Neolithic sites (Copley et al 2003; Copley et al 2005; Copley et al 2008). Some writers have pointed out that the residues might have been from milk which had been used merely to seal pottery vessels. Even if this was so, it seems far-fetched to suggest that people whose cattle were accustomed to being milked (Balasse et al 1997) and who were able to milk cows failed to eat the yogurt, cheese, and other products which the milk provided. It is likely that, as Copley and colleagues concluded, dairying was well developed when farming was introduced into Britain in the 4th millennium BC.

It has also sometimes been assumed that people in the Neolithic, especially the Early Neolithic, ate wild birds and fish, as in the Mesolithic, and that remains would be recovered if excavation techniques were designed for the recovery of these small bones. New research, discussed in Chapter 3, disproves this. Richards and Hedges (1999) demonstrated that even at sites which were within 20 km of the coast people were eating a diet based mainly on terrestrial rather than marine foods. This was even the case in Scottish coastal sites (Richards et al 2003), even though some fish remains have been found on such sites.

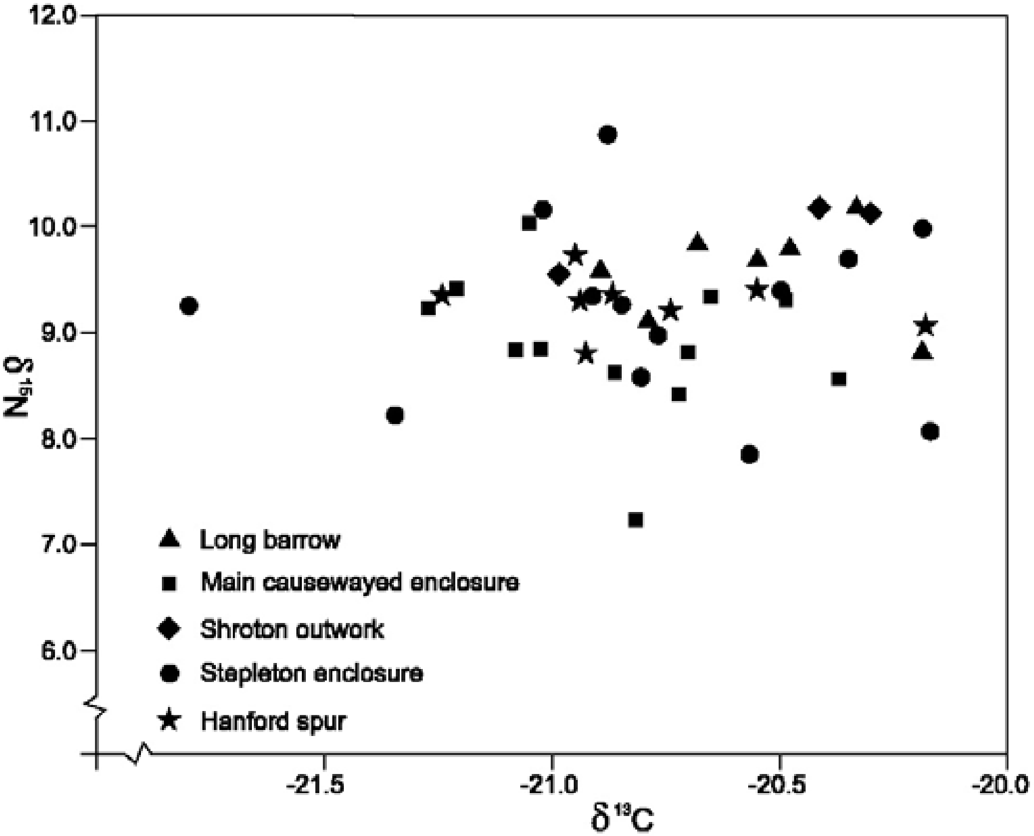

Figure 1.3 Diet of individuals from Hambledon Hill: the ratio of δ13C to δ15N in a sample of human bones shows that people had an omnivorous diet with a fairly large component of animal foods. Based on Richards (2008, 720)

1.4.4 Feasting and the question of rank

Feasting is likely to have been a feature of life throughout the Neolithic period. A whole cow, red deer or aurochs could have been eaten only by a large group of people, since, in the absence of salt , meat preservation must have been negligible. Salt was not produced in any quantity until the Late Bronze Age (Morris 1994) but the salting of meat may have started earlier as evaporation trays were identified at Early Bronze Age Brean Down (Pollard and Healy 2008). Feasting will have taken different forms at different times. The provision of feasts is a characteristic of ranked societies, as many authors have pointed out, so the question of ranking in Neolithic and Bronze Age society can also be addressed. The features of an assemblage which might identify feasting are discussed in Chapter 4.

1.4.5 Animals, memory and belief

It has also become clear in the past two decades that many – perhaps even most – deposits of animal bones were deliberately placed. This deliberate placing of bones in the ground within pits and ditches emphasises the importance of animals not just as the main providers of food but also as the focus of social and spiritual life in the Neolithic and Early Bronze Age, as discussed in Chapter 5.

1.5 Earlier surveys

Brief surveys of the wild and domestic fauna of Neolithic and Bronze Age Britain were published in the 1980s (Smith et al 1981; Tinsley and Grigson 1981; Grigson 1984). Regional reviews of environmental archaeology were also published in the 1980s (Keeley 1984; Keeley 1987). Southern Britain was discussed in four separate areas, the South-West (Bell 1984), Wessex (Coy and Maltby 1987), London (Armitage et al 1987) and the South Midlands (Robinson and Wilson 1987). The approach taken was to divide the regions into small areas of similar soils and topography, which was appropriate for the non-anthropogenic biological data with which they were mostly concerned but was less useful for considering the remains of large animals. Coy and Maltby discussed topics such as hunting and domestication as well as briefly referring to some Neolithic and Early Bronze Age sites. In the South Midlands review, Robinson and Wilson noted (p.24) that 'with bones the evidence is relatively similar from site to site' so they adopted a thematic approach to the data. That is the approach followed here.

A first version of this review was written twelve years ago (Serjeantson nd). It has been circulated in manuscript. In the intervening years much new research has been done and some authors have published surveys of animals and animal foods in the Neolithic with a limited scope (eg Tresset 2003; Schulting 2008). This updated review is more comprehensive. It has been substantially changed since 1998 to take into account the research of the past twelve years on lipid residues in pottery and on isotopic signatures in the bones of humans and animals. It also takes into account the assemblages published since 1998, which include Hambledon Hill and the Whittle excavations at Windmill Hill. Developer funding of excavations has not produced new large assemblages of this period which have been published, but has resulted in several small assemblages, some of which are available in the grey literature or have been made available for this review in advance of publication. The database also includes a number of assemblages which were omitted from the earlier review because at the time the number of identified bones was considered too few to be significant. Some important Neolithic sites in addition to Runnymede are currently in the process of full publication. The most important are Eton/Dorney Lake (Allen et al 2004) and Yarnton (Hey et al 2003), both on the Thames floodplain.

1.6 Interpreting the data

As the summaries of the major sites implied, the aims of the study of animal bones from archaeological sites have changed since the excavations of the 19th century, from the animals themselves to animal husbandry, the taphonomy of deposits and to deliberate bone deposition. These changes are reflected in the content and detail of reports on animal bones.

1.6.1 Recovery and retention

In tandem with changes in aims there has been a change in the attitude to recovery and retention of bones. Until the 1960s, the emphasis of zooarchaeology was on the size of the animals, so large and complete bones, especially of cattle, were important but it was not deemed necessary to examine every fragment. Consequently, excavators in the 19th and early 20th century saw no reason to retain the bulk of bones excavated. Though Keiller and Gray collected the animal bones from their excavations at Windmill Hill, Keiller later discarded the fragments regarded as unidentifiable (Grigson 1999, 210). Hawley did not retain all the bones from the excavations carried out at Stonehenge in the first half of the 20th century, but Atkinson in excavations in the 1960s sieved the sediments and retained all bone fragments (Serjeantson 1995). The records of bone numbers which have been taken from publications earlier than about 1970 should not be taken as reflecting what was originally recovered.

From the 1970s onwards the work of the Cambridge Early History of Agriculture project led to the realisation among zooarchaeologists that it was important to recover and retain all fragments. A campaign was waged to encourage excavators to recover bone more carefully – something which can be seen in the reproachful tone of many of the bone reports written in the 1970s and 1980s. Since that time many excavators have accepted that the sieving of samples is essential for complete recovery of vertebrate remains.

1.6.2 Implications of bone preservation

Consistent recovery is important, but in the end it is preservation in the ground which has the greatest effect on the nature of a bone assemblage. As well as causing the absence of bone in sandy soils and in shallow sediments generally, poor preservation leads to erosion of the bone surface and fragmentation in the ground. This accounts for the high percentage of unidentified bones in certain assemblages. Erosion of the bone surface also makes the recognition difficult of cut marks, chop marks and charring, as discussed in Chapter 4, and dog gnawing, as discussed in Chapter 5.

In Table 1.4 the percentage of unidentified bones has been calculated for those assemblages where both the number identified and the total number of bones was available. The assemblages are grouped into five categories which range from those with a very high percentage (60-95) to those with a very low percentage (2-19) of identified bones. There are various reasons why the percentage should be high or low; the reasons were sometimes made explicit in the published report but in some cases in Table 1.4 they were deduced from the report.

Table 1.4 Variations in the percentage of identified bone and possible interpretations. The calculation was based on assemblages with more than ten identified bones. Possible interpretations are based on a combination of the effects of survival and recovery

Percent identified	*N assemblages*	*Possible interpretations*
60 – 95 per cent	*20*	*Placed deposit or selective retention*
40 – 59 per cent	*15*	*Good recovery and very good condition or placed deposit*
30 – 39 per cent	*19*	*Good recovery and average condition*
20 – 29 per cent	*16*	*Good recovery and poor condition*
2 – 19 per cent	*17*	*Good recovery and very poor condition*

In a typical assemblage of food remains with good preservation and recovery the percentage of identified bones lies between about 20 and 39 per cent. A higher percentage identified suggests that the assemblage was unusual in some way, perhaps a placed deposit, or – in an old excavation – that only those bones selected by the excavator as identifiable were retained. Typical examples are the assemblage from the Barrow Hills Radley, which was a placed deposit, and Stonehenge, where fragments were not retained. Where fewer than 20 per cent of bones are identified this indicates that the bone was in poor condition but was recovered very carefully. Careful recovery accounts for the high percentage unidentified at Hazleton North, Drayton Cursus and Twyford Down. It is unexpected that as many as 35 out of 87 assemblages have more than 40 per cent identified bones, but this probably reflects the fact that many assemblages consist of placed bones.

1.7 Discussion

Southern England has the greatest number of Neolithic and Early Bronze Age bone assemblages of all regions in Britain, including most of the major assemblages. In Central England there were only fifteen sites with Neolithic bone assemblages (Albarella and Pirnie 2008) and in the North of England there was only a handful (Dobney ND). The findings from this review can be extrapolated for elsewhere in the lowland zone. The highland zone of the British Isles is likely to have had very different agricultural practices, as the soils, vegetation and climate were quite different from the south. Unfortunately the lack of assemblages from Cornwall and Devon means that this review cannot contribute to understanding herding, food and animals on the western seaboard. The dearth of coastal sites also means that we cannot explore the question of whether food and subsistence among coastal communities differed from those inland. The substantial body of data brought together for this review helps to answer some of the key research questions which are currently being asked concerning changing lifestyles in the Neolithic and Early Bronze Age.

2 DOMESTIC ANIMALS AND HUSBANDRY

2.1 Introduction

The three major domestic animals, cattle, pigs and sheep, are found at all Neolithic and Early Bronze Age sites for which bones have been recovered in any number, but over time there were changes in the numbers and the ages to which they were kept. Goat remains were found in just seven of the assemblages covered in this review. As well as the three main domestic animals, every household or settlement had dogs; we know this not so much from their remains but from the traces of gnawing on the bones of food animals. Horse remains have been recorded on about twenty sites, though the integrity of many of these finds is in question. The numbers, types and ages of the domestic animals all have implications for the ways that their human herders tended – and eventually slaughtered and ate – them. The species are discussed here in turn.

Whether cattle were kept solely to be eaten, whether they were milked, and whether they were used for ploughing affects our understanding of how the earliest farmers in Britain lived. The answers have implications for what foodstuffs were most relied on and for the degree of care with which the herds were treated. Cows which were milked or used for ploughing would have been handled daily so would have been individually closely known to their human herders. Flocks of ewes which were milked also needed close handling, though probably less than the cattle, since an individual sheep would have been less valued than an individual cow. Pigs also require tending, but again less care is needed with each individual animal. The horse was re-introduced to Britain at some time in the Neolithic period or the Bronze Age. Once available, the ownership of a horse would have had implications for mobility and probably also social rank.

The numbers of identified bones of cattle, pigs, sheep and the other domestic animals are set out in Appendix 3. The percentages of the three main domestic animals relative to each other have been calculated for each period and, within periods, for certain types of site (Figures 2.1 – 2.6). These calculations were based on all sites with more than ten identified bones. The age at death of cattle and pigs was available from some assemblages, which allowed some general comparisons between periods.

2.2. Cattle

2.2.1 Identification and relationship with aurochs

In most cases domestic cattle can be distinguished from the wild aurochs by their smaller size. The identification of aurochs remains is discussed in Chapter 3. If the earliest Neolithic cattle in southern Britain were intermediate in size between the wild aurochs and domestic cattle this would suggest that the aurochs was domesticated independently in Britain. Research by Grigson, which is discussed below, demonstrated that there is a clear separation in size between wild and domestic cattle in most skeletal elements, and this has been confirmed by subsequent studies (Tresset 2003, fig. 3.1). The conclusion that there was no local domestication of the aurochs is now supported by mitochondrial DNA. Ancient European domestic cattle carry a haplotype T which probably originated in Syria, whereas the European aurochs has a P haplotype (Edwards et al 2007).

In the environment and climate of southern Britain in the 4th and 3rd millennium BC it would have been possible for cattle to have lived outdoors all year round (Schulting 2008). It would not have been necessary to provide housing in winter as in some parts of continental Europe because winters in Britain were milder. The surviving areas of wildwood would have provided browse and shelter in winter. If cows gave birth in spring they would have produced milk in the spring and summer.

2.2.2 Numbers

Cattle numbers are greater than those for other species in the Early Neolithic (Figure 2.1). Cattle are the only domestic animal present in any number in the Coneybury Anomaly and the most numerous in the other assemblages. In the Early-Middle Neolithic more than half of all remains were of cattle at most sites; in long barrows they account for nearly 70 per cent (Figure 2.2). There are a few assemblages which are exceptions, the most notable of which is Runnymede, shown separately in Figure 2.2. We are familiar with the fact that the numbers of cattle are high in long barrows and causewayed enclosures, but this review shows that cattle numbers are also high in pits and occupation layers. There is little variation between contexts in the major causewayed enclosures: cattle yielded more than half of all bones in all areas at Windmill Hill and in all but three areas on Hambledon Hill (Appendix 3).

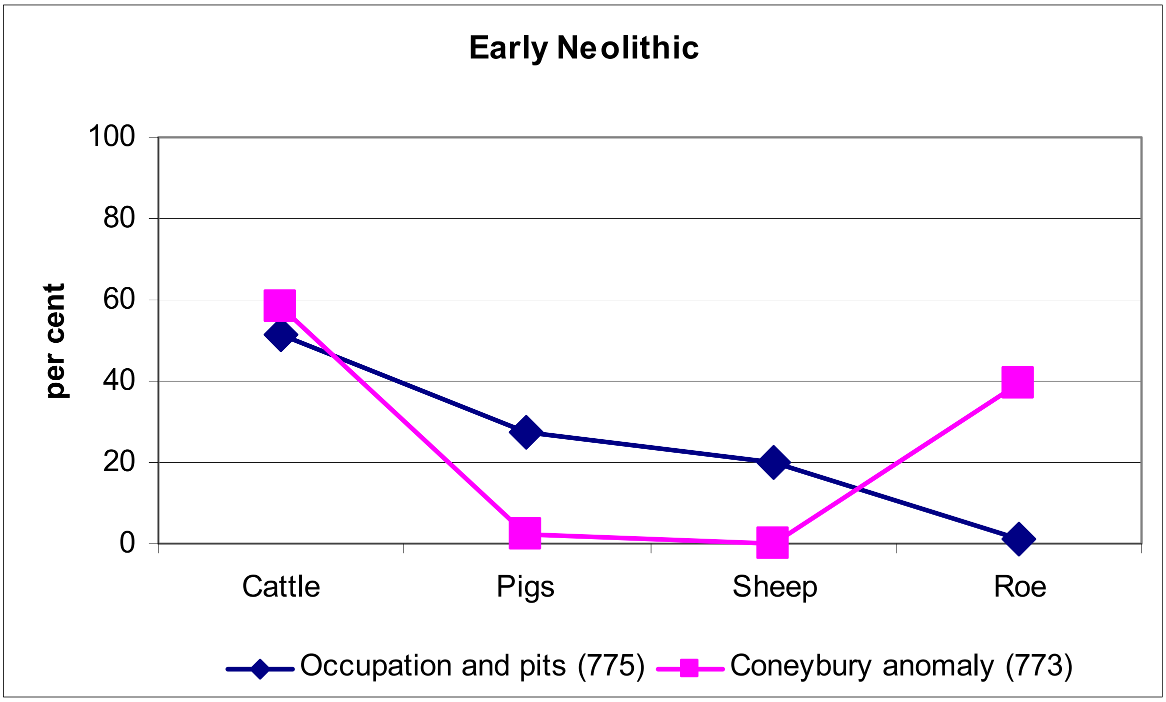

Figure 2.1 Percentage NISP of cattle, pig, sheep and roe deer in Early Neolithic assemblages, based on data in Appendix 3: sample size in brackets. The Coneybury Anomaly pit, which had an unusually high percentage of roe deer, is shown separately

In the Middle Neolithic the proportion of cattle is again consistently high (Figure 2.3), but to some extent this is because many contexts contained specially placed bones rather than food remains. It is only in the Late Neolithic that cattle are fewer than pigs (Figure 2.4). In contrast, a notable feature of assemblages associated with Beaker pottery (Figure 2.5) is that cattle are once again the most important animal. In the Early Bronze Age the relative numbers of cattle declined (Figure 2.6): this is because by this time people were keeping more sheep. The ratio of the main species is very similar between barrows and other types of site, confirming that this was a temporal trend and not a reflection of different types of site.

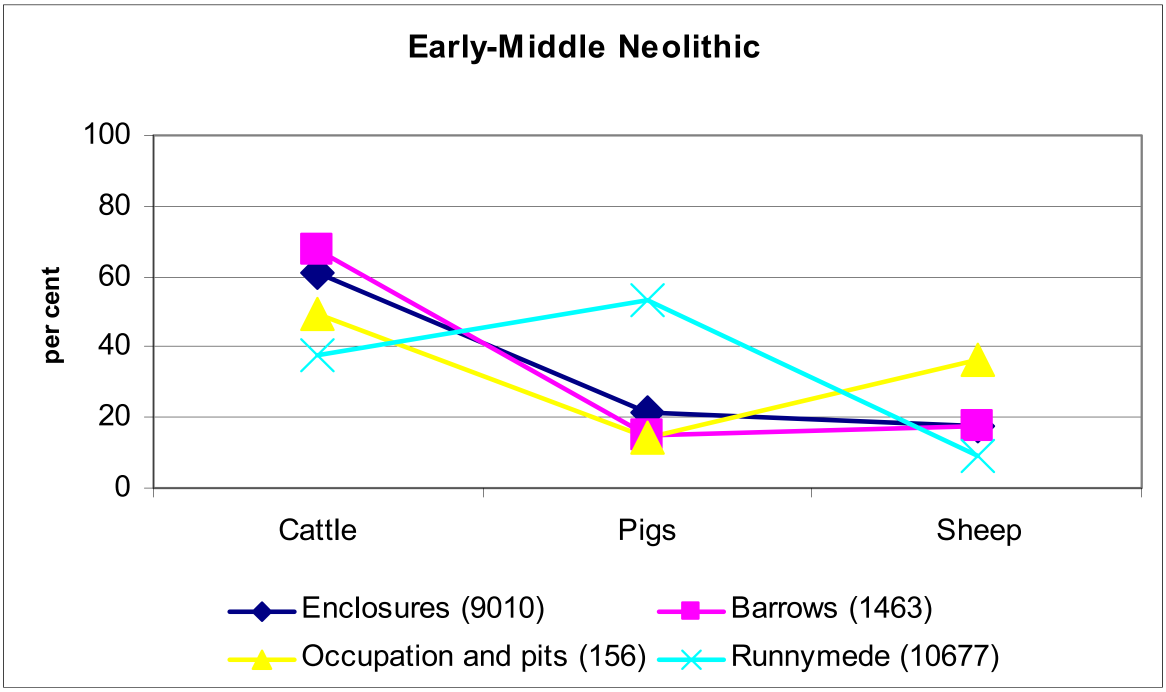

Figure 2.2 Percentage NISP of cattle, pig and sheep in Early-Middle Neolithic assemblages, as Figure 2.1. Long barrows, causewayed enclosures and occupation layers and pits are shown separately. Runnymede, with a higher percentage of pig than any other Early-Middle Neolithic site, is also shown separately

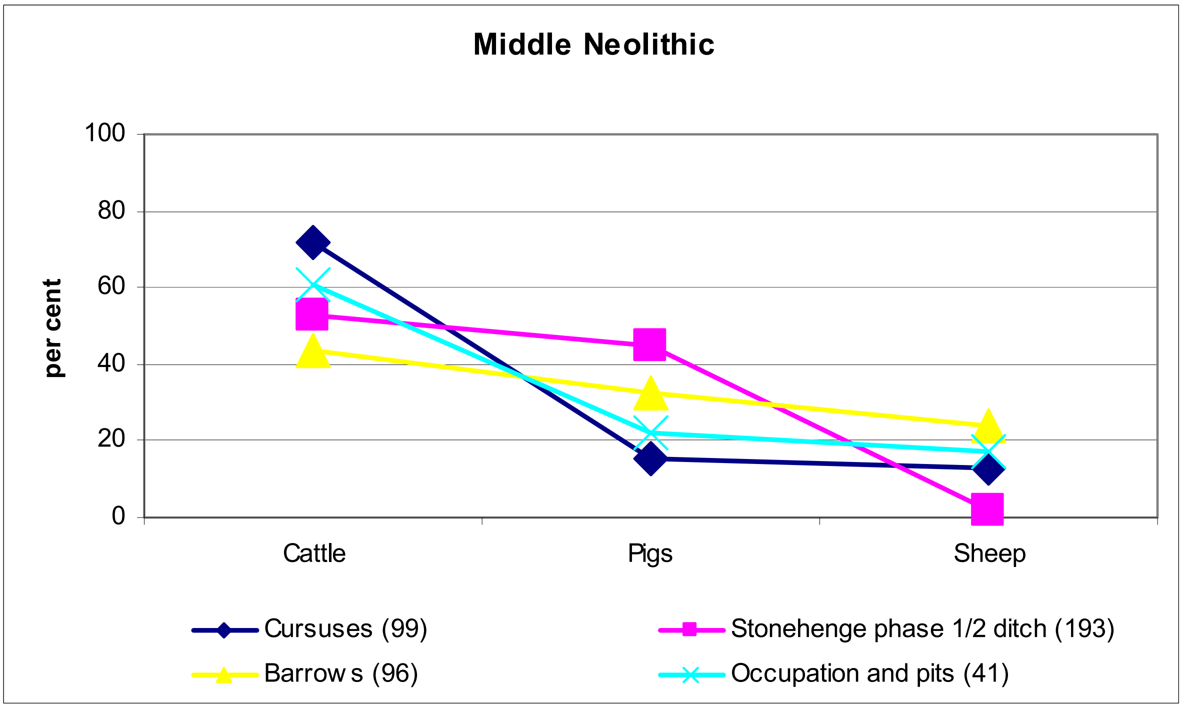

Figure 2.3 Percentage NISP of cattle, pig and sheep in Middle Neolithic assemblages, as Figure 2.1. Stonehenge, cursuses, barrows and occupation layers and pits are shown separately

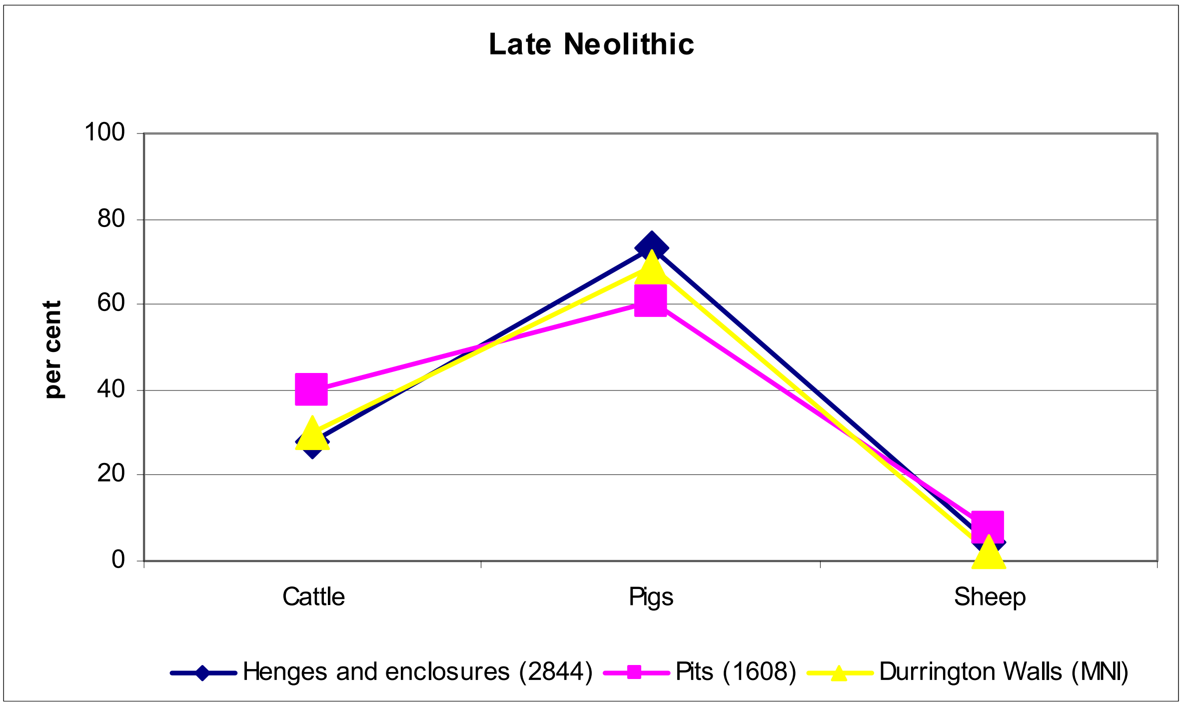

Figure 2.4 Percentage NISP of cattle, pig and sheep in Late Neolithic assemblages, as Figure 2.1. Henges and other enclosures, pits and Durrington Walls are shown separately. Durrington Walls data are based on MNI

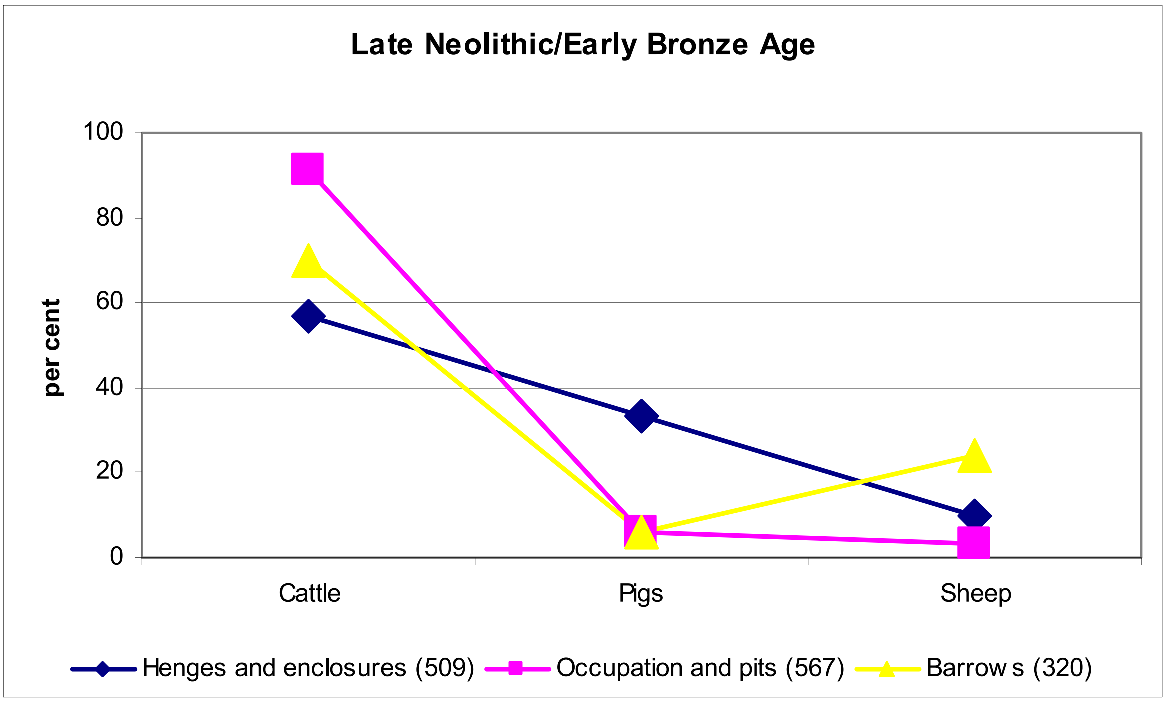

Figure 2.5 Percentage NISP of cattle, pig and sheep in Late Neolithic/Early Bronze Age (mainly Beaker) assemblages, as Figure 2.1. Henges and other enclosures, occupation layers and pits and barrows are shown separately

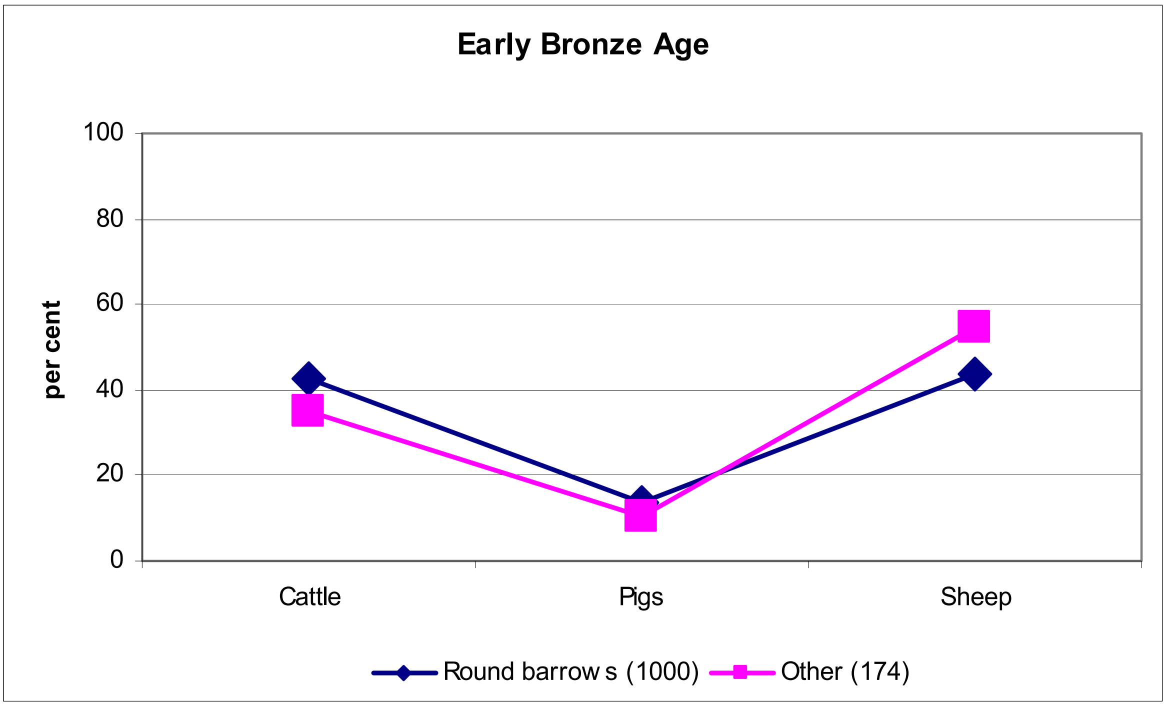

Figure 2.6 Percentage NISP of cattle, pig and sheep in Early Bronze Age assemblages, as Figure 2.1. Barrows are shown separately

2.2.3 Conformation and size

Prehistoric domestic cattle in Britain were originally seen as falling into two types. Following continental practice, when cattle remains from excavations were first studied (Jackson 1929; Jackson 1934; Kennard and Jackson 1935) the larger Neolithic cattle were classified as ‘ *primigenius*’ or ‘*frontosus*’ type and the smaller cattle, which were sometimes called the ‘Celtic ox’, was classified as ‘*Bos brachyceros*’ or ‘*Bos longifrons’* (Jewell 1963). All domestic European cattle are now regarded as the same species, *Bos taurus* (Clutton-Brock 1981b, 197). The larger type was identified by Jackson at Whitehawk causewayed enclosure, Woodhenge and Stonehenge. These cattle were taller and more robust and had larger horns and a wider skull than the small cattle of the Iron Age. The Neolithic skulls which have been described are alike. One from Whitehawk had a forehead with a ‘low rounded mesial prominence between the horn bases’ (Jackson 1934, 129). A cow skull from a Grooved Ware pit in Down Farm Firtree Field had a similar ‘bow-shaped profile and large curved horns’ (Legge 1991). In the Early Bronze Age cattle with skulls of a different shape appear. Of the pair of cattle buried in the Early Bronze Age Down Farm pond barrow, one had a frontal bone with the double curved profile and pronounced boss typical of Neolithic cattle while the other had short horns which tapered from base to tip, more typical of Iron Age cattle (Legge 1991). Of the two skulls from Middle Bronze Age deposits in the Wilsford Shaft, one was characteristically Neolithic in shape while the other, which is contemporary, has the Iron Age conformation (Grigson 1989). By the early 2nd millennium BC there were cattle present in southern Britain with skulls of two different types.

The size of cattle diminished from the 4th to the 2nd millennium BC (Figures 2.7 and 2.8). In Figure 2.9, which shows the breadth of the distal humerus, it is clear that the cattle from Late Bronze Age Grimes Graves were smaller than those from the Early-Middle Neolithic sites. At Boscombe Down the cattle scapulas showed a decrease in size from the Early-Middle Neolithic to the Late Neolithic. Early Neolithic cattle stood about 1.2 m tall at the withers (Grigson 1984), but by the end of the 2nd millennium BC cattle were 20 – 30 cm shorter and correspondingly smaller in every dimension. The skeletal elements from the Early Bronze Age barrows at Milton Lilbourne included some from large cattle and some from cows described as of 'the usual Bronze Age size' (Grigson 1986). It appears that these smaller cattle are found for the first time in the 2nd millennium BC. The diminution in cattle size, together with the change in skull shape, raises the question of whether there was an autochthonous size reduction in cattle in southern Britain or whether a new type of cattle was imported from outside the region. Modern British cattle are particularly diverse as far as their DNA is concerned, which shows that cattle of more than one type have been introduced to Britain at some time in the past (Tresset and Vigne 2007). The timing and nature of the change in cattle type will only be understood after future research on cattle size and bone chemistry.

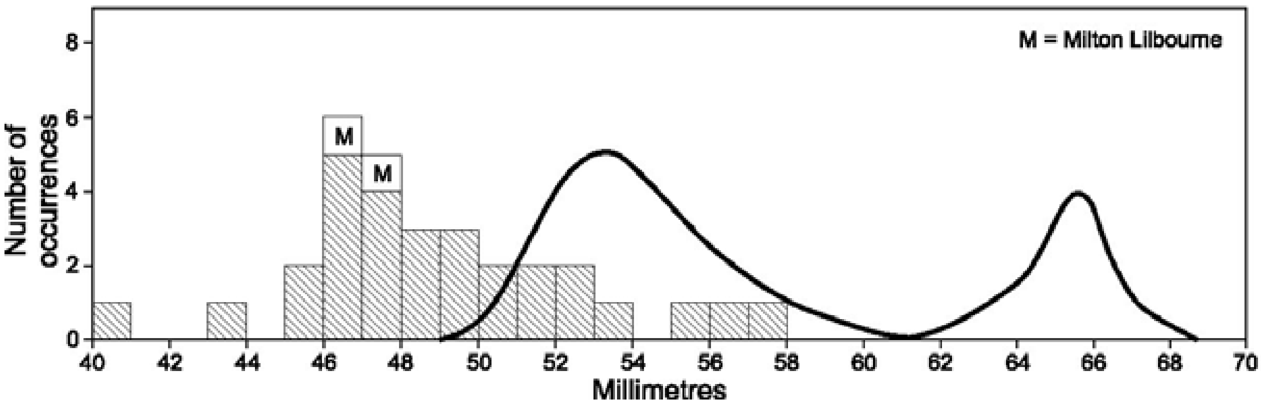

Figure 2.7 Size of Neolithic and Bronze Age cattle: length (L) of lower third molar (M3) from Neolithic (line) and Bronze Age assemblages (stippled squares). Some teeth from the Early Bronze Age site of Milton Lilbourne (M) are of the larger Neolithic type and some are of the smaller Bronze Age type. Based on Grigson (1986, fig. 41)

Coat: There is no direct evidence for coat type or colour. Cattle at this time were undoubtedly hairy like the aurochs rather than smooth-coated (Zeuner 1963). In the absence of winter shelter, a hairy pelt would have been needed as winter protection. The only find of what might have been cattle hair was from the Wilsford shaft and this was not informative about colour or type (Ryder 1989). We will only learn what coat colours were favoured by Neolithic herdsmen from finds of surviving hair or if it can be demonstrated that coat colour is linked to certain DNA sequences.

Skeletal abnormalities: Jackson noted that many jaws of domestic Neolithic cattle have no first permanent premolar (P_2). He thought that this was a congenital absence, characteristic of domestic as opposed to wild cattle, and that it was associated with the shorter jaw of domestic cattle. As this tooth is often lost from the jaw early in life, and the alveolus closes, it would be hard to establish whether or not it is a feature of domestic cattle. Potentially more significant is the fact that there are very few Neolithic cattle in which the third permanent molar (M3) lacks the third cusp, a condition which is fairly common by the Iron Age. One specimen only with lack of third cusp, from Durrington Walls, has been noted from the Neolithic in southern Britain (S. Viner, personal communication 19/4/2010). The condition may be genetic, but it certainly appears to be associated with a smaller size of cattle.

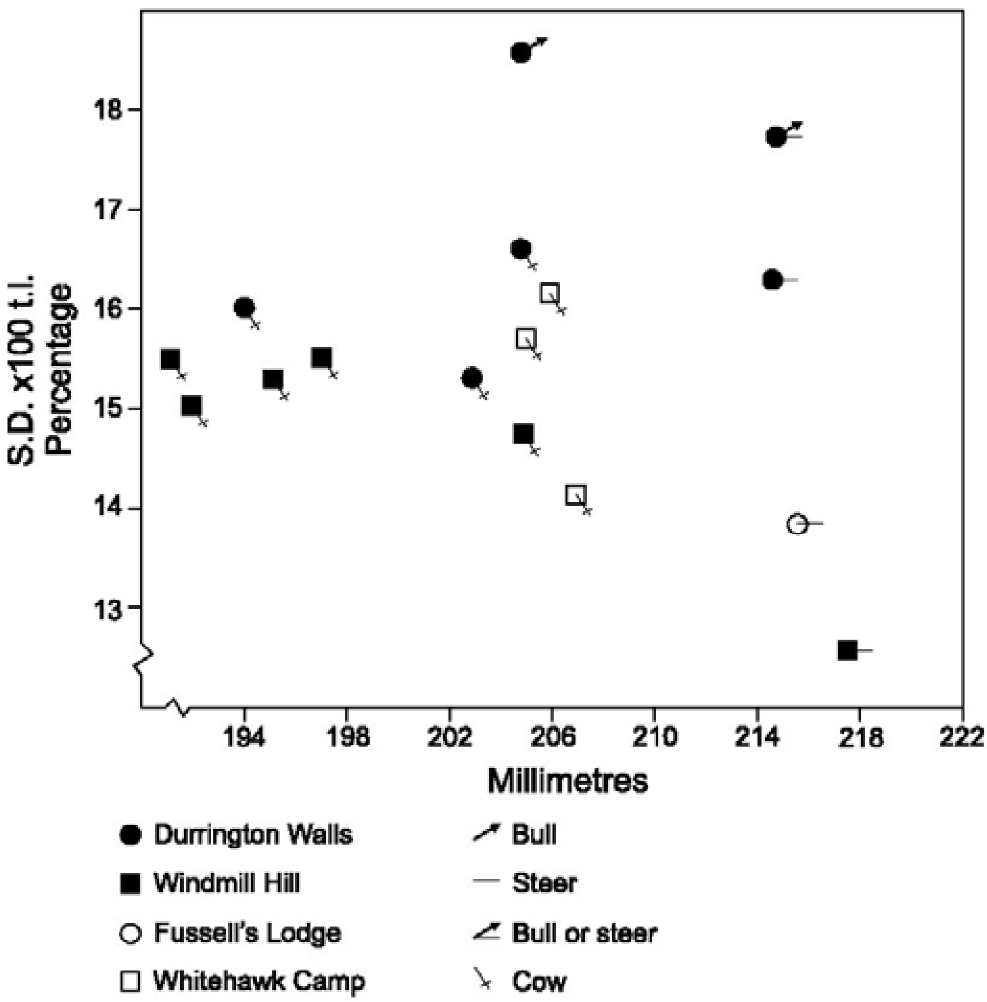

Figure 2.8 Size of cattle from four Neolithic assemblages: metacarpal midshaft diameter expressed as a percentage of the total length against the total length. Most elements are from cows, two are from bulls and three are from bulls and/or castrates. Based on Harcourt (1971, fig. 109). See also Figure 2.9

2.2.4 Traction

Neolithic cattle must have been used to carry goods on their backs and to pull sledges, travois, carts or ploughs when these were used (Piggott 1992, 16-19). This has implications not just for the animals themselves but also for their herders. Settlement mobility would have made it necessary for people to transport their possessions from place to place. The quantity of material goods required by herders and farmers is much greater than that needed by hunter-gatherers. At a minimum, it must have included pottery, querns, stone tools and perhaps, by analogy with recent herders, some of the materials used for constructing houses. Seed corn and foodstuffs would also have been transported; cleaned grain was carried to Hambledon Hill (Jones and Legge 2008). Modern-day illustrations of stones being transported across the countryside for the construction of monuments such as Stonehenge usually show the stones being dragged by people, but it is more likely that cattle were the motive power. Wheeled carts were in use in Switzerland and the Low Countries by the 4th millennium BC (Whittle 1988, 95; Bakker et al 1999). No wheels have yet been recognized in Britain at this early date, but, if used, the carts would have been drawn by cattle.

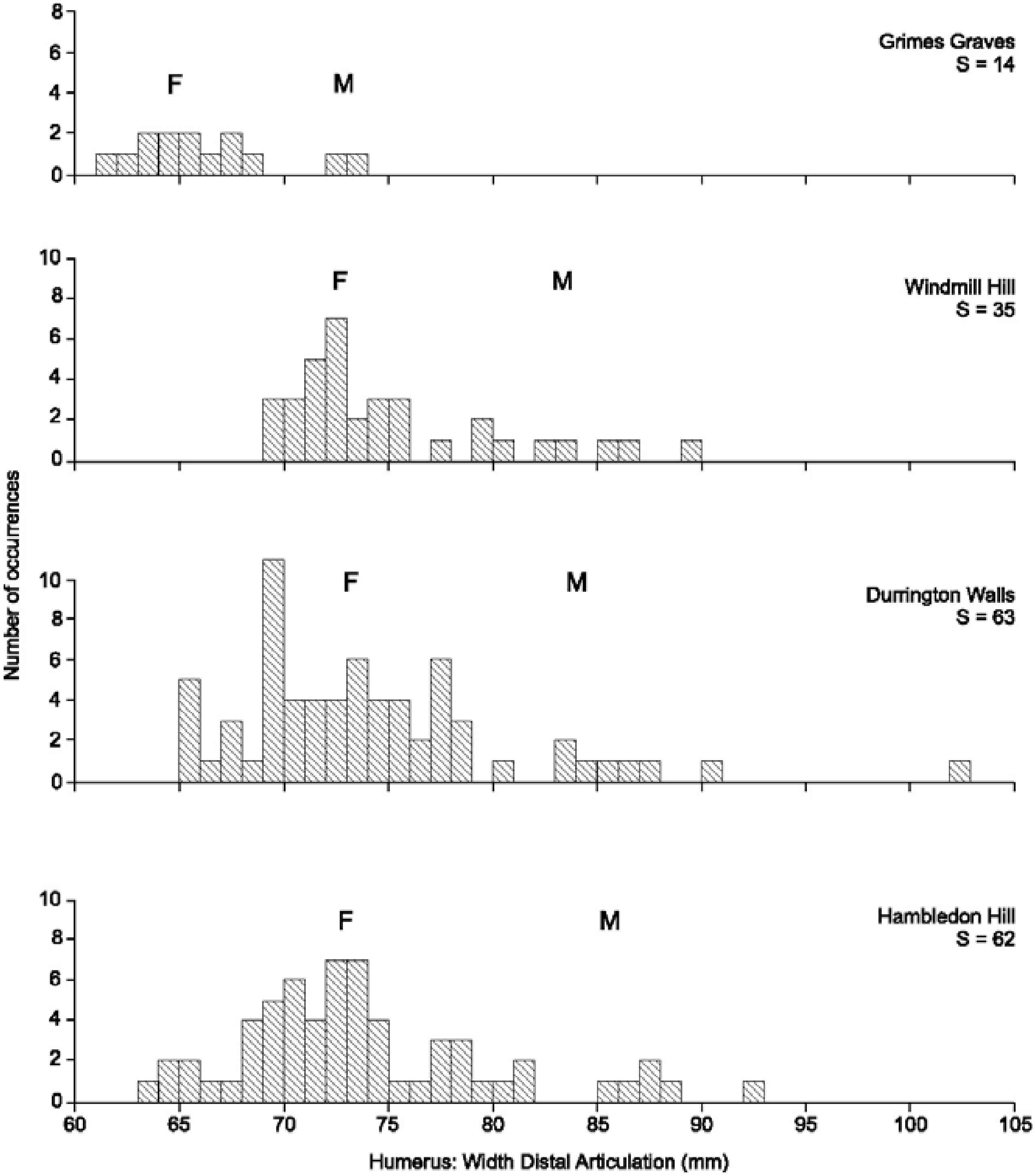

Figure 2.9 Cattle sex ratio based on breadth of distal humerus (BT) from Grimes Graves, Windmill Hill, Durrington Walls and Hambledon Hill. Most are in the group of smaller females (F) and a few are in the group of larger males (M). Based on Legge (1981a, fig. 5)

Whether cattle were also used for ploughing in the Neolithic and Early Bronze Age is a question which can only be answered by looking at several sources of evidence (Isaakidou 2006), including ard marks, the sex ratio among the adult cattle, and pathologies which may derive from traction. In continental Europe excavated traces of ard marks from the early 4th millennium show that ploughing was taking place at a time before the earliest Neolithic in Britain (Sherratt 1981; Bogucki

1993). In southern Britain there are just a few sites with ard marks, of which the earliest may be the furrows beneath South Street long barrow (Ashbee et al 1979). Marks made by a rip-ard were also noted beneath Amesbury Early Bronze Age barrows G70 and G71 (English Heritage 2002). Some primitive ards can be pulled by human power, so ard marks do not necessarily imply the use of cattle, but it is likely that they do.

