

# A Reassessment of the Role of Animals at the Eton Causewayed Enclosure

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## ABSTRACT

In recent years, causewayed enclosures have come to be regarded as being ceremonial or ritual sites. This classification is derived from a *perceived* lack of evidence pertaining to domestic settlement, in the form of houses and 'typical' domestic animal bone assemblages, and a *perceived* abundance of 'atypical' material and methods of deposition. This thesis explores the animal bone from the Etton causewayed enclosure in order to ascertain whether these perceptions have an empirical basis.

Etton was excavated in the 1980s, and the published literature relating to the site appeared to conform to the stereotypes established for causewayed enclosure sites, however during preliminary analysis, it became clear that the animal bone data was not complete and that many of the inferences regarding the role of animals at Etton were the result of presumption or data being taken out of context. Specifically, this thesis looks at the nature of the fractures on the animal bones from Etton, and also from a similar causewayed enclosure at Staines in order to establish a clear taphonomic history for the faunal remains on the site, from which aspects of the role of animals can be deduced. In archaeological literature the absence of 'fresh', or helical fractures (which tend to result from the conscious decision to break a bone for marrow) is said to support the hypothesis that sites of this type were not domestic in nature. This assertion has been made despite the fact that no detailed studies into bone fracture at Neolithic sites have ever been undertaken.

This thesis demonstrates that at both Etton and Staines, fresh fractures were abundant and considers the potential implications of this for these sites. In so doing it highlights the dangers of presuming evidence exists or does not exist, and of cherry-picking data to fit a preordained ideal rather than allowing the data to speak for itself. At Etton and Staines, the animal bone speaks not necessarily of a categorically ceremonial or ritual economy, divorced from the domestic economy of the time, but of a more mundane economy, with occasional 'atypical' activity, that was standard for the inhabitants of causewayed enclosures, whether at this type of site or elsewhere.

*To Etholie for keeping me company  
and to Tom for understanding despite not understanding.*

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\*Please note – all dates are given in calibrated calendar years\*

## **1. Introduction**

## 1.1 Introduction

The archaeological record suggests that animals were of critical importance to the prehistoric people of the British Isles, both before and after farming was adopted as a way of life at the beginning of the Neolithic period. With the emergence of farming, however, the role of animals in the lives of Neolithic people changed significantly. Domestic versions of familiar species, as well as some entirely foreign species, were imported from the continent to live in and around gradually settling communities. In Britain this process can first be seen around 6,000 years ago, at c. 4,300 BC (Whittle *et al.* 2011), however the process is generally accepted to have begun some 6,000 years prior to that in the Near East, where it appears to have had a significant impact on the social and cultural lives of the communities at the time (Barker 2006, 1). These social and cultural changes have been interpreted as resulting in animals playing a significant ritual and symbolic role in society and culture. Partially as a result of the evidence for such changes in the Near East, and partially as a result of the post-processual academic climate of archaeology since the 1980's (Hodder 1982, 2006; Conkey 1982; Moore 1982, Grant 1984; Wilson 1992; Hill 1995; Thomas 1999, Balter 2006), it has been argued that the beginnings of the Neolithic in Britain saw animals take on a more evident 'ritual' or symbolic role in people's lives, which continued throughout the Neolithic, Bronze and Iron Ages.

In some instances the significance of the apparent 'ritual' activity seems emphasized at the expense of time spent looking at the more mundane faunal data. Where this is the case it sometimes appears as though the data recovered from the site has been 'cherry-picked' in order to create this 'symbolic' emphasis for the site. It is the aim of this thesis to test the assumption that animal remains present at causewayed enclosures have strongly symbolic overtones. This will be achieved by re-examining the role of animals at the causewayed enclosure site of Etton in Peterborough by reanalyzing the animal bone recovered using new techniques for recording the taphonomic processes to which it has been subject. By so doing, it is hoped that a clearer picture of the role of animals at this site can be established.

## **1.2 Thesis Structure**

This thesis is presented in eight chapters. The first of these provide an introduction and background to the site. The middle chapters present the results of the analysis of the animal remains present in the Etton causewayed enclosure archive, and the final chapters bring together the results in a conclusion before discussing the possibilities for further work on the subject.

- **Chapter 1: Introduction**
- **Chapter 2: Background to the Research**

Chapter 1 introduces the research area and outlines the specific research problems which inspired and are addressed by this thesis. It also presents the overall aims and rationales of the thesis. Chapter 2 presents a review of the literature relevant to the research area and research problems, and gives a more thorough background to the geographical and chronological context of the thesis as well as explaining the link between the rationale behind the thesis and the more chronologically and geographically diverse research which has influenced it.

- **Chapter 3: Methodology**
- **Chapter 4: The Animal Remains from the Etton Causewayed Enclosure**

Chapter 3 gives a brief methodology of the approaches used in the analysis of the faunal material from Etton and Staines, and the results of this analysis can be found in Chapter 4, which presents the basic analysis of the animal remains present in the Etton causewayed enclosure archive. This includes general preservation, species counts, element abundance and age and sex profiles, as well as overviews of the butchery, fracture and fragmentation analysis, which are more thoroughly discussed in following chapters.

- **Chapter 5: Butchery Analysis**
- **Chapter 6: Fracture and Fragmentation Analysis**

Chapters 5 and 6 focus on the more detailed butchery and fracture and fragmentation analysis applied to the animal bones. They both begin with an explanation of the methodology used in the identification and recording of butchery marks and the different types of fracture and degree of fragmentation, and draw conclusions regarding the impact these analyses have on our understanding of the site.

- **Chapter 7: Distribution Analysis**

Chapter 7 investigates whether or not there appear to be patterns in the distribution of animal remains across the site. Focusing on the single ring-ditch encompassing the site, it presents the results of the analysis of the distribution of species and elements across the site and, where possible, considers this in light of the other materials present in the same contexts.

- **Chapter 8: Conclusions**

Chapter 8 concludes the thesis by bringing together all of the various lines of enquiry presented previously, to comment on the apparent role of animals at the site, and how this corresponds with current interpretations of both Etton, and causewayed enclosures more generally. It finishes by suggesting where further this kind of research could be taken, and the potential that future work might have in aiding our understanding of both the role of the animals in the Neolithic and the purpose of causewayed enclosures more generally.

### **1.3 Research Problems**

1. *Why are causewayed enclosures interpreted as ceremonial/ritual as opposed to domestic/settlement?*

2. *What do the animal remains at Etton and Staines tell us about the role of animals at causewayed enclosures?*

Given that the number of causewayed enclosures known about in Neolithic Britain outnumber settlements by a very considerable margin, it is difficult to understand how the benchmark for 'domestic' activity has been set. Material encountered on causewayed enclosure sites was, at one time, thought to be entirely indicative of domestic settlement (Curwen 1931, Crawford 1937, Evans 1988). The same material is now interpreted as being quite the opposite due to its distinction from that material encountered on settlement sites. The question one must consider is which settlement sites? There are remarkably few. Those that have been excavated do not seem to be exempt from 'special deposits' of material, or the apparent structuring of materials within pits or ditches. Indeed, at Durrington Walls, a site which for many years was thought to be entirely the result of episodic ritual, the levels of structure and numbers of 'unusual' deposits are extremely high, yet this has now been reinterpreted as a village (Parker-Pearson *et al.* 2007). Add to this the fact that very few causewayed enclosures have been subject to interior excavations, where presumably most settlement/domestic activity would have been occurring, and the basis upon which assumptions are made regarding the nature of finds begin to seem slightly tenuous.

Analysing the taphonomic history of the bones present at Etton will give an insight into how animals were being exploited at this site during the Neolithic. From the results it is hoped that it will be possible to suggest that with a much-improved degree of confidence (based on a solid empirical base) whether or not this exploitation appears to be indicative of short-term, immediate gain consumption (such as feasting), or a more stable, long-term economic system. If it transpires the minutiae of the faunal assemblage corroborate long-standing beliefs about the nature of activity and economy at causewayed enclosures, it will be the first time such data has been provided to make this point, and will add weight to currently tenuous assertions. If, on the other hand, the data suggests the antithesis of current interpretation, it could launch a new era of interpretation of causewayed enclosures, in which hypotheses that are based on empirical data supersede those which are largely presumptuous.

### 1.3.1 *Why causewayed enclosures?*

Causewayed Enclosures are the focus of this thesis because they have yielded amongst the best-preserved and most substantial faunal assemblages of any Neolithic site type, yet a satisfactory interpretation of the role of animals at these sites is yet to be established. The scope and quality of faunal assemblages from causewayed enclosure sites has meant that it was the animal bones recovered from some of the early major sites, such as Windmill Hill and Maiden Castle, which were used to establish a picture of the animal population of Neolithic Britain. This picture has provided the backdrop for, and been augmented by, subsequent studies of Neolithic animal bone. Arguments have been made against the validity of such a picture (Thomas 1999, 26), however, these are based on the widespread belief that causewayed enclosures were centres of ceremony and ritual and that the represented animal population may have been particular to this kind of activity. An awareness of this possibility is clearly necessary, it is also necessary to be aware that even this is based on the still tenuous assertion that this was the nature of the activity occurring at causewayed enclosures.

One of the primary pieces of evidence cited for the use of causewayed enclosures for activities outside the realm of general domesticity is that the animal bones are dominated by meat-rich elements, and that a higher percentage of them are found in articulation than would generally be expected at a domestic site (Serjeantson 2011, 64). The levels of fracture and fragmentation at the sites are also thought to be lower than at settlement sites, with no real indication that bone processing for fat was occurring (Thomas 1999, 27). This has led to the interpretation that the animal bones represent the remains of large feasts. Smith was the first to suggest this based on her excavations at Windmill Hill (Smith (1965, 19). She believed that the archaeological material was the long-term build up from repeated seasonal gatherings. The presence of large amounts of pottery suitable for the consumption and storage of food has been seen as complimentary to the animal bone evidence used to support this hypothesis (Thomas 1999, 40). More recent studies have added to this theory; a preponderance of adult female cattle

remains suggests a seasonal cull of young males (possibly autumnal) at Hambledon Hill (Mercer and Healy 2008), and the presence of crab apples and hazelnuts there and at Etton (Mercer and Healy 2008; Pryor 1998), which are only present in autumn months, have led to the suggestion that causewayed enclosures were the sites of harvest festivals (*Ibid*).

The evidence provided for this interpretation is troubling in many ways. While there is no denying a prevalence of high-meat yield elements, these are by no means the exclusive type of element present on the sites. High-proportions of low-meat elements such as skulls, spines, ribs and feet are also cited as evidence for the ceremonial/ritual activity (Piggott 1962; Armour-Chelu 1998, 283). Where large amounts of both high- and low-meat yielding elements are present at a single site, there is simply a large and varied assemblage, rather than two discrete sets of bone. Those elements, which are under-represented, such as the carpals, tarsals and phalanges, are not only under-represented at these sites, but at all kinds of sites from all different eras as a result of taphonomic processes both during the deposition and excavation of the material.

The analysis of fracture-type and the levels of fragmentation in order to ascertain activity type has not been applied to causewayed enclosures, or indeed looked at in detail within the context of the British Neolithic prior to this thesis. Despite this, this passage can be found in Julian Thomas' seminal book 'Rethinking the Neolithic' -

*"It is evident that the consumption of large quantities of meat took place at various kinds of monuments during the Neolithic. At none of these [Neolithic monuments] is there extensive evidence for complex bone-processing, marrow-splitting and butchery marks... More clear traces of bone processing might be expected if the nutritional value of the carcasses were being exploited to the full." (Thomas 1999, 27).*

The above quote is taken from a passage in which he argues against the notion that the animal bone remains present at Neolithic monument sites (including causewayed enclosures) are generally representative of the everyday economy

of the Neolithic. Rather, he believes that the animal bones present at causewayed enclosures represent 'special' or 'ritual' occasions, large feasting events, the remains of which were placed within the ditches of causewayed enclosures in a way which was planned and purposeful and which was intended to evoke memories of pertinent celebrations - rites of passage, fertility rituals and the like. These notions have become widely prevalent within the literature pertaining to the British Neolithic and in particular to causewayed enclosure sites (Oswald et al. 2001; Pollard 2001; Whittle 2003; Harris 2003). By considering the fragmented bone and fracture patterns at Etton, it is possible to prove this statement entirely false, which technically removes an important piece of 'evidence' in support of causewayed enclosures *not* being domestic sites, or sites at which domestic economic activity was occurring.

Fracture and fragmentation was considered, briefly, in Albarella and Serjeantson's (2002) paper on pig consumption at Durrington Walls. Here, the argument is made that pig carcasses were subject to less intensive processing than 'normal', where 'normal' is defined by the level of fragmentation at Runnymede (98% (Albarella and Serjeantson 2002, 40)). Durrington Wall's 80% fragmentation is supposed to appear low in comparison, despite the fact that by the author's admission, shaft splinters were not collected (*Ibid*), and that there is absolutely no guarantee that levels of fragmentation at Runnymede were 'normal'.

There is clearly scope to substantially refine interpretations regarding the presence and use of animals at causewayed enclosure sites, even if it transpires there is no contradictory evidence to current theories. The tentative nature of all of the interpretations of the functions of causewayed enclosures, despite significant amounts of research, makes this site type ideal for further work. It may be possible, by looking at the fragmented bone remains, to see the presence of bone processing activities that one would not expect to see on a site inhabited for a short time for the sole purpose of conducting seasonal ceremonies and feasting. Conversely, a notable absence of the kind of processing one would expect to see on long-term sites would only further the arguments for a feasting and gathering hypothesis. Either way, the patterns of fracture and fragmentation, thus the nature and degree of animal exploitation at

these sites, has never been looked at in depth so affords an exciting opportunity to add information to a dataset which has often been guessed at or taken for granted (see Thomas 1999, 27) but never ascertained one way or another.

### *1.3.2 Why Etton?*

Etton was initially chosen as one of a number of case studies that would be used in this thesis. This decision was made based on a number of considerations. The first of these was that there was clearly a very large assemblage of bone that was both very well preserved and relatively easily accessible. The size of the assemblage was important, as much of the analysis that was to be undertaken was intended to provide a statistically valid picture as opposed to looking at individual bones – the larger the sample, the better the resolution of the results. The surface preservation of the bones was equally, if not more important than the size of the archive, as butchery marks and the marks of other taphonomic processes are only visible on the outer surface of the bones, which is the area most prone to erosion. Another key consideration was the fact that all material was retained, including the smallest of fragments. This was particularly important, as it allowed for analysis of fragmentation patterns to be carried out.

The second reason for choosing Etton was that the animal bone report (Armour-Chelu 1998, 273 – 288) appeared to be full and thorough yet lacked any detailed taphonomic analysis or discussion; the first section of the report summarized the usefulness of observing taphonomic modifications on bone, and very briefly commented on the decreasing levels of identifiable bone present in features belonging to later phases, as well as stating that 3% of bones had butchery marks. Slightly more was made of the burning of bones on the site (due to the presence of a number of apparent ‘animal cremations’ in pits within the interior of the site), and slightly more attention again was given to the presence of gnawing marks, root-etching and water action upon the bones. The presence of these summaries of data, however cursory, indicated that taphonomic modifications were there to be seen on the material. Given the advances in the observation, identification and recording of this kind of evidence

since the mid-80s, it was felt that a reanalysis of the taphonomy of the faunal assemblage would potentially yield a large amount of interesting data.

The final reason was that the original zooarchaeological report generally conformed to the picture of causewayed enclosures as ceremonial centres, which was being established during the mid-1980s. The entire site report also came to this general conclusion, contributing to this being the abiding interpretation of causewayed enclosures to this day. The zooarchaeological analysis looked briefly into taphonomic considerations, and provided an overview of the material that was encountered, only discussed material in depth when it was perceived to be unusual (e.g. rib bundles or skulls). This cherry picking of interesting data very much reflects many zooarchaeological investigations of the last two decades, particularly at prehistoric sites. It was hoped that the reanalysis of the Etton bone from a taphonomic perspective would provide new data with which to interpret the nature of activity at Etton, and that this data would support data from a large number of sites in demonstrate the potential of this kind of analysis.

The decision to make Etton the principal focus of this research was made following a visit to assess the bone archive at the Natural History Museum. During the course of this assessment, it became clear that there were considerable discrepancies between this material and the original zooarchaeological report (Armour-Chelu 1998). The most evident and concerning were the differences between the amount of material present in the archive, and the amount of material claimed to have been analyzed in the report. The disorder that the archive was in made an accurate picture of the material very difficult to achieve, however it was clear that a large proportion of bone present had not been included in the original report.

Table 1.1 (below) outlines the amount of material recovered from the ring-ditch that was discussed in the original report, and compares it to the amount of material that actually exists in the archive. It was thought that perhaps the reason for the exclusion of so much material was that there was a problem with the reliability of the context from which it came, however no mention of such a situation was made anywhere in the site or zooarchaeological reports. In order

to clarify the situation, Francis Pryor (who directed the excavations of the site and authored the final report) was contacted. He stated that all of the bone recovered from within the enclosure ditch was from sealed contexts, as the entire ditch was sealed by silting and even where a precise date according to the established site chronology was not possible, the material was mid- to late-Neolithic. He had no knowledge of any logical or practical reason why the report did not include all materials, and was under the impression that the report was complete.

**Table 1.1: Quantities of bone present in report and in reality.**

Ditch Number	Total NISP and unidentifiable specimens in original analysis	Total NISP and unidentifiable specimens in present analysis
1	1627	2948
2	87	131
3	60	80
4	129	160
5	67	2243
6	57	501
7	187	170
8	38	199
9	113	248
10	458	762
11	205	446
12	264	1095
13	451	752
14	13	332
TOTAL	3408	10040

A thorough taphonomic analysis using the latest techniques for identification and recording would therefore reveal a large body of hitherto unknown data; spot-checks for the presence of taphonomic modifications conducted on random boxes of material during the assessment of the material implied that there was a greater level of butchery and gnawing than previously recorded, as well as significant amounts of rodent and canid gnawing. A full taphonomic analysis would be the first of its kind to take place on a causewayed enclosure site.

It is clear that the integrity of the original zooarchaeological investigation was severely compromised by the initial findings of this research. It is difficult to conceive of a circumstance outside the knowledge of the site directors that would have resulted in so great an amount of potentially valuable material being ignored. By completely reanalysing the Etton bone there is an opportunity to put this right, to create a permanent record of the material (the original paper archives are supposed to be housed at the British Museum, but appear to have long since vanished), and to conduct the first taphonomy led investigation into the presence and use of animals on Neolithic causewayed enclosures.

#### **1.4 Specific Research Aims and Rationales**

*Research Aim 1: To perform a trial analysis of taphonomic modifications on the relatively small amount of material existing from the Staines causewayed enclosure.*

Prior to tackling the thousands of bones from Etton, a pilot study of the bone from the Staines causewayed enclosure was carried out in order to appreciate how such a study works, and the potential pitfalls that might be encountered during the reanalysis of Etton. It also provided an opportunity to clarify the direction of the research, and will give an indication as to whether the results would be useful.

*Research Aim 2: To re-record the entire faunal assemblage from the Etton causewayed enclosure*

The original records of the faunal assemblage appear to be somewhat inaccurate and incomplete. The paper database is no longer traceable. No archival information exists for the Etton animal bone except the bones themselves and the original publication. This is to be rectified.

*Research Aim 3: To conduct a full and detailed analysis of butchery evidence on the assemblage.*

An original figure of 3% was given for the percentage of bones displaying butchery marks. This will be confirmed or denied. No further information was given regarding the nature of butchery at the site, except in cases of exceptional interest. During reanalysis precise details regarding the butchery including the kind of mark and its location were recorded onto diagrams. Composite diagrams have been produced and a complete picture of all butchery is now possible. Trends and patterns of butchery analysis have also been identified. Conclusions have been reached about the nature of butchery at Etton, and how this relates to activities occurring on site.

*Research Aim 4: To assess and record levels of fracture and fragmentation throughout the assemblage.*

Levels of fracture and fragmentation were not considered in the previous assessment of Etton faunal material. This is an area of taphonomic investigation that has only come to fruition in the last decade or so. The type of fracture present on bone indicates at what stage of its journey from animal to archaeology it was broken. Freshly broken bones are likely to have been the result of bone processing for fat extraction, bones with dry fractures are more likely to have been broken around the time of their deposition, while mineralized bones may have broken in their archaeological context. Levels of fragmentation within the assemblage can be used to imply how intensely bones were being processed for their nutrients that can suggest the presence of dietary stress.

*Research Aim 5: To assess and record other taphonomic modifications to the bone assemblage (including burning and gnawing).*

More attention appears to have been paid to these taphonomic processes in the original publication. For each, a summary of results has been provided. A preliminary scan of the material indicated that evidence of these processes is more prevalent than initially thought. For this reason the presence of these kinds of modification have been recorded in the same detail as the other kinds of modification (butchery, burning, fracture and fragmentation) described above. The presence of these features on bones can provide evidence for the nature of the deposition of faunal remains on the site. High levels of gnawing by canids

and rodents suggest that the bone material was accessible for a time, rather than being deposited immediately.

## **2. Background to the Research**

This chapter provides a review of research into the following subjects: 'ritual' in the archaeological record, the Neolithic, causewayed enclosures, animals of the Neolithic and the changing interpretations of animal remains on prehistoric sites. It begins considering 'ritual' within the context of archaeology in general, and more specifically the Neolithic. It then gives some contextual background to the study by considering the emergence and impact of the Neolithic on Britain and how this is visible archaeologically. It then moves on to discuss causewayed enclosures and how the interpretation of these sites has changed over the last century of research. Following this, the animals of the British Neolithic, both wild and domestic, are discussed, as is the way in which they are approached archaeologically and theoretically. This considers the relatively insubstantial data and interpretations of animal remains from Neolithic sites. The chapter concludes by considering the impact of later prehistoric studies on the British Neolithic.

## **2.1 The Neolithic and Causewayed Enclosures**

### *2.1.1 The Neolithic in Britain*

Indications of changes in the way in which people were living in Britain begin to be archaeologically visible c. 4300 BC (Whittle *et al.* 2011, Oswald *et al.* 2001). These changes are traditionally thought to be indicative of the shift from the primarily nomadic, hunter-gatherer way of life of the Mesolithic to the apparently more settled, agricultural lifestyle of the Neolithic. This change appears to have gradually diffused west across Europe between 7,000 and 4,000 BC (Thomas 1999, 311) from its genesis in the Near East, where it is generally regarded as having emerged about 12,000 years ago (Barker 2006, 1) The changes that are perceived to herald the arrival of the Neolithic have long been grouped together to form a 'Neolithic Package', and although this is now viewed as being somewhat simplistic (Thomas 2003; Çilingiroglu 2005; Schulting 2008), it remains a useful tool for explaining the impact the Neolithic is thought to have had on the people who adopted some, or all of its technologies.

The 'Neolithic Package' is a term used to describe the social, economic and cultural changes associated with the transition from a nomadic, hunter-gatherer

lifestyle, to an agrarian one. Aspects of this 'package' were initially visible in the Near East around 9,500 BC, and the full package not until around 8,500 BC (Cauvin 2000, 1). The 'package' appears to have gradually diffused westwards towards Britain as a largely intact set of archaeologically visible changes to material culture, architecture and subsistence economy. Inevitably, as it passed with or between the people of Mesolithic Europe, it was subject to various deviations, but when it reached Britain it is traditionally believed to have consisted of sedentism, animal husbandry, arable agriculture, monumental architecture and innovations to material culture. A great many debates are ongoing as to the actual impact of the individual elements of the 'package' to the everyday lives of the Mesolithic populous but what is certain is that that by the end of the Neolithic period and the beginning of the Bronze Age, c. 2400 – 2200 BC (Oswald *et al.* 2001, 3), Britain was inhabited by largely sedentary mixed farming societies.

Arguably the most important yet certainly one of the least visible of these changes is the change from a nomadic to a sedentary lifestyle. On mainland Europe the arrival of the Neolithic is often associated with the emergence of large permanently inhabited settlements such as the *Linearbandkeramik* sites of Bylany, Eythra Langweiler 8 and Erkelenz-Kückhoven in Central Europe (Květina and Končelová 2013 and Nockemann 2007, 1). In Britain, such sites have never been encountered and as a result the notion that people were living permanently in one place has gradually been eroded due to lack of evidence (Edmonds 1999, Whittle 1996). It is now believed that rather than developing a generic sedentary economy, Neolithic Britain supported a wide variety of individual economies including a form of 'tethered mobility' (Thomas 1999, 223; Whittle 1997) which would have seen people utilise a number of locations for settlement at different times of the year. Although this hypothesis appears to be relatively acceptable, there is no more evidence to suggest this kind of settlement pattern was occurring than there is to suggest the presence or absence of permanent settlement.

Recent excavations at Durrington Walls have revealed an extensive, apparently permanent, settlement linked to the construction and use of Stonehenge (Parker-Pearson *et al.* 2007), and other large-scale settlement sites, such as

Cheviot Quarry in Northumberland (Johnson and Waddington 2008) are adding to the picture. Despite there being just a handful of sites which are widely accepted as being domestic settlements, material which would generally be regarded as being domestic in nature is common across all kinds of site. Many sites, which are now in the category 'ritual' or 'ceremonial' site, were originally identified as settlements or camps because of the abundance 'domestic refuse' encountered during excavation. This thesis considers causewayed enclosures, perhaps the most ambiguous Neolithic site type, with this in mind and attempts to discern what it is that demonstrates that these sites were not used for settlement activity.

As with the evidence for permanent settlement, the evidence for arable agriculture is contentious. Landscape evidence points to deforestation and soil depletion in chalk downland areas, both of which are often cited as evidence for the rapid spread of agriculture across the land, as they are often thought to become visible at around the beginning of the Neolithic (Evans *et al.* 1993, Brown 1997). Both forms of evidence are less than definitive however. Soil depletion could equally possibly be the result of the post-glacial conditions of the Mesolithic (Fisher 1982) as the result of intensified agriculture (Thomas 1999, 30-1). Deforestation, evidenced by pollen diagrams and traditionally attributed to land-clearance prior to arable cropping could plausibly be the result of soil depletion, disease, climate change or pre-Neolithic human activity (Tipping 1994, 22). The pollen diagrams which evidence woodland decline suggest a wave of deforestation very much in keeping with traditional 'pioneer' models used to explain the spread of the Neolithic across Europe (Dennell 1983), however, the homogeneity with which the decline appeared to take place and the 500 year time span does not seem particularly conducive to human action. More likely, the natural process of deforestation facilitated the intensification of arable agriculture at this time.

As well as landscape evidence for arable agriculture, environmental remains have been used to suggest its presence or absence around sites. Unfortunately this tends to be equally as ephemeral as the landscape evidence discussed above. The proportions of macrobotanical remains present in environmental assemblages are subjected to massive biases, making accurate interpretations

difficult. A dominance of wild species is sometimes observed at Neolithic sites (Robinson and Wilson 1987; Moffett *et al.* 1989; Murphy 1990, 32; Brown 1997, 93; Thomas 1999, 25), however, this tends to be based on the presence of hazelnut shells which were a non-consumable and necessary by-product of every nut that was eaten, and very likely to be discarded into a fire thus become carbonised, unlike cereal grain which was consumable and would usually only have been carbonised in small numbers and by accident.

Ard marks are also used to argue for the presence of arable agriculture and are, once again, exceptionally rare. Marks beneath the South Street long barrow represent the earliest evidence for ploughing in Britain, and date from 3663 to 3367 BC (Evans 1971, 48 and Ashbee *et al.* 1979). It is not clear whether they were created with the purpose of drilling crops or whether some other activity was responsible.

Many believe that the farming of food crops was at best sporadic, with little real importance to the Neolithic economy. This has led to the interpretation that when crops were exploited it was for 'ritual' or 'ceremonial' activity and therefore it does not reflect everyday subsistence (Edmonds 1999; Thomas 1999, 2003; Whittle 2003). This notion is contrary to the opinion that in mainland Europe crops were cultivated as basis of everyday subsistence (Bogucki 1998, Lüning 2000, 179) but comparisons between crops from Britain and mainland Europe have shown no particular difference (Bogaard and Jones 2007, 370). Bogaard and Jones have suggested that this is more interesting as an example of the British obsession of divorcing function and ritual than it is of any particular economic system. Regardless of the intensity of arable agriculture and the ephemeral nature of the evidence pertaining to it, what is known is that by the early Neolithic, emmer, einkorn and possibly bread wheat and six-rowed barley were present in the British Isles for the first time. Their exploitation, whether as widespread agricultural activity or relatively limited local cultivation, is unique to the Neolithic and subsequent time periods, and where arable agriculture was being practiced, people would have had to be fairly sedentary.

Compelling as Bogaard and Jones' argument is, there is no denying that evidence for arable agriculture remains fairly sparse for Neolithic Britain.

Fortunately considerably more evidence for sedentism is present when we consider material culture, animal husbandry and monumental architecture. The development and innovation of material culture involves two mediums – flint and pottery. Flint tools had already been developing for hundreds of thousands of years, so their refinement is not necessarily particularly surprising or indicative of major life-style changes or sedentism. The emergence of pottery however, was a uniquely Neolithic development in this country, with no evidence at all for this kind of technology prior to c. 4000 BC (Hey and Barclay 2007, 40). The adoption of a ceramic technology meant that objects were being created in apparently large quantities that were bulky, fragile and relatively heavy, therefore were not particularly conducive to a lifestyle based around transient settlement.

The animals of the Neolithic will be discussed at length in the next section, so just a very brief summary will be given here. The presence of domestic animals in Britain from the Neolithic period onwards is as incontrovertible as the absence of domestic animals from pre-Neolithic periods. Cattle, pigs and sheep are found in large numbers at various different kinds of Neolithic site, and appear to have been at the heart of the Neolithic economy, while wild animals only make up a very tiny percentage of the total assemblage at most sites from this era (Serjeantson 2011).

It is entirely possible to herd animals over wide areas, though this tends to be particularly effective where the animals that are being herded have migratory instincts, and they are being moved over wide open landscapes such as grassland steppe or tundra however neither of these applies to Britain. The animals of Neolithic Britain were initially imported from mainland Europe, making the idea of herding over large areas unlikely, especially in the case of cattle and sheep. It has been suggested that it might have been suitable to keep pigs semi-feral in woodland, but this is the only domestic species to which such practices could really be applied.

Legge (1981) first postulated widespread dairying and recently substantial evidence for this has been published (Copley *et al.* 2003 and 2005). This evidence has been used to suggest that a more permanent or at least semi-

permanent lifestyle was being followed. The amount of milk that would have been produced by even a small herd would have been substantial; this makes Thomas' hypothesis (2004, 120) regarding milk as a purely ceremonial foodstuff an unlikely one.

The final part of the 'Neolithic package' is monumental architecture. The first kinds of monument to appear in the British landscape were funerary architectures called long barrows and chambered tombs. They represent the first real attempts to influence the appearance of the landscape in which people were living. These first monuments are thought to have been largely funerary in nature and it is perhaps modern sensibilities regarding funerary activity which why any monumental architecture is often perceived to be in some way ceremonial. The tradition of burial monuments continued from the early Neolithic through into the Bronze Age (Oswald *et al.* 2001, 2). Causewayed enclosures, the site type upon which this thesis focuses, appeared several hundred years after the first barrows and around 500 years from the presumed beginning of the Neolithic period. They are discussed at length below. Cursus monuments appeared soon after causewayed enclosures, and some 200 – 300 years later the first henge monuments appeared (*Ibid*, 3). Traditionally it is believed that monumental architecture appears when a society has acquired a sufficient surplus from farming as the construction of many monuments thousands, if not hundreds of thousands of man-hours, which would have detracted from the production of food. While the smallest barrows may not have required this, it is certain that the construction of monuments such as Stonehenge would have needed hundreds of fulltime workers, all of whom and all of whose would have needed feeding and maintaining. Halstead (1989) suggests that the notion of communities generating sufficient surplus is not necessary for the construction of monumental architectures, but that arable agriculture will, even in normal circumstances, generate a surplus. Some people will generate more than others, allowing for a gradual establishment of a hierarchy in society and that this will allow for the construction of monumental architecture. Regardless, the hundreds of fulltime workers required for the construction of monuments, such as Stonehenge, would have required feeding and would not have been inputting into the generation of food. We must presume then, that by this point in the Neolithic period, society and its economy

had developed away from the transient model of the Mesolithic enough to be able to deal with the demands of this – permanent or at least semi-permanent settlement, crop cultivation and animal husbandry are surely the only facilitators of this.

### *2.1.2 Changing Interpretations of Causewayed Enclosures*

Causewayed enclosures are roughly circular or oval monument comprising at least one but sometimes many concentric rings of ditches interrupted by causeways. The time during which these monuments were being constructed and used is thought to have been relatively short – just 300 years between 3900 BC and 3600 BC (Whittle *et al.* 2011, 1). In 2001, almost 120 sites were identified in the British Isles as possibly being causewayed enclosures, of which 60 (all in England) were thought to definitively be identifiable as such (Oswald *et al.* 2001, xii). Compared to other prehistoric monument types, causewayed enclosures are relatively scarce – for example, in excess of 600 Neolithic long barrows have been identified within the same geographical area. Yet compared to known Neolithic settlements, causewayed enclosures are common (*Ibid*, 3).

Causewayed Enclosures are located all over Britain, though are concentrated in southern England. They are also present in Ireland and on mainland Europe. It is thought that the density of these monuments is probably greater on mainland Europe than in Britain, particularly in France, Germany and Belgium (*Ibid*, 83). Gaining a precise understanding of the location of causewayed enclosures is difficult. The majority are identified solely by their visibility as a crop-mark, yet crop-marks require specific sets of circumstances to form so it should not be presumed that all or even a majority of causewayed enclosures would be visible in this way. They are also prone to be located in areas now devoted to agriculture and as such have been subject to hundreds, if not thousands of years of cultivation, disturbance and erosion (Mercer 1990, 10). For these reasons it is logical to suggest that the causewayed enclosures known to modern archaeologists represent the tip of the iceberg of monuments that would have been in existence during the early Neolithic.

Traditionally the differential rate of survival of causewayed enclosures in various physical locations was misinterpreted as a preference to construct the monuments on high ground rather than in riverine locations (Palmer 1976). In actual fact there is no such preference for the construction of the enclosures on upland sites; two thirds of known causewayed enclosures are situated in riverine locations, either on slight rises on valley floors or on the sides of valleys (Oswald *et al.* 2001, 91). These riverine sites were usually situated just above the Neolithic high water line (though it is thought that one or two, such as Etton, spent some of the year waterlogged). Waterways were clearly of great importance to these sites. They were not of so much importance to upland sites, though some affinity between site and water remains, as they are rarely more than 2km from a navigable passage (*Ibid*, 1999). In terms of physical environment it is thought that most sites were located in clearings in predominantly wooded landscapes, making upland sites very visible from great distances (*Ibid*, 104).

Large-scale and frequent excavation of causewayed enclosures coincided with the realization of the potential of aerial photography to identify the sites in the 1970s (Palmer 1976). However, some excavations were carried out before this, including at Windmill Hill, Knap Hill, Abingdon, The Trundle and Whitehawk Hill, all of which were opened in the 1920's, and Combe Hill, Whitesheet Hill, Hambledon Hill, Rybury Camp and Robin Hood's Ball which were all opened in the post-war years (Oswald *et al.* 2001, 27 – 29). Sites with extant earthworks drew attention and therefore tend to have been excavated. The preservation of earthworks is very variable, and usually only occurs at upland sites. It is unusual for earthworks to be present at a river valley site, though subterranean preservation conditions in these contexts tend to be more favourable (*Ibid*).

Causewayed enclosures are the focus of this thesis because they have yielded amongst the best-preserved and most substantial faunal assemblages of any Neolithic site type. The composition of these assemblages is largely consistent from one site to the next, with cattle remains dominating and pig and sheep following closely behind. Most also have a very small proportion of wild species, but domestic species always dominate (Chapter 5; Thomas 1999, 27). The often excellent quality of assemblages at causewayed enclosures means that

they were historically been used to extrapolate the general faunal environment of Neolithic Britain. Arguments have been made against the validity of using these assemblages to reflect wider norms given the widespread belief that causewayed enclosures functioned in a largely ceremonial capacity, thus making it plausible that the species represented are particular to this kind of activity. There is a clear consensus amongst Neolithic specialists that this ceremonial interpretation of the function of causewayed enclosures is correct (Whittle *et al.* 2011; Oswald *et al.* 2001; Thomas 1999), but it is difficult to discern the evidence upon which this is based. There are certainly peculiarities in the archaeological record at causewayed enclosures, and instances where ritual explanations appear to be the most 'logical', however, the vast proportion of evidence recovered from these sites does not fall into this category and appears to be more mundane. The ceremonial interpretation of these sites seems to be based on the very small proportion of the total amount of material, which has been judged to be extraordinary. The limited archaeological record for the Neolithic in Britain, and more specifically for domesticity in Neolithic Britain means that it is almost impossible to judge the relative sacredness or banality of any material recovered. Rather than identifying particularly ritualistic-looking components of an assemblage and expounding them, it is the intention of this thesis to question this acceptance of ceremonial/ritual over domestic/settlement activity and also to question the implicit false dichotomy created by the separation of the two spheres by looking at the entire assemblage from a perspective which is as detached as possible from the implications derived from its context.

It is generally believed that the animal remains at causewayed enclosures are indicative of sporadic feasting activity and the, often structured, deposition of associated refuse. This is because of the large numbers of meat rich elements, and the presence of articulated bone groups (ABG's). The recent discovery of extensive dairying activity at the enclosure sites of Hambledon Hill, Windmill Hill and Abingdon (Copley *et al.* 2005) suggests not so much of a sporadic inhabitation of the sites, but a more localised way of life around them, if not in them. This does not seem to have made its way into more general literature on causewayed enclosures as yet, and the idea that causewayed enclosures were primary ceremonial centres where gathering and feasting may have occurred is

the most popular current interpretation. The presence of large amounts of pottery suitable for the consumption and storage of food is seen as complimentary to the animal bone evidence in support of this hypothesis. Smith (1965, 19) was the first to suggest this based on her excavations at Windmill Hill. She believed that the archaeological material was the long-term build up from repeated seasonal gatherings. More recent studies have added to this theory; a preponderance of adult female cattle remains suggests a seasonal cull (possibly autumnal) (Mercer and Healy 2008), and the presence of crab apples and hazelnuts (Mercer and Healy 2008; Pryor 1998), which are only present in autumn months, have led to the suggestion that causewayed enclosures were the sites of harvest festivals (*Ibid*).