Castration: The presence of castrated males would suggest that some cattle were kept especially for traction, though castration might also have been carried out on animals to be raised for meat. The size and shape of certain skeletal elements fall into two groups if males and females are present and into three size groups if castration was carried out (Grigson 1982). Castrated oxen typically grow taller than bulls but are not as heavy, so have longer and narrower metapodials. Metacarpals from some Neolithic sites suggest three populations are present (Grigson 1969). Two or three of the sixteen metacarpals from Early-Middle Neolithic sites were longer and had narrower shafts than the rest, so may be from castrates (Figure 2.8). The horn cores of contemporary Neolithic cattle in France suggested that three populations were present there (Arbogast 1994). However, as discussed below, there are many sites where the bones fall into two size classes only. The osteological evidence for castrated oxen is inconclusive. It should be noted that there is no reason why cows could not have been used to pull ploughs (Reynolds 1979), so it was possible to use cattle for ploughing even if mainly cows were kept. In the Early Bronze Age there are two examples of burials of pairs of cows (see Chapter 5): these may represent plough teams.

Traction pathologies: The models and rock engravings in continental Europe which illustrate prehistoric ploughing show that the ard was attached to the pair of cattle by a yoke attached to the horns. A yoke would also have been used on cattle pulling sledges or carts. It was thought at one time that pressure from the yoke on the back of the skull caused perforations in the skull. Three such perforations were present in the skull of a cow from the Down Farm pond barrow. However, recent research has shown that these perforations are not a response to the wearing of a yoke but are probably a developmental disorder of genetic origin, as they occur in wild animals and other domesticates, eg. pigs (Brothwell et al. 1996; Fabis and Thomas 2011), so this cannot be regarded as evidence for traction by cattle. Other pathological changes to the skeleton may be the result of strains from traction: they include alterations to the phalanges (Higham et al 1981; Olsen 1994). One such first phalanx from Windmill Hill and another from Durrington Walls (Harcourt 1971, plate XIII c) had what was described as widespread periostitis which was thought to have resulted from ploughing. Changes are sometimes seen in the distal metapodials (Bartosiewicz, Van Neer and Lentacker 1997; Isaakidou 2006) and the pelvis (Baker and Brothwell 1980; Armour-Chelu and Clutton-Brock 1985) but these have yet to be reported from Neolithic and Early Bronze Age sites in southern Britain.

Other pathologies have been noted which probably had no connection with traction. Of two cow skeletons from the Down Farm pond barrow one had pathological changes including exostosis around the glenoid of the scapula and the other had exostosis around the distal articulation of the femurs. This bone proliferation at the articular ends was thought to be normal in old animals and not necessarily associated with traction (Legge 1991).

Thus in southern Britain, while it is probable that cattle were used as beasts of burden and for traction, this has yet to be conclusively demonstrated.

2.2.5 Milking: sex ratio and age at death

Pictorial evidence of the 4th millennium BC shows that in the eastern Mediterranean both cattle and sheep were milked. There is now also evidence from various sources for the milking of cattle in France (Balasse et al 1997). Whether prehistoric cattle in Britain were milked has been a subject of debate, which has also concerned whether dairy herds can be recognised from the animal bone remains. The milk residues in pottery have resolved the first question, as it is now clear that milk and milk products were cooked and stored in pots. Here we are concerned with the animal bone evidence which complements the chemical evidence: it can indicate how intensively cattle were managed for milk.

Sex ratio: A herd of cattle which is milked includes many more cows than bulls. The sexes can be identified from the skulls and some of the long bones. Most of the skulls found on early Neolithic sites are of cows (Grigson 1982). The Beaker skull at Hemp Knoll was that of an old cow, as were those from the pond barrow at Down Farm. The horn cores from Keiller's excavations at Windmill Hill suggest a ratio of six cows to one bull. Those from the first phase at Stonehenge were from approximately the same number of males and females. However, these need not reflect the cattle population as a whole, since they were selected for deposition at the base of ditches (see Chapter 5) and may therefore not be random sample of the cattle herds.

The size of the long bones is a more reliable guide to the sex ratio. It has been calculated based on the metacarpal and the distal humerus, both of which are sexually dimorphic. Metacarpals from four Neolithic assemblages (Figure 2.8) include eleven cows and at least two bulls, as well as some possible castrates, as discussed earlier. The long bone which is the most dimorphic between males and females is the humerus (Legge 1981a). The distribution of the breadth of the distal humerus of cattle from Windmill Hill, Hambledon Hill and Durrington Walls (Figure 2.9) shows many more cows than bulls at each site. The ratio reached nearly 10:1 of cows to bulls at Hambledon Hill, a ratio confirmed by a survey by Tresset (2003, fig. 3.1).

Age at death: In a milk herd most of the males are superfluous, so some of the male calves are killed off (Legge 1981b). This is especially the case if grazing or manpower to tend the cattle is limited. Where management of the herd is not intensive, the calves are killed at the end of the summer. If they were killed before that time, this indicates that the management of the herd is more intensive. This early cull of some of the calves was seen at Middle Bronze Age Grimes Graves and in some other Late Bronze Age assemblages, where the percentage of calves (up to 40 per cent) is very high and the calves were killed at a few months of age (Legge 1981b; Serjeantson 2007). This would have been before the end of the lactation period of the cow, so it implies that prehistoric herdsmen had mastered some of the strategies which can be used to encourage cows to let down their milk in the absence of the calf (Ryan 2005; Tani 2005).

Cattle management was not necessarily so intensive in the Neolithic and Early Bronze Age as later in the 2nd millennium BC. At Neolithic sites in north-west France calves were slaughtered at 6 - 12 months of age (Tresset 1994; Balasse et al 1997). This was also the age of slaughter of the calves from the site of Tofts Ness in Neolithic Orkney (Serjeantson and Bond 2007). Both teeth and post-cranial bones provide evidence for age at death, but a few assemblages only from Neolithic and Early Bronze Age southern Britain have post-cranial bones in the numbers which provide an age profile. The patchy records of bone fusion suggest that most assemblages include cattle of all ages: juvenile, immature, and old. In the Late Neolithic, post-cranial remains of calves are fewer than in the Early and Middle Neolithic – few calf bones were found among the large quantity of bone material from Durrington Walls and the West Kennet Palisade Enclosures.

Teeth are a more valuable source of evidence regarding age. In some assemblages from the Neolithic and Early Bronze Age the eruption and wear stages of the cattle teeth were published in a form in which makes them comparable with other assemblages. In this review records have been collated from those reports where the wear codes of Grant (1982) were published (Appendix 4). In addition it was sometimes possible to extrapolate the eruption and wear stage of an individual jaw from the published description. Appendix 4 includes a sample of the unpublished dental records from Runnymede as well as published records.

Figure 2.10 shows the age at death of Early and Early-Middle Neolithic cattle compared with those from Runnymede. They are shown in nine age classes, which are defined in Table 2.1. The few very young calves come from Early Neolithic deposits at Hemp Knoll and Windmill Hill. In addition, one of the very few reliably dated skeletal elements from the Neolithic of the Scilly Isles is an unworn fourth deciduous molar from a very young calf (Ratcliffe and Straker 1996). Just over 20 per cent of sample from Runnymede were calves killed before six months of age. Of these, more than ten per cent were dead in the first three months. The percentage of calves is similar to that at Hambledon Hill (Legge 2008, fig. 8.6). It is small compared with the Late Bronze Age sites, but this does suggest fairly intensive management of the cattle for milk.

Table 2.1 Definitions of age stages of cattle, based on Legge (1992, tab. 4) with some author's amendments for the youngest and oldest age stages. Mandibular tooth wear stages are from Grant (1982, fig. 1). The correlation of wear stage and age is approximate in the later stages

STAGE	ERUPTION/WEAR STATE	TOOTH WEAR STAGES	APPROXIMATE AGE
1	*Milk molars unworn or enamel wear only*	*DPM4 a, M1 C*	*0-1 mo*
2	*DPM4 in wear, M1 unerupted*	*DPM4 b–f, M1 E*	*1-3 mo*
3	*DPM4 worn on all cusps, M1 not in wear*	*DPM4 g-h*	*3-6 mo*
4	*M1 in wear, M2 unworn*	*M1 b-f, M2 E*	*6-15 mo*
5	*M1 in full wear, M2 in wear, M3 unworn*	*M1 g, M2 b-f*	*15-26 mo*
6	*M3 in early wear*	*M2 f-g, M3 b-f*	*26-36 mo*
7	*M3 all cusps in wear*	*M2 h-k, M3 g*	*3-6 years*
8	*M3 in full wear*	*M2 j-k, M3 h-l*	*6-8 years*
9	*M3 in heavy wear*	*M3 m*	*> 8 years*

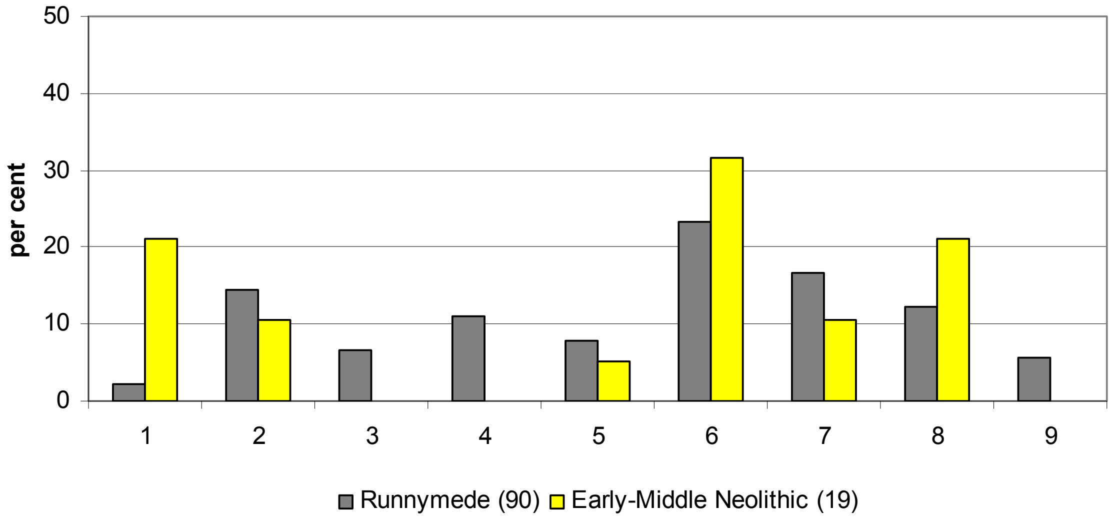

Figure 2.10 Age classes of cattle from Runnymede, Hambledon Hill and other Early-Middle Neolithic assemblages, based on data in Appendix 4. Key to age classes in Table 2.1; sample size in brackets

Sample numbers are much smaller for the Late Neolithic and Early Bronze Age (Figure 2.11), but in general the percentage of calves dead in the first months of life is lower than in the earlier period. Only five per cent of the cattle from Durrington Walls were calves and at Late Neolithic Gorsey Bigbury henge just one long bone was from an animal below 1-1 ½ years of age; the jaws are all from cattle between 2 ½ and 3½ years of age at death. The remains from the Early Bronze Age are mainly from barrows, where we might not expect cattle of all ages to be buried. However, we know from lipid studies that milk and milk products continued to be consumed in the 3rd millennium.

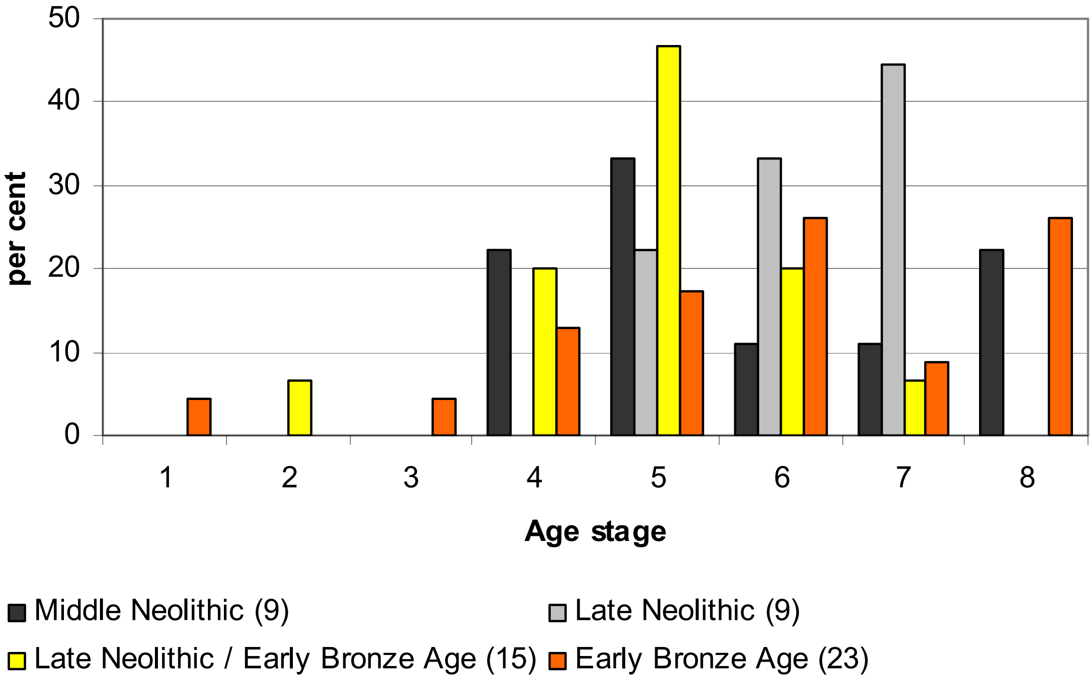

Figure 2.11 Age classes of cattle from Middle and Late Neolithic and Early Bronze Age assemblages, as Figure 2.10

2.2.6 Discussion of cattle husbandry

The relatively large number of cattle must translate into the fact that people kept more cattle than other animals in the Early-Middle Neolithic. Even though it is very likely that people deliberately deposited cattle bones in preference to the smaller animals in some contexts, the predominance of cattle persisted in all types of sites until the Late Neolithic. The high ratio of cows to bulls and the relatively high percentage of calves confirms that cows were milked, but milking appears to have been carried out more intensively, and so provided a greater proportion of foodstuffs eaten, in the Early-Middle Neolithic than in the Late Neolithic. At that time the herds may have been managed less intensively because societies were more focussed on the eating of meat, as discussed below.

This changed at some time in the 2nd millennium BC when a smaller type of cattle is first seen. These small cattle may have evolved locally in response to a reduction in the amount of grazing available or they may derive from new imported stock. The development of permanent fields and the disappearance of woodland would have reduced the amount of grazing available in southern Britain in the 2nd millennium BC and, where grazing is limited, the milk yield is greater from a larger number of small cattle than from fewer large ones (Lucas 1989; Kelly 1998). If a new cattle type was indeed introduced to southern Britain, it could have come either from continental

Europe or from the highland zone of Britain. As cereal cultivation increased in southern Britain in the 2nd millennium, cattle will increasingly have been used for ploughing. Though small cattle are not more desirable than large ones for ploughing they were capable of drawing the ards in use in the 2nd millennium (Reynolds 1979).

2.3 Pigs

2.3.1 Identification and relationship with wild boar

The smaller size of domestic pigs distinguishes them from wild boar, as will be discussed in Chapter 3. The size range of each was unclear until recently, so the numbers recorded for domestic pigs (Appendix 3) may include a few wild boars. Recent research into pig DNA has revealed that pigs were domesticated locally in Europe; this is contrary to earlier studies based on size which suggested that all pigs were domesticated in the Near East (Larson et al 2007). Domestic pigs were introduced to Britain just as were domestic cattle and sheep. Some interbreeding with the local wild boar may have taken place but it is thought that Neolithic swineherds may have deliberately discouraged interbreeding because wild boar grow more slowly than domestic pigs and are less easy to manage (Albarella et al 2007).

2.3.2 Numbers

Pigs number rather less than one-third of the three main domestic animals in the Early Neolithic (Figure 2.1), and overall in the Early-Middle Neolithic period the proportion is only about 20 per cent of the three main domestic animals (Figure 2.2). The percentage varies slightly between sites but there are a few individual assemblages with significantly more pigs than cattle. The most notable of these is Runnymede, which is shown separately in Figure 2.2. There are some variations between assemblages from some of the larger sites. Though pigs are less numerous than cattle at Hambledon Hill in general, the mandibles suggest that more pigs than cattle were killed on Stepleton Spur. At Runnymede there was a higher percentage of pigs in the north-western area of the site (60 per cent of identified bones) than the south-eastern area where they are 40 per cent (Serjeantson 2006, fig. 9.3). The differences between the two areas are currently not understood: they are apparently contemporary, so the differences may prove to be associated with different activities.

In the Middle Neolithic numbers of pigs are again quite low except at Stonehenge where numbers are boosted by three part-skeletons of piglets (Appendix 6). The abundance of pigs from Late Neolithic sites is well known. It is enhanced by the fact that few sheep were kept at this time (Figure 2.4). Durrington Walls, where the comparison is based on MNI rather than NISP, is well-known for having a high percentage of pigs, but Figure 2.4 shows that the percentage was typical for the period. The pits with Grooved Ware, some of which have been excavated in the past decade, confirm that numbers of pigs are high at all types of site, though overall cattle numbers are slightly higher than in the henges. This is counter-intuitive, as we might expect smaller animals to be more favoured for eating in smaller scale settings, but it supports the idea, discussed below, that the pigs at the henges were highly selected. The Late Neolithic/Early Bronze Age assemblages (Figure 2.5) have a significantly lower percentage of pigs, though there are more in henges than in round barrows, occupation layers and pits. By the Early Bronze Age (Figure 2.6) people had almost ceased to keep pigs.

2.3.3 Size and type

In the Neolithic and Early Bronze Age, domestic pigs were similar in appearance to wild boar today, with relatively long snouts and long legs (Grigson 1965). The pigs from Durrington Walls and Mount Pleasant are estimated to have stood 71 cm at the shoulder on average. Like modern wild boar, pigs are likely to have been hairy and dark in colour. Unlike modern pigs, they will have had just one litter a year, and a single birth season in the spring. The dimensions of the skeletal elements of domestic pigs in the Late Neolithic are now well-known as a database of measurements from Durrington Walls is available which has provided a basis for comparing pig size with other sites (Albarella and Payne 2005).

2.3.4 Age and sex

Because most pigs are usually killed while still quite young, leaving only a few breeding adults, it might be expected that the age at death would be the same between the Early-Middle Neolithic and the Late Neolithic. It has been possible to test this by comparing the age classes of the pigs from Runnymede with those from Durrington Walls and other Late Neolithic sites (Figure 2.12). As with cattle, assemblages were included where the eruption and wear stages according to Grant were available (Appendix 5). Teeth and jaws were assigned to six age classes; the approximate age at death (Table 2.2) was taken from Bull and Payne (1982). The pigs from Runnymede were rather older when they were killed than those from Durrington Walls: most at Runnymede were subadult and almost one-fifth were fully adult. At Durrington half of all pigs were killed in their first autumn while still immature. Those from other Late Neolithic sites were killed at different ages but those from Durrington Walls were selected for slaughter at a certain age.

The post-cranial bones of pigs are not sexually dimorphic (Albarella and Payne 2005), but the canine tooth is distinct in male and female pigs. Both the tooth itself and the alveolus for the tooth are diagnostic. A ratio of teeth alone can be misleading, as the canines of adult male pigs ('boars' tusks') were removed for use as ornaments and knives. In the large collection from Durrington Walls a ratio of males to females was based on the canine alveolus; the ratio proved to be approximately equal. It was also approximately equal in the Grooved Ware pits at Barrow Hills Radley where, of the nine pig jaws which were sexed, five were from males and four were from females.

Table 2.2 Definitions of age stages of pig: ages stages are based on O'Connor (1988, tab. 23) and approximate ages follow Bull and Payne (1982)

STAGE	TOOTH ERUPTION AND WEAR STAGE	APPROXIMATE AGE
NEO	Teeth unerupted	Neonatal
JUV	First permanent molar (M1) not in wear	Juvenile
IMM	First permanent molar in wear; second permanent molar not in wear	Immature (4 – 12 months)
SUB	Second permanent molar in wear; third permanent molar not yet in wear	Subadult (12 – 24 months)
AD	Third permanent molar in wear, but not heavily worn	Adult (2 - 3 years)
ELD	Third permanent molar heavily worn (Grant stage 'j' or beyond)	Elderly (over 3 years)

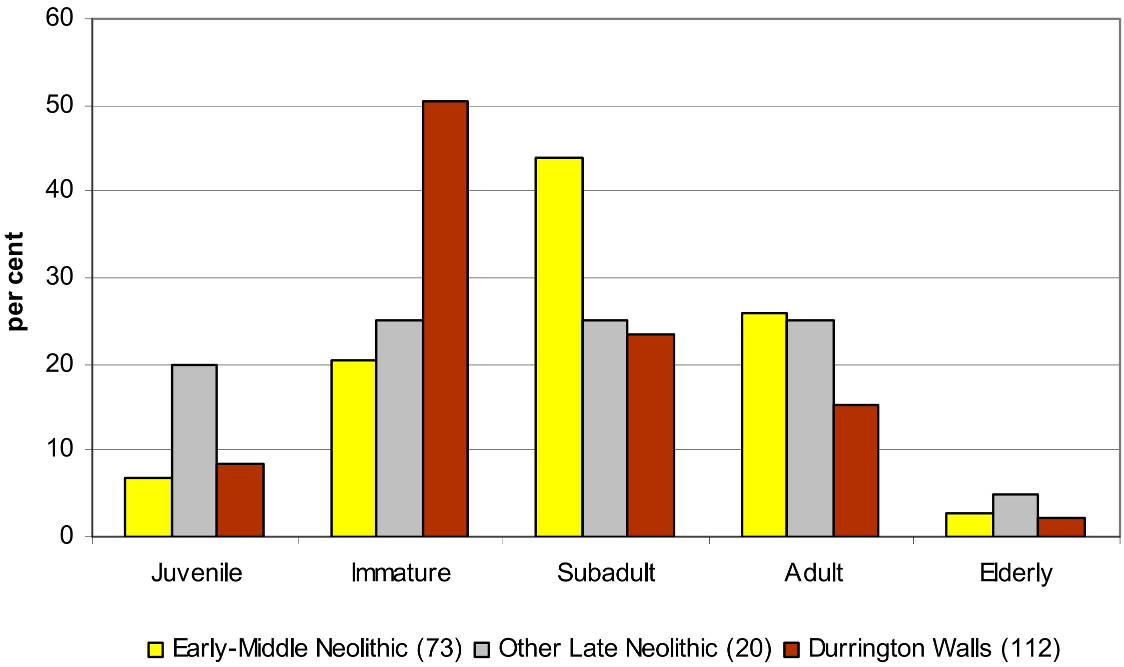

Figure 2.12 Age classes of pigs from Early-Middle Neolithic, Durrington Walls and other Late Neolithic assemblages, based on data in Appendix 5: sample size in brackets. See Table 2.2 for definitions of age stages. Data for Durrington Walls are at http://ads.ahds.ac.uk/catalogue/adsdata/arch-393-1/dissemination/csv/dwmand.csv [accessed August 20, 2012]

2.3.5 Discussion of pigs

Pigs are more common in the Early and Middle Neolithic than was apparent when in the 1980s when Grigson carried out her surveys but, except at Runnymede, there are still fewer pigs than cattle. The reasons for the large number of pigs at Runnymede are not certain. Tresset (2003) proposed that the many pigs at Runnymede reflected the cultural affiliations of the site; this is discussed further in Chapter 7. Other possibilities were that the presence of so many pigs was a reflection of the local environment or of the distinctive the role of the settlement. In the 4th millennium BC the environment at Runnymede was very suitable for pigs, as the marshy and lightly wooded Thames floodplain would have provided ideal year-round food. However, environment alone cannot explain the contrast between Runnymede and other sites. At Staines causewayed enclosure, which is contemporary with Runnymede and only about a kilometre away from it, cattle were much more common. Serjeantson (1996) concluded that the pigs were characteristic of domestic sites where food consumption took place on a small scale, while cattle were characteristic of the causewayed enclosures, which were centres of communal gatherings. This conclusion might have some support at Hambledon Hill, but only if Stepleton Spur was seen as a more 'domestic' area and the main enclosure as the place where communal feasts took place. However, Serjeantson's conclusion is not supported elsewhere by the more abundant evidence from this review. In general in southern Britain assemblages from occupation layers have similarly small numbers of pigs compared to the long barrows and causewayed enclosures.

The increase in pig numbers from the beginning of the 3rd millennium suggests that a profound change took place in the relationship between humans and their herds at that time. Though people continued to keep and milk cows, increasingly they also raised pigs which produced only meat, always something which could be considered a luxury. Then quite abruptly in the Early Bronze Age, pig-keeping was almost abandoned. It is very hard to see the increase in pigs and their abandonment solely as a response to changes in the environment as was once thought (Chapter 6). The reason is more likely to lie in the role of pigs in feasting in the 3rd millennium, which is discussed further in later chapters.

2.4 Sheep

2.4.1 Numbers

Both goats, which are discussed separately below, and sheep were present in the Neolithic and Early Bronze Age, with sheep greatly predominating. Many bones were identified as sheep/goat and these have been included with 'sheep' in the tables and discussion which follows. Sheep account for more than 20 per cent of the three main domestic animals in the Early Neolithic (Figure 2.1) though they are absent from the Coneybury Anomaly pit. When fragment numbers from the first excavation campaign at Windmill Hill are recalculated to include teeth and omit ribs, the proportion of sheep increases at the expense of cattle in the pre-enclosure deposits. In the Early-Middle Neolithic (Figure 2.2) sheep are more common in occupation layers and pits and less frequent in long barrows and enclosures. This fits the hypothesis that more sheep were consumed in the smaller scale of settlements while more cattle were consumed in ceremonial sites. At this time there are individual sites in Wiltshire and Dorset where sheep make up more than one third of the fauna and all the Sussex sites have relatively high numbers. Sheep are notably few at Runnymede. There are also few sheep in the Middle Neolithic (Figure 2.3) and they are present in negligible numbers on Grooved Ware sites. Even in the Late Neolithic/Early Bronze Age numbers of sheepexceed 20 per cent only in round barrows (Figure 2.5). In the Early Bronze Age for the first time sheep are present in significant numbers, making up over 40 per cent of the main domestic animals in round barrows and also at other sites (Figure 2.6).

2.4.2 Size and type

As they are not native to Britain, the first sheep must have been introduced from continental Europe. They were gracile, about the size of a modern Soay or slightly larger, and not particularly tall, standing less than 60 cm at the shoulder. One from Pamphill Lodge Farm was estimated to have been 58 cm in height and one from Windmill Hill 57 cm. We know less about the size and conformation of sheep than of cattle and pigs because remains are fewer and there are fewer questions regarding their origins. Such evidence as there is for size suggests that it did not change between the Early-Middle Neolithic and the Late Neolithic. The distal humerus measurements from Hambledon Hill and those from the later site at Durrington Walls all fall within the same range (24.0 – 28.0 mm).

There have been few reports of pathology in sheep. A metacarpal from Whitehawk causewayed enclosure has a constriction of the shaft immediately above the distal articulation, a condition which has been seen since in sheep metapodials from later sites. It was thought to be associated with poor nutrition.

2.4.3 Wool, milk and meat

Sheep in the 4th and 3rd millennium in Britain had a predominantly hairy rather than woolly coat and one which was less capable of being spun and woven. Hair gave way to wool as the main component of the fleece only in the Early Bronze Age (Ryder 1993). This new type of fleece could be woven into plaids and garments. An improved fleece type provides the most likely explanation for the dramatic increase in sheep numbers in the 2nd millennium BC in Britain. Though wool itself survives only rarely, the presence of spindle whorls from the Early Bronze Age onwards (MacPherson Grant 1977) confirms the use of wool at this time. The question of whether woolly sheep evolved locally or – more likely – were introduced to Britain is a question yet to be resolved.

Sheep were probably milked in the Neolithic and Early Bronze Age as were cattle. This has not been demonstrated from the milk proteins in pots as these do not distinguish whether the residue was from cattle or sheep milk, but people who were able to milk cattle would certainly have been able to milk sheep. Serjeantson (2007) recently argued that sheep were milked intensively at some sites in southern Britain in the Late Bronze Age, based on the fact that some assemblages included large numbers of young lambs. Similar evidence suggests that the sheep from the Knap of Howar in Neolithic Orkney and from coastal sites in continental Europe were also milked (Tresset and Balasse 2003). There is insufficient data on the age distribution of sheep to investigate this for the Neolithic and Early Bronze Age period in southern Britain. Immature as well as mature sheep have been reported at some sites including Barrow Hills Radley where half were adult and half immature. A few burials of lambs have been found in each period, as will be discussed in Chapter 5, but no assemblage has a high proportion. While it is likely that sheep as well as cattle were milked in the Neolithic and Early Bronze Age in southern Britain their milk would have provided relatively little food.

There are further reasons for keeping sheep. Their skin is more easily made up into garments than is the hide of cattle. In additions, their dung is better than that of the other domestic animals for manuring cereal crops. The folding of sheep on cultivated fields in winter was an essential basis for the growing of cereals from the Iron Age until the 19th century in Britain. However, there is no evidence for permanent fields in southern Britain in the Neolithic period, which suggests that cultivation plots changed repeatedly. Sheep manure may therefore not have been a prerequisite for growing cereals at the time.

2.4.4. Discussion of sheep husbandry

This survey has demonstrated that sheep were more frequent in the Early and Middle Neolithic than earlier surveys suggested. If sheep were not brought to Britain for wool the question arises as to why they were introduced, particularly in view of the fact that their favoured environment, open grassland, must have been in short supply. Sheep provided meat in the smaller quantities which can be eaten by a family rather than by a larger group of people, as well as other products. It is likely that the first farmers in Britain brought sheep with them because their way of life involved keeping all three species together. When sheep began to be kept in greater numbers, from the Early Bronze Age onwards, their wool must have been the main reason for keeping large flocks of sheep.

2.5 Goats

Goats are identified most obviously from their horn cores, metapodials and the fourth deciduous premolars; however other elements can be confused with sheep. The only site with goat remains in any quantity is Windmill Hill where they accounted for nearly 25 per cent of sheep and goats together. Goats have been reported from fourteen assemblages. Skeletons or part-skeletons were found at Hambledon Hill, Windmill Hill and Yarnton; a burial at Windmill Hill was of a kid. Just one goat was recognised at Durrington Walls, from a horn core. The skeleton of an adult goat was buried in the Early Bronze Age barrow at Twyford Down. It was between 3½ and 6 years at death and stood between 56 cm and 58 cm tall, comparable in size to the sheep. The proximal metatarsal had a 'massive proliferation of reactive bone' so according to the authors, the goat 'would have been very lame' (Powell et al 2000, 132).

In such small numbers goats were not important as providers of meat. Their milk is more palatable to people than cows' milk, but very little can have been available. The reason for keeping goats must lie in their role with sheep flocks. Today in some parts of the world shepherds keep a goat with their sheep flock. Goats are more intelligent animals than sheep and a goat will act as the leader and guide to a flock of sheep (Ryder 1983). If goats were kept in small numbers for this purpose in the Neolithic and Early Bronze Age, this may help to explain why some were given special burial, as discussed later.

2.6 Dogs

The remains of large dogs can be confused with those of wolves and small ones with those of foxes. Harcourt (1974) examined the size of Neolithic dogs, using factors based on the limb bones to estimate the height at the shoulders. Most in his survey were between 35 cm to 49 cm in height but two elements came from very tall dogs over 60 cm high at the shoulders. These, he considered, 'may come from unusually large animals or it may be that with the discovery of more material the gap between them [in length] may be closed'. This has proved to be the case; the gap in size has been filled by dogs from Stonehenge, Coneybury Anomaly, Barrow Hills Radley and others (Clark 1996; Clark 2006). The Stonehenge dog was an estimated 54 cm at the shoulders, about the size of a German Shepherd. The shoulder heights of Neolithic dogs can now be seen to range from 35 cm to 62 cm (Figure 2.13). This suggested to Clutton-Brock that dogs formed a 'single interbreeding and uncontrolled population' (Burleigh, Clutton-Brock et al 1977).

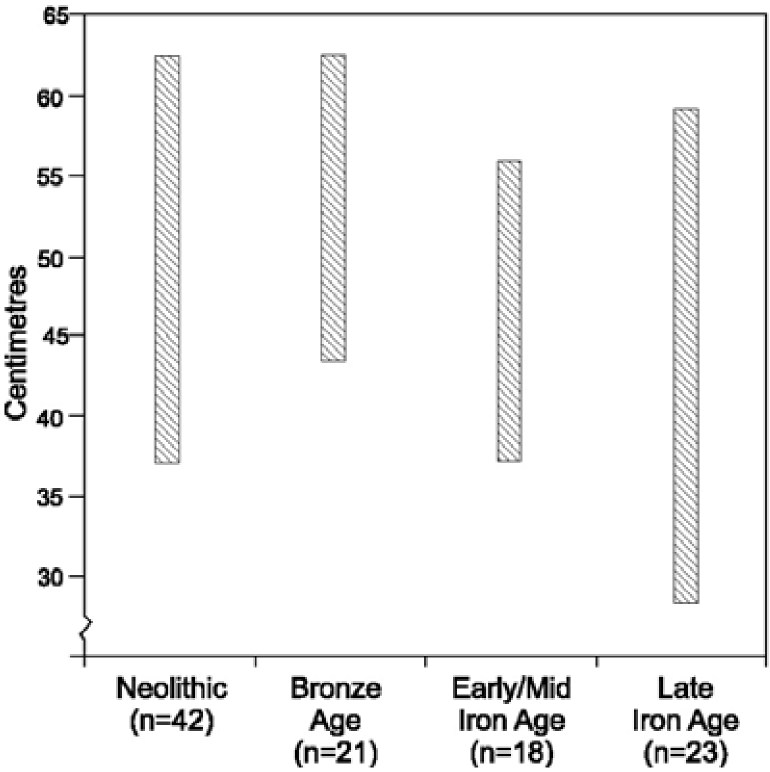

Figure 2.13 Dogs: shoulder height in centimetres. Source: Clark (2006, fig.4.1)

Dog remains have been found at sites of all periods, although more often at Early and Middle Neolithic sites than later (Figure 2.14). Skeletons and part-skeletons as well as isolated elements have also been found in each period. At Hambledon Hill and Windmill Hill the remains included some of puppies. The dogs buried in the mortuary enclosure at Manor Farm Horton and in the barrows at Twyford Down and Ashey Down in the Isle of Wight seem to have been buried with their owners, as discussed in Chapter 5.

Though their remains have not been found on every site, we can be certain that there were dogs in every village or group, as there are traces of gnawing on bones at every site where the assemblage is well-preserved enough for such traces to be visible (see tables 5.3 and 5.4). Some heavily calcified dog coprolites found at Windmill Hill confirm that bones were eaten: bones must have been the principal source of food for the dogs, except on those occasions when there was a surplus of meat.

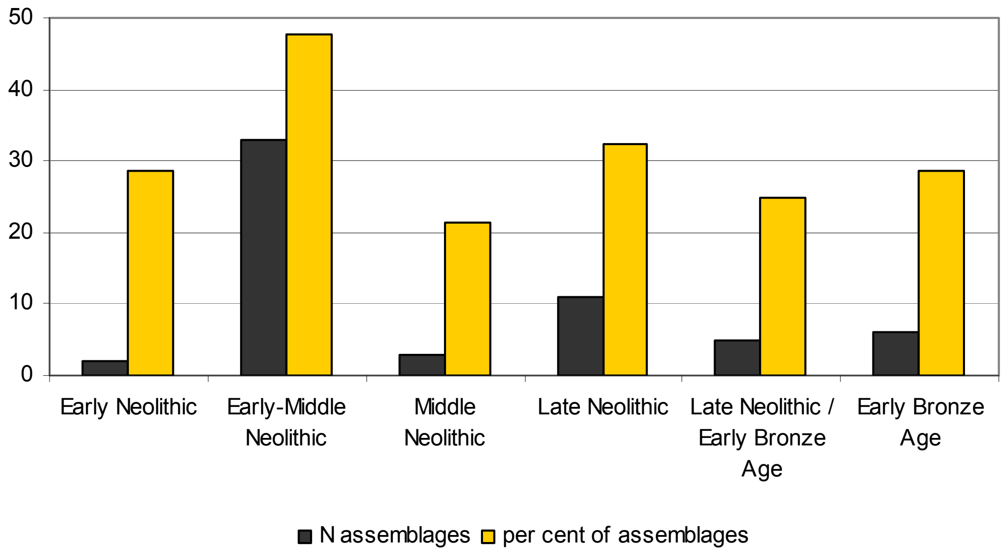

Figure 2.14 Dogs: number and percentage in Neolithic and Early Bronze Age assemblages

Dog skins were used: occasional cut marks associated with skinning have been noted and an articulated set of foot bones from Windmill Hill may be from a dog skin. Very few dog bones themselves show chop and cut marks which suggest that dogs were butchered for food but occasional marks have been observed. One on a bone from Hambledon Hill and another from Windmill Hill were thought more likely to be from dismembering than from skinning. The eating of dogs does not seem to have happened as often as in the Neolithic as in the Iron Age, when it was common.

Domestic dogs have been attached to human settlements since the Upper Palaeolithic period. They may have been 'pets, guard dogs, shepherd dogs, hunting dogs' (Grigson 1999, 231) or any or all of these. They must have had an important role in guarding the settlements and protecting the herds and flocks against predators such as wolves. They may have lived semi-ferally around the margins of settlements, scavenging bones where they could. However, the deliberate burial of some dogs in the Early Bronze Age does suggest that by this time some were personal or household pets whose owners were concerned about them in death as in life.

2.7 Horses

Individual assemblages from which horse remains have been recorded are listed in Table 2.3. The number and percentage of assemblages from each period with horse is small until the Late Neolithic, but horse remains have been identified in four (almost 20 per cent) of Beaker period assemblages and six (nearly 30 per cent) of the Early Bronze Age (Figure 2.15). It is possible that the donkey as well as the horse was introduced, but there is a single example where the possible presence of donkey was explicitly ruled out. Grigson (1986) compared the phalanx of an equid from Milton Lilbourne with those for donkey and horse and confirmed from its size that the bone was indeed from a horse.

Table 2.3 Horse: sites with records of horse (NISP), based on data in Appendix 3: see text for discussion of dates of horse from Neolithic assemblages

Assemblage	Period	Site type	NISP
Ascott-under-Wychwood barrow	EMNEO	Long barrow	4
Manor Farm outer ditch	EMNEO	Enclosure	1
Millbarrow	EMNEO	Long barrow	3
Nympsfield	EMNEO	Long barrow	1
Runnymede Interior Zone (A19)	EMNEO	Occupation layer	8
Wayland's Smithy	EMNEO	Long barrow	6
WH25-39 primary occupation	EMNEO	Causewayed enclosure	2
Coneybury henge	LNEO	Henge	1
Marden	LNEO	Henge	1
Mount Pleasant GW	LNEO	Henge	1
Amesbury Barrow 42	LNEO/EBA	Long barrow	3
Devil's Quoits	LNEO/EBA	Henge	1
Drayton cursus OGS	LNEO/EBA	Occupation layer	2
Lambourn 19	LNEO/EBA	Round barrow	2
Arreton Down	EBA	Round barrow	1
Milton Lilbourne 1	EBA	Round barrow	1
Milton Lilbourne 2	EBA	Round barrow	1
Milton Lilbourne 3	EBA	Round barrow	2
Milton Lilbourne 5	EBA	Round barrow	2
Twyford Down	EBA	Round barrow	6

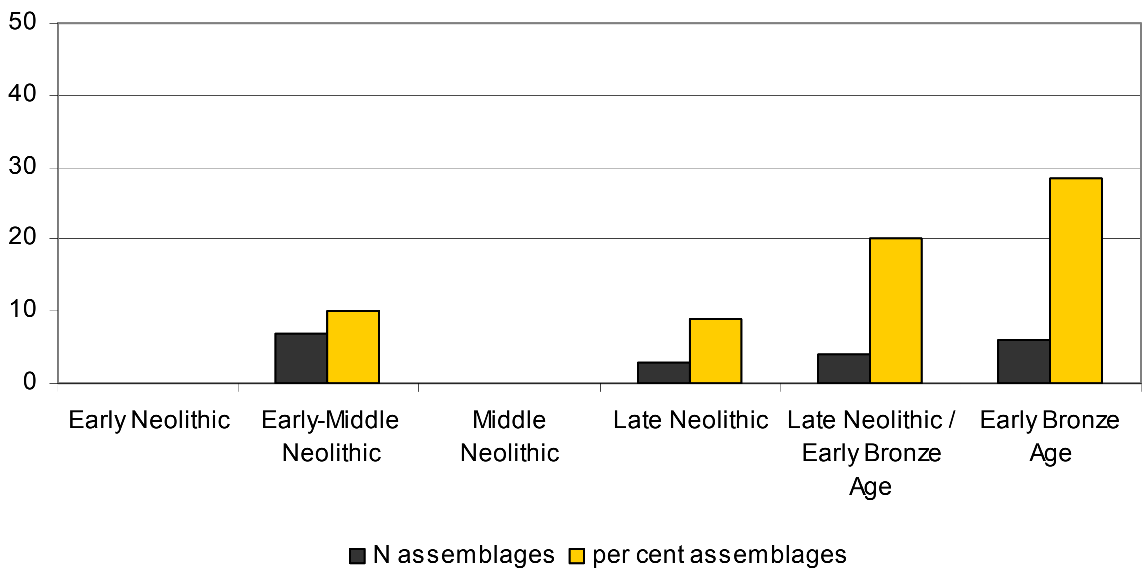

Figure 2.15 Horse: number and percentage in Neolithic and Early Bronze Age assemblages. See also Table 2.3 and text for discussion of records of horse

Survival or re-introduction? The horse was thought to have become extinct in Europe in the 7th millennium BC until reintroduced from the Asian steppes. Recent research suggests that horses may have survived in the wild into the Holocene in a few areas of continental Europe (Boyle 2006). The question of whether any wild horses survived in Britain beyond the end of the last glaciation has been explored by several authors (Kennard and Jackson 1935; Grigson 1966; Kaagan 2000; Bendrey 2010). A programme of radiocarbon dating of some of the horse remains believed to come from Neolithic levels had the result that none was confirmed as dating from the 4th or 3rd millennium BC (Kaagan 2000). A tooth from Fussell's Lodge and the four horse bones from Durrington Walls were radiocarbon dated, and all produced dates in the 2nd and 1st millennium BC. There are other reasons for rejecting the presence of horses in the Neolithic. Two vertebrae originally recorded at Windmill Hill were not found when the fauna was re-examined, with the implication that they were misidentified originally. A bone from Millbarrow chambered tomb proved to be from a context which was not certainly Neolithic and the Neolithic context of the Runnymede horse remains is provisional and may not be confirmed when analysis is completed (see Chapter 1). A horse skeleton from King Barrow Boreham was buried on the periphery of the mound so was almost certainly intrusive. Part of a horse pelvis was reported from a long barrow by Thurnam (1865), but this identification should perhaps not be accepted at face value. At the moment the presence of horse in the Neolithic is still unproven.

Horse remains were reported at the Beaker site of Newgrange in Ireland which led to the suggestion that the horse was re-introduced in the Beaker period. The Newgrange bone has now been dated to the Late Iron Age (Robin Bendrey, personal communication 1/2/2010) so Beaker horses are again in doubt. The horse skull from the Lambourn barrow and the other horse bones recorded for the Beaker period in southern Britain still need to be dated.

The earliest secure date for horse in Britain is on a skull from Grimes Graves with a radiocarbon date of 3740±210 BP which calibrates to between 2860-1630 cal BC (Clutton-Brock and Burleigh 1991) – an unhelpfully wide date range. The present situation is that horses may be present from the Beaker period onwards in small numbers. The horse only becomes common in the Iron Age (Bendrey 2010).

A rider on horseback can travel faster and further than an ox or a person, so from the time of their first domestication the horse revolutionised contacts between peoples. The Beaker period saw increased evidence for long distance contact in Europe, so would be a likely time for the first use of the horse in southern Britain. Horses will have been used as pack animals as well as for riding. They pulled light chariots but were not able to pull heavy carts until the invention of the horse collar in the 1st century AD (Langdon 1986) so were not used for ploughing or for pulling carts in prehistoric times. Horses were eaten in the 1st millennium BC (Hambleton 2008) but it has yet to be demonstrated that they were eaten in southern Britain from the time of their re-introduction.

2.8 Discussion of domestic animals

This review has confirmed some of the long-held views about animals and husbandry in the Neolithic and has also raised new questions. When the findings from all sites are taken together some general trends are evident, even if nuances from individual sites are lost. We now have a clearer picture than before of the changes which took place in animal husbandry and animal keeping from the 4th to the 2nd millennium BC.

2.8.1 Early and Middle Neolithic

The importance of cattle herds in the Early and Middle Neolithic is confirmed by this survey, but it does not support the notion of an economy which is dominated by cattle to the exclusion of the other two main domestic animals. A comparison of the three main species which relies on NISP is always likely to show more cattle than the two smaller species, as cattle bones are larger and more robust than those of the smaller stock so survive better and are easier for the excavator to recover. This bias in favour of the larger animal has been mitigated by assemblages excavated in the past few years during which time bones have been carefully recovered often using sieving. It is now clear that remains of both pigs and sheep are usually found together with those of cattle. This emphasises that animal keeping in the Neolithic in southern Britain invariably involved the three main domestic animals together.

The different species and the different age classes within them all needed different management. If we envisage that the cows, heifers and calves among the cattle, and the breeding sows and piglets among the pigs each needed to be cared for in different ways by different individuals (genders, age classes) within the community, the size of the human groups must have been quite large at all times of year.

It is not surprising that the milking of cattle in Neolithic Britain has now been confirmed by lipid studies. It was always implausible that cattle would have been kept in high numbers but not milked, in view of the fact that cattle-herding communities known from history and ethnography invariably milked their cattle. The milking of cows also provides more food in relation to the available grazing than meat (Pimentel and Pimentel 1979) even if it also requires greater labour on the part of the herders. As discussed, people may well also have obtained some milk from sheep as well as cattle at this time. The many products which can be made with milk must have provided the major source of food in summer and – with storage – also into the autumn and winter. Raw milk is difficult for some people to digest (Sherratt 1981), but pottery made it possible for raw milk to be transformed by cooking into foodstuffs which could be eaten by everyone, even by those who were lactose intolerant. The range of foodstuffs which can be made from milk is very wide. In Ireland in early historic times, dozens of food products were made with boiled and/or fermented milk. Some of these could be stored for a short time and some for a long time (Lucas 1989). In future it may be possible to distinguish processed milk in pottery fabrics from raw milk, from their higher reading of $\delta 15N$ (Privat et al 2005). Pottery also allowed milk products to be stored. It is hard to see how the size of the population suggested by the scale of some of the monuments of the period between 3700 and 3300 BC could have been sustained if people lived only on meat. The meat must have been supplemented either by milk products or by cereals or both: the stable isotope evidence referred to in Chapter 1 suggests that this was milk products.

2.8.2 Late Neolithic

The new data brought together here from a greatly increased number of assemblages has strengthened the contrast between sites with Grooved Ware and earlier and later Neolithic sites. The nature of farming and animal management changed greatly in the Late Neolithic when pigs were kept in greater numbers than cattle. Cattle continued to be milked, though probably less intensively. This would have been made possible because much of people's requirement for food, especially for protein and fat, was met by eating pigs.

Harcourt (1979) calculated the relative contribution of meat from the different species at Mount Pleasant, including the quantity from wild as well as domestic animals. He used the MNI as the unit of comparison and took sheep as the basic unit with a value of one. This was multiplied by 1.5 for pig and by 12 for cattle. The calculation suggested that 60 per cent of the meat eaten was beef and only 16 per cent pork. Wild animals, mainly red deer, provided 21 per cent of the meat, but this is likely to be an overestimate as MNI always tends to enhance the role of minor species.