A great many alternative theories regarding the usage of causewayed enclosures have been presented since they began to be investigated, yet even almost one hundred years after the initial investigations at Windmill Hill, there is no real consensus as to what the role of these sites in the lives of the people of Neolithic Britain actually was. The earliest hypothesis is that causewayed enclosures were some kind of camp or settlement site. This has been circulating since the first large scale excavations of causewayed enclosures in the 1920's (Curwen 1930, Whittle 2001 *et al.*, 9) and is based on the fact that almost without exception, large quantities of material indicative of occupation debris (animal bones; pottery; flint, stone, antler and bone tools) have been recovered during excavations. The undermining factor for this interpretation is, and has always been, the absence of explicit evidence for structures within the enclosures. Some sites have yielded tenuous evidence for structures such as at Hembury in Devon where postholes can tentatively be interpreted as following a potential structure alignment. Hambledon Hill (Mercer and Healy 2008), Crickley Hill (Dixon 1988), Staines (Robertson-Mackay 1987) and Etton (Pryor 1998) all have pits and postholes scattered throughout their interiors, however, these tend to be in fairly amorphous groups or no particular groups at all. At Etton for example, despite fairly abundant internal features and almost complete excavation of the interior, only one group of features appear to bear any resemblance to a structure and there is virtually none of the stratigraphic evidence presumed to be the typical result of occupation activity such as hearths, house platforms, gullies or waterholes (Pryor 1998, 360). At Crickley

Hill, where three houses have fairly definitively been identified, the features have been dated to a later phase of activity (Dixon 1988, 82). Without such evidence, it has been argued little more than sporadic seasonal occupation of these sites can possibly have been occurring (Oswald *et al.* 2001, 124; Pryor 1998. 361), however one would also expect to see some evidence of structures and hearths from even the most intermittent periods of inhabitancy of a site, unless of course, structures were present but left little or no archaeological footprint, or a footprint which is being misinterpreted.

The difficulty with the settlement argument comes in reconciling the artefacts recovered from the sites with the archaeological features identified during excavation. It has tended to be the case that the lack of physical settlement evidence has outweighed the plethora of material culture suggestive of settlement activity. This may in part be a result of the overwhelming evidence for permanent Neolithic structures on very large sites across Europe and the expectation that the same evidence would be visible in Britain were the same kind of activity occurring. If settlement activity was different in nature to that which was occurring on the continent however, perhaps it is simply that we are expecting to see the wrong kind of evidence and therefore seeing nothing at all. It is plausible that settlement architecture in Britain is archaeologically more ephemeral without having been any less permanent for the occupants (Healy 1988).

The presence of human bone in prehistoric contexts has traditionally been used as evidence for ritual or non-normative behaviour. This interpretation likely has more to do with the modern perspectives of human remains than any evidence that human remains were thought of as special in prehistoric Britain. Relatively small quantities of human remains have been frequently recovered from contexts within and associated with causewayed enclosures, for example Windmill Hill (Whittle *et al.* 1999), Abingdon (Avery 1982), Staines (Robertson-Mackay 1987), Maiden Castle, The Trundle, Offham Hill and Maiden Bower (Matthews 1976). Complete inhumations and cremations are occasionally recovered from causewayed enclosures, for example at Whitehawk Hill where one grave containing a crouched inhumation was found, and where numerous skeletons were recovered from within the banks constructed around the

monument (Mercer 1990, 57); and at Hambledon Hill where two child burials were found on the floor of a ditch (*Ibid*, 51). More frequently encountered are disarticulated and fragmented human remains apparently deliberately positioned in the base of ditch cuts or pits. In the same context as the two child burials at Hambledon were the partial remains of a teenager that appeared to have been disarticulated prior to burial and which had been gnawed by dogs – implying its exposure for some time after death and before inhumation (*Ibid*). There was a considerable amount of this kind of material at Hambledon Hill, which inspired the hypothesis that it was utilized as a massive 9ha Neolithic necropolis where excarnation would have occurred prior to the secondary deposition of human remains in surrounding long barrows, or burial in pits or ditches (Oswald *et al.* 2001, 123 – 130). Similar material has been recovered at Maiden Castle, Offham Hill and Abingdon, and a few gnawed human bones were present at Etton, fuelling this interpretation of the function of causewayed enclosures further,

Also thought to be indicative of ‘ceremonial’ or ‘ritual’ behaviour is the nature of the deposition of animal remains at causewayed enclosures. Deposits of complete or semi-complete skulls, spines and rib cages in the termini of ditches has been labelled as ‘structured deposition’ and is argued to represent the premeditated and ‘special’ placement of this material into the ground (Thomas 1991, Chapter 4). Similarly the deposition of articulated limbs of animals is thought to represent the purposeful waste of meat for some unknown yet special purpose (Morris 2008), however it is possible for a limb to remain intact once the meat has been removed. The notion of conspicuous consumption has widely permeated the study of British prehistory and will be discussed in greater detail in the following section. Certainly during the Neolithic there appear to be unusual instances of deposition, however given the very little evidence there is pertaining to settlement activity it is difficult to ascertain a level from which deposition has had to deviate in order to be judged as unusual. The deposition of birch bark, whole pots and bundles of cattle ribs at Etton (Pryor 1998, 365), a broken axe butt, human skull fragments and burnt material at Haddenham (Evans 1988, 134), a sheep’s skull in the terminal of a ditch at Staines (Robertson-Mackay 1987, 46), skulls on the base of a ditch at Hambledon (Mercer 1980, 30) or complete burials in ditch termini at Offham (Curwen 1929),

Whitehawk (Curwen 1934, 110) and the Trundle (Drewett 1977, 209) may all represent instances of premeditated deposition practices accompanied by some sort of ceremonial activity, but equally they may just represent people carefully depositing material that simply needed depositing.

It is not just deposits of apparently complete or partially complete material that have been interpreted as of ritual activity. Other deposits of seemingly innocuous material, such as a commingled mass of animal and human bone, flint flakes and potsherds at Hambledon Hill (Mercer 1980, 30) have been identified as unusual because of their apparent confinement to a certain space. Something else that has been used to allude to the fact that the deposition occurring at causewayed enclosures was non-normative is that many deposits appear to have been backfilled almost immediately following their interment. An example of this from Briar Hill is a pit containing fragments of charcoal and ironstone that had obviously been burnt and were sealed in context by a single clean layer of soil (Bamford 1985, 96). The backfilling and sealing of ditch deposits is equally common as it is with pits (Oswald *et al.* 2001, 36; Evans 1988, 85 – 87). Some ditches at Etton were filled and recut as many as eight times (Pryor 1998).

Other theories regarding the usage of causewayed enclosures include exchange and manufacture and defence. The exchange and manufacture hypothesis suggests that causewayed enclosures were rather like market-places (Thomas 1999, 43). It was initially based on the presence of numerous objects made from non-local stone at Windmill Hill (Oswald 1999, 123), and developed due to the identification of non-local clays in the pottery (Peacock 1969). The primary argument against this notion is that exotic/unusual materials are encountered with some regularity at causewayed enclosures, and if they were being traded they would be being removed rather than deposited. It is plausible that if one is inclined to believe that the purpose of the sites was for seasonal gatherings then another facet of such an occasion would have been trade/exchange, but it seems unlikely that this was the primary purpose of such events.

In the cases of Crickley Hill and Hambledon Hill, the presence of human remains was used to promote the idea that these enclosures were defensive structures. At both of these there is evidence of an attack by archers and of burning (Dixon 1988; Mercer and Healy 2008). There is also evidence of violence at Carn Brae in Cornwall. At all three there are issues surrounding the continuity of these events. The apparent assault at Carn Brae appears to have stopped activity at the site, while at Crickley Hill and Hambledon activity continued for a limited time afterwards (Oswald *et al.* 2001, 128). It seems far more likely that assaults would have been made on a settlement than on the location for a seasonal feast.

Probably the most favoured interpretation of causewayed enclosures is by no means the most recent. Following her excavations at Windmill Hill, Smith made the assertion that the complex deposits recovered from most causewayed enclosure ditches were the result of repeated gatherings, whether seasonal, annual or periodic (Smith 1965 19). Her hypothesis is so favoured because it would explain the very diverse nature of the activities that appear to have been occurring at causewayed enclosures, as well as the more unusual activity that is also seen with relative frequency.

As well as the apparently regular accumulations of ditch material; the seasonal nature of some of the material recovered from sites such as Hambledon Hill (Legge 1981; Mercer and Healy 2008) and Etton (Pryor 1998) seems to suggest regular autumnal activity. At Hambledon Hill the dominance of mature females in the cattle assemblage is thought to represent the autumnal cull of a herd kept largely for dairying (Legge 1981, 179), though this is based on presumption rather than actual data. At Etton, Pryor suggests that large gatherings were happening in the autumn when communities had both time and surplus to allow them to come together in large numbers to either celebrate rites of passage, resolve disputes or to compete for social ranking. This interpretation cites the evidence for hazelnuts, crab apples and sloes present across the site (Pryor 1998, 361).

## 2.2 The Domestic Animals of Neolithic Britain

Three major domesticates are present ubiquitously on Neolithic sites - cattle, pigs and sheep (and possibly goat, though sheep and goat are largely interchangeable archaeologically). Although the levels of these fluctuate over the Neolithic period, cattle are generally the most prevalent species, followed by pigs and sheep (Serjeantson 2011, 15). Wild species are also present at a large proportion of Neolithic sites – around 70% of sites in southern Britain, though in considerably fewer numbers than domesticates. The dominant wild species are red deer followed by roe deer, and then aurochs (*Ibid*).

### 2.2.1 Domestic Cattle

Although cattle numbers appear to have fluctuated throughout the Neolithic, they remained the primary domesticate for the majority of the period, only being challenged for this position by pigs for a short time during the latter part of the period. For a short spell during the very late Neolithic and early Bronze Age cattle were once again the primary domesticate, until being usurped by sheep once the early Bronze Age had become established (Serjeantson 2011, 15 – 17). The preponderance of cattle has traditionally been explained as being representative of ceremonial site types, such as barrows and causewayed enclosures rather than representative of the everyday economy of the Neolithic, however, in her recent review of the fauna of the Neolithic in southern England, Serjeantson argues that although cattle remains are a little less abundant at sites which are regarded as being more domestic in nature, in fact, cattle are consistently the most abundant domesticate, regardless of site type (*Ibid*, 15; Serjeantson 1996, 207). Their presence on both ‘ceremonial’ and domestic site types does not diminish the value of the cattle as a status animal, but does indicate that it was widely kept and exploited for everyday use and consumption as well as special events.

It has been thought for some time that domestic cattle were imported from the continent rather than being domesticated from a local population in Britain. Originally this hypothesis was based upon the fact that no remains bridging the size gap between aurochs and domestic cattle populations had been recovered

from sites in Britain, implying that the transition from one to the other was not a gradual one (Grigson 1982; Tresset 2003; Bruford *et al.* 2003). This has since been confirmed by DNA studies, identifying a Near Eastern origin for European domestic cattle (Edwards *et al.* 2007).

Butchery marks present consistently on cattle remains suggest that, unsurprisingly, cattle were exploited for their meat. As well as meat, there are also questions regarding the extent to which cattle were utilised for their secondary products - milk and traction. Although now largely resolved, the question of the dairying of Neolithic cattle has been debated for many years, not just with regards to the British Neolithic, but also in early farming communities more generally. Originally, herd structure analysis afforded some understanding of the uses to which cattle were subject. For example, one would expect a dairy herd to mostly comprise adult cows, with young cows being raised to maturity and young bulls being killed off. To maintain such a herd, perhaps only one or two bulls would need to be kept to maturity in order to service the herd (Grigson 1999, 228). This pattern was evident at Windmill Hill where elderly female cows were clearly dominant, and led to the suggestion that the secondary products which were continuously provided by cows throughout their lifetime were more important than the meat product of their slaughter (*Ibid*). At the time the Windmill Hill report was being written there was no identification of specific material culture which associated with dairying, however, in the years since, the development of lipid residue analysis has confirmed the widespread presence of dairying both at Windmill Hill and across Britain from the very early Neolithic (Copley *et al.* 2003; Copley *et al.* 2005).

The lipid analysis of potsherds from six major Neolithic sites, including pottery from Windmill Hill and Hambledon Hill, revealed significant evidence for dairying. Perhaps unsurprisingly, given its interpretation as being domestic in nature, the site with the highest percentage of sherds containing lipid residues was Runnymede, however, significant percentages of sherds from the causewayed enclosure sites of Windmill Hill, Abingdon and Hambledon Hill also contained dairy residues (Copley *et al.* 2005, 528). That dairying was evidently occurring, and appears to have been widespread has implications for the closeness of the animals to human settlement activity. The apparent ubiquity of

dairying could be used to argue for a relatively high level of sedentism of Neolithic society and against the notion that animals (specifically cattle) were “circulating in the landscape” (Thomas 1999, 29), although the two do not always go hand in hand. Although the hypothesis that Neolithic people in Britain retained a largely nomadic lifestyle was initially made prior to lipid residue studies (Barker and Webley 1978 and Jarman *et al.* 1982, Thomas 1999), more recent papers on the subject (e.g. Thomas 2007), have maintained this opinion without reference to the work of Copley *et al.* (2003, 2005). It is entirely possible to maintain a dairying economy whilst nomadic, or at least semi-nomadic, however, the landscape of Britain during the Neolithic is unlikely to have been particularly conducive to this, and with the compelling evidence from Bogaard and Jones (see above) regarding the prevalence of agrarian economies, it seems increasingly unlikely that this was the case.

Aside from milk, cattle may have been being used as traction animals during the Neolithic (Piggott 1992, 19). If the notion of settlement mobility is accepted, the increased material culture of the Neolithic including significant collections of ceramics would have needed to be transported and cattle attached to a sled would have made this process easier. Although there is no evidence that the wheel had yet reached Britain, there is evidence that it was being used in continental Europe at about this time (Whittle 1988, 95). As well as potentially being used to transport materials there are some pieces of evidence that suggest that cattle were also used for the pulling of ards. Some pathologies present on cattle bones at Neolithic sites have been associated with ploughing, such as changes to the metapodia, phalanges or pelves (Olsen 1994; Armour-Chelu and Clutton-Brock 1985; Armour-Chelu 1998, 284; Isaakidou 2006). A number of pathologies, which were thought to represent this activity, such as the perforation of the skull around the base of the horncore, have subsequently been identified as genetic rather than traction related (Brothwell *et al.* 1996; Fabis and Thomas 2011).

As well as pathologies, plough marks and evidence of castration have also been used in arguments for cattle being used for traction. The presence of ard-marks beneath sealed Neolithic monuments such as the South Street Long Barrow (Fowler and Evans 1967, 292; Ashbee *et al.* 1979) could potentially

have been made by a cattle-driven ard, but could also have been made by a human worked plough or another activity altogether, such as levelling the ground and clearing turf for covering the barrow following its construction. Evidence for the castration of male cattle could also indicate the selection of some animals specifically for traction activity (Serjeantson 2011, 22), though this is much more common in later periods, and does not necessarily have to imply this, as cows could have pulled ploughs as effectively as castrated males (Reynolds 1979).

The ceremonial exploitation of cattle has been reported on a number of occasions (Davies 1987, 178; Armour-Chelu 1998, 284). The presence of ceremonially exploited cattle has in the past been defined by the identification of a non-normative herd structure. For example, at Hambledon Hill the bone remains indicate the presence of a herd of very young animals with a tiny number of more mature individuals – in practice a herd of this structure would be untenable for any length of time and young animals who die or are killed must have been deposited somewhere (Legge 2008, 555). At Etton (Pryor 1998) and Windmill Hill (Grigson 1999, 207-8) it was the presence of a disproportionate amount of high meat yielding elements, and the 'unusual' nature of their deposition, rather than herd structure, which was used to imply a ceremonial function.

Usually however, it is the composition of the assemblage and the manner and context of deposition, which is cited as evidence for non-economic treatment of animals. There is an apparent association between human and cattle remains that has led to the two sometimes being referred to as interchangeable (Thomas 1999, 28; Pollard 2005, 141). Evidence for such an association is well attested at funerary monuments; at Fussell's Lodge the presence of cattle crania and metapodia has been used to argue that the interred bodies were probably being draped in hides which has been interpreted by Pollard as being indicative of ideas of 'containment, melding together, or absorption of ancestral bone and cattle' (Pollard 2005, 141). This phenomena, sometimes known as head and hoof burials, were first identified by Stuart Piggott (1962) in Northern Russia but have also been identified across continental Europe and the Near East (*Ibid*, 115), and also in Britain at later sites such as Hemp Knoll

(Robertson-Mackay 1980) and Beckhampton (Young 1950) and have also been found to involve the head and hooves of horses. Other examples of the interposition of humans and cattle include the presence of an infant skull within a cattle frontlet and an infant femur within a cattle humerus at Windmill Hill (Whittle *et al.* 1999, 89, 110). The hyperbole surrounding such deposits is significant. Interpretations have focused on ideas of hybridization or transformation of humans and cattle in death, flows of 'essence' and statements of identity (Thomas 1999, 28; Pollard 2005, 141). Considerable confidence of authors in their interpretations of such deposits has caused some to be repeated so often within literature that they have become almost accepted as truth, but it must be emphasized that all are extremely tenuous, based largely on ideas that cannot be grounded in any empirical evidence.

Other repeated depositional practices include the placement of bovine skulls in the base of features such long barrows, causewayed enclosures and other sites identified as likely centres of ceremonial activity, for example at Whitesheet Hill (Piggott 1952), Maiden Castle (Smith *et al.* 1981) and Hambledon Hill (Legge 2008). Feasting at these sites is thought to have been a very important activity which was far more than simply eating, and which likely had all manner of political, social and cultural ramifications. Large quantities of meat-bearing elements found in contemporary contexts, such as those at Windmill Hill (Grigson 1999) and Durrington Walls (Richards and Thomas 1984) are usually interpreted as being the result of episodes of ceremonial feasting.

### 2.2.2 Domestic Pig

During the early and middle parts of the Neolithic period, domestic pigs made up around 20% of the three main domesticates. The only significant exception to this rule is the site at Runnymede, thought to be a primarily domestic site, where in certain areas pig remains make up 60% of the entire assemblage (Albarella and Serjeantson 2002, 35). Because of the interpretation of Runnymede as a domestic site, the prevalence of pigs (and sheep) at this time has been used to suggest that pigs were, in fact, the mainstay of the domestic economy, while cattle were primarily used when ceremonial or feasting activity was occurring (*Ibid*). In the latter part of the Neolithic pigs appear to increase

significantly in abundance (Edwards and Horne 1997; Hey *et al.* 2003, Mukherjee *et al.* 2008). They go from making up between 20% and 30% of most assemblages, to representing between 60% and 80% of the total domestic assemblages. Durrington Walls is particularly well known for having large proportions of pig remains (Serjeantson 2011, 26; Albarella and Serjeantson 2002).

The rise in proportions of pig in the late Neolithic is argued by some to reflect a genuine increase in stock numbers caused by changes in environmental conditions favourable to pigs dietary requirements (Grigson 1982, Mukherjee *et al.* 2008, 1008). There is evidence suggestive of considerable woodland regeneration from the mid to late Neolithic, which would have hampered the grazing animals such as cattle, but to which pigs would have been eminently adaptable; being omnivorous they can thrive in forests or woodland as well as more open environments (*Ibid*). On the other hand, there are those who believe that the dominance of pigs at the end of the Neolithic period is a reflection of site function and not of their true importance to the Neolithic economy as vast majority of late Neolithic sites are thought to be ceremonial rather than domestic in nature, so the high proportion of pig bones in these contexts may represent the pigs importance to ritual rather than their genuine status as a domesticate (Albarella and Serjeantson 2002, 35). This contradicts the idea that at the beginning of the Neolithic period, pigs were more important to domestic situations, and enforces the notion that the two contexts are divorced. By the turn of the Bronze Age, the partiality for pig appears to have receded, and by the time the Bronze Age is established in Britain, people seem to have hardly been keeping pigs at all, preferring by now to keep sheep (*Ibid*).

Much as was the case with cattle, there does not seem to have been any indigenous domestication of pigs from wild boar stock in Britain. New aDNA evidence suggests that while Near Eastern introductions of pig were made into Europe, their influence in the gene pool was limited by subsequent domestication of pigs locally to continental Europe (Ottoni *et al.* 2013; Larson *et al.* 2007). It is thought likely that domestic pigs and wild boar would have been relatively similar in appearance, with coarse dark hair, and long snouts and legs (Grigson 1965; Serjeantson 2011, 26). It is thought likely that there was some

interbreeding between domestic and wild populations (Hamilton *et al.* 2009, 999), though they are generally distinguishable based on size and shape. Tentative implications of inter-breeding is one of a number of lines of evidence that have led some to question whether pigs were kept in herds in the immediate vicinity of a settlement or whether they were kept as semi-feral herds who freely roamed locally. Recent stable isotope analysis conducted on Neolithic pig remains indicates that their diet was focused on wildwood resources rather than domestic waste (*Ibid*, 1008), possibly indicating that they were loosely husbanded rather than enclosed close to human populations. Another, albeit highly tentative, piece of evidence cited as possibly indicative of feral or loose pig populations is the presence of an arrow head in a pig humerus from Durrington Walls, as well as fragments of stone imbedded in three other bones (Albarella and Serjeantson 2002, 42). This has led to the postulation that pig herds may have been hunted and killed immediately prior to consumption.

### 2.2.3 Domestic Sheep/Goat

Sheep and goats were both present in the Neolithic, though sheep were present in significantly higher numbers than goats (Serjeantson 2011, 29). Having said this, the difficulty with distinguishing between sheep and goat remains makes it possible that many goat remains were misidentified and are counted amongst sheep numbers. The two species tend to be referred to together, as sheep/goat. Overall, in the early and middle Neolithic sheep tend to be the least well represented of the three primary domesticates, generally accounting for between 10% and 20% of assemblages (Serjeantson 2011, 16). By the late Neolithic there is a much more significant paucity of sheep, which account for less than 10% of most assemblages (*Ibid*, 17), however, by the time the Bronze Age is established sheep are by far the most abundant domesticate, representing between 40% and 55% of most assemblages.

Unlike cattle and pigs, sheep have no indigenous progenitors in Britain, so must have been domesticated and imported from the continent. Neolithic sheep are thought to have been similar to the modern Soay breed, which originates from the island of Soay on the St. Kilda archipelago in Scotland. It is thought that

they were introduced here during the Neolithic and have suffered hardly any human interference since this time (Finnington 2011).

It is probable that sheep were kept for their secondary products – milk, hide and dung – as well as their meat. It is unlikely that if people in the Neolithic were keeping cattle for their dairy products they would not have been doing the same for sheep. Because sheep were relatively scarce during the Neolithic period, much of the information we have pertaining their use is from Bronze Age contexts. Although there is no direct evidence for dairying, large numbers of lambs found at some late Bronze Age sites in the south of Britain have been argued to be the result of culling to ensure available milk (Serjeantson 2011, 30; Serjeantson 2007). Keeping sheep for fleece or wool is unlikely to have been a concern for the population of Neolithic Britain as it was not until the Bronze Age that sheep were bred to have a woolly fleece such as is seen on modern breeds and that could be woven or spun for fabric (Ryder 1993). Previously to this sheep are thought to have been hairy, as opposed to woolly. The improvement to the fleece is argued by Serjeantson (2011, 29) to be one possible reason for the significant increase in sheep populations seen during the early part of the Bronze Age.

The size of sheep has always meant that they have been regarded as an animal which would likely been eaten in a domestic situation, as opposed to a ceremonial or feasting situation. Serjeantson believes it likely that the main reason for their introduction to Britain was that where people kept cattle and pigs, they tended also to keep sheep. Given the fact that they were not being kept for their wool until the wool-yielding trait was bred into them in the early Bronze Age, and the relatively small contribution they would otherwise have made to the diet of the Neolithic she believes there is little other reason for their being kept (Serjeantson 2011, 30).

#### *2.2.4 Other Domestic Species*

The remains of dogs, and to a far lesser extent horse, are present at a number of Neolithic sites. The presence of domestic horse in the early and middle Neolithic remains disputed. Where remains have been recovered from contexts

apparently from these periods, the integrity of the context is often questionable and the material very limited, making it difficult to extrapolate any particular conclusions from the presence of the remains. The presence of horse in early to middle Neolithic Britain could be the result of two possible scenarios – the first is that some of the indigenous horse population present in Britain during the Holocene managed to survive into the Neolithic, when they were previously thought to have become extinct across Europe (Bendrey *et al.* 2013; Bendrey 2010; Boyle 2006). The second is that the horse was introduced back into Europe, and eventually Britain, from domestic stock, which originated in Central Asia (Serjeantson 2011, 34). If horses were present in Neolithic Britain, or even in Bronze Age Britain, it was in very small numbers.

Although dog remains are by no means uncommon on Neolithic sites, the pervasiveness of the dog on the lives of the people of Neolithic Britain is better highlighted by the fact that traces of gnawing have been recovered from every site in the south of Britain where the preservation of the material allowed this kind of surface modification to be recorded (Serjeantson 2011, 31). The ubiquity with which dog gnawing appears to be present in the south makes it unlikely that a similar pattern would not be observed elsewhere in the country.

The physical remains of dogs are present at many Neolithic sites, with a slightly elevated numbers recovered from early and middle Neolithic sites compared to later Neolithic or Bronze Age sites. The recovery of partial or complete skeletons is not uncommon, especially at causewayed enclosure sites, and the remains of puppies were found interred within the ditches at Etton (see Chapter 4), Hambledon Hill (Legge 2008) and Windmill Hill (Grigson 1999). Where physical remains of dogs are present, they are usually distinguished from wolves and foxes based on an estimate of the height of the animal's shoulders (Harcourt 1974), which tends to range from between 35cm to 62cm. It is unusual, but not unprecedented, for dog remains to display signs of having been butchered. Where such evidence is present the resultant marks appear to indicate the removal of the dog hide, as opposed to butchery for the removal of meat (Serjeantson 2011, 32).

### **2.3 The Wild Species of Neolithic Britain**

One of the most significant and visible changes to the archaeological record during the Mesolithic to Neolithic transition is the proportion of wild species present in faunal assemblages. During the Mesolithic period, no domestic species were present in Britain, so assemblages from this period are entirely comprised of wild species including red and roe deer, aurochs and wild boar, as well as other species indigenous to the British Isles, but not thought to add significantly to the diet or economy of the time. The cessation of hunting as the primary means of subsistence, and the adoption of domestic species appears to have happened remarkably swiftly as even by the early Neolithic the proportion of wild animals present in assemblages had dropped to around 4% (Serjeantson 2011, 40), with most of the remaining 96% comprising the remains of the three primary domesticates – cattle, pig and sheep.

Red Deer are generally the most abundant wild species recovered from Neolithic sites in Britain, especially from the early to middle Neolithic onwards. Roe deer are the second most abundant wild species, but together these two species make up only a very small proportion of the assemblages in which they are present. It is possible that, despite their small numbers, they are over-represented, as historically antler may have been included in the bone counts, despite the fact that it is shed without the need for the animal to be hunted (Serjeantson 2011, 40). Where red deer remains are present on Neolithic sites, it is fairly common for them to have evidence of butchery activity on their surface (see Chapter 6). Their very limited presence, however, suggests that they were not often hunted for food. Serjeantson argues that by choosing not to hunt this species, the people of Neolithic Britain were preserving them for their antlers, which were useful for all sorts of tasks including digging ditches, pits and mines and weaving (2011, 41).

Aurochs provide the third highest proportion of bones to the wild fauna on Neolithic sites (according to studies focussed on the south of Britain), though are generally present in extremely small numbers. Aurochs appear to have been at their most prevalent during the middle to late Neolithic, before becoming increasingly rare into the early Bronze Age and later periods (*Ibid* 43). Aurochs would almost certainly have been hunted for their meat, as attested by

the presence of butchery marks on a number of the bones from this species (see Chapter 6), but such an endeavour would have been exceptionally dangerous, with one aurochs weighing up to four times a domestic cow (*Ibid* 44). Some have suggested that the killing of aurochs was a display of social prowess (Harcourt 1971) or control over the 'wild' (Cotton *et al.* 2006), while Serjeantson suggests that wild aurochs would have been an occasional threat to domestic populations of cows, and may have been killed when this was the case (2011, 45).

Wild boar were also indigenous to Britain before the Neolithic and were occasionally hunted during it, however, there is exceptionally little direct evidence pertaining to this activity. As well as red and roe deer, aurochs and wild boar – all of which are traditionally perceived to be food animals, species such as brown bear, wolf, fox, badger, hare, otter and squirrel are occasionally encountered at Neolithic sites. The presence of these species is definitely the exception rather than the norm, however, and it is unlikely that they had any real impact on the social or economic lives of Neolithic people (Serjeantson 2011, 47).

## **2.4 'Ritual' and causewayed enclosures**

Attempts to understand prehistoric ritual and religion have been an important part of the modern archaeology for decades. The establishment of the post-processual movement in the late 1970s and early 1980s can be seen as a direct reaction to the science and data-based functionalist and processual movements of previous decades, and saw a huge upsurge in the number of scholars attempting to discern the agency and thought-process behind archaeological material. This inevitably led to the identification of archaeological deposits that appeared to lack 'functional' explanations, and as such, for which no 'logical' thought-process could be derived. Such deposits have tended to be labelled as 'ritual'.

Like many of the terms utilised both in this thesis and in discussions of the nature of sites such as causewayed enclosures, the definition of 'ritual' varies, even within the single discipline of archaeology. Linguistically, the

archaeological definition of 'ritual' behaviour tends to be behaviour, which does not correspond to some functional purpose, usually domestic in nature. By necessity, those seeking to define it in terms of its archaeological visibility (Levy 1982; Richards and Thomas 1984; Hill 1995; Brück 1999) draw from anthropological and ethnographic sources. These tend to largely agree that ritual behaviour is repeated and patterned. Much of the research into prehistoric ritual has been Iron Age centric (Wilson 1992; Hill 1995; Edmonds 1999; Cunliffe 1992; Gibson 2003). However, Richards and Thomas (1984) extrapolated the idea of repeated and patterned deposits to Neolithic archaeology, and formalized the identification of repetitive deposits of animal bone, represented by a distinction between species and element deposition (primarily of cattle and pig) in different parts of a site (Richards and Thomas 1984, 204 – 206). They believed that the remains were 'obviously' deposited in a particular manner and according to certain rules, which were important to those involved in the act of deposition. It has been argued (1984, 215) that the remains are indicative of large-scale feasting (Albarella and Serjeantson 2002), which may possibly have occurred at ceremonies where social relations were renewed and where social unification was sought. The term 'structured deposition' has frequently been used since in attempting to describe deliberately placed animal bone; many argue, however, that everyday deposits of refuse are also highly structured (Hill 1995, Morris 2008, Richards and Thomas 1984, 215). Unfortunately that does not seem to have stopped it from being used to claim ritual behaviour, even in more recent years (Pollard 2001; Pollard and Ruggles 2001; Harris 2003; Albrecht 2010).

While ritual is often used to describe the nature of activity (e.g. a ritual deposition), it is also laden with connotations of religion, rite and ceremony relating to the impetus behind an activity. It is these connotations that make the term such a difficult one to either wield or understand. Other terms, such as 'special', 'unusual' 'ceremonial' and 'extraordinary' are also utilised in discussions of the nature of activity at causewayed enclosure sites. These terms are even less well defined than the term 'ritual', and as such are too subjective to be used reliably, however the jist of each is that either the material being described, or the nature of its deposition, is a-typical. Whether this is in terms of the rest of the material at a site, or the nature of the deposition of the

material or whether it is in relation to expectations of the site or site type is often unclear. On the other hand terms such as 'mundane' and 'domestic' are often used interchangeably to describe material that is thought to be more typical, where typical is usually benchmarked by standard domestic settlement refuse. Throughout this thesis, typical and a-typical are predominantly used to describe the supposed nature of material and deposits, though ceremonial and ritual are used when describing past interpretations of causewayed enclosures, as these are the terms most often associated with them. Mundane is also used when describing activity which seems to categorically be related to everyday domestic settlement.

The identification of the 'structured deposition' of animal bones within features at Durrington Walls (Richards and Thomas 1984) coincided with the publication of Cunliffe's first reports on excavations carried out at Danebury hillfort (Cunliffe 1984a, 1984b). Iron Age archaeology such as this greatly influenced the development of the identification of 'ritual' activity, and the methods and techniques of identification disseminated throughout archaeological practice, both forward to Romano-Britain, and backward to the Bronze Age and Neolithic. The Danebury animal bone report (Grant 1984) identified the presence of 'special animal deposits', including crania, articulated or associated bone groups and complete animal skeletons. Grant used three primary criteria for establishing whether or not such an animal bone deposit could be classified as being 'special';

1. The apparently deliberate presence of two (or more) animals within the same context.
2. The direct association of the animal remains with other materials (e.g. sling stones).
3. The unexpected presence of less well-represented species of less nutritional value.

Though her interpretations were largely functional (reflecting the general consensus regarding animal remains at the time), the identification of obviously 'special' animal deposits was a big step for zooarchaeology, and kick-started much more extensive research into the nature of animal bones on prehistoric

sites. Immediately following the release of the Danebury publication, Wait (1985) published an investigation which considered Iron Age religion, in which he identified two primary deposit types indicative of Iron Age ritual activity, human remains and 'special animal deposits'. His criteria for identifying special animal deposits were somewhat more detailed than those established by Grant and comprised five main points:

1. The exploitation of animals in an unusual manner
2. The presence of less well-represented species
3. The consistency of body parts
4. The care of placement of the remains
5. The presence of remains within pits

These attempts to identify 'ritual' in the Iron Age archaeological record on the Neolithic archaeological record is great and can be seen in *The Harmony of Symbols: the Windmill Hill causewayed enclosure* (Whittle *et al.* 1999). Following on period of prolific activity surrounding the identification of Iron Age animal deposition and ritual, the report specifically considers the nature of animal bone deposition at the causewayed enclosure. The animal bone deposits are split into three groups:

1. **Deliberate placements** which are characterized by large size bone fragments, a high proportion of identifiable bones, and a predominance of cattle bones
2. **Intermediate type deposits** which are characterized by larger deposits of bone, though with relatively small size bone fragments
3. **Less formalized deposits** that have an even distribution of fragment sizes, skewed towards the smaller end, a high proportion of loose teeth and other evidence pointing towards degradation of material prior to deposition.

Grigson proposed that the deliberate placements of bone (predominantly cattle) would have had the meat intact and are indicative of 'conspicuous non-consumption of potential food' (Whittle *et al.* 1999, 208) while the intermediate and less formalized deposits, which had 'rather more pig, sheep and goat bones

than the deliberate placements' were probably the result of consumption activities. Whether or not deliberately placed bones were fleshed or defleshed is one of the considerations of this thesis, which will undertake detailed analysis of the surface of bones in order to try to understand their nature at the time of deposit.

The criteria for the identification of ritual activity have now been widely extrapolated to Neolithic sites. From the literature, it seems that structured deposition and special deposits are abundant at the vast majority of sites that have been excavated, and as such, the majority of the material that has been analysed from these sites, has been looked at whilst having in mind the fact that sites were 'undoubtedly' ceremonial in nature. Unfortunately this has remained the explanation for many sites regardless of the presence of greater proportions of material that does not necessarily conform to the 'ritual' criteria, and this material has tended to become lost as a result and more utilitarian explanations for Neolithic sites, and the animal remains therein have not been forthcoming.

There have been those within the zooarchaeological community who have remained sceptical of the proposed nature of the 'special animal deposits', probably due to the term being synonymous with the loaded and disliked term 'ritual'. Particularly opposed was Mark Maltby, who interpreted the associated and articulated animal bone from Winnall Down as being either the result of the burial of diseased animals (Maltby 1987a), natural deaths (Maltby 1987a, 1988) or the victims of population/pest-control (Maltby 1987a, 1988). In the case of small groups of articulated bone, butchery waste is the most commonly applied interpretation (Maltby 1987b).

Also opposed to the notion of 'special animal deposits' from Danebury was Bob Wilson (1992), who argued that the interpretation had been followed blindly, even though the evidence was lacking. While he acknowledges the ritual origins of a few deposits, he believes that the criteria used to define such deposits are dubious (1992, 342), and prefers to emphasise the role of taphonomic factors to account for the archaeological presence of crania and articulated or complete skeletons.

One of the reasons that the idea that the structuring and patterning of material endures as a marker for ritual activity is that there tends to be a certain amount of cherry-picking of data in order to create a picture that 'odd' deposits are more normal than in fact they are (see Garrow 2012). Certainly this is a tactic that has been employed by Thomas (1999) and Pollard (2001, Pollard and Ruggles 2001) among others (Harris 2003; Albrecht 2010), and which is prevalent in site reports (particularly the finds reports), which tend to fixate upon the exciting finds at the expense of the more mundane (e.g. Armour-Chelu in Pryor 1998). This willingness to focus on the extraordinary, has perpetuated the notion that causewayed enclosures (and other 'monumental' sites) were places of special ceremonial importance, and that the archaeological material present therein can tell us about ritual and not so much about domestic activity.

The idea that ritual is the antithesis of domestic is almost certainly a false dichotomy. This was discussed at length by J.D. Hill, who, with particular reference to Iron Age pit deposits, drew attention to the artificial distinction between sacred (ritual) and profane (rubbish) and the assignment by archaeologists of particular materials to one or other of these categories (e.g. human bone might not always be representative of ritual activity, it may just as well be rubbish). Hill also acknowledged the potential for highly structured, yet entirely un-symbolic deposits of material, arguing that while the majority of bones in pits were not recognized as being 'special', they were still the result of deliberate deposition.

The validity of the need to divorce the normative and non-normative aspects of prehistoric life is something that is mentioned in most papers and theses that deal with the subject of Neolithic ritual. Despite this, it is a false dichotomy that endures, and is often perpetuated both those who acknowledge it (e.g. Thomas 1999, 2011, 2012; Pollard 2001; Harris 2003) when they focus research on the ritual aspects of prehistoric behaviour whilst ignoring or undermining contrary evidence. This seems to be particularly evident at causewayed enclosure sites – perhaps because their purpose remains elusive, perhaps because the material recovered from this site type tends to be of a sort which would usually be regarded as being the result of domestic activity yet for some reason most are adamant that this cannot be the case (*Ibid*).

The refusal to acknowledge domestic activity as being important to the nature of causewayed enclosure sites is very much of post-processual origins. During her ethnographic observations of the Marakwet, Moore (1982) identified that the distribution of animal bones cannot always be explained by functional considerations. Bulmer's observations (1976) went even further, suggesting that the deposition of animal bones was, in fact, governed by the social classification of the animal (e.g. its habitat, whether it was domestic or wild etc.). Contemporaneously, Ian Hodder argued that it was too easy to impose modern conceptions of 'rubbish' onto the archaeological record (1982). While it is widely accepted that the activities observed during ethnographic studies are not necessarily directly analogous to activities occurring in prehistoric Britain, these studies were invaluable in demonstrating a range of motives that might lie behind prehistoric depositional practices that are often largely invisible, something which would force archaeologists to accept that functional interpretations may not always be applicable to prehistoric archaeology.

Unfortunately the unempirical speculation over more unusual deposits started by such studies has had a number of unfortunate consequences for Neolithic archaeology. The first is a matter of the presentation of speculation, which tends to be as absolute fact. The second is that they have come to be regarded as describing 'normal' depositional activity at causewayed enclosures, even though the reality seems to suggest that the deposits they focus upon, those that are in some way odd or unusual, are clearly the exception to the rule.

In a recent paper 'Odd deposits and average practice' Duncan Garrow (2012) critically précis the idea 'structured deposition' from its inception to the present day. He too makes the point that 'odd' deposits, as he calls them, have dominated research since the 1980s and that this has unfairly skewed our opinion of the Neolithic towards believing that this sort of deposit were common place and representative of the sort of activity occurring more generally at Neolithic sites (*Ibid*). Thomas has gone so far as to suggest that the animal bone from causewayed enclosure sites should not be regarded as being typical of Neolithic economy, because the purpose of the site was categorically non-domestic (Thomas 1999, 26). Rather, he believes that the animal bones at

causewayed enclosures represent a closed economy only present at this kind of monument, which is based around the sporadic, ceremonial usage of the site.

There is absolutely no denying that there are deposits within the ditches of causewayed enclosures that are unusual in many ways, and it is likely that there were motives to the deposition of these deposits which were linked to ceremony and ritual. These will of course excite those academics seeking to learn more about the *why's* of the Neolithic, and they should be investigated and speculated over. But, it should be noted that with the focus of decades of research seemingly having been on these unusual deposits, the bulk of the material from causewayed enclosures has almost been relegated to being unimportant, despite the fact that it is abundant and has the potential to tell us about the role of animals at these sites. This material and what it can empirically tell us should be regarded as equally if not more importantly than unempirical attempts to get inside the mind of Neolithic people. Without first understanding what is factually apparent, it is impossible to accurately speculate as to the agency and motivations behind the more unusual of Neolithic activities.

## **2.5 Impact on this Thesis**

It is almost certain that with the beginnings of the Neolithic in Britain, there were changes to belief systems, and socio-cultural systems, as well as changes to the economy. The construction of monumental architecture alludes to this. This does not mean, however, that belief systems had to change to be similar to, or even more in line with those visible in the Near East when the Neolithic and agriculture emerged there, thousands of years previously.

Research on pre-farming communities and the earliest farming communities, as well as ethnographic evidence from hunter-gatherer communities has been used to fit analogies and theories from these contexts into the archaeology of prehistoric Britain. While much research of this nature is very thorough, much (though not all) is simply not based on empirical archaeological evidence, but on theories that have been referenced with such frequency over the years that their origins are no longer of consequence and their basis in fact immaterial – they have become dogma.

It is the aim of this thesis to consider the animal bones from the Etton causewayed enclosure a fresh in order to ascertain what they can tell us about the Neolithic economy and culture at this site, and others like it. As has been discussed, the identification of this type of site as being primarily ceremonial may be valid but it is felt that given the incomplete and tenuous nature of the original animal bone report, this is impossible to say for certain. It is often said that the remains present at causewayed enclosure sites are simply not indicative of those one would expect to encounter at domestic settlement sites, however, given the clear absence of Neolithic settlement sites in Britain, it is difficult to get a notion of the deviation that is being alluded to. A thorough investigation of all aspects of the faunal assemblage from Etton will provide information about how animals were being kept, used and disposed of at the site, and will provide the benchmark that is currently lacking, against which both similar and completely different site types can be compared for deviation in the nature of their animal bones.

### **3. Methodologies**

### 3.1 Recording Methodology

The recording of the Etton bones in this thesis was carried out some thirty years after the excavation, and almost 15 years after the original analysis of these bones was published (Armour-Chelu 1998). Unfortunately all records made during the original analysis appear to have been misplaced. The bones are all labelled with ink numbers, and most have been stored at the Natural History Museum since the excavations finished in 1988. The majority of bones are individually wrapped within two paper bags, both of which give all context details for the bone; however, as the excavation was carried out over a period of six years (and the curation of the faunal material is likely to have gone on for some time following this) many and various curation methods are evident. The earlier of these simply comprised all of the bones from a particular location and context being put into a box and labelled. The labelling of the bones included B(one) number, F(eature) Number, Context, Layer and Location (by m<sup>2</sup>). This information, with the exception of location, was recorded as part of the new analysis.

All of the bones were recorded by hand on to recording sheets before being transferred into a Microsoft Access database. These sheets recorded the provenance of the bone as well as their state, species; element; zone (according to Dobney and Reilly's (1998) bone zoning model); fusion; sex; side; preservation; the presence of butchery, burning and gnawing marks and fracture type, as well as whether a photo or diagram had been made, or other notes taken. Where butchery or gnawing was present it was hand-drawn onto a diagram of the relevant element. These diagrams were numbered, and the number recorded on the bone record (after Outram *et al.* 2005). Bones which were thought to belong to a certain species and element, but which had been identified with less than the usual level of certainty were preceded by a question mark (for example ?Sus or ?Humerus). Those bones that were too small to be identified to species or element were simply recorded by number, to context.

Because of the retrospective nature of the analysis, the absence of original records and the way in which the majority of the bones had been curated, it was difficult to gain an appreciation of instances in which bones were originally

articulated. Where it was possible to fit joint surfaces on different elements together it was noted that articulation was likely. Where bones bore remarkably close resemblance to one another by size and appearance, possible articulation was noted. Despite the level of uncertainty with which the original zooarchaeological report is now regarded, it and the entire publication will have to be relied upon to provide more information about associated and articulated bone groups encountered during the excavations.

Aside from standard zooarchaeological identification and counting practices, butchery, bone fracture and gnawing are discussed at more length in this thesis, both briefly in the following chapter and in far greater detail in subsequent chapters. The methodologies for these analyses are discussed here.

### **3.2 Butchery**

Bone surface modifications are a crucial piece of evidence for understanding how animals were utilized in past societies. The analysis of butchery marks was rare (e.g. Guilday *et al.* 1962) prior to the publication of a large number of papers in the early and mid 1980's (Binford 1981; Bunn 1981; Shipman 1981; Shipman 1983; Johnson 1985; Behrensmeyer *et al.* 1986; Behrensmeyer *et al.* 1989; Blumenschine and Selvaggio 1988; Blumenschine and Selvaggio 1991; Olsen and Shipman 1988). This research recognized the surface modifications present on bones at various early Stone Age sites in Africa as having the potential to reveal the role of human activity in the formation of the assemblage, thus proving the presence of early hominids (Fisher 1995, 9). Surface modifications that fall under the label of butchery marks include cut-marks, chop-marks and impact scars, all of which can result from human modification of an animal bone. Non-human processes can cause similar marks to these making accurate distinctions between human and non-human processes critical for the accurate reconstruction of animal utility. Many studies have concentrated on defining the differences between marks left by the various 'actors' (humans/carnivores/other non-human processes) that may have had a role in modifying the bones (Binford 1981; Bunn 1981; Shipman 1981; Shipman 1983; Shipman 1986; Behrensmeyer *et al.* 1986; Behrensmeyer *et al.* 1989;

Blumenschine and Selvaggio 1988; Blumenschine and Selvaggio 1991; Olsen and Shipman 1988).

Cut-marks tend to be created during the defleshing of a bone using a knife or knife-like implement (Fisher 1995, 12; O'Connor 2000, 45). Defleshing might occur for a number of reasons, most of which are oriented around the reduction of a carcass for useful products such as meat, hide or horn. Defleshing may also occur in order to facilitate access to a bone for the extraction of marrow or the detachment of tendons (Fisher 1995, 12). Binford describes cut-marks as being made using an often one-directional 'sawing motion' which results in 'short...multiple...roughly parallel marks...[which] rarely follow the contours of the bone on which they appear' (1981, 169). Marks that are very similar to those created when cutting at a bone can include those marks caused when other animals trample bones, carnivore tooth marks and the abrasion of a bone by a sharp stone, but these can often be distinguished by the profile of the cut, which is more 'u'-shaped than the sharp 'v'-shaped cut of a stone and the direction of the cut which is often curved rather than straight (Fisher 1995, 14).

Chop-marks are achieved when muscle and bone are chopped through with an implement such as an axe or a cleaver (O'Connor 2000, 45). Binford has observed that, in very early contexts, this is most likely to have been the case as a result of the exploitation of meat which had become dry or which was frozen, or when separating entire limbs from one another (Binford 1984). Frison, on the other hand, has observed the use of chopping to detach muscle attachments and to divide the spine (Frison 1982, 164). The V-shaped cross section of a chop-mark tends to be fairly obvious in archaeological contexts. Some debate has surrounded the possibility of confusion between carnivore tooth marks and chop-marks, though this is thought to be unlikely in most instances. Impact scars are produced when strong force is applied to the thick, cortical areas of bone. It is typically thought that they result from attempts to extract marrow from fresh long bones (Binford 1981). The identification and recording of these will be discussed in the next section.

Because the material being looked at from Etton is entirely from sealed Neolithic deposits, it can be assumed that the tools being used for the butchery

of animals were made from stone. The shape of these cut marks have been repeatedly analyzed (for example: Bunn 1981; Lyman 1987; Greenfield 1999; Dominguez-Rodrigo *et al.* 2009) in order to be accurately distinguish them from surface modifications caused by other processes (such as trampling or abrasion) that appear to look similar. The general identification criteria for cut-marks are that they are narrow, linear striations, which are often V-shaped in profile and which have straight sides. Fine parallel striations are often present around the edges of cut marks and are thought to be indicative of a blade being moved in a sawing motion. There are often multiple cut-marks present in a relatively small area, which tend to be both parallel to one another and of equal width, as they would have been made by the same blade in quick succession (Fisher 1995, 12; O'Connor 2000, 46). Though it can often be postulated with some degree of confidence that marks displaying all of these features were the work of humans, it is rare that this can be proven definitively – it is possible some other force caused a sharp stone to interact with the surface of a bone. It is sometimes possible to identify other features of cut-marks such as shoulder marks or barbs and splitting that are thought to be unique to the modification of bone by a human-wielded stone tool (Shipman and Rose 1983; Eickhoff and Hermann 1985).

As well as cut-marks, scrape and chop marks are often identified on prehistoric bone. Scrape-marks are groups of closely spaced linear striations that tend to be parallel to one another (Olsen and Shipman 1988). They are created when the long-edge of a blade is scraped across the surface of a bone. They are sometimes accompanied by ridges within the groove of the scrape, known as chatter-marks (*Ibid*). These are created when the knife or blade surface bounces minutely on the surface of the bone. Binford observed this kind of activity taking place in order to remove the periosteum from a bone prior to striking the bone to facilitate marrow extraction (1981, 134).

### *3.2.1 Identification, recording and interpretation*

Where present, cut-marks, chop-marks, scrape-marks and percussion/impact scars were identified and recorded. Identification was by hand lens in good light. The method for the identification of butchery marks follows the standard

conventions in literature (including Selvaggio 1994; Fisher 1995; Blumenschine *et al.* 1996 and 2007; Greenfield 1999; Dominguez-Rodrigo *et al.* 2009; Galan *et al.* 2009). Recording largely follows a method established during the recording of a complex assemblage of co-mingled human and animal bone at Velim Skalka (Outram *et al.* 2005). According to this method, surface modifications of bone were recorded directly onto digital multi-view diagrams of individual elements. Each different type of modification (including burning/heating and non-human modification such as gnawing) was illustrated using a different symbol. Once all modifications had been recorded it was possible to produce composite diagrams of individual elements illustrating all surface modification present in the entire assemblage. It was then possible to combine these illustrations of individual element to create a composite diagram showing entire skeletons with all modifications present. By so doing, patterns within the butchery activity occurring at the site are more easily observable, thus our understanding of the animal exploitation becomes clearer.

The various marks visible on the bones were generally interpreted as being indicative of one of three processes - skinning, disarticulation and meat-removal. The identification of the motives behind the marks present on the bones follows original ethnographic research Binford (1978, 1981) which has been applied by Knight (2003) in her analysis of the butchery data from the Iron Age hillfort, and by Knüsel, Outram and Knight (2007) in their analysis of the commingled human and faunal assemblage at Velim in the Czech Republic. The common indications of skinning, disarticulation and meat removal will be discussed briefly below so that the means by which they are identified during the butchery analysis will be clear. They will be discussed at greater length in chapter 5, where the individual processes will be discussed with reference to Etton.

#### 3.2.1.1 Skinning

Evidence for skinning tends to conform to a fairly typical pattern, regardless of the time period from which bone derives, or the technology available to those conducting the process (Plates 3.1). It is sometimes, though not always the case that the feet and head were removed with the hide. The evidence for

skinning is usually located at the extremities of the carcass, where the hide could have been detached from the bone and subcutaneous tissues before being pulled or rolled back over the carcass. It would then be detached again at the head. The cut made to the hide down the central part of the carcass is not likely to be visible on any bones as it largely penetrates muscle and viscera.

This method of hide removal ensures the hide is not damaged, which is important if the intention is to cure or tan it, and to use it for clothing, shelter or other craft activities. As a result, it tends to be the case that the removal of the skin of an animal begins around the metapodia or lower tibia or radius (Knight 2003, 68). Here, the marks are usually short, sharp, horizontal cuts, which are often repeated a few times in roughly the same place (*Ibid*, 69). Other marks, resulting from the same activity are sometimes seen on the skull and mandibles, particularly on the frontal bone around the base of the horn core (Serjeantson 2011, 59; Knight 2003, 69) and around the diastema of the mandible. Both of these locations have very little meat between the bone and the hide, making marking during the skinning process more likely (Knight 2003, 69).



**Plate 3.1: Example of possible skinning marks from Etton.**

#### 3.2.1.2 Disarticulation

Cuts present around the epiphyses or articular surfaces of bones are usually interpreted as being the result of the disarticulation of a carcass (Plates 3.2 and 3.3) (Knight 2003, 71; Knüsel, Outram and Knight 2005, 113). A carcass might be separated into a number of small parts, either for ease of transportation, for cooking or in order to share meat among a number of people. The marks created during the disarticulation of a carcass need not be particularly heavy, as

substantial force is not required when the tendons are being cut to facilitate the detachment of bones. Disarticulation marks usually comprise fine, short repeated marks.

The positioning of marks on some elements is often regarded as being definitively the result of disarticulation, and are seen with relative frequency at Neolithic sites - marks around the articular surface of mandibles cannot be from any activity except for the removal of mandibles from crania, for example at Stonehenge, Windmill Hill and Rowden (Serjeantson 2011, 59). Similar marks on astragali and calcanei imply the removal of feet and are recorded from Etton (see below), Stonehenge and Firtree Field (*Ibid*). At Etton almost all cattle elements, and many elements of pig and sheep have some evidence of disarticulation, implying that carcasses were being heavily disarticulated. Comparisons of this activity by species, and resultant implications, will be discussed in the concluding part of this chapter.



**Plates 3.2 and 3.3: Disarticulation marks present on a mandible and proximal metatarsal from Etton.**

### 3.2.1.3 Meat Removal

The removal of meat, (or the filleting or defleshing of a carcass) leaves marks on the bones which are often quite distinct from either skinning or disarticulation activity. They tend to be longer, and orientated either diagonally or vertically along the shaft of the primary meat-bearing bones (humerii, radii, femora and tibiae), where they follow the striation of the muscles (Knight 2003, 71) (Plates 3.4 and 3.5). Serjeantson says that filleting of meat is visible less frequently

than disarticulation (2011, 59), however as will be shown later in this chapter, this is not seen to be the case at Etton.



**Plates 3.4 and 3.5: Meat removal marks on the proximal shaft of a femur and on a rib from Etton.**

Meat-removal marks are not only present on the main limb bones. They are also present on both the outside of the mandible where they are likely indicative of cheek meat removal, and on the inside where a more likely explanation is the removal of the tongue (*Ibid*). Meat can also be removed from the spinal column, ribs and pelvis and marks indicative of this activity are apparently very common on the scapula (Serjeantson 2011, 59).

### **3.3 Fracture and Fragmentation**

Analysis of the fracture and fragmentation patterns present within assemblages of faunal material has been shown to yield important information pertaining to bone processing and depositional processes (for example Karr and Outram 2012a, 2012b; Outram *et al.* 2005; Outram 1999, 2001, 2002, 2003; Morlan 1984; Johnson 1985). The usefulness of such information has long been appreciated within palaeontological contexts, particularly with reference to the identification of human activity at plio-pleistocene sites containing animal bone (Blumenschine 1995; Blumenschine and Selvaggio 1988, 1991; Blumenschine *et al.* 2007; Capaldo and Blumenschine 1994; Capaldo 1997).

The application of the analysis of fracture and fragmentation to more recent archaeological contexts is a much newer endeavour, and one that remains relatively scarcely considered in most current zooarchaeological publications,

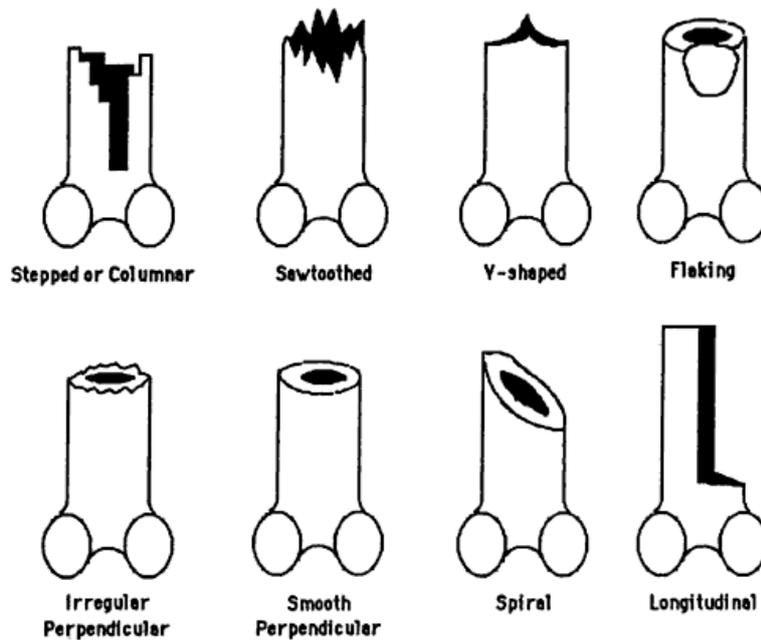
and almost never in commercial publication reports. As with the beginnings of structured taphonomic analysis, it was the late 1970s and early 1980s that saw a shift in the application of this kind of analysis from largely palaeontological contexts to contexts with much more relevance to western zooarchaeologists (Meadow 1981; Andrews and Cook 1985). Much of this research was ethnographic and comprised research into the procurement of marrow from the long bones of animals and how the bone left behind represented this activity (Binford 1978). This led to the observation and identification of fracture types, how these change according to the properties of bones (Johnson 1985; Marshall 1989), and the establishment of classification system for fracture types established (Davis 1985). It was the mid to late 1990s before any substantial research based on relatively recent archaeological material was conducted.

The work of Outram (1999, 2001, 2002, 2003, 2004) built on the knowledge established in the research of the late 1980s that the breakage of bone for the purpose of fat extraction left a largely indisputable signature in the archaeological record. Where marrow extraction has occurred on any significant scale there will be large numbers of bones that display helical fractures (the fracture type created when fresh bones are split). There is really no other reason for the fresh splitting of bones that contain marrow than for its extraction, or for the production of bone technology, though the later of these usually leaves other evidence such as polishing or signs of wear. Outram has argued that it is not only the fracturing of large bones that are useful for determining the existence of fat processing, but also indeterminate fragments of bone which are not identifiable to element or species. In his 2001 paper "A new approach to identifying bone marrow and grease exploitation: why the indeterminate fragments should not be ignored", Outram uses ethnographic models (Binford 1978) to explain how the process of rendering bone in order to extract its grease requires the comminution of large amounts of cancellous and axial bone, which leaves very low levels of intact cancellous material in an assemblage. In the process of the comminution of the cancellous and axial material, there is a high likelihood that shaft bones will have been reduced in size more substantially than one would expect from marrow extraction (Outram 2001, 402).

The processing of bones for the extraction of marrow is neither labour-intensive, nor time consuming (*Ibid*). It may have been done in order to store the fat or to use the fat for some kind of craft, or it may simply have been that the marrow was consumed as a snack as and when marrowbones were available. The production of bone grease is rather more labour intensive than the extraction of bone marrow. Although where evident at low intensity it can be an activity associated with normal activity, where it is evident at high intensities it tends to be related to the need produce any amount of bone grease from bones. This implies the necessity to procure every possible calorie from an animal, therefore, is often associated with severe nutritional stress (*Ibid*). More recently work by Karr and Outram (2012a) has provided actualistic evidence regarding the rates of degradation of bone after various periods of exposure in various environments and the effect that each has on the nature of the fracture obtained when the bone is broken. Work by these two authors has also considered the impact of natural processes, such as rock fall, on assemblages of bone in order to ascertain the effect on high and low (cancellous and diaphyseal) bone, discovering that bone density does not necessarily correlate with survival when external factors are involved (Karr and Outram 2012b).

### 3.3.1 Identification and recording

Bones that are broken when they were fresh usually display a helical fracture, the texture of the bone at the point of fracture is usually smooth and the angle of the fracture tends to be at less than 90° from the surface of the bone (Fig. 3.1; Outram 2001, 403; Lyman 1994, 319; Morlan 1994; Johnson 1985). As bones dry out, they develop split lines and gradually lose their organic content. When fragmented, dryer bones tend to fracture along these split lines and the fracture surfaces become rougher (Figure 3.1). These features are epitomized in the fracture of mineralized bone (*Ibid*). Bones that are broken through flesh display butterfly fractures. The burning, boiling and freezing of bone can all affect the way in which bones break when fractured, therefore studying the fracture patterns of animal bone assemblages can provide information about the exploitation of animal remains prior to their deposition.



**Figure 3.1: Bone fracture types (from Lyman 1994, 319)**

Many analytical frameworks have been developed in order to record the nature of fragmentation present on bone fragments. The most recent, and the one to be used in this study, has been designed specifically in order to fit in with the rapid processing of large assemblages of fragmented bone. These are not intended to provide information about specific bones fragments, but rather are intended to provide an overview of the nature of fracture of a complete assemblage, which can be used to surmise general exploitation practices. The recording method utilized in this study is 'judgment based categorization'. This simply requires the recording of up to four letters; H (Helical), D (Dry), M (Mineralized) and N (New) (Plates 3.6 – 3.9). The letters are used to describe the condition of the bone fracture based on the criteria discussed above. The first letter refers to the dominant fracture type, subsequent letters can be used to refer to smaller areas of different fracture types (Outram *et al.* 2005; Knüsel *et al.* 2007)

The method for assessing the levels of fragmentation in the assemblages largely follows Outram (1999; 2001). The samples were be sorted into categories according to bone type (cancellous, diaphyseal and axial) and size, then counted and weighed. Size categories are at 10mm intervals: <10mm, 11 – 20mm, 21 – 30mm, 31 – 40mm, 41 – 50mm, 51 – 60mm, 61 – 70mm, 71 – 80mm, 81 – 90mm, 91 – 100mm, and >100mm. Following Outram's lead

(1999), 'part-bone' (an entire epiphyseal portion) and 'whole bone' were also recorded. Contrary to Outram's initial methodology (1999), but in line with a revised paper (2001), by using a 'whole bone' category one avoids placing small, unbroken bones into a size band. In order to sort the bone into size classes as quickly and efficiently as possible a chart, rather like a pottery rim chart was used. Size categories will then be weighed to the nearest 0.1g using electronic scales, and counted. By weighing the bone, as well as counting it, one eliminates the obvious bias towards larger numbers of smaller fragments.

Following the sorting of fragments into size categories, they were then sorted into categories according to fracture type. The only fragments that were not subject to this secondary sorting are in the smallest size category (<10mm), as these are largely too small to be informative. Fragments were sorted into the four categories outlined above; H (Helical), D (Dry), M (Mineralised) and N (New). Subcategories such as HD (Helical and Dry), HM (Helical and Mineralised) or MNH (Mineralised, New and Helical) were established as necessary. These allow different types of fracture to be recorded according to the proportion of bone they affect, but ensure that helical fractures are always record, even if most of the fragment has been newly broken.



**Plates 3.6, 3.7 and 3.8: Examples of helical, or fresh fractures from Etton.**



**Plate 3.9: Example of a dry fracture from Etton.**

### **3.4 Gnawing**

Much like the various other taphonomic processes discussed in this chapter, the analysis of carnivore and rodent gnaw marks on animal bones has been a regular feature of palaeoanthropological research for many decades (e.g. Guilday *et al.* 1962; Maguire *et al.* 1980; Binford 1981; Selvaggio 1994). The usefulness of this has been demonstrated both in its own right (as a means by which to establish the environmental or ecological context of plio-pleistocene assemblage) and in terms of distinguishing between mammalian and hominid actions against bones. Unlike the analysis of fracture and fragmentation, carnivore gnawing on bones found in assemblages from British Neolithic sites is often commented upon (Armour-Chelu 1998). This is presumably because it tends to be seen as direct evidence for the presence of dogs on sites; a point of interest for many zooarchaeological reports. So too is rodent gnawing often mentioned. In both instances the information given tends to lack any detail or interpretation.

The reasons for including gnawing as one of the primary taphonomic processes to be analyzed at Etton are twofold. Firstly a survey of the material has suggested that gnawing evidence is plentiful from both carnivores and rodents and secondly, it is intended to compare the levels of gnawing on numerous dimensions to ascertain whether or not it has the potential to add to our

understanding of depositional practices at the site. The presence of significant amounts of gnawing by carnivores suggests they were active on site at the same time as humans. They may easily have picked up and chewed on bones immediately following, or even prior to their purposeful discard. This seems unlikely to be so with rodents, who by their nature, are skittish and not likely to enter a situation where humans are active and who have been observed to avoid fresh bone in favour of dry (Klippel and Synstelien 2007). Their access to bone material is much more likely to have been following disposal of bones in either a midden context (which was then redeposited in the ditches) or directly in the ditches. Either way, the substantial presence of gnawing by rodents suggests waste material was left open as opposed to being covered immediately after deposition/discard.

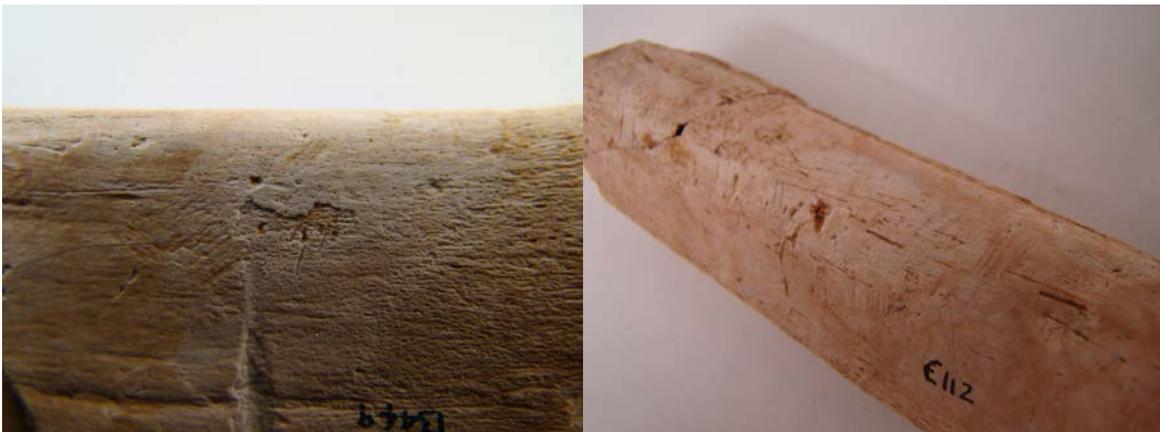
#### *3.4.1 Identification and recording*

There are many various bone modifications that can be caused by the gnawing faunal remains. These were recorded on the diagrams used for the recording of butchery marks and burning. Identification followed the advice of a number of publications including Maguire *et al.* (1980), Binford (1981), Lyman (1994), Blumenschine *et al.* (1996), O'Connor (2000), Klippel and Synstelien (2007) and Cáceres *et al.* (2011). The marks made by carnivore gnawing of bones are distinctive from those created during the process of human butchery of a carcass (Blumenschine *et al.* 1996, 496). Carnivore modifications also include ragged-edged chewing (Plate 3.10), usually of the ends of long bone shafts is identified by the presence of a ragged or crenulated edge of a bone, and is indicative of protracted gnawing of diaphyseal bone by a large carnivore such as a dog (Maguire *et al.* 1980, 79 – 80; Binford 1981, 51); tooth scratch marks, where the teeth of the carnivore have dragged across the cortical surface of the bone leaving wide grooves (Shipman 1981, 365; Binford 1981, 44 – 48; Maguire *et al.* 1980, 79 – 80) and punctures and perforations, where a single tooth breaks through the bone leaving a very round, often cone-shaped hole.



**Plate 3.10: An example of ragged-edged chewing and tooth scratch marks from Etton.**

For the most part gnawing of bones by large carnivores in the context of Neolithic Britain is put down to dogs. The presence of dogs on Neolithic sites is known from the occasional discovery of their remains, and the patterns of modification present tends to fit with models created to distinguish their gnawing from that of other carnivores (e.g. Haynes 1983). It is possible that other carnivores had access to discarded or deposited bones on Neolithic sites. Foxes, polecats, badgers, wild cats and lynxes are carrion-eaters where opportunity arises, though whether they would venture into a human environment is unclear. Aside from dogs, the other major group of mammals to leave visible taphonomic modifications to bones is rodents (Plate 3.11).



**Plates 3.11 and 3.12: Examples of rodent gnawing on bones from Etton.**

The effect of rodent gnawing on mammal remains has been observed and debated by many different disciplines, including wildlife professionals and forensic scientists, as well as palaeontologists and archaeologists. It is generally agreed that taphonomic modification by rodents comprises pairs of

broad, shallow, flat-bottomed grooves on dense parts of bones (Klippel and Synstelién 2007), and is done for either the purpose of keeping teeth short or in order to extract nutrients such as calcium, phosphorus and sodium from the bone (Cáceres *et al.* 2011). Debate exists as to whether rodents prefer fresh (Eickhoff and Herrmann 1985; Thornton and Fee 2001) or dry bone (Brain 1981; Miller 1975). A recent study by Klippel and Synstelién (2007) observed the behaviour of both brown rats and grey squirrels (squirrel gnawing is thought to be generally representative of 'rodent' gnawing – Lyman 1994) as they modified both human and animal bones in varying degrees of freshness. They observed that brown rats exploit bones for their nutritional value in much the same way as canids. They only appear to be interested in fresh, greasy bone, and gnaw the areas where cortical thickness is minimal and access to cancellous bone is easiest (Klippel and Synstelién 2007, 772). Grey squirrels on the other hand gnaw bones for their mineral value and actively avoid fresh bones in favour of bones that are dry. They were observed to gnaw single bones for upwards of one year and to ignore a fresh cattle rib for seven months until such time as the fat and grease had disappeared (*Ibid*, 771). When grey squirrels did gnaw bones it was usually in areas where the cortices was at its thickest.

A secondary result of these experiments is that gray squirrel gnawing appears to be seasonal, at least in North America. It had previously been observed that pregnant and lactating squirrels would gnaw on bones (Carlson 1940, 573), a fact corroborated by the fact that although dry bone was present in the experiment area from December, gnawing only began in March and continued to May, then ceased almost entirely (Klippel and Synstelién 2007, 765).

As rats were not introduced in to Britain until considerably later than the Neolithic, it seems impossible that they could be held responsible for the rodent gnawing that affects many assemblages of animal bone from sites of this date. The squirrel (in this instance red rather than grey), which leaves modifications on bone that are of a similar shape and size to those left by rats, is thought to have been abundant in Mesolithic Britain, and is likely to have remained so. It is entirely possible that it is what is behind 'rodent gnawing' associated with Neolithic contexts. Very few other rodents have any interest in the gnawing of

bones, or leave modifications of equal shape and size to those usually encountered.

#### **4. The Neolithic Animal Remains from the Etton Causewayed Enclosure**

## 4.1 Introduction

The Etton causewayed enclosure was located in a gravel quarry in Maxey, Cambridgeshire (NGR TF13830739, on a low-lying plain, which bordered fenland to the north of Peterborough (Fig. 4.1). It was first identified by aerial photograph in 1976, and was excavated between 1982 and 1987, prior to the complete destruction of the site by gravel extraction in 1988. The site comprised a single roughly circular, ditched causewayed enclosure, which measured c. 187m in diameter east to west, and c. 160m in diameter north to south. Three entrances were identified to the north, east and west of the enclosure. It is very likely there was one to the south as well, however this was not visible due to the presence of the Maxey Cut, a drainage channel that truncated the southernmost part of the site. It is thought that Neolithic activity on site probably started between 3725-3670 *cal* BC and lasted between 380-510 years (Whittle *et al.* 2011).



**Figure 4.1: The location of the Etton causewayed enclosure.**

At the time of excavation it was decided to divide the enclosure ditch into two arcs – an eastern and a western. The point at which these two arcs were divided was the widest causeway (causeway F), which was located directly to the north of the site. The western arc comprised ditches 1 – 5, and the eastern arc comprised ditches 6 – 14. Despite the eastern arc being made up of

considerably more ditches, both the arcs were roughly commensurate in length. The widths of the ditch segments ranged from 3 – 5m, and the depths rarely exceeded 1.25m below the alluvial layer covering the site – likely because of high groundwater levels (Pryor 1998, 16).

During excavation, the eastern and western arcs were seen to differ considerably in terms of the deposits present within them (Pryor 1998, 13). It appeared to Pryor that the western arc had been the subject of a prolonged period of being 'open', and had been repeatedly inundated with water, causing waterlogging of the material present within it. Cultural material (primarily wood and bone) accumulated in the ditch bottom. The eastern arc it appeared as though material was being 'placed' into the ditches and that soon after, the ditches were being backfilled.

Unusually for a causewayed enclosure site, about 70% of the interior was excavated (Pryor 1998, 71). The features were generally excellently preserved. The vast majority were middle Neolithic in date. Internal features were divided into four groups (Pryor 1998, 82);

1. Undiagnostic pits and postholes
2. Possible floors or buried soils (including possible structural features)
3. Small filled pits (believed to have had religious or funerary significance)
4. Ditches and gullies

The small filled pits were regarded as a particularly important aspect of the site (Pryor 1998, 102). They were found across the excavated interior, but appeared to cluster around the ditch segments of the eastern arc, whilst being noticeably absent near the ditches of the western arc. It was noticed during the excavations that the material found within the pits near the eastern arc appeared to compliment the material that was present within the eastern arc

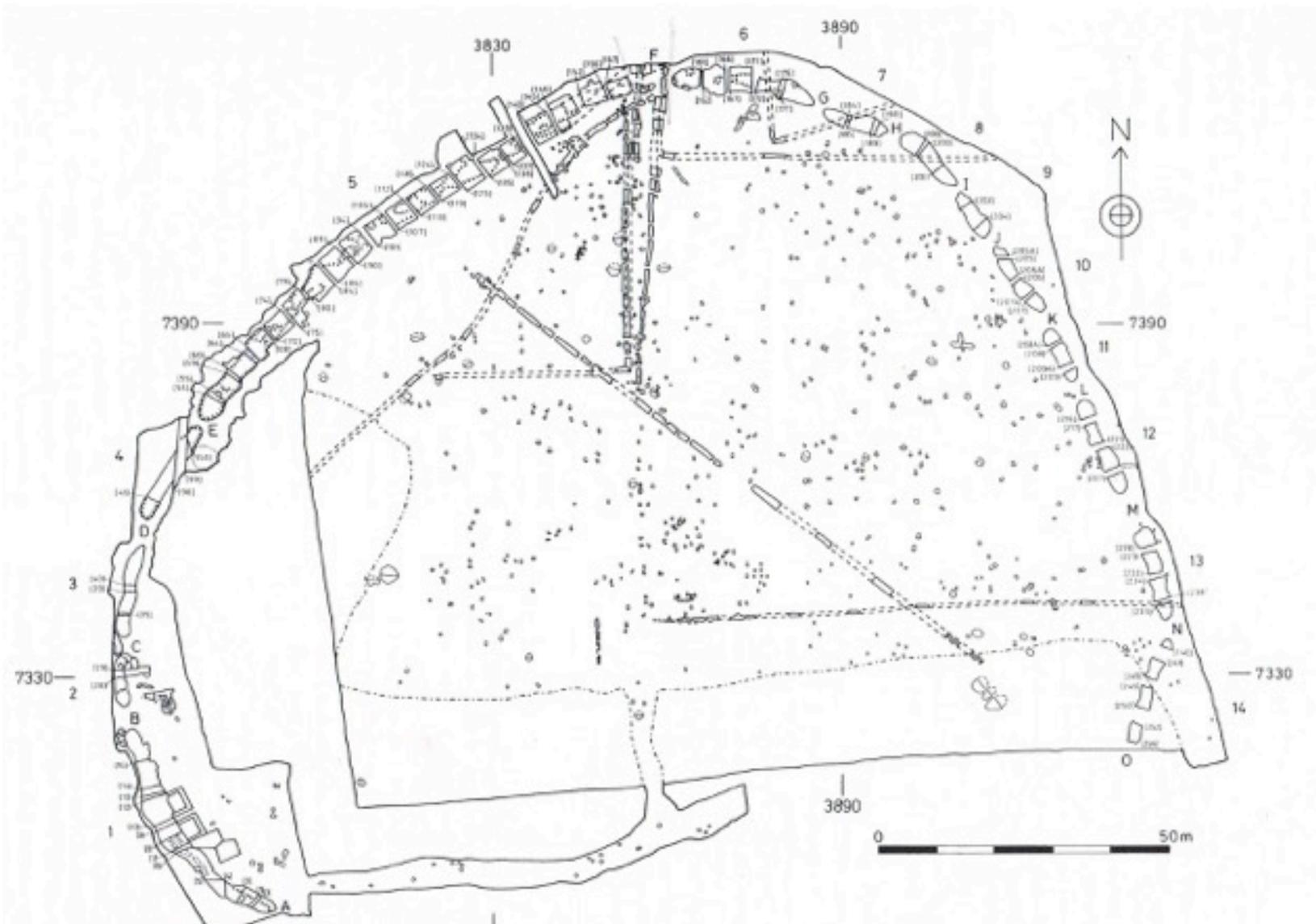


Figure 4.2: General Plan of Excavations (Pryor 1998)

deposits. Pryor states that the pits were “beyond all reasonable doubt...deliberately backfilled.” (Pryor 1998, 103).

Two long slots present in the northwestern quadrant of the site were thought to have housed timber revetments, interpreted at the time of excavation as belonging to some kind of barrow or funerary structure. A possible fence line was thought to extend directly south from the northern entrance to the site (Causeway F).