The large number of pigs in the Late Neolithic is especially notable because it is untypical. During six millennia of farming in Britain, the animal economy has been based mainly on cattle and sheep.

Both fit better with cereal cultivation and the mixed farming suited to the climate and soils of southern Britain. There have been some periods in the past when people were able to raise large numbers of pigs, but the consumption of pork and bacon was then restricted to an elite stratum in society such as Roman villa owners or the wealthy households which developed after the Norman conquest (Albarella 2006). There are also a few Late Bronze Age sites where people were able to command large numbers of pigs (Serjeantson 2007) even though at the time most sites had more sheep. The keeping of pigs in such large numbers over such a long period was never possible on this scale in Britain after the disappearance of the wildwood. Comparisons with later periods emphasise the likelihood that the demand for pigs in the Late Neolithic was based ultimately on cultural rather than economic imperatives.

2.8.3 Latest Neolithic and Early Bronze Age

By the Early Bronze Age the animal economy was transformed. It was based on smaller cattle, probably new types of sheep and the presence of some horses. It is unclear which if any of these innovations belong to the Beaker period and which are not found until the 2nd millennium. The new small cattle may have been taken up because they gave more milk and they may also have been different from Neolithic cattle in other ways. From this time onwards cattle might calved all year round or had an extended period of lactation or had the capability of giving milk more easily in the absence of the calf. Sheep would have provided wool. Woven textiles were not just a material from which to make new types of clothing but were also an item which might be used in the increased volume of trade and exchange which characterises the Bronze Age. As permanently cultivated areas expanded, the dung of sheep was increasingly needed. The horse would have made travel and also trade easier.

At one time it was thought that the use of 'secondary products' started at approximately the same time three to four millennia after the first introduction of agriculture to Europe. The four innovations of the 'secondary products revolution' were the use of cattle for traction, the introduction of the horse, the use of wool for textiles, based on the development of sheep with woolly rather than hairy fleeces, and milking (Sherratt 1981). It is now clear that they did not all appear at the same time in continental Europe, so much so that they can no longer be seen as constituting a single 'revolution'. In Britain, too, the dates of these innovations are widely separated. Cattle, and probably sheep, were milked from the time of their first introduction to the British Isles. The earliest use in southern Britain of cattle for ploughing is not known for sure, but ploughing took place from at least the 3rd millennium BC and may have begun earlier. The introductions of the horse and of woolly sheep do not seem to have taken place until some point in the 2nd millennium BC. Future research on each of these topics, discussed in chapter 8, will refine the dates of each of these innovations.

3 WILD ANIMALS AND HUNTING

3.1 Introduction

There are several reasons why people might have hunted wild animals in the Neolithic and Early Bronze Age, not all of which would have concerned with the need for food. The topic has been discussed by many writers and the diverse possibilities were considered in a comprehensive recent survey (Boyle 2006). This chapter will look at questions of identification, numbers and taphonomy of the wild animals in order to investigate which of the possible reasons for hunting in the 4th and 3rd millennium BC in southern Britain seem to be most appropriate. Some of these are:

Continuity: An indigenous Mesolithic population which only gradually adopted 'Neolithic' traits might have continued to hunt in the traditional manner so long as wild animals were abundant, while at the same time carrying out the herding of domestic animals and the cultivation of crops. A high percentage of wild animals in an assemblage has often been taken as evidence that a group was not fully 'Neolithicised', though this explanation can be challenged. Even in continental Europe in the 5th millennium BC hunting was a fairly minor component of Neolithic life. Some later communities which fished and caught wild birds – as did some in Switzerland and on coastal sites in Scotland – have also been seen as having economies which were not fully Neolithic. If this was the case in southern Britain, we should expect a higher proportion of wild animals in Early Neolithic sites and a decline in this ratio over time.

Resource buffering: The hunting of wild animals is a means by which some farmers have counteracted food shortages. In some environments farmers had to rely on what have been defined as 'secondary' or 'fall-back' resources. As O'Shea (1989) commented, 'in poor agricultural years, farmers may resemble hunter-gatherers and can utilise a range of wild resources in the immediate environment'. This was particularly the case with early farmers in the Americas. If wild animals were caught as a food reserve or a supplementary resource, we should expect the proportion of wild animals to fluctuate on individual sites in all periods and also expect fish and birds to be consumed.

Skins and other raw materials: In societies with few textiles, as was the case in Neolithic Britain, the skins and furs of small animals would have been valued for clothing and decoration. Other raw materials from wild animals such as antler and feathers were also important, but these could sometimes be obtained without killing the animal.

Removal of threatening animals: Wild animals such as wolves and foxes would have preyed on domestic animals, especially the young, unless the herds and flocks were carefully tended. Deer and aurochs would have robbed growing cereals unless these were carefully guarded, with wild boar probably the most destructive species of all. If people killed predators and ate them, we would expect assemblages to contain their remains.

Totem animals: Pre-modern societies often adopted a wild animal as their totem (Fraser 1983). Certain burials within ceremonial monuments in southern Britain might have this origin; the possibility is discussed in Chapter 5.

Hunting camps: There are some sites in Spain, France, Hungary and the Alpine foreland where the percentage of wild animals is very high (Jarman et al 1982; Boyle 2006). In the Alpine Foreland the population appears to have hunted deer, aurochs and wild boar to such an extent that the bones of wild animals make up half of all bones at some sites. These are specialised Neolithic hunting sites rather than the settlements of people who were not part of a fully Neolithic wider economy. Such sites specialising in hunting continued into the Bronze Age in Bulgaria and Spain (Legge 1994). Some sites also specialised in hunting and trapping smaller wild animals for furs.

Social reasons for hunting: Some authors have argued that Neolithic groups whose lives revolved around domestic animals and activity felt an imperative to demonstrate control over wild or dangerous natural elements in the outer world by killing wild animals (Hodder 1982; Cotton et al 2006). In the past warriors hunted the large wild animals as a means of demonstrating their bravery and prowess. It also allowed them to practise the skills needed in warfare, as was the case in the Middle Ages (Sykes 2006). Hunting of this nature has a strong symbolic component.

3.1.1 Data

There were remains of wild mammals in approximately 70 per cent of the assemblages for which it was possible to record NISP (Appendix 3). In addition, some of the wild mammals discussed here were recorded only as part of a placed deposit (see Appendix 6): these include a brown bear scapula from a Grooved Ware pit at Ratfyn (Tinsley and Grigson 1981) and some of the aurochs' skulls from long barrows.

Table 3.1 shows the number of elements of wild animals from each period. The totals include all elements, so the numbers are inflated where assemblages include skeletons and part-skeletons. The totals in Table 3.1 should therefore be taken together with the number and percentage of assemblages in which each species was present (Table 3.2).

Table 3.1 Wild mammals: totals by period, based on data in Appendix 3

	ENEO	EMNEO	MNEO	LNEO	LNEO/EBA	EBA	TOTAL
Red deer	42	440	23	80	13	29	627
Roe deer	314	142	3	49	5	16	529
Aurochs	2	30	9	13	10	1	65
Wild pig	5	5		10	1	1	22
Brown bear				1			1
Wolf		2	1				3
Fox	2	23	7	12	3	5	52
Badger		17		11	2	36	66
Beaver	24	32		8			64
Hare		16		3	1	2	22
Otter		8		1			9
Wild cat	1	59				1	61
Red squirrel				1			1
Pine marten		2		1		2	5
TOTAL	390	777	43	191	35	93	1527

Among the Early Neolithic assemblages, the Coneybury Anomaly stands out, with 42 per cent of its faunal remains from wild mammals. When this assemblage is omitted, wild mammals are only five per cent of NISP (Figure 3.1). The percentage of wild mammals is also fairly high at Cherhill, with more than one-fifth wild mammals, most of which were red deer. At that site there was also earlier Mesolithic occupation.

Table 3.2 Wild mammals: number and percentage of assemblages by period in which wild mammals were present, as Table 3.1

ASSEMBLAGES	ENEO	*%ENEO*	EMNEO	*%EMNEO*	MNEO	*%MNEO*	LNEO	*%LNEO*	LNEO/EBA	*%LNEO/EBA*	EBA	*%EBA*
Red deer	4	*57*	41	*59*	7	*50*	19	*56*	6	*30*	8	*38*
Roe deer	3	*43*	25	*36*	2	*14*	9	*26*	4	*20*	3	*14*
Wild pig	1	*14*	4	*6*			7	*21*	1	*5*	1	*5*
Aurochs	2	*29*	16	*23*	3	*21*	8	*24*	4	*20*	1	*5*
Brown bear							1	*3*				
Wolf			2	*3*	1	*7*						
Fox	2	*29*	6	*9*	2	*14*	3	*9*	2	*10*	1	*5*
Beaver	2	*29*	4	*6*			3	*9*				
Badger			3	*4*			2	*6*	1	*5*	1	*5*
Hare			4	*6*			1	*3*	1	*5*	1	*5*
Wild cat	1	*14*	4	*6*				*0*			1	*5*
Pine marten			2	*3*			1	*3*			1	*5*
Otter			2	*3*			1	*3*				
Red squirrel							1	*3*				
N / %	5	*71*	49	*71*	9	*64*	27	*79*	14	*70*	12	*57*

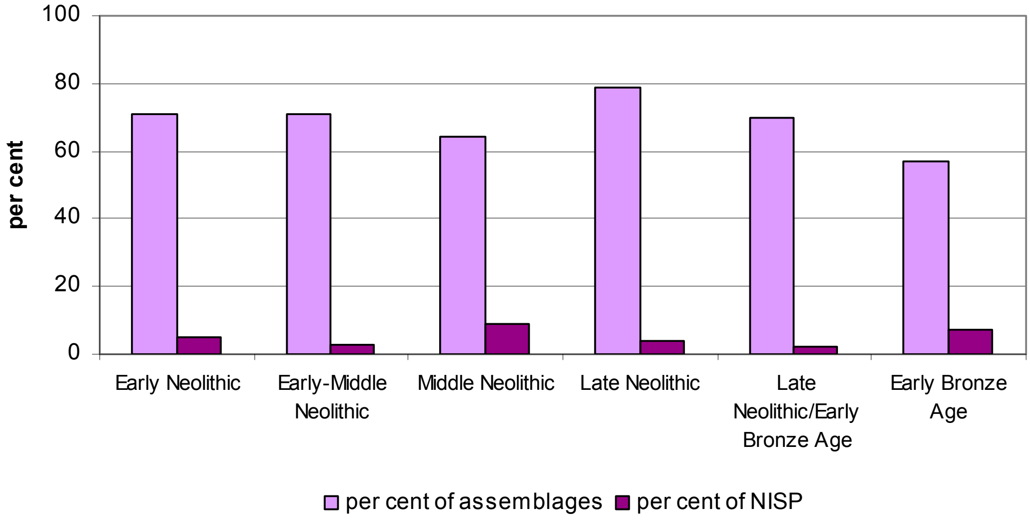

Figure 3.1 Percentage of wild mammals and percentage of assemblages with wild mammals, based on data in Appendix 3. Early Neolithic assemblages exclude the Coneybury Anomaly.

The percentage of wild mammals is slightly lower in the Early-Middle Neolithic: less than four per cent of the whole sample. There are thirteen assemblages with more than 10 per cent wild animals in this period of which eight are long barrows and the remainder enclosures or selected areas. In some of these the percentage of wild animals is enhanced by a part-skeleton and in others antler as well as bones of red and roe deer may have been included in the totals. The small number of sites designated Middle Neolithic have a relatively high percentage of wild mammals, mainly red deer and aurochs. In the Late Neolithic the percentage of wild mammals is again below five per cent but they are found on a higher percentage of assemblages and include a wider range of species than earlier, as discussed below. There were many small wild mammals and also a wide range of species in the chalk hollows at Hambledon Hill which were referred to as 'flint mines', but it is thought likely that some or all of these are in fact animal prey from burrows rather than anthropogenic. The percentage of wild mammals is lowest in the Late Neolithic/Early Bronze Age with fewer than three per cent altogether. It is relatively high in the Early Bronze Age, but a complete badger skeleton at Twyford Down barrow has biased the results in this small sample.

Though absolute numbers of wild mammals are surprisingly low, they are nevertheless a fairly constant presence. Remains have been found on between 60 and 80 per cent of sites in all periods before the Early Bronze Age (Figure 3.1). The percentage of assemblages with some wild mammals is highest in the Late Neolithic (nearly 80 per cent of assemblages) but then declines. The Coneybury Anomaly pit is exceptional in its high percentage of wild mammals; otherwise few sites with an assemblage of any size have a high percentage. If we examine the main large mammals individually (Figure 3.2), we can begin to suggest different interpretations for the presence of a relatively small numbers of wild mammals.

3.2 Red deer, *Cervus elaphus*

The number of elements shown for red deer excludes both shed and unshed antler since these were a raw material which could have been collected elsewhere or curated. Antlers were used for digging pits and ditches mainly by those who lived in chalk and limestone areas. Most reports distinguish antler from bone, but it cannot be ruled out that some records in Appendix 3 include antler. Of the larger mammals, red deer is the wild animal most frequently found in all periods except in the Early Neolithic when roe deer in the Coneybury pit outrank other wild species (Figure 3.2). The percentage of sites with red deer declines from the Early Neolithic onwards and is lowest in the Beaker period. Though more frequent than the other wild animals, even in the Early and Middle Neolithic the percentage of red deer overall is lower than in continental Europe, where their remains made up just over ten percent of bones from all sites together (Boyle 2006).

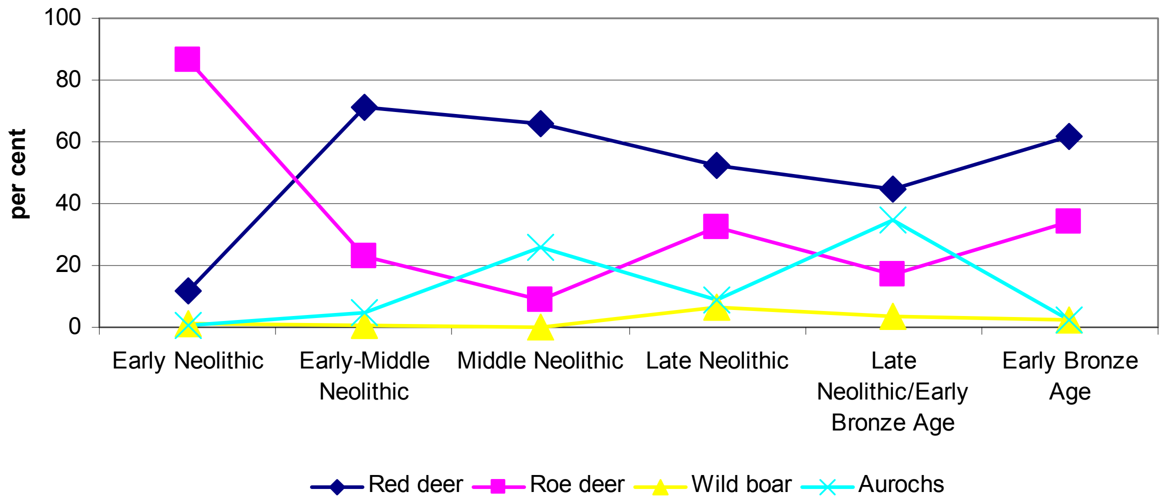

Figure 3.2 Percentage of assemblages with red deer, roe deer, wild boar and aurochs, as Figure 3.1

A further clue to the numbers of deer which were actually killed can be found in the percentage of antlers from deer which were killed (Figure 3.3) as opposed to antlers which were shed. In those assemblages with ten or more antler bases, the percentage varied between none at Woodhenge and one-third at Windmill Hill and Stonehenge (Figure 3.3). In general, fewer than 20 per cent were from killed animals, a percentage which does not change over time or between types of site. At some sites, including Hambledon Hill and Stonehenge, more red deer were killed to provide antler than were eaten at the site itself. At Stonehenge in the Phase 1-2 ditch there were fourteen antlers from slaughtered deer but no post-cranial remains of deer. The numbers of deer on sites does not seem to have a relationship to the need for antler, as red deer were less frequent in the Late Neolithic, despite the fact that the need for antler was as great as ever for constructing the large monuments of the period (Worley and Serjeantson in press).

The large red deer of the 4th millennium BC would have weighed 100-150 kg (Legge 2008, 551). A tibia from Durrington Walls had a healed fracture. The bone shaft had healed with distortion and shortening. According to Harcourt (1971, 349) 'these types of injury are 'not uncommon in red deer and cause them little inconvenience'. In view of the need for antler we might expect post-cranial bones to be mostly from males, but occasional remains of hinds as well as stags have been found, recognised from the pelvis. Remains of immature deer are rare.

Red deer were mainly valued for their antlers, which were usually collected after being shed rather than obtained from deer which had been killed (Worley and Serjeantson in press). The skins were also used. A metatarsal of an adult red deer from the Grooved Ware pit 3196 at Barrow Hills Radley has skinning cuts showing that the hide was carefully removed. A pair of mandibles and a metatarsal of a foetal or infant red deer in pit 3831 at the same site is probably best seen as coming from the hide of a fawn. Red deer like other wild animals were probably hunted with bow and arrow. Whatever the reason for their slaughter, they were eaten. However, if they had been hunted due to a need for food in winter, we might expect more remains from immature deer. The fact that they were not often killed in southern Britain is probably because they were conserved to provide antlers for the digging of ditches, pits and flint mines.

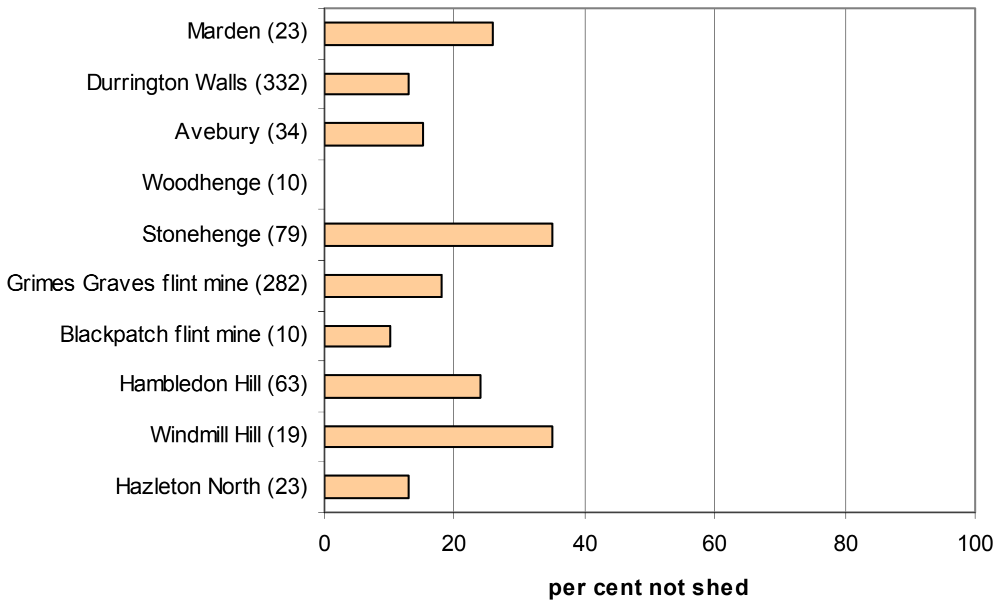

Figure 3.3 Percentage shed of antler picks from ten sites: sample size in brackets. Data from Worley and Serjeantson (in press)

3.3 Roe deer, *Capreolus capreolus*

Roe deer are the second most frequent wild animal in the Early-Middle Neolithic and the Late Neolithic, but numbers are small. They were found in four out of the seven Early Neolithic assemblages and in 36 per cent of Early-Middle Neolithic assemblages. There were remains of two fawns as well as of an adult at Wayland's Smithy. The largest number was from the Coneybury Anomaly, where 323 bones were found from a minimum of seven deer. They were from all parts of the carcass, demonstrating that the deer had been consumed at the site. They were the second most frequent species after cattle, and more frequent even than pigs (which were domestic), so were clearly important for food at that site. Such a large number of roe is unique on any site in the British Isles. It is also unusual in Europe: there are just a couple of sites in the Southern Alps which have a high percentage of roe (Boyle 2006).

Roe deer could have been hunted with spears or trapped in nets (Legge 2008, 555). Their antler was used for tools, with shed antler as well as antler from killed animals used for this purpose. Roe would also have been killed for their skins. They were certainly eaten: one bone from Maiden Castle had filleting cuts. The most likely interpretation of the fauna from the Coneybury Anomaly is that the site was a special purpose hunting camp where a small herd of roe deer was corralled, trapped and killed. The hunters then consumed the deer before returning to the main group, but even here, the skins may have been more important than the meat.

The fact that numbers of roe deer declined between the 4th and the 2nd millennium BC probably reflects a decline in the roe deer population in southern Britain, as will be discussed in Chapter 5. It will have been brought about by competition from the domestic animals which would have reduced the available browse.

3.4 Aurochs, *Bos primigenius*

The criteria for identifying aurochs among remains of domestic cattle have been examined in a series of papers by Grigson (1965; 1966; 1969; 1978; 1982; 1999). Wild and domestic cattle can be distinguished by the least frontal breadth and basal length of the skull. Aurochs bulls can be identified by their absolute size, but certain elements of aurochs cows cannot always be distinguished from those of domestic bulls, as bone dimensions overlap. It is thought that earlier writers may have been too ready to identify aurochs when they encountered remains of domestic bulls, at least partly because Fraser and King misidentified many of the elk from Star Carr as small aurochs (Legge and Rowley-Conwy 1988). This suggested that female aurochs in Britain were smaller than in fact they were. The third mandibular molar (M3) is longer in the aurochs than in domestic cattle. When M3s from Stonehenge were compared with those from Windmill Hill and the causewayed enclosure at Etton in Cambridgeshire, one of the three proved to be from an aurochs (Figure 3.4). Among the cattle astragali from Windmill Hill (Figure 3.5), one is from an aurochs bull, and another is from either an aurochs cow or a domestic bull. The distal humeri from Durrington Walls include at least one which is from an aurochs (Figure 2.11). Sometimes even fragmentary bones can be recognised from the thickness of the bone wall: this was the case with a bone scoop from a Grooved Ware pit in the Lower Colne valley which was made from an aurochs' tibia (Jones and Ayres 2004).

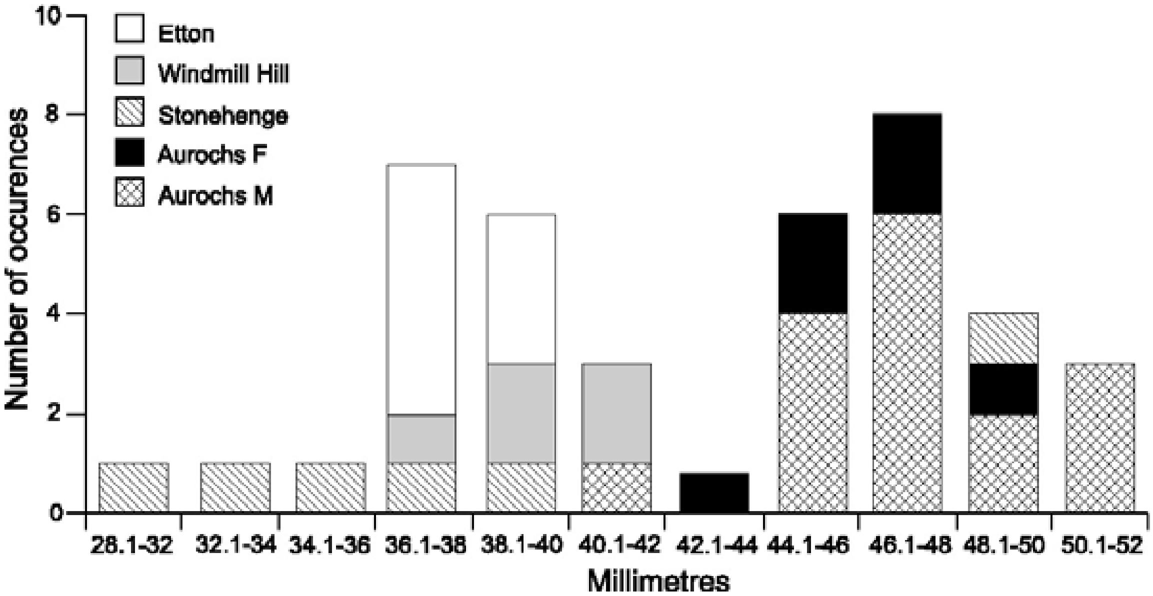

Figure 3.4 Distinction of domestic cattle and aurochs from length (L) of lower third molar (M3). The smaller teeth on the left from Etton, Windmill Hill and Stonehenge are from domestic cattle; one of the lower third molars Stonehenge falls within the size range for aurochs. Based on Serjeantson (1995, fig. 244)

At Offham causewayed enclosure in Sussex the remains of the cattle from the two basal layers of the ditch were reported to be 'very large, comparable with Pleistocene *Bos primigenius*'. The author suggested that these might have been wild cattle; if so this would be the only assemblage site with aurochs but no domestic cattle; it is more likely that they were the large 'primigenius' type of Neolithic domestic cattle as defined by Jackson.

The aurochs was recorded at two of the seven Early Neolithic sites and at about one fifth of the Early-Middle Neolithic assemblages (Figure 3.2). Their rarity is accentuated by the fact that a total of 12 were identified from the Keiller excavations at Windmill Hill out of more than 4000 identified bones. Remains of aurochs were often noted as special deposits of some kind so the records of placed deposits (Appendix 6) also have to be taken into account. The proportion of sites with aurochs is similar for the Late Neolithic and Beaker period. By the Early Bronze Age remains are much rarer: apart from the aurochs from the round barrow at Snail Down (Jewell 1963; Grigson 1978) a single large thoracic vertebra was present in the Durrington Down round barrow. An aurochs radius from Barrow 12 at Barrow Hills Radley is thought not to be from the Early Bronze Age but to have been reworked from an earlier Neolithic ditch in same area.

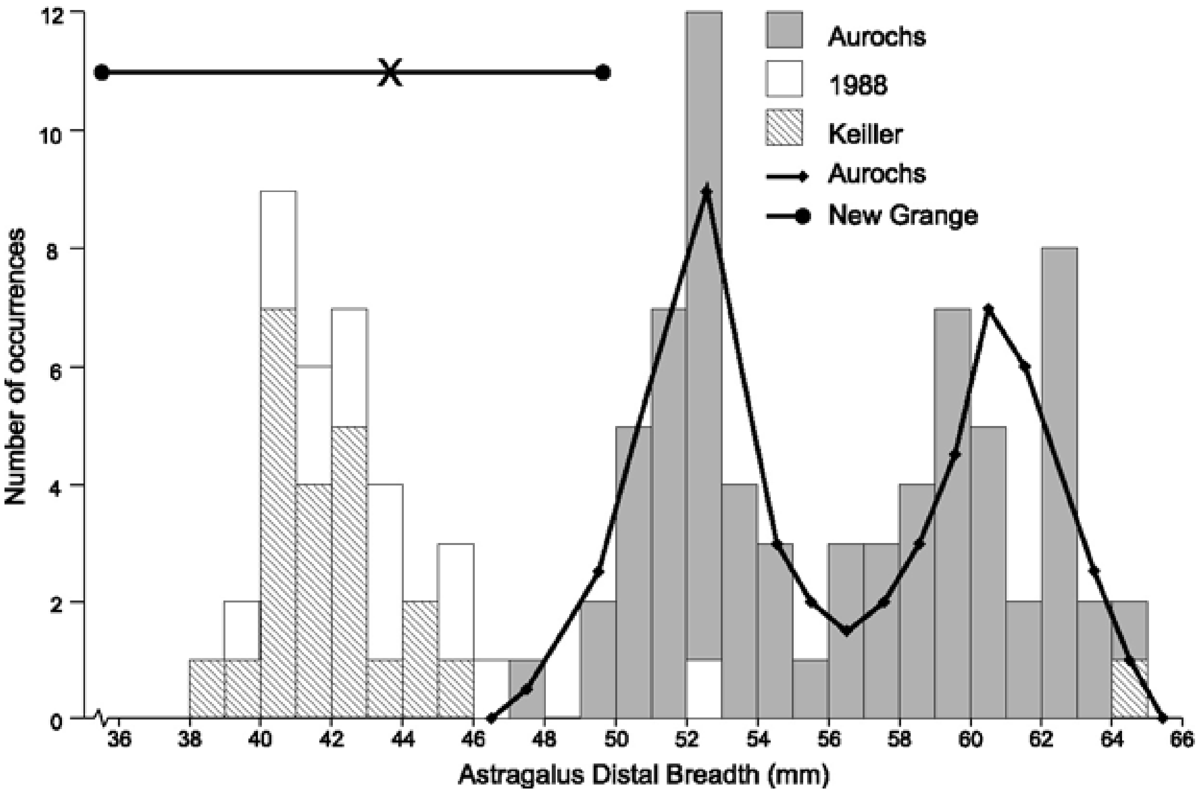

Figure 3.5 Distinction of domestic cattle and aurochs from distal breadth of astragalus (Bd): Windmill Hill compared with cattle size range from New Grange in Ireland and wild cattle. One astragalus from Windmill Hill is from an aurochs bull and one may be from an aurochs cow. Based on Grigson (1999, fig. 166)

The aurochs, particularly the male, was a formidable animal which weighed about 1000 kg, that is, four times as much as a red deer and 20 times as much as a sheep (Harcourt 1979). Males were 1.53 -1.75 m at the shoulders and females 1.38–1.52 m (Grigson 1999, 231). Remains of both male and female aurochs were found at Windmill Hill and Maiden Castle, but few juveniles have been recognised. Most remains are from adult animals. An aurochs buried in a Beaker pit at Holloway Lane in Hillingdon, discussed in Chapter 5, was between 2 ½ and 5 years old. The isolated M3 from Stonehenge was well worn so from a much older animal.

Aurochs remains have been found at both domestic and ceremonial sites. They may prove to be rarer in domestic contexts than in others; work in progress on the remains from Runnymede suggests that there are few aurochs at that site. Despite the fact that aurochs is present on more than 20 per cent of Late Neolithic sites its actual numbers are few; for instance they were very rare at Durrington Walls.

The hunting of aurochs, especially of adult bulls, must have been a hazardous pursuit. The killing of an aurochs by an individual or a small group would have been more dangerous than the killing of a bear. It may well have represented the most dangerous activity which could be undertaken. The aurochs in the pit at Hillingdon revealed the method by which it had been hunted. Humphrey

Case reconstructed the hunting method from the six barbed and tanged arrowheads which were found within the skeleton: four in the area of the ribs and pelvis, and two amongst the bones of the lower leg. The aurochs had been 'stalked from the rear, wounded, and pursued until it eventually succumbed to a combination of blood loss, shock and exhaustion' (Cotton et al 2006). This deposit is discussed again in Chapter 5.

Why did people hunt and kill the aurochs? There are practical reasons. Since wild and domestic cattle were fully interfertile, aurochs bulls might have presented domestic herds (or domestic cows) with a problem. Any calf which resulted from a cross with a wild bull would have been very large and might have given a difficult or even fatal birth. The calves would also be undesirable since herders would have aimed to breed cows which could be milked. Like deer, a group of aurochs would have caused mayhem in sown crops.

Social reasons for hunting the aurochs must have been foremost. Killing this powerful and no doubt respected animal would have demonstrated the bravery and skill of the hunter (Harcourt 1971). Cotton et al (2006) suggested that killing this fierce and feared animal represented control over the wild or the 'other'.

3.5 Wild boar, *Sus scrofa*

Wild swine or wild boar have been recognised on altogether five Early and Middle Neolithic sites and nine of the Late Neolithic and Early Bronze Age sites (Table 3.2).

Wild boar can be recognised from their very large bones and teeth. Large canine teeth were identified as from male wild boar at Whitehawk, Ascott-under-Wychwood, Durrington Walls (Harcourt 1971, plate XIII b) and Roughground Farm. Some early records of wild boar were based on massive canine teeth of males which may prove in fact to be from domestic pigs. More reliable are distinctions based on the length of M3, with teeth with a length greater than 40 mm probably from wild boar: based on this criterion two from Cherhill were identified as wild (Grigson 1983, fig. 15). Harcourt was of the view that no specimen from Durrington Walls was large enough to suggest that wild as well as domestic pigs were present, but one proximal radius and a handful of other elements lie so far outside the normal size range that they are almost certainly from wild boar (Albarella and Serjeantson 2002, fig. 5.3). Based on the Durrington Walls size range, two humeri from the Stonehenge ditch, of which one was unfused, were identified as from wild boar (Serjeantson 1995, fig. 243).

For a community or family group which raised domestic pigs there would have been little economic value in killing a wild pig, but the hunting and killing of this dangerous animal would have brought prestige, just as with the aurochs. Before the invention of firearms wild boar were killed by a spear thrust into the throat; in the Neolithic period, flint tipped spears or arrows must have been used. The use of a pitfall as an initial trap would have made the task easier. At Durrington Walls there are hints that even some domestic pigs were killed with arrows (Albarella and Serjeantson 2002), which suggests that wild boar were hunted in the same way. It is hard to believe that people capable of hunting and killing an aurochs would have been unable to kill a wild pig if they had had a reason to do so. It seems that in the main wild pig were ignored or avoided.

3.6 Brown bear, *Ursus arctos*

Though the brown bear was present in Britain in the post-glacial period, bones have been found at three sites only in our area: Eton/Dorney Lake (Hammon 2010), Ratfyn and Down Farm Firtree Field. The latter two were in Late Neolithic pits with Grooved Ware (not Bronze Age, contra Yalden 1999, table 4.3). Elsewhere in Britain remains are rather more common (Yalden 1999, fig 4.8). Two bear bones from Central England were also found in pits with Grooved Ware (Albarella and Pirnie 2008). We cannot tell whether these bones came from bears which were hunted and killed, or whether they were retrieved from the carcasses of bears which had died naturally. If the latter, the ulna from Firtree Field, which had been gnawed, could have been gnawed by a wolf or fox.

There is no reason why the environment of southern Britain would not have suited bears, which eat plants, small animals and carrion, but the arrival of agriculture and stock-rearing, together with the increase in population in the Neolithic, no doubt caused bears to retreat to areas which were still relatively undisturbed. They may have been deliberately hunted in the 3rd millennium by communities using Grooved Ware but otherwise the rarity of remains suggests that bears were avoided.

3.7 Wolf, *Canis lupus*

The conventional criterion for identifying wolf bones in Neolithic assemblages is that elements exceed the size range for dogs. New criteria for separating wolf remains from those of dogs have now been established (Clark 1996) which should allow the distinction between dogs and wolves to be made with more confidence in future, especially for the jaws and teeth.

Some elements recorded as 'canid' in assemblages may presumably come possibly from wolf (if large) or fox (if small). These doubtful identifications have been omitted from Appendix 3. Remains of wolf in our period are sparse: they have been recorded only in Abingdon Causewayed enclosure and Staines Road Farm Shepperton. An atlas from Stonehenge suggested a canid with an estimated height of 71 cm at the shoulder. This is well outside the expected size of Neolithic dogs so it is likely to be from a wolf. A wolf canine tooth pierced for use as ornament was recovered at Hambledon Hill. A canid skull (Figure 3.6) with its mandible from a late Neolithic henge at Staines Road Farm was originally interpreted as wolf, but is now thought possibly to be a cross between a dog and a wolf. The animal had suffered two blows to the head which had healed, distorting the shape of the skull, suggesting that it had been attacked when young.

Figure 3.6 Wolf or dog skull from the henge ditch at Shepperton Staines Road Farm. See also Figure 5.2. Based on Clark (2006, fig. 4.2). Photo: Nick Bradford

The killing of wolves would have benefited the herders of domestic stock by removing a predator. It would also have had the virtue of increasing the red deer population (Clutton-Brock 1984). However, records are so few as to suggest that there may have been no desire to hunt and kill wolves, whether as vermin or trophies.

3.8 Other wild mammals

The smaller wild mammals were probably killed mainly for their skins. Where the numbers of bones of individual species from a single assemblage are relatively large they invariably derive from part-skeletons.

Remains of fox (*Vulpes vulpes*) have been found most often in southern Britain. One from Stonehenge had been eaten. Beaver (*Castor fiber*) has been found at only nine sites and badger (*Meles meles*) at seven. Despite the fact that there can have been only small areas of the open country which is favoured by hares, their remains have been recovered from seven sites, of which four date from the Early-Middle Neolithic. Those from Late Neolithic hollows thought to be flint mines at Hambledon Hill are thought to be non-anthropogenic. The mountain hare (*Lepus timidus*) was the only species in the British Isles at the end of the last glaciation; the brown hare (*L. europaeus*) was introduced later at some unknown date (Yalden 1999, 127; 2010, 193). The hare remains from Windmill Hill were identified as *Lepus timidus* and those from Lanhill long barrow as "? Brown hare"; others were not identified to species. The question whether the brown hare was re-introduced in the Neolithic period has yet to be answered. Remains of wild cat (*Felis sylvestris*) have been found on just six sites including Windmill Hill, Ascott-under-Wychwood, Woodhenge (Jackson 1929, 63) and Twyford Down. The cat bones from Windmill Hill were from kittens; as they are from the feet, they are likely to be from a skin or fur. The pine marten (*Martes martes*) has been found on just five sites, the otter (*Lutra lutra*) on three. The red squirrel (*Sciurus vulgaris*) is recorded from just on two archaeological sites in southern Britain (Table 3.2). Those found in the entrance passage of Notgrove were possibly the prey of raptors (Thomas and McFadyen 2011) but red squirrel has been found in layers of Neolithic date in two caves (Yalden 2010, 190-191) so its presence in the Neolithic is confirmed.

In continental Europe there are one or two Neolithic sites which appear to be camps for hunting small mammals, including in Scandinavia (Strid 2000), the Netherlands (Zeiler 1997) and Switzerland (Desse 1975). At those sites the skins and furs were more important than or as important as the meat. As discussed, the Coneybury Anomaly may have been a specialised hunting site where beavers as well as roe deer were trapped for their skins, but the some of the beaver bones as well as those of the roe deer, have cut marks confirming that the meat was eaten. The few remains of fur-bearing small animals is surprising since skins and furs must have been worn. It does not appear that they were much used for warmth or decoration when hides and skins of domestic animal were available. Even if – as is likely – fur animals were caught away from settlements and only the pelt brought back, we would expect to find more of those elements such as foot bones which are usually left attached to the pelt.

3.9 Fish and shellfish

There are remarkably few remains of fish on inland sites in southern Britain (Table 3.3), even on those sites which were on rivers. It was believed in the 1970s that the sieving of sediments would recover fish bones but even when sampling took place on a large scale using 2 mm mesh sieves – as at Runnymede – it was demonstrated that very few fish remains had been present (Serjeantson et al 1994). Other sites which have been carefully sampled and sieved confirmed this lack of fish in the Neolithic and Early Bronze Age. At Easton Lane, Hazleton, Easton Down and Twyford Down rodent bones were recovered in quantity in the sieved samples but fish remains of similar size were few or absent. The lack of fish is therefore not a function of survival or recovery but is a real absence

Table 3.3 Fish from Neolithic and Early Bronze Age sites

SPECIES	Coneybury Anomaly	Runnymede	Maiden Castle	Manor Farm Horton	Gatehampton ditch	RBH Barrow 12	Twyford Down	Brean Down
Eel (*Anguilla anguilla*)							3	3
Pike (*Esox lucius*)		2		2	1	2		
Trout (*Salmo trutta*)	11		2				1	
Trout or salmon		3					1	
Flatfish		1						
Cyprinid			2					
TOTAL	11	6	4	2	1	2	5	3

The fish bones which have been identified to species come from only eight sites. The freshwater species are eel, pike, trout and a cyprinid. A whole trout was recovered in the Coneybury Anomaly. A few elements of freshwater eels were recovered from the barrows at Brean Down and Twyford Down. One vertebra from a flatfish was found at Runnymede, probably from a flounder because, of all flatfish species, only the flounder comes into brackish water. Remains of pike, the most frequent species, have been found at five sites, including at the unpublished site at Eton/Dorney Lake (Allen et al 2004). Two elements from Runnymede (Figure 3.7) were exceptionally large, as big as the largest prize fish today. Pairs of pike jaws were found in the ditches at Manor Farm Horton and Barrow Hills Radley Barrow 12: these jaws or the bones must have been deliberately deposited, as discussed in Chapter 5. Large pike might have been caught by spearing or netting, but it is also possible that the jaw bones were taken from fish found dead on the riverbank. Initially, it was believed that some pottery residue at Runnymede indicated that fish had been cooked or stored in the pots but the consumption of fish on inland sites in southern Britain has not been confirmed by any subsequent lipid studies.

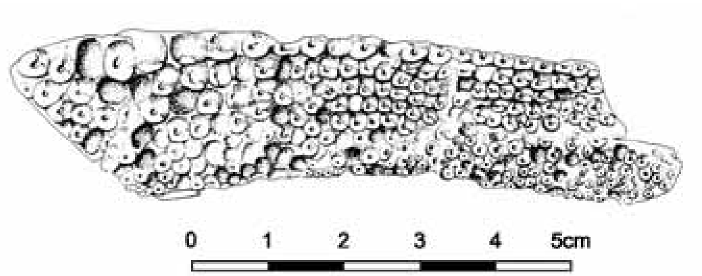

*Figure 3.7 Dentary of pike (*Esox lucius*) from Neolithic Runnymede. The size of the fish equals recent record specimens in the Natural History Museum. Source: Serjeantson, Wales and Evans 1994, fig. 3. Drawing by Karen Hughes*

Some marine fish were probably eaten in the Scilly Isles – those which have been recovered are from layers identified as Neolithic to Bronze Age (Turk 1984; Ratcliffe and Straker 1996). Fish was caught and eaten on contemporary sites in northern Scotland, but the isotope analysis of human bones referred to in Chapter 1 did not give a marine signature, indicating that the quantity of fish eaten was probably small compared with the quantity of food originating from mammals. The bone evidence from southern Britain indicates that that freshwater fish were ignored.

Marine shells were recorded at Bishopstone in Sussex, which is close to the coast. Oysters and other marine shells have also occasionally been recorded inland on late Neolithic sites (Cleal et al 1994). Shells, including oyster (*Ostrea edulis*) and great scallop (*Pecten maximus*), were used as inclusions in Grooved Ware pottery in the Amesbury area (Cleal et 1994) so their presence inland does not necessarily imply that shell food was eaten. There are no records of freshwater mussel (*Unio tumidus*) from excavations to suggest that it was eaten, though this large mussel would have been common in the clean slow-moving rivers of the 4th and 3rd millennia BC. It may be that shell-food, like fish, was generally avoided, on inland sites. However, at least by the Bronze Age, there is some evidence that they were consumed on coastal sites in Cornwall (Pollard and Healy 2008).

3.10 Birds

Bird bones, like fish, are very rare, having been found in only eighteen assemblages (Table 3.4). There are no studies of eggshell. Any record of chicken was regarded as intrusive and therefore omitted as the domestic chicken was not introduced to Britain until the Iron Age (Poole 2010). Small as well as large birds were found at Hazleton North and Twyford Down, both of which were extensively sieved, as well as at some other sites. The birds include some which were undoubtedly carried to the site by people and some which were non-anthropogenic. The latter are the passerines such as the starling, wren, robin and great tit which are probably from bird pellets, as will be discussed in Chapter 6. The largest number came from the two major henges, Durrington Walls and Mount Pleasant. No species has been found at more than two sites. The larger birds include geese and ducks; the skeleton of a mallard was found at Barrow Hills Radley. The only bone of common crane, a species sometimes found on Neolithic sites in the Netherlands, is from Mount Pleasant. The crane is a striking bird that was a favourite target of hunting in Roman times and later, but it seems not to have been pursued in Neolithic times. Remains of the white-tailed sea eagle were found in the Coneybury Anomaly, and at Barrow Hills Radley an awl was made from the ulna of the same species. Some elements of ravens, crows and birds of prey have also been found. The attempt to discuss the significance of birds during this period is frustrated by the records of 'unidentified bird' in many reports. It is rarely made clear whether these were potentially identifiable – in which case further research might identify the bird – or were too fragmentary for identification.

The absence of birds at most sites is real and not a function of recovery or survival, since, as with fish, careful recovery, including sieving, retrieves bird remains if they were originally present and if the bones have survived. It is clear that birds were not normally caught for food. If they were ever eaten, it must have been when people were away from the places of normal food consumption. However, people who used bows and arrows needed feathers to fletch the arrows (Serjeantson 2009, 207). This may account for the remains of some birds such as ducks and birds of prey. People could have obtained feathers from birds which had moulted, but these are poor quality compared with the feathers from live birds. Birds are more difficult to catch than small mammals, but there is no doubt that the technology (nets, bows and arrows, snares for birds which walked on the ground) would have been available had people chosen to use it. The bones of the wing and leg were occasionally used for tools, as in the eagle ulna. The circular decoration on some impressed ware pottery is thought to have been made with a bird bone (Keiller and Smith 1965, Thomas and Whittle 2007), but such a bone has never been found in southern Britain.

Table 3.4 Birds from Neolithic and Early Bronze Age sites: key to site catalogue numbers in Appendix 1. BAR *barrow*

SITE CATALOGUE NO.	18	23	38	47	49	51	58	67	71 (GW)	71 (BEAKER)	79 (LNEO)	80 (BAR 12)	80 (P3196)	86	94	101	102	108	N
Goose *Anser albifrons/brachyrhynchus*					1														1
Greylag goose *Anser anser*						1				1									2
Mallard *Anas platyrhynchos*			1									11							12
Pintail *Anas acuta*										1									1
Teal *Anas crecca*																1			1
Duck *Anas* sp.																1			1
Cormorant *Phalacrocorax carbo*			1																1
Kite *Milvus* sp.			1																1
White-tailed sea eagle *Haliaeetus albicilla*		1											1						2
Crane *Grus grus*									1										1
Woodcock *Scolopax rusticola*			1																1
Lapwing *Vanellus vanellus*		1																	1
Raven *Corvus corax*			1													3			4
Crow *Corvus corone*							1												1
Passerine, thrush size										1						4			5
Starling *Sturnus vulgaris*						1													1
Wren *Troglodytes troglodytes*						1													1
Robin *Erithacus rubecula*	1																		1
Great tit *Parus major*						1													1
Passerine, small																3			3
Unidentified bird		3		1				1		1	1	1		5	2		6	9	25
TOTAL	1	5	5	1	1	4	1	1	1	4	1	12	1	5	2	12	6	9	67

3.11 Discussion

3.11.1 Hunting continuity from Mesolithic?

If there was a period during which people had not yet made the transition to a fully Neolithic way of life, we should expect it to be visible in early Neolithic animal bone assemblages which included a high percentage of wild animals. However, already in the Early Neolithic the percentage of wild animals in assemblages from southern Britain is mostly very low. There are currently one or at most two sites where it could be argued people retained hunting as a significant component of their food procurement: the Coneybury Anomaly and possibly Cherhill. The Coneybury Anomaly, with its exceptionally high percentage of wild animals, has probably had the greatest influence on the thinking of those who envisage that agriculture being was adopted by a local Mesolithic population, but for the time being, this assemblage is unique. This is reinforced by the fact that the main food-bearing parts of the cattle carcass were removed, presumably to be eaten at a home settlement.

The percentage of wild animals does not decline during the course of the Neolithic: as we have seen, numbers were low from the Early Neolithic onwards and are high only in those periods (the Middle Neolithic and the Early Bronze Age) when many assemblages are deposits of individual bones rather than from food consumption. If the Coneybury Anomaly is excluded, in each period red deer are the most frequent of the wild mammals, with roe deer and aurochs next and wild boar very few. We might also expect the component from fish and birds to decline over time if hunter-gatherers were adopting agriculture, but in fact the evidence is that these were abruptly abandoned as sources of food. As far as hunting and wild animals are concerned, this review does not support an argument for continuity from an indigenous Mesolithic population.