#### 4.1.1 Phasing

Five phases of archaeological activity were initially identified at Etton; middle Neolithic (Phase 1), late Neolithic (Phase 2), Bronze Age (Phase 3), Iron Age (Phase 4) and Romano-British (Phase 5) (Pryor 1998, 16 – 17). The vast majority of activity, including the complete enclosure ditch and most of the internal features, could be dated to Phase 1, with a very small number of features attributable to Phases 2 and 3. Phase 4 and 5 activity comprised a small number of pits and ditches representing a field system overlying the causewayed enclosure. In the original report it was suggested that the Phase 1 and 2 activity on site only lasted for a short time (perhaps only two or three centuries), during the second quarter of the fourth millennium BC (3750 – 3500 BC). This original hypothesis has recently been corroborated by a detailed dating exercise of causewayed enclosures all over the UK using Bayesian modelling (Whittle *et al.* 2011), which estimates that the ditch was cut between 3705 – 3670 BC, and that primary use of the enclosure ended between 3310 – 3210 BC.

Because the majority of the features present at the site could be dated to the middle Neolithic (Phase 1), this phase was subdivided into three discrete phases of activity: Phase 1A, which saw the original excavation of the ditch circuit; Phase 1B, which saw the re-cutting and backfilling of some of the Phase 1A ditch segments, as well as the placement of material within the ditch; and Phase 1C in which re-cutting continued but more narrowly than in Phase 1B and with less emphasis on the complete burial of materials. Although it was possible to discern three phases of activity dated to the middle Neolithic, it is

almost impossible to understand how these phases reflect activity the site as a whole, as each ditch segment has separate and very different stratigraphy and they are all dated by the presence of the same pottery types. Identified layers of activity do not follow from one segment to another, making it difficult to follow the stratigraphy chronologically around the entire site. While it is clear that three or four phases of activity went in to the enclosure ditch over the use of the site, it may be that different ditch segments were subject to these episodes of re-cutting and back-filling at quite different times.

#### 4.1.2 Excavation Methodology

During the first three seasons of excavation, a 1m-wide toothless bucket on a JCB removed topsoil and alluvium. In subsequent excavation seasons a 2m wide toothless bucket was used. All layers lower than the alluvium, including a buried soil, were removed by hand. Following geophysics, field walking, sample sieving and excavation, a digger removed the buried soil from the site. The upper layers of the enclosure ditch were removed by fork and spade. Any finds present therein were recorded by depth and to a 1m-grid square. Lower levels of the enclosure ditch and all non-linear features in the interior of the site were excavated by trowel, wooden spatulae or similar hand tools and all Neolithic deposits were planned *in situ* and bagged by 1m squares (Pryor 1998, 11, 20, 81).

As described above, animal bones from the upper levels of the enclosure ditch were recovered using forks and shovels. Those present in the lower levels were excavated with hand-tools such as plasterers' leaves and spatulae. All bone was plotted within a 1m-grid square, and depths recorded. A control was carried out in order to ascertain the levels of loss during the excavation. Two buckets of soil were processed through sieves. The number of bone fragments recovered was extremely low, giving confidence that overall retrieval during excavation was excellent (Armour-Chelu 1998, 273).

### 4.1.3 Finds

A very large number of finds of many different types were recovered from Etton. The following provides a very brief précis of each of the main categories of material recovered, and considers how its analysis helped shape the wider interpretations for the site as a whole.

#### 4.1.3.1 Wood and Bark

The assemblage of waterlogged wood and bark found within the western arc of the enclosure ditch is the only large collection of such material to have been found on a site of this type in Britain. It is also the only assemblage of British Neolithic wood to display evidence of *in situ* woodworking (Taylor 1998, 115). The wood was evenly distributed across the bases of ditches 1 – 5. It is possible that the repeated waterlogging of the western arc of the enclosure caused this to be the case (*Ibid*, 120). There were only two instances where wooden artefacts were thought to have been ‘structured deposits’. The first was a birch bark mat present within a birch bowl in ditch segment 1, and the second was an unused sheet of birch bark and piece of flax twine in ditch segment 2 (*Ibid*). The majority of the assemblage comprised small woodchips, indicative of woodworking. Also present was a good deal of naturally occurring wood including coppice stools, roots, bark and natural roundwood (*Ibid*, 127). Of the nearly 5000 pieces of wood present within the ditch, only 20 were identified as being ‘products’ – these included 2 pieces of worked timber, an axe haft, five fragments of wooden vessel, five forks, five heel points and two thin pieces of worked bark (*Ibid*, 147 – 157). The large quantity of woodworking debris present within the enclosure ditch suggests that woodworking activities were being carried out in its immediate vicinity.

Maisie Taylor, who conducted the analysis on the wood and bark suggests that, contrary to what is suggested overall for the usage of the site, people may have been woodworking at Etton more than once a year, and at various different times of year. She states that the cleanliness of the ditch suggests that it was not abandoned for any length of time (*Ibid*, 159).

#### 4.1.3.2 Pottery

The pottery assemblage from Etton is large and varied. Five different types of pottery were present – Mildenhall Ware, Peterborough Ware, Fengate Ware, Ebbsfleet ware and Grooved Ware. Mildenhall Ware was by far the most extensively represented. Over half of the pottery from Etton was decorated, and the nature of the decoration is varied and often elaborate (Pryor 1998, 211). The condition of the Mildenhall pottery within the enclosure ditch and in the interior of the site is excellent and usually unabraded. This has been used to suggest that the vessels were being covered rapidly after deposition, and that they did not derive from domestic contexts (*Ibid*). It is suggested that the selection of decorated pieces rather than plain pieces is indicative of selection, and that the pottery being deposited was not ‘rubbish’ but was selected and placed with intent (*Ibid*, 212). The deposition of Ebbsfleet and Fengate Ware was thought to predate Peterborough and Grooved Ware. Only one sherd of Ebbsfleet Ware was present on the site. It is not thought to originate locally and is not common in the area, so must have been brought in at some point. Fengate Ware was only present in the eastern arc of the enclosure ditch (*Ibid*). Sherds of Peterborough Ware were scarce, and generally appeared to be unabraded. No complete Fengate, Ebbsfleet, Peterborough or Grooved Ware vessels were recovered from the site. This is suggested by Pryor to indicate a change in ‘rite’ associated with the deposition of pottery between the late middle Neolithic and the late Neolithic (*Ibid*, 213).

#### 4.1.3.3 Flint

The flint assemblage from Etton is thought to be of considerable importance. It is thought that all the material was gathered in the area local to Etton, and that flint working represented archaeologically was undertaken on site (Middleton 1998, 238) In total, 7407 pieces were recovered, as well as two flakes of chert. Of these, 5278 were waste flakes, 247 were cores and 284 further pieces were classified as being ‘irregular waste’ (*Ibid*, 215). Six hammerstones and 1344 struck flint implements, including utilised flakes, were found. The assemblages of flint implements included serrated and retouched flakes, rods, fabricators, scrapers, piercers, denticulates, leaf arrowheads, transverse arrow heads and

tanged arrowheads. Four laurel leaves were also present. Twenty polished axe fragments were found, as well as a small polished blade (*Ibid*, 235).

There is a general rarity of flint in the earlier phases of the site, it does not become widely evident at the site until the later middle Neolithic period. There is a distinction between depositions of flint the western and the eastern arc. The western arc appears to have been kept 'clean' of flint during the middle Neolithic, with the exception of a thin scatter of flints and a slight concentration at the terminus of ditch segment 3. In the eastern arc of the enclosure ditch there is hardly any flint in the very low layers, however there is considerably more in later layers and it was often situated in deposits identified as being 'structured' in Pryor's report (Pryor 1998, 253). The flint in these deposits included waste flakes and other by-products however Pryor does not believe that these were created *in situ*, but rather that they were deposited in the ditch intentionally and after selection. There were concentrations of flint in the ditch termini of a number of ditches in the eastern arc.

There seems to be a preference for the deposition of finer material in the interior features than the enclosure ditch (*Ibid*, 240). Middleton suggests that the relatively high number of implements present at Etton, and enclosure sites more generally, contrasts with unenclosed sites, and may reflect the importance of enclosures in the production of flint tools (*Ibid*, 241). He also suggests that the location of the enclosure may have been, at least in part, determined by the ready availability of a good source of flint nodules (*Ibid*, 238).

#### 4.1.3.4 Stone and Fired Clay

Thirty-five polished stone artefacts were recovered, two from the buried soil, sixteen from the enclosure ditch and seventeen from interior features. One of these was a polissoir made from a large quartzite pebble. Traces of ochre seem to be present in its centre. Four fired clay objects were recovered from Etton. One was of indeterminate function and was found in the causeway, F – by the main entrance to the site. This location has been used to suggest that the object had a ritual use (Kinnes and Pryor 1998, 270). The three other fired clay objects were found in a group in ditch segment 7 in the eastern arc of the enclosure

ditch. Pryor describes these objects as phallic and says they are a group of fertility offerings (*Ibid* 270). It is unclear from the illustrations in the original report why these are described as such.

Three complete querns were recovered. Of these, two were found in small pits – one was upside down and the other was on its side. Pryor deems these to both be ritual in contexts. The remaining querns all appear to have been deliberately broken. Two of these were also from small pits. These were both heavily abraded and had clearly been subject to significant usage. Further quern fragments were present in the enclosure ditch; two of these seem to have been virtually unused. One quern was deposited with a quartzite rubber directly above it, and were likely used together.

#### 4.1.3.5 Human Bone

No complete, partial or reassembled skeletons, or articulated human bones were recovered from Eton. All of the human bone present on the site was large and easily identifiable as such. It was all recovered from the enclosure ditch. Segment 1 contained the largest concentration of human bone; a left femur and left humerus, both of which had been heavily damaged by canid gnawing. Also in this segment were a femoral head and a left and a right scapula, which are possibly a pair. Fragments of skull were present in ditch segments 6, 8, 10, 13(x2) and 14. A further gnawed femur was present in ditch segment 3 and a left tibia was in ditch segment 12.

Armour-Chelu (1998, 272) states that the human bone has a very different taphonomic history from the animal bone. Certainly, the animal bone had not been butchered and showed no signs of fresh fracture. Considerably less human bone was recovered with animal bone, which clearly makes direct comparisons difficult, however, the animal bone present in the western arc ditch segments had also been significantly gnawed. It is this gnawing, as well as the absence of small skeletal elements, which leads Armour-Chelu to propose that the human bone may have been excarnated.

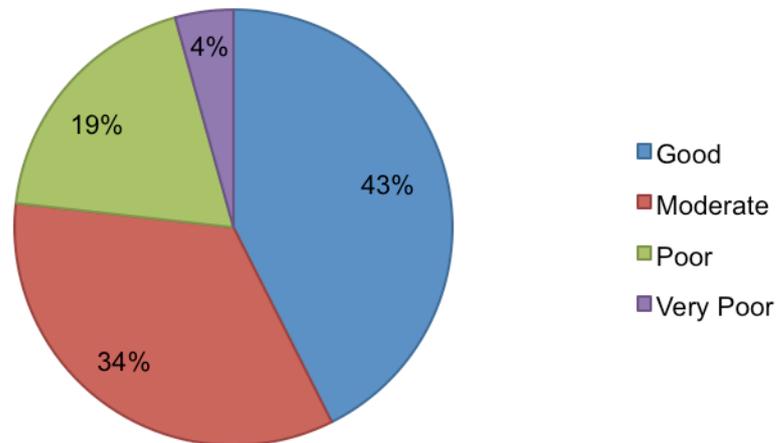
## **4.2 Changes to Phasing**

It was decided, with the support and encouragement of the original site director Francis Pryor, that for the purposes of this investigation the sub-divisions within the original Phase 1 should be disregarded. There are a number of different reasons for this. Firstly, it is thought that, despite the many different layers within the enclosure ditch, everything that is present within it is middle Neolithic in date (3705 – 3210 cal BC), as an alluvium layer caused by regular flooding of the site was observed to seal the context (Pryor pers. comm.). This period of just 500 years is a relatively small window of time to be considering when compared to the more general phasing often attributed to Neolithic sites. Secondly, the stratigraphic layers are considerably more various than the three identified phases of activity, and are difficult to define more precisely chronologically than just to say the order in which they were constructed (and even this in some cases is not clear). Because of this, to only consider the layers that are attributable to one of the three Phase 1 sub-phases will result in a considerable amount of material being left out of the analysis, despite the fact that it can be dated to a narrow date-range. Lastly, the general premise of the animal bone analysis is that its resolution will be greatest when considered from a distance – that is, if the animal bone is considered by sub-phase, the overall impression we are given of what is kind of activity is occurring between the inhabitants of the site and their animals will be more patchy than if we look at human-animal activity over a period of c. 500 years that we know the site was in use.

## **4.3 Current Preservation**

The bone recovered from Etton seemed generally well preserved, and in most instances the manner of its curation had prevented further damage occurring to the bone in the intervening period between it being bagged and tagged and the present analysis. Where loose bones had been boxed together some degree of post-excavation fragmentation had occurred. The preservation of bones was recorded where it was applicable (not in the case of teeth, skull fragments or horncores). Of the 3259 middle to late Neolithic bones for which preservation was subjectively recorded, 1388 were in a good state, 1114 were moderately

well preserved, 617 were poorly preserved and 140 were very poorly preserved (see Figure 4.3).



**Figure 4.3: Preservation of middle to late Neolithic bones**

The bones recovered from the internal features were generally better preserved than those present in the enclosure ditch. This is potentially because of the effect of the annual inundation of the enclosure ditch by floodwater. The preservation of the bones within the enclosure ditch varies from segment to segment from just 24% and 25% recorded as good in Ditch Segments 7 and 11 up to 59% in Ditch Segment 14.

As well as the surface preservation of bones, the numbers of 'new' fractures were also recorded. These fractures, which are likely to have occurred during the excavation and post-excavation process, are quite distinct from those that occurred in antiquity and are easy to recognize. The proportions of new fractures can be used to understand the nature of care that the bones were subject to from their retrieval from archaeological contexts, through washing, marking, bagging and storage. In the case of the Eton bone, 397 of the identifiable middle Neolithic bones had been subject to new fractures, which, at less than 10% of the total number of bones, implies that a lot of care was taken both at the time of excavation and subsequently. Most of the bones that had been subject to new fractures were found amongst bones put loose into boxes.

The individual bagging of the vast majority of the material had precluded much damage from occurring.

#### **4.4 A Note on the Original Animal Bone Report**

As has already been mentioned, it was clear from a cursory analysis of the archive that the original animal bone report for Etton (Armour-Chelu 1998) was seriously compromised by the absence of at least two thirds of the existing bone from the investigation. There is currently no explanation for this absence, as it was not intended for the original analysis to look at a sample of bone, but the whole assemblage. That the analysis was of only part of the assemblage is not alluded to at any point in the original report, and the site director and author of the site monograph (1998), Francis Pryor, was under the impression that Armour-Chelu's faunal analysis had been exhaustive. This is naturally reflected in his conclusions regarding the use of Etton as a causewayed enclosure site, and the role of animals thereon.

Throughout the following chapters, there will be sections that summarise what the data and perspectives of the original report. These are intended not only to demonstrate the difference in the two phases of analysis, but also to show the difference that a full and thorough analysis of animal bone can make to the interpretation of both the role of animals in an economy and on individual sites.

The introduction to the original report states that the majority of the faunal material (3843 bones, including unidentifiable specimens and post-Neolithic contexts) was recovered from the enclosure ditches, with a further 2361 bones coming from interior features. Thirteen species were represented by these bones which were, in order of abundance; cattle, pig, sheep, red deer, aurochs, goat, roe deer, fox, otter, dog, wolf, horse and toad. During the analysis presented in this thesis, 10040 individual bones were counted, of which 2423 were positively identified to species and element and were from middle Neolithic contexts.

## 4.5 Basic Counts

As is typical of assemblages from the middle Neolithic (Phase 1), the three main domestic species (cattle, pig and sheep/goat) dominate the fauna present at Etton, making up 96% of the total number of species present. Also typically, cattle (*Bos taurus*) dominate, comprising 72% of the total number of identified bones, and 74% of the domestic animals. Pigs (*Sus scrofa*) are the second most abundant species and make up 13% of the total assemblage of identifiable bone and of the domestic animals, and sheep (*Ovis aries*) (and potentially, though not definitively goats (*Capra hircus*)) comprise 10% of both the total and domestic assemblages. Domestic dog (*Canis familiaris*) accounts for roughly 2% of the total assemblage and domestic assemblage. After the domesticates the most abundant species are aurochs (*Bos primigenius*) and red deer (*Cervus elaphus*) at about 1% of the total assemblage. Fox (*Vulpes vulpes*) and roe deer (*Capreolus capreolus*) are also present but at less than 1% of the total identifiable middle Neolithic bones.

A single horse bone (*Equus caballus*) was also recovered from an apparently mid Neolithic context, however, its date is yet to be confirmed. It is very unusual for horse remains to be found in contexts which are earlier than the Bronze Age, and if, upon the completion of C14 dating, it is found to be genuinely mid Neolithic, it is potentially an important piece of evidence in the search for early domestic horses in Britain (Bendrey pers. comm.).

Figure 4.4 shows the NISP and percentages for the identifiable middle Neolithic specimens (all NISP Figures are exclusive of cranial fragments, loose teeth, fragments of horncore, carpals and tarsals, ribs and vertebrae). The proportions of the species are almost identical between the enclosure ditch and internal features, with only slightly more pig and sheep remains present in the internal features (and 1%).

The Phase 2 assemblage, dating to the late Neolithic/early Bronze Age sees a change in the proportions of species present. The overall percentage of cattle drops to 50%, while sheep take over from pigs as the second most abundant species (32%). Pigs are now the least abundant, comprising 14% of the

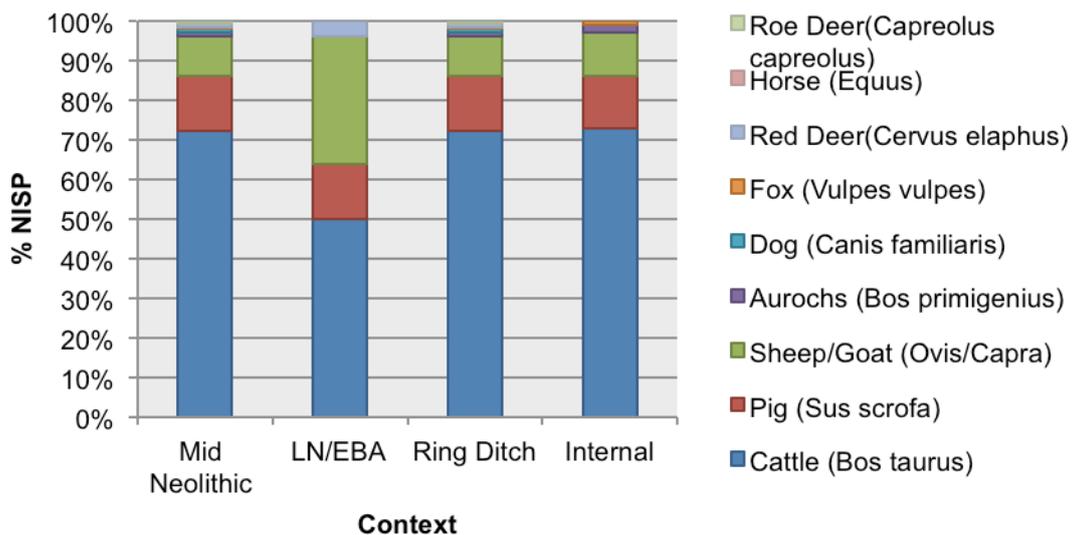
assemblage. The total number of identifiable bones attributable to the late Neolithic/early Bronze Age is substantially less than those attributable to the middle Neolithic and derive from just six contexts, all pits present in the centre of the site.

**Table 4.1: NISP and percentages for middle Neolithic specimens.**

Species	NISP	%
Cattle ( <i>Bos taurus</i> )	1759	72
Pig ( <i>Sus scrofa</i> )	327	13
Sheep/Goat ( <i>Ovis/Capra</i> )	240	10
Dog ( <i>Canis Familiaris</i> )	32	2
Aurochs ( <i>Bos primigenius</i> )	25	1
Fox ( <i>Vulpes vulpes</i> )	4	0.25
Red Deer ( <i>Cervus elaphus</i> )	24	1
Roe Deer ( <i>Capreolus capreolus</i> )	11	0.75
TOTAL	2423	100

**Table 4.2: NISP and percentages for late Neolithic/early Bronze Age specimens.**

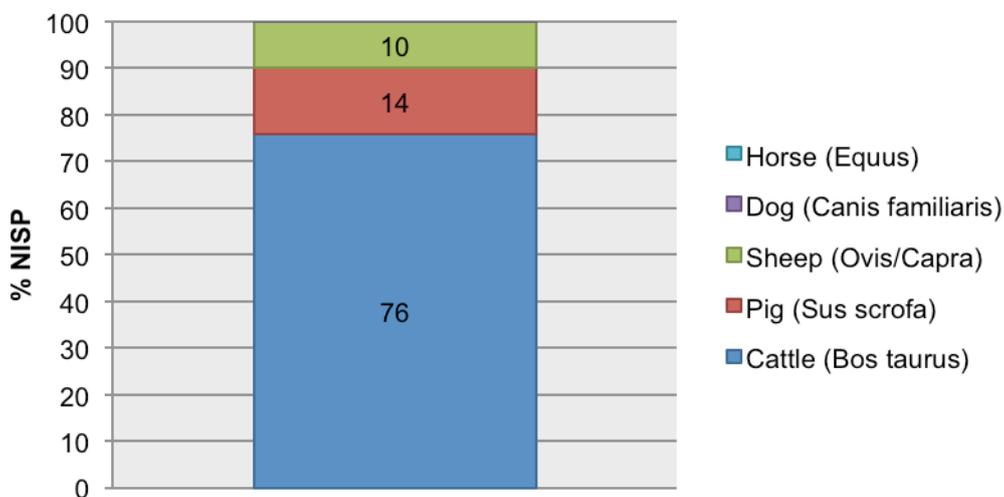
Species	NISP	%
Cattle ( <i>Bos taurus</i> )	14	50
Pig ( <i>Sus scrofa</i> )	4	14
Sheep ( <i>Ovis/Capra</i> )	9	32
Red Deer ( <i>Cervus elaphus</i> )	1	4
TOTAL	28	100



**Figure 4.4: Percentages of species present for a) mid Neolithic features, b) late Neolithic/early Bronze Age features, c) in the ring-ditch and d) in the internal features.**

## 4.6 The Domestic Species

In order of prevalence, the domestic species represented at Etton are Cattle (75%), Pig (14%), Sheep (10%), Dog (1%) and potentially horse (<1%). Interestingly, representation of these species by mandibles raises the proportion of cattle to 86%, lowers the proportion of pig slightly to 12% and the proportion of sheep/goat dramatically to 2%. This is likely partially a result of the fact that sheep mandibles are somewhat less robust than mandibles of either cattle or pigs, but could also be a result of, for some unknown reason, there being less sheep mandibles present during the use of the site.



**Figure 4.5: Domestic Species present in mid Neolithic contexts.**

### 4.5.1 Domestic Cattle (*Bos taurus*)

Domestic cattle are present in almost all contexts of the site that contain animal bone. As demonstrated by Figures 4.4 and 4.5, they are by far the most prevalent of all the species on the site. This is typical of Neolithic assemblages across the country, regardless of proposed usage of the site.

#### 4.6.1.1 Cattle in the Original Report

Armour-Chelu identified cattle as accounting for 40% of the elements from the enclosure ditch (Armour-Chelu 1998, 284), and acknowledged that if this had been combined with bones identified as 'large ungulate' then this proportion would have significantly increased. She states that the distribution of cattle was

different to that observed for pig and sheep/goat in a number of ways; firstly that the bones of cattle did not seem to have been selected for deposition as articulated bone groups of partial skeletons, but rather as groups of elements such as ribs, skulls and vertebrae, which she says made it clear from the outset that the faunal assemblage was atypical of bone refuse from domestic activity. This is swiftly contradicted by the statement that the cattle assemblage “in most respects resembled domestic refuse” (*Ibid*). She states that small deviations from typical domestic assemblages can be seen in the patterns of butchery (which is not elaborated upon anywhere in the report) and ‘disposal’ of the cattle bone. The fact that the assemblage contains a high proportion of meat-yielding bone is used as evidence for feasting being a primary activity at Etton, as seen at Windmill Hill (Smith 1965, 20).

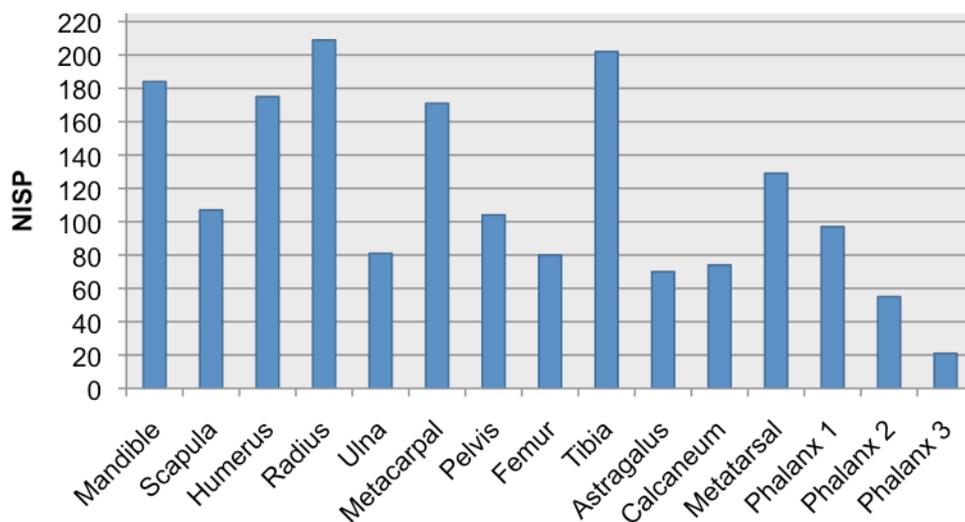
#### 4.6.1.2 Element Abundance

Most of the primary elements of cattle are well represented on site (Figure 4.6), There does not appear to be a particular dearth of any element except perhaps the 3<sup>rd</sup> phalanx. The main lower limb bones, radii and tibiae, are most abundant of all the cattle elements present on site, with mandibles, humeri and metatarsals following relatively closely behind. Femora are the most poorly represented of the main limb bones, despite the rest of the bones of the hind limbs being relatively well represented. Despite radii being the best represented cattle element on the site, ulnae are relatively poorly represented, suggesting a detachment of these two elements prior to deposition.

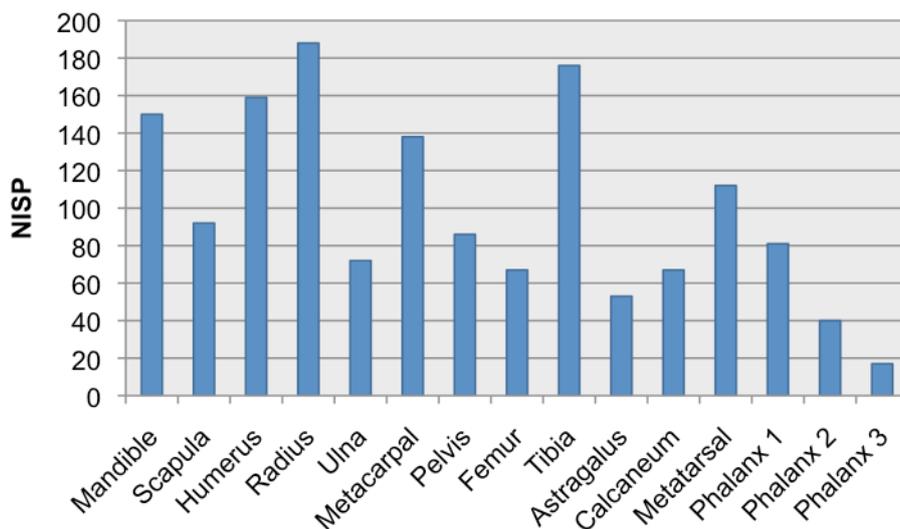
Generally, the best-represented elements are those that yield the highest amounts of meat and marrow. Two notable exceptions to this are the abundance of mandibles (the third most prevalent element) and the relative under-representation of femora. Mandibles do yield both meat and marrow, but the quantity and quality is not generally thought to be high. They do tend to be very hardy elements taphonomically, however, which may explain their prevalence. Femora on the other hand yield the most meat and marrow of any appendicular element, yet they are less than half as prevalent as bones such as the radius, tibia and mandible. It is possible this is a result of the late fusion of

the femur, as unfused bones tend to survive less well taphonomically than fused bones that have reached their full strength (Legge 2008).

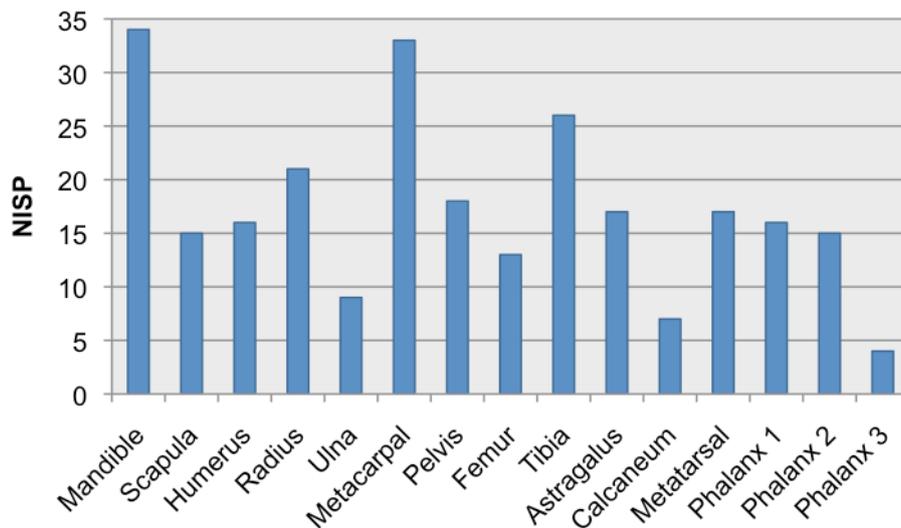
The number of cattle elements present differs between the enclosure ditch and internal features (Figures 4.7 and 4.8). In the enclosure ditch, as in the overall figures, radii and tibiae are the most prevalent elements by some margin, followed by humerii, mandibles and then metacarpals. There is still a clear paucity of femora when just the bone from the enclosure is considered, however, it remains true that it is predominantly the high meat/marrow yielding bones that are most prevalent, with bones of lower economic value less so.



**Figure 4.6: NISP main cattle elements**



**Figure 4.7: NISP main cattle elements from enclosure ditch**



**Figure 4.8: NISP main cattle elements from interior features.**

There is an obvious difference between the most prevalent elements from the enclosure ditch and from the interior features. Mandibles are the most common element recovered from the interior features, with metacarpals a close second. Radii, tibiae and humerii, which were most prevalent in the enclosure ditch, have been relegated to 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> most prevalent, with the total number of humerii falling to beneath the total number of astragali and phalanges 1 and 2. The difference in the numbers of elements between the enclosure ditch and interior features alludes to different rationales governing the deposition of bones in these contexts. The prevalence of high meat/marrow yield bones in the enclosure ditch has connotations of food waste, while the mandibles and metapodia present in the interior features potentially implies the deposition of remains from a different kind of activity, potentially primary butchery waste or the production of secondary products. It might also be the case that the taphonomic conditions were different within the enclosure ditch and outside it. This will be discussed further in Chapter 7, which focuses on distribution.

Cranial fragments (not including loose teeth) were identified from various contexts around the site. These were considered separately from the bone identifiable to element and/or species as they tended to be so fragmentary that identification to species was impossible, and the taphonomic nature of skulls is to fragment heavily, making it difficult to discern the state of deposition. There are in total 114 fragments of cattle crania from the site. The vast majority of

these fragments derive from enclosure ditch contexts, but contrary to previous analysis, there does not seem to be particular preponderance for their deposition in the termini of ditch segments. There is, however, a strong concentration of cranial fragments in the eastern side of the enclosure ditch compared to the western side. For the most part it is unclear whether or not the cranial fragments derive from skulls that were complete when deposited, however, in Ditch 10 (206-207) it is clear that two complete skulls had been deposited.

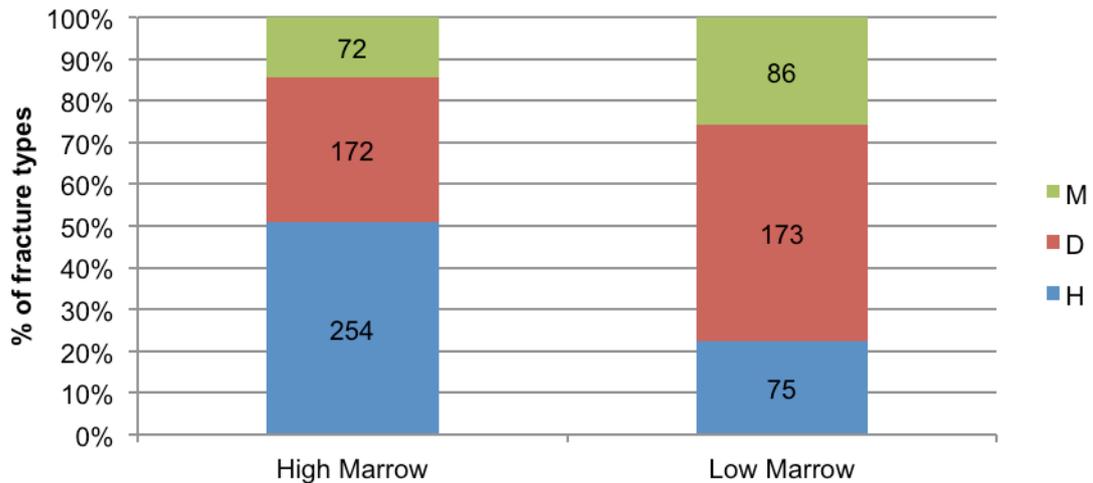
423 vertebrae were recovered from the site, including 30 axes, 9 sacra and 7 atlases. These vertebrae were usually identified as belonging to a 'large mammal', but given that cattle were clearly the predominant large mammals on the site, it is highly likely that they are cattle bones.

#### 4.6.1.3 Butchery

Butchery is discussed in fine detail in the next chapter, so will not be considered here. However, in excess of 18% of the bone displayed butchery marks, which is significantly more than was observed during the original analysis of the bones.

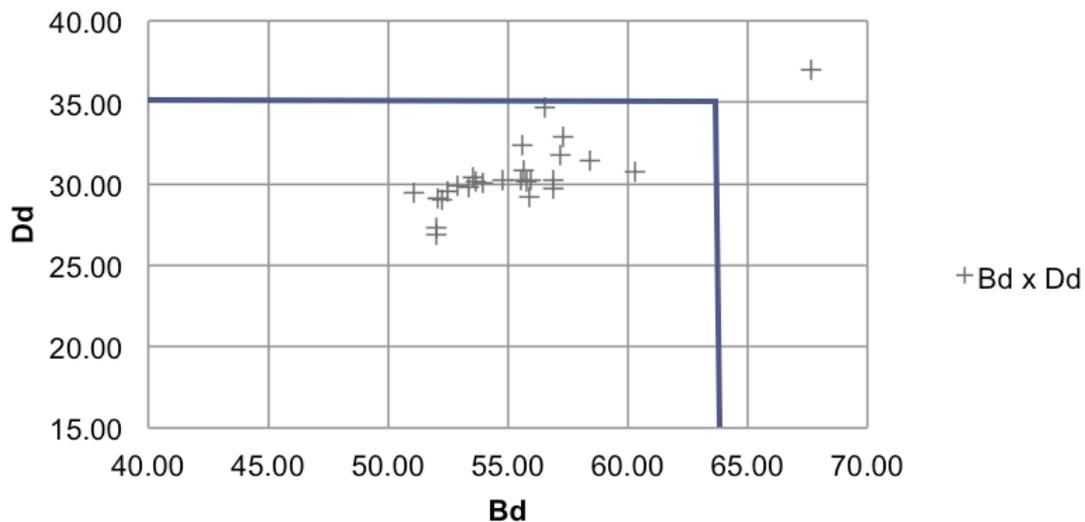
#### 4.6.1.4 Fracture

Fracture analysis was conducted on the bones in order to establish whether or not they were being exploited for their marrow content as well as the meat present on them. The results of this analysis are presented in great depth in Chapter 6, therefore will not be covered here in any detail. However, it is possible to say that overall around 50% of all tibiae, humeri, femora and radii had helical fractures and, therefore, were fresh when broken, most likely deliberately (Figure 4.9).



**Figure 4.9: Different fracture types for high and low marrow-bearing bones present in the enclosure ditch.**

#### 4.5.1.5 Sexing



**Figure 4.10: Cattle sexing by metacarpals (Bd x Dd). The area within the thick lines indicates animals considered to be domestic females after (Legge 2008).**

It is possible to determine the sex of adult cattle based on measurements taken of the condyles on the distal end of their metacarpals. Figure 4.10 is a scatter graph that plots the measurements of the breadth of the distal condyles (Bd) by their depth (Dd). It shows the measurements of twenty-six metacarpals that were complete enough to allow accurate measurements. The thick line is the accepted limits of female domestic cattle (Legge 2008). All but one of the metacarpals from Etton fall within this limit and should therefore be interpreted

as being adult domestic female cattle. The outlier is clearly separate from the adult females, and although there is an overlap between female aurochs and domestic male cattle, it is not convincingly large enough to be considered as a female aurochs, and thought more likely to be an adult domestic male. This single male against 25 females gives an extremely high female/male ratio of 25:1, which most likely indicates the presence of a dairying herd.

Sexing of cattle is also possible by morphological analysis of pelves. In total 36 pelves had complete enough acetabula regions to allow for sexing. This analysis revealed surprisingly even numbers of females and males, resulting in a ratio of 11:7. This is clearly dichotomous with the female biased ratio suggested by the metacarpals, and also considerably lower than has become expected from Neolithic causewayed enclosure sites, where ratios of 5:1 – 7:1 appear to be the norm (Legge 2008, Grigson 1999). It is possible that the absence of acetabulum on the majority of the cattle pelves from Etton has somewhat skewed this ratio. Certainly if gracility is taken to account on otherwise unsexable pelves, there does seem to be a suggestion of more female pelves. If all the elements that appear to be female based on this criteria were confirmed as female, were the case the ratio would likely be within the normal range identified by Legge (2008).

In the original report Armour-Chelu reports a ratio of 7:1 female to male cattle by morphological analysis of humerii and metacarpals. Interestingly, she appears to have the same deviation from the norm with regards to sexing by cattle pelves, which returned a ratio of 5:2 male to female (Armour-Chelu 1998, 283).

#### 4.6.1.6 Ageing

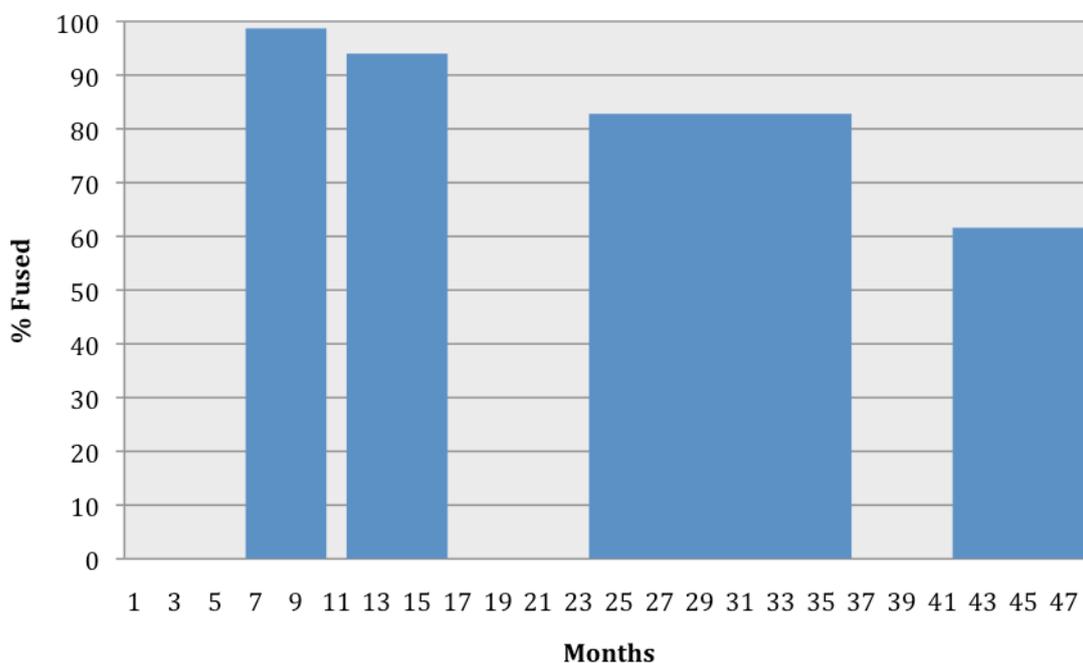
An idea of the age of the animals present at Etton can be got in two ways; the first is by looking at the fusion of the elements present. Bones fuse in a certain order, and at certain times during the development of an animal. By looking at the numbers of fused and unfused bones it is possible to create a picture of the herd structure.

**Table 4.3: Cattle Fusion Table (ages after Silver 1969)**

Fusion Age	Element	Unfused	Fused	%Fused	Average % Fused
7 - 10 Months	Scapula (D)	1	77	98.7	98.7
12 - 16 Months	Humerus (D)	10	89	89.9	94.0
	Radius (P)	4	101	96.2	
	Phalanx 1 (P)	5	85	94.4	
	Phalanx 2 (P)	2	53	96.4	
2 - 3 Years	Tibia (D)	20	84	80.8	82.8
	Metacarpal (D)	10	72	87.8	
	Metatarsal (D)	9	32	78.0	
3.5 - 4 Years	Humerus (P)	8	16	66.7	61.6
	Radius (D)	20	41	67.2	
	Ulna (P)	5	17	77.3	
	Femur (P)	13	18	58.1	
	Femur (D)	5	4	44.4	
	Tibia (P)	17	20	54.1	
	Calcaneum (P)	16	19	54.3	
Total		145	728	83.4	

The bone fusion diagram (Figure 4.11) suggests that almost all animals present on the site are surviving until they are at least 1 year old. Eight elements were identified as belonging to neonate cattle during analysis, which possibly accounts for the 1.3% of cattle that do not seem to be surviving to this point. Only 4.8% of cattle appear to be dying or being killed before they are 16 months of age, this drops off to 18.8% by the time the animals have reached 3 years old, which is not a huge fall considering that 20 months will have passed. By the time animals are 4 years old 60% are surviving. This is a more considerable drop and possibly indicates elevated slaughter of animals at this age. Nevertheless, with 60% apparently not being killed until at least the age of 4, Etton is clearly contrasts to Hambledon Hill, where 90% of cattle are being killed before this point (Legge 2008).

The herd structure created for Etton is somewhat atypical. It neither conforms particularly well to a milk or meat kill off pattern, but despite the discrepancy mentioned above, is very similar to the pattern seen at Hambledon Hill (Legge 2008). Were it demonstrating that cattle were being kept at the site primarily for their meat, we would expect to see a more significant killing-off of animals between 18 and 30 months, when is thought to be the optimum time for meat production. If cattle were primarily being kept for milking we would expect to see a much more significant early mortality rate as the young males are killed in order to stop them taking the milk from their mothers, but we would also expect to see the high presence of older animals, as is demonstrated in Figure 4.14. The presence older animals does not indicate that cattle were being kept on the site specifically for their meat, and makes the hypothesis that the site is primarily a place for ceremonial feasting unlikely. It is easier to explain the absence of young male carcasses by arguing that they were kept off site or utilised in such away that meant they were not being deposited at Etton.



**Figure 4.11: Cattle Bone Fusion Diagram**

The second method for ageing cattle is by levels of wear observable on their teeth (after Brothwell and Higgs 1969 and Payne 1973). Nine entire mandibles recovered from the enclosure ditch and 296 loose teeth were recovered from

across the site. The majority of the loose teeth came from fully mature individuals older than 4 years, with only small numbers coming from individuals younger than this. The wear of the mandibles tended to corroborate this, with most demonstrating stages of wear indicative of 3 – 4 years and more.

There was little significant deviation between the ageing data from the most recent analysis and Armour-Chelu's ageing data presented in the site report (Armour-Chelu 1998, 283).

#### 4.6.1.7 Bone Groups/Partial Skeletons

Eleven cattle bone groups were identified at Etton; six were present in the enclosure ditch and five in three interior pits. This number, which is roughly the same as the number of sheep and pig bone groups, might be argued to be fairly low, considering the quantity of cattle bone present at the site. The most obvious and impressive of the bone groups were two rib bundles recovered from the first ditch segment of the enclosure ditch. The first (from 5-6/3) comprises 20 ribs (10 left, 10 right) of a juvenile animal. Butchery marks could be seen on 14 of these bones, thought to derive from the disarticulation of the rib cage from the spine and sternum. A second group of ribs was found in the terminus of Ditch Segment 1 (16-0/3), these displayed similar butchery marks also thought to derive from the disarticulation of the rib cage. A group of six vertebrae were found in close proximity to this group of bones, and might have derived from the same individual. The ribs and vertebrae suggest the animal died at an age of around 6 months.

A second group of cattle vertebrae including a sacrum were found in Ditch Segment 7 (185-187/5). As all of these elements were fused, it is thought that the animal from which they derive was fully mature at time of death. Two further groups of cattle vertebrae, each comprising three elements, were recovered from Ditch Segment 5. It is entirely likely that many further groups of vertebrae were present across the site, however, identifying them during post-excavation, when bones are stored individually and not necessarily by context, is almost impossible.

A potential deposit of a cattle forelimb was identified in enclosure ditch segment 10 during the original analysis of the site and comprises a scapula, humerus and radius. This was identified as the only case of conspicuous consumption at the site. The elements were thought to have been articulated at the time of deposition because of their size and appearance, as well as what remained of their articulating surfaces. Having re-examined these bones, however, it would appear unlikely that they were deposited whilst articulated, at least in the context from which they were recovered. This is because the bones all displayed dry fractures that indicate they were subject to breakage at some point around the time of deposition, or that they were disturbed post-depositionally and re-deposited. This is not to say they did not originate from the same animal, just that they were not deposited as an entire, fleshed joint.

Other cattle bone groups included the deposition of three articulated 'feet' in Pit 748. Only one of the groups included all three phalanges, the other two comprised the 1<sup>st</sup> and 2<sup>nd</sup> phalanges and the 2<sup>nd</sup> and 3<sup>rd</sup> phalanges. The only other bones present in this pit were cattle metacarpal and carpal. It seems highly likely that these would also have been articulated to one of the bone groups.

#### 4.6.1.8 Cattle in the late Neolithic/early Bronze Age

Thirty-one elements belonging to domestic cattle were recovered from late Neolithic/early Bronze Age contexts, seventeen of which were loose teeth, one was a vertebra and one was a horncore. The remaining 14 elements comprised one astragalus, mandible, metatarsal, 1<sup>st</sup> and 2<sup>nd</sup> phalanx, scapula, tibia and ulna as well as two femora, radii and metacarpals. Both metacarpals were right hand side, so it is unlikely the bones represent a skeleton. The scapula was the only element that had been butchered, however, the femora, radii, metatarsal and one of the metacarpals had helical fractures, suggesting marrow was still being extracted during this phase of the site. All but four of the elements were from a single pit (F14).

#### 4.6.2 Domestic Pig (*Sus scrofa*)

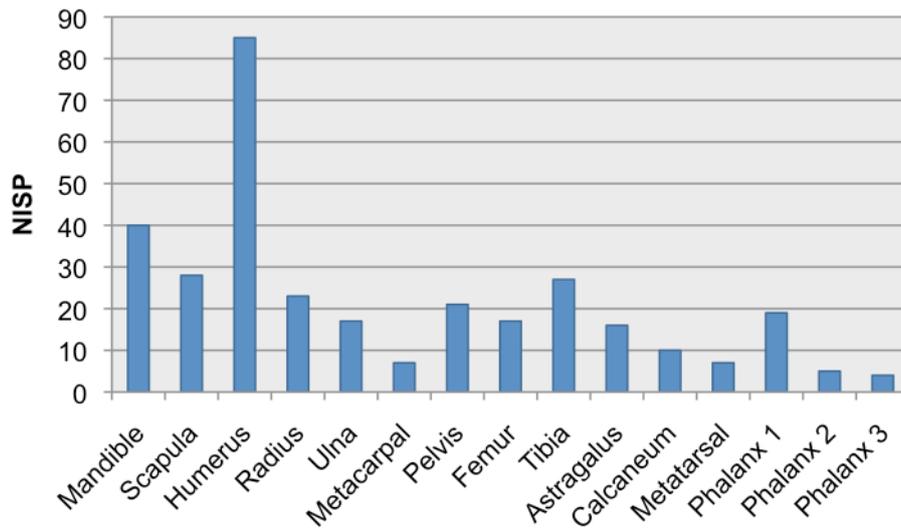
The domestic pig was the second most abundant animal at Etton, although it was present in considerably fewer numbers than cattle. 457 pig bones were recovered from middle Neolithic features at the site (327 bones excluding cranial fragments, loose teeth, carpals, tarsals, ribs and vertebrae).

##### 4.6.2.1 Pigs in the Original Report

The full summary for pig bone from Etton is as follows; “A total of 410 elements of pig (11%) was identified from the enclosure ditch, and 6% of these bones were derived from partial skeletons excavated from Phase [1]” (Armour-Chelu 1998, 285).

##### 4.6.2.2 Element Abundance

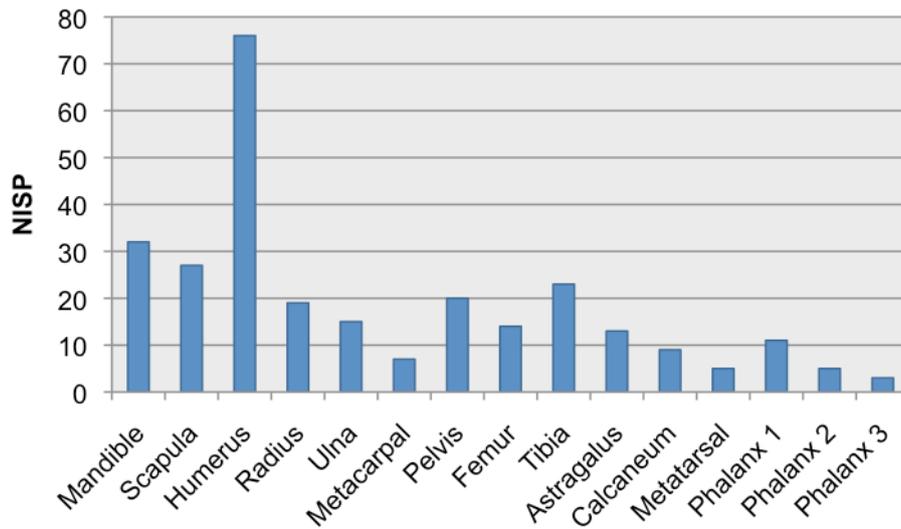
Pigs were fairly evenly represented across the site, though with a significant abundance of humerii and relative abundance of mandibles. The humerii account for 26% of the total pig bones recovered from the site, mandibles for 12% and scapulae for 9% (Figure 4.12). These three elements in total account for almost 50% of the total amount of pig bone recovered. Distal leg-ends were the most poorly represented body parts, and limbs were generally better represented, with the forelimbs being the best represented of all the body parts. Similarly to the dearth of cattle femora, there is something of an under-representation of pig femora, though the tibiae are relatively well represented.



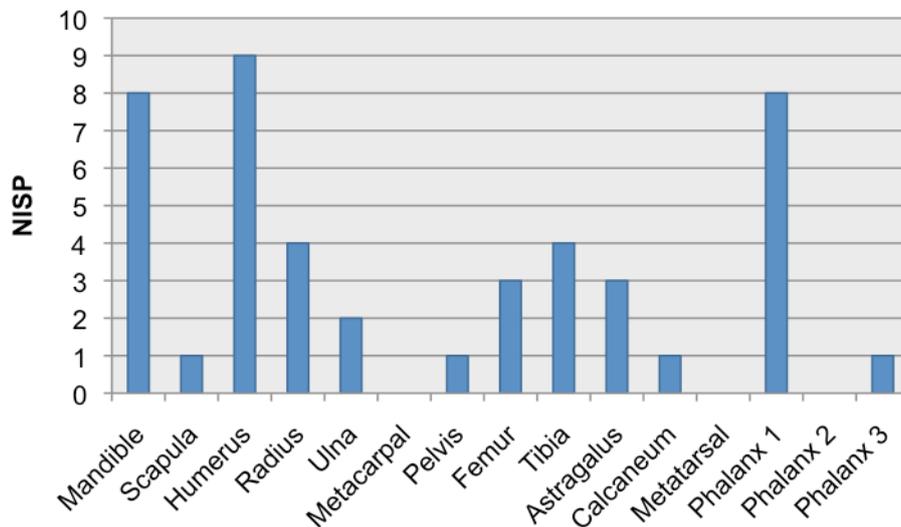
**Figure 4.12: NISP main pig elements**

The pig elements present in the enclosure ditch (Figure 4.13) roughly mirror those present on the site over all, though the abundance of humerii is even more obvious, with more than double the number of humerii present than any other element. The elements present in the interior features are considerably fewer in number, and the proportions are rather different from the overall picture, or the picture suggested by the elements present in the enclosure ditch (Figure 4.14). The humerii remain the most abundant of the elements but only by one, with mandibles and 1<sup>st</sup> phalanges following closely behind. The radii and tibiae are the next most abundant elements closely followed by the astragali and femur.

Seventeen different deposits contained fragmented cranial material. Two thirds of these were in the enclosure ditch and a third in interior features. Eighty-six loose teeth were recovered from the site, both incisors and molars; most of these also came from the enclosure ditch. There was a slight preponderance of cranial material in the western side of the enclosure ditch, though not a particularly significant one (10 more fragments). Only 5 vertebrae were definitively identified as belonging to pigs; however, 166 were identified as being medium size mammals, though these could also have been sheep.



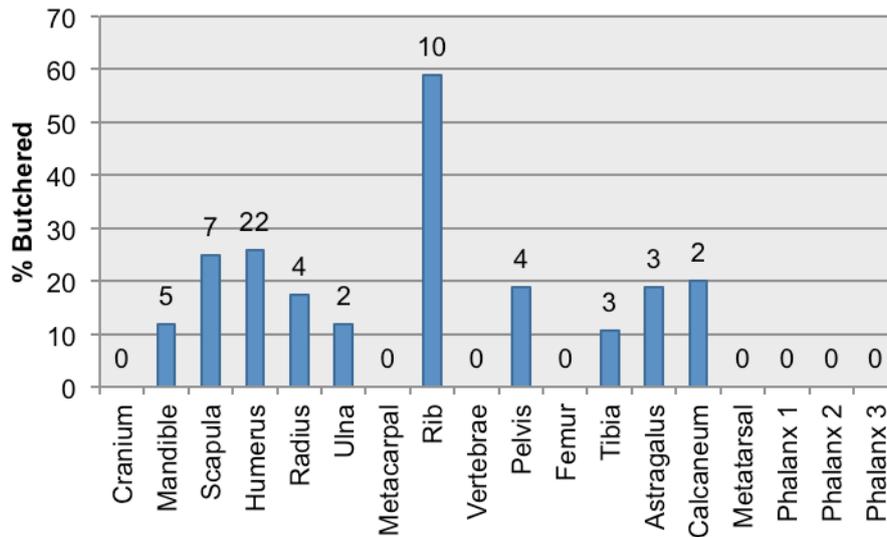
**Figure 4.13: NISP main pig elements from enclosure ditch**



**Figure 4.14: NISP main pig elements from interior features**

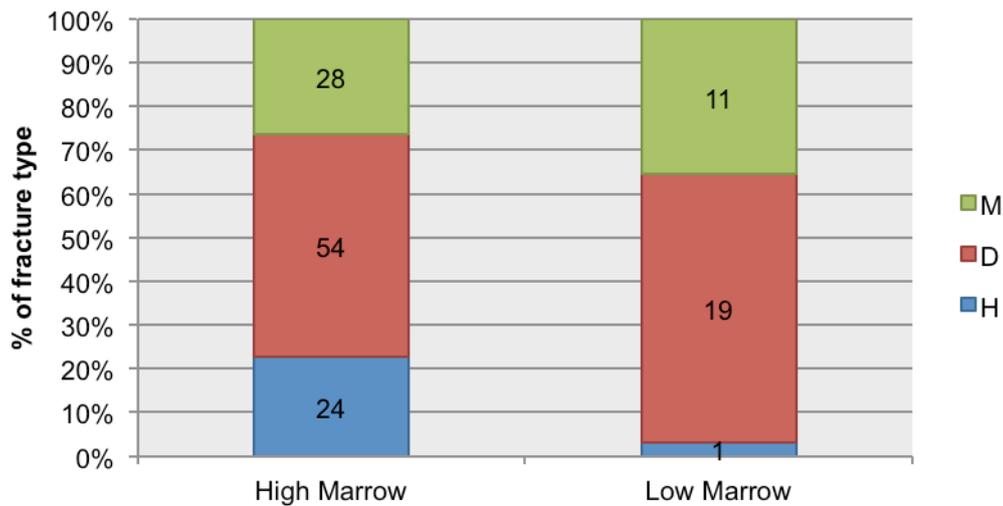
#### 4.6.2.3 Butchery

In total, 16.99% of the pig bone displayed evidence of butchery activity. This is slightly lower than the overall percentage of cattle bone with butchery marks present, but not significantly so. Ribs were the most intensively butchered element, followed by the elements of the upper forelimb; scapulae and humerii (Figure 4.15). The results of the butchery analysis on the pig bone are thoroughly considered in the following chapter.



**Figure 4.15: Percentage of total pig bones showing butchery marks**

**4.6.2.4 Fracture**



**Figure 4.16: Proportions of different fracture types for high and low marrow bones present in the enclosure ditch.**

Although not fractured at the same intensity as cattle, over 20% of high marrow yield pig bones recovered from the site had been fractured when fresh (Figure 4.16), indicating that pig bones were regularly being exploited for their bone marrow content. The results of the analysis of bone fracture on pig bones is presented in Chapter 6.

**Table 4.4: Pig Fusion Table (ages after Silver 1969)**

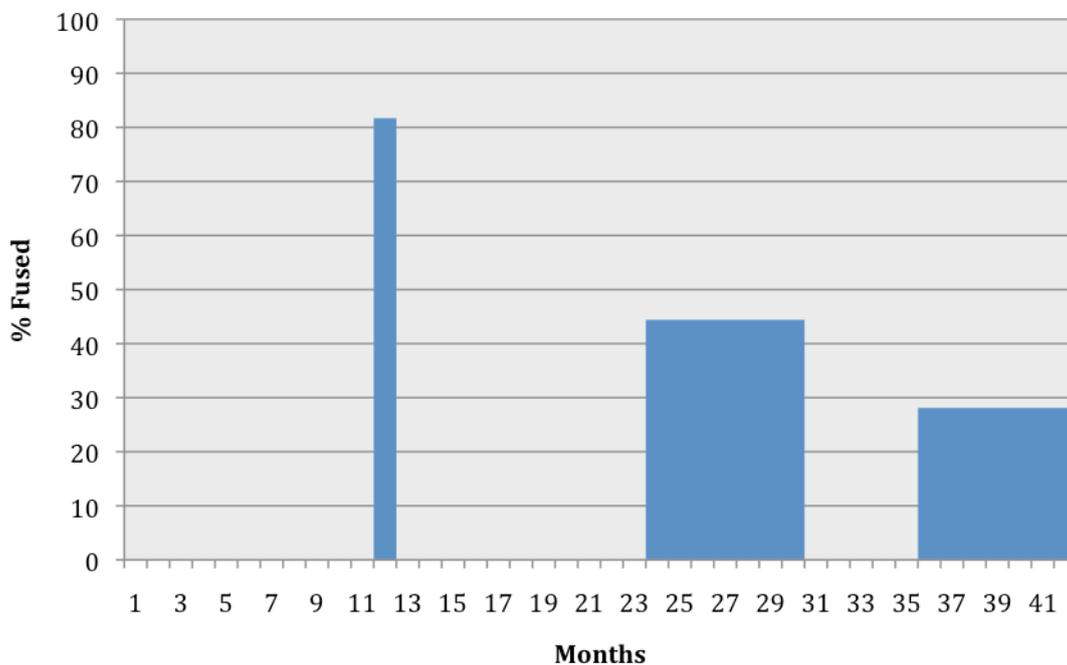
Fusion Age	Element	Unfused	Fused	%Fused	Average % Fused
12 Months	Scapula (D)	0	22	100.0	81.7
	Humerus (D)	5	19	79.2	
	Radius (P)	4	5	55.6	
	Phalanx 2 (P)	2	3	60.0	
24 - 30 Months	Metacarpal (D)	2	2	50.0	44.4
	Phalanx 1 (P)	7	5	41.7	
	Tibia (D)	5	7	58.3	
	Calcaneum (P)	5	0	0.0	
	Metatarsal (D)	1	2	66.7	
3 - 3.5 Years	Humerus (P)	0		-	28.1
	Radius (D)	5	2	28.6	
	Ulna (P)	9	2	18.2	
	Femur (P)	4	0	0.0	
	Femur (D)	2	3	60.0	
	Tibia (P)	3	2	40.0	

The bone fusion diagram for pigs shows a completely different pattern from the cattle fusion diagram, reflecting the different uses of the two species at Etton (Figure 4.17). The number of pigs surviving to one year old is 81%, which shows that significant numbers of animals are being killed before this point. The survival of pigs to 2 – 2.5 years old drops off by almost half to 44%, indicating that the majority of pigs being kept by the inhabitants of Etton are being killed before this point. Less than 30% of animals go on to survive until they are 3 – 3.5 years old. This model appears to be one dominated by the pigs position as a primarily meat-yielding animal.

It should be pointed out that the fusion data might be biased by the fact that there were seven possible partial pig skeletons present in the enclosure ditch, most of which were those of juvenile animals. None of these comprised more than one quarter of their original bones, however, the concentration of unfused

bones in these deposits might have had an effect on the low survival rate of pigs to 1 year old.

The indications as to the age of the pigs being kept at Etton according to the bone fusion is supported by levels of tooth wear. Nineteen mandibles were intact enough to allow for tooth wear to be analysed. Of these seven were from animals which had been killed before they reached 12 months old, and seven more before they were 2 years old. Five mandibles were from individuals who appeared to have reached maturity, and of these the M3 on two were almost completely worn. This data corroborates Armour-Chelu's ageing results for pigs.



**Figure 4.17: Bone fusion diagram for pig**

#### 4.6.2.5 Bone Groups/Partial Skeletons

Seven partial skeletons or bones groups were found within the enclosure ditch, often in the termini of ditch segments. Two were found in the butt-end of Causeway E and Ditch Segment 5 in a densely packed group. It is thought that one of the animals was relatively new born, while the other was somewhat older. They are represented by, among other things, two tibiae, two mandibles and two pelvises. A group of ribs from Ditch Segment 9 comprised 10 ribs, all from the left hand side of an animal, all of commensurate size and shape. Five

of these bones had butchery on their outsides, indicative of the removal of meat.

Three partial skeletons or bones groups were present in Ditch Segment 10. One on the base of the ditch roughly in the middle of the feature, was a young animal represented by various elements including a tibia, ulna, radius and 1<sup>st</sup> phalanx, all of which were unfused. Cutmarks present around the epiphyses of the bones imply it was disarticulated before deposition, raising the question of whether it was deposited as an animal, meat or as post-consumption debris. Ditch Segment 10 another partial skeleton or bone group in its butt-end with Causeway K. This comprised a left and right radii, left humerus, left scapula, right calcaneum, left mandible and three loose incisors. The mandible had M1, M2 and M3 erupting but not in wear, suggesting the animals age to have been about 6 months at time of death.

Armour-Chelu (1998, 285) makes much of the number of partial pig skeletons present in the enclosure ditch at Etton, stating that the presence of this kind of deposit for both pig and sheeps marks a significant deviation from the nature of cattle deposition. At the beginning of her report she states that “The majority of bones identified as pig or sheep from Phase 1 were derived from bone groups comprising one or more individuals and are described as ‘partial skeletons’ (*Ibid*, 276). Later on in the report, she states that 24 pig bones derive from bone groups or partial skeletons, from a total of 420 bones. This most recent analysis showed that many of these had been subject to butchery including meat removal and disarticulation, suggesting that the animals had been heavily exploited for their meat prior to their deposition as a ‘bone group’.

#### 4.6.2.6 Pigs in the late Neolithic/early Bronze Age

Only twelve pig bones were present in late Neolithic/early Bronze Age features at Etton, but seven of these were loose teeth and one was a cranial fragment. The other elements were a calcaneum, an ulna, a metatarsal and a tibia. None of these elements were butchered, nor was there any evidence for fresh fracture, but given the very tiny number of bones, this is probably not particularly significant.

#### *4.6.3 Domestic Sheep/Goat (Ovis/Capra)*

A very small number of elements were identified as belonging to goat rather than sheep during the original analysis of this material (Armour-Chelu 1998) and although some elements were thought potentially goat-like during the reanalysis, no elements were definitively identified as such so the two species have been grouped together.

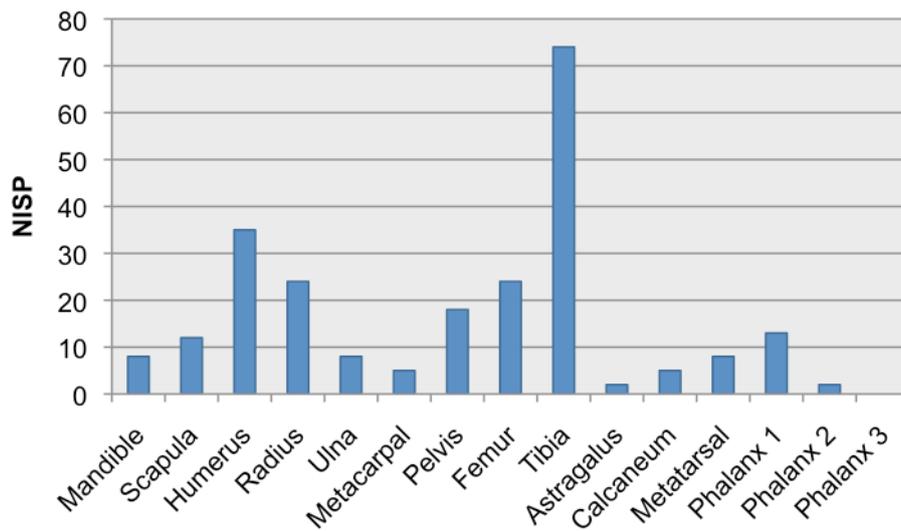
According to the numbers of bones, the sheep/goat was the third most prevalent domestic animal present at Etton. Sheep/goat make up about 10% of the total middle Neolithic assemblage. The proportions of pig and sheep/goat switch by the late Neolithic/early Bronze Age as the percentage of sheep rises to about 32%, suggesting an increasingly important role in the economy of the site.

##### 4.6.3.1 Sheep in the Original Report

Armour-Chelu identifies sheep as 9% of the assemblage from the enclosure ditch. She states that 70% of the sheep bone derived from eight partial sheep skeletons in the enclosure ditch, and that this indicates that sheep were specially selected for this kind of special deposit.

##### 4.6.3.2 Element Abundance

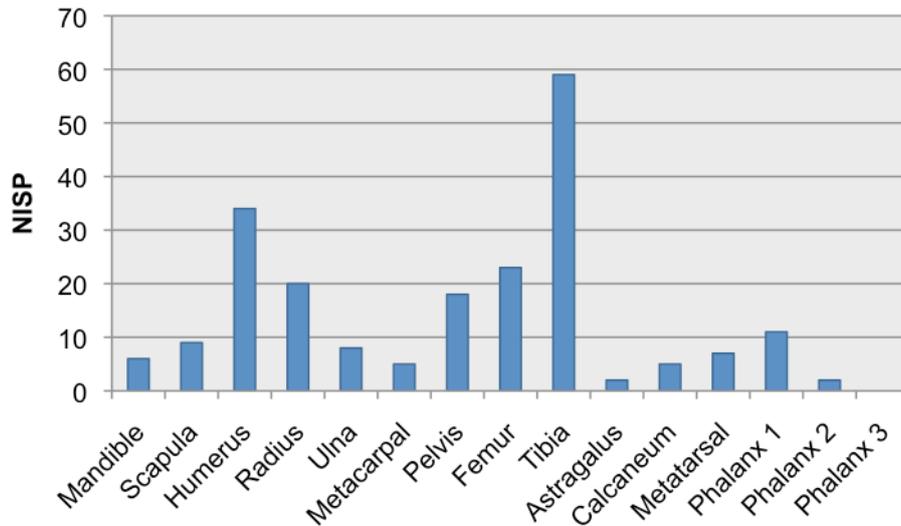
In total 301 bones were recovered from the middle Neolithic contexts at Etton (239 excluding cranial fragments, vertebrae, ribs and loose teeth). As might have been expected, it is the limb bones that are the most abundant of all the sheep/goat elements present at the site (Figure 4.18), with tibiae being by far the most apparent element (31%). Humerii (15%) are the second most abundant element, with femora and radii (both 10%) close behind. Unlike pigs and cattle, the mandibles are not particularly well represented in sheep/goat, and unsurprisingly neither are many of the elements associated with the lower limbs and feet.



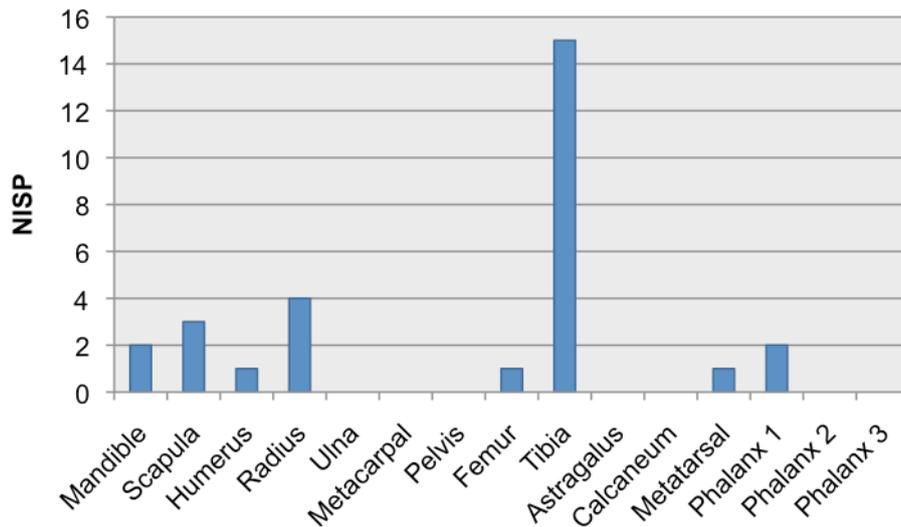
**Figure 4.18: NISP main sheep elements**

Because the majority of the elements were recovered from the enclosure ditch, the analysis of the element abundance within this feature is much the same as the overall element abundance (Figure 4.19). Only a very few sheep/goat elements were recovered from the interior features (Figure 4.20), where once again tibiae and humerii dominate the assemblage, followed by radii. The interior features were almost entirely devoid of elements associated with the feet, with the exception of two 1<sup>st</sup> phalanges and one metatarsal. Although not present in large numbers, sheep bones were recovered from many of the interior features and were certainly more widespread in the interior of the site than pig bones.

Very few fragments of crania or horncore identifiable as sheep were recovered from the site, and no complete skulls. Cranial fragments were almost exclusively present in the enclosure ditch rather than the interior features, with the exception of two horncore fragments in Pits 313 and 1060. A concentration of cranial fragments, loose teeth, fragments of horncore and parts of mandibles was present in the butt-end of Ditch Segment 13, potentially suggesting the presence of a complete skull in this context at some point. It was difficult to identify ribs and vertebrae as being definitively those of sheep due to their highly fragmented nature, and the presence of other medium sized animals on the site. Ninety-six ribs and 166 vertebrae were defined as indeterminate medium size and could potentially be sheep.



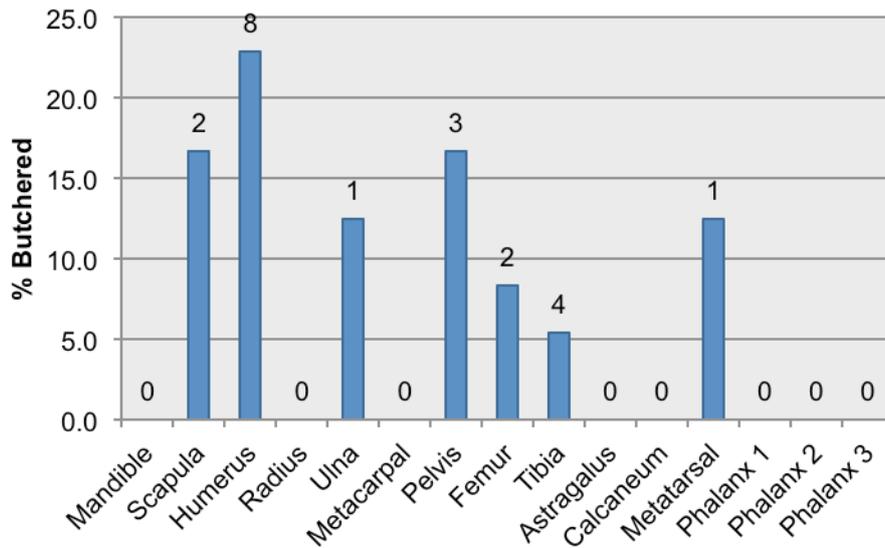
**Figure 4.19: NISP main sheep elements in enclosure ditch**



**Figure 4.20: NISP main sheep elements in interior features**

#### 4.6.3.3 Butchery Overview

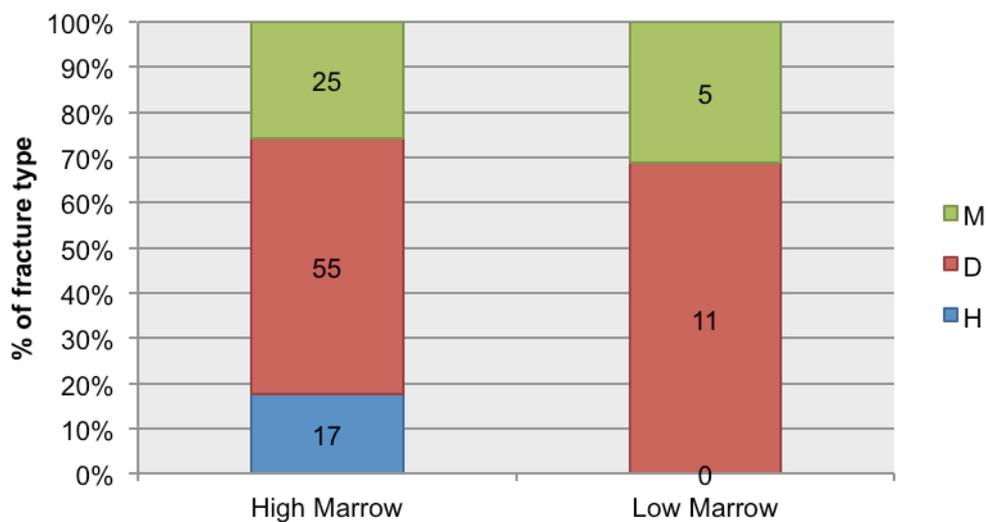
In total 8.8% of the main sheep elements displayed evidence of butchery activity, which is quite a lot lower than the proportions of butchered cattle or pig (Figure 4.21). The details of the butchery present on sheep bones will be discussed in the next chapter.



**Figure 4.21: Percentage of sheep/goat bones showing butchery marks**

4.6.3.4 Fracture Overview

Similarly to fracture freshness visible on pig bones, we would expect to see rather less evidence for fresh fracture on sheep/goat bones than on cattle bones, if only because of the small yields gained from smaller animals. This is clearly the case here (Figure 4.22), though the levels of fracture remain relatively high, with just under 20% of all high-marrow yield bones having been exploited for their bone marrow. The results of this analysis will be discussed further in Chapter 6.