3.11.2 Fall-back resources

This review is not entirely appropriate for discussing the role of minor species as fall-back resources, because the data are treated at the gross level. Further, the majority of sites are ceremonial rather than domestic so we might not expect to see evidence for the consumption of fall-back resources at such sites, even if they were consumed elsewhere. We might expect such resources in occupation sites but in fact none has the enhanced number of wild animals which would be expected. There are no sites where birds or fish had a role as supplementary or fall-back resources.

3.11.3 Raw materials

Antler could be obtained without killing the deer but if skins and other raw materials such as sinew and bone were desired, the deer had to be killed. Fur-bearing animals will have been killed primarily for their skins. 'It would be reasonable to anticipate that domestic sites from the earlier Neolithic in Britain would be marked by high frequencies of wild mammals, both large and small, especially those that are fur-bearing, though this is not the case' (Legge 2008, 554). Legge's observation is confirmed by this survey.

3.11.4 Social and cultural reasons for hunting

Various aspects of the bone assemblages discussed in this review suggest that there were cultural and social rather than economic reasons for the presence of wild animals at sites in the Neolithic and Early Bronze Age. The percentage of sites with wild mammals is greater in the 3rd millennium BC than it was earlier, a time when the special use of certain sites implies that there was greater complexity in the social life. As well as the wider range of wild mammals, many of the birds which were anthropogenic in origin belong to this period. The reasons for hunting other animals have to be sought elsewhere than in the quest for food. Harcourt (1971, 350) observed that, 'it seems almost incredible that the aurochs, as so commonly implied, can ever have been hunted solely for meat at this period' and this is surely the case. Rather the hunting and killing of the aurochs could be seen as reflecting a desire to tame the external environment, as discussed by Cotton et al (2006). This is harder to claim for the other potentially dangerous wild animals such as wild boar, wolf and bear, since remains of these are so few. With the larger animals, it must have been an exceptional activity outside the normal run of everyday life. Hunting will have taken place on special occasions when an individual young man or a group needed or wished to demonstrate their bravery and skill or the community's power and control over nature.

4 MEAT EATING AND FEASTING

4.1 Introduction

Schulting (2008, 102) recently observed that 'given the centrality of food in people's daily lives, it is surprising that issues surrounding the preparation and serving of food in prehistoric Britain have received very little attention'. In this chapter I shall attempt to remedy this omission. We saw in Chapter 2 that cattle, pigs and sheep provided most of the food which was eaten. This chapter is concerned with how meat was prepared and eaten, how it was consumed and when it was consumed in the context of feasting. The marks of cuts, chops and burning show how animals were prepared, cooked and eaten. The consumption of meat on a large scale, which indicates that feasting took place, can be identified from the species and parts of the body which were eaten. Bone remains themselves are not the only source of information about food and feasting: more can be learned from chemical analysis of bones and pottery (discussed in Chapter 1), tools, pottery cooking vessels and the evidence for cooking places.

Many writers have argued that feasting was a feature of Neolithic life in Britain (eg Parker Pearson 2003). Feasting is best defined as the consumption of meat in quantity on a communal occasion; it has now been identified in many early societies (eg Hayden 2001; Dietler and Hayden 2001; Hamilakis 2008). The other component of a good feast, alcoholic drink (Sherratt 1997), may have been available in Britain in the 4th and 3rd millennia BC but is not discussed further here.

Feasting may be on a small or a large scale. Hayden (2001) identified four types of feasts: minimal or household feasts, promotional or alliance feasts which were on a clan scale, competitive feasts and tribute feasts at state level. Rowley-Conwy and Owen (2011) translate this scale into feasts which took place weekly, seasonally, annually, occasionally (such as marriages) or generationally (such as coronations). For Neolithic farmers, milestones in the farming year, rites of passage of individuals or age-cohorts, marriages, deaths and group or tribal alliances would all be occasions which would have merited a feast. Feasting on these occasions was a means by which a community confirmed its social cohesion. The provision of feasts is also a means by which secular or ritual leaders demonstrate and consolidate their power. This is particularly the case in ranked societies so in such societies we should expect to find traces of lavish consumption and feasting (Sherratt 1981). Where society is stratified – or even if it is not – the provision of feasts would have been a 'strategy for building personal prestige' and a means by which individuals might build rank for themselves (Bradley 1984, 25). The deposition of the remnants of feasts has been seen as a mnemonic device, by which the occasion of the feast was commemorated. Bones deposited in ditches are thought to have acted as visible remembrances of former feasts which might be recalled during later gatherings (Hamilakis 2008; Whittle and Pollard 1999, 368).

In Neolithic and Early Bronze Age Britain feasting had different significance at different times. The monuments of the Early and Middle Neolithic are thought to have served as a focus for groups to come together yearly or at other intervals for communal gatherings accompanied by feasting. Some of the Late Neolithic henges, in particular the large henges with Grooved Ware, must also have served as centres for gatherings. At these sites feasting was accompanied by the deposition of bones which has preserved the evidence of the feasts. No doubt feasts took place at sites of other types, but the evidence elsewhere is not so clear.

4.2 Butchery

The means by which animals were butchered and cooked were governed partly by the anatomy of the animals themselves and partly by the tools available. There are fewer opportunities for cultural differences to play a part in butchery when the tools were of flint and stone than in later societies for whom a wider choice of butchering tools was available. The extent to which animals were disarticulated before the meat was cooked will have been one of the few aspects of butchery which varied according to the occasion.

In the Neolithic period flint tools were used for skinning, to cut the meat and tendons and to fillet meat from the bone. The bones themselves were chopped using heavy stone tools. Some time in the 2nd millennium BC copper and bronze knives and axes became available for these tasks. Cut marks made with flint cutting tools fall into two types. Those made when dismembering the carcass were short repeated cuts at muscle attachments (Figure 4.1) while longitudinal striations were made when filleting meat from the bone (Figure 4.2). Dismemberment might be aided by the use of stone chopping tools, but these were more important for the later process of breaking bones for marrow. Not all butchered bones have cut marks, since it is possible to disarticulate and fillet even a large animal and leave few or no marks on the bones. Chop marks have to be distinguished from natural breaks, something which is reasonably straightforward in a well preserved assemblage but which is difficult or impossible when bones have been heavily eroded or broken up in the ground.

Figure 4.1 Dismembering cuts on cattle radiuses from Neolithic Runnymede. Photo: Mark Bracegirdle

Figure 4.2 Longitudinal filleting marks on a cattle rib from Neolithic Runnymede. Photo: Mark Bracegirdle

A calculation of the percentage of bones with cut marks has been made for a few of the assemblages which have been studied in the past twenty years, since zooarchaeologists have started to take an interest in the subject. The number of bones with visible cut marks is invariably rather low when calculated as a percentage of the whole assemblage (Table 4.1). The only assemblage in Table 4.1 where the percentage of cut marks is high is Boscombe Down. This was an unusual assemblage which is discussed further below.

Table 4.1 Percentage of bones with cut marks for sites and assemblages where cut marks were quantified. Some authors give the percentage but not the numbers. Coneybury henge includes chop marks

Assemblage	Period	Species	N cut	Total	% cut
Boscombe Down pits	LNEO	All			9.0
Coneybury henge	LNEO	All	10	357	2.8
Down Farm Firtree Field pits	LNEO	All	4	144	2.8
Down Farm Wyke Down henge	LNEO	All	2	59	3.4
RBH Pit 917	LNEO	All	1	170	0.6
Roughground Farm GW pits	LNEO	All	2	88	2.3
Seven Barrows Gallop pit	LNEO	All	1	65	1.5
Milton Lilbourne barrows	EBA	All	3	1113	0.3
Twyford Down barrow	EBA	All	3	1631	0.2

Table 4.2 Percentage of bones with cut marks by individual species, as Table 4.1

Assemblage	Species	N cut	Total	% cut
Boscombe Down	Cattle	23	148	16.0
RBH Pit 3831	Cattle	2	13	15.4
RBH Pit 913	Cattle	3	18	16.7
RBH Pit 917	Cattle	14	69	20.3
West Kennet enclosure 2	Cattle	15	202	7.4
West Kennet enclosure 1	Cattle	4	72	5.6
Runnymede A16	Cattle and cattle-size	4	106	3.8
West Kennet enclosure 2	Dog	8	35	22.9
Boscombe Down	Pig	11	109	10.0
RBH Pit 913	Pig	2	35	5.7
RBH Ring ditch 801	Pig	2	10	20.0
Runnymede A16 all layers	Pig	14	127	11.0
West Kennet enclosure 1	Pig	61	631	9.7
West Kennet enclosure 2	Pig	125	913	13.7
RBH Pit 917	Sheep	1	3	33.3

However, the number of cuts can be quite high when calculated as a percentage of the identified bones of a single species (Table 4.2) or individual elements (Figure 4.3). On most sites cattle bones show more cut marks than those of pigs and sheep, no doubt because cattle were usually older when slaughtered and tougher to dismember, so the flint is more likely to have marked the bone. This can be seen in two assemblages from Grooved Ward pits. At Boscombe Down 16 per cent of cattle bones and 10 per cent of pig bones had cut marks and in pit 913 at Barrow Hills Radley 17 per cent of cattle and 6 per cent of pig bones had cut marks. Between about 10 and 20 per cent of bones of both cattle and pigs from Durrington Walls showed cut marks; this varied according to the individual element. Cattle bones, however, were much more often chopped into pieces than pig bones.

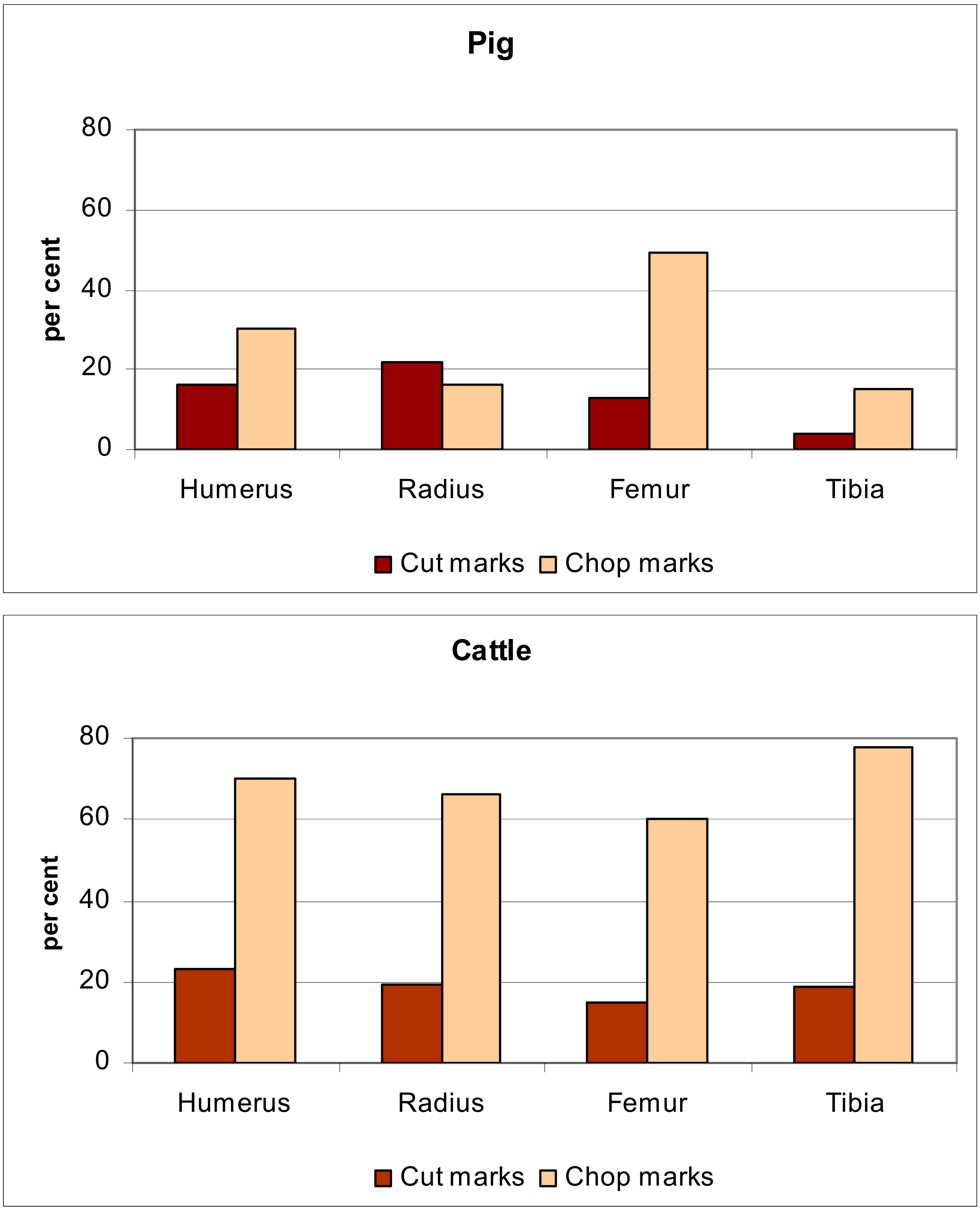

Figure 4.3 Incidence of cut marks and chop marks on limb bones of pig (above) and cattle (below) from Durrington Walls. Based on Albarella and Serjeantson (2002, fig. 5.8)

Table 4.3 Percentage of burnt bones in assemblages with available data: 'interpretation' shows whether 'burnt' refers to charred or calcined bones

Assemblage	Period	N burnt	Total	% burnt	Interpretation
Mount Pleasant GW	LNEO			7.0	Charred from roasting
Mount Pleasant Beaker	LNEO/ EBA			1.6	Charred, none calcined
Mount Pleasant	EBA			1.0	Charred, none calcined
Boscombe Down GW pit	LNEO			8.0	Half calcined, half charred
King Barrow Ridge pits	LNEO	83	510	16.3	'charred and calcined'
West Kennet Enclosure 1	LNEO			7.0	Charred, 'associated with burnt structure' – but see text
West Kennet Enclosure 2	LNEO			4.0	Charred, 'associated with burnt structure' – but see text
Pamphill Barford Farm GW pit	LNEO	78	357	21.8	Charring on bones of all species
Seven Barrows Gallop GW pit	LNEO	1	65	1.5	Charred cattle-size fragment
RBH Beaker Grave (950)	LNEO/EB A	1	7	14.3	Roe deer radius 'burnt and battered'
Runnymede OLS (A16 B-E)	EMNEO			2.5	Some calcined, some slightly charred
Runnymede reworked (A16 F)	EMNEO			5.7	More calcined than charred
Hazleton North pre-cairn OLS	ENEO	651	1948	33.4	Some calcined, some slightly charred
Abingdon causewayed enclosure	EMNEO	15	1940	0.8	No details. All burnt bones were unidentified
RBH GW Pit 917	LNEO	17	170	10.0	No details. All burnt bones were unidentified
Salisbury Beehive GW pit	LNEO	4	10	40.0	All calcined
Twyford Down barrow	EBA	5	1631	0.3	Pyre debris, calcined
Kintbury Sewage Works cremation	EBA	115	168	68.5	Mostly calcined
RBH Ring ditch 611	LNEO	1	19	5.3	Cattle-size fragment, no detail
Longstones enclosure	LNEO	1	46	2.2	No details
Waylands Smithy OLS	EMNEO	81	852	9.5	No details

It is tempting to infer from the different incidence of cut marks that butchery at some sites was more intensive than at others, but the visibility of cut marks and the skill and perseverance of the individual bone analyst are so variable that the temptation should be resisted.

4.2.1 Slaughter

In societies which do not have access to sophisticated equipment, the usual method by which domestic animals were killed was to cut the throat, an action which rarely leaves a mark on the bone. The alternative slaughtering method was poleaxing the skull. This leaves a characteristic depressed fracture or hole in the frontal bone. A cattle skull from the Winterbourne Monkton barrow G9 was thought to have been pole axed (Cleal 2005; Schulting 2008, fig. 4.4). A cow skull from Down Farm Firtree Field had a similar depressed fracture in the frontal bone but Legge concluded that because this bone is fragile and almost invariably breaks under the weight of sediment, a break in this position could not be taken as certain evidence for pole axing. In the Neolithic and Early Bronze Age many cattle skulls found in ditches and pits (see below) were sufficiently complete to show that pole axing was not usually employed at this time.

Table 4.4 Percentage of charred bones in assemblages with available data, by species and element

Assemblage	Period	Detail	N charred	Total	% charred
Durrington Walls	LNEO	Pig astragalus	290		94.0
Durrington Walls	LNEO	Pig calcaneum	229		82.0
Durrington Walls	LNEO	Pig humerus	404		46.0
Durrington Walls	LNEO	Pigs proximal radius	385		29.0
Hazleton long barrow	ENEO	Cattle	6	89	6.7
Hazleton long barrow	ENEO	Pigs	7	80	8.8
Hazleton long barrow	ENEO	Sheep	9	99	9.1
RBH Pit 913	LNEO	Cattle	1	18	5.6

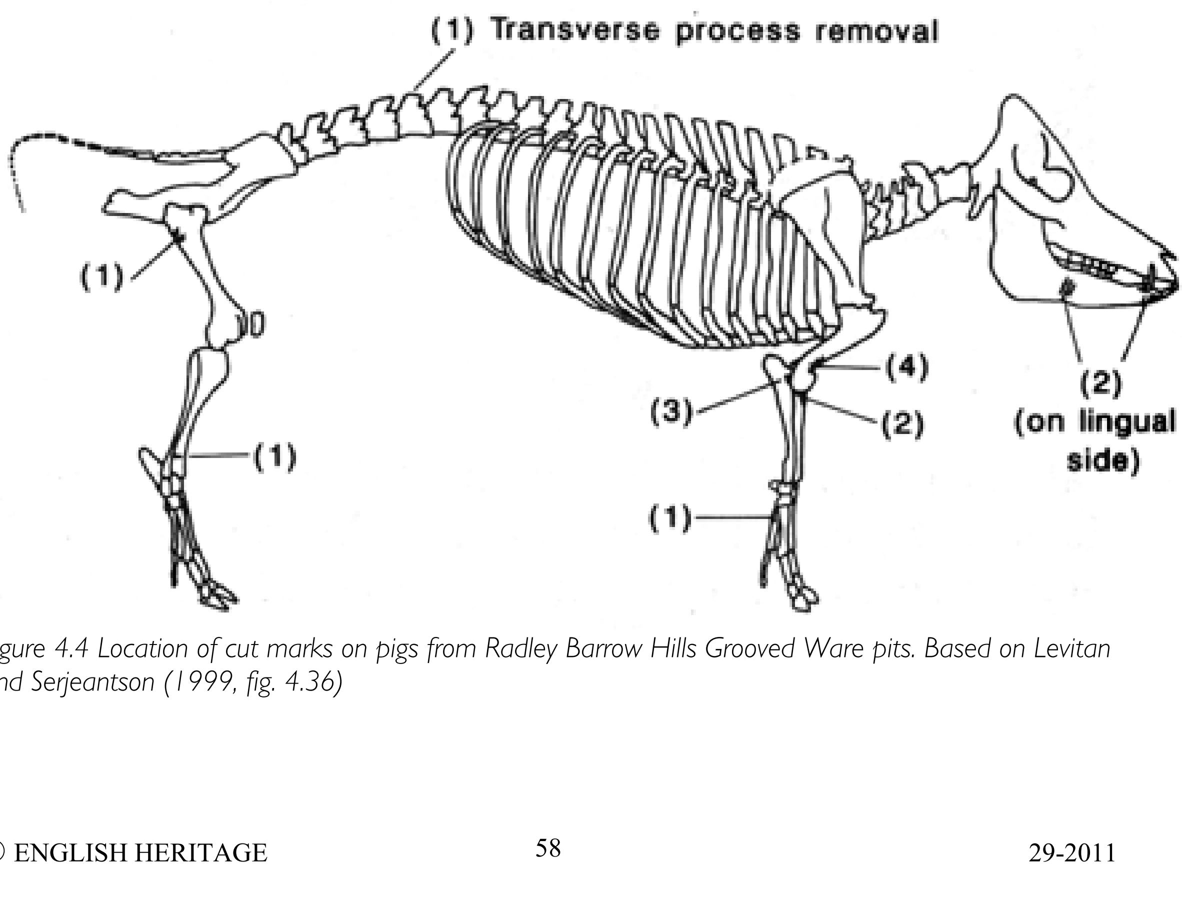

Figure 4.4 Location of cut marks on pigs from Radley Barrow Hills Grooved Ware pits. Based on Levitan and Serjeantson (1999, fig. 4.36)

Hunting injuries from spears and arrows might be expected on wild animals, but none have been recorded in the assemblages surveyed here. Bizarrely, one of the humeri of a pig from Durrington Walls, domestic judging from its size, has the tip of a flint arrow embedded in the external side of the articulation of the distal humerus; two other pig bones and a cattle femur also have embedded flint flakes (Albarella and Serjeantson 2002). In wild animals these would be interpreted as hunting wounds. The best explanation is that the animals were immobilised with arrows or flint-tipped spears. It may suggest that pigs were maintained in a more or less feral state or it might indicate that the pigs were 'hunted' in semi-ritual fashion within the enclosure (Albarella and Serjeantson 2002). It may even reflect a deliberately protracted slaughter process in order to enhance the drama of the event (Schulting 2008).

4.2.2 Skinning

The tell-tale traces of skinning are usually found on the bones of the lower leg, the feet, the skull and the mandible. Metapodials of red deer at Roughground Farm had cut marks from skinning. On the jaw cut marks from skinning are found towards the front of the bone below the diastema: such marks were seen on pig jaws from Radley Barrow Hills (see Figure 4.4) and on cattle jaws from Rowden, Down Farm pond barrow and Crab Farm barrow. The cows at the latter two barrows were buried whole, but they had clearly first been skinned. Skinning of the head may also leave cuts on the zygomatic bone: such cuts were seen on pig and sheep or goat bones at Tower Hill Ashbury. Cuts on the frontal bone around the base of the horn core were sometimes made to loosen the base of the horn before removing it from the horn core, or when skinning the head. Such cut marks were seen on a Neolithic cattle frontal bone at Eden Walk Kingston. As the places where skinning cuts are located are dictated by the anatomy of the animal, like other butchery marks, they vary little between periods and cultures.

4.2.3 Disarticulation and filleting

Short repeated cuts located on the area of bone where ligaments and tendons insert into the bone sever the ligaments and disarticulate the bones. Such cuts are present on the proximal radius of some of the cattle bones from Runnymede (as in Figure 4.1) and cuts of the same type are present on other cattle and also pig bones from Runnymede. Disarticulation cuts were recorded on cattle humeri at Horslip and Rowden, on cattle scapulas at Horslip and Fordington Farm long barrow, and on cattle astragali from Firtree Field and Stonehenge. Cut marks where jaws were disarticulated from the skull were seen on one of the two cattle jaws from Stonehenge and on a cattle jaw from the Late Neolithic pits outside the causewayed enclosure at Windmill Hill. They were also seen on a pig jaw from Rowden.

Striated filleting cuts are seen less frequently than disarticulation cuts. They have most often been noted on the scapula, where cuts along the blade of the bone are characteristic of stripping meat (Binford 1981, Chapter 4). Such striated cut marks were noted on each of the four cattle scapulas from Fordington Farm and on scapulas from South Street long barrow and Runnymede. A cattle scapula from Firtree Field had cuts on the anterior margin of the spine. Filleting cuts are present on some of the cattle ribs from Runnymede (as in Figure 4.2) and from Boscombe Down. One of the cattle mandibles from the ditch at Stonehenge also had striated filleting marks (Serjeantson 1995, fig. 246). The fox radius from Stonehenge referred to in Chapter 3 had a defleshing cut along the length of the bone, so it must have been eaten, a rare example of the consumption of the meat of a fur-bearing animal.

The fragments of cattle skull found in the Grooved Ware pit at Boscombe Down show how cattle heads were butchered and consumed. The rear portions of the skull had been removed before the rest of the skulls were buried. The bones present (maxillas, premaxillas and nasal bones) were from the front of the skull. Most had skinning or filleting cuts. Transverse cuts on three hyoid bones are thought to have been the result of removing the tongue for consumption.

The location of the cut marks of all types on the pig bones from Pit 3196 at Barrow Hills Radley is shown in Figure 4.4. The cuts on the metacarpals were probably from skinning, those on the articular ends of limb bones will have been dismembering cuts, and those on the lingual face of the mandible may have been made when the tongue was removed. Many of those on the limb bones are located in the same areas of the bone as at Mount Pleasant and other Grooved Ware sites (Figure 4.5).

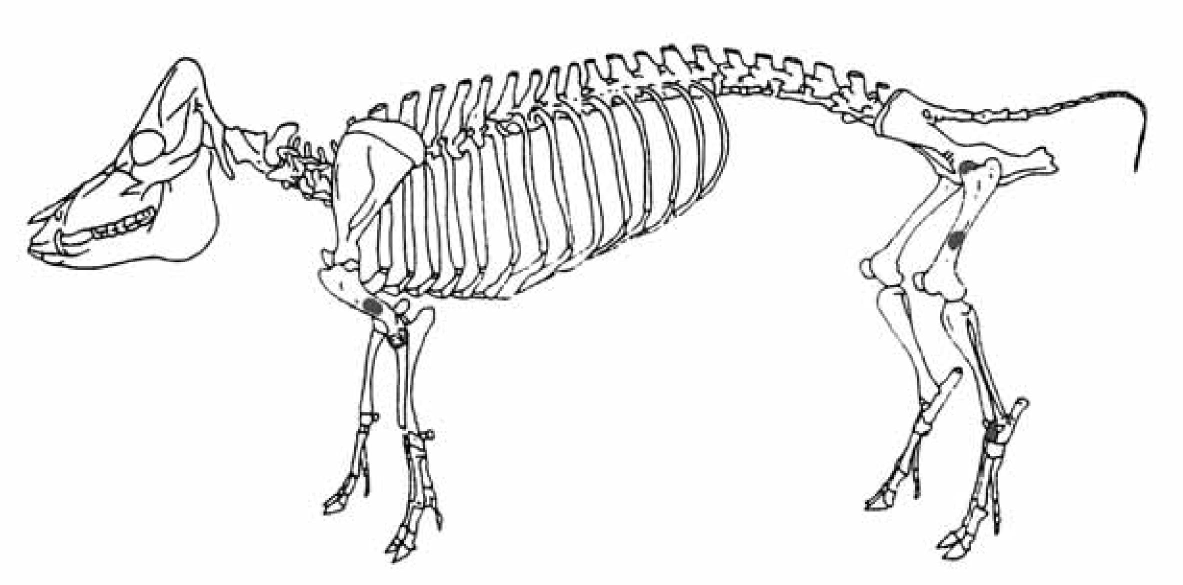

Figure 4.5 Location of butchery and burning on pigs from Mount Pleasant and other Late Neolithic sites. Based on Westron (2002)

4.3 Cooking and eating

Whereas butchery is dictated largely by function, cooking methods are an expression of culture (Levi-Strauss 1970; Goody 1982). Some cooking leaves traces on bones, but most does not, and in this case we also have to look at other evidence of cooking methods. Most meat must have been cooked on skewers over fires after having been stripped as small pieces of meat from a carcass or by stewing. Pottery vessels made possible the cooking of stews and soups, of which a very important ingredient was the fatty broth released from boiled bones. Neolithic pots, as lipid research shows, were used to stew the meat of both ruminants and pigs (Mukherjee et al 2007; Mukherjee et al 2008) as well as to cook milk. From the 3rd or 2nd millennium BC onwards meat was also sometimes cooked in boiling pits. None of these cooking methods exposes bones to fire.

4.3.1 Burnt bones

The only method of cooking meat which leaves traces of burning on the bones is roasting on the bone. This distinctive method of cooking, which had not been described elsewhere, was first clearly identified at Durrington Walls (Albarella and Serjeantson 2002) and has subsequently been observed in other assemblages. Black or brown areas on certain pig bones (Table 4.3) show where the end of a joint had been scorched by direct heat leaving the bone discoloured or eroded (Figure 4.6). Some bones were eroded, but had lost signs of the colour changes associated with burning. The area of bone is thought to have eroded because of the fragility of the surface once it had been exposed to a high temperature. These traces suggest that the pigs were disjointed through the lower part of the leg and that whole joints of meat or whole pigs were roasted on the bone, with the exposed bone ends becoming burnt.

Figure 4.6 Marks of charring on a pig humerus from Durrington Walls. The condyles are burnt black and also eroded. Photo: Umberto Albarella

The chopping of individual bones is made easier if the outer surface is briefly exposed to heat or a fire. This can also leave the bone surface partly or slightly charred on the bone shaft (rather than the articular end). This partial charring on bones from sites on chalk bedrock shows as a black or brown colour or as patches of eroded bone. At Runnymede, where bones were in silty clay, slight charring gave the bones a blackish-brown, dark brown or even pinkish-brown colour (Serjeantson 1991). Antler as well as bone was sometimes exposed to heat before it was worked (Serjeantson 1995, figs. 233-235).

While some bones may become burnt during cooking or in the course of opening up limb bones for marrow, there are other reasons why burnt bones are present on archaeological sites. Some were thrown (deliberately or accidentally) in an open fire. On burial sites some animals were included in cremation pyres, in which case the burning resembles that of human cremations. Bones burnt in both these types of fire become calcined to a white or greyish-white colour. The calcination of bones makes them resistant to decay in the ground so they sometimes survive when all unburnt bone has disappeared (Campbell et al 2011, 15). However, calcined bones become brittle so they are very prone to breaking into pieces which often makes elements hard to identify.

The percentage of burnt bones was recorded in some assemblages (Table 4.4). The type of burning – whether bones were mostly charred or calcined – is shown in column 5. The type of burning was not made explicit in every report, and in this case it was inferred from the description and context. Some assemblages have both charred and calcined bones, showing that some were charred by cooking and others were burnt on fires. Two Early Bronze Age burials have calcined animal bone associated with cremations.

Ten assemblages in addition to Durrington Walls (Table 4.3) have bones which appear to have been charred or scorched by roasting. At Coneybury henge burning traces were not quantified but it was reported that some cattle and pig bones were burnt, which was interpreted as 'roasting on the bone' (Maltby 1990). At the West Kennet enclosures between four and seven per cent of bones were burnt: there, it was thought that the burning of the palisades had given rise to the large quantity of charcoal found in the ditches and had also caused the burning of the bones, but Alasdair Whittle (personal communication 16/6/1998) has suggested that the possibility should now be considered that the bones were burnt in cooking. Westron re-examined the pig and cattle bones from Mount Pleasant and compared the butchery and burning with other Grooved Ware assemblages. He found that the pig bones from all the sites examined had similar patterns of scorching (Figure 4.5). Some cattle had been butchered and cooked in the same fashion (Westron 2002). In the earlier Neolithic and also in Beaker period and Early Bronze Age assemblages the percentage of charred bones is much lower (Tables 4.3 and 4.4). The roasting of pigs seems to be a cooking method restricted to the Late Neolithic and to Grooved Ware sites. Roasting on the bone is a profligate method of cooking because it does not make as much use of the whole carcass as stewing, so the roasting of pork can be seen as a mark of feasting, especially when taken together with other features of the bone assemblage.

4.3.2 Bone marrow consumption

Bone marrow, a nutritious, rich fatty substance, is found in long bones, the mandible and some other elements. The main reason why long bones were chopped in the Neolithic and Early Bronze Age was not to divide the carcass but to extract the nutritious marrow, as Cram (1982) originally observed in connection with the chopped bones from Abingdon causewayed enclosure. To obtain marrow, long bones were chopped through the shaft. Marrow is not much developed in the bones of very young animals, and for this reason their bones tend to be chopped up less than those of adult animals. For the marrow to be eaten fresh, bones were chopped into two pieces only. However, for bones to be cooked in stews it was desirable to chop them into several pieces. As well as exposing the marrow, chopping bones into small pieces makes them small enough to fit into cooking pots and it also releases the fats within the bones themselves. This was evident at Runnymede where most bones were broken into pieces even in those layers where there was little post-depositional damage (Serjeantson 1991). The most fragmented bones from Windmill Hill were those from the innermost circuit of the ditch. This might suggest that the cooking of soups and stews took place in the middle of the enclosure. The alternative explanation is that midden material was carried into the centre of the enclosure (Whittle, Pollard and Grigson 2009b). Most long bones, especially those of cattle, on Neolithic and Early Bronze Age sites have been chopped into small pieces for the same reason.

When bones are heated prior to being chopped, the layer of periosteum which covers the bone surface is weakened. Heating a bone also liquefies the marrow, which makes removal of the marrow easier. There is direct evidence for fresh marrow consumption at Durrington Walls. A rib of a pig was inserted into a cattle femur to extract the marrow and the femur was later discarded with the rib still attached (Albarella and Serjeantson 2002, fig. 5.11). Heating the bone prior to chopping it produces a patch of light charring and/or erosion on the bone shaft. This eroded patch is often adjacent to the break, but in the cattle radius illustrated in Figure 4.7 the charring and erosion extends over much of the bone surface. This type of charring is not confined to one period. Assemblages where it was noted include the Coneybury Anomaly pit, Hazleton North long barrow, Runnymede and Staines Road Farm in the Early and Middle Neolithic and Stonehenge, Durrington Walls and Boscombe Down in the Late Neolithic. At Mount Pleasant charred long bones were seen in both Grooved Ware and Beaker contexts (Westron 2002). The roasting of long bones heated on an open fire to obtain fresh marrow is likely to be a further characteristic of feasting.

4.4 Recognising feasting in the archaeological record

We have seen how certain methods of cooking and of eating bone marrow could suggest that feasting took place, but there are other features of bone assemblages which can point to the same conclusion, particularly when considered together (Table 4.5). These are the quantity of bones, the parts of the carcass present, the presence of joints still in articulation, and a predominance of animals most appropriate for feasts.

Figure 4.7 Charring on the shaft of a cattle long bone from Beaker deposits at Mount Pleasant, showing as erosion and discolouration. Photo: Paul Westron

4.4.1 Quantity of bones

It is tempting for the archaeologist to assume that a mass of bones in a deposit is evidence for feasting. Sometimes this must be the case, but the crude equation cannot be accepted without careful analysis. Before a large quantity of bone is seen as evidence of feasting, the origin of the bones must be carefully investigated as well as its absolute abundance. There were thick spreads of bone at Runnymede, but the traces of consumption, bone processing, dog gnawing and trampling suggested that the bones had accumulated over quite a long period. The presence of bone in large quantities there is likely to be the result of frequent or continuous use of the site together with good preservation in the accumulating river silts. A better marker of abundance is the density of bone in a feature. This can be estimated as quantity of bones per volume of soil, a calculation which has been used with shell-middens, but has not been attempted for Neolithic and Early Bronze Age sites in southern Britain. Yet another possible measure of abundance is the relative number of bones to potsherds; the fact that bone was more abundant than pottery in the recent excavations at Windmill Hill, for instance, suggested to the excavators that meat was eaten in quantity at the site. This potentially useful way of estimating abundance of bone has yet to be tested with other assemblages.

At Windmill Hill and Hambledon Hill, as at many other sites, the deliberate burial of food remains following feasts or meals (discussed again in Chapter 5) made the occasions visible to us. The discarding of the bones into middens and ditches also preserved the evidence of feasting at the major Grooved Ware enclosures (Albarella and Serjeantson 2002; Westron 2002). The burial of food remains in pits – which may also have been deliberate – preserved the evidence of feasting at other Grooved Ware sites.

4.4.2 Parts of the carcass

Knowing whether the surviving bones derive from whole animals or whether they were from joints brought from elsewhere is important for understanding consumption and the nature of settlements. In farming communities which were not organised for the market whole animals were generally consumed close to the place where they were killed. In this case bones from all parts of the skeleton should be found at the consumption site. This raises the question of whether the mobile communities of the Early and Middle Neolithic drove their animals to the significant places in their territories or carried joints of meat there. The main limb bones of cattle were absent from the Coneybury Anomaly pit, which suggested that the limb bones with meat attached were removed from there to a settlement or central place elsewhere.

Table 4.5 Summary of some of the features of Neolithic and Early Bronze Age bone assemblages which suggest either everyday meat consumption or feasting: the types of site with feasting evidence are also indicated

CRITERION	EVERYDAY MEAT CONSUMPTION	FEASTING	TYPES OF SITES WITH FEASTING EVIDENCE
Selection of species	*Small animals? No selection?*	*Pigs*	*Grooved Ware enclosures and pits*
Treatment of the carcass	*All skeletal elements disarticulated*	*Some joints in articulation*	*Causewayed enclosures; other sites*
Selection of parts of the carcass	*All parts of the animal present*	*Meat bearing elements more common than heads and feet*	*Grooved ware enclosures (especially West Kennet)*
Burning	*No traces of burning (because stewing leaves no surface evidence)*	*Charring on articular ends of bones (from roasting)*	*Grooved ware enclosures and pits*
Treatment of marrow bones (1) butchery	*Marrow bones chopped into several pieces for stewing*	*Limb bones chopped through once only for fresh marrow*	*Most Neolithic assemblages; ?typical of both small and large-scale feasts*
Treatment of marrow bones (2) burning	*Marrow bones not charred or eroded*	*Marrow bones lightly charred or eroded on the shaft from exposure to heat for consumption of fresh marrow*	*Most Neolithic assemblages; ?typical of both small and large-scale feasts*
Quantity of bone (relevant only for sites with good preservation)	*Few bones*	*Large quantities of bone; More bone than pottery?*	*Causewayed enclosure ditches; Grooved Ware assemblages*

The Meat Utility Index (MUI) has been developed to separate sites where animals were consumed from those where they were killed and processed in preparation for carrying parts of the carcass back to the main settlement. It distinguishes bones with a high meat value from those with low meat value (Binford 1978). The index can be a valuable tool for understanding hunter-gatherer sites. A calculation of MUI for the assemblage from Down Farm Firtree Field showed 'little relationship between meat utility and the bones represented in the Neolithic pits' (Legge 1991). This indicated that whole animals rather than joints of meat had been consumed there. The presence of bones with high meat utility was claimed at Buckskin round barrow (Clark 1995) and Woodhenge (Pollard 1995), but neither author demonstrated that survival at those sites was not governed by natural processes of bone destruction. Research elsewhere has confirmed that

Binford's Meat Utility Index has not produced clear distinctions when applied to farming settlements (Marean and Frey 1997).

The possibility that joints of meat were carried to Hambledon Hill was investigated by comparing surviving bones with what would be expected from their relative density and the age at which they fuse. The density of bones governs their resistance to destruction from all sources: butchery, gnawing by dogs, trampling and damage in the soil. The skeletal elements were found to be present in the ratio which would be expected, showing that there too whole animals had been present both in the central area and in the Stepleton enclosure (Legge 2008, fig. 8.10 and fig. 8.11).

Because bone density accounts for the numbers of skeletal elements in most assemblages, those assemblages which lack certain parts of the body which might be expected, or have more of certain elements than would be expected, stand out as unusual. Among the most interesting are Durrington Walls and the West Kennet Palisade Enclosures. At Durrington Walls skulls of older pigs were less common than limb bones though all parts of the younger pigs were found. It appears that the skulls of the older pigs were taken away or never brought to the site. In the West Kennet enclosures bones from the front and back legs of pigs were more common than those from the head. In particular, femurs, which are notoriously liable to be destroyed, were recorded in exceptionally high numbers. In the palisade ditch of Enclosure 1 there were 100 femurs but only 39 humeri, though the distal end of the humerus, being denser, is normally found in much higher numbers than the femur. It is clear that significantly more leg joints than shoulder joints were brought to the site and eaten. Uniquely, too, the bones from the right leg were selected in preference to those of the left leg (Edwards and Horne 1997, figs 75 and 76). The consumption of animals in feasts is nearly always accompanied by customary rules about who is allotted which part of the animal. In several cultures different parts of the carcass were consumed by different individuals according to their rank, status, gender or role within the community (Grant 2002; McCormick 2002). In early Irish tradition the hindquarter was the portion which was traditionally given to those of high status. By analogy, this could suggest that the remains in the Palisade Enclosure ditch were of joints eaten by an elite section of society.

The sites with a marked selection of body parts are also those where other features of the assemblage indicate that feasting was taking place. Most sites in all periods do not have a marked presence or absence of the parts of the body expected to survive. This is not to suggest that feasting did not take place at such sites, but that, where it did, it involved the whole animal.

4.4.3 Articulated bones

Articulated joints, mostly of cattle but also of other animals, have been found in several assemblages (Appendix 6). Cattle legs were found in articulation at Hambledon Hill and a leg of red deer was found in the Stonehenge Avenue ditch. Sections of articulated vertebrae of cattle were found in some long barrows. Several sets of neck vertebrae were found at Windmill Hill. These may represent joints which were discarded or deposited after some of the meat had been eaten without the further disarticulation and bone processing. This could suggest that meat had been provided so abundantly for a feast that carcasses could be less heavily processed than usual (Legge 1981a). There are other explanations for finds of articulated joints which will be discussed in Chapter 5.

4.4.4 Feasting animals

The killing of a cow or bull must have been carried out only on those occasions when many people were present to consume it, since a whole adult cow or bull provides more meat than can be eaten by a single family group and so suggests that it formed part of a feast. The presence of large quantities of cattle bones has always been invoked to support the interpretation of causewayed enclosures as places of communal gatherings and feasting. Large wild animals were eaten more rarely, but, whatever the impulse for killing them, they were also so large that their consumption must have been part of, or the occasion for, a feast; this must certainly have been the case with an aurochs. The pig, as discussed earlier, has no secondary products, so pigs were always raised for meat and as we have seen, were the main feasting animal in the Late Neolithic period. However, cattle must also have continued to have this role and resumed their central place as the main feasting animal in the Latest Neolithic and Early Bronze Age. Sheep may also have played a part. There was a rite known as the 'suovetaurilia' in the Classical World in which one of each of an ox, a pig and a sheep was sacrificed and consumed in large scale communal feasts. Sacrifice of the three together reflected the fact that each had an important and complementary role in agriculture and the provision of food (Hamilakis 2008). The consumption of the three main domestic species together is evident in most individual assemblages, small as well as large, of the Early and Middle Neolithic (Appendix 3). Despite later biases towards the pig and then the sheep, we should perhaps consider that the idea which lay behind the 'suovetaurilia' was already current from the 4th millennium onwards and that in most cases it is misleading to think of any particular species as appropriate for feasts.

4.5 Discussion

While methods of butchery and some aspects of cooking and preparing meat were common to all periods, the method of cooking and the choice of feasting animal changed over two and a half millennia.

4.5.1 Early and Middle Neolithic

In the Early and Early-Middle Neolithic it is likely that most consumption of meat took place communally around communally organised fires. Small pieces of meat were probably cooked off the bone. The long bones were cracked open so that the marrow could be eaten. Each occasion may have had the character of a feast. Later remaining meat and the bones were taken to be chopped into small pieces and cooked as soups and stews in pots. It may have been at this point that the eating of meat moved from a communal setting to individual households. Stews made from boiled bones, meat, cereals and wild vegetable foods together will have been part of the everyday foods together with milk products.

The scale of feasts in the Early-Middle Neolithic might suggest that they were orchestrated by a leader or chief but the fact that consumption was not specialised to favour one animal or certain joints of meat could equally imply that the feasts developed organically out of small local episodes of food consumption. There are too few assemblages from the henges, cursuses and other sites of the Middle Neolithic period with good evidence for consumption at either the communal or domestic scale. Feasting no doubt took place, but it was not accompanied by the burial of the food remains.

4.5.2 Late Neolithic

Many of the means of cooking and eating must have continued into the Late Neolithic, but there were also major changes. The small Grooved Ware pit cluster sites probably did not see large-scale feasting, but they share the same cooking method as the large henges. The selection of pigs and the techniques by which they were roasted are unique to the Late Neolithic period. These methods need to be seen as a cultural marker for the period just as much as flat-based pottery.

As far as the large sites are concerned, Durrington Walls and the West Kennet Palisade Enclosures have many of the characteristics of places where meat was eaten in quantity and where food was abundantly available. In the Palisade Enclosures at West Kennet, as we have seen, pigs' haunches were eaten. The selection of the back leg is an unusually direct reflection of a ritual of consumption more often found in later periods and more evolved societies. Some feasting seems to have been a more complex and more structured event in the 3rd than in the 4th millennium. Feasting in the henges may well have been organised and provided by an elite group, the leaders, religious or secular, of Late Neolithic society. Together with the actual construction of large monuments, the provision of feasts is likely to have been one of the principal means by which an elite stratum in the society maintained their position.

4.5.3 Latest Neolithic and Early Bronze Age

Most Beaker and Early Bronze Age sites in this review are barrows in which there are few deposits of food remains. If feasting did take place, the discarded bones were not disposed of in a manner which preserved them. Most of the methods by which meat was cooked and consumed at this time will be similar to those of the Early and Middle Neolithic. People ceased to barbecue pigs in the 2nd millennium BC though a few bones with charring have been noted in Beaker assemblages to suggest that roasting may have continued. These may prove to be residual from earlier phases at the site, or they may belong to the period of overlap between Grooved Ware and Beakers.

From the Early Bronze Age onwards meat was sometimes cooked in boiling pits (Schulting 2008, 103). This is a method which allows large joints of meat to be cooked and so was another means of providing meat for large-scale communal feasts. At least one example is known from our area: a burnt mound with an associated pit of mid-3rd millennium date was excavated near the ring ditch at Staines Road Farm (Jones 2008). Unfortunately there was no bone refuse associated with it. One of the few Early Bronze Age sites with food remains is the old land surface below Buckskin barrow: here, remains of sheep were more numerous than those of cattle and pigs were almost absent. At this time society was transformed by the use of bronze tools and weapons as well as by new types of livestock discussed earlier. Once access to bronze became the source of wealth and power for the leaders, the provision of communal feasts probably became a less important means for achieving rank and earning loyalty.

5 DEPOSITION AND RITUAL ACTIVITY

5.1 Introduction

Animals did not just provide food; they also played a major role in the ceremonial, ritual and religious life in the Neolithic and Early Bronze Age. This was inevitable given the dependence on domestic herds for much if not most of the daily food and the fact that the care of cattle, pigs and sheep must have been the main activity of most people's lives. This chapter will look at how different attitudes to animals and food may have prompted people to place bones in certain places as part of the rituals and ceremonies of daily life. I have used the term 'placed deposits' for any deposit which was or might have been deliberately put in place, as this designation leaves open the reason for the acts of deposition.

It has been argued that most of the cultural debris which was deposited in, for instance, the ditches of causewayed enclosures was placed there deliberately. Since these remains comprise debris from food consumption, they cannot easily be distinguished from 'normal' food remains. Certain types of deposits however do stand out as clearly different from what would in another context be considered debris from food consumption. These are discussed first.

The different types of placed deposit are examined here separately with the aim of teasing out whether they represent a purposeful attempt to give significance to certain actions or certain animals. Reasons for the selection of certain species are explored as are questions of whether differential deposition on some sites reflected different attitudes to certain animals. Restricting dogs from certain sites or parts of sites may indicate than the area was out of bounds, so this is also discussed.

Various authors have discussed the possible intentions of those who created the deposits. Whittle and Pollard (1999, 385) summarised some of the reasons why bones might be deliberately placed: 'particular things that were built or dug, *or were eaten or otherwise consumed, middened, stored and deposited* may also have stood metonymically for larger wholes, and metaphorically for larger ideas' (my italics). If some types of bone deposition in the Neolithic and Early Bronze Age was carried out to memorialise a communal occasion or a feast, the bones may 'stand metonymically for meals and feasts, for eating' (Whittle and Pollard 1999, 385). The regularly played out sequence of dramatic actions which feasting involved – butchery, cooking, the allotting of meat and meat consumption – has been regarded as a performance (Dietler and Hayden 2001; Pollard 2001), so the deposition of bones can be seen as the final act in the performance. This end to a communal gathering and feast was marked by the digging of a pit or ditch and the placing within it of the remains, the contents of which would comprise any uneaten portion of meat and any bones not retrieved for use later in stews.