**Figure 4.22: Percentage of fracture types by high and low marrow sheep bones**

4.6.3.5 Ageing

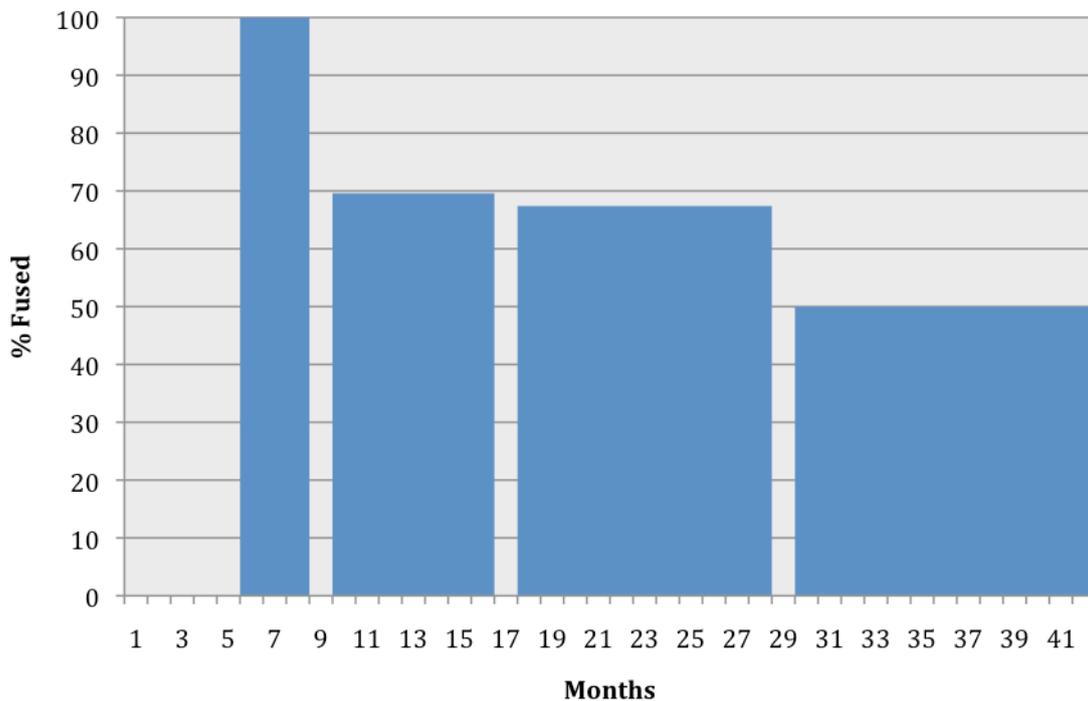
**Table 4.5: Sheep Fusion Table (ages after Silver 1969)**

Fusion Age	Element	Unfused	Fused	%Fused	Average % Fused
6 - 8 Months	Scapula (D)	0	9	100.0	100.0
10 - 16 Months	Humerus (D)	2	4	66.7	69.6
	Radius (P)	0	7	100.0	
	Phalanx 1 (P)	5	3	37.5	
	Phalanx 2 (P)	0	2	100.0	
18 - 28 Months	Metacarpal (D)	1	1	50.0	67.4
	Tibia (D)	11	25	69.4	
	Metatarsal (D)	2	3	60.0	
2.5 - 3 Years	Calcaneum (P)	1	1	50.0	50.0
	Ulna (P)	0	0	0.0	
	Femur (P)	0	0	0.0	
3 - 3.5 Years	Humerus (P)	1	2	66.7	50.0
	Radius (D)	4	2	33.3	
	Femur (D)	0	0	0.0	
	Tibia (P)	1	2	66.7	

The bone fusion diagram for sheep (Figure 4.23) is similar in some ways to that shown above for pigs, implying a similar sort of kill pattern between the two species which is completely different to that applied to cattle. One difference is the fact that the vast majority of animals appear to be surviving until they are at least 6 to 8 months old. It would appear that from 6 months to roughly two years, over 40% of sheep were killed. The age of the animals when killed suggests that they are largely being exploited for their meat. The kill off of animals between 2 and 3.5 years is much more gradual, resulting in half of sheep still being alive after they are 3.5 years old. These animals may well still be being exploited for their meat, however, it seems likely that they were also being used for their secondary products.

Five mandibles were suitable for determining age by tooth wear. Four belonged to sheep aged between 3 and 4 years old, one to a younger animal of between

18 and 24 months. This corroborates what was suggested above about an artificially high survival rate after 18 – 24 months old.



**Figure 4.23: Sheep bone fusion diagram**

Armour-Chelu suggests that the eight partial sheep skeletons identified during her analysis died between the ages of 18 months and 4 years, before their period of maximum productivity (Armour-Chelu 1998, 283).

#### 4.6.3.6 Bone Groups/Partial Skeletons

Eight bone groups were identified in Armour-Chelu's original analysis (1998, 285) that were thought to be partially complete sheep skeletons. Because this material has become heavily dispersed, it was not possible to corroborate this during the reanalysis. However, cautiously using the original animal bone report to interrogate the new database, it was possible to potentially identify some of these partially complete animals.

Elements present in the butt end of Ditch Segment 1 are thought to represent one individual and comprise parts of limb bones, vertebrae, ribs and pelvis. Not all of the elements described in the original report were encountered during the

more recent analysis, however, many elements were found to be present that were not identified in the original report including five tibiae, four of them lefthand, suggesting the presence of more than one animal. It was noted in the original report that many of the bones in this deposit showed butchery marks indicative of disarticulation, and in fact that the animal had been almost completely disarticulated before being deposited. This being the case, and given the extra elements now present it seems more likely that this 'partial skeleton' is in fact a group of bones, not necessarily from one animal.

Another proposed partial skeleton present in Ditch Segment 3 was not encountered at all, however a group of three vertebrae and a sacrum discovered in Ditch Segment 6 were present and found to fit together implying they had been deposited whilst still articulated as was a group of four vertebrae and a left and right mandibles present in Ditch Segment 12.

Three groups of bones were identified in Ditch Segment 13 in the original report and rediscovered during reanalysis. The first was a butt-end deposit at the north end of the ditch and was a group of apparently articulated vertebrae. The second was rather larger and comprised numerous vertebrae, an atlas, two ulnae, up to four tibiae (left and right), a scapula, a sacrum, numerous ribs, three radii, 1<sup>st</sup> and 2<sup>nd</sup> phalanges, an astragalus, at least two pelvises, mandibles and humerii, up to five femora (2 right, 3 left), multiple fragments of crania and horncore. Some butchery marks were identified on these bones, but these were not particularly numerous and are indicative of defleshing. It was originally thought that these bones may account for two partial skeletons, however the presence of more than two of some elements and the fact that the bones were densely packed, as opposed to being laid out skeletally, implies disarticulation before deposition and makes it tricky to definitively suggest the presence of a set number of animals rather than just a dump of bones. The opposite butt-end of Ditch Segment 13 contained another group of apparently articulated vertebrae.

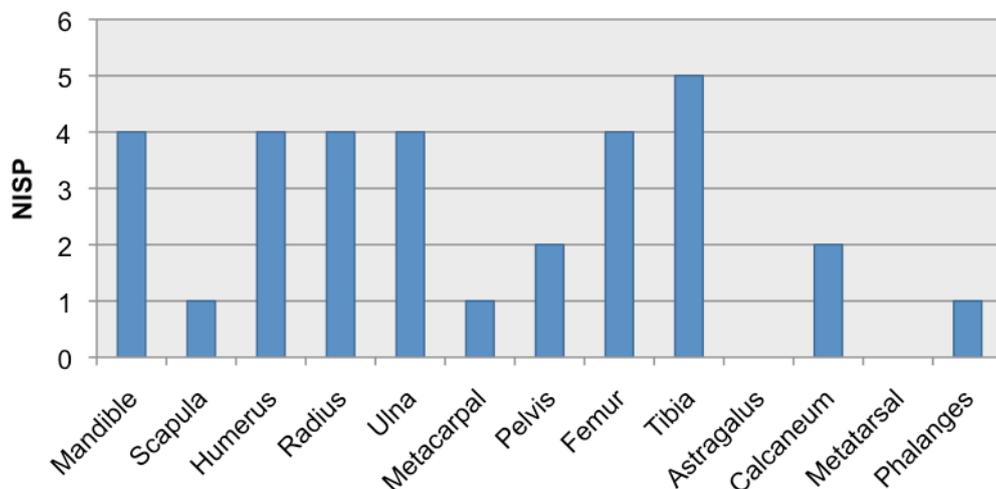
#### 4.6.3.7 Sheep in the late Neolithic/early Bronze Age

Twelve sheep bones were recovered from late Neolithic/early Bronze Age contexts, three of which were loose teeth. The remaining nine bones comprised 4 humerii, 3 tibiae, a scapulae and a 2<sup>nd</sup> phalanx. None of these had been butchered, however one tibia and one humerus had been fractured when fresh.

#### 4.6.4 *Domestic Dog (Canis familiaris)*

With the exception of one of the tables, where one dog bone is recorded, neither dog, nor wolf, are mentioned in Armour-Chelu's original report.

The domestic dog is represented by 32 elements from middle Neolithic contexts. All of these elements were recovered from the 13 contexts within enclosure ditch, none from the interior features. Of the thirteen enclosure ditch contexts in which dog remains were found, seven were ditch termini deposits. The main elements were fairly evenly represented (Figure 4.24), with tibiae being the most prevalent element by a margin of just one. None of the dog elements had any butchery marks, or were subject to fresh fracture for marrow extraction, implying that no direct economic gain (meat or marrow) was being derived from the animals. This is elaborated and discussed in Chapter 6. There seemed to be a predominance of elements from the right hand side of the animals for which there is no immediate explanation.



**Figure 4.24: NISP dog bones from middle Neolithic contexts.**

It was quite rare to find a discrete dog bone, they tended to be deposited in small groups, perhaps indicating the presence of partial skeletons or at least associated bone groups. Two obvious partial skeletons were found. One in the terminus of Ditch Segment 6 was in a particularly auspicious position, directly next to what is thought to have been the main northern entrance to the enclosure. This partial skeleton was of a very young, if not newborn animal. It comprised a fragmented crania, left and right humerii, radii, femurs and tibiae, and a partial pelvis, scapula and ulna as well as two ribs. The presence of these bones in close proximity to each other and that they were excavated as a discrete deposit implies the deposition of the body of an entire puppy. The second partial skeleton was recovered from the middle of Ditch Segment 10. This was an adult animal and comprised a femur, radius, metacarpal, calcaneum, phalanges and three ribs.

While the quantity of dog bones was fairly limited, their presence on site was attested a more significant way by the number of bones of other species which had gnaw marks on them. Of all the middle Neolithic bones (excluding cranial fragments, teeth, vertebrae and horncores) just over 12% displayed canid gnawing. This is a significant increase from the 4% of bones thought to have shown canid gnawing in the original report, and implies a number of things about the role of dog at Etton. The first is that dogs were clearly present within the enclosure alongside the humans using that space, the second is that they had access to these bones in order to be able to gnaw on them – this indicates that the deposits of bone were either open within the enclosure ditch (the majority of the gnawed bones were found in the enclosure ditch), or were not deposited in the enclosure ditch immediately but were left lying about in contexts which dogs would have had access to. That dogs were allowed to gnaw on the bones implies that the material had no particular special connotations, despite the fact that they were to be deposited in the enclosure ditch. This is particularly significant with regards to the human femur from Ditch Segment 3 which had been gnawed all over its proximal epiphysis.

## 4.7 The Wild Species

Four wild species were present in the middle Neolithic assemblage from Etton. In order of abundance they were red deer, aurochs, roe deer and fox. All were only represented by fewer than 100 elements, many of which, for the deer at least, were antler.

The wild species are not discussed in any detail in the original report. It is stated that 34 elements belonging to wild species were recovered (including antler) and that many of these comprised skulls and vertebrae. The presence of these element types has been used to suggest that the wild animal assemblage is not indicative of one related to hunting for food but rather than the bones had some kind of special significance (Armour-Chelu 1998, 287). It is also suggested that the remains of wild animals may have been 'divorced from their original significance to other spheres of influence such as a symbol of hunting prowess or for their medicinal/magical properties' (*Ibid*, 288).

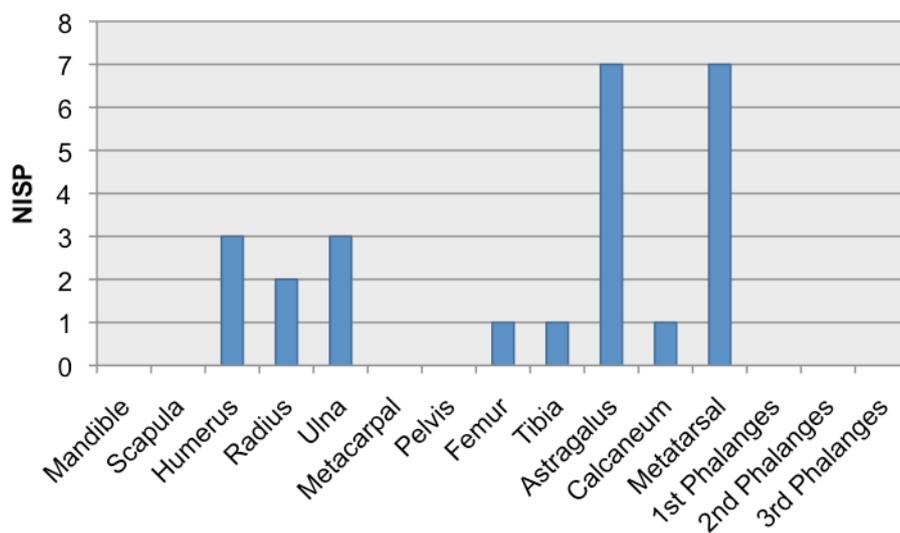
### 4.7.1 Red Deer (*Cervus elaphus*)

Red deer were predominantly represented by their antlers, the presence of which does not necessarily imply the presence of whole deer. Seventy-six red deer elements were present altogether, of which 51 were antlers or parts of antlers. Of the 25 non-cranial elements, all were from the limbs, and most from the forelimbs (Figure 4.25). Astragali are well represented, though the rest of the hindlimbs are not. The general spread of red deer elements is quite different from the domestic species, where all elements tended to be represented more evenly, and also from aurochs, whose elements more mirror that of a domestic species. This could be down to the fact that deer are being hunted and only exploited for certain body parts, such as the forelimbs. The high representation of astragali could potentially be related to the use of deer hide in craft activities on the site, if these bones were for some reason left attached to the hide and returned to the site.

Of the elements represented in Figure 4.25, five displayed evidence for butchery - two humeri, two metatarsi and a radius. These marks seem to be

indicative of the defleshing of these elements and are therefore evidence for the consumption of red deer at Etton. One humerus and two metatarsi appeared to have been freshly fractured, potentially for the extraction of marrow.

Fifty-one antler tines and fragments were recovered from middle Neolithic contexts at Etton. Seven of these came from interior features, while the other 44 were found in the enclosure ditch. The antler present in the enclosure ditch was generally rather better preserved than that from the interior features. Antler was present in nine of the 14 Ditch Segments, and did not seem to have been placed particularly in butt-end deposits. There was an apparent concentration throughout Ditch Segment 5, which began in the butt-end at the south of the ditch with a fairly complete, antler crown or rake. Also in Ditch Segment 5 were numerous examples of antler working debris including a group of four antler parts (Sections 85 – 87). There was also a group of five antler parts present in the butt end of Ditch Segment 13. Generally the antlers seem to have been placed in the northern part of the enclosure ditch, in the c. 50m of ditches leading up to the northern entrance to the site.



**Figure 4.25: NISP red deer bones from middle Neolithic contexts.**

An antler comb was found during the original investigations in the southern butt end of Ditch Segment 7. This tool had been decorated around the base of its teeth, and was thought to show clear signs of wear including broken and worn or rounded teeth. Unfortunately this comb is no longer with the assemblage so could not be looked at during reanalysis; however another bone comb, very

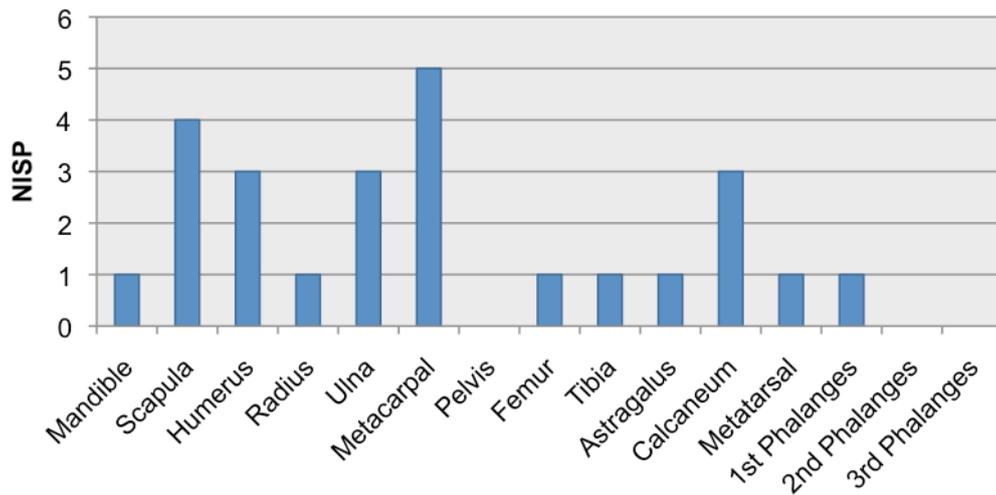
similar in proportions, with similar decoration and wear was uncovered. This had been more heavily fragmented than the original comb, but remains of great importance to our understanding of the site and of antler combs during the Neolithic. Also, uncovered were potentially unfinished combs, which had axial grooves running from midway up the shaft, but which had no apparent teeth.

#### 4.7.2 Aurochs (*Bos primigenius*)

A total of 25 bones from aurochs were present in the assemblage (excluding cranial fragments etc). Eighteen of these bones came from the enclosure ditch, and just seven from the interior features. It is possible more aurochs bones were present at the site; however in identification caution was exercised so as not to simply label all large cattle bone as potentially being aurochs. Only those bones that were very remarkable in size were identified as belonging to aurochs.

Metacarpals were the best-represented aurochs element on the site, with 5 present. Scapulae were the next most abundant, with calcanei, humerii and ulna all third most prevalent. If a preponderance of any particular body area was to be suggested it would be for limbs though this assertion, although an obvious one, is somewhat tenuous. Of the bones represented in Figure 4.26, only one calcaneum and one humerus displayed any evidence of butchery. A rib and a horn core also had butchery marks.

Four of the aurochs bones, two humerii and two metacarpals, appear to have been fractured whilst fresh – presumably for the extraction of the marrow they contained. This is not particularly unexpected given the frequency with which cattle bones were exploited for this same reason. Aurochs bones would be expected to contain even more marrow than cattle bones, so the effort of breaking them would have been worth it economically. Obviously the numbers of aurochs bone displaying helical fractures are very small so it is difficult to come to any particular conclusions; however it is interesting to note that the same number of high marrow yield (humerii) and low marrow yield (metacarpals) bones were subject to this process.



**Figure 4.26: NISP aurochs bones from middle Neolithic contexts.**

Two aurochs skulls were recovered from Ditch Segment 12 (222-226/4). These comprised four large (identifiable) cranial fragments, two large right hand horn cores. More comminuted material from this context probably also belongs to these two skulls. Even though the skulls were fragmented, the difference in size between the two was noticeable, and possibly indicated that both a male and a female animal are represented. One of the fragments of skull present in this context had marks indicative of butchery on its surface.

#### 4.7.3 Roe Deer (*Capreolus capreolus*)

Roe deer were represented by fifteen elements in total, ten of which were antler parts. The five post-cranial elements present were two metatarsi, a metacarpal, a 1<sup>st</sup> phalanx and a calcaneum. There is an obvious abundance of lower leg bones, potentially indicative of the part of the animal being transported back to the site after being hunted. Seven of the ten antler parts came from the butt-end of Ditch Segment 12, and two of these were attached to cranial fragments. This possibly suggests the deposition of a complete skull in this context. Two shed antlers were present in Ditch Segment 1, are likely to have been picked up rather than taken from a carcass. Evidence of butchery was visible on the calcaneum present in Ditch Segment 10, and a metacarpal and metatarsal present in the butt-end of Ditch Segment 9 appeared to have been fractured whilst fresh, potentially for the extraction of marrow.

#### 4.7.4 Fox (*Vulpes vulpes*)

The only evidence for the presence of foxes at Etton comprised four elements present in Ditch Segment 1 (sections 10 – 11/1). These were a mandible, a canine tooth, an ulna and a metacarpal. The metacarpal, ulna and canine were all more or less complete, but only the zone 1 of the mandible was present (the tooth row). It seems probable that these four elements originated from the same individual. A fox skull was identified during the excavation and in Armour-Chelu's original analysis, however this was not encountered.

## **Chapter 5: Butchery Analysis**

## 5.1 Introduction

This chapter presents the findings of the butchery analysis carried out on the animal remains from the Etton causewayed enclosure. All of the bones that were identifiable to species and/or element were analysed in order to ascertain whether or not they had butchery marks present on their surface. It transpired that roughly 10% of the entire Neolithic assemblage did have marks attributable to butchery activity. This chapter will initially present the data collected during analysis by species, before considering what can be learnt about the assemblage in its entirety. For each species, the individual elements will be considered initially before being amalgamated and the butchery of the animal looked at as a whole. A methodology for the butchery analysis is presented in Chapter 3.

The observation of butchery marks on animal bones from archaeological sites is fairly commonplace, however the analysis of these marks, at least with reference to Neolithic sites in Britain, is not so widespread. It is possible that this is because it is not anticipated that such evidence will be present in any significant amount. The quote below is taken from Thomas' 'Understanding the Neolithic' (1999) and refers to butchery marks at causewayed enclosures.

*"It is evident that the consumption of large quantities of meat took place at various kinds of monuments during the Neolithic. At none of these is there extensive evidence for complex bone-processing, marrow-splitting and butchery marks... More clear traces of bone processing might be expected if the nutritional value of the carcasses were being exploited to the full." (Thomas 1999, 27).*

For Neolithic sites in Britain, the analysis of butchery marks to the extent at which zooarchaeologists have begun to synthesise proportions of butchered bones for sites and species, as well as to understand the implications of different types and locations of butchery marks is something that has only really developed in the past 25 years (Serjeantson 2011, 55). As such, it is unlikely that at time of writing, with regards to butchery marks at least, Thomas' statement is based on much empirical evidence.

Increasing interest in the subject over the last twenty years or so has brought

new evidence to light regarding the intensity of butchery at various Neolithic sites. Serjeantson (2011) lists the few sites in the south of Britain for which overall proportions of butchered bone have been established and appears to suggest that one site in particular, Boscombe Down, is unusual for the high level of butchery visible (9%). This is in comparison to six other sites at which levels of butchery go no higher than 3.8%. However at Durrington Walls between 10% and 20% of the cattle and pig bone shows cut marks and between 60% and 80% of the cattle bone appeared to have been chopped, implying that the butchery of animal carcasses was systematic. At the time of writing, Albarella and Serjeantson (2002) were working on Durrington under the impression that it was a 'ritual' site and they concluded that the high levels of butchery were the result of intensive episodes of feasting, however subsequent interpretations of Durrington have suggested that it was in fact an auxiliary settlement to Stonehenge. This doesn't at all preclude large scale feasting activity, but it does leave cause to consider the distinction between feasting and eating, and whether or not the original interpretation would have been one of more mundane domestic consumption if the site had already been labelled as a settlement.

The purpose of conducting a detailed analysis into the butchery practices at Etton was foremost to confirm or refute Thomas' assertion that there would be no extensive evidence for such activity. In the original report Armour-Chelu (1999, 274) states, "All bones were examined for evidence of butchery and 3% of the assemblage bore evidence of cutmarks or chopmarks". This level of butchery would confirm Thomas' statement and would put Etton in line with what Serjeantson seems to consider as being 'normal' in comparison to other sites for which similar analysis has been undertaken. As this chapter demonstrates, considerably more than 3% of the bone showed butchery marks. These are illustrated and discussed in this chapter with the intention to show the nature and extent of butchery activity at the site.

### *5.1.1 Butchery in the Original Report*

The butchery identified in the original analysis is presented as follows;

“All bones were examined for evidence of butchery, and 3% of the assemblage bore evidence of cutmarks or chopmarks. The bones retrieved from upper levels of the ditch were often poorly preserved compared with those from early phases, and some loss of butchery evidence may have occurred” (Armour-Chelu 1998, 275).

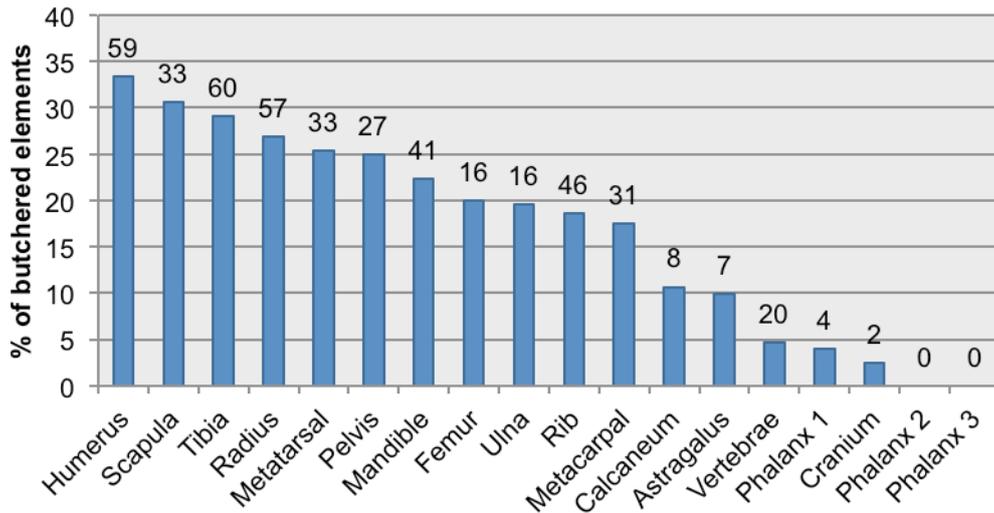
During her segment-by-segment analysis of the animal bone, Armour-Chelu notes where butchery marks were present. It is not always clear to which bone or species she is referring, but where possible, her identification of butchery has been noted in the below analysis.

## 5.2 Domestic Cattle (*Bos taurus*)

As the most prevalent species on site it was anticipated that the butchery marks present on the bones of domestic cattle would provide the bulk of the butchery analysis. In total, some 18.6% of the total cattle bone appeared to have been butchered in some way.

**Table 5.1: Total NISP, number of butchered elements and % of elements butchered belonging to cattle from the Etton causewayed enclosure.**

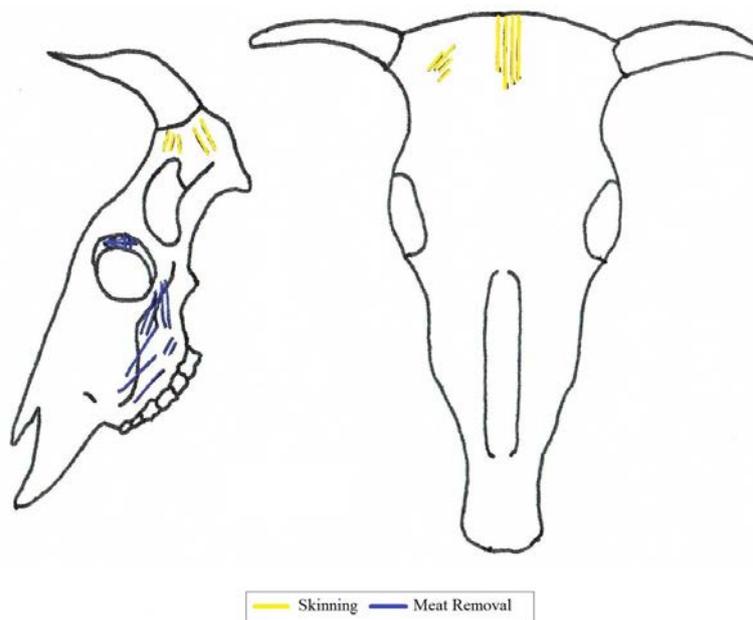
Element	NISP	No. Butchered	% Butchered
Humerus	177	59	33.33
Scapula	108	33	30.56
Tibia	206	60	29.13
Radius	212	57	26.89
Metatarsal	130	33	25.38
Pelvis	108	27	25.00
Mandible	184	41	22.28
Femur	80	16	20.00
Ulna	82	16	19.51
Rib	248	46	18.55
Metacarpal	177	31	17.51
Calcaneum	75	8	10.67
Astragalus	71	7	9.86
Vertebrae	428	20	4.67
Phalanx 1	102	4	3.92
Cranium	83	2	2.41
Phalanx 2	55	0	0.00
Phalanx 3	21	0	0.00
	2547	460	18.06



**Figure 5.1: Graph showing % of cattle elements with butchery marks.**

Armour-Chelu identified cut marks on the bundles of cattle ribs recovered from Ditch Segment 1. She suggests that the marks are indicative of the ribs being disarticulated prior to their deposition (Armour-Chelu 1998, 278).

### 5.2.1 Crania



**Figure 5.2: Composite diagram showing all butchery marks present on mid-Neolithic cattle skulls present at Etton.**

Eighty-three fragments of skull, thought to belong to domestic cattle, were recovered. Of these, the majority were assigned to the category of 'large

mammal' rather than more specifically to *Bos taurus*, however, in light of the domination of the assemblage by cattle it seems probable that they in fact belong to the latter category. Of these bones and bone fragments, just five had observable butchery marks. All of these five marked bones were recovered from the ring-ditch. It is thought that the butchery marks present on the cattle crania are likely the results of two processes, skinning and removal of head meat (see Figure 5.2).

**Skinning:** A number of vertical and parallel cut marks present towards the rear of the frontal part of the skull and around the base of the horncores are potentially indicative of skinning, as removal of skin from the head is usually thought to take place in areas where there is the least amount of meat. However, the distance of these marks from the occipital condyles makes them more likely the result of decapitation.

**Meat Removal:** Long diagonal cut marks in the region of the zygomatic process are thought to be the result of the removal of head/cheek meat, as this is where muscle is most abundant on the skull. It is possible that they result from the disarticulation of the mandibles; however, the lightness of the mark, and their length and diagonal position is more indicative of meat removal. As well as these marks in the zygomatic region, one orbital fragment had a number of marks on the interior of the socket. These kinds of marks can only be indicative of removal of the eyeball (Knight 2003, 78).

### 5.2.2 Mandibles

Of the 184 mandibles attributable to domestic cattle, 41 had butchery marks of some kind. Figure 5.3 illustrates all of these butchery marks. Much like those present on the skull, marks representing skinning and meat removal activities are thought to be present but unlike the rest of the skull, marks representing disarticulation are also visible.

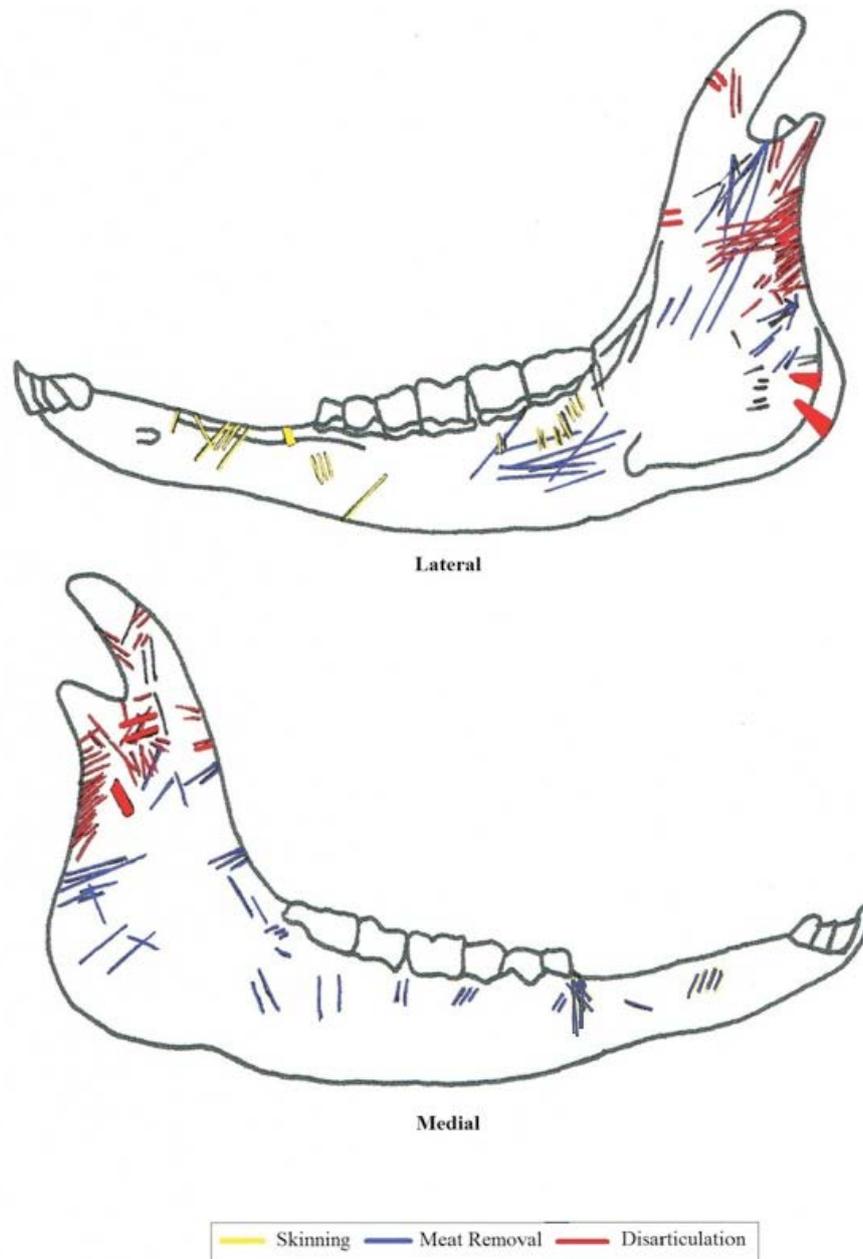
**Disarticulation:** The removal of the mandible from the skull usually results in marks around the mandibular condyle and higher areas of the zygomatic process, where the two bones form a joint. As can clearly be seen from Figure

5.3, there are a great many marks around the mandibular condyle and neck on both the medial and lateral sides of the mandible. Most of these marks are relatively short, sharp and in orientated horizontally to the posterior edge of the bone. The few disarticulation marks that are orientated diagonally emerge from the interior face of the condyle and therefore can only logically be interpreted as resulting from the disarticulation of this joint. Some marks also thought to be indicative of disarticulation were present on the coronoid process and anterior ascending ramus. These were interpreted as such for two reasons, firstly the location of this area of the mandible with the skull makes it as much part of the articulating area and the condyle itself, and secondly that the marks in these areas tend to be short, horizontal and relatively heavy – not the same as those that tend to be associated with meat removal. Some heavier marks were present on the medial side of the mandibles, thought to possibly be the result of the need for more force to detach the stronger muscles of the inside of the mouth.

**Skinning:** Some evidence for skinning is present on the cattle mandibles, largely where the meat becomes less abundant, and the skin is close to the bone at the anterior of the element. These tend to be small clusters of short, light, parallel vertical marks. The majority of marks interpreted as resulting from skinning activity on the bones from Etton are located on the diastema, between the incisors at the front of the jaw and the tooth row in the middle part. On the lateral part of the bone there are some marks extending to the posterior end of the tooth row, however marks in a similar position on the medial side of the bone are interpreted instead as being the result of meat removal (see below).

**Meat Removal:** Although not one of the highest meat yielding elements on the skeleton, the mandible of cattle carries enough meat to make its exploitation worthwhile. Marks identified as being indicative of meat removal tend to be long, light and diagonal. As can be seen on Figure 5.3, these marks tend to be concentrated around the ramus and the anterior periphery of the mandibular angle. When present on the lateral side of the mandibles, these marks probably served to detach the cheek muscle. On the medial side of the mandible however, it is much more likely that they were the result of the removal of muscles inside the mouth, specifically the tongue. It is thought that short vertical

cuts under the medial tooth row were also made with the intention of the removal of the tongue, rather than the removal of skin as was the interpretation of similar marks on the lateral side of the mandible.



**Figure 5.3: Composite diagram showing all butchery marks present on mid-Neolithic cattle mandibles present at Etton.**

#### 5.2.2.1 Comparison by context

Of the 184 mandibles recovered from the site, 34 were found in internal features. Despite the significant difference in numbers, the proportion of butchered mandibles found in both contexts was very similar - 22.7% of the

ring-ditch assemblage and 20.6% of those from the internal features. Half of the mandibles present in the internal features came from one context – Pit F1054, a large pit, however none of these displayed any signs of butchery. Seven mandibles from the internal features had butchery marks, of these six were from middle Neolithic pits and a ditch, and one was from a later Neolithic pit.

Naturally the marks present on these bones when considered as an entire group are considerably less dense than depicted in Figure 5.3; however all of the same activities are represented on the bones. Cut marks present on the lateral side of the element, running from the rear of the mandibular neck, a little below the condyle, are thought to be indicative of the disarticulation of the mandible from the skull, as are a small group of cut marks present on the anterior portion of the ascending ramus on the medial side of the bone.

A small number of longer diagonal cuts on the medial side of the bone in the region of the mandibular angle are possibly the result of the detachment of tongue or muscles within the mouth. Small groups of short almost horizontal lines on the diastema are potentially the result of skinning.

### *5.2.3 Vertebrae*

The vertebrae were one of the least frequently butchered elements at the site. In total, 428 vertebrae identified as belonging to cattle and large mammal (most likely cattle) were recovered from the site, but only 20 (4.7%) were found to have any indication of having been butchered. This clearly does not mean that cattle spines were not part of the butchery process at Etton; however, it does imply that techniques were being used to exploit or disarticulate the vertebrae that are not archaeologically visible.

None of the atlases present at the site showed any indication of having been butchered, however one of the thirty axes present has cut marks running horizontally across its medial side. Because these cuts are horizontal, rather than vertical, it is thought that they resulted from the removal of muscle from the axis, rather than from the disarticulation of atlas and skull (Knight 2003, 68).

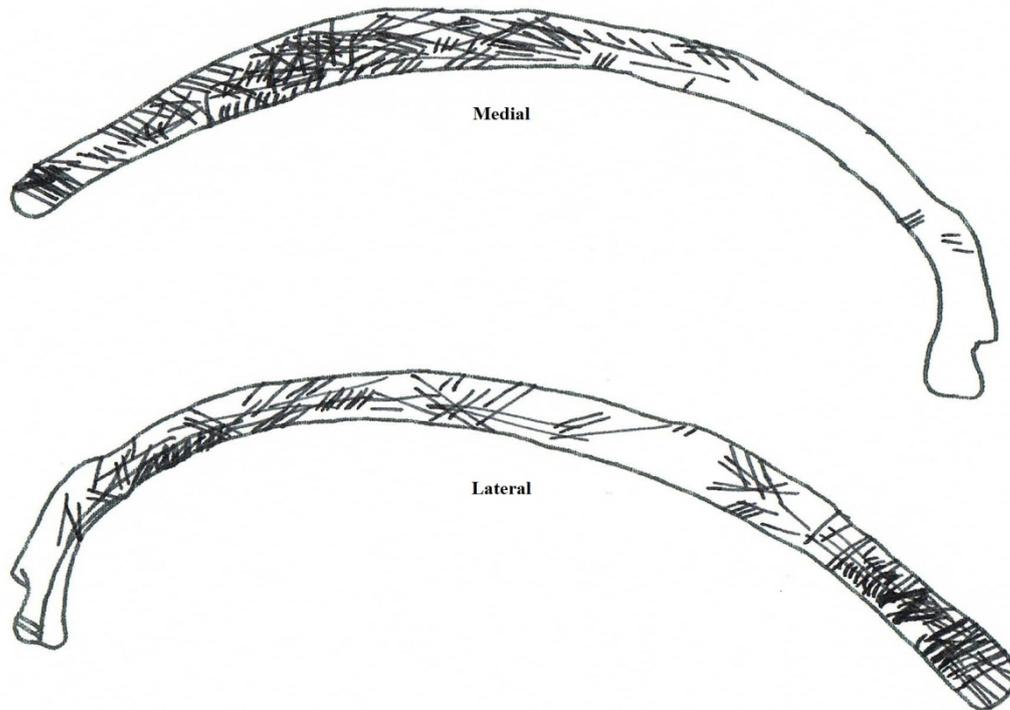
Three thoracic vertebrae have horizontal and diagonal cut marks along their spines, almost certainly representative of meat stripping along the spine. One further thoracic vertebra has vertical cut marks down the spine. It is possible that these resulted from the removal of meat from the thorax, but could also be the result of attempts to portion or disarticulate this upper part of the spinal column.

Eleven lumbar vertebrae were butchered. Of these, seven have horizontal or diagonal cut marks on their spines, similar to those seen on the thoracic vertebrae discussed above. It is probable that these marks resulted from the removal of meat present along the spinal column. Three further lumbar vertebrae have vertical cut marks in the ventral part of the vertebrae. These marks are thought to possibly result from the disarticulation of the ribs from the spinal column. The final two marked lumbar vertebrae have fine cut marks on their anterior articular face. These marks likely result from the separation of vertebrae.

Three sacra also showed evidence of having been butchered. On these elements the butchery marks are exclusively present on the shoulders between the wings and centrum. These marks could be the result of the detachment of the spine from the tissues and ligaments of the pelvis in order to disarticulate the two elements.

#### *5.2.4 Ribs*

Two hundred and forty eight ribs thought to belong to cattle (identified as either cattle or large mammal) were recovered from the site, of which 46 (18.6%) were found to have butchery marks. Although by proportion of butchered bone, the ribs were one of the elements with less frequent butchery marks, those bones that were marked tended to be marked very densely (see Figure 5.4). The butchery marks depicted in Figure 5.4 have not been coloured like the rest of the Figures in this section, this is because the marks are so dense and are clearer when black and white.



**Figure 5.4: Composite diagram showing all butchery marks present on mid-Neolithic cattle (and large mammal) ribs present at Etton.**

Marks present around the articulation of the ribs probably indicate the removal of ribs from the vertebrae. These kinds of marks are not particularly evident at Etton, however, on the lateral side of the ribs, there are concentrations of cut marks just below the proximal articulation, which might also be reflective of this kind of activity. It is also possible that disarticulation was occurring from the sternum, so that access to the internal rib cage could be gained. The marks thought to potentially indicate this kind of activity are those that run horizontally (when the bone is orientated upright) across the very distal extremity of the spine. On Figure 5.4 this kind of mark can be seen on both the medial and lateral sides.

More prominent is the abundance of cut marks around the lower portion of the blade of the rib, both on the lateral and medial sides. It is thought that these cuts most likely represent the filleting of belly meat from the ribs, which can be done either with or without leaving the ribcage intact (Knight 2003, 100). It is

thought that the vast majority of marks present on the blades of the ribs recovered from Etton are the result of the stripping of ribs for their meat content.

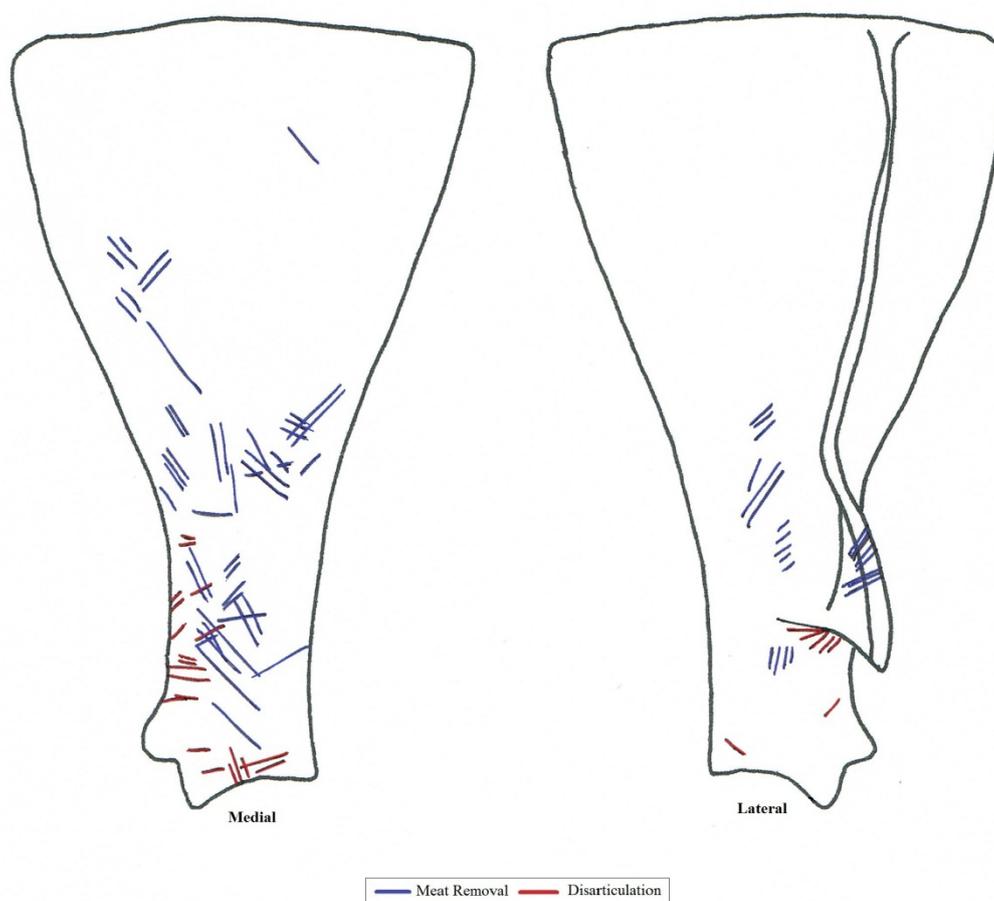
#### 5.2.5 Scapulae

One hundred and ten scapulae were identified as belonging to domestic cattle, of which 33 have butchery marks on their surfaces. Both disarticulation and meat removal marks are thought to be present on these scapulae, but no marks are thought to be the result of skinning. Generally speaking the scapulae found at the site comprised all of, or fragments of bone from the glenoid cavity, supraglenoid tuber and neck, to the lower portions of the spine and supraspinous/infraspinous fossa. It was rare to come across a complete scapula. This is one explanation for the absence of marks on the proximal zones of the diagrams below (Figure 5.5).

**Disarticulation:** Marks on the neck of the scapula and around the glenoid cavity are thought to be almost exclusively the result of the disarticulation of the scapula from the humerus. On the bones from Etton these marks are largely short and orientated horizontally across the bone. On the lateral side of the scapulae these extend up the caudal border of the neck as far as the acromion, however on the medial side they extend up the cranial border a little further. Repeated cuts around the base of the acromion are also thought to be indicative of the disarticulation of scapula and humerus.

**Meat Removal:** Marks indicative of meat removal extend from the neck to around half way up the fossa subcapularis, with one mark almost at the proximal end of the scapula. They largely comprised long vertical or diagonal cuts that, generally speaking, followed the line of the borders of the bone and the tissue of the infraspinatous muscle. Two clusters of marks across the acromion and distal end of the spine are also thought to be indicative of the removal of meat, though are more likely to represent the removal of muscle attachments rather than the actual filleting of a muscle.

### 5.2.5.1 Comparison by context



**Figure 5.5: Composite diagram showing all butchery marks present on mid-Neolithic cattle scapulae present at Etton.**

Scapulae were the second most commonly marked element at Etton, both overall and on the bones from the ring-ditch assemblage (30.1% of bones were marked from the ring-ditch); however they were only the seventh most frequently butchered element from the internal features (26.7% of bones were marked in internal features). Of the 108 present on the whole site, only fifteen were recovered from internal features, and of these only four were found to have any butchery marks.

No evidence of disarticulation could be seen on the scapulae recovered from the internal features. There were no marks in the vicinity of the glenoid cavity of neck, nor were there any around the base of the acromion. The only marks present on the scapulae from the internal features were on the medial side of

the bones, at the top of the neck and lower part of the fossa subcapularis. These marks were all relatively long, shallow and diagonal and ran largely parallel to one another. They were almost certainly caused by the removal of meat from the rear of the scapula blade. The absence of disarticulation marks cannot be judged to be very significant in this instance because of the very small sample size available for analysis. It is possible that if it is a pattern we see repeated on other, better represented elements, some conclusions will be possible, but for the scapulae it is more likely influenced by a lack of material, than a true lack of evidence.

#### *5.2.6 Humerii*

In total 177 cattle humerii were recovered from Etton. Of these, one third have butchery marks present (59 elements - 33.4%). Much like the scapulae, both meat removal and disarticulation are evident on the humerii, but evidence for skinning is absent. This is simply thought to be because of the amount of meat separating the bone and the skin the higher forelimb bones. It is interesting to note (see Figure 5.6) that neither kind of mark is present on any humerus higher up than the top of the deltoid tuberosity. This is partially to do with the fact that only a very small number of the proximal epiphyses of humerii were encountered at the site, so this part of the bone could not be included in the analysis, however this cannot be the complete explanation, as the proximal part of the shaft was often encountered, and there was a dearth of butchery marks on this part of the bone when compared to the distal shaft.

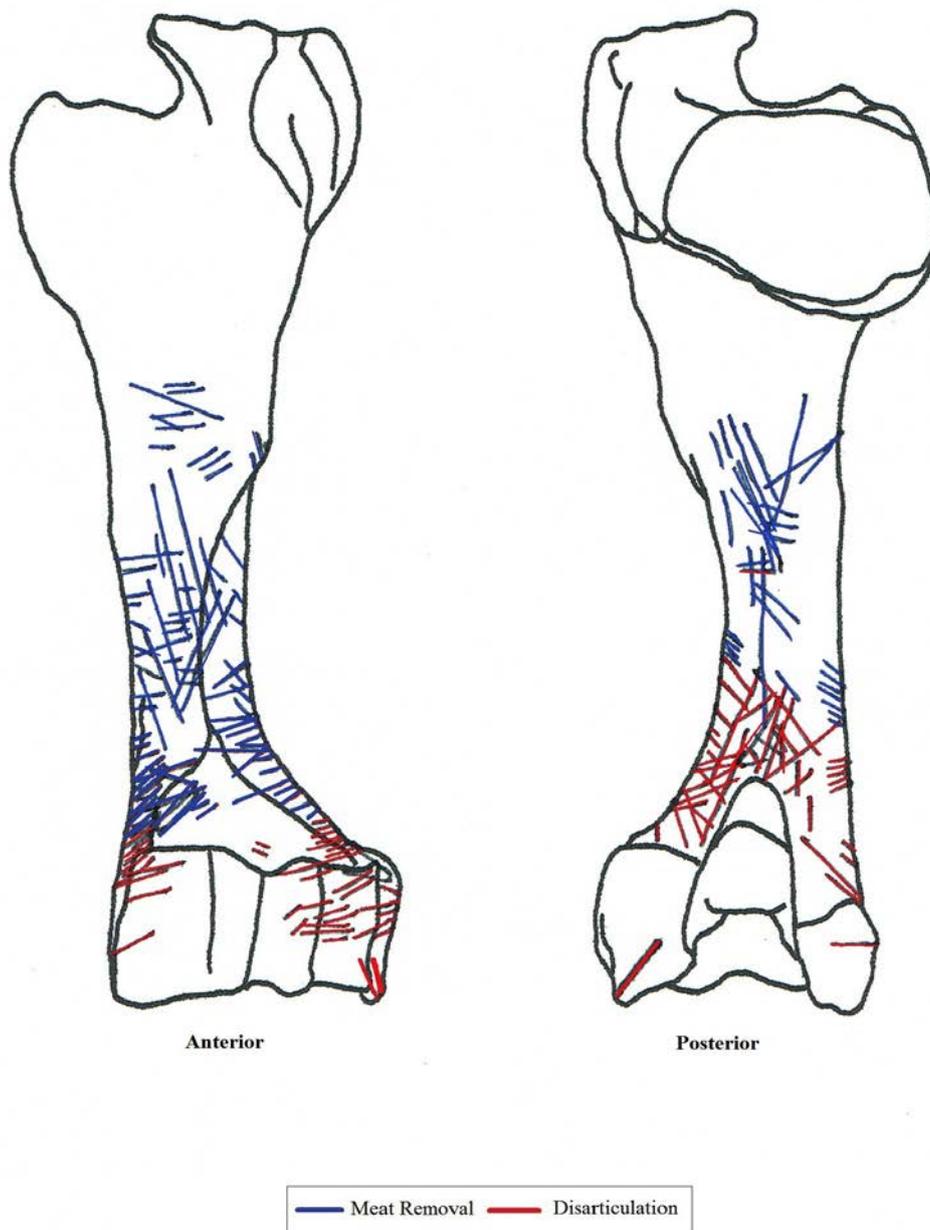
**Disarticulation:** An abundance of marks indicative of disarticulation are present on the distal condyles, epicondyles and shaft of the humerii (Figure 5.6). On the lateral side of the bone these are concentrated around the lateral and medial edges of the trochlea and along the periphery of the radial fossa. They tended to comprise repeated short, horizontal lines, often visible in small parallel groups on individual bones, where a number of strokes of a blade had been made in order to achieve a cut in a specific location. Two heavier marks on the distal trochlea possibly represent a chop or heavier blow made to the actual joint, potentially to remove tough muscle or ligaments and to make the disarticulation from radius and ulna easier.

The marks representing disarticulation activity on the posterior side of the bone are somewhat different from those just described on the anterior side. While there are short, sharp horizontal lines on both the medial and lateral sides of the bones, there are also much longer more diagonal strokes more like those generally interpreted as representing meat removal when present further up the shaft of a bone. On the humerii however these marks follow the line of the olecranon fossa, where the ulna articulates with the humerus. They are less coherent or precise than the marks further up the shaft that are thought to indicate meat removal, and as such are thought to represent the numerous different marks required to detach the tissues from around the proximal ulna and olecranon fossa in order to allow the disarticulation of these two elements. The dearth of marks around the proximal shafts, lateral tuberosities and heads of the humerii has already been mentioned. The apparent absence of evidence for disarticulation present on the proximal articulation (Figure 5.6) of the humerus is misleading, as this part of the element was only encountered twice during the analysis.

**Meat Removal:** Marks indicative of meat removal on both the anterior and posterior humerii tend to be represented by long diagonal or vertical lines which would have followed the striation of the muscle tissue. On both sides they begin half way up the distal part of the shaft, slightly above where the radial and olecranon fossae end. Compared to the marks around the olecranon fossa on the posterior humerii, the marks on the shaft (particularly on the posterior bone) thought to indicate meat removal appear much more orderly. Although the marks on the medial and lateral sides of the shaft look short on the diagram, in reality they extend around the sides of the bone, so are much longer and more diagonal than they appear in Figure 5.6. Marks that extend horizontally across the mid-section of the shaft are likely indicative of the removal of the triceps and pectoral muscles (Knight 2003, 81).

The absence of meat removal marks from around the base of this area, on the proximal shaft is a true one, however is probably explainable by the fact that there is so much meat in this area, removing it without marking the bone would be easier here than in places where the meat is not so abundant. It is also

possible that having been removed from the lower shaft, evidence for meat removal from the upper shaft would be present if we had more evidence of the proximal articulation.



**Figure 5.6: Composite diagram showing all butchery marks present on mid-Neolithic cattle humerii present at Etton.**

#### 5.2.6.1 Comparison by context

Just sixteen of the humerii discussed above came from internal features, and of these only five were found to have butchery marks. The low sample size once again creates a problem for interpretation. The opposite evidence is present on

the humerii from internal features as was present on the scapulae. No evidence for disarticulation was present on the scapulae, while no evidence except disarticulation is present on the humerii. The majority of the marks on the humerii from the internal features are from the around the medial trochlea and radial fossa, only two marks were present on the lateral trochlea, and on the posterior bone, only four marks were present, all around the top of the olecranon fossa, presumably created during the disarticulation of the ulna.

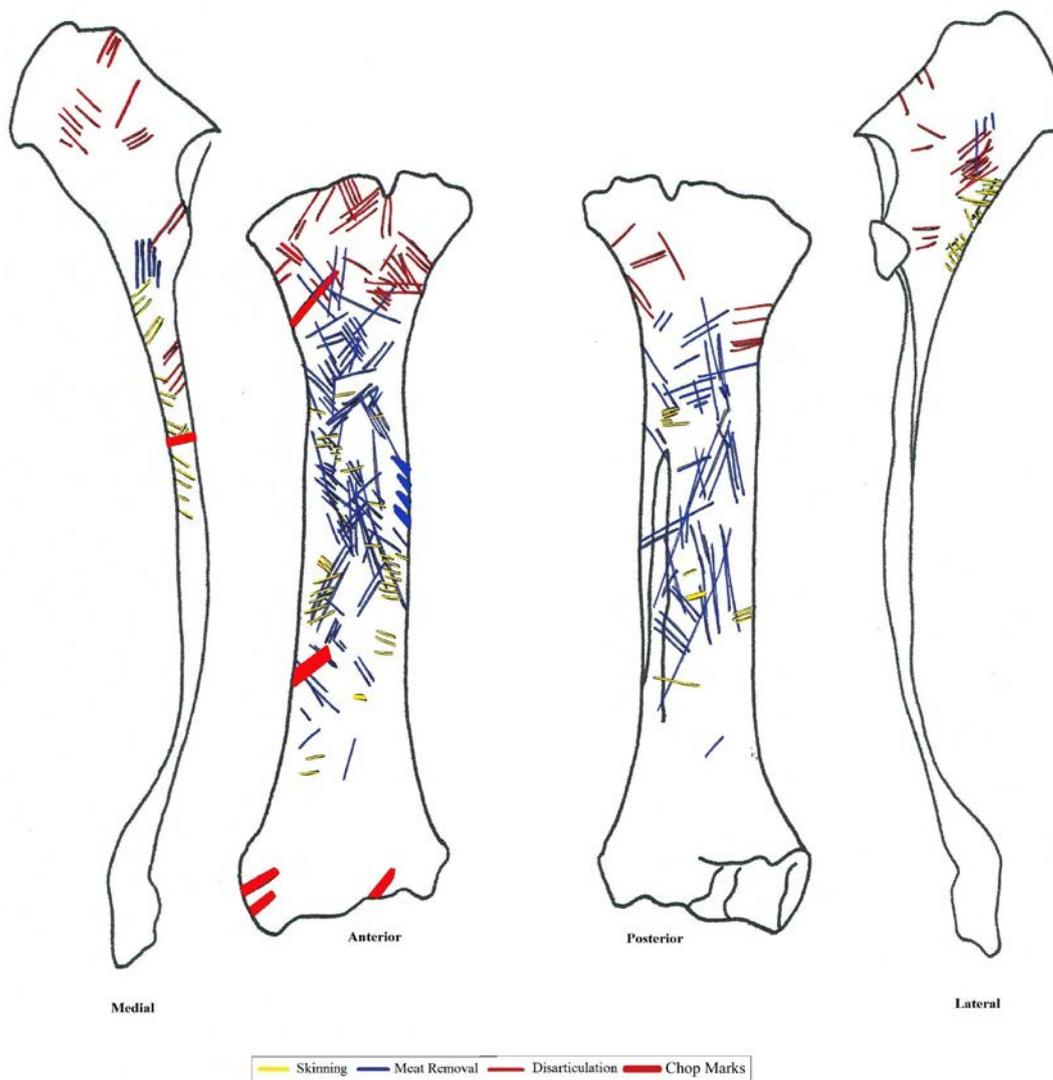
### *5.2.7 Radii and Ulnae*

Radii were the most abundant cattle limb element present at Etton, with 212 being recovered from the entire site. Ulnae were not so well represented, with 82 the total number recovered. Overall, 26.9% of the radii and 19.5% of the ulnae had visibly been butchered. Although still a relatively high meat yield element, the coverage of meat on the radius (and ulna) is thinner than on the humerus and scapula, so as well as having both disarticulation and meat removal marks, there is also evidence of the marks left behind by skinning activity.

The almost complete absence of any kind of mark from the distal end of the radii is not so easily explained as it was for the proximal humerus. Distal radii are as well represented as proximal radii; therefore the lack of marks has to be something to do with the way this bone was being exploited, rather than an absence of material for analysis.

**Skinning:** Skinning marks are the least abundant kind of mark on the radii and ulnae; however, it is thought that they are present. As has already been mentioned, although the radius is a relatively high-meat yield element, the thickness of the meat is not as considerable as on the humerii or femora, especially from the mid-shaft to the distal end. The presence of parallel short, horizontal cut marks across the anterior and posterior faces of the bone suggests that some skinning activity was occurring here. These skinning marks are quite distinct from the long, light, diagonal or vertical marks also present on the shaft of the bone, which are thought to represent the removal of meat (as demonstrated by Figure 5.7), making it unlikely that the two different kinds of

mark served the same purpose. The similar marks present on the caudal shaft of the ulna are more conclusively derived from skinning activity, as this part of the ulna is not covered by a lot of meat, so the skin is very close to the bone.



**Figure 5.7: Composite diagram showing all butchery marks present on mid-Neolithic cattle radii and ulnae present at Etton.**

**Disarticulation:** Marks representing disarticulation are largely confined to the anterior proximal articulation and shaft of the radii, and the area between the process anconaeus and olecranon on the ulna. That there are a great deal more marks on the anterior of the radii than the posterior is because the ulna sits over the posterior proximal shaft, and for the most part was probably not being disarticulated from the radii in the same way as it was from the humerii. Having said this, there are some meat removal marks that go across the ulna

scar – in these cases the ulna must have been removed prior to the cuts being made. The identified disarticulation marks on the radii are orientated in various directions. Many are either diagonal or vertical, emerge from the articular surface and travel down the shaft of the radius; however some are also thought to have been horizontal, intended to cut across the strong tissue at the top of the bone. One particularly thick mark, reminiscent of a chop mark, implies that sometimes disarticulation was achieved forcefully by chopping through the bone rather than detaching muscle attachments, tendons and ligaments.

Some further chop like marks are present at the distal end of the anterior side of the radii. One of these, on the lower part of the shaft, is extremely thick. The others, which are all located on the distal articular surface, were less pronounced though still considerably thicker than most other marks on the bone. These too are likely to be indicative of disarticulation techniques that were less sympathetic to the structure of the joint/limb. It is possible they represent the disarticulation radii and metatarsals by chopping or cleaving the bone, rather than through the joint itself.

**Meat Removal:** There is considerable evidence for the removal of meat from the radii at Etton. We would expect to see an increase of marks around the middle of the shaft, at the same time as we see a petering out of skinning marks. This is because the meat becomes more abundant at this part of the bone. Generally speaking this is what appears to be happening at Etton. The majority of the marks indicative of meat removal are long diagonal or vertical striations, often in groups of parallel lines. Some of the marks also included as representative of meat removal are short, but their position and orientation suggests meat removal rather than skinning or disarticulation. There were four short, heavy marks on the lateral anterior side of one radius. These have been classified as meat removal marks, as they are too deep to be the likely result of skinning. It is possible that in this instance muscle removal began at this point, and the heavy cuts allowed access to the rest of the muscle.

The only evidence of meat removal from the ulnae takes the form of two groups of parallel vertical lines at the top of the shaft on the medial side, and a little above this on the lateral side. These marks would likely have facilitated the

removal of muscle from around the ulna, without making it necessary to detach the ulna itself.

#### 5.2.7.1 Comparison by context

The radii and ulnae are the first elements for which their location either within the ring ditch or the internal features affects the butchery present though again there is the caveat that the amount of material from the internal features was substantially less than from the ring-ditch, which may have an effect on the overall results.

Of the 212 radii present across the whole site, 191 were found in the ring-ditch and 21 in the internal features. Within the ring-ditch, 25.1% of the radii showed evidence of some kind of butchery, making radii the fourth most highly butchered element (relatively) from this context. In the internal features however, 42.9% of the radii present had evidence of butchery. The jump of 17% between contexts appears to be significant, especially when considered alongside the evidence from the ulnae. In the ring-ditch 16.44% of the radii had evidence of butchery that is a comparatively low proportion against the proportions of butchery present on other elements in the same context. In contrast, ulnae were (by proportion) the most frequently butchered element in the internal features, with 44.5% of the total number showing evidence of butchery.

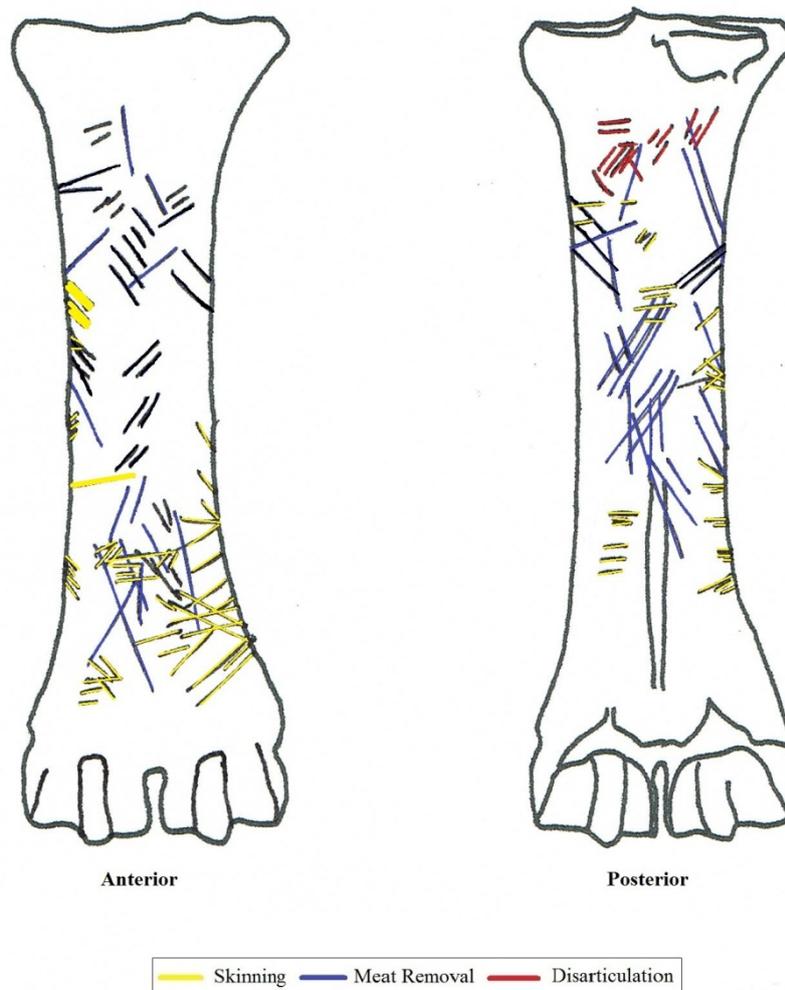
The actual butchery marks present on the radii from the internal features comprise those resulting from disarticulation and meat removal. Marks resulting from skinning were not present on the bones recovered from the internal features. Almost all of the marks on the proximal articulation of the radii from across the site were present on the elements within the internal features (only one instance of disarticulation at this point could be seen on elements from the ring-ditch). No disarticulation marks were present on the distal articulation of the radii. The vast majority of the marks present on radii from the internal features were meat removal marks, and of these almost all were on the anterior side. Only one instance of butchery was present on the posterior side of the bone.

Disarticulation, skinning and meat removal marks were present on the ulnae in both the ring-ditch and internal features. Considering that there were fewer ulnae from the internal features, only five which displayed butchery marks, there are not actually that substantially fewer marks overall on the ulnae from the different contexts. The major difference between the ulnae in the ring-ditch and in the internal features is the presence of marks down the caudal shaft of the ulna, representative of skinning. These are abundant on the ulnae from the ring ditch, but entirely absent from the internal features. Aside from this, the same kinds of marks are present in roughly the same locations in both the ring ditch and internal features.

### *5.2.8 Metacarpals*

The metacarpals recovered from the site were among the least frequently butchered element present. Of the 177 that were recovered from the site, 31 had been butchered giving a proportion of 17.5%. Disarticulation, skinning and meat removal marks were present on the metacarpals, though disarticulation marks were by far the least abundant. Many of the marks present on the anterior shaft of the metacarpals are fairly ambiguous, and could have resulted from either skinning or defleshing activity. These marks have been left uncoloured on Figure 5.8.

**Disarticulation:** A very small number of marks thought to represent disarticulation activity were present on the posterior side of metacarpals at the proximal end of the shaft. These were very short, sharp marks in various orientations, located just below the proximal articulation. The evidence from the tibiae suggest that the lower limb bones might have been being removed at about half way up the tibiae, and evidence from the calcanei and astragali suggest frequent disarticulation at this point, so disarticulation at the metacarpals would not have been an essential part of the butchery process either for meat or foot removal. It may however have been the case that the metacarpals were being exploited secondarily for marrow or some other bone processing activity.



**Figure 5.8: Composite diagram showing all butchery marks present on mid-Neolithic cattle metacarpals present at Etton.**

**Skinning:** Unsurprisingly, over half of the marks present on the metacarpals are thought to result from skinning activity (51.8%), making the metacarpals the element with the most evidence for skinning overall. They are, for the most part, short, sharp and orientated horizontally across the bone. They also tended to be located around the lateral and medial sides of the bone rather than on the middle of the anterior and posterior shaft. The marks left uncoloured on Figure 5.8 are possibly all indicative of skinning activity, though they are fairly ambiguous and could also result from the removal of what little meat there is on this element. The abundance of skinning marks on this element suggests that the skin was being removed before the disarticulation of the lower limb bones

from the rest of the fore limb, and that this part of the feet were not being left attached to the hide, as is sometimes thought to be the case (Piggott 1962).

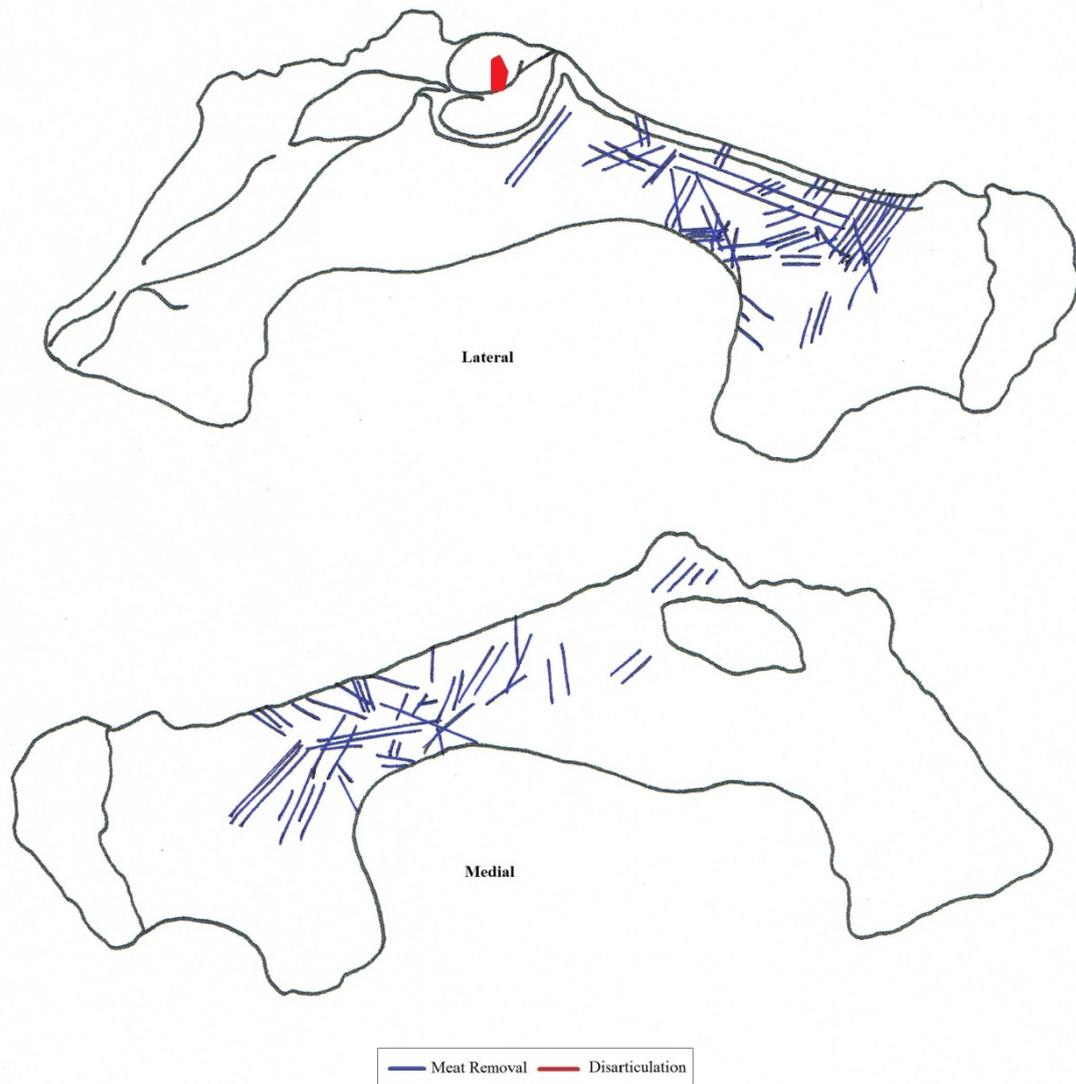
**Meat Removal:** The metacarpals have so little meat on them that whatever evidence there is for meat removal is not likely to be the result of filleting, but more likely to be indicative of the cleaning up of the bone, by the removal of tendons, ligaments and what muscle tissue was present, prior to it being processed for marrow or used for some other activity.

#### 5.2.8.1 Comparison by context

One hundred and forty-four metacarpals were present in the ring-ditch, of which 24 had evidence of being butchered (16.7%). The proportion of butchered metacarpals present in the internal features was slightly higher – thirty three bones were recovered, of which 6 (18.2%) had butchery marks. The same groups of marks were present in both contexts, with skinning marks being the most abundant in all contexts.

#### *5.2.9 Pelves*

A quarter (27) of the 108 cattle pelves recovered from Etton showed evidence of butchery activity, making them one of the more highly butchered elements present. These butchered pelves have evidence of both disarticulation and meat removal activity, but none of the marks were thought to be indicative of skinning. This is likely because the pelves are relatively deep underneath the hide, with a thick covering of meat. Meat removal marks were by far the most prevalent kind of mark on the pelves (99.1%), with only 0.9% of the marks thought to represent disarticulation. All of the butchered pelves were recovered from the ring ditch.



**Figure 5.9: Composite diagram showing all butchery marks present on mid-Neolithic cattle pelves present at Etton.**

**Disarticulation:** Just one mark, situated within the acetabular articulation, is thought to represent the disarticulation of the pelvis from the femora. This mark is short, thick and very heavy, and would have required a significant amount of force to create it. Its implications are very limited by the fact that it is the only evidence for this kind of activity. It is unlikely that the femora were being left attached to the pelvis. The absence of disarticulation marks from the articular region of the pelvis is perhaps indicative of the ability of the inhabitants of Etton to detach it from the femora without creating butchery marks, though this is

tenuous. The presence of the chop mark across the acetabular articulation however could suggest the opposite – that brute force was being used to disarticulate these elements rather than the more precise knife disarticulation seen on the articular surfaces between other joints.

**Meat Removal:** Meat removal marks make up over 99% of the total marks present on the pelvis. They are largely present in parallel pairs of long, light diagonal lines, and are positioned all over the anterior and posterior ilium and iliac spine. More transversely orientated marks may be the result of having to cut through the tendons and ligaments that surround the pelvis, and which would have been considerably tougher than the muscle. A concentration of long cut marks at the proximal end of the ilium suggests that this was a location often targeted for the removal of meat or other tissues. The absence of marks from the ischium is more to do with the fact that this part of the pelvis was largely absent from the site, and is not evidence of an actual lack of butchery marks in this area. The same is true distal part of the ilium and the tuber coxae.

#### *5.2.10 Femora*

Precisely one fifth of the 80 femora present on the site showed evidence of butchery activity. Overall as an element the femora appear to be underrepresented at the site compared to the other primary limb bones present. Similarly, it does appear to be somewhat under-marked, when compared elements such as the humeri, radii and tibiae. There is no obvious taphonomic reason for this, given, as it is one of the most robust bones of the skeleton.

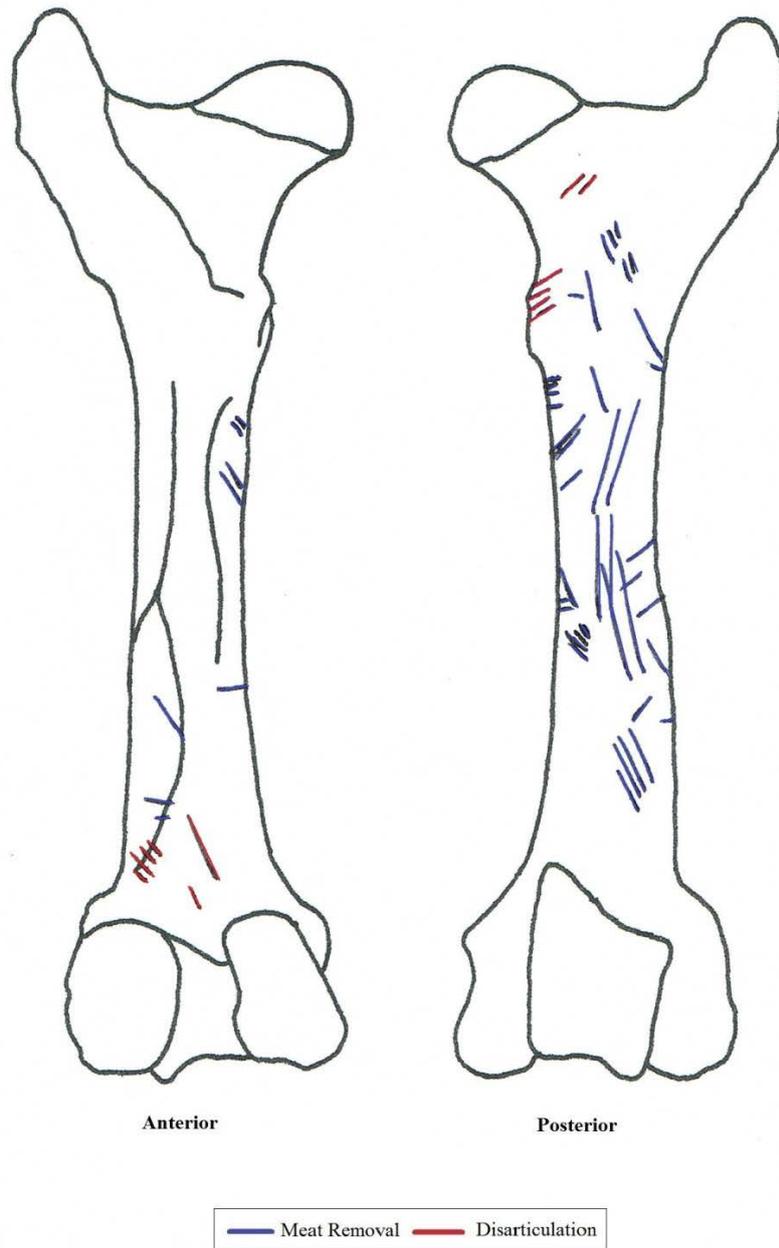
As one of the highest meat-yield elements on the cow, it is not surprising that the vast majority of the butchery marks present on the surface of the femora are indicative of meat removal. A small number of marks are thought to represent the disarticulation of the femora proximally from the pelvis and distally from the tibiae. Much like the humeri, there are no marks thought to represent skinning activity. This is almost certainly because the amount of meat covering cattle femora puts considerable distance between the hide and the bone.