Other possible reasons for the placing of animals and parts of their bodies in certain deposits relate to peoples' beliefs about animals. In the Neolithic and Early Bronze Age animals and humans are likely to have been seen as a continuum rather than as dichotomous beings. A skull or other body part of a valued or cherished cow, bull or other animal may have been deposited to commemorate an individual animal just as parts of humans were deposited in barrows and in the ditches of enclosures. Parts of wild animals might be deposited as memorials to the character of the animal or to the bravery and skill of the hunter. As discussed in Chapter 4, animals and parts of animals deposited but not eaten represented the sacrifice of some food. Fraser (1983) argued that some of the animal burials in Neolithic tombs in Orkney should be interpreted as the totem animal of the group, so this should also be considered as an origin for some bones.

The key to understanding whether or not the deposition was deliberate depends on an understanding of bone taphonomy: the human and natural alterations which bones have undergone since the death of the animal. Signatures of bones which suggest purposeful deposition include the presence of relatively intact bones and whole joints of meat, as discussed in the last chapter, and the absence of dog gnawing. It is also crucial to take into account the context of the deposited element or elements (Whittle, Pollard and Grigson 1999b; Morris 2008). Individual deposits alone are not the sum of ritual activity in the Neolithic and Early Bronze Age. Other aspects of ritualised action might include whether certain parts of a site were distinguished from others by the presence of different parts of the carcass or whether the deposition of certain species was restricted to certain areas in a site.

5.2 Data

Appendix 6 lists some of the placed and possibly placed deposits which have been reported. The database includes some deposits about which there is little doubt and others where the designation is more tentative. Where skulls, horn cores, skeletons and part-skeletons were referred to in the report they were included in the catalogue. Bones found in articulation and some individual elements which are unusual in some way were included if the archaeologist or zooarchaeologist noted that they were probably deliberately placed. The many red deer antlers which were deliberately deposited are not included because of inconsistencies in how antler is dealt with in excavation reports.

The catalogue includes more than 160 deposits from over 80 sites. The list gives a flavour of the types of deposit and the species, but whether or not a particular bone or group of bones was included depends on the vagaries of interpretation by the excavator and the bone analyst. At Windmill Hill a great many deposits were noted as possibly placed; their disposition and associations are discussed in detail in the monograph (Whittle, Pollard and Grigson 1999b) and are not repeated here; just the skulls and skeletons from Windmill Hill are listed.

The numbers of placed deposits are summarised in Table 5.1 according to the type of deposit. Table 5.2 summarises the species which made up the placed and possibly placed deposits. This latter table comes with a caveat: there is a danger of circular argument with remains of rare animals. Skulls, horn cores and complete bones of aurochs are usually singled out for comment by the bone analyst but I have also noted the presence of horse, aurochs, bear and wolf as special whether or not attention was drawn to it in the report.

Table 5.1 Placed and possibly placed deposits: summary of types of deposit (excluding antler) by period, based on data in Appendix 6

Deposit type	ENEO	EMNEO	MNEO	LNEO	LNEO/EBA	EBA	Total
Skull(s)		27	6	2	4	5	44
Skull + feet		2		1	2		5
Horn core		2					2
Jaw		5	1		2	2	10
Skeleton(s)	1	11	3	8	2	13	38
Part-skeleton	1	7	2	2	1	2	15
Articulated bones		11	2	6	2	2	23
Single bone		3	2	7	1	4	17
Group of bones		4	1	1	2	1	9
Total	2	72	17	27	16	29	163

Table 5.2 Placed and possibly placed deposits: summary of species by period, as Table 5.1

SPECIES	ENEO	EMNEO	MNEO	LNEO	LNEO/EBA	EBA	TOTAL
Cattle		34	10	7	8	12	70
Calf		2		2		1	5
Pig	1	9		2	1	5	19
Piglet			3	5			8
Sheep		3		1	1	5	10
Sheep/goat		1					3
Lamb		3		1		2	4
Goat		2				1	3
Dog		4	1	3		1	9
Horse		1			1	1	3
Red deer				1			1
Roe deer		3					3
Aurochs		7	2	2	3	1	15
Brown bear				2			2
Fox			1				1
Wolf		1					1
White-tailed sea eagle				1			1
Mallard					1		1
Pike		2			1		3
Trout	1						1
TOTAL	2	72	17	27	16	29	163

The absolute numbers of placed deposits also cannot be given too much significance because of the varying degrees to which excavators and zooarchaeologists identified deposits as as deliberately placed. One measure of abundance can suggest the relative importance of placed deposits in each period: their ratio to the total number of assemblages (Figure 5.1). This ratio shows that there are two periods when placed deposits make up a major proportion of all deposits: the Middle Neolithic and the Early Bronze Age. Most of the Middle Neolithic assemblages are from what were probably ceremonial sites. The high ratio of placed deposits in the Early Bronze Age is also a reflection of the fact that most assemblages are from barrows and many bones on such sites were deliberately placed.

5.3 Types of deposit

5.3.1 Skulls and horn cores

Nearly all skulls from placed deposits are from cattle. These have created interest since the 19th century (Thurnam 1865, 140-5; Kinnes and Longworth 1985; Field 2006). Cattle skulls were found in Boles Barrow, Ascott-under-Wychwood and Beckhampton Road long barrows. At the last site three skulls were placed axially in a row beneath the barrow mound. A skull at Fussell's Lodge was at the forecourt end of the chamber, suggesting that it had been displayed there. It was 'badly preserved, dirty, and broken into many small pieces' suggesting that it had suffered from exposure prior to burial, as had some of the human bones in the burial mound. Aurochs' skulls were placed in the barrows at Horslip, Knook and Thickthorn Down. The skull of a large bull aurochs of uncertain Neolithic date was inverted and buried in a tree-throw hole at the recently excavated

Turnpike School site in Newbury and a horn core of a large aurochs was deliberately buried in a pit at Corhampton.

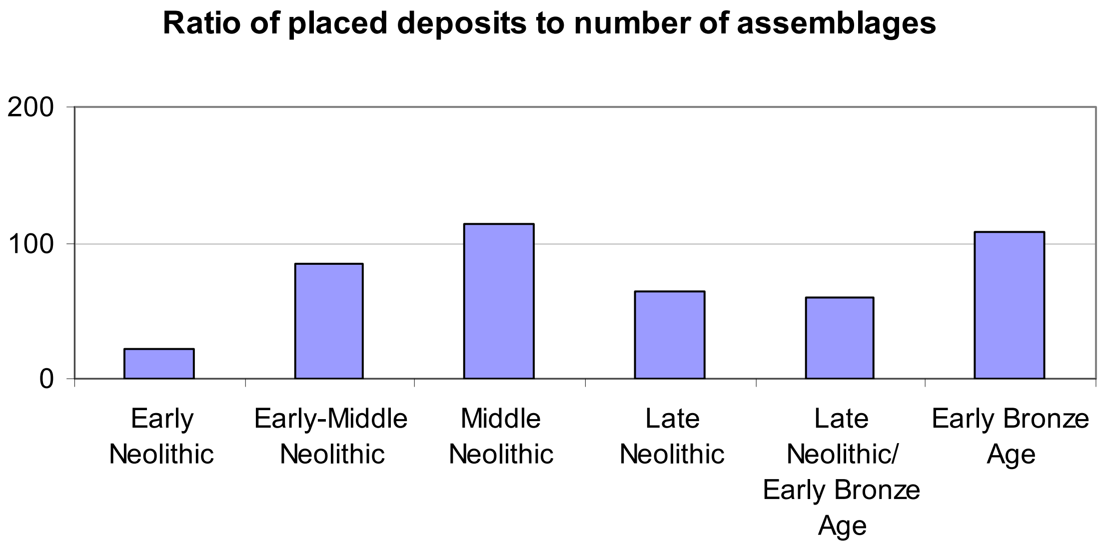

Figure 5.1 Ratio of placed deposits to total number of assemblages: '100' indicates an equal number of placed deposits and other assemblages. In the Middle Neolithic and Early Bronze Age the number of placed deposits is greater than the number of other assemblages

Cattle skulls were also placed within the ditches of causewayed enclosures. Of the thirteen cattle skulls from the excavations at Windmill Hill in 1988, ten were in the terminals of ditches (Whittle, Pollard and Grigson 1999b, 359) as was a cattle skull in the enclosure ditch at Corporation Farm Abingdon (Barclay et al 2003). The custom of placing skulls within the ditches of monuments continued into the later Neolithic period. Up to four cattle skulls were found on the base of the first henge ditch at Stonehenge and an aurochs' skull was found in the ditch of Henge II at Dorchester-on Thames (Atkinson et al 1951, plate VII). Horn cores not apparently attached to skulls were also deliberately placed in ditches and pits at causewayed enclosures and other sites.

Complete and incomplete skulls have also been found in some Grooved Ware pits, not an obvious place to expect a skull since in general these pits contain food remains. On the other hand the skulls which were placed in Early Bronze Age barrows and graves were clearly intended to accompany the burial. Cleal (2005) includes 'cattle skulls in burials' as markers of the early Beaker period.

The skulls of animals other than cattle are rarer. A pig skull was found in the forecourt area of the Hazleton North chambered cairn and another with a Beaker burial at Eynsham (Mulville 2001). The skull of a dog was associated with the Food Vessel burial (G.70) in the Amesbury barrow group. One of the few examples of the burial of the skull of a wild animal other than an aurochs is the possible wolf at Staines Road Farm (Figure 5.2) which was discussed in Chapter 3. It is notable that, for all the unshed antlers recovered, there are no records of placed red deer skulls.

When the processes through which skulls are progressively destroyed are taken into account it is possible to recognise the presence of a skull from a collection of broken fragments. The vault of the skull is fragile: it cracks and disintegrates readily as the overburden of soil becomes compacted. The denser parts such as the occipital bone and the horn cores survive longer and the maxillary teeth withstand decay for the longest time. A skull can therefore be recognised, at least tentatively, from the rows of maxillary teeth, especially if fragments of the denser parts of the bone such as the occipital condyles are also present. The cattle teeth from the forecourt area at Hazleton North are thought to have been part of a skull displayed over the forecourt revetment. A collection of skulls is the most likely origin of the more than 300 fragments of cattle maxillary teeth which were found in the old ground surface close to the Drayton cursus. They may once have been in skulls displayed on a barrow as was proposed for Irthlingborough in Northamptonshire (Davis and Payne 1993).

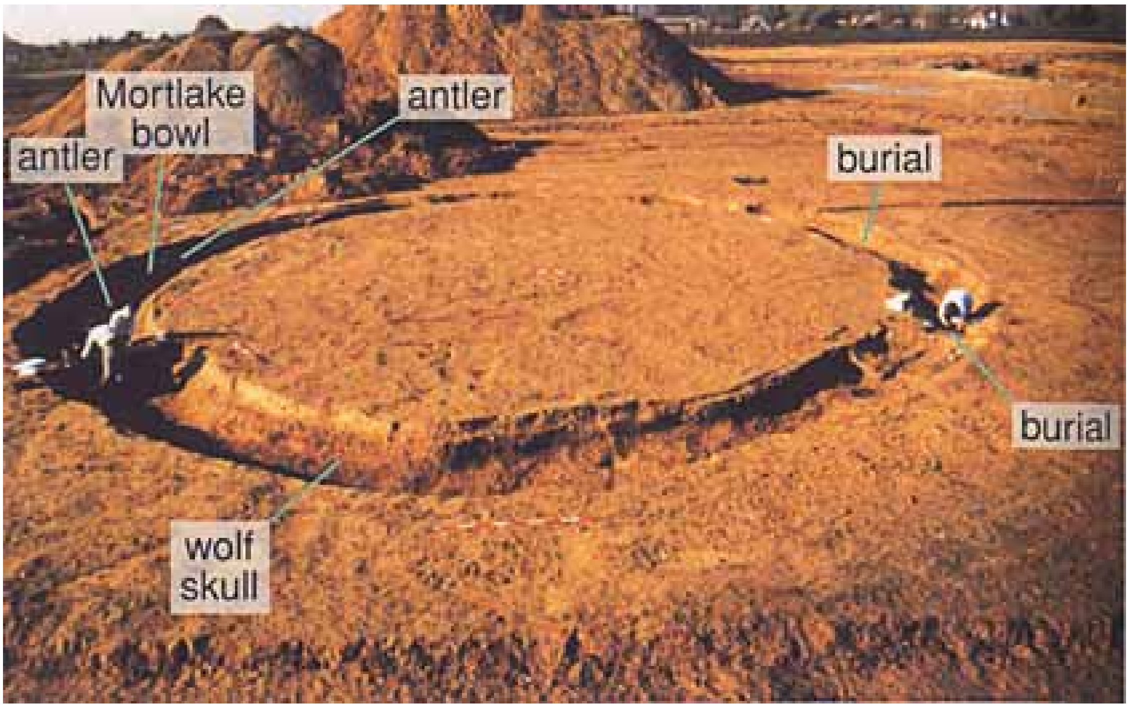

Figure 5.2 Ring ditch at Shepperton Staines Road Farm showing location of wolf or dog skull, antlers, human burials and Mortlake bowl. Illustration by Giles Pattison, Surrey Archaeological Unit

'Heads and hooves': Skulls accompanied by foot bones are thought to represent a hide on which the head and feet remained. This type of deposit was first identified by Piggott (1962). Heads and hooves were usually associated with human burials and enough are known in southern Britain to suggest that they were not confined to one period in time. Such burials in continental Europe were interpreted as with folded hides or 'hide-wrapped', but Piggott also pointed out that they might represent the end product of a feast in which the animal was eaten. Bones from the head and feet, thought to be from hides, were found in poor condition in the Neolithic long barrows at Fussell's Lodge. They were also present in Bole's Barrow, Amesbury 42, Knook 2, Corton, Sherrington 1 and Tilshead (Ashbee 1966). At Barrow Hills Radley a cattle skull in a Beaker grave found with a metapodial may have the same origin. The most complete example from Britain was found with a Beaker burial at Hemp Knoll (Figure 5.3). The cattle bones were outside the coffin, which led Robertson-Mackay (1980) to speculate that the hide or cloak should be seen as 'perhaps belonging to the shaman or chief mourner' rather than to the individual buried within the barrow.

5.3.2 Skeletons and part-skeletons

There are more problems associated with the interpretation of whole skeletons than with other apparently deliberate deposits (Wilson 1992). A complete skeleton in articulation is from an animal which was not eaten, as it is almost impossible to fillet the meat from a carcass and leave the whole in articulation and unmarked. A whole carcass left unburied would have been disturbed and eaten by dogs or other carnivores. Any complete carcass must therefore either have been buried deliberately or have or died in a protected environment such as a burrow.

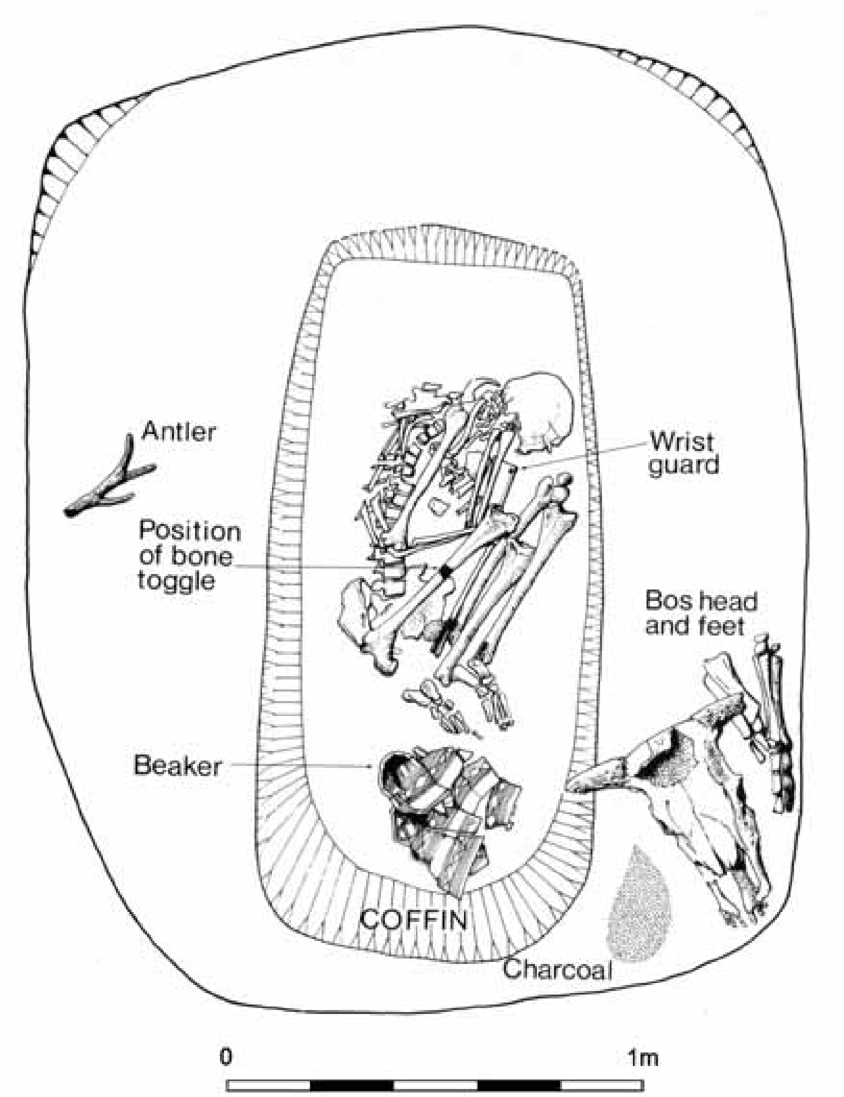

Figure 5.3 Beaker burial at Hemp Knoll with the 'head and hooves' of an ox. The bones are thought to have been from a folded hide which was placed on or beside the coffin. Redrawn from Robertson-Mackay 1980, fig.7

The burial of a whole animal is not a normal sacrifice offered in tribute to a deity because such animals were usually eaten when they were sacrificed. In every culture the gods are seen as content with part of the animal representing the whole, or sometimes only the smell of the animal as it was cooked. We should not therefore expect complete skeletons to represent food sacrifices.

For foxes and badgers, which burrow into deposits, the possibility that the skeleton is of an animal which died in its burrow has always to be considered. In addition farmers in later periods often buried the carcasses of dead horses, cattle and sheep in the field, so might use the soft earth of a barrow or its ditch for the purpose. It is often possible to recognise the skeleton of a post-medieval sheep or cow from its large size; if there is any doubt about such as skeleton, it is worth confirming the date by radiocarbon dating. The horse skeleton in the King Barrow at Boreham referred to earlier was in the exterior of the mound, so is likely to be intrusive.

The importance of context is emphasised by four animals buried on the periphery of the Down Farm pond barrow, two cows and two sheep on the four axes of the barrow. Three which were fairly complete were recognised during excavation. As only a few teeth and bone fragments survived, the fourth, a sheep, was identified only after it was understood to be located on the axis of the barrow opposite the other sheep.

Skeletons and part-skeletons of neonatal and very young piglets, calves and lambs also raise questions. They are often thought to be natural deaths, but there is no reason why such casualties should be carefully buried out of reach of dogs. These newborn animals may be better considered as some kind of sacrifice or offering. A rite in which the firstborn calf or lamb was sacrificed to ensure fertility is known widely from ethnographic studies (eg Frazer 1963, 601-2).

With older animals, there must have been a good reason for burying them complete and uneaten. The goats at Hambledon Hill, Windmill Hill and the round barrow at Twyford Down may have had a role as leaders of the sheep flock, as discussed in Chapter 2, so were regarded as meriting individual burial. The only adult cattle and sheep buried whole are from Early Bronze Age barrows: they include the pairs of cattle and sheep from Down Farm referred to above and a pair of cows buried at Crab Farm, one accompanied by a calf. Two articulated legs of calf were found in a late Neolithic context at Barrow Hills Radley; they were arranged on opposite sides of the ring ditch. They were thought to have come from the same calf, in which case they probably represent a calf burial. A part-skeleton of a cow from Twyford Down may be part of this series of burials in ring ditches and barrows. Dogs too were sometimes buried; at least seven are known from various periods and some others, previously unrecognised, were present in the Cotwold-Severn tombs (Thomas and McFadyen 2010). The dog at Manor Farm Horton was in a mortuary enclosure, and is thought to have been part of the funerary ritual. The dogs buried with the human cremations in Barrow 8 on Ashey Down on the Isle of Wight (Drewett 1970) and in the Twyford Down barrow were buried with the pyre debris.

Few skeletons of wild animals have been found. A roe deer was reported at Whitehawk causewayed enclosure. More unusual were a white-tailed sea eagle in Coneybury Henge and a mallard at Barrow Hills Radley. As discussed in Chapter 3, these may have been killed so that their feathers could be used. The trout skeleton in the Coneybury Anomaly is hard to explain, since it was clearly not eaten. Undoubtedly the most intriguing animal burial is the aurochs in a pit at Hilllingdon (Figure 5.4). Groundwater percolation made most elements too spongy to be recovered but the bones survived well enough in the pit for it to be clear that the aurochs was originally whole, though the arrangement of the bones showed that the aurochs had been dismembered to fit in the pit. The fact that no parts of the body had been removed suggests that it was not eaten.

Remains of a cremated sheep and a cremated pig were associated with human cremations in the Mockbeggar Lane barrow, a site where no unburnt bone survived. These may have originally been complete. They are thought to have been sacrificed on the pyre.

Some disarticulated part-skeletons have proved to be of animals which were eaten. Parts of a cow from Area 6 at Runnymede had been butchered, yet all elements seemed to be from the same animal. One of the pits (913) at Barrow Hills Radley contained the skeletons of several immature pigs which had been butchered. These examples are unusually direct evidence of how bones were sometimes deposited quickly following consumption of the meat and with no further processing.

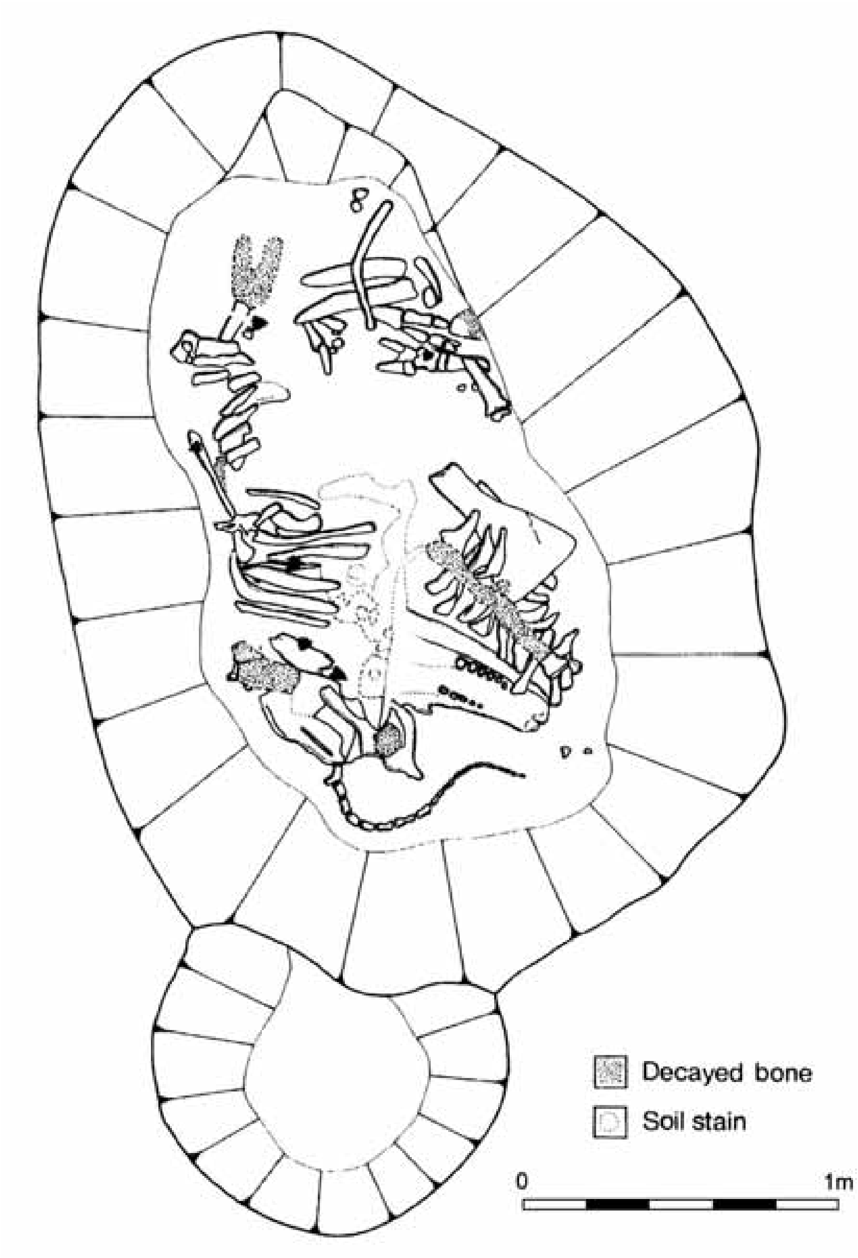

Figure 5.4 Burial of an aurochs in pit at Hillingdon. The positions of six Beaker arrowheads associated with the aurochs are also shown. Reproduced from Cotton et al 2006, fig. 11.2 with permission of MOLA

5.3.3 Articulated bones

As discussed in Chapter 4, elements found in articulation indicate that a whole joint was deposited uneaten or only partly filleted of meat. Whole legs, sections of vertebrae and feet bones have been found in articulation on Neolithic sites. These, like some partial skeletons, must have been buried immediately after butchery and consumption. Segments of the vertebral column are not infrequently found articulated. The ligaments hold these bones firmly together, and there is less incentive to disarticulate them for further cooking than there is to disarticulate the limb bones which contain marrow.

Some articulated bones appear to represent food offerings with the dead. An articulated leg of a pig placed above a cremation in the round barrow at Ogbourne St George and a leg joint of roe deer at Hazleton North may have had such an origin. A red deer joint was found in the palisade ditch at Stonehenge. Some of the most intriguing finds of articulated bones are those where it appears that someone made a deliberate attempt to replace bones in articulation after the animal had been eaten but failed to replace them in the anatomically correct arrangement. Grigson's careful work on the remains from Fussell's Lodge revealed that part of the vertebral column of a cow had been placed on the floor of the ditch, but with two vertebrae missing from the sequence. The presence of foot bones in articulation may have more than one explanation. As discussed, these were sometimes left attached to hides or skins: this is thought to be the origin of the foot bones of a dog in the Stonehenge ditch. This is unlikely to account for pigs feet in articulation as were found at Robin Hood’s Ball and the Longstones Enclosure, because pig skins, unlike those of other animals, were not used for clothing. These may have been discarded uneaten when the pig was butchered.

5.3.4 Individual elements

Individual elements and collections of elements were sometimes intentionally deposited but this is more difficult to recognise with individual bones than with other types of placed deposits. Again, the context, the taphonomy, the species and the element all have to be taken into account. Twelve pig fibulas found in a Grooved Ware pit at Barrow Hills Radley were unusual because it is rare to find several of the same elements collected together. Pig fibulas were sometimes used to make bone points, so these may have been amassed with that intention.

Context: Bones associated with burials raise the question of whether they were deliberately placed in the grave. Some of the jaws and long bones catalogued in Appendix 6 were deliberately placed with human burials. A group of four cattle scapulas was placed with a grave in the round barrow at Fordington Farm. These could have been intended to represent food offerings or they could have been deposited following the funerary feast, as cut marks showed that the meat had been removed. A jaw or a pair of jaws may have also been intended to represent the complete animal. Limb bones in graves, like joints of meat, may have been intended to represent food.

Other individual elements were sometimes purposefully placed at the base of ditches, just as were skulls and horn cores; certainly there can be little ambiguity in the case of those from ditch terminals. At Stonehenge two cattle jaws were found in the terminals of the henge ditch, one on either side of the north-east entrance. They are from two different animals, and were deposited as clean bones – filleting cuts showed where the meat had been removed from at least one (Serjeantson 1995, fig. 246). The radiocarbon dates of the jaws were significantly earlier than the dates of antlers from the base of the same ditch which suggested that they had been curated before finally being buried.

Taphonomy: As discussed, a long bone which is complete and not processed further for food is exceptional. For this reason some complete limb bones from Abingdon Causewayed Enclosure and a radius from Badshot Lea long barrow should probably be considered as bones deliberately placed in the monuments despite the fact that there is no record of their context. A radius from Stonehenge may belong with these, even though a failed attempt was made to break it for marrow (Serjeantson 1995, fig. 248). A single bone may have been buried to represent an animal which had otherwise been consumed. The fact that a bone had been gnawed by a dog did not preclude it from being deposited, as in the case of a cattle tibia in the Stonehenge ditch (Serjeantson 1995, fig. 249).

Cattle scapulas are sometimes found whole or almost whole, as in the Fordington Farm grave. Their origin can be ascertained from the modifications (or lack of them) to the bone, provided that the bone is well-enough preserved. In 1926 the Curwens found a cattle scapula in an excavated flint mine which seemed to have been used as a shovel and since that time several other possible scapula shovels have been identified. Scapulas used as shovels had the scapular spine cut off and there will be wear or damage on the proximal end of the blade (Serjeantson 1995, 428). They may show cut marks on the blade from filleting meat from the bone. Alternatively, as discussed, a scapula (with meat attached) may be an offering of food or may represent an animal offering. In this case it will retain the scapular spine and the blade will be unworn. If there were no filleting cuts (which would be visible only if the bone is very well preserved) this might suggest it was buried with the meat on. An investigation of the butchery and use-wear traces on a scapula from Barrow Clump using SEM did not show clear wear traces, leaving it open whether the scapula was a tool or an offering (Last 2006).

Unusual species: It is always worth considering the possibility that any bone of an aurochs was deliberately placed. The size of the animal and the skill and bravery required to kill it must have given the aurochs and its remains special significance in the Neolithic and Early Bronze Age. The same is true for bear bones: the ulna from Firtree Field is thought to have been deliberately deposited and the same may be true of the scapula from Ratfyn and the other bear bones which have been found in pits with Grooved Ware.

5.3.5 Mixed deposits

Up to now we have looked at individual elements and parts of the skeleton, but at many sites whole groups of elements of mixed species and ages appear to stand out as special. At Windmill Hill bones were deposited in rows or lines on the base of ditches and some appeared to be bound together (Whittle, Pollard and Grigson 1999b, 357, 368). At Hambledon Hill, groups of bones and other cultural material were buried – possibly in bags – in discrete groups in recuts or slots within the ditches (Legge 2008, 569). The deposits at this site as elsewhere invariably include elements from all of the three main domestic animals. The authors proposed that the decision to include parts of all three domestic animals may in itself have been deliberate at Windmill Hill. As discussed in Chapter 4, the inclusion of all three animals may have been a deliberate feature of feasting.

5.3.6 Red deer antler

Red deer antlers (not quantified here) were often deposited on the base of ditches and pits in ways which suggest they were deliberately placed (eg Figure 5.2). Most – though not all – were picks or rakes which had been modified for use in digging the pits and ditches on Neolithic monumental sites (Worley and Serjeantson in press). Antler picks were sometime deposited after they were worn down to the stage when the tines were of no further use for digging but were sometimes deposited before that stage of wear was reached. For example, at the South Street long barrow, among the antlers from the mound and the base of the quarry ditches, six had worn tines but one had no trace of wear. At Barrow Hills Radley antlers were arranged on the base of Ring ditch 611: all but one had been modified for use and were well worn and all but one was shed (Barclay and Halpin 1999, fig. 4.1). By contrast three antlers in an Early Bronze Age grave (4969) from the same site were from slaughtered deer and had been little modified and showed no trace of wear (Barclay and Halpin 1999, fig. 4.62). While the former were apparently deposited as a final act following the digging of the ring ditch, the latter may have been grave offerings, perhaps recalling the slaying of the deer.

5.4 Species

5.4.1 Domestic animals

Cattle were most often given special treatment both in the Neolithic and in the Early Bronze Age (Table 5.2). The numbers of deposits of pigs and sheep more or less reflect their numbers generally, and immature animals also reflect numbers in all deposits. Pigs and piglets are more frequent in the Late Neolithic while sheep, goats and lambs were more often found in the Early Bronze Age. A horse skull was excavated from the Beaker barrow at Lambourn 19 and a horse jaw from the Twyford Down round barrow. If dating confirms that these are indeed contemporary with the barrows, they may prove to be early examples of the additions of the horse to the other animals of importance deliberately deposited in the barrows. Dog burials become more common in the Early Bronze Age but are few compared to the Iron Age (Morris 2008). Some of these, as discussed, were probably buried with their owners.

5.4.2 Wild animals

There are several deposits of aurochs, as discussed, but few of other wild mammals. No deer skulls have been reported except for those parts of the skull attached to antlers. Though individual bones of wild boar have been recognised, few deliberately placed bones or skulls have been noted. The fact that the four bear bones from excavated sites in Lowland Britain are all from Grooved Ware sites (Chapter 3) suggests that the bear may have had special significance in the Late Neolithic.

Pike jaws have now been found in a number of sites along the course of the River Thames, some as a pair. Almost all were found in contexts which suggest that they were deliberately placed, including a pair of jaws in the terminal of a ring ditch at Manor Farm Horton and another in the ditch of Barrow 12 at Barrow Hills Radley. A Middle Neolithic inhumation at Eton/Dorney Lake had 'a pike bone in front of the body between the arms and legs' (Allen et al 2004). The significance of these formidable jaws with their sharp teeth is unexplained. Birds seem rarely or never treated as animals to be killed and memorialised by burial.

Some authors (eg Richards and Thomas 1984; Pollard 2005) have argued that people in Neolithic Britain viewed wild and domestic animals in different categories and that consequently we should expect that their remains would be disposed of in different areas of a settlement, with the domestic animals occupying the innermost area and the wild the outer. Richards and Thomas claimed to have found such a distinction within the site at Durrington Walls, a conclusion which has been repeated many times (eg Pollard 1995). Wilson (1996, 81-84) observed that their conclusion had been reached by largely ignoring the taphonomy of bone and noted that there were inconsistencies in their findings. He observed that the pattern they claimed to have detected could not be confirmed without more precise spatial records and systematic analysis. Albarella and Serjeantson (2002) showed that it is no longer possible to confirm the spatial patterning of bone deposition at Durrington Walls because the bones had not been stored according to their original contexts. None of the studies of bone deposition on Neolithic and Early Bronze Age sites has shown clear and unequivocal distinction in the deposition of remains of wild and domestic animals in different site areas. A recent study which specifically looked for a separation between domestic and wild animals in the Cotswold-Severn chambered tombs failed to find any (Thomas and McFadyen 2011).

The scarcity of placed deposits of wild animals does support the evidence from assemblages generally that wild animals were avoided. According to Cotton et al (2006), the Hillingdon aurochs burial may have represented a final attempt to tame what was becoming an increasingly less wild landscape. It has been suggested that, if wild animals were killed, their remains were not brought into the settlements and places where people met and lived. Some of the aurochs finds tend to confirm that this may have been the case. The various aurochsen from Turnpike Lane, Corhampton and Hillingdon were all buried in pits which were not obviously associated with settlements.

5.5 Sites where access was restricted

If access to a site or part of a site was restricted to certain people within a group we might be able to discern this from the degree to which dogs were also free to roam within a site. This will be evident in the degree of dog gnawing on the food remains. As gnawing (which can be recognised so long as the bone surface is well enough preserved) was normal in assemblages, a reduced incidence of gnawing makes an assemblage stand out.

In Table 5.3 the percentage of gnawed bones from a range of assemblages is shown. It is typically below 10 per cent when calculated as a percentage of the whole assemblage, which reflects the fact that most assemblages have been damaged by many different agents and not only by dogs. Some assemblages had an unusually high percentage of bones which were gnawed: those from the ditches of Barrow 12 and Ring Ditch 611 at Barrow Hills Radley and the Firtree Field pits. In each of these contexts the percentage of identified bones was also high and the assemblage probably comprised bones that were selected to be placed in the deposits.

When the calculation is done for bones identified to individual species and elements, the percentage of gnawed bones can be high (Table 5.4), with limb bones of cattle usually showing more traces of gnawing than those of pigs, as at Runnymede and Barrow Hills Radley. If the percentage of gnawed cattle and pig bones from Durrington Walls is compared with the percentage from Runnymede, it is clear that at Durrington Walls, far fewer cattle bones were gnawed and that no more than a handful of pig bones had been gnawed by dogs (Table 5.4; Figure 5.5). At the West Kennet Palisade Enclosures, too, few bones were gnawed. It is clear that at those sites bones were largely kept from dogs, suggesting that dogs – and perhaps certain people? – were excluded from the feasting activities which took place at these enclosures. A less striking contrast was observed at Hambledon Hill where dogs may have been excluded – at least sometimes – from the Main Enclosure, as there were fewer gnawed bones there than on Stepleton Spur (Legge 2008, fig. 8.1).

Table 5.3 Percentage of gnawed bones from assemblages where the data are available: '% gnawed' is the percentage of all bones

ASSEMBLAGE	% GNAWED
Amesbury chalk plaque pit	8
Ascott-under-Wychwood pre-barrow	< 1
Badshot Lea long barrow	2
Boscombe Down	4
Coneybury henge	1
Firtree Field all pits	16
Firtree Field pit 11A only	33
HH main enclosure	1-2
HH Stepleton enclosure	3-8
HH Stepleton features	2-3
Longstones enclosure	4
Maiden Castle bank barrow	1
Maiden Castle enclosure	3
Milton Lilbourne barrows	2

ASSEMBLAGE	% GNAWED
Pamphill Barford Farm	8
RBH Barrow 12 Inner ditch Phase 1	50
RBH Barrow 12 Outer ditch Phase 2	5
RBH Pit 3831 unidentified fragments	1
RBH Pit 917 unidentified fragments	1
RBH Ring ditch 611	21
Robin Hood's Ball	3
Runnymede A16 B (in situ deposits)	7
Runnymede A16 F (reworked deposits)	1
Seven Barrows Gallop	3
Twyford Down barrow	2
West Kennet enclosure 1	1
West Kennet enclosure 2	1
Wyke Down henge	8

Table 5.4 Percentage of gnawed bones for individual species and elements from assemblages where the data are available

ASSEMBLAGE	SPECIES	ELEMENT	% GNAWED
Durrington Walls	Cattle	Femur	36
Runnymede Interior Zone	Cattle	Femur	100
Durrington Walls	Cattle	Humerus	14
Runnymede Interior Zone	Cattle	Humerus	91
Durrington Walls	Cattle	Radius	6
Runnymede Interior Zone	Cattle	Radius	70
Durrington Walls	Cattle	Tibia	9
Runnymede Interior Zone	Cattle	Tibia	34
RBH Pit 3831	Cattle	All	15
RBH Pit 913	Cattle	All	22
RBH Pit 917	Cattle	All	22
RBH Ring ditch 801	Cattle	All	50
Durrington Walls	Pig	Femur	5
Runnymede Interior Zone	Pig	Femur	57
Durrington Walls	Pig	Humerus	1
Runnymede Interior Zone	Pig	Humerus	58
Durrington Walls	Pig	Radius	3
Runnymede Interior Zone	Pig	Radius	23
Durrington Walls	Pig	Tibia	2
Runnymede Interior Zone	Pig	Tibia	50
RBH Pit 3196	Pig	All	15
RBH Pit 3831	Pig	All	8
RBH Pit 917	Pig	All	10
RBH Ring ditch 801	Pig	All	30

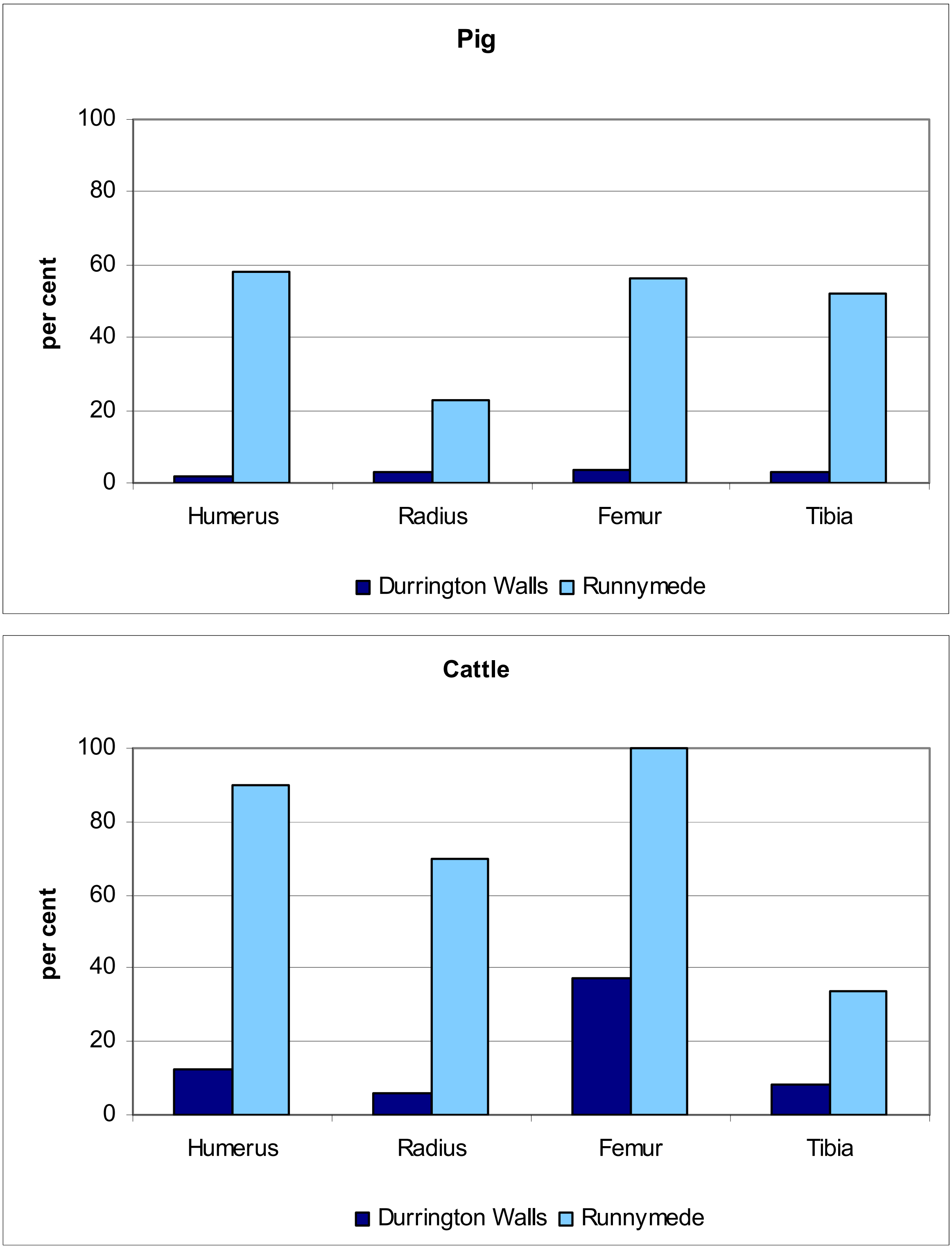

Figure 5.5 Percentage of dog gnawed limb bones of pig (above) and cattle (below) at Runnymede and Durrington Walls. The small number of gnawed bones at Durrington Walls suggests that dogs were excluded from the henge. Based on Albarella and Serjeantson (2002, fig. 5.6)

5.6 Discussion

As we have seen, bones which may have been deliberately deposited can only be understood when the taphonomy, the context and character of the deposit and the associated material are all taken into account. Skeletons in particular need care in their interpretation. This requires close collaboration between the excavator and the zooarchaeologist and has occurred with a number of recent publications such as Windmill Hill and Barrow Hills Radley. With such collaboration, it is possible to interpret the significance of many bone deposits.

Where the intention was to memorialise a feast or other gathering at which animals had been consumed this was marked during some periods by the burial of food remains, which usually included parts of all three main domestic animals together. The practice of burying the remains of feasts was a regular feature of the Early-Middle Neolithic period, especially in causewayed enclosures, and it is found again in the Late Neolithic when remains of feasts were buried within the henges and also in individual pits. It does not seem to have happened so much at other periods.

Where the remains are of a single animal or a few animals which were eaten and then buried with a minimum of further processing, the individual animal was probably intended to be remembered as well as the feast during which it was eaten. The burial of an articulated joint or a single element may also have been intended to memorialise the feast at which the particular animal was eaten, and in this case too there may well have been the intention of leaving a memorial of the individual animal. There are not many examples of this and they are not confined to a certain period.

Offerings of meat must be the origin of some of the joints which were buried complete. Such joints, if buried with no attempt to extract the meat or the bone marrow, represent a sacrifice of food. These are found from time to time in all periods, but joints placed with human burials were presumably intended either as food for the deceased to take into the after-world or as a propitiatory offering to the gods.

The celebration and remembrance of individual animals must often have been marked by the display of skulls and other body parts. Skulls and other elements were apparently sometimes curated above ground and only later buried. We have seen how skulls were displayed on some long barrows, and how skulls and horn cores were deposited in the ditches of causewayed enclosures. The skulls placed in ditches in the Early-Middle Neolithic period may have been intended to remain visible. The tradition of placing skulls persists into the Middle Neolithic and later, and by the Early Bronze Age many skulls were displayed together on some barrows. Displaying the skulls of their cows after death is a tradition found throughout the world in communities of cattle herders. Cattle, especially fertile and long-lived cows, which were cherished and valued in life, will have been memorialised in death.

Some individual elements may be from totem animals. The bear, whose bones have been found only on Grooved Ware sites, is the most likely of those discussed here. People normally avoided killing their totem animal (Frazer 1963, 902; Oberg 1980), but they may have curated bones of an animal which had died. Otherwise, there is no pattern of associations of certain animals with burials in southern Britain as there was on Orkney to suggest that some were totem animals.

Animal sacrifice is a likely origin of some of the skeletons which have been found. These were not killed in anticipation of feasts (in which case the animal would have been eaten) but for some other occasion such as a foundation sacrifice.

The burials which are most straightforward to interpret are those of animals which were killed to accompany their owner in the afterlife. There were burials of dogs and other animals in the Early Bronze Age barrows. The pairs of cattle and sheep buried in some barrows were probably intended to represent ownership of the flock. The cattle skulls in Beaker burials mayl have been intended to represent the animal itself.

'Heads and hooves' found with human burials have a rather different origin. These may have been either part of a cloak (worn by the deceased or by the shaman who officiated at the burial) or may have been intended as a covering for the grave or coffin. It is likely that the cow or bull which was killed for its hide was one which had special significance for the deceased either as an individual animal or as representing his herd. Heads and hooves burials or hide burials not associated with human burials are found from all period in southern Britain as well as in continental Europe.

Antlers (and perhaps also scapulas) were deposited after use. In this case deposition of the tool acknowledges the completed work rather than the individual animal.

The patterns of deposition which have been identified here have shown that the deposition of animal remains took a multitude of forms. There were clearly many reasons why people deliberately placed animals or parts of animal in the ground, some of which have been touched on here. There may well have been others not considered; it would be presumptuous to assume that we can understand fully the motivations of the people who collected and deposited the bones in the Neolithic and Early Bronze Age.

6 ANIMALS AND THE ENVIRONMENT

6.1 Introduction

Both large and small vertebrates from archaeological sites contribute to our understanding of the environment in the Neolithic and Early Bronze Age. The large mammals provide evidence on the gross scale and the small vertebrates give clues to the immediate surroundings of a site.

6.2 Micro-vertebrates

The small vertebrates such as rodents, amphibians and reptiles which lived and died in the vicinity of a site can provide information about its immediate environment. Table 6.1 lists the presence of those micro-vertebrates which were identified from some sites of the Neolithic and Early Bronze Age. The table includes those assemblages where a detailed study was made of the micro-vertebrates. Some of the micro-vertebrates are present on several sites, and for some we have a few records only.

For each assemblage it was considered essential to establish the origin of the remains before their environmental implications could be evaluated. Some assemblages had a variety of origins, as was noted for Hazleton North chambered tomb. If the presence of a species is to be invoked as evidence for the environment of a site it is essential first to be certain that it was contemporary with the deposit in which it was found and second to understand how it got there, since many micro-vertebrates may have been later inclusions.

Most micro-vertebrates are non-anthropogenic in origin, though there is some doubt regarding small carnivores such as stoats and weasels, as these might have been killed by people to provide furs and trimmings for garments. Some small birds, as previously discussed, might have been killed for food. Other micro-vertebrates either died natural deaths or were brought to the site by predators such as foxes, weasels or raptorial birds which regurgitated bones in pellets. If small animals are the result of natural deaths they will have lived within a few hundred metres from the site, but if they are derived from bird pellets the catchment area may be up to several kilometres around the site (Jewell 1958; Rouse 1993).

6.2.1 Intrusive burrowing species

All burrowing species are liable to be intrusive: not only rabbits, but also moles, most rodents and also amphibians and reptiles. Even those species which do not burrow seek out crevices and holes in which to hide or hibernate, such as are provided by a loosely refilled ditch, pit or burial cut.

The depth of burial and the context are keys to whether or not the micro-vertebrates were contemporary with the deposits in which they were found. The bats from Hazleton North are not burrowing animals but were regarded as intrusive, as they were thought to have died within the chamber of the tomb while hibernating there. Rouse (1993) considered the moles from Easton Down to be intrusive as all were within the limits to which moles will burrow. Of the small vertebrates from Hazleton North, all those from less than one metre below the surface of the cairn were considered intrusive; all rabbit bones for instance, were found within this distance from the ground surface. However, those from basal cairn contexts were regarded as securely stratified, that is, contemporary with the initial construction and use of the cairn.

Table 6.1 Presence of micro-vertebrates on Neolithic and Early Bronze Age sites: see text for discussion of records which may post-date Neolithic and Early Bronze Age occupation. x present

	Hazleton North	Maiden Castle	Windmill Hill	Easton Down	Stonehenge	Tower Hill Ashbury	Twyford Down
Frog, *Rana* sp.		×	×	×		×	×
Toad, *Bufo* sp.		×	×	×			×
Newt indet. Amphibia/Salamandridae		×					
Grass snake, *Natrix natrix*	×	×					
Adder cf. *Vipera berus*		×					
Slow worm, *Anguis fragilis*		×					×
Field vole, *Microtus agrestis*	×	×	×	×	×		×
Woodmouse, *Apodemus sylvaticus*	×	×		×	×	×	×
Yellow-necked field mouse, *Apodemus flavicollis*		×	×				
Harvest mouse, *Micromys minutus*	×						
House mouse, *Mus musculus*	×						
Common dormouse, *Muscardinus avellanarius*	×						
Bank vole, *Clethrionomys glareolus*	×	×	×	×	×	×	×
Water vole, *Arvicola terrestris*							×
Mole, *Talpa europaea*			×	×			×
Stoat, *Mustela erminea*	×						
Weasel, *Mustela nivalis*	×						
Common shrew, *Sorex araneus*	×	×				×	×
Pygmy shrew, *Sorex minutus*	×						
Water shrew, *Neomys fodiens*	×	×					
Hedgehog, *Erinaceus europaeus*	×						
Whiskered bat, *Myotis mystacinus*	×						
Natterer's bat, *Myotis nattereri*	×						
Common pipistrelle, *Pipistrellus pipistrellus*	×						

Toads and carnivorous mammals are attracted to burials. A grave below the bank at Windmill Hill contained remains of thousands of bones of toads, frogs and rodents. They were clearly contemporary with the grave as it was sealed by the Neolithic bank. An Early Bronze Age grave at Twyford Down also contained a large number of bones of rodents and amphibians, again probably attracted to the burial. Frogs and toads hibernate, so when they are found in local concentrations they are likely to be the result of deaths during hibernation. Once a burial is skeletonised, a skull or a void within the grave provides shelter for toads and other burrowing animals. A complete toad skeleton which was found within the skull of a cow from Down Farm was thought to have used the skull for hibernation.

6.2.2 Raptor prey

The micro-vertebrates from Snail Down are thought to be raptor prey as they were found in masses, suggesting that they were from bird pellets (Jewell 1958). As they were located on the old land surface they were thought likely to be contemporary with the construction of the barrow. Some of the fragmentary rodent teeth and bones recovered from the pre-barrow buried soil and pre-barrow turf line at Easton Down had the etched surface which is characteristic of teeth and bones from pellets of birds of prey. Some fragmentary rodent bones from Maiden Castle had the long oblique breaks which are made by raptors. At these last two sites the remains were probably prey of kestrels (Rouse 1993; Evans and Rouse 1992). Bones from the pellets of hawks tend to be damaged, while those from owls are often complete and very well-preserved (Serjeantson 2009, 115-121). Rodents from the chamber area at Hazleton North were also thought likely to be raptor prey and so not necessarily contemporary with the use of the tomb. A jaw of a house mouse was found within the tomb which is almost certainly later than the period during which the chamber was in use, as the house mouse is not thought to have been present in Britain before the Iron Age (O'Connor 2010). As mentioned in Chapter 3, it is likely that some of the remains of small birds from Neolithic and Early Bronze Age sites were raptor prey, whether or not they were contemporary with the site. The birds from Woodhenge (Jackson 1929, 63) were 'of small size, about equal to those of blackbird or thrush' so are likely to be passerines which had been caught by raptors, as were the remains of a robin from Beaker deposits at Brean Down.

6.2.3 Environmental implications of the micro-vertebrates

The bank vole, the wood mouse and the field mouse have been found most often on Neolithic and Early Bronze Age sites, together with frogs and toads. Reptiles are rare, but the grass snake and slow worm remains from Hazleton and Twyford Down, which were well sealed, may well be contemporary with the deposits. The four species found in stratified contexts at Hazleton North (field vole, bank vole, woodmouse and common shrew) reflect a mixed environment but all are also found in association with cultivation. This may confirm the indications from other sources that the area was cultivated before the pre-cairn deposits accumulated. The small vertebrates from the pre-barrow buried soil at Easton Down are those which favour a variably wooded and open environment while those which were raptor prey reflect a heterogeneous mix of woodland and open areas. Those at Twyford Down also favour both woodland and more open areas, but, taken together with the slow worm and also the land snails, indicate a mostly wooded environment in the environment of the barrow.

6.3 Large wild mammals

Changes in the relative numbers of both domestic and wild mammals may reflect changes in the wider environment. The size of the larger mammals also varies according to environment and vegetation. Though some authors have regarded the changing numbers of the main domestic animals as ecological indicators, the usual view is to be more cautious. R. W. Smith (1984), who surveyed all sources of environmental data for an environmental history of the Avebury region, expressed this when he wrote that 'faunal remains do not constitute an independent source of environmental data'. This is because human selection, as well as the abundance or otherwise of the wild animals in the surrounding area, dictated which large mammals were found on archaeological sites.

Of the larger mammals, roe deer live in woodland, though they also venture to the woodland edge. Both domestic and wild pigs live mainly in woodland, but also do well in marshy country. The presence of pigs in large numbers implies the presence of either or both types of environment. Their feeding in woods allows woods to regenerate, as pigs disturb the ground and allow acorns and other tree seedlings to take root. Red deer, aurochs and domestic cattle are browsing animals which favour a mix of woodland and clearings. Sheep can live partly in woodland, but their teeth are better adapted to grazing in open grassland, so their presence implies that there were areas of open grassland.

6.3.1 Numbers

The percentage of sites on which roe deer bones were found declined from the Early Neolithic to the Latest Neolithic. The percentage of red deer also declined slightly (Figure 3.2). This could be taken as evidence for a decrease in woodland over the period but, as Legge (2009, 551) observed, the 'low proportion [of red deer at Hambledon Hill] … is unlikely to be a reflection of the prevailing landscape'. Red deer do not reflect environmental change because their numbers were tied to the requirement for antler at this time. R. W. Smith (1984) showed that the relatively high proportion of pigs at Windmill Hill correlated with the environmental data which suggested that woodland predominated near the site, whereas the higher numbers of sheep at South Street correlated with evidence for cereal cultivation and woodland clearance around that site. This correlation at the local scale is superficially plausible, but fails to take into account the very different types of site and the fact that herds can be moved over much greater distances than the 10km blocks used for his study.

From the 2nd millennium sheep were present in increasing numbers. Clearance of woodland would have come about from that time onwards as an unintended consequence of keeping large numbers of sheep, as grazing by sheep keeps the grass cover low and does not allow scrub or woodland to regenerate. The land remains open pasture. The loss of woodland from the 2nd millennium BC onwards may have been caused by the increase in sheep as well as by an increase in the area of land under cultivation.

6.3.2 Size

The size of herbivores such as red and roe deer reflects the environment and available fodder. Red deer populations in woodland have a greater body size than those living in more open territory (Clutton-Brock 1984) because the quality of the browse is richer.

The size of the red deer limb bones from Windmill Hill and Hambledon Hill (Figure 6.1) show that red deer in the Neolithic were larger than those today in Britain. According to Legge (2009) 'the large red deer from Hambledon are indicative of good environmental conditions for this species, which prefers a habitat of open woodland for much of the year'. Grigson (1989) observed that the red deer from Neolithic sites in southern Britain were similar in size to those from Mesolithic Star Carr, so had not undergone a decrease in size which might suggest a significant decrease in woodland between the 8th and the 4th millennium.

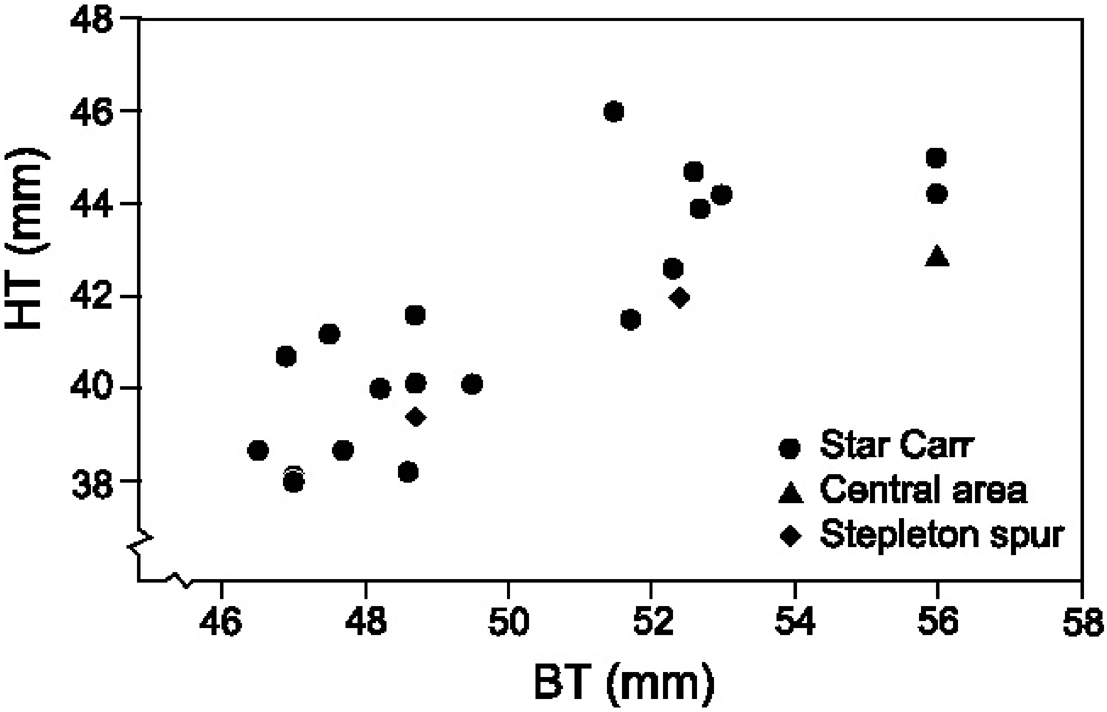

Figure 6.1 Size of Neolithic red deer: humerus measurements from Hambledon Hill (Stepleton Spur and Central area) compared with Star Carr. HT height of trochlea, BT breadth of trochlea. Data from Legge (2008, fig. 8.23)

The size of the antlers of mature stags also reflects body size so may also indirectly reflect the vegetation of the region. The antlers from Durrington Walls were compared with those from Grimes Graves flint mine in Norfolk (Clutton-Brock 1984) and were found on average to be smaller, both from the circumference of the burr and also by weight (Table 6.2). Deliberate selection of larger antlers at the Breckland site was rejected, so Clutton-Brock concluded that Norfolk was more wooded than Wiltshire in the Late Neolithic. This is possible, in view of the abundant evidence for human settlement in the Stonehenge area at the time. The red deer from the 2nd millennium deposits in the Wilsford Shaft (Grigson 1989) were smaller again than those of the 4th and 3rd millennium. The decline in size also fits with what we know of the increase in cultivated area and loss of woodland in the 2nd millennium.

Table 6.2 Red deer size based on antler measurements: Durrington Walls compared with Grimes Graves. Data from Clutton-Brock (1984, 25)

	N	Range	Mean	Standard deviation
Circumference of burr (mm)				
Durrington Walls	311	260-103	198.5	25.61
Grimes Graves	274	280-133	212.97	24.96
Weight (gm)				
Durrington Walls	331	993-46	401.39	179.73
Grimes Graves	281	1195-150	582.13	196.14

Some evidence suggests that roe deer too were larger in the 4th millennium BC than today. The roe deer from Hambledon Hill were within the size range of those from Star Carr. A skeleton from Whitehawk causewayed enclosure was larger than those of the modern animals with which it was compared, as were the roe deer from Maiden Castle. An astragalus from Cherhill was larger even than those of Swiss Neolithic roe deer (Grigson 1983, fig. 15). However, nearly half of the sixteen shed roe deer antlers from the first Windmill Hill excavations were smaller than those of modern animals (Grigson 1965, 148).

Cattle diminished significantly in size in the 2nd millennium BC, as discussed in Chapter 3. Cattle are browsers as well as grazers, so their smaller size may have come about as a result of a decline in the areas of woodland which would have provided browse and fodder in winter (Legge 1981a). However, as discussed, there were economic reasons for keeping smaller cattle, so their smaller size may not reflect the environment.

6.4 Minor mammals, fish and birds

We can gain some insight into river regimes from the presence of beavers and otters, always bearing in mind that relative numbers of these animals reflect hunting choices as well as their abundance in southern Britain. Otters, which favour fast-flowing rivers, have been found only at Runnymede, which was beside a wide river, and at Hambledon Hill. There are more records of beaver. This aquatic mammal inhabits braided and slow-flowing rivers, an environment which the beaver creates with its dams. The presence of beaver suggests that the rivers were generally more slow-flowing than today, which might be expected of rivers in southern Britain at the time. The fish include species such as trout and salmon which are found in clean fast-flowing rivers, as well as pike, which is content in lakes and more sluggish waters. Of the birds, the white-tailed sea eagle was a resident which inhabited a mix of woodland, clearings and open water. The crane, a migrant to Britain, would have required areas of open wetland in which to breed in summer. The bone of a cormorant found at Durrington Walls suggests that this bird was found inland as well as on the coast in the 3rd millennium BC. None of the bird species identified at Neolithic and Early Bronze Age sites in southern Britain is outside what would have been its past range and environment.

6.5 Extinctions

Of the species recorded on Neolithic and Early Bronze Age sites, the aurochs is extinct and the brown bear, the beaver, the crane and the white-tailed sea eagle became extinct in southern Britain. The decline in numbers of aurochs and brown bear by the 2nd millennium BC must indicate a decline in areas of undisturbed wildwood in which they could avoid human contact. The aurochs was apparently extinct in Britain by the end of the 2nd millennium BC, a process which is thought to have been quite rapid. As settlement expanded in the Bronze Age on to the poorer soils and the hills which had once supported wildwood, reduction in habitat must have helped its decline but the final extinction of the aurochs may have been caused by determined hunting or disease (Legge 2010). The beaver survived in Britain into the early middle ages and the brown bear also survived in small numbers into the middle ages in the highland zone (Hammon 2010). The crane and the white-tailed sea eagle were found in southern Britain until recent centuries and both still visit southern England from time to time (Serjeantson 2010).

6.6 Discussion

There must have been some decrease in the wildwood during the 4th millennium BC as a consequence of a greatly expanded increase in the human population over the previous millennium, some clearance for the cultivation of cereals, and above all the keeping of sheep. Micro-vertebrates and large mammals affected this process and were affected by it. All wild and domestic animals found in the Early and Middle Neolithic were adapted to an environment of wildwood with clearings, with the exception of sheep, so, as sheep were present in southern Britain from the Early Neolithic onwards, it suggests that there were already some clearings. Other sources of environmental evidence suggest that southern Britain was not wholly wooded even at the beginning of the Neolithic but had clearings in the woodland canopy (Allen 2000, Allen 2008).

The large numbers of domestic pigs in the 3rd millennium have been taken in the past to reflect an increase in woodland in the Late Neolithic (eg Tinsley and Grigson 1981). Woodland regeneration could well have occurred if there had been a population crash which took areas out of cultivation. This was proposed for Switzerland at the end of the 4th millennium (Schibler 2006) but in southern Britain surface scatters of flint and pottery suggest that there were in fact more and larger occupation sites in the Late Neolithic (Bradley et al 2010). As discussed, pig keeping – and eating – on the scale evidenced on Grooved Ware sites was tied into the social structures of the Late Neolithic, but it could only have continued while woodland and marshy river valleys were available in which pigs could forage for food. The keeping of pigs at the expense of cattle and sheep is not a practice which can be sustained in the long-term in the environment of southern Britain, and it could only have been sustained in a landscape in which large areas of woodland and marsh remained. It is not surprising that enhanced numbers of pigs was a relatively short-lived phenomenon. At Twyford Down the snail shells indicate that local woodland clearance on the downs took place for the first time in the Early Bronze Age (Allen 2000).

The micro-vertebrates which could be assigned securely to a Neolithic and Early Bronze Age date are all species which suggest an environment of mixed woodland and more open areas, as would be expected in southern Britain. Relative numbers and size change in the large mammals provide some suggestions of wider environmental conditions, but this evidence will always be of lesser value than that of other biological materials in the interpretation of the natural environment.

7 DISCUSSION AND CONCLUSIONS

7.1 Introduction

This review has brought together evidence from a wide range of sites, including both major assemblages and some smaller individual assemblages which are not on their own very informative. After the manuscript was complete, some additional assemblages came to light which had been omitted from the survey database. Bibliographic details for these are in Appendix 7.

Many facets of life in the Neolithic and Early Bronze Age in which animals were involved have been discussed. These include ways in which animals were kept and eventually eaten and the feasts they provided, the role of wild animals, and some of the ways in which people remembered their gatherings and their animals by the deposition of remains. In this chapter I shall discuss how some practices changed in the two and a half millennia spanned by the Neolithic and Early Bronze Age. When the evidence is considered at the scale of this review it is possible to identify broad changes, though it has not always been possible to look at some of the finer variations in time and place. The Early and Middle Neolithic are discussed in greatest detail, and the changes which took place later are given briefer attention.

7.2 Early and Early-Middle Neolithic

The idea that the Neolithic way of life was imported to southern Britain as a set of ideas taken up by the local population rather than by the movement of people was recently reiterated by Pollard (2008): 'indigenous uptake perhaps best explains the distinctive features of the British and Irish Neolithic'. This view is not supported by the animal remains from southern Britain. They point clearly to the diffusion of a new population rather than the diffusion of a set of traits. As we have seen, there is only one securely dated site where elements of a hunting way of life survived alongside the herding of domestic animals. The Coneybury Anomaly pit remains unique in southern Britain in having wild animals in large numbers, but they are associated with other cultural traits such as pottery and pit digging which are Neolithic in character.

The animal remains otherwise provide no evidence in southern Britain for the adoption of herding and agriculture alongside hunting by the local population. The characteristics of the assemblages on sites of the early 4th millennium in Britain are quite different from those at sites in northern Europe of the 5th and 4th millennium where a good case has been made for the local adoption of agriculture and where hunting remained an important source of subsistence (Zvelbil and Rowley-Conwy 1986; Zeiler 1997).

There was no local domestication of cattle or pigs as was once thought possible. Both have now been shown to have been brought to Britain from continental Europe. Local domestication was never in question with sheep and goats. The presence of sheep more than any other single trait supports the notion that the origin of farming lay with the arrival of a group of people who were accustomed to keeping all three main species together. It would be natural for a colonising population which was accustomed to keeping sheep to have introduced them as well as cattle and pigs. It would not however have been the natural act of people who were unfamiliar with the animal, especially as the landscape of southern Britain was unsuited to sheep in the Early Neolithic period as there were few areas of open grassland.

The origins of the domestic stock (and the people who brought them to Britain) has been investigated by Tresset. She compared the Early-Middle Neolithic fauna from southern Britain with that from neighbouring areas of Europe (Tresset 2003). The mix of the domestic animals in Brittany in the 4th millennium BC included more sheep and fewer pigs, while those in northern European areas (the Low Countries and around the Baltic) included more pigs. In Tresset's small sample of assemblages from Britain she found more pigs in eastern England and more sheep in the west. Her conclusions were heavily influenced by the assemblage from Runnymede. This theory, though plausible, is in fact not confirmed by this wider review. A comparison of animal numbers from all the assemblages from the 'eastern' counties (Kent, Sussex, Surrey, Berkshire) with those from the 'western' counties shows that there are relatively more pigs in 'western' counties and more sheep in 'eastern' counties, though the contrast is not very marked (Figure 7.1). The comparison was based on numbers from the smaller assemblages; the largest assemblages, Hambledon Hill, Runnymede and Windmill Hill were omitted as they would have biased the results. The question remains open why there is such a strong contrast between Runnymede and the other Early-Middle Neolithic assemblages. Other sites on the Thames floodplain and in Essex and Kent may one day give some answers.

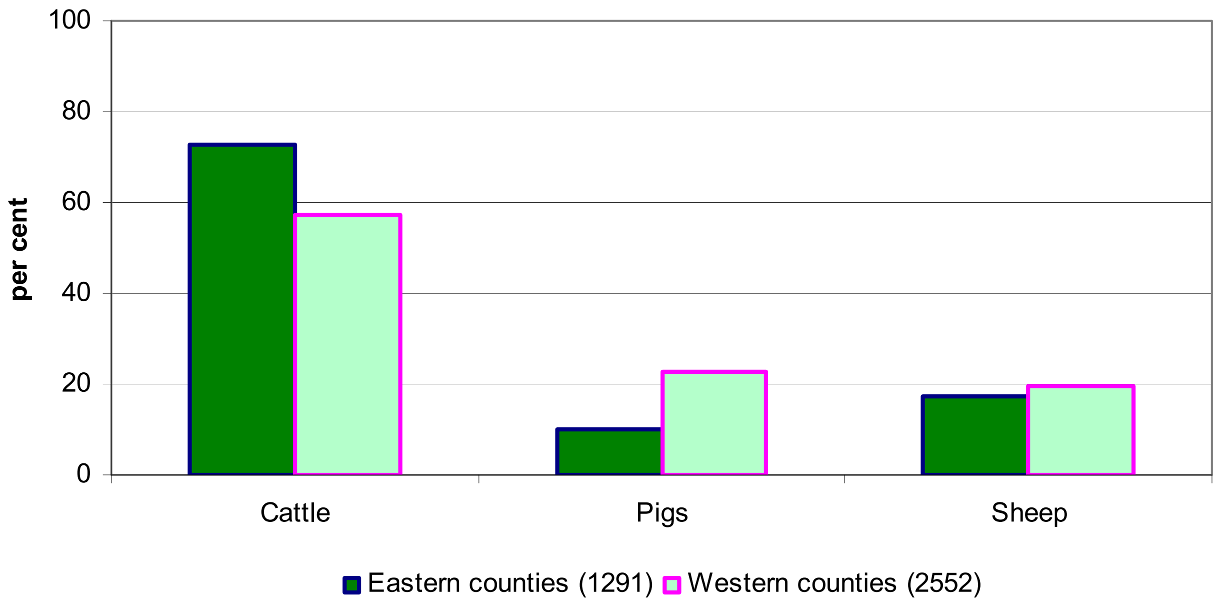

Figure 7.1 Numbers of the main domestic animals in assemblages from Eastern and Western counties in the Early-Middle Neolithic compared: Hambledon Hill, Runnymede and Windmill Hill omitted. Sample size in brackets

The fact that cattle (and possibly sheep) were milked and milk products were consumed from the Early Neolithic onwards also has implications for arrival of farming in Britain. It is widely recognised that pottery making was a radically new skill, but there has been little or no discussion of how the keeping of domestic animals also involved a range of new skills and lifestyles. As expressed elsewhere, 'keeping cattle, small stock, pigs or any combination of these involves different constraints, organisations and the use of different knowledge and techniques' (Tresset 2003, 21). The whole way of life would have involved physiological and psychological adaptations very different from those of hunters.

Table 7.1 sets out the adaptations which would have been required and the new skills which would have had to be learned by a group setting out to embrace a Neolithic way of life. The list includes only those adaptations in which animals were involved; it omits such skills as cultivating cereals and making pottery and more abstract changes such as management of time (Barnard 2007). The range of skills are so all-encompassing that it is very hard to believe that Mesolithic groups in southern Britain would have been able to acquire all of the skills and adaptations together, which is what would have been necessary. We do not know when people in Britain acquired the ability to digest raw milk. Lactose tolerance is found today in populations with a long history of cattle keeping though it is absent in others. Lactose tolerance had developed as early as the 4th millennium BC in European populations among people from farming communities. The gene for lactose tolerance was already present in Middle Neolithic skeletons from Sweden

(Malmström et al 2009). Those who lacked this tolerance could hardly have lived to a large degree on milk and its products.

Table 7.1 Some of the physiological and psychological adaptations and new skills which would have been involved in changing from a lifestyle of hunting wild animals to one of herding and milking domestic animals

TYPES OF ADAPTATION	NEW ADAPTATIONS AND SKILLS
Physiological adaptations	Tolerating lactose consumption
	Surviving the shorter intervals between births (women only)
	Tolerating the parasites and diseases associated with animal keeping
Psychological adaptations	New labour roles for men and women
	New seasonal round based on milking and harvesting cereals rather than hunting
	Looking after animals rather than hunting them
	Conserving red deer for their antler rather than killing them
	Living close to herds and flocks of domestic animals
New skills	Daily care of herds and flocks
	Finding grazing for cattle, pigs and sheep at all times of year, especially sheep
	Finding water daily for the herds and flocks
	Keeping predators (wolves, bears, foxes, white-tailed sea eagles, etc) away from domestic herds, especially from young animals
	Assisting cows with difficult calving, farrowing and lambing
	Milking cattle and sheep
	Converting raw milk to yogurt, soft cheese, etc., using rennet
	Cooking milk products which required heating in pots
	Storing milk products

The keeping of herds involves looking after the animals throughout the day and guarding them or protecting them with hedges at night. Each cow in a milking herd would have had been known individually and probably given a name. During the summer when the cattle and sheep were giving milk the milking of the cattle and caring for the herds and flocks would have taken up most of the day for a large section of the community. Oxen or cows used for ploughing would also have to be carefully looked after during the ploughing season. At this time they would have to be watched for signs of lameness or disease and given extra fodder. The skills of making products with fermented milk would have had to be learned. The specialised skills needed for making cheese include knowing how to obtain the rennet from stomachs of newborn calves as well as how to make the cheese itself. The sheer number of new skills makes it much more likely that agriculture was initially brought by groups of people, whether large or small, from continental Europe who were familiar with these techniques.

This review has confirmed that there are remarkably few remains of wild animals in the Early and Middle Neolithic. The paucity of wild animals has been explained in more than one way. It has been suggested that wild animals were in fact eaten at settlements but that their bones were disposed of away from the site, an argument which cannot be proved or disproved from excavated remains. None of the sites discussed has good evidence for the differential deposition of the bones of wild and domestic animals. Another possibility is that wild animals were killed away from settlements and eaten where they were killed. The fact that roe deer at the Coneybury Anomaly site were eaten but that parts of the cattle were taken away might support this, though if this was at all common, we might expect by now to have found further examples of sites with the same pattern of consumption. Since 1990 when the Coneybury Anomaly pit was published, a substantial number of isolated Neolithic pits have been encountered during rescue excavations. The assemblages from these have included the three main domestic animals. It is likely that the routines of everyday labour were so closely focussed on the three main domestic animals that the meat from wild animals was unnecessary even as a fall-back food resource. It was eaten only on the rare occasions when a wild animal was killed for some reason other than a need for food.

While it is surely the case that wild animals were viewed in a different light from domestic herds, they were not avoided as food. Fish however, which would also have been potential fall-back resources, were ignored, to the extent that they were probably regarded as taboo (Serjeantson et al 1994). As they came from rivers, they may have been associated with the ancestors and with death (Pollard 2004). It may also have been taboo to kill birds for food.

Each of these aspects of animal keeping currently point to farming being brought to southern Britain by individuals to whom the way of life and the skills of animal keeping were familiar. Tresset and Vigne (2007) see cultural continuity between the animal regimes on the Atlantic façade and southern Britain. The original incomers may have been few in number but the animal remains show that they brought their skills with them. They no doubt intermarried with and otherwise assimilated members of the local population which they encountered, as studies of ancient DNA (aDNA) studies are showing. If some of those elusive sites in southern Britain from the centuries between about 4100 and 3700 BC are encountered and excavated in the future they may yet show evidence for some economic continuity, but this is not evident at present.

Farmers in the Neolithic have sometimes been referred to as pastoralists. Whether or not this is a valid description depends on how pastoralism is defined. 'Pastoralism can be used to mean the domestic-animal component of mixed farming, or it can mean the keeping of animals in large flocks or herds that move over a large area of the landscape, usually with some degree of transhumance' (Grigson 1986). Recent pastoralists in the latter sense usually travel long distances between summer and winter grazing and depend for part of their food on exchanging cereals and other products with sedentary cultivators. This long-distance movement is an adaptation which allows grass to be used which is only available in one season. It is unlikely that pastoralism of this type took place in southern Britain because seasonal differences are small and varied types of grazing and browse would have been available within short distances. In addition, pigs are not normally part of classical pastoralism because, unlike cattle and sheep, they do not adapt well to being driven long distances.

People will nevertheless have moved their herds and flocks seasonally within their territory and over short distances. The absence of evidence for substantial houses suggests that people themselves also moved, either seasonally or every few years. The season of occupation of sites has not often been discussed in excavation reports despite its relevance for the earliest Neolithic, but remains of calves, piglets and lambs show that some sites must have been occupied or visited in spring and summer. It is more difficult to demonstrate the absence of occupation at any season though the fact that few very young pigs were present at Runnymede might suggest that the site was not occupied in spring and summer. At Hambledon Hill the age at death of the sheep showed that the site was visited at all times of the year.

However, people in the Neolithic were pastoralists in the sense that they lived to a large degree from their domestic herds. Indeed, if the results of future isotopic studies confirm those of Hazleton North and Hambledon Hill it appears that in southern Britain at least people relied more heavily on animal foods, both milk and meat, than did typical mixed farmers in temperate conditions.

As we have seen, feasting in the Early-Middle Neolithic took the form of communal feasts at which all three species were eaten. If milk and milk products made a significant contribution to the food supply people needed smaller quantities of plant food and less meat. This would have made it unnecessary for people to eat meat every day, especially in summer. It makes it more likely that the slaughtering of animals was restricted to occasional events and that it was carried out on communal occasions.

The deliberate placing or deposition of bones took two main forms in the Early-Middle Neolithic. In one, food remains were placed in segments or scoops within ditches in causewayed enclosures, perhaps in bags or other containers. The mix of all three species and all parts of the carcass typical of these small groups of bones suggest consumption of all three animals. Whittle and Pollard (1999) proposed that this is typical for a communal activity rather than one organised by rank. In the other, cows and bulls were given special treatment after their death. The skull was taken to be displayed or placed in a significant place such as a chamber tomb or an enclosure ditch segment. Other parts of the body were sometimes treated in the same way and other domestic animals were also memorialised by burial of the body or part of it.

7.3 Middle and Late Neolithic

The few assemblages from the Middle Neolithic do not suggest that there were changes from the earlier period in the ways in which the three main domestic animals were husbanded and treated after death. The major contrast with the earlier period is that people ceased to bury large quantities of food remains and other midden debris in communal meeting places though animals and parts of animals continued to be given special burial. As in the Early and Middle Neolithic, some of the elements deposited were curated before being deposited as at Stonehenge.

The greatest change which took place in the Late Neolithic was the emphasis on pigs and pig roasting. The feasts which took place at communal henges were mirrored in a smaller way at the individual small pit clusters which, presumably, represented short term settlements or small scale feasting sites. The roasting of pigs (and occasionally joints of cattle) on the bone is closely associated with Grooved Ware sites. Both the large numbers of pigs and also the way in which they were cooked should be seen as distinctive cultural markers for Grooved Ware sites. The large numbers of pigs suggest that there was an absolute increase in the eating of meat. Large herds of pigs would have occupied woodland at the expense of cattle, which might well have reduced the amount of milk available, though lipid analysis showed that milk products continued to be consumed in the 3rd millennium.

The scale of feasting at the henges and enclosures suggests that a ranked society had developed in which secular or religious elites could command meat in large quantities. This interpretation is strengthened by the fact that selected parts of pigs were eaten. Burial of the remains of feasts without allowing dogs access to the bones suggests that sites were restricted to certain activities.

Wild animals more clearly played a part in this period than earlier and later in the Neolithic period: bear bones, large birds and also, marine shells on inland sites are distinctive of Grooved Ware sites. Bradley suggested that the marine shells may have functioned as prestige items as well as being used as pottery filler. As Bradley et al (2010) suggest, the use of the bones – and possibly the feathers – of the white-tailed sea eagle may suggest a link with northern Britain at this time. Though, as discussed in chapter 3, white-tailed sea eagles were probably widespread in southern Britain before the 3rd millennium, their bones have not been found on earlier Nolithic sites (Serjeantson 2010).

There is some evidence in the Late Neolithic for seasonal occupation. The pit at Tower Hill Ashbury contained skeletons of a foetal or neonatal lamb and a young pig, both of which would have been born in the spring. A roe deer antler in the pit was shed, which meant that it was collected in the autumn, but, as was pointed out, antler might have been stored. As the finds were from a single pit which was not associated with other occupation material, Tower Hill may have been occupied only for a time in spring. There is also evidence for long distance movement of animals. Strontium isotope analysis of bones from Durrington Walls showed that some cattle had been brought to the site from a distance (Viner et al 2010). This contrasts with the findings from the Early Bronze Age barrow at Irthlingborough in Northamptonshire where all but one of many cattle whose skulls were deposited on the barrow had been raised locally (Towers et al 2010). Deposition in the Late Neolithic mainly took the form of the burial of food remains though whole animals and parts of animals and occasionally skulls also received special burial.

7.4 Latest Neolithic / Early Bronze Age

Cattle had paramount importance in Beaker society but the inclusion of sheep and a reduction in pig numbers shows that animal husbandry had resumed a mode more typical for Britain. Feasting deposits are not on the scale of earlier periods, but feasting focussed again predominantly on cattle and all three animals together. The placed deposits at this time are mainly from barrows and most were of cattle or aurochs.

According to Needham and Weekes (2008), 'there is evidence of radical change, beginning in the Beaker period, in terms of the relationship of south-east England to Europe'. Some aspects of the animal remains are relevant to the debate about the nature of the contact and the degree to which Beakers and associated material were brought by new people or were novel cultural traits adopted from continental Europe. As well as new pottery types and metallurgy, the initial set of Beaker traits included single burial under round barrows and the use of archery. The burials were often associated with cattle skulls (Cleal 2005). 'Heads and hooves' are also characteristic of the early Beaker period, though they are not restricted to sites with Beakers. The burial of cattle skulls implies ownership of the animals. It may also represent wealth, but by this time precious metals as well as cattle represented wealth and power. It is possible that horses were introduced at this time, but, as discussed earlier, this has yet to be unequivocally demonstrated. It is also possible that a new type of woolly sheep was introduced but this too remains to be demonstrated.

At this time we glimpse how farming communities viewed the large wild animals which still inhabited their world. An aurochs in a pit at in West London was buried in what seem to have been isolated location, and an undated Neolithic aurochs skulls buried in pit at Newbury was also not apparently associated with a settlement.

7.5 Early Bronze Age

A cultural and economic marker for the Early Bronze Age is the increase in numbers of sheep. I have argued elsewhere that sheep with predominantly woolly rather than hairy coats were introduced in the Late Bronze Age (Serjeantson 2007), but the increase in sheep numbers in the Early Bronze Age and the presence of some spindle whorls suggests that this introduction took place earlier. By this time a smaller type of cattle can be seen, which may have been selected or introduced for an increased milk yield. If these really are quite new types of animal, research is needed on whether they were introduced to southern Britain or whether they developed locally. The increased numbers of sheep had important implications for the transition of the landscape in southern Britain from one which was largely wooded to one with grassland which was maintained by the relentless grazing of sheep.

At some point in the Bronze Age the animal remains suggest a more intensive management of cattle and sheep for milk than we saw in the Neolithic period. The earliest evidence for this in southern Britain at present is the Late Bronze Age (Serjeantson 2007) but it may have happened earlier elsewhere in Britain. The smaller size is typical for dairy cattle as small animals produce more milk for the amount of grazing than large animals. This is insignificant when there are no constraints on grazing, but by the 2nd millennium the amount of grazing was limited by the development of permanent fields, so more small cattle would have been more valuable than fewer larger animals. In the Early Bronze Age the earliest examples of perforated pottery vessels are found in southern Britain. Two were found in Sussex, at Bishopstone and Kingley Vale (Curwen 1954, 184). This type of vessel is thought to have been used for cheese-making (Sherratt 1981) and may have been used to make a new type of cheese – perhaps one which uses salt, which was produced for the first time in the 2nd millennium.

Rank and hierarchy at this time were marked by burial in barrows as well as by the command of metals. Animals were sometimes buried in barrows with human interments and cremations which imply ownership of the animal by the individual buried. Burials of cattle and sheep may represent the wealth in herds and flocks of the individual buried. Ownership of a horse must also have been a mark of rank, as it allowed the rider to travel long distances. Exploration for raw materials and also trading were made easier.

7.6 Discussion

Southern Britain has a large number of Neolithic and Early Bronze Age sites on which animal bones have survived, but there are gaps in our knowledge even in this region. In particular in this review there is an absence of sites with animal bones from the centuries between 4100 BC and c. 3700 BC. As these must have been the main centuries of contact with continental Europe, the sites from that period may have been close to the coast, and so no longer survive in the south of England.

There is also a bias in the geographical spread, with most assemblages coming from sites in Dorset, Wiltshire and Oxfordshire. While many of the conclusions here about Neolithic animal husbandry, hunting, and ritual behaviour may be relevant for other areas of the British Isles, it is likely that there will be some differences in other parts of Britain, especially around the coast and in the Highland Zone. The loss of Neolithic coastal sites on the mainland and in particular the Scilly Isles means that the way of life on the coast – where for instance some fish and birds continued to be eaten (Tresset 2003) – are visible only in Scotland where isostatic uplift has preserved sites near the coast. The strong contrast between the faunal spectrum at Runnymede with large numbers of pigs and other contemporary sites in southern Britain, which have fewer pigs and more sheep, has yet to be satisfactorily explained. Publication of the important assemblages from both Yarnton and Eton/Dorney Lake should contribute to our understanding of the contrast between the lower Thames sites and others discussed here.

Animal husbandry has for many years now been discussed in economic terms. The economic basis of life cannot be ignored: people have to eat, so the foods they ate – and hence the ways the animals were managed – are basic to human life. Cows were not just milked and then killed; they were central to social relations (Ray and Thomas 2003). They will also have been exchanged for marriage partners, given away, lent to sons and other family members in exchange for future calves, given as dowries and used as reciprocal payment of other obligations. Every individual herder and farmer will have experienced the tension between the need to keep herd numbers as large as possible and the need for milk and for meat to provide for feasts. The tension must have been particularly acute in those periods when cattle were the main source of a community's or a household's wealth as well as their livelihood. The decisions about which animals to keep and which to kill for feasts and food will have been greater when numbers of animals equated with wealth, prestige or power for individual leaders. Cattle, as well as sheep and pigs (pigs especially in the Late Neolithic) must have been at the heart of all the relationships between individuals and households, between households and communities, and between communities, their ancestors and their gods.

8 RECOMMENDATIONS FOR EXCAVATION AND RESEARCH

8.1 Introduction

In this review many questions have been raised concerning economic and social life in the Neolithic and Early Bronze Age which will only be resolved by further excavation and research. Many of the recommendations also have an application to other regions than southern Britain, and should be taken together with the recommendations for these regions. However, the data from southern Britain has the potential to answer many questions because of the number of sites in the region with good bone survival. Some of the research topics proposed in the first version of this review (Serjeantson nd) have yet to be taken up but many of the recommendations have been followed up in the twelve years since that review was written. Scientific techniques have yielded results which have transformed our knowledge of the period. Excavation and publication have also made important additions to knowledge. For example, one effect of PPG16 is that several pits and pit groups with interesting animal bone assemblages have been excavated in the past twelve years.

First, recommendations for future research are set out. They include many which use physical and chemical methods of examining bone as well as analysis of the bones themselves. Second, recommendations are set out for excavation, post-excavation analysis on the part of the project as a whole and the zooarchaeologist and for publication of the animal remains.

8.2 Recommendations for research

Some of the research topics with highest priority in the Neolithic and Early Bronze Age in general are concerned with animals, food, settlement and mobility. The most significant advances in the understanding diet and mobility are based on studies of biomolecules in human bones and pottery complemented by study of animal bones.

Some zooarchaeological topics can be addressed through the study of published and archive records of bone assemblages, but most require re-examination of the bones themselves. The restudy of material from old excavation has to be done with caution: their value is limited because it was not regarded as worthwhile to collect and retain all fragments of bone until the late 1960s. The use of bones from museum collections for scientific analyses, especially DNA, is also problematical because of possible contamination problems (Richards 2004).

8.2.1 Role of marine foods in human diet

The role of marine foods in the diet continues to be a controversial but important topic for our understanding of Neolithic origins (Richards, Schulting and Hedges 2003; Milner et al 2004; Richards and Schulting 2006; Milner et al 2006). Bradley et al (2010) pointed out that 'many of the most distinctive artefacts of the Neolithic period have been discovered near to the coast of Hampshire, Dorset and West Sussex' but there are currently few Neolithic and Early Bronze Age sites in that region on which bones have survived. The identification of such sites is a priority, and the animal remains, including the marine shells, would be an important element in the research on diet at coastal sites, complemented by isotopic analysis of human remains if present.

8.2.2 Ratio of plant and animal foods in human diet

The degree to which people ate plant foodstuffs is one of the most significant topics for the Neolithic period, as it is related to how we understand the adaptation of the earliest Neolithic population to local conditions and their degree of mobility. As discussed in chapter 1, carbon and nitrogen isotopes in human bones are the key to understanding this ratio. Animal remains make a contribution to the question of whether cattle were used for ploughing. This is investigated both by searching for traces of ard marks and also by investigating the sex ratio of the cattle and pathologies associated with traction. As discussed in chapter 2, if cereals and other plant foods were not a major component in Neolithic diet, it is likely that much was made up from milk products. Lipid analysis can now separate adipose fat from milk and future work should concentrate on separating fats of beef, mutton and pork, following from the work of Mukherjee et al (2007) and Mukherjee et al (2008).

8.2.3 Milk and milking

Research on traces of milk products surviving in pottery fabric continues to progress. Future aims of research in milk lipids and milk proteins should be to separate traces of the milk products of cattle from those of sheep and to refine methods of separating traces of raw from processed milk products. The research on lipid residues should be complemented by study of age at death of cattle and sheep. The culling pattern shows how intensively cattle and sheep were milked and hence the degree to which milk products might have made up an important part of the diet. Continued research into human DNA to identify the genetic signature for lactose tolerance and applying it to human skeletal remains from southern Britain also has high priority. Further relevant research would be to continue the work on the age at which calves were weaned (Balasse et al 1997) and the possibility that cattle may have calved year-round rather than seasonally (Towers et al 2011).

The animal bone research related to this topic should focus on age at death based on tooth eruption and wear of cattle and sheep. As we saw in chapter 2, very few individual sites have samples of jaws and teeth of cattle large enough on their own to show husbandry patterns, so assemblages will need to be grouped by period and by site type. None in southern Britain has a large sample of sheep teeth. A project to re-examine the jaws and teeth of cattle and sheep from smaller sites is recommended, using uniform recording methods and current understanding of cattle ages (Jones and Sadler 2012).

8.2.4 Long- and short-distance mobility

Research on long-distance mobility in the domestic animals, as with humans, can be identified from isotopes in bone such as lead, strontium and oxygen (Budd et al 2003; Hamilton 2008; Towers et al 2010). The technique has been applied to cattle but it also has the potential of shedding light on the origins of the earliest horses in Britain as it might reveal the exchange of animals over long-distances. It would also be interesting to apply the technique to the brown bear bones from sites in southern Britain to investigate whether the bears were in fact from the local area.

Short-distance and seasonal mobility can be identified from seasonal markers in the animal bone such as age at death of certain herbivores and the presence of migratory species. It may yet prove possible to identify seasonal slaughter in older cattle through study of the dental cementum. Some of the research up to now has yielded ambiguous results (Beasley 1987) but isotopes in dental enamel continue to hold promise for future research into seasonality as well as diet (Hamilton 2008).

8.2.5 Animal diet and husbandry

Isotopic analysis of bones and teeth also has the potential for investigating other aspects of animal husbandry (Balasse et al 1999). Such research might establish if the diet of cattle in our area was predominantly based on grass or on leaf and twig fodder. In pigs, isotopic research might discriminate between a diet based on acorns and one based on tubers.

8.2.6 Introduction of the horse and brown hare

The date of the post-glacial introduction to Britain of the horse and also the brown hare is still uncertain. Research into the earliest dates for the horse, carrying forward the work begun by Kagan (2000) and Bendrey (2010), continues to be important. This review has identified some horse bones from sites excavated in the past which were recorded as coming from early contexts. All would merit radiocarbon dating, including those from the Early Bronze Age.

The brown hare was not present at the end of the last glaciation so must have been introduced at some point since that time (Yalden 2010). Re-identification of the recorded Neolithic and Bronze Age hare bones would be a valuable small-scale research topic. It might be combined with a study of the aDNA of European species of brown hare (Stamatis et al 2009) to show its origin. Radiocarbon dating may also be necessary if there is any question that bones were intrusive.

8.2.7 New types of cattle and sheep

Cattle of the 2nd millennium BC were smaller than in the previous two millennia. A research project focused on the timing and nature of this change has a high priority. Study of the aDNA of the cattle of the period should be combined with analysis of size based on long bones and of cattle type based on skulls and horn cores. This would address the question of whether the smaller cattle evolved locally or were introduced. Coat hair colour may also be identifiable from ancient DNA. A new type of cattle might have come from continental Europe or from the northern or western seaboard of Britain, so cattle from both these regions should be included in the research programme.

It is also possible that a new type of sheep was introduced. A research project on sheep remains from the late 3rd and early 2nd millennium has high priority. It would address whether there was a new type of sheep and, if so, its date of introduction. The research would combine metrical and morphological study of the bones with aDNA and other bimolecular studies, as with cattle. In the fortuitous chance that wool or hair survives, it would be a high priority for analysis of fibre type.

8.2.8 Use of metal tools

Research into the earliest use of metal tools would contribute to understanding the nature of the earliest Bronze Age in southern Britain (Needham and Weekes 2008). Using guidelines established by Greenfield (1999) and others, cuts made on bones with metal tools can be distinguished from those made with flint tools. Assemblages where the bone surface is well preserved would have to be chosen. Initially assemblages of the early 2nd millennium BC would be targeted, but the research might also be extended to assemblages of the later 3rd millennium BC.

8.3 Recommendations for excavation and analysis

The priorities set out here will help to maximise the potential of the animal remains for interpreting activities on site as well as broader aspects of life in the Neolithic and Early Bronze Age. Many feed into research topics proposed above. The recommendations for excavation incorporate the current best practice in commercial units and research excavations while those for post-excavation analysis incorporate some of the current best practice in the study of animal bones. The recommendations for publication are also already followed by those project managers and editors who recognise the key role of animals and bone deposition in Neolithic and Early Bronze Age society.

8.3.1 Excavation

Period priorities: To fill the gap in our knowledge of the earliest Neolithic period (i.e. from c.4100 to c.3700 BC) any opportunity should be taken to excavate sites of this period. Other periods where we know little of people and their animals are the Middle Neolithic and the Early Bronze Age other than barrows.

Area priorities: The main gaps in our knowledge of peoples' relationships with animals are in those counties where bone does not survive well. Most regrettable is the absence of sites with bones in the far south-west. Coastal sites on which bone has survived might show patterns of animal husbandry which are complementary to those inland. They might show that fish and marine resources were used. The current research programme in the Scilly Isles may reveal Neolithic and Early Bronze Age sites and any opportunity to investigate coastal sites should be seized where bone is preserved. Opportunities should also be taken to excavate in other counties with few bone assemblages – though the experience of the CTRL excavations in Kent has shown that bone survival is often frustratingly poor on sites in south-east England (eg Hayden 2008).

Types of site: Any site which seems to be a settlement rather than a ceremonial site has a high priority for excavation. The publication of Yarnton and Eton/Dorney Lake will help to fill the gap in our knowledge of settlement in the Early-Middle Neolithic, as will the eventual publication of Neolithic levels at Runnymede. Up to now, no Early Bronze Age settlement on the scale of the substantial site at West Row Fen in Suffolk has been encountered in southern Britain. There does not seem to be any means of predicting where such sites might be found, but any such site would have a high priority for excavation.

Excavation method: Decisions regarding excavation methods and recovery of animal bones are best taken with the advice of appropriate animal bone specialists (Campbell et al. 8, 11, 12). Payne (1972) recommends sieving of all deposits to 4 mm mesh. This mesh size is appropriate for recovery of smaller elements such as isolated teeth and bones of young animals of those species usually found on Neolithic and Early Bronze Age sites in southern Britain. However, sieving of all deposits has not usually been regarded as cost-effective for commercially funded excavations in southern Britain where sediments are difficult to sieve. In any case it is not appropriate if bone and other finds are sparse. Instead the recommendation is to take judgemental samples of contexts in which bone may be present and sieve to 2 mm, as this mesh is appropriate for other classes of material as well as bones of larger mammals. The whole context should be sieved in some circumstances: it is recommended for protected old ground surfaces, most pit fills and the fills of ditches of causewayed enclosures where bone is present in quantity. Depending on research questions, recovery of samples of 100 litres may also be recommended for larger contexts where bone is more sparsely distributed. It is rare for remains of birds and fish to be present in deposits of this period except on coastal sites but sieving whole contexts to 2 mm mesh is recommended for any deposits where they are present. Full recovery of fish remains, and of micro-vertebrates which provide information about past environmental conditions, however, requires sieving to 1mm or 0.5 mm (Campbell et al 2011, 11-12). Original land surfaces are most likely to yield micro-vertebrates contemporary with the deposits investigated.

Current best practice on excavations of Neolithic and Early Bronze Age sites is to record the location of significant bones and bone groups in detail. This helps the interpretation of deposits which may have been deliberately placed. Significant bones to be individually recorded include skeletons, part-skeletons, skulls, horn cores and bones in articulation. It should include individual limb bones which are unbroken as these may also be ritually significant. Guidelines for lifting and recording skeletons and articulated groups of bones have been published by English Heritage (Campbell et al 2011, 14).

8.3.2 Post-excavation analysis

The assessment of the animal bones should take place after the provisional context list has been drawn up.

Both small and large animal bone assemblages are significant for the Neolithic and Early Bronze Age because small assemblages may inform on deposition and the attitude of people to their animals even if they cannot contribute to understanding animal husbandry. They should not be rejected at assessment stage – though it may be possible to deal with them fully at that stage if the number of bones is very few.

Selection of the appropriate unit of analysis for the report will be done in collaboration between the project management team and the bone analyst. It is likely to be an iterative process, which starts at assessment stage and is re-considered again following assessment (Campbell et al 2011). The report can only be written after the final context list is available. It cannot be emphasised too often that analysts are dependent on the associated material and radiocarbon dates for the dating of the bone groups analysed. They cannot report on them until the dates are finalised.

Certain bones of this period should be directly dated as part of the excavation project. Such bones should be identified at the time of the post-excavation assessment so that dating can be arranged (Campbell et al 2011). Any horse bone should be dated, as part of a programme to identify its earliest introduction to Britain, and also any bone of hare. It may also be worth dating bones of aurochs from the Late Neolithic onwards with the aim of dating its extinction locally. Animal skeletons from contexts where they might be intrusive should also be dated. Other scientific procedures such isotopic analysis which may be desirable should also be identified at assessment stage. It would be desirable to submit any securely dated horse or brown bear bone for isotopic analysis.

Human cremation burials may be accompanied by burnt animal remains. The guidelines for human cremations are appropriate for their recovery (Campbell et al, 14). Arrangement should be made for the animal bone specialist to examine the cremated animal remains after the human bone specialist has sorted the cremated remains (McKinley and Bond 2001).

To establish how bone tools and other objects were made and used, collaboration between the animal bone specialist and finds specialist should be part of the post-excavation project design. Their joint aim should be to identify each stage of the *chaine opératoire*, from selection of the raw material to use and final deposition, as well as the cultural affinities of the tool or other object.

8.3.3 Zooarchaeological analysis

Bone assemblages from discrete features such as pits may derive from a single episode. Such assemblages lend themselves to calculations of the number of individual animals killed, taking into account the age and sex of the animals. From this the quantity of meat available eaten can be calculated, which in turn suggests the numbers of people present and/or the duration of the occupation. This calculation has rarely been done because of the many problems which arise when extrapolating animal numbers in large assemblages, but it should be considered for certain contexts.

Tooth eruption and wear of cattle, pigs and sheep should be recorded following the illustrations of Grant (1982) and/or Payne (1987). Wear on isolated M3s and dpm4s should be recorded as well as on teeth in jaws (Legge 2008, 536). Recording of some additional detail on cattle teeth is also recommended (Jones and Sadler 2012).

Feasting and other types of cooking can be identified only if the types of burning marks are clearly distinguished in the report. Erosion and burning on the shaft of long bones can suggest the roasting of bones for marrow so this should be recorded separately. If charred bones are present, they should be recorded and shown separately from other burnt bones. The analyst should be alert to traces of erosion as well as blackening on distal articulations. It is particularly important to note if such traces are present in assemblages that are not associated with Grooved Ware, so that the argument that such traces are a cultural marker for Grooved Ware sites can be tested.

The presence of bones which are calcined should be distinguished from those which are charred. Calcined bone may have been burned on a fierce domestic fire but they may also come from a cremation pyre. The context will usually suggest which was involved.

Butchery marks relating to dismembering should be distinguished from filleting cuts where possible so that meat consumption can be interpreted. A standard method of recording of cut marks using codes is available (Binford 1981; tab 4.04) which is suited to assemblages where cuts were made with flint tools. It is more appropriate than codes developed for butchery in periods when metal cleavers were available. Codes are recommended as well as (or instead of) sketches because coded data are easier to manipulate. From the Early Bronze Age onwards, it is important to be alert to the possibility that cut marks were made with metal tools, as discussed earlier.

Bird bones should be identified to species where possible, but this can only be done where the analyst has access to a comprehensive reference collection and the relevant literature. Such a collection is now available to zooarchaeologists at the Centre for Archaeology at Fort Cumberland. If a bird bone is not identified to element and species, it should be made clear whether it was potentially identifiable given enough time and resources, or, alternatively, whether it was too fragmentary for identification. If the former, the report should make it clear that the bone would be available for future research. Even if not identified to species, the origin of all bird remains should be carefully considered. As we saw in chapter 3, bird remains in Neolithic and Early Bronze Age assemblages may have had various origins.

Marine shells should be identified to species where possible and their origin discussed. These were possibly foodstuffs, trade items or temper for pottery. Collaboration with the pottery analyst is important to establish whether pottery from the site was shell-tempered.

Fragments of antler should be recorded and listed separately from the other parts of the red deer skeleton. The details which should be recorded in order to interpret the use and deposition of red deer antlers are discussed by Worley and Serjeantson (in press). Points or tines of antler of red and roe deer should be carefully examined with the aim of separating use-wear from natural wear in life so far as possible, using microscopic techniques if necessary (Olsen 1989).

As discussed above, bone and antler tools should be examined to investigate whether they are of antler or bone and to establish the skeletal element and the species, where possible. Traces of the manufacturing method and use wear should be noted.

8.3.4 Publication of zooarchaeological results

The full data from the analysis of animal remains should be submitted with the report (Campbell et al 2011, 8, 26). Decisions regarding what is published and what remains in the project archive are ultimately made by the project management team. In the Neolithic period the aims of the project as a whole and those of the bone analyst are likely to coincide to a substantial degree, since both agree that understanding how animals were regarded in life and death was at the centre of Neolithic life.

The mode adopted for publication of Barrow Hills Radley (Barclay and Halpin 1999) and the recent excavations at Windmill Hill (Whittle, Pollard and Grigson 1999a) is recommended as a model for excavation reports of the period. The bone assemblages from each feature or deposit were discussed with that feature and the comments focus on its origin and character. This requires the bone analyst to write a series of separate short reports as well as a longer summary report.

The value of making certain data available in detail is emphasised. The raw data on numbers of elements, bone fusion, tooth eruption and wear (see above), measurements and bone taphonomy should be available. Today this does not necessarily mean paper publication; data can be archived digitally and made available via the World Wide Web (Campbell et al, 8). Records of tooth eruption and wear are especially important as there is still debate about the relationship between age at death and eruption stages of teeth, and fusion of bones.

8.4 Discussion

This review is the most substantive examination of the animals from Neolithic and Bronze Age sites in Britain up to now. It answers some questions about the animals themselves and the roles they played in providing food for every day and for feasts. It also shows how the animal remains contribute to answering some of the topics set out in the Research Agendas for the different regions within southern Britain. However, the review has also highlighted the fact that there are many areas concerned with human life and the animals themselves of which we still know very little. Some of these outstanding questions will be answered by by the research recommended here and others by analysis of assemblages excavated in future. Many questions will remain.

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APPENDICES

Appendix 1 Assemblages included in the review, showing site name, site catalogue number, county, assigned period, site type and NISP. Associated pottery, feature type and total number of bones (including unidentified) are also shown where data were available

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
Abingdon causewayed enclosure	1	Oxon	Abingdon causewayed enclosure	EMNEO		Causewayed enclosure		1366	614
Abingdon oval barrow	2	Oxon	Abingdon oval barrow	MNEO		Oval Barrow	Ditches		20
Alfriston	3	E Sx	Alfriston	EMNEO	PLB	Oval Barrow		446	11
Amesbury Barrow 42	4	Wilts	Amesbury Barrow 42	LNEO/EBA	BEA/CU	Long barrow	Later fill of ditches	256	89
Amesbury Barrow 51	5	Wilts	Amesbury Barrow G51	EBA		Round barrow	Burial within barrow		8
Amesbury barrow 39	6	Wilts	Amesbury barrow 39	EBA		Round barrow		36	24
Amesbury chalk plaque pit	7	Wilts	Amesbury chalk plaque pit	LNEO	GW	Pit	Pit	12	6
Amesbury grave 1502	8	Wilts	Amesbury grave 1502	EBA		Grave		4	3
Arreton Down	9	IoW	Arreton Down	EBA		Round barrow	OGS and barrow		140
Ascott-under-Wychwood	10	Oxon	Ascott-under-Wychwood barrow	EMNEO		Long barrow	Cairn	916	327
Ascott-under-Wychwood	10	Oxon	Ascott-under-Wychwood pre-barrow	ENEO		Occupation layer	Pits, etc	2014	180
Avebury	11	Wilts	Avebury	LNEO		Henge			1
Badshot Lea	12	Surrey	Badshot Lea	EMNEO		Long barrow		195	117
Beckhampton Road	13	Wilts	Beckhampton Road	EMNEO		Long barrow		106	41
Bevis Grange	14	Hants	Bevis Grange	EMNEO		Long barrow		9	9
Bishopstone	15	E Sx	Bishopstone	EMNEO		Occupation layer	Pit		13
Boles Barrow	16	Wilts	Boles Barrow	EMNEO		Long barrow			1
Boscombe Down	17	Wilts	Boscombe Down	LNEO	GW	Pit cluster	Pits	1072	240
Brean Down	18	Som	Brean Down	LNEO/EBA	BEA	Occupation layer	Layer 7/8a	118	29
Buckskin	19	Hants	Buckskin	EBA	CU	Round barrow	Occupation layer	150	96
Bury Hill	20	W Sx	Bury Hill	EMNEO		Enclosure	Primary ditch fill	289	255
Cherhill	21	Wilts	Cherhill	ENEO		Occupation layer			38

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
City Farm, Hanborough	22	Oxon	City Farm Hanborough	LNEO/EBA	BEA	Round barrow			1
Coneybury Anomaly	23	Wilts	Coneybury Anomaly	ENEO		Pit		2110	927
Coneybury henge	23	Wilts	Coneybury henge	LNEO	GW/BEA	Henge	Ditch+pits	1742	395
Conygar Hill	24	Dorset	Conygar Hill	LNEO	GW	Henge		155	61
Corhampton	25	Hants	Corhampton	EMNEO		Pit			1
Corporation Farm Abingdon	26	Oxon	Corporation Farm	MNEO		Ring ditch	Ditch		1
Court Hill Singleton	27	W Sx	Court Hill Singleton	EMNEO		Causewayed enclosure	Ditch	15	15
Cowleaze pasture	28	Dorset	Cowleaze pasture	EBA		Round barrow		13	5
Crab Farm Shapwick	29	Dorset	Crab Farm	EBA		Round barrow		98	43
Crescent Copse Shrewton	30	Wilts	Crescent Copse Shrewton	LNEO/EBA	BEA	Pit cluster			20
Devil's Quoits	31	Oxon	Devil's Quoits	LNEO/EBA	BEA	Henge	Secondary ditch fill	630	124
Dorchester Greyhound Yard	32	Dorset	Dorchester Greyhound Yard	LNEO	GW	Henge	Pits	108	67
Dorchester Thomas Hardye School	33	Dorset	Dorchester Thomas Hardye School barrows	EBA		Barrow cemetery			296
Dorchester Thomas Hardye School	33	Dorset	Dorchester Thomas Hardye School pits	LNEO	GW	Pit cluster			473
Dorchester-on-Thames	34	Oxon	Dorchester-on-Thames I	LNEO		Henge	Ditch		6
Dorchester-on-Thames	34	Oxon	Dorchester-on-Thames II	LNEO		Henge			44
Down Farm Dorset cursus	35	Dorset	Dorset cursus	MNEO		Cursus	West ditch		30
Down Farm Firtree Field	35	Dorset	Firtree Field	LNEO	GW	Pit cluster	Pits		144
Down Farm pond barrow	35	Dorset	Down Farm pond barrow	EBA		Round barrow	Ditches and OGS		58
Down Farm Wyke Down henge	35	Dorset	Wyke Down henge	LNEO	GW	Henge	Pits		59
Drayton cursus	36	Oxon	Drayton cursus ditches	MNEO		Cursus	Ditches	316	21
Drayton cursus	36	Oxon	Drayton cursus OGS	LNEO/EBA		Occupation layer	Pits and OGS	1478	497
Durrington Down Barrow	37	Wilts	Durrington Down Barrow	EBA		Round barrow	Ditches and grave pit	21	14
Durrington Walls	38	Wilts	Durrington Walls	LNEO	GW	Henge	Ditches and OGS		8500
Easton Down	39	Wilts	Easton Down primary fill	MNEO		Long barrow	Primary ditch fill	49	20

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
Easton Down	39	Wilts	Easton Down secondary fill	LNEO		Long barrow	Secondary ditch fill	293	191
Easton Lane Winchester	40	Hants	Easton Lane 2	LNEO		Pit cluster	Pits	99	16
Easton Lane Winchester	40	Hants	Easton Lane 2/3	LNEO/EBA		Pit cluster	Pits	202	49
Easton Lane Winchester	40	Hants	Easton Lane 3	EBA		Pit cluster	Pits	71	46
Eden Walk Kingston	41	Surrey	Eden Walk Kingston	MNEO	IMP	River silts	River silts		1
Flagstones	42	Dorset	Flagstones	EMNEO		Causewayed enclosure	Pits	115	46
Fordington Farm	43	Dorset	Fordington Farm grave	EBA		Round barrow	Grave below mound		7
Fordington Farm	43	Dorset	Fordington Farm mound	EBA		Round barrow	Mound	110	32
Fussells Lodge	44	Wilts	Fussells Lodge	EMNEO		Long barrow	Barrow + ditches		43
Gatehampton	45	Oxon	Gatehampton barrow	LNEO/EBA	BEA	Round barrow	Barrow 36	11	3
Gatehampton Farm	45	Oxon	Gatehampton enclosure	EMNEO		Enclosure	Ditch 46	96	18
Gatehampton Farm	46	Oxon	Gatehampton pits	MNEO		Pit cluster	Pits	259	20
Gorsey Bigbury	47	Som	Gorsey Bigbury	LNEO/EBA	BEA	Henge	Ditch		314
Gravelly Guy	48	Oxon	Gravelly Guy XV	LNEO/EBA	BEA	Flat grave	Grave		1
Hambledon Hill	49	Dorset	Hambledon Hill 'flint mines'	LNEO		Shaft	Shafts		152
Hambledon Hill	49	Dorset	HH enclosure features	EMNEO	PLB	Causewayed enclosure	Features		93
Hambledon Hill	49	Dorset	HH Hanford spur features	EMNEO	PLB	Causewayed enclosure	Pits, etc		283
Hambledon Hill	49	Dorset	HH Inner E cross-dyke	EMNEO	PLB	Causewayed enclosure	Ditches		225
Hambledon Hill	49	Dorset	HH Inner Hanford spurwork	EMNEO	PLB	Causewayed enclosure	Ditches		145
Hambledon Hill	49	Dorset	HH Inner S cross-dyke	EMNEO	PLB	Causewayed enclosure	Ditches		54
Hambledon Hill	49	Dorset	HH Inner Stepleton outwork	EMNEO	PLB	Causewayed enclosure	Ditches		507
Hambledon Hill	49	Dorset	HH main enclosure	EMNEO	PLB	Causewayed enclosure	Ditches and slots		4271

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
Hambledon Hill	49	Dorset	HH Middle Stepleton outwork	EMNEO	PLB	Causewayed enclosure	Ditches		68
Hambledon Hill	49	Dorset	HH Outer E cross-dyke	EMNEO	PLB	Causewayed enclosure	Ditches		108
Hambledon Hill	49	Dorset	HH Outer Hanford spurwork	EMNEO	PLB	Causewayed enclosure	Ditches		58
Hambledon Hill	49	Dorset	HH Outer S cross-dyke	EMNEO	PLB	Causewayed enclosure	Ditches		29
Hambledon Hill	49	Dorset	HH Outer Stepleton outwork	EMNEO	PLB	Causewayed enclosure	Ditches		635
Hambledon Hill	49	Dorset	HH Outer Stepleton-Hanford outwork	EMNEO	PLB	Causewayed enclosure	Ditches		20
Hambledon Hill	49	Dorset	HH S long barrow	EMNEO	PLB	Long barrow	Ditches		310
Hambledon Hill	49	Dorset	HH Shroton outwork	EMNEO	PLB	Causewayed enclosure	Ditches		138
Hambledon Hill	49	Dorset	HH Stepleton enclosure	EMNEO	PLB	Causewayed enclosure	Ditches and slots		164
Hambledon Hill	49	Dorset	HH Stepleton spur features	EMNEO	PLB	Causewayed enclosure	Pits, etc		118
Hambledon Hill	49	Dorset	HH Western outwork	EMNEO	PLB	Causewayed enclosure	Ditches		20
Hamel, Oxford	50	Oxon	Hamel, Oxford	LNEO/EBA	BEA	Pit			7
Hazleton North	51	Gloucs	Hazleton North cairn	EMNEO		Long barrow	Chambers	13	4
Hazleton North	51	Gloucs	Hazleton North pre-cairn	ENEO		Long barrow	Pre-cairn OGS	2767	245
Hemp Knoll	52	Wilts	Hemp Knoll burial	LNEO/EBA	BEA	Round barrow	Burial pit		63
Hemp Knoll	52	Wilts	Hemp Knoll ditch	LNEO/EBA		Round barrow	Ditch D2	15	10
Hemp Knoll	52	Wilts	Hemp Knoll pits	EMNEO		Pit cluster	Pits	97	67
Hodcott Down	53	Berks	Hodcott Down	MNEO		Occupation layer		11	11
Hodcott Down	53	Berks	Hodcott Down bowl barrow	EBA		Round barrow		213	39
Holloway Lane Hillingdon	54	London	Holloway Lane	LNEO/EBA		Pit			1
Horslip	55	Wilts	Horslip ditch primary fill	EMNEO		Long barrow	Ditches		51

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
Horslip	55	Wilts	Horslip ditch later fill	LNEO/EBA	PBW/ BEA	Long barrow	Ditches		192
King Barrow Boreham	56	Wilts	King Barrow Boreham	EMNEO		Long barrow			1
King Barrow Ridge	57	Wilts	King Barrow Ridge	LNEO	GW	Occupation layer	Pits	496	137
Kintbury Sewage Works	58	Berks	Kintbury Sewage Works	EBA	CU	Pit	Pit fills	168	19
Knook Barrow	59	Wilts	Knook Barrow	EMNEO		Long barrow			1
Lambourn 19	60	Berks	Lambourn 19	LNEO/EBA	BEA	Round barrow		165	63
Lanhill	61	Wilts	Lanhill	EMNEO		Long barrow			1
Lechlade cursus	62	Gloucs	Lechlade cursus	MNEO		Cursus	Ditches		148
Longstones enclosure	63	Wilts	Longstones	LNEO	GW	Enclosure	Ditch	180	46
Maiden Castle	64	Dorset	Maiden Castle bank barrow	EMNEO		Bank barrow	Mound		186
Maiden Castle	64	Dorset	Maiden Castle enclosure	EMNEO		Causewayed enclosure	Midden		781
Manor Farm Horton	65	Berks	Manor Farm inner ditch	EMNEO	IMP	Enclosure	Inner ditch		370
Manor Farm Horton	65	Berks	Manor Farm outer ditch	EMNEO	IMP	Enclosure	Outer ditch		19
Marden	66	Wilts	Marden	LNEO	GW	Henge	Ditch		320
Millbarrow	67	Wilts	Millbarrow	EMNEO		Long barrow	Ditches	119	37
Milton Lilbourne	68	Wilts	Milton Lilbourne 1	EBA		Round barrow		18	7
Milton Lilbourne	68	Wilts	Milton Lilbourne 2	EBA		Round barrow		471	87
Milton Lilbourne	68	Wilts	Milton Lilbourne 3	EBA		Round barrow		88	25
Milton Lilbourne	68	Wilts	Milton Lilbourne 4	EBA		Round barrow		335	89
Milton Lilbourne	68	Wilts	Milton Lilbourne 5	EBA		Round barrow		100	29
Mockbeggar Lane	69	Hants	Mockbeggar Lane	EBA		Round barrow	Cremation pit		1
Monkton Down	70	Wilts	Monkton Down G9	EBA		Round barrow			1
Mount Pleasant	71	Dorset	Mount Pleasant Beaker	LNEO/EBA	BEA	Henge			1946
Mount Pleasant	71	Dorset	Mount Pleasant EBA	EBA		Henge	later fills		454
Mount Pleasant	71	Dorset	Mount Pleasant GW	LNEO	GW	Henge			630
North Marden	72	W Sx	North Marden	EMNEO		Oval Barrow	Ditches	1244	493
Notgrove	73	Gloucs	Notgrove	EMNEO		Long barrow			1

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
Nutbane	74	Hants	Nutbane	EMNEO	PLB	Long barrow	Various		20
Nympsfield	75	Gloucs	Nympsfield	EMNEO		Long barrow		196	34
Offham Hill	76	E Sx	Offham Hill	EMNEO		Causewayed enclosure	Ditch fill		84
Ogbourne St George G1	77	Wilts	Ogbourne St George G1	EBA		Round barrow			1
Old Ditch Long barrow	78	Wilts	Old Ditch Long barrow	EMNEO		Long barrow			1
Pamphill Barford Farm	79	Dorset	Pamphill Barford Farm	LNEO	GW	Pit		357	159
Pamphill Lodge Farm	79	Dorset	Pamphill Lodge Farm EN	EMNEO		Pit cluster	Pits		32
Pamphill Lodge Farm	79	Dorset	Pamphill Lodge Farm LN	LNEO	GW	Pit	Pit		14
Radley Barrow Hills	80	Oxon	RBH Barrow 12 Inner ditch Phase 1	LNEO/EBA		Round barrow	Inner ditch 602	16	5
Radley Barrow Hills	80	Oxon	RBH Barrow 12 Outer ditch Phase 2	LNEO/EBA		Round barrow	Outer ditch 601	53	32
Radley Barrow Hills	80	Oxon	RBH Barrow 4A	LNEO/EBA	BEA	Round barrow	Ditch		2
Radley Barrow Hills	80	Oxon	RBH Beaker grave 950	LNEO/EBA	BEA	Grave	Grave 950	28	7
Radley Barrow Hills	80	Oxon	RBH Grave 4969	EBA		Grave	On coffin	2	2
Radley Barrow Hills	80	Oxon	RBH mortuary structure	EMNEO		Mortuary enclosure	Grave	4	4
Radley Barrow Hills	80	Oxon	RBH Oval barrow	EMNEO		Oval barrow	Ditch fill	8	2
Radley Barrow Hills	80	Oxon	RBH Pit 2181	LNEO/EBA	BEA	Pit cluster	Pit	6	3
Radley Barrow Hills	80	Oxon	RBH Pit 3196	LNEO	GW	Pit cluster	Pit	489	250
Radley Barrow Hills	80	Oxon	RBH Pit 3197	LNEO	GW	Pit cluster	Pit	2	2
Radley Barrow Hills	80	Oxon	RBH Pit 3831	LNEO	GW	Pit cluster	Pit	156	53
Radley Barrow Hills	80	Oxon	RBH Pit 900	EBA		Pit cluster	Pit	12	4
Radley Barrow Hills	80	Oxon	RBH Pit 911	LNEO	GW?	Pit cluster	Pit	9	4
Radley Barrow Hills	80	Oxon	RBH Pit 913	LNEO	GW	Pit cluster	Pit	103	54
Radley Barrow Hills	80	Oxon	RBH Pit 917	LNEO	GW	Pit cluster	Pit	313	138
Radley Barrow Hills	80	Oxon	RBH Pit 942	LNEO/EBA		Grave	Pit		1
Radley Barrow Hills	80	Oxon	RBH Ring ditch 611	LNEO	GW	Ring ditch	Ditch	43	19
Radley Barrow Hills	80	Oxon	RBH Ring ditch 801	LNEO	GW	Ring ditch	Ditch middle fill	109	34

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
Radley Barrow Hills	80	Oxon	RBH Segmented ring ditch	LNEO/EBA	BEA	Ring ditch	Ditch	20	14
Ratfyn	81	Wilts	Ratfyn	LNEO	GW	Pit	Pit		1
Reading Business Park	82	Berks	Green Park (Reading Business Park 2)	LNEO		Pit cluster		660	100
Reading Business Park	82	Berks	Reading Business Park 1	MNEO		Cursus		112	25
Robin Hood's Ball	83	Wilts	Robin Hood's Ball	EMNEO		Causewayed enclosure	Ditch	65	30
Roughground Farm	84	Gloucs	Roughground Farm Beaker pit	LNEO/EBA	BEA	Pit	Pit		3
Roughground Farm	84	Gloucs	Roughground Farm GW pits	LNEO	GW	Pit cluster	4 pits		82
Rowden	85	Dorset	Rowden	ENEO		Pit		231	88
Runnymede	86	Surrey	Runnymede (A4)	EMNEO		Occupation layer	Various features	268	181
Runnymede	86	Surrey	Runnymede (A6)	EMNEO		Occupation layer	River silts	330	235
Runnymede	86	Surrey	Runnymede Interior Zone (A16)	EMNEO		Occupation layer	OGS	765	251
Runnymede	86	Surrey	Runnymede Interior Zone (A19)	EMNEO		Occupation layer	OGS		3470
Runnymede	86	Surrey	Runnymede Interior Zone NW	EMNEO		Occupation layer	OGS		6346
Salisbury Beehive	87	Wilts	Salisbury Beehive	LNEO	GW	Pit		10	3
Seven Barrows Gallop	88	Surrey	Seven Barrows Gallop	LNEO	GW	Pit		65	22
Shepperton Staines Rd Farm	89	Surrey	Shepperton Staines Rd Farm	EMNEO		Ring ditch	Ditch	637	175
Sherrington Barrow	90	Wilts	Sherrington Barrow	EMNEO		Long barrow			1
Silbury Hill	91	Wilts	Silbury Hill	LNEO		Mound	Mound	196	125
South Street	92	Wilts	South Street mound and OGS	MNEO	IMP	Long barrow	OGS+mound		59
South Street	92	Wilts	South Street primary fill	MNEO	IMP	Long barrow	Primary ditch fill		3
South Street	92	Wilts	South Street secondary fill	LNEO/EBA	BEA	Long barrow	Secondary ditch fill		89
Staines causewayed enclosure	93	Surrey	Staines causewayed enclosure	EMNEO		Causewayed enclosure			614
Stonehenge	94	Wilts	Stonehenge palisade ditch	LNEO		Henge	Ditch		1
Stonehenge	94	Wilts	Stonehenge Phase 2	MNEO		Henge	Secondary ditch fill	135	117
Stonehenge	94	Wilts	Stonehenge Phases 1/2	MNEO		Henge	Primary ditch fill	121	103
Stonehenge Avenue	95	Wilts	Stonehenge Avenue	LNEO		Avenue	Ditch	12	6

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
Stonehenge Lesser cursus	96	Wilts	Stonehenge Lesser cursus	MNEO		Cursus	Ditch	158	26
The Sanctuary	97	Wilts	The Sanctuary	LNEO/EBA		Grave			1
Thickthorn Down	98	Dorset	Thickthorn Down	EMNEO		Long barrow	Mound and ditch		1
Tower Hill Ashbury	99	Oxon	Tower Hill Ashbury	LNEO	GW	Pit	Pit		51
Turnpike School, Newbury	100	Berks	Turnpike School Newbury	MNEO		Natural feature	Solution hollow		1
Twyford Down	101	Hants	Twyford Down	EBA	CU	Round barrow	Ditch		615
Waylands Smithy	102	Oxon	Waylands Smithy	EMNEO		Long barrow		852	304
West Kennet palisade enclosures	103	Wilts	West Kennet palisade enclosure 1	LNEO	GW	Enclosure	Ditch+interior		720
West Kennet palisade enclosures	103	Wilts	West Kennet palisade enclosure 2	LNEO	GW	Enclosure	Various		1203
White Barrow	104	Wilts	White Barrow	EMNEO		Long barrow			1
Whitehawk Camp	105	E Sx	Whitehawk Camp	EMNEO		Causewayed enclosure			1
Whitesheet Hill	106	Wilts	Whitesheet Hill	EMNEO		Causewayed enclosure			1
Whitesheet Hill	107	Wilts	Whitesheet Hill environs	EMNEO	HEM	Causewayed enclosure	Primary ditch fill	132	101
Windmill Hill	108	Wilts	WH 25-39 outer ditch	LNEO/EBA		Causewayed enclosure	Outer ditch	114	87
Windmill Hill	108	Wilts	WH 25-39 pre-enclosure	ENEO		Causewayed enclosure	Pre-enclosure	208	175
Windmill Hill	108	Wilts	WH 25-39 primary occupation	EMNEO		Causewayed enclosure	Primary occupation	1300	780
Windmill Hill	108	Wilts	WH Inner ditch Tr F primary	EMNEO	PLB	Causewayed enclosure	Ditch	27	9
Windmill Hill	108	Wilts	WH Inner ditch Tr F secondary	EMNEO	PLB	Causewayed enclosure	Ditch	208	97
Windmill Hill	108	Wilts	WH Middle ditch Tr D primary	EMNEO	PLB	Causewayed enclosure	Ditch	13	11
Windmill Hill	108	Wilts	WH Middle ditch Tr D secondary	EMNEO	PLB	Causewayed enclosure	Ditch	381	69
Windmill Hill	108	Wilts	WH Middle ditch XII Tr E primary	EMNEO	PLB	Causewayed enclosure	Ditch	456	194

Site	Cat. No	County	Assemblage	Period	Pottery	Site type	Feature	Total	NISP
Windmill Hill	108	Wilts	WH Middle ditch XII Tr E secondary	EMNEO	PLB	Causewayed enclosure	Ditch	80	30
Windmill Hill	108	Wilts	WH OGS Tr BB	EMNEO	PLB	Occupation layer	OGS	412	95
Windmill Hill	108	Wilts	WH Outer circuit Tr A Primary	EMNEO	PLB	Causewayed enclosure	Ditch	14	8
Windmill Hill	108	Wilts	WH Outer circuit Tr A Secondary	EMNEO	PLB	Causewayed enclosure	Ditch	383	70
Windmill Hill	108	Wilts	WH Outer ditch IV Tr C Primary	EMNEO	PLB	Causewayed enclosure	Ditch	245	81
Windmill Hill	108	Wilts	WH Outer ditch IV Tr C Secondary	EMNEO	PLB	Causewayed enclosure	Ditch	105	15
Windmill Hill	108	Wilts	WH Outer ditch Tr B primary	EMNEO	PLB	Causewayed enclosure	Ditch	362	129
Windmill Hill	108	Wilts	WH Outer ditch Tr B U secondary	EMNEO	PLB	Causewayed enclosure	Ditch	789	126
Windmill Hill	108	Wilts	WH Outer ditch Tr C U Secondary	EMNEO	PLB	Causewayed enclosure	Ditch	59	26
Windmill Hill	108	Wilts	WH Outer ditchTr B secondary	EMNEO	PLB	Causewayed enclosure	Ditch	634	130
Windmill Hill outer pits	108	Wilts	Windmill Hill outer EN pits	ENEO	PLB	Pit cluster	Pit fills	20	18
Windmill Hill outer pits	108	Wilts	Windmill Hill outer LN pits	LNEO	GW	Pit cluster	Pit fills	215	200
Wingham	109	Kent	Wingham	ENEO		Pit	Pit		18
Woodhenge	110	Wilts	Woodhenge	LNEO		Henge			1
Yarnton	111	Oxon	Yarnton	ENEO		Occupation layer			1

Appendix 2 Bibliographic references for assemblages included in the review, listed by site name. CBA Res Rep: Council for British Archaeology Research Report; BAR, Brit Ser: British Archaeological Reports, British Series; BAR, Int Ser: British Archaeological Reports, International Series

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Fussells Lodge	Grigson, C 1966 'The animal remains from Fussell's Lodge long barrow', *in* Ashbee, P 'The Fussell's Lodge long barrow excavations l957'. *Archaeologia,* **100**, 1-80, 63-73
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Gravelly Guy XV	Barclay, A, Gray, M and Lambrick, G 1995 *Excavations at the Devil's Quoits, Stanton Harcourt, Oxfordshire, 1972-3 and 1988.* Thames Valley Landscapes Volume 3: the Windrush Valley. Oxford: Oxford Archaeology
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Hambledon Hill	Legge, A J 1981 'Aspects of cattle husbandry', *in* Mercer, R (ed) *Farming Practice in British Prehistory*. Edinburgh: Edinburgh University Press, 169-81 Legge, A J 2008 'Livestock and Neolithic society at Hambledon Hill', *in* Mercer, R and Healy, F (eds) *Hambledon Hill, Dorset, England. Excavation and Survey of a Neolithic Monument Complex and its Surrounding Landscape*. Volume 2. London: English Heritage, 536-86
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Hodcott Down	Richards, J 1990 'Death and the past environment'. *Berkshire Archaeological Journal* **73**, 1-42 Cram, L 1990 'Animal bones', *in* Richards, J 'Death and the past environment'. *Berkshire Archaeological Journal* **73**, 1-42, Mf B13-C3
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King Barrow Boreham	Field, D 2006 'William Cunnington and his butcher', *in* Serjeantson, D and Field, D (eds) *Animals in the Neolithic of Britain and Europe*. Oxford: Oxbow, 1-9
King Barrow Ridge	Maltby, M 1990 'Animal bones', *in* Richards, J *The Stonehenge Environs Project*. London: English Heritage, 121-3
Kintbury Sewage Works	Grimm, J 'Animal bones from Kintbury Sewage Treatment Works'. Unpublished report for Wessex Archaeology, Salisbury
Knook Barrow	Field, D 2006 'William Cunnington and his butcher', *in* Serjeantson, D and Field, D (eds) *Animals in the Neolithic of Britain and Europe*. Oxford: Oxbow, 1-9
Lambourn 19	Richards, J 1990 'Death and the past environment'. *Berkshire Archaeological Journal* **73**, 1-42 Cram, L. 1990 'Animal bones', *in* Richards, J 'Death and the past environment'. *Berkshire Archaeological Journal* **73**, 1-42, Microfiche Mf B13-C3
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Old Ditch Long barrow	Field, D 2006 'William Cunnington and his butcher', *in* Serjeantson, D and Field, D (eds) *Animals in the Neolithic of Britain and Europe*. Oxford: Oxbow, 1-9
Pamphill Barford Farm	Maltby, M 1989 'Animal bones', *in* Howard, S 'A double ring ditched, Bronze Age barrow at Barford Farm, Pamphill'. *Proceedings of the Dorset Natural History and Archaeological Society* **111**, 31-55, 46-9
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Sherrington Barrow	Field, D 2006 'William Cunnington and his butcher', *in* Serjeantson, D and Field, D (eds) *Animals in the Neolithic of Britain and Europe*. Oxford: Oxbow, 1-9
Silbury Hill	Gardner, N 1997 'Vertebrates and small vertebrates', *in* Whittle, A *Sacred Mound, Holy Rings*. Oxford: Oxbow, 47-9
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Stonehenge Lesser cursus	Maltby, M and Richards, J 1990 'Animal bones and worked bone', *in* Richards, J (ed) *The Stonehenge Environs Project*. London: English Heritage, 83-8
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West Kennet Palisade Enclosures	Edwards, A and Horne, M 1997 'Animal bone', *in* Whittle, A *Sacred Mound, Holy Rings*. Oxford: Oxbow, 117-29
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Woodhenge	Jackson, J W 1929 'Report on the animal remains found at Woodhenge, Durrington, Wiltshire', *in* Cunnington, M E (ed) Woodhenge: A Description of the Site as Revealed by Excavations Carried Out There by Mr and Mrs B H Cunnington, 1926-7-8; Also of Four Circles and an Earthwork Enclosure South of Woodhenge. Devizes: Simpson, 61-9 Pollard, J 1995 'Inscribing space: formal deposition at the Later Neolithic monument of Woodhenge, Wiltshire'. *Proceedings of the Prehistoric Society* **61**, 137-56
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Appendix 3 Assemblages showing number of identified elements (NISP) of mammals: period and site type are also shown. See text for criteria for inclusion. The 'comments' field indicates the presence of skeletons and part-skeletons and doubtful identifications of possibly significant species; x=present

Assemblage	Cow	Pig	Sheep	Goat	Horse	Dog	Red deer	Roe deer	Wild boar	Aurochs	Fox	Wolf	Canid	Cat	Badger	Beaver	Hare	Otter	Brown bear	Red squirrel	Pine marten	Total	Comment
Abingdon causewayed enclosure	348	210	53	1			1			1		1										615	Wolf is probable id.
Abingdon oval barrow	10	6	4																			20	
Alfriston		1	2			3	4	1														11	
Amesbury barrow 39	3	13	4				4															24	
Amesbury Barrow 42	53	8	19		3		1	1			2											87	
Amesbury Barrow G51	6						2															8	
Amesbury chalk plaque pit	3	2	1																			6	
Arreton Down	76	38	24		1				1													140	Wild boar is probable id.
Ascott-under-Wychwood barrow	228	36	26		4	5	7	5	2	3			1				1					318	Horse remains are late
Ascott-under-Wychwood pre-barrow	104	47	11			1	3	6	5	1	1			1								180	
Badshot Lea	111	3	1			2																117	
Beckhampton Road	16	12					8	5														41	
Bevis Grange	5	2					1			1												9	Aurochs is probable id.
Bishopstone	2	3	8																			13	
Boscombe Down	148	109	4			1		4														266	
Brean Down	15	4	6														1					26	
Buckskin	30	1	65																			96	
Bury Hill	149	64	34			4	1															252	
Cherhill	66	14					17	4			1					2						104	
Coneybury Anomaly	450	19					21	304								22						816	
Coneybury henge	237	79	14		1	56	1	5		1												394	

Assemblage	Cow	Pig	Sheep	Goat	Horse	Dog	Red deer	Roe deer	Wild boar	Aurochs	Fox	Wolf	Canid	Cat	Badger	Beaver	Hare	Otter	Brown bear	Red squirrel	Pine marten	Total	Comment
Conygar Hill	21	40	0																			61	
Court Hill Singleton	6	4	5																			15	
Cowleaze pasture	4		1																			5	
Crab Farm	8	1	31			1											2					43	
Crescent Copse Shrewton	1	3																				4	
Devil's Quoits	103	4	6		1	1	4			6												125	
Dorchester Greyhound Yard	7	49	3				8															67	
Dorchester-on-Thames II	28	3	10			2																43	
Dorset cursus	21	1					2			6												30	
Down Farm pond barrow	38	9	10																			57	
Drayton cursus ditch	16	2	1							1												20	
Drayton cursus OGS	469	7	4		2																	482	
Durrington Down barrow	6	0	4			3				1												14	
Durrington Walls	85	198	5	1		4	14	2	1	3	2				1	1					1	318	These are MNIs not NISP
Easton Down primary fill		13	3			1	3															20	
Easton Down secondary fill	24	106	23			10	11	17														191	Roe is part skeleton
Easton Lane 2	10	2	3				1															16	
Easton Lane 2/3	24	19	5							1												49	
Easton Lane 3	14	6	22				2														2	46	Sheep includes part skeleton
Firtree Field	69	60	7				5	2											1			144	
Flagstones	14					3	16															33	
Fordington Farm mound	28	3	1																			32	
Fussells Lodge	40		1		1		2															44	Horse bone dated later
Gatehampton barrow	2						1															3	
Gatehampton enclosure		7	8			1											2					18	

Assemblage	Cow	Pig	Sheep	Goat	Horse	Dog	Red deer	Roe deer	Wild boar	Aurochs	Fox	Wolf	Canid	Cat	Badger	Beaver	Hare	Otter	Brown bear	Red squirrel	Pine marten	Total	Comment
Gatehampton pits	13	1					4			2												20	
Gorsey Bigbury	160	127	26			1																314	
Green Park (Reading Business Park 2)	21	80	1				11									6						119	
Hambledon Hill 'flint mines'	42	18	27			14	6	16			9				10		3	1		1		147	
Hamel, Oxford	4		3																			7	
Hazleton North cairn	2	1	1																			4	
Hazleton North pre-cairn	89	71	84							1												245	
Hemp Knoll burial	63																					63	Placed deposit
Hemp Knoll ditch	3	3	3			1																10	
Hemp Knoll pits	31	3	31				2															67	
HH Inner E cross-dyke	91	84	47			1	2															225	
HH Inner Hanford spurwork	17	28				1	2	1														49	
HH Inner S cross-dyke	40	6	7				1															54	
HH Inner Stepleton outwork	257	126	102				38	19														542	
HH main enclosure	1401	547	380			16	27	16														2387	
HH Middle Stepleton outwork	32	14	17				3	2														68	
HH Outer E cross-dyke	47	20	19	20			1															107	Goat skeleton
HH Outer Hanford spurwork	46	21	8				1	1														77	
HH Outer S cross-dyke	3	4		1																		8	
HH Outer Stepleton outwork	27	3	11				3															44	
HH S long barrow	220	53	48			1	5	2														329	
HH Shroton outwork	62	34	35				3	4														138	
HH Stepleton enclosure	340	145	91	15		6	29	9														635	Goat skeleton
Hodcott Down barrows	4	5						2														11	
Hodcott Down bowl barrow	14	10					3	12														39	Roe skeleton? Unusually high # bones

Assemblage	Cow	Pig	Sheep	Goat	Horse	Dog	Red deer	Roe deer	Wild boar	Aurochs	Fox	Wolf	Canid	Cat	Badger	Beaver	Hare	Otter	Brown bear	Red squirrel	Pine marten	Total	Comment
Horslip ditch primary fill	16	13	15			1		2		1					3							51	
Horslip ditch later fill	120	34	23	1			10	2		2												192	
King Barrow Ridge	39	90	3				5		1	1												139	
Kintbury Sewage Works	11	4	4																			19	
Lambourn 19	4	6	48		2		3															63	
Lanhill	×	2	×														3					5	
Lechlade cursus	3	4	1																			8	
Longstones	18	21	6				1															46	
Maiden Castle bank barrow	93	32	40				7															172	
Maiden Castle enclosure	407	139	205	1			8	7		1												768	
Manor Farm inner ditch	318	10	31			11																370	
Manor Farm outer ditch	15	1			1																	17	
Marden	8	8	2		1		×			1												20	MNI, NOT NISP
Millbarrow	15	7	6		3		1			1	4											37	Horse In ENEO? Date should be checked
Milton Lilbourne 1	1	1	3		1		1															7	
Milton Lilbourne 2	39	25	15		1	4	3															87	
Milton Lilbourne 3	7	5	10		2			1														25	
Milton Lilbourne 4	47	13	21			2	6															89	
Milton Lilbourne 5	10	14	3		2																	29	
Mount Pleasant Beaker	18	35	12			3	2	1	1	2	1											75	MNI, not NISP
Mount Pleasant EBA	3	5	3			1																12	
Mount Pleasant GW	8	17	4		1	2	2		1	1	1											37	
North Marden	304	23	113			16	36	1		2												495	
Nutbane	2	6	0				3	1		3	4										1	20	
Nympsfield	1	27	2		1	2	1															34	
Offham Hill	31	10	20			1	6	14								2						84	

Assemblage	Cow	Pig	Sheep	Goat	Horse	Dog	Red deer	Roe deer	Wild boar	Aurochs	Fox	Wolf	Canid	Cat	Badger	Beaver	Hare	Otter	Brown bear	Red squirrel	Pine marten	Total	Comment
Pamphill Barford Farm	44	113	0				2															159	
Pamphill, Lodge Farm EN	28	3	1																			32	
Pamphill, Lodge Farm LN	1	11	1					1														14	
RBH Barrow 12 Inner ditch Phase 1	3		2																			5	
RBH Barrow 12 Outer ditch Phase 2	9	2	5				2			1												19	
RBH Barrow 4A	2																					2	
RBH Beaker grave 950	2	3						2														7	
RBH Grave 4969	1	1																				2	
RBH GW pit 3196	20	225	4				1															250	
RBH mortuary structure	3	1																				4	
RBH Oval barrow	2																					2	
RBH Pit 2181	3																					3	
RBH Pit 3197	2																					2	
RBH Pit 3831	13	36	1				3															53	
RBH Pit 900	2	1	1																			4	
RBH Pit 911	2		2					1														5	
RBH Pit 913	18	35				1																54	
RBH Pit 917	69	63	3				2		1													138	
RBH Ring ditch 611	14	2	3																			19	
RBH Ring ditch 801	22	10	1				1															34	
RBH Segmented ring ditch	7	1	5					1														14	
Reading Business Park 1	16	4	5																			25	
Robin Hood's Ball	19	8	3																			30	
Roughground Farm GW pits	21	55	1				3		1				1									82	Wolf is possible id.
Rowden	10	49	29																			88	

Assemblage	Cow	Pig	Sheep	Goat	Horse	Dog	Red deer	Roe deer	Wild boar	Aurochs	Fox	Wolf	Canid	Cat	Badger	Beaver	Hare	Otter	Brown bear	Red squirrel	Pine marten	Total	Comment
Runnymede (A4)	108	40	19			1																168	
Runnymede (A6)	103	90	26			15																234	
Runnymede interior zone (A16)	114	100	18			1	4	1														238	
Runnymede Interior Zone (A19)	1569	1605	417		8	19	33	7	1	2				3		3		2				3669	Horse dates to be confirmed
Runnymede Interior Zone NW	2112	3834	522			13	84	16	1		1				7	23		6				6619	
Salisbury Beehive		3																				3	
Seven Barrows Gallop	4	14	3							1												22	
Shepperton Staines Rd Farm	115	28	9			19						1										172	
South St mound and OGS	29	12	16				2															59	
South St primary fill	3																					3	
South St secondary fill	85					2									2							89	
Staines causewayed enclosure	464	48	73			19	6									4						614	
Stonehenge Lesser cursus	15	4	6				1															26	
Stonehenge Phase 1/2	67	18	1			1	8	1			6	1										103	Wolf is probable id.
Stonehenge Phase 2	35	69	3			6	3				1											117	
Tower Hill Ashbury	11	12	25				1		1													50	
Twyford Down	138	6	310	73	6	29	8	3			5			1	36							615	Sieved and unsieved combined
Waylands Smithy	41	32	45		6	19	62	18		2	4										1	230	Marten may be intrusive; red deer may include antler
West Kennet palisade enclosure 1	72	631	10			5		1								1						720	
West Kennet palisade enclosure 2	202	913	35			35				1												1186	
WH Inner ditch Tr F primary	7	2																				9	
WH Inner ditch Tr F secondary	55	19	18	1		4																97	
WH Middle ditch Tr D primary		6	3			1	1															11	

Assemblage	Cow	Pig	Sheep	Goat	Horse	Dog	Red deer	Roe deer	Wild boar	Aurochs	Fox	Wolf	Canid	Cat	Badger	Beaver	Hare	Otter	Brown bear	Red squirrel	Pine marten	Total	Comment
WH Middle ditch Tr D secondary	50	10	5							4												69	
WH Middle ditch XII Tr E primary	114	40	35	1		4																194	
WH Middle ditch XII Tr E secondary	20	4	3				1			2												30	
WH OGS Tr BB	65	19	11																			95	
WH Outer circuit Tr A Primary	8		2																			10	
WH Outer circuit Tr A Secondary	43	17	4			3	1		1	1												70	
WH Outer ditch IV Tr C Primary	51	11	13	1				1			2			2								81	
WH Outer ditch IV Tr C Secondary	13		2																			15	
WH Outer ditch Tr B primary	85	14	16	1		1	3															120	
WH Outer ditch Tr B U secondary	63	45	12			2		3														125	
WH Outer ditch Tr C U secondary	23	1				1				1												26	
WH Outer ditchTr B secondary	65	39	8	1		4	6	3		1												127	
WH25-39 outer ditch	50	15	8			4	5			3				2								87	
WH25-39 pre-enclosure	115	27	30	1		1	1															175	
WH25-39 primary occupation	342	90	138			127	5	1			8			52	7		10					780	
Whitesheet Hill environs	34	18	49																			101	
Windmill Hill outer EN pits	13	3	2																			18	
Windmill Hill outer LN pits	103	48	38			3			4	4												200	
Wingham	8	3	7																			18	
Wyke Down henge	45	9	3				2															59	

Appendix 4 Cattle: eruption and wear of individual jaws and molar teeth for sites and assemblages where the data are available: tooth eruption stages after Ewbank et al (1964) and tooth wear stages after Grant (1982, fig. 1); 'x' present but no wear data. Jaws and teeth were assigned to nine eruption/ wear stage. See Table 2.1 for description of age stages. The Runnymede records are unpublished and are a subsample from all Neolithic areas of the site

Assemblage	Period	Taxon	Anat	Side	dp4	P4	M1	M2	M3	Stage
Ascott-under-Wychwood	ENEO	Cattle	Jaw			W		W		5
Ascott-under-Wychwood	ENEO	Cattle	Jaw						j	8
Ascott-under-Wychwood	ENEO	Cattle	Jaw			e/f	k	k	j?	8
Crab Farm	EBA	Cow	Jaw		a					1
Crab Farm	EBA	Cow	Jaw		j		h	g	b	6
Devil's Quoits	LNEO/EBA	Cow	Jaw		j		f			4
Devil's Quoits	LNEO/EBA	Cow	Jaw				f			4
Devil's Quoits	LNEO/EBA	Cattle	Jaw		k		g	e	a	5
Devil's Quoits	LNEO/EBA	Cattle	Jaw				g	e		5
Devil's Quoits	LNEO/EBA	Cattle	Jaw		j					5
Devil's Quoits	LNEO/EBA	Cattle	Jaw		k					5
Devil's Quoits	LNEO/EBA	Cattle	Jaw						a	5
Devil's Quoits	LNEO/EBA	Cattle	Jaw					j	b	5
Devil's Quoits	LNEO/EBA	Cattle	Jaw		j		k			6
Devil's Quoits	LNEO/EBA	Cattle	Jaw				k			6
Down Farm pond barrow	EBA	Cow	Tooth						a	5
Down Farm pond barrow	EBA	Cow	Tooth						a	5
Down Farm pond barrow	EBA	Cow	Jaw						e	6
Down Farm pond barrow	EBA	Cow	Jaw			f	l	j	g	7
Down Farm pond barrow	EBA	Cow	Jaw			f	k	k	j	8
Drayton cursus OGS	LNEO/EBA	Cow	Tooth				a			2
Drayton cursus OGS	LNEO/EBA	Cow	Tooth					a		4
Drayton cursus OGS	LNEO/EBA	Cattle	Tooth					b		5
Drayton cursus OGS	LNEO/EBA	Cattle	Tooth						e	6
Drayton cursus OGS	LNEO/EBA	Cattle	Tooth				l			7
Firtree Field pits	LNEO	Cattle	Jaw						e	6
Firtree Field pits	LNEO	Cattle	Tooth						b	5
Firtree Field pits	LNEO	Cattle	Tooth				k			6
Firtree Field pits	LNEO	Cattle	Tooth					j		7
Fordington Farm	EBA	Cow	Jaw					k	j	8
Milton Lilbourne	EBA	Cow	Tooth				a			3
Milton Lilbourne	EBA	Cow	Tooth				b/c			4
Milton Lilbourne	EBA	Cow	Tooth				c			4
Milton Lilbourne	EBA	Cow	Tooth				e			4
Milton Lilbourne	EBA	Cow	Tooth					b		5
Milton Lilbourne	EBA	Cow	Tooth					b		5
Milton Lilbourne	EBA	Cow	Tooth						b	6

Assemblage	Period	Taxon	Anat	Side	dp4	P4	M1	M2	M3	Stage
Milton Lilbourne	EBA	Cow	Tooth						d	6
Milton Lilbourne	EBA	Cow	Tooth						d	6
Milton Lilbourne	EBA	Cow	Tooth				k			6/7
Milton Lilbourne	EBA	Cow	Tooth				k			6/7
Milton Lilbourne	EBA	Cow	Tooth						g	7/8
Milton Lilbourne	EBA	Cow	Tooth						h	8
Milton Lilbourne	EBA	Cow	Tooth				l			8
Milton Lilbourne	EBA	Cow	Tooth				l			8
Pamphill Lodge Farm	EMNEO	Cattle	Jaw				h	h	c	6
RBH Pit 917	LNEO	Cattle	Jaw						a	5
RBH Ring ditch 801	LNEO	Cattle	Jaw			b	h	g	g	7
Rowden	ENEO	Cattle	Jaw				E			1
Rowden	ENEO	Cattle	Jaw				E			1
Runnymede A13	EMNEO	Cow	Tooth	R	b		a			2
Runnymede A13	EMNEO	Cow	Tooth	R	b					2
Runnymede A13	EMNEO	Cow	Jaw	R	c					2
Runnymede A13	EMNEO	Cow	Tooth	L	g					3
Runnymede A13	EMNEO	Cow	Tooth	R			g			4
Runnymede A13	EMNEO	Cow	Tooth	L	k					4
Runnymede A13	EMNEO	Cow	Tooth	R					d	6
Runnymede A13	EMNEO	Cow	Jaw	L				g-h		6
Runnymede A13	EMNEO	Cow	Jaw	R				j	g	7
Runnymede A13	EMNEO	Cow	Tooth	R					g	7
Runnymede A13	EMNEO	Cow	Tooth	L					g	7
Runnymede A13	EMNEO	Cow	Jaw	L					g	7
Runnymede A13	EMNEO	Cow	Tooth	R				j		7
Runnymede A13	EMNEO	Cow	Jaw	R				k	j	8
Runnymede A13	EMNEO	Cow	Tooth	R					k	9
Runnymede A19	EMNEO	Cow	Jaw	L	b		a			2
Runnymede A19	EMNEO	Cow	Tooth	R	b					2
Runnymede A19	EMNEO	Cow	Jaw	R	c					2
Runnymede A19	EMNEO	Cow	Tooth	R			b			3
Runnymede A19	EMNEO	Cow	Jaw	L	h					3
Runnymede A19	EMNEO	Cow	Tooth	R			f			4
Runnymede A19	EMNEO	Cow	Jaw	L	k		g			4
Runnymede A19	EMNEO	Cow	Tooth	L	j					4
Runnymede A19	EMNEO	Cow	Jaw	L	j					4
Runnymede A19	EMNEO	Cow	Jaw	R	j					4
Runnymede A19	EMNEO	Cow	Tooth	L			h			5
Runnymede A19	EMNEO	Cow	Tooth	L					a	5
Runnymede A19	EMNEO	Cow	Tooth	L				b		5
Runnymede A19	EMNEO	Cow	Jaw	R		b	j	g	d	6
Runnymede A19	EMNEO	Cow	Tooth	R					b	6
Runnymede A19	EMNEO	Cow	Jaw	R					e	6
Runnymede A19	EMNEO	Cow	Tooth	L					f	6
Runnymede A19	EMNEO	Cow	Tooth	R					f	6

Assemblage	Period	Taxon	Anat	Side	dp4	P4	M1	M2	M3	Stage
Runnymede A19	EMNEO	Cow	Tooth	R					f	6
Runnymede A19	EMNEO	Cow	Tooth	L					f-g	6
Runnymede A19	EMNEO	Cow	Tooth	L					f-g	6
Runnymede A19	EMNEO	Cow	Tooth	L				f		6
Runnymede A19	EMNEO	Cow	Tooth	R				f		6
Runnymede A19	EMNEO	Cow	Jaw	R				g		6
Runnymede A19	EMNEO	Cow	Jaw	R		f	k			7
Runnymede A19	EMNEO	Cow	Tooth	L					g	7
Runnymede A19	EMNEO	Cow	Tooth	L					g	7
Runnymede A19	EMNEO	Cow	Tooth	L					g	7
Runnymede A19	EMNEO	Cow	Tooth	R					g	7
Runnymede A19	EMNEO	Cow	Tooth	R					g	7
Runnymede A19	EMNEO	Cow	Jaw	R					g	7
Runnymede A19	EMNEO	Cow	Tooth	L					j	8
Runnymede A19	EMNEO	Cow	Tooth	R					j	8
Runnymede A19	EMNEO	Cow	Tooth	L				k		8
Runnymede A19	EMNEO	Cow	Tooth	L				l		8
Runnymede A19	EMNEO	Cow	Jaw	R					k	9
Runnymede A19	EMNEO	Cow	Tooth	L					l-m	9
Runnymede A20	EMNEO	Cow	Tooth	L	a					1
Runnymede A20	EMNEO	Cow	Jaw	L			a			2
Runnymede A20	EMNEO	Cow	Tooth	R			a			2
Runnymede A20	EMNEO	Cow	Jaw	L	b					2
Runnymede A20	EMNEO	Cow	Jaw	L	g		a			3
Runnymede A20	EMNEO	Cow	Jaw	L	g		b			3
Runnymede A20	EMNEO	Cow	Tooth	L	f-g					3
Runnymede A20	EMNEO	Cow	Jaw	R	j		f			4
Runnymede A20	EMNEO	Cow	Tooth	R			g			4
Runnymede A20	EMNEO	Cow	Tooth	R			h			5
Runnymede A20	EMNEO	Cow	Tooth	L				b		5
Runnymede A20	EMNEO	Cow	Tooth	R				b		5
Runnymede A20	EMNEO	Cow	Jaw	L			j	f		6
Runnymede A20	EMNEO	Cow	Tooth	R					d	6
Runnymede A20	EMNEO	Cow	Tooth	L					f-g	6
Runnymede A20	EMNEO	Cow	Jaw	R				d		6
Runnymede A20	EMNEO	Cow	Tooth	R				e		6
Runnymede A20	EMNEO	Cow	Tooth	L					g	7
Runnymede A20	EMNEO	Cow	Jaw	R			l	k		8
Runnymede A20	EMNEO	Cow	Tooth	L					g-j	8
Runnymede A20	EMNEO	Cow	Tooth	L					h	8
Runnymede A20	EMNEO	Cow	Tooth	R					j	8
Runnymede A20	EMNEO	Cow	Tooth	L					k	9
Runnymede A24	EMNEO	Cow	Tooth	R	b					2
Runnymede A24	EMNEO	Cow	Jaw	R	b					2
Runnymede A24	EMNEO	Cow	Tooth	L	b					2
Runnymede A24	EMNEO	Cow	Tooth	R	f					2

Assemblage	Period	Taxon	Anat	Side	dp4	P4	M1	M2	M3	Stage
Runnymede A24	EMNEO	Cow	Tooth	R			f			4
Runnymede A24	EMNEO	Cow	Tooth	R					a	5
Runnymede A24	EMNEO	Cow	Jaw	R				g	c	6
Runnymede A24	EMNEO	Cow	Jaw	L					g	7
Runnymede A24	EMNEO	Cow	Jaw	L					g	7
Runnymede A24	EMNEO	Cow	Jaw	L			l	k		8
Runnymede A24	EMNEO	Cow	Tooth	L					h	8
Runnymede A24	EMNEO	Cow	Jaw	L			l	k	j-k	9
Runnymede A4	EMNEO	Cow	Jaw	Pair			g	f	c	6
Runnymede A4	EMNEO	Cow	Jaw			b			b	6
Runnymede A4	EMNEO	Cow	Jaw		a					1
Stonehenge	MNEO	Cattle	Jaw		m		j	g	E	5
Stonehenge	MNEO	Cattle	Jaw		j					5
Stonehenge	MNEO	Cattle	Jaw					g	d	5
Stonehenge	MNEO	Cattle	Jaw			E	j	g	d	6
Stonehenge	MNEO	Cattle	Jaw				k	j	h	8
Stonehenge	MNEO	Cattle	Jaw			f	k	k	j	8
Stonehenge	MNEO	Cattle	Tooth row		g		d	V		4
Stonehenge	MNEO	Cattle	Tooth					h		7
Stonehenge	MNEO	Cattle	Tooth row		j		f	E		4
Windmill Hill	EMNEO	Cattle	Jaw		a					1
Windmill Hill	EMNEO	Cattle	Jaw		a					1
Windmill Hill	EMNEO	Cattle	Jaw		c					2
Windmill Hill	EMNEO	Cattle	Jaw		c					2
Windmill Hill	EMNEO	Cattle	Jaw						c	6
Windmill Hill	EMNEO	Cattle	Jaw						c	6
Windmill Hill	EMNEO	Cattle	Jaw						c	6
Windmill Hill	EMNEO	Cattle	Jaw						c	6
Windmill Hill	EMNEO	Cattle	Jaw						c	6
Windmill Hill	EMNEO	Cattle	Jaw						g	7
Windmill Hill	EMNEO	Cattle	Jaw						g	7
Windmill Hill	EMNEO	Cattle	Jaw						j	8
Windmill Hill	EMNEO	Cattle	Jaw						j	8
Wyke Down henge	LNEO	Cattle	Tooth row				g	g	g	6
Wyke Down henge	LNEO	Cattle	Tooth row					g	g	7
Wyke Down henge	LNEO	Cattle	Tooth row					g	g	7

Appendix 5 Pigs: eruption and wear of individual jaws and molar teeth, as Appendix 4: wear stages follow Grant (1982, fig. 3). Jaws and teeth were assigned to six age stages. See Table 2.2 for description of age stages: 'x' present but no wear data.

Site name	Period	Taxon	Anat	Side	dp4	P4	M1	M2	M3	Age stage
Ascott-u-Wychwood	EMNEO	Pig	Jaw	R	E					JUV
Ascott-u-Wychwood	EMNEO	Pig	Jaw	L					j	ELD
Firtree Field	LNEO	Pig	Jaw				b			IMM
Firtree Field	LNEO	Pig	Jaw	R				E		IMM
Firtree Field	LNEO	Pig	Jaw	l		x	x	c		SUB
Firtree Field	LNEO	Pig	Jaw	R		E		b		SUB
Firtree Field	LNEO	Pig	Tooth						c	AD
Firtree Field	LNEO	Pig	Jaw	M					j	ELD
Gorsey Bigbury	LNEO/EBA	Pig	Jaw			x	x	x	x	AD
Gorsey Bigbury	LNEO/EBA	Pig	Jaw			x	x	x	x	AD
Gorsey Bigbury	LNEO/EBA	Pig	Jaw			x	x	x	x	AD
Gorsey Bigbury	LNEO/EBA	Pig	Jaw			x	x	x	j	ELD
Lechlade cursus	MNEO	Pig	Tooth						e	AD
Maiden Castle	EMNEO	Pig	Jaw				c			IMM
Maiden Castle	EMNEO	Pig	Jaw						g	AD
Maiden Castle	EMNEO	Pig	Jaw					b		SUB
Maiden Castle	EMNEO	Pig	Jaw					b		SUB
Pamphill Lodge Farm	LNEO	Pig	Jaw				g	g	V	SUB
RBH mortuary structure	EMNEO	Pig	Jaw				f	d	C	SUB
RBH Pit 3196	LNEO	Pig	Jaw		a		V			JUV
RBH Pit 3196	LNEO	Pig	Jaw		d		a	C		JUV
RBH Pit 3196	LNEO	Pig	Jaw		f		b			IMM
RBH Pit 3196	LNEO	Pig	Jaw			a	e	a	V	IMM
RBH Pit 3196	LNEO	Pig	Jaw					b	V	SUB
RBH Pit 3196	LNEO	Pig	Jaw						d	AD
RBH Pit 3831	LNEO	Pig	Jaw						b	AD
RBH Pit 917	LNEO	Pig	Jaw		E					JUV
RBH Pit 917	LNEO	Pig	Jaw		a		C			JUV
RBH Pit 917	LNEO	Pig	Jaw				c	a	C	IMM
RBH Pit 917	LNEO	Pig	Jaw			b	f	c	a	SUB
RBH Pit 917	LNEO	Pig	Jaw						b	AD
RBH Pit 917	LNEO	Pig	Jaw						c	AD
Robin Hoods Ball	EMNEO	Pig	Tooth						d	AD
Runnymede	EMNEO	Pig	Tooth	R	m		g	b		SUB
Runnymede	EMNEO	Pig	Jaw	R			f	b		SUB
Runnymede	EMNEO	Pig	Tooth	R			b	V		IMM
Runnymede	EMNEO	Pig	Tooth	R		c	l	h	a	SUB
Runnymede	EMNEO	Pig	Tooth	R					E	SUB
Runnymede	EMNEO	Pig	Tooth	R					E	SUB
Runnymede	EMNEO	Pig	Tooth	R					V	SUB
Runnymede	EMNEO	Pig	Tooth	R			e			SUB
Runnymede	EMNEO	Pig	Tooth	R			e			SUB

Site name	Period	Taxon	Anat	Side	dp4	P4	M1	M2	M3	Age stage
Runnymede	EMNEO	Pig	Tooth	R			f			SUB
Runnymede	EMNEO	Pig	Tooth	R				b		SUB
Runnymede	EMNEO	Pig	Tooth	R				b		SUB
Runnymede	EMNEO	Pig	Tooth	R					b	AD
Runnymede	EMNEO	Pig	Tooth	R					k	ELD
Runnymede	EMNEO	Pig	Jaw	R			V			JUV
Runnymede	EMNEO	Pig	Jaw	R	g		b			IMM
Runnymede	EMNEO	Pig	Jaw	R	g		c	V		IMM
Runnymede	EMNEO	Pig	Jaw	R	j		c	V		IMM
Runnymede	EMNEO	Pig	Jaw	R				V		IMM
Runnymede	EMNEO	Pig	Jaw	R	l			E		IMM
Runnymede	EMNEO	Pig	Jaw	R				e	a	SUB
Runnymede	EMNEO	Pig	Jaw	R					a	SUB
Runnymede	EMNEO	Pig	Jaw	R					a	SUB
Runnymede	EMNEO	Pig	Jaw	R		b	h	b	V	SUB
Runnymede	EMNEO	Pig	Jaw	R					V	SUB
Runnymede	EMNEO	Pig	Jaw	R			d			SUB
Runnymede	EMNEO	Pig	Jaw	R			d			SUB
Runnymede	EMNEO	Pig	Jaw	R			d			SUB
Runnymede	EMNEO	Pig	Jaw	R	l		e			SUB
Runnymede	EMNEO	Pig	Jaw	R		c	j	c		SUB
Runnymede	EMNEO	Pig	Jaw	R				c		SUB
Runnymede	EMNEO	Pig	Jaw	R		b	j			SUB
Runnymede	EMNEO	Pig	Jaw	R				d	b	AD
Runnymede	EMNEO	Pig	Jaw	R		d	m	g	c	AD
Runnymede	EMNEO	Pig	Jaw	R			g		c	AD
Runnymede	EMNEO	Pig	Jaw	R					c	AD
Runnymede	EMNEO	Pig	Jaw	R			k	j	d	AD
Runnymede	EMNEO	Pig	Jaw	R			n	k	e	AD
Runnymede	EMNEO	Pig	Jaw	R			m	g		AD
Runnymede	EMNEO	Pig	Tooth	R	b					JUV
Runnymede	EMNEO	Pig	Tooth	R	g					IMM
Runnymede	EMNEO	Pig	Tooth	R	h					IMM
Runnymede	EMNEO	Pig	Tooth	R				a		IMM
Runnymede	EMNEO	Pig	Tooth	R			e			SUB
Runnymede	EMNEO	Pig	Tooth	R			f			SUB
Runnymede	EMNEO	Pig	Tooth	R					b	AD
Runnymede	EMNEO	Pig	Tooth	R					c	AD
Runnymede	EMNEO	Pig	Tooth	R					c	AD
Runnymede	EMNEO	Pig	Tooth	R					f	AD
Runnymede	EMNEO	Pig	Tooth	R			k	h		AD
Runnymede	EMNEO	Pig	Jaw	R	c		a			JUV
Runnymede	EMNEO	Pig	Jaw	R			a			JUV
Runnymede	EMNEO	Pig	Jaw	R			b			IMM
Runnymede	EMNEO	Pig	Jaw	R			b			IMM
Runnymede	EMNEO	Pig	Jaw	R	c		b			IMM
Runnymede	EMNEO	Pig	Jaw	R	d		b			IMM
Runnymede	EMNEO	Pig	Jaw	R	d					IMM

Site name	Period	Taxon	Anat	Side	dp4	P4	M1	M2	M3	Age stage
Runnymede	EMNEO	Pig	Jaw	R		d			E	SUB
Runnymede	EMNEO	Pig	Jaw	R			d	b		SUB
Runnymede	EMNEO	Pig	Jaw	R			e	b		SUB
Runnymede	EMNEO	Pig	Jaw	R			e			SUB
Runnymede	EMNEO	Pig	Jaw	R		b	m	d	b	AD
Runnymede	EMNEO	Pig	Jaw	R				d	b	AD
Runnymede	EMNEO	Pig	Jaw	R		d	k	f	b	AD
Runnymede	EMNEO	Pig	Jaw	R					c	AD
Stonehenge	MNEO	Pig	Jaw	R	d		a			JUV
Stonehenge	MNEO	Pig	Jaw	L	c		E			JUV
Stonehenge	MNEO	Pig	Jaw	M		b	g	c		SUB
Stonehenge	MNEO	Pig	Jaw	R			k	j	f	AD
Stonehenge	MNEO	Pig	Jaw	L				h	e	AD

Appendix 6 Placed and possible placed deposits by assemblage, showing period, site type, feature, deposit type, species, element details, associated material where known: skulls, skeletons and part-skeletons were included if referred to in the report; other elements were included if they were identified as placed or otherwise noted as 'special' by the excavator or the bone analyst; the list of horn cores is partial because horn cores are not routinely shown separately in animal bone reports

Assemblage	Period	Site type	Feature	Deposit type	Species	Detail	Comments
Abingdon causewayed enclosure	EMNEO	Causewayed enclosure		Bones (2)	Ox	Complete long bones	
Abingdon causewayed enclosure	EMNEO	Causewayed enclosure		Bones (4)	Pig	Complete long bones	
Abingdon causewayed enclosure	EMNEO	Causewayed enclosure		Bones (4)	Sheep	Complete long bones	
Abingdon causewayed enclosure	EMNEO	Causewayed enclosure		Horn core	Goat		
Abingdon causewayed enclosure	EMNEO	Causewayed enclosure		Part-skeleton	Sheep		
Amesbury barrow G51	EBA	Round barrow		Skull	Ox	Horn core and part skull	Below pelvis of human burial, so possibly deliberate
Amesbury grave 1502	EBA	Grave		Skull	Ox		In grave
Arreton Down	EBA	Round barrow	Cremation pit	Jaw	Pig		
Ascott-under-Wychwood	EMNEO	Long barrow	Barrow mound	Skull	Ox		Midline of barrow construction
Ascott-under-Wychwood	EMNEO	Long barrow	Barrow mound	Skulls	Ox		Elsewhere in barrow construction
Badshot Lea	EMNEO	Long barrow		Articulated bones	Ox	Vertebrae	
Badshot Lea	EMNEO	Long barrow		Bone	Ox	Radius, whole	
Beckhampton Road	EMNEO	Long barrow		Skull + vertebrae	Ox	Skull with mandibles, atlas, axis, vertebrae	
Beckhampton Road	EMNEO	Long barrow		Skulls (2)	Ox	Two further skulls axially placed on OLS	
Boles Barrow	EMNEO	Long barrow		Skull + feet	Ox		
Boles Barrow	EMNEO	Long barrow		Skulls	Ox		
City Farm Hanborough	LNEO/EBA	Round barrow	Inner ditch	Articulated bones	Ox		
Coneybury Anomaly	ENEO	Pit	Pit	Skeleton	Trout		
Coneybury henge	LNEO	Henge	Primary fill	Skeleton	Dog		
Coneybury henge	LNEO	Henge	Primary fill	Skeleton	White-tailed sea eagle		
Corhampton	EMNEO	Pit		Horn core	Aurochs		With horncore
Corporation Farm	MNEO	Enclosure	Ditch terminal	Skull	Ox		

Assemblage	Period	Site type	Feature	Deposit type	Species	Detail	Comments
Crab Farm	EBA	Round barrow	Base of ditch	Skeleton	Calf		With cow
Crab Farm	EBA	Round barrow	Base of ditch	Skeleton	Ox		With calf
Crab Farm	EBA	Round barrow	Base of ditch	Skeleton	Sheep		With lambs
Crab Farm	EBA	Round barrow	Base of inner ditch	Skeleton	Sheep		
Crab Farm	EBA	Round barrow	Base of ditch	Skeletons (2)	Lambs		With sheep
Dorchester Thomas Hardye School	LNEO	Pit cluster	Pit 5243	Bone	Aurochs		
Dorchester Thomas Hardye School	LNEO	Pit cluster	Pit 5167	Bone	Ox	Scapula	
Dorchester Thomas Hardye School	LNEO	Pit cluster	Pit 5243	Bone	Ox	Scapula	
Dorchester Thomas Hardye School	LNEO	Pit cluster	Pit 5293	Skeleton	Dog		
Dorchester Thomas Hardye School	LNEO	Pit cluster	Pit 5243	Skeleton	Piglet		
Dorchester Thomas Hardye School	LNEO	Pit cluster	Pit 5180	Skull?	Ox	Fragment	
Dorchester-on-Thames II	LNEO/EBA	Henge	Base of ditch	Skull	Aurochs		
Dorset cursus	MNEO	Cursus	Upper leverls of ditch	Skulls (?)	Ox	Tooth rows	Originally a skull or skulls?
Down Farm pond barrow	EBA	Round barrow	Outside barrow	Skeleton	Ox		One of pair on opposite sides of barrow
Down Farm pond barrow	EBA	Round barrow	Outside barrow	Skeleton	Ox		One of pair on opposite sides of barrow
Down Farm pond barrow	EBA	Round barrow	Outside barrow	Skeleton	Sheep	Very fragmentary	One of pair on opposite sides of barrow
Down Farm pond barrow	EBA	Round barrow	Outside barrow	Skeleton	Sheep		One of pair on opposite sides of barrow
Drayton cursus	MNEO	Cursus	Ditch	Bone	Aurochs	Radius	
Drayton cursus	LNEO/EBA	Cursus	OGS post-cursus	Skulls (?)	Ox	Maxillary molar teeth	Suggests heap of skulls originally
Durrington Down barrow	EBA	Round barrow		Bone	Aurochs	Vertebra	
Durrington Down barrow	EBA	Round barrow	With inhumation	Skull	Ox		
Easton Lane 2	LNEO	Pit cluster	Pit fill	Skeleton	Dog		
Easton Lane 2/3	LNEO/EBA	Pit cluster	Pit fill	Articulated bones	Ox	Phalanges, carpals and tarsals	
Easton Lane 3	EBA	Pit cluster	Pit fill	Skeleton	Lamb		
Firtree Field	LNEO	Pit cluster	Pit	Bone	Brown bear	Ulna	

Assemblage	Period	Site type	Feature	Deposit type	Species	Detail	Comments
Firtree Field	LNEO	Pit cluster	Pit	Skull	Ox		
Fordington Farm	EBA	Round barrow	Within grave	Bones	Ox	Set of scapulas	
Fordington Farm grave	EBA	Round barrow	Grave 61 as pillow	Bone	Ox	Scapula	Human burial
Fordington Farm grave	EBA	Round barrow	Grave 61 as footrest	Bone	Ox	Vertebra	Human burial
Fussell's Lodge	EMNEO	Long barrow		Articulated bones	Ox	Vertebral column	Replaced in articulation but incomplete
Fussell's Lodge	EMNEO	Long barrow	Entrance	Skull + feet	Ox		
Gatehampton enclosure	EMNEO	Enclosure		Bone	Aurochs	Not specified	
Gatehampton enclosure	EMNEO	Enclosure		Jaw	Pike		
Gatehampton enclosure	EMNEO	Enclosure		Part-skeleton	Lamb		
Gatehampton enclosure	EMNEO	Enclosure		Part-skeleton	Pig		
Gravelly Guy XV	LNEO/EBA	Grave	Flat grave	Jaw	Ox		On burial in chest area
Hazleton North cairn	EMNEO	Long barrow	South chamber	Articulated bones	Roe deer	Leg 'joint'	With human burials
Hazleton North cairn	EMNEO	Long barrow	North chamber	Bones	Dog		With human burial; no other dogs in assemblage
Hazleton North cairn	EMNEO	Long barrow	South chamber	Part-skeleton	Lamb/kid		Peri-natal, with human burial
Hazleton North cairn	EMNEO	Long barrow	Forecourt	Skull?	Pig	Isolated teeth and fragments of skull	
Hemp Knoll burial	LNEO/EBA	Round barrow	Central burial	Skull + feet	Ox	Skull, mandibles, foot bones	
Hemp Knoll pits	EMNEO	Pit cluster	Pit	Skeleton	Calf		
HH Inner E Cross Dyke	EMNEO	Causewayed enclosure	Cross-dyke	Part-skeleton	Calf		
HH Inner E Cross Dyke	EMNEO	Causewayed enclosure	Cross-dyke	skeleton	Sheep/goat		
HH Inner E Cross Dyke	EMNEO	Causewayed enclosure	Cross-dyke	Skeletons (2)	Ox		
HH Main enclosure	EMNEO	Causewayed enclosure	Ditch	Articulated bones	Ox	Leg bones	
HH Middle Stepleton outwork	EMNEO	Causewayed enclosure		Articulated bones	Ox	Vertebral column	
HH Middle Stepleton outwork	EMNEO	Causewayed enclosure		Part-skeleton	Lamb/kid	Immature	
HH Outer E cross-dyke	EMNEO	Causewayed enclosure	Cross-dyke	Skeleton	Goat		

Assemblage	Period	Site type	Feature	Deposit type	Species	Detail	Comments
HH S long barrow	EMNEO	Causewayed enclosure	Long barrow ditch, segment 3	Articulated bones	Ox	Vertebral column	With other skeletal elements
HH S long barrow	EMNEO	Causewayed enclosure	Long barrow ditch, segment 3	Articulated bones	Ox	Vertebral column	
HH S long barrow	EMNEO	Causewayed enclosure	Long barrow ditch, segment 3	Articulated bones	Roe deer		Same context
Hodcott Down bowl barrow	EBA	Round barrow		Articulated bones	Pig		
Holloway Lane	LNEO/EBA	Pit	Pit	Skeleton	Aurochs		With beaker arrowheads
Horslip ditch primary fill	EMNEO	Long barrow	Base of ditch	Skull	Aurochs		
King Barrow Boreham	EMNEO	Long barrow	Central area	Canine tooth	Pig		Male, with other bones
King Barrow Boreham	EMNEO	Long barrow	Edge of mound	Skeleton	Horse		Likely to be intrusive
King Barrow Ridge	LNEO	Pit cluster	Pit 418	Skeletons (3)	Piglets		
Knook	EMNEO	Long barrow		Skull	Aurochs		
Lambourn 19	LNEO/EBA	Round barrow	Base of ditch	Skeletons	Sheep		
Lambourn 19	LNEO/EBA	Round barrow	Base of ditch	Skull	Horse		
Longstones	LNEO	Enclosure	Ditch terminal	Articulated bones	Ox	Vertebrae	
Longstones	LNEO	Enclosure	Ditch terminal	Articulated bones	Pig	Foot	
Maiden Castle enclosure	EMNEO	Causewayed enclosure		Skeleton	Dog		
Maiden Castle enclosure	EMNEO	Causewayed enclosure		Skulls	Ox		
Maiden Castle enclosure	EMNEO	Causewayed enclosure		Skulls	Aurochs		
Manor Farm Horton	EMNEO	Enclosure	Ditch	Jaws	Pike	Pair of jaws	
Manor Farm Horton	EMNEO	Enclosure		Skeleton	Dog		Interpreted as 'part of funeral process'
Millbarrow	EMNEO	Long barrow		Jaws	Pig	Three boar mandibles	
Mockbeggar Lane	EBA	Round barrow	Cremation pit	Skeleton	Pig	Cremated	
Mockbeggar Lane	EBA	Round barrow	Cremation pit	Skeleton	Sheep	Cremated	
Monkton Down G9	EBA	Round barrow		Skulls (2)	Ox		

Assemblage	Period	Site type	Feature	Deposit type	Species	Detail	Comments
Mount Pleasant GW	LNEO	Henge	Main enclosure ditch	Articulated bones	Aurochs	Radius and ulna	
Ogbourne St George G1	EBA	Round barrow	Above human cremation	Articulated bones	Pig	Leg bones	
Ratfyn	LNEO	Pit		Scapula	Brown bear		
RBH Barrow 12 Outer ditch	LNEO/EBA	Round barrow	Ditch	Bone	Aurochs	Distal radius	
RBH Barrow 12 Outer ditch	LNEO/EBA	Round barrow	Ditch fill	Jaws	Pike	Pair of jaws	
RBH Barrow 12 Outer ditch	LNEO/EBA	Round barrow	Ditch	Part-skeleton	Mallard		
RBH Barrow 4A	LNEO/EBA	Round barrow	Ditch	Horn core + metatarsus	Ox		Ritual offering' or part of head and hooves deposit
RBH Grave 4969	EBA	Grave	AB26 on coffin	Bone	Pig	Calcaneum AB27	May be part of placed deposit - see illustration
RBH Grave 4969	EBA	Grave	AB27 on coffin	Skull	Ox		Illustration shows it as fragmentary. Text mixes AB numbers
RBH mortuary structure	EMNEO	Mortuary structure	Grave	Jaw	Pig		Beside grave - possible grave good
RBH oval barrow	EMNEO	Oval barrow	In grave on skeleton	Jaw	Pig		
RBH Pit 913	LNEO	Pit cluster	GW pit	Bones	Pig	12 fibulae	With 6 other limb bones
RBH Pit 913	LNEO	Pit cluster	GW pit	Skeletons	Piglets		Several, most very young, and butchered
RBH pit 942	LNEO/EBA	Grave	Human burial	Skull	Ox	Frontal+molar	
RBH ring ditch 611	LNEO	Ring ditch	Ditch AB16	Articulated bones	Calf	Hind limb	Opposite sides of barrow, but probably same calf as AB15
RBH ring ditch 611	LNEO	Ring ditch	Ditch AB15	Articulated bones	Calf	Fore limb	Opposite sides of barrow, but probably same calf as AB16
RBH ring ditch 611	LNEO	Ring ditch	Ditch AB17	Bone	Large mammal		Burnt large ungulate L.B.fragment, id on site as placed deposit
RBH ring ditch 611	LNEO	Ring ditch	Ditch AB18	Bone	Sheep	Distal humerus	Identified on site as placed deposit; gnawed proximally
Reading Business Park 1	MNEO	Cursus	Pit C7057	Skeleton	Ox	Not fully mature	

Assemblage	Period	Site type	Feature	Deposit type	Species	Detail	Comments
Robin Hood's Ball	EMNEO	Causewayed enclosure	Pit	Articulated bones	Ox	Foot	Same pit
Robin Hood's Ball	EMNEO	Causewayed enclosure	Pit	Articulated bones	Pig	Foot	Same pit
Roughground Farm GW pits	LNEO	Pit cluster	Pit	Part-skeleton	Piglet		
Runnymede (A6)	EMNEO	Settlement		Skeleton	Ox		Butchered, but all seem to be from same animal
Shepperton Staines Rd Farm	EMNEO	Ring ditch	Base of ditch	Skull	Wolf	Skull + mandibles	
Shepperton Staines Rd Farm	EMNEO	Ring ditch	Ditch fill	Skull?	Ox	Pair of horn cores	
Sherrington barrow	EMNEO	Long barrow		Part-skeleton	Pig		
Sherrington barrow	EMNEO	Long barrow		Skull	Ox		
South St primary fill	MNEO	Long barrow	Ditch	Articulated bones	Ox	Vertebrae	
Stonehenge palisade ditch	LNEO	Henge		Articulated bones	Red deer	Humerus, radius, ulna	
Stonehenge Phase 2	MNEO	Henge	Secondary fill	Articulated bones	Dog	Metapodials and phalanges	
Stonehenge Phase 2	MNEO	Henge		Bone	Ox	Pelvis	
Stonehenge Phase 2	MNEO	Henge		Part-skeleton	Fox		
Stonehenge Phase 2	MNEO	Henge	Secondary fill	Part-skeleton	Piglet	Neonatal	Skull +other bones
Stonehenge Phase 2	MNEO	Henge		Skeleton	Piglet		
Stonehenge Phase 2	MNEO	Henge		Skeleton	Piglet		
Stonehenge Phase 2	MNEO	Henge	Secondary fill	Skull	Ox	Horn cores + ?	
Stonehenge Phases 1/2	MNEO	Henge	Base of ditch	Bones	Ox	Radius+ulna	
Stonehenge Phases 1/2	MNEO	Henge	Ditch terminals	Jaws (2)	Ox		Different animals
Stonehenge Phases 1/2	MNEO	Henge	Ditch terminal	Skull	Ox		
Stonehenge Phases 1/2	MNEO	Henge	Base of ditch	Skulls (4)	Ox		
The Sanctuary	LNEO/EBA	Grave	Flat grave	Bones	Pig		On the body, with fragment of red deer antler
The Sanctuary	LNEO/EBA	Grave	Flat grave	Bones	Ox		On the body, with fragment of red deer antler
Thickthorn Down	EMNEO	Long barrow	Ditch	Skull	Aurochs		
Thickthorn Down	EMNEO	Long barrow		Skull	Aurochs		
Tower Hill Ashbury	LNEO	Pit	GW pit	Part-skeleton	Piglet		Must have been buried whole

Assemblage	Period	Site type	Feature	Deposit type	Species	Detail	Comments
Tower Hill Ashbury	LNEO	Pit	GW pit	Skeleton	Lamb		Must have been buried whole
Tower Hill Ashbury	LNEO	Pit	GW pit	Skull + feet	Ox		Hide burial?
Turnpike School Newbury	MNEO	Natural feature	Fill of tree throw hole	Skull	Aurochs		Bull
Twyford Down	EBA	Round barrow	Ditch terminal	Jaw	Horse		
Twyford Down	EBA	Round barrow	Pyre debris	Part-skeleton	Dog		With cremation; not burnt
Twyford Down	EBA	Round barrow	Ditch	Part-skeleton	Ox	less than 4 years	One element gnawed
Twyford Down	EBA	Round barrow	Ditch	Skeleton	Goat		3 1/2 - 6 years Lame
Whitehawk Camp	EMNEO	Causewayed enclosure	Pit	Skeleton	Roe deer		
Whitesheet Hill	EMNEO	Causewayed enclosure	Base of ditch	Skull	Ox		
Whitesheet Hill environs	EMNEO	Causewayed enclosure	Primary fill	Articulated bones	Ox	20 phalanges from 2 or 3 animals	
Whitesheet Hill environs	EMNEO	Causewayed enclosure	Primary fill	Skeleton	Sheep	Immature	
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal MD XA 1.4a	Skeleton	Dog		Near cattle skull
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal MD XA 1.4a	Skull	Cattle		Horncores, dog skeleton nearby
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal A117	Skull	Cattle		Inverted, with horncores and infant cranium
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal MD IB 1.4b	Skull	Cattle		Upright
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal MD VIII	Skull	Cattle		Upright, with horncore
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal MD XB, base	Skull	Cattle		With articulated bones
Windmill Hill	EMNEO	Causewayed enclosure	Centre of ditch ID XII 1.2	Skull	Cattle		With articulated bones, pig, sheep/goat

Assemblage	Period	Site type	Feature	Deposit type	Species	Detail	Comments
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal ID XVI, 1.3a	Skull	Cattle		With articulated bones, sheep/goat
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal ID XVII, base	Skull	Cattle		With horncore
Windmill Hill	EMNEO	Causewayed enclosure	Minor terminal MD XIA	Skull	Cattle		With horncores
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal ID II,1.4	Skull	Cattle		With horncores
Windmill Hill	EMNEO	Causewayed enclosure	Ditch terminal D 418	Skull	Cattle		With pig, red deer antler, human skull frags
Yarnton	ENEO	Settlement	Occupation layer	Part-skeleton	Pig		

Appendix 7 Assemblages not included in the database: period and bibliographic references

Site	Period	Bibliographic reference
Adlestrop	EMNEO	Thomas, R and McFadyen, L 2010 'Animals and Cotswold-Severn long barrows: a re-examination'. *Proceedings of the Prehistoric Society* **76**, 95-113
Belas Knap	EMNEO	Thomas, R and McFadyen, L 2010 'Animals and Cotswold-Severn long barrows: a re-examination'. *Proceedings of the Prehistoric Society* **76**, 95-113
Benson: St Helens Ave	EMNEO	Pine, J and Ford, S 2003 'Excavation of Neolithic, Late Bronze Age, Early Iron Age and Early Saxon features at St. Helen's Avenue, Benson, Oxfordshire'. *Oxoniensia* **68**, 131-78
Bullock Down		Rudling, D 1988 'Excavations at Bullock Down.' *Sussex Archaeological Collections* **126**, 21-30
Burn Ground	EMNEO	Thomas, R and McFadyen, L, 2010 'Animals and Cotswold-Severn long barrows: a re-examination'. *Proceedings of the Prehistoric Society* **76**, 95-113
Durrington Walls	LNEO	Westley, B 1971 'The animal bones from Durrington Walls, 1970', *in* Wainwright, G J 'The excavation of prehistoric and Romano-British settlements near Durrington Walls, Wiltshire, 1970'. *Wiltshire Archaeological and Natural History Magazine* **66**, 76-128, 122-5
Durrington Walls Environs	LNEO	Hamilton-Dyer, S 2004 'Animal bone', *in* Cleal, R M J, Allen, M J, Harding, P and Newman, C 'An archaeological and environmental study of the Neolithic and later prehistoric landscape of the Avon Valley and Durrington Walls Environs, Wilts'. *Wiltshire Archaeological and Natural History Magazine* **97**, 218-48, 226-8
Easton Down beaker settlement	LNEO/EBA	Jackson, J W, 1931 'Animal bones', *in* Stone, J F S 'A settlement site of the Beaker period on Easton Down, Winterslow, S. Wilts'. *Wiltshire Archaeological and Natural History Magazine* **45**, 366-72, 368-9 Jackson, J W 1937 'Report on the skeleton of the dog from Ash Pit C', *in* Stone, J F S 'Excavations at Easton Down, Winterslow 1933-1934'. *Wiltshire Archaeological and Natural History Magazine* **47**, 68-80, 76-8
Eynsham	LNEO/EBA	Mulville, J, 2001. 'Animal bones from a Beaker pit', *in* Barclay, A, Boyle, A and Keevill, G D 'A prehistoric enclosure at Eynsham Abbey, Oxfordshire'. *Oxoniensia* **66**, 105-59, 146-150
Fir Tree Field shaft	ENEO EMNEO MNEO LNEO LNEO/EBA	Maltby, M 2007 Animal bones from the Fir Tree Field shaft and associated pits', *in* French, C and Lewis, H (eds) *Prehistoric Landscape Development and Human Impact in the Upper Allen Valley, Cranborne Chase, Dorset*. Cambridge: McDonald Institute for Archaeological Research, 295-305
Horcott Pit	EMNEO	Evans, E-J 2009 'Animal bone', *in* Lamdin-Whymark, H, Bradyand, K and Smith, A 'Excavation of a Neolithic to Iron Age landscape at Horcott Pit, Gloucestershire'. *Transactions of the Bristol and Gloucestershire Archaeological Society* **127**, 45-121, 122-5
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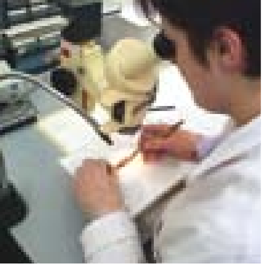
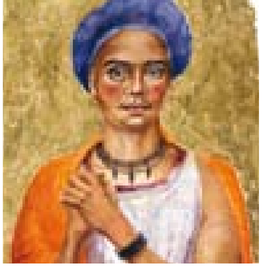



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- *Archaeological Science*
- *Archaeological Survey and Investigation (landscape analysis)*
- *Architectural Investigation*
- *Imaging, Graphics and Survey (including measured and metric survey, and photography)*
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