**Disarticulation:** A few marks, possibly indicative of disarticulation activity, are present around the trochanter minor and trochanter tertius at the proximal and of the femora. These marks are not unambiguous however, and could potentially be the result of meat removal activity. They have been identified as potentially being the result of disarticulation because their horizontal orientation differentiates them from the longer more vertical lines thought to represent meat removal. No marks were actually present on the trochanter major, the trochanter fossa and neck or the head of the femora. At the distal end of the femora a few marks were present around the lateral side of the shaft. One mark, which is longer and more diagonal than is usually associated with disarticulation has been included in this category based on it being exactly aligned with the lateral condyle. Again, no marks were present on the distal part of the condyles or epicondyles.

**Meat removal:** The meat removal marks on the femora are fairly typical of those identified on other bones from Etton. They are seen in pairs or groups of light, parallel diagonal or vertical lines and are located largely around the middle part of the shaft. The evidence for meat removal from the femora is somewhat limited compared to the evidence from the humerii or tibiae. It is difficult to understand why, unless they are not being butchered, but the meat is being consumed directly off the bone. It is thought that this is unlikely though, given the size of a cattle femur, and the time that would be required to cook it through if still on the bone. It is possible that because of the size of the bone, and the volume of meat present on it, the meat was usually being removed without causing butchery marks.

#### 5.2.10.1 Comparison by context

Of the sixteen butchered bones included in the analysis, only four were present in the internal features. These bones had marks likely indicative of meat removal but not of disarticulation. Unfortunately, once again, the limited amount of material inhibits the potential significance of this; however, if it exists across multiple elements, the absence of disarticulation marks from internal features will be discussed later in this chapter.



**Figure 5.10: Composite diagram showing all butchery marks present on mid-Neolithic cattle femora present at Etton.**

### 5.2.11 Tibiae

Overall, in the ring-ditch and in the internal features the tibiae were the third most frequently butchered element. Two-hundred and six tibiae were recovered from the site, of which 60 (29.1%) have evidence for butchery. The butchery marks present on the tibiae included those indicative of disarticulation, skinning

and meat removal. Those indicative of meat removal were the most abundant (57.7%), followed by skinning (32%) and then disarticulation (10.3%). The locations, orientations and frequency of marks on the tibiae are not dissimilar to those present on the radii (discussed above), especially with regards to disarticulation.

**Disarticulation:** The disarticulation marks present on the tibiae are mostly on the distal shaft, beginning about a third of the way up. The most obvious of these marks (Figure 5.11) are five heavy chop marks orientated horizontally and diagonally across the shaft. It is thought that these marks may that tibiae were sometimes being separated from the lower limb bones at this point, rather than by disarticulation at the articulation between the tibiae and metacarpals. This interpretation is supported by the fact that over half of the tibiae found on the site are found in fragments that are broken around the middle of the lower shaft (Dobney and Reilly (1998) zones 8 and 9).

Short, light, horizontal cut marks were present around the proximal articulation, though none were directly located on the actual articular surface. These marks may be indicative of the cutting of the thick ligaments or tendons of the knee, making detachment at the joint easier. It is unlikely that marks this far up the shaft of the tibiae were indicative of skinning activity, as such a lot of meat was present around the knee.

**Skinning:** Marks potentially indicative of skinning activity begin about half way down the shaft of the tibiae, where the meat begins to become relatively less abundant and results in the skin being considerably closer to the bone. Similar to those seen on the radii and metatarsals, the marks on the tibiae that likely result from skinning are short and vertical, and in groups of numerous parallel striations. They begin around the same location of the heavy, thick chop where the tibiae may have been chopped instead of being disarticulated at the joint – were this happening, this is where we would expect to see the skinning marks.

**Meat Removal:** Just over half of the butchery marks present on the cattle tibiae are indicative of the removal of meat from the bone. These are predominantly distinguishable from the skinning marks because of their longitudinal

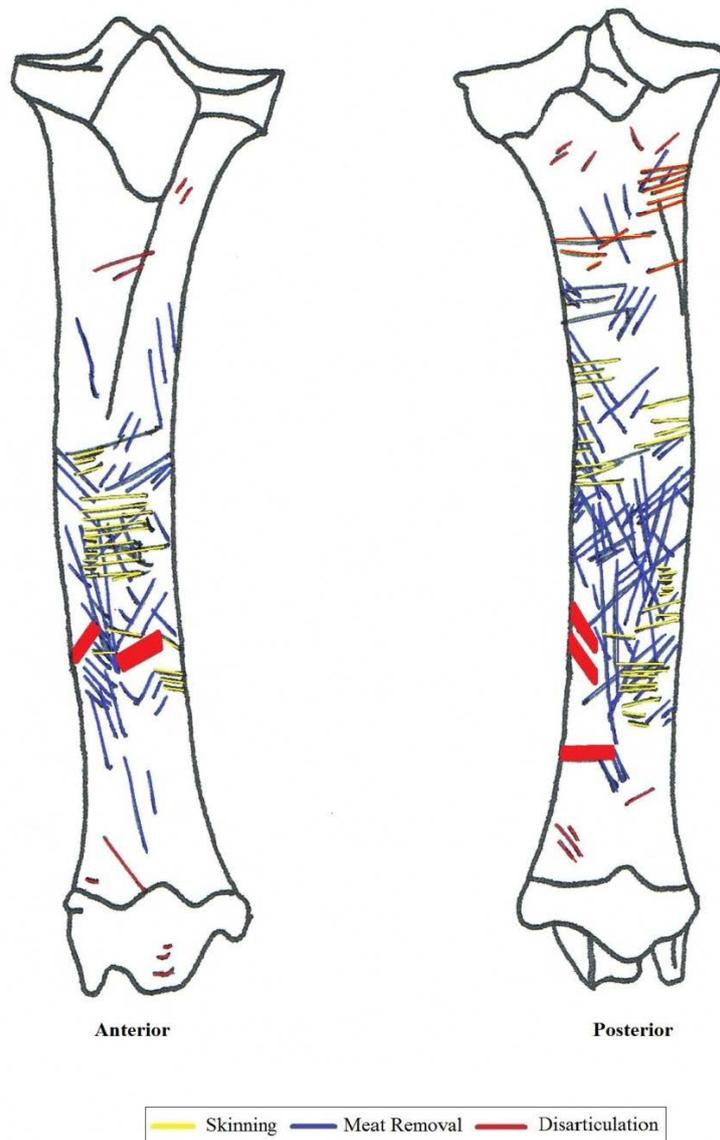
orientation, which would have been in line with the striations of the muscle tissue.

Typically, the marks tend to be in groups of parallel lines, probably representative of the multiple cuts required to detach muscle tissue from the bone. On the anterior side of the bone the meat removal marks begin at the distal shaft, a little way above the malleoli and occur up to the lower portion of the anterior crest; however, they are not abundant around the muscle attachment line of the crest. Some of the marks depicted in Figure 5.11 as being meat removal marks are slightly ambiguous, as although they are orientated diagonally, they are fairly short and occur in large groups of repeated cuts. It is possible that these are, in fact, the result of skinning rather than meat removal. The meat removal marks on the posterior side of the tibiae are heavily congregated around the lower middle part of the shaft, just above the heavy chop marks thought to be indicative of the splitting of tibiae at this point. It is likely that were the tibiae being chopped through in order to detach the lower tibiae and feet bones, the meat was being removed prior to this, hence the concentration of marks in this area.

#### 5.2.11.1 Comparison by context

One hundred and eighty tibiae were recovered from the ring ditch, of which 50 (27.8%) had evidence of butchery activity. Accordingly, the vast majority of the marks depicted on Figure 5.11 are from this context. Twenty-six tibiae were recovered from the interior features, of which 11 had evidence of butchery, making the proportion of butchered bone from these contexts considerably higher than from the ring ditch, at 42.3%.

The bones from the internal features have all three kinds of marks identified on the bones from the ring ditch, including one of the heavy chops on the posterior distal shaft, and skinning marks on both anterior and posterior sides. The marks indicative of meat removal on these bones are not so abundant, however.

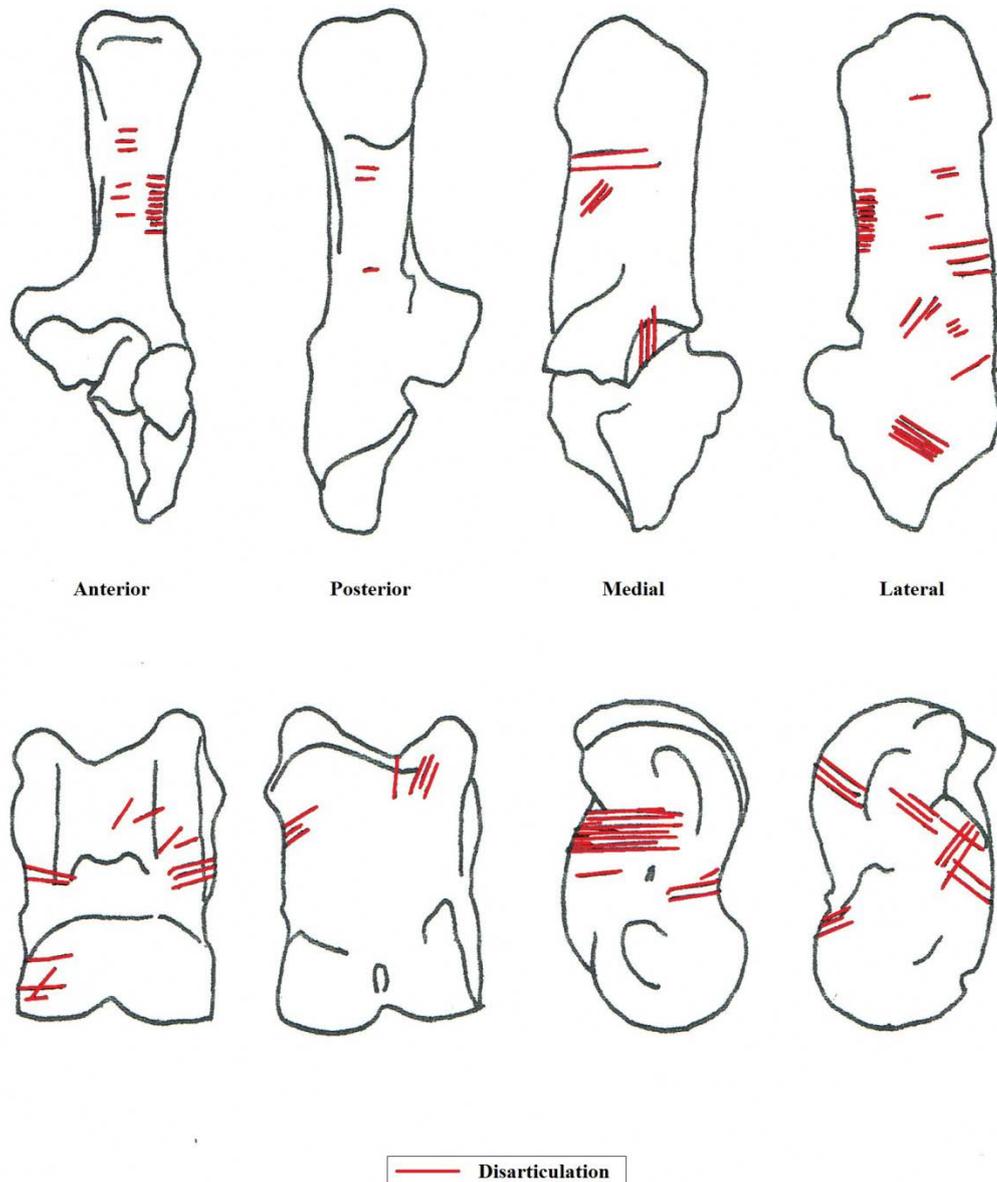


**Figure 5.11: Composite diagram showing all butchery marks present on mid-Neolithic cattle tibiae present at Etton.**

### 5.2.12 Astragali and Calcanei

Seventy-one astragali and 75 calcanei were recovered from the site, of which 7 (9.9%) of the astragali and 8 of the calcanei (10.7%) had evidence of butchery. All of the butchery marks present on the astragali and calcanei are thought to be indicative of the disarticulation of the feet. The marks present on the lateral, medial and anterior faces of the calcanei likely derive from disarticulation with the tibiae, as do the marks present on the anterior face of the astragali. It is possible that the marks on the more proximal portion of the medial calcaneum

result from skinning activity rather than from disarticulation, as they are somewhat ambiguous. Those marks present on the other faces of the astragali probably result from the disarticulation of this element from the calcanei, and from the lower foot.



**Figure 5.12: Composite diagram showing all butchery marks present on mid-Neolithic cattle metacarpals present at Etton.**

5.2.12.1 Comparison by context:

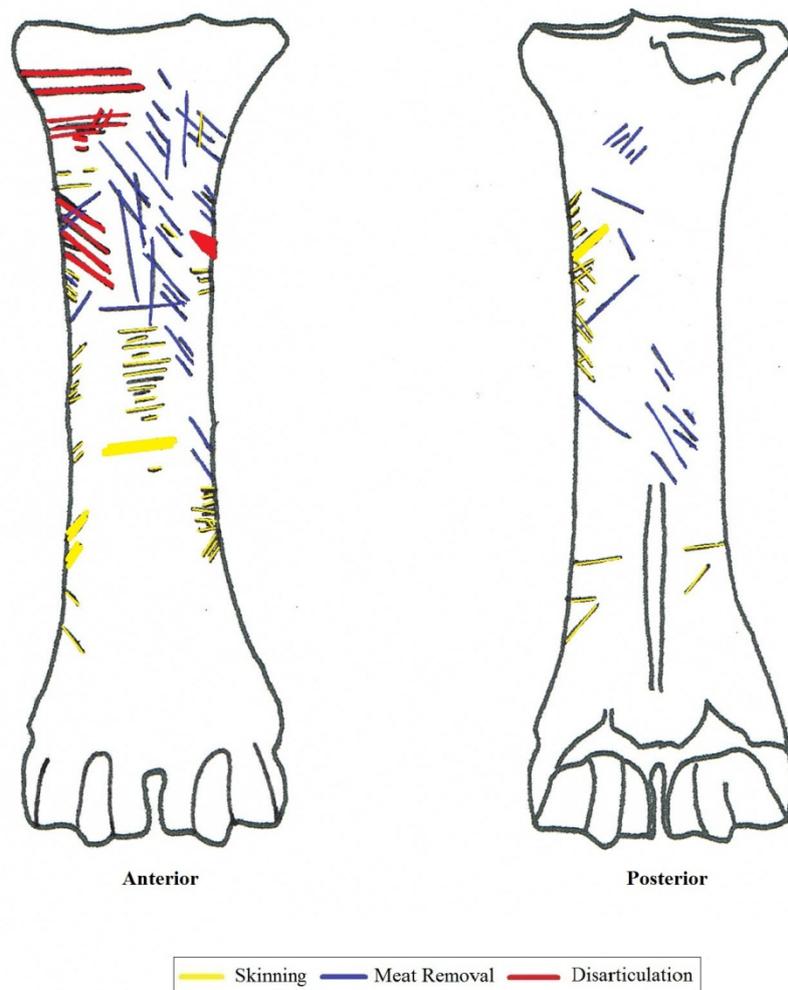
Sixty-eight calcanei and 54 astragali were recovered from the ring ditch, of which seven and four elements (respectively) had evidence of butchery. This

means that 10.3% of the ring ditch calcanei and 7.4% of the astragali were butchered. These numbers are slightly lower than those of the internal features; seven calcanei and 17 astragali were recovered from the internal features, of which 3 and 1 element showed evidence of having been butchered (17.6% and 14.3% respectively). Because the numbers of butchered bones from the internal features are so low, it is difficult to draw any conclusions regarding the potential for differential deposition practices. The one calcaneum present in the internal features had a cut mark on its proximal lateral body, and the astragali had been cut on the medial and posterior sides, implying disarticulation from the calcanei and lower foot bones.

### *5.2.13 Metatarsals*

One hundred and thirty-three metatarsals were recovered from Etton, of which 33 (25.4%) had evidence for butchery. The most common butchery mark on the metatarsals resulted from skinning activity, followed by meat removal and then disarticulation. As a lower-meat yield bone, it is unsurprising that the metatarsals have one of the lowest instances of butchery marks for meat removal.

**Disarticulation:** All of the marks present on the metatarsals that are indicative of disarticulation are located around the proximal articulation and proximal end of the anterior shaft. There are no corresponding marks on the posterior side of the bone. The marks are predominantly horizontal from the medial side, and many are rather heavier than have been seen on the higher bones of the forelimbs. This perhaps implies that less care was being taken in disarticulation of the bones here. No cut marks are actually present on the proximal articular surface. Together with the thickness of the marks around the proximal end of the bone it could be suggested that the bones are being effectively portioned through the shaft rather than disarticulated at the joint. The presence of many disarticulation marks on the astragali and calcanei, but relatively low numbers elsewhere on the hind limb supports the notion that the hindlimbs were being disarticulated in this way rather than at the joints. This is also supported by the fact that the top halves of metatarsals are far more abundant at Etton than the lower parts of the bone.



**Figure 5.13: Composite diagram showing all butchery marks present on mid-Neolithic cattle metatarsals present at Etton.**

**Skinning:** The majority of the marks indicative of skinning are located on the lower half of the anterior shaft, where there would have been hardly any meat. These marks are almost entirely short and horizontal, cutting across the medial, lateral and anterior faces of the shaft of the bone transversely. Only two marks are on the posterior side of the bone, although a number wrap around onto this side from the lateral edge. There is a clear difference between the horizontal cut marks resulting from skinning and the vertical and diagonal cut marks indicative of meat removal. Some of the skinning marks are rather heavier than would usually be deemed necessary for the removal of hide. It is possible that these are simply indicative of a more careless approach to skinning, as there is no meat to be spoiled at this point on the bone. It could be that these bones are in

fact more in line with the disarticulation marks seen further up the shaft however – they are slightly ambiguous in nature.

**Meat Removal:** On the anterior side the marks representative of the removal of meat begin to increase around half way up the shaft, where the marks indicative of skinning being to diminish. On the posterior side the meat removal marks begin further down the shaft. Almost all of the marks are long, light and diagonal or vertical and would have run along the striations of the muscle present on the proximal part of the bone.

As well as what meat there is on a metatarsal being concentrated at the top of the bone, the prevalence of meat removal marks in this part of the bone corroborates what was said above about the metatarsals, astragali and calcanei potentially being disarticulated along the proximal end of the shaft rather than at the joint with the tibiae. Were meat being removed from this part of the bone and kept intact as part of a joint comprising the upper metatarsals, radii and ulnae, the waste would have been considerably less than if the joints were cut through.

#### 5.2.13.1 Comparison by context

Only four metatarsals with butchery marks were recovered from the interior features, so the vast majority of the marks visible on Figure 5.13 derive from the bones present in the ring-ditch. Despite this, it is actually the case that a higher proportion of the metatarsals from the internal features were marked (29.4%) than those from the ring ditch (24.8%). Those markings that were present on the bones in the internal features comprised disarticulation, skinning and meat removal marks, indicating no particular difference from those present in the ring ditch.

#### *5.2.14 Phalanges*

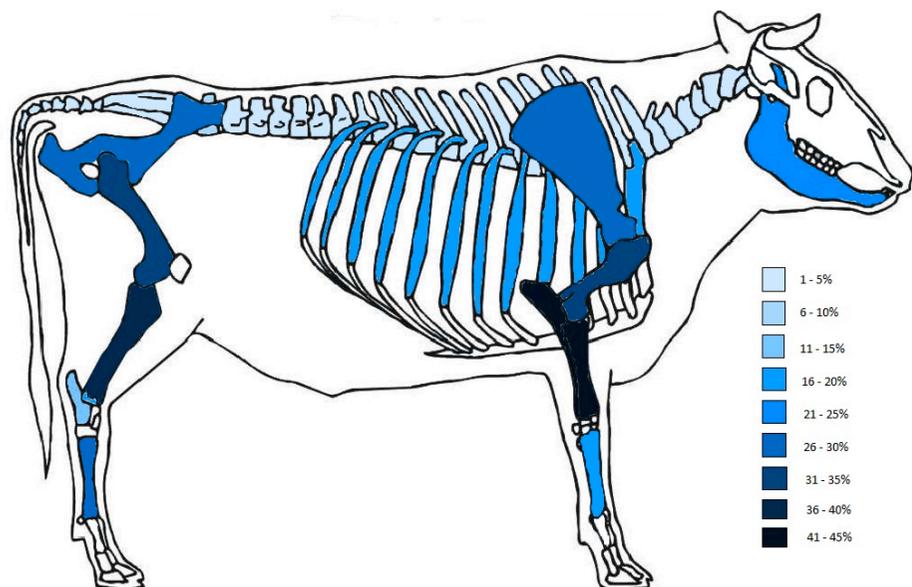
Just four of the 99 cattle 1<sup>st</sup> phalanges recovered from Etton had evidence of being butchered. All of these came from the ring ditch. None of the 55 2<sup>nd</sup>

phalanges or 21 3<sup>rd</sup> phalanges showed any signs of having been butchered at all.

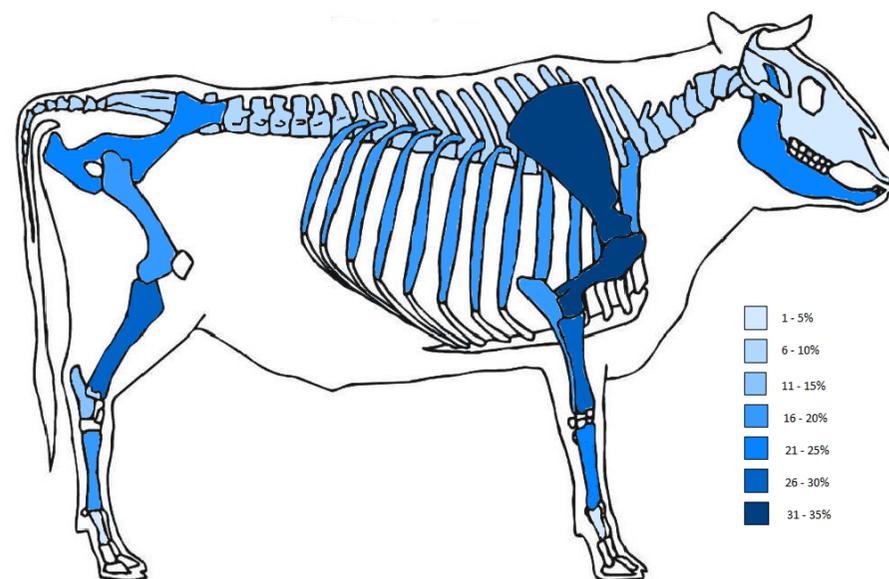
Three of the butchered 1<sup>st</sup> Phalanges had horizontal marks on their posterior side and one had similar marks on its anterior side. These marks may have resulted from skinning starting at the very lower leg. One of these cuts is positioned just above the distal epiphysis, and could alternatively have been the result of the disarticulation of the hooves at this point. The only other marks present on the first phalanges were a group of long, parallel vertical marks on the lateral side of a bone. Although distinct from the short horizontal marks so typical of skinning activity, it is likely that they were produced by the same activity. If butchery was starting at the hooves, then it is likely that cuts were created simply with the aim of getting the removal of the hide started, and the necessity to keep it neat and intact would not have been such a concern as it would on the higher limb bones.

### **5.3 Cattle Butchery: Summary by body area**

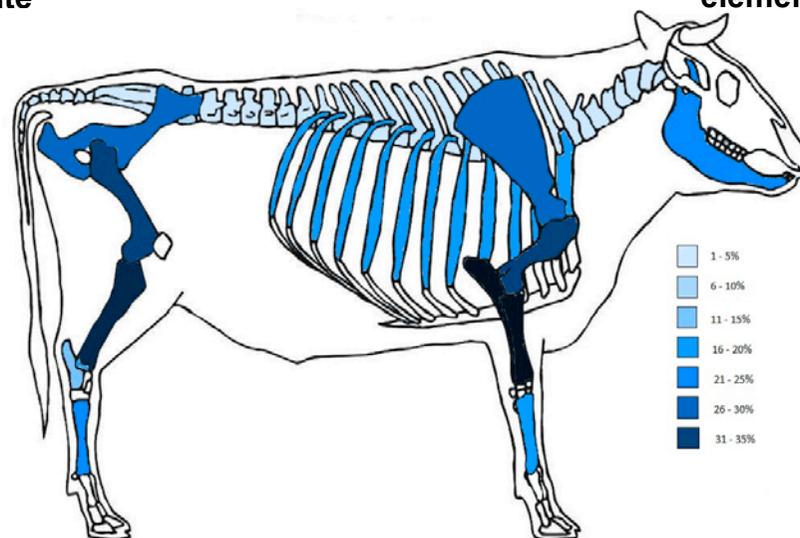
Having considered the butchery activity being applied to the individual elements, it is useful to take a broader view of how this translates to how the various parts of a cattle carcass were being treated at Etton. For the purposes of this analysis the cattle carcass will be split into five main parts; the head, the torso, the forelimbs and the hindlimbs and the feet. Figures. 5.14 – 5.16 show the various percentages of elements with visible butchery marks according to context.



**Fig 5.14: Total percentages of cattle butchery by element across the site**



**Fig 5.15: Total percentages of cattle butchery by element in the ring ditch**



**Fig 5.16: Total percentages of cattle butchery by element in the internal features**

### 5.3.1 Head

With the exception of the mandibles, the heads of cattle at Etton appear to be among the least frequently butchered of elements. This is unsurprising given the low meat and marrow yields of the crania, atlases and axes. Having said this, the most frequently observed kind of activity present on the head bones was meat removal with all of the marks on the axes, 50% of the marks on the crania and 34.7% of the marks on the mandibles thought to represent this kind of activity (Figure 5.14). This quantification of marks on the axes and crania must be tempered by the fact that relatively few marks were present overall however.

Marks representative of skinning were the second most abundant, with the remaining 50% of marks on the crania and 16.8% of marks on the mandibles thought to be indicative of this activity. These marks were located where the skin was at its closest to the bone, and tended to be characterised by groups of short, sharp parallel lines. Skinning marks are thought to be more abundant on these elements (and on the feet) than on the other elements of the skeleton because if a hide was intended to be removed whole, it is likely the feet and skull would be the starting and finishing points, and the necessity to be careful not to damage it in these places would have been less pressing than in its middle.

Evidence of disarticulation was only present around the coronoid process, condyle and neck of the mandible. There was no evidence for the detachment of the skull from the atlases or axes. The removal of the mandibles from the rest of the head was potentially because of its heightened economic value compared to the other head bones. On cattle, the mandible yields a relatively good amount of meat, and can also be exploited for its marrow – a process that we know was happening at Etton (see Chapter 6), and which would be made considerably easier were it disarticulated. There is also some ethnographic evidence that mandibles might be a prized or collectible element, and although such a practice is not discernible at Etton, this does not mean it was not a consideration.

Two complete skulls were recovered from the ring ditch at Etton; neither of which are thought to have butchery marks, but which are both so poorly preserved a detailed analysis was difficult. This kind of deposit tends to be regarded as special in some way (Grant 1984; Wait 1985), and may indeed have been so, however, it is clear that skulls were not always treated with this apparent reverie – the majority of skulls present on site are represented by fragments of cranial material, and as we have seen, exploitation of this material was occurring, and apparently more frequently than whole skulls were being deposited.

### *5.3.2 Torso*

The torso comprises the spinal column and rib cage, elements of which were the most abundant of all the skeletal elements recovered from Etton. The majority of these elements were identified to the category of 'large mammal' but are thought to almost certainly represent domestic cattle. Examples which were remarkably large (comparatively) were singled out as potentially belonging to aurochs, and as such are not included here or above. Overall 18.6% of the ribs, and just 4.7% of the vertebrae appear to have been subject to butchery activity.

The butchery marks present on the vertebrae and ribs tended to be somewhat more ambiguous than those present on the head, forelimbs, hindlimbs or feet. The marks present on the ribs could potentially all result from the removal of meat from the rib cage, and it is highly likely that the vast majority do, however, marks around the epiphyses of the bones could also result from disarticulation from the vertebrae and sternum. The vertebrae, both thoracic and lumbar, had marks potentially indicative of meat removal activity, on their spines, as well as some indicative of disarticulation activity on or around the columns. It is clear that the torso area of the cattle was being defleshed and potentially portioned, perhaps not to the same degree as the forelimbs and hindlimbs, but significantly nevertheless.

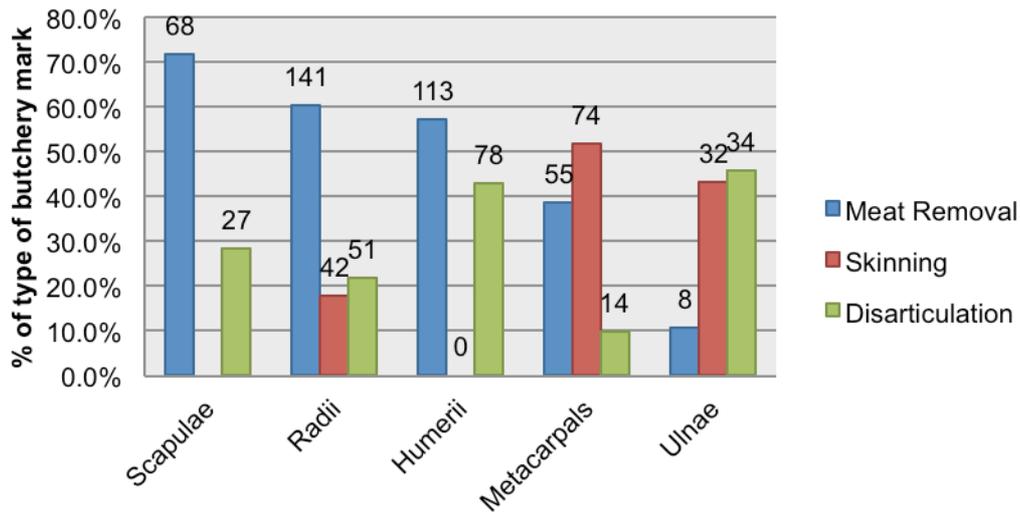
Much like the deposition of a whole skull, the deposition of groups of ribs or vertebrae have long been considered markers for 'special' or 'ritual' activity

(Wait 1985, Grant 1984, Wilson 1992). Four groups of cattle vertebrae and two bundles of ribs were identified in the ring ditch during excavation. Unfortunately it is impossible to work out which of the vertebrae were included in these groups, as the contexts in which they were found also had loose bones, and no labels were on the bags to indicate which bones were part of the groups, so it is impossible to tell whether they had been subject to butchery activity prior to their deposition. Considerable numbers of the ribs in the rib bundles did have butchery marks, however, so had clearly been thoroughly butchered prior to their deposition in the ditch, making an explanation of conspicuous consumption unlikely. If the interpretation of these rib bundles as being 'special' or significant deposits is valid, the presence of butchery marks potentially suggests that just because bones had been economically exploited does not mean that they lost their value as items to be deposited.

### *5.3.3 Forelimbs*

The forelimbs, comprising scapulae, humerii, radii and ulnae and metacarpals, were the most heavily butchered of all the areas of the cattle carcass (see Figure 5.17). Unsurprisingly, meat removal is the best represented of the various butchery activities, with an average of 47.68% of the total butchery marks visible on the forelimb elements attributable to this activity. Disarticulation activity is the next most frequently evident, whilst skinning activity is only evident on three of the five forelimb elements.

Figures 5.14 – 5.16 show the percentage of the total number of elements (present overall, in the ring ditch and in the internal features) that have butchery marks of one kind or another. They clearly demonstrate the density of butchery marks present on the forelimbs. Figure 5.17 clarifies these data by showing the total proportions of the different kinds of butchery marks present on the forelimb elements.



**Figure 5.17: Chart showing the % of different types of butchery mark per forelimb element in order of highest to lowest % of meat removal marks.**

Meat removal from the forelimbs is focussed on the primary limb bones, the scapulae, humerii and radii. This is to be expected considering that these bones are among the highest meat yielding bones on the skeleton. The scapulae have the highest proportion of butchery marks thought to be indicative of meat removal, followed by the radii, and then the humerii (Figure 5.17). The metacarpals also have a relatively high proportion of meat removal marks. These tended to be limited to the upper parts of the bone, where the meat becomes more abundant. It is clear that all four of these elements are being exploited for their meat. The only forelimb element which is not being regularly utilised for meat is the ulnae.

Disarticulation activity appears to be focussed around the distal humerii and proximal ulnae, though some evidence for this activity is also thought to be present around the articular surface of the scapulae. As has been mentioned above, there is a significant lack of proximal humerii on the site, which is the reason for the lack of disarticulation evidence in this area. According to the evidence that is available, however, it seems likely that the most frequent course of action for the disarticulation of the forelimbs was to detach the humerii from the radii and ulnae. Having said this, disarticulation evidence was visible on all of the other bones of the forelimbs, albeit in not the same proportions, so it entirely possibly that legs were being detached and then disarticulated (or not) according to necessity and circumstance.

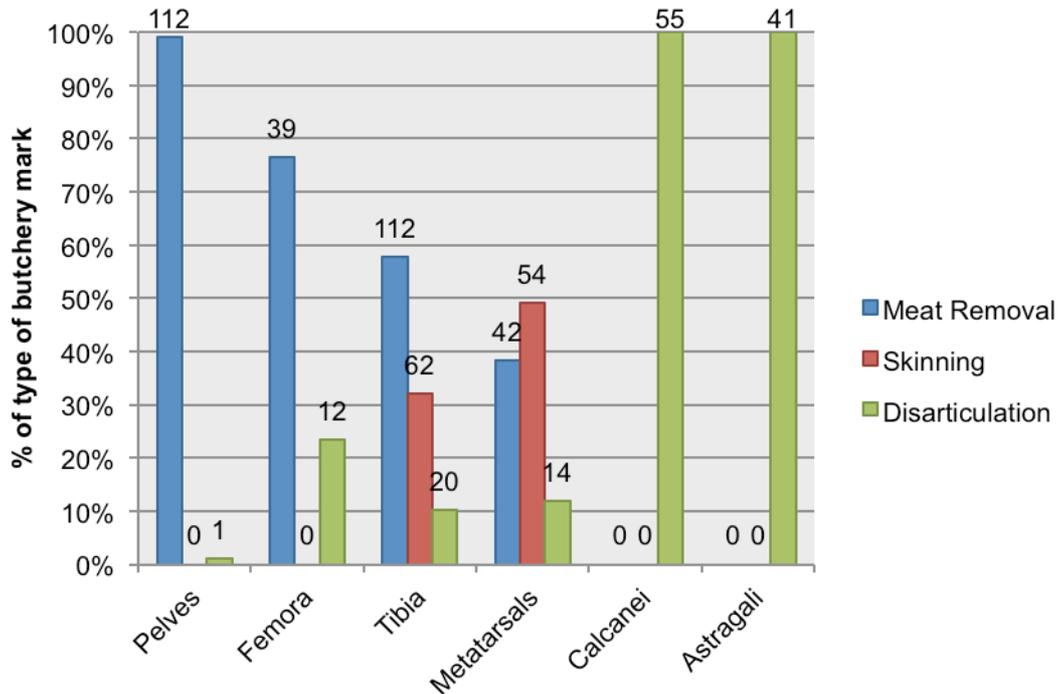
Skinning marks are abundant on the metacarpals, where the skin and the bone are only thinly separated. The majority of marks present on the metacarpals are skinning marks (Figures 5.17). Ulnae also display a relatively high number of marks indicative of skinning along the shaft, again, where the covering of meat is relatively shallow.

The forelimbs were obviously being heavily exploited for meat and hide. It is possible they were being regularly disarticulated around the distal humerus, before being apportioned into small parts according to need. As will be shown in the following chapter, they were also being very regularly exploited for their marrow content, implying that the economy at Etton was not a wasteful one.

#### *5.3.4 Hindlimbs*

The hindlimbs, comprising the pelvis, femora, tibiae, calcanea, astragali and metatarsals, also have considerable evidence for butchery, though it is less abundant than the forelimbs. The tibiae appear to be the most frequently butchered bone in the hindlimb, with 29.1% of the total number displaying some evidence for butchery. Tibiae are followed by metatarsals (25.4%) pelvis (25%) and femora (20%) according to the percentage of bones with visible butchery marks. Figure 5.18 shows the differing proportions of mark types on each element of the hindlimb.

Meat removal is the most visible activity on the hind limb elements, with over 50% of the marks on the pelvis, femora and tibiae attributable to this kind of activity (Figure 5.18 and 5.44). In fact, 99.1% of all the marks visible on the pelvis from Etton are thought to derive from meat removal activity, with just one mark thought to be evidence for disarticulation. Of course meat removal from the pelvis would likely have included the removal of the tendons and ligaments involved in the articulation of the pelvis and femora, and aided the disarticulation of these two elements, but direct evidence for the separation of these bones at the joint is more limited than might be expected. Meat removal from the femora, tibiae and metacarpals is entirely in line with expectation, given the large amount of meat available on these bones on cattle.



**Figure 5.18: Chart showing the % of different types of butchery mark per hindlimb element in order of highest to lowest % of meat removal marks.**

Skinning activity is limited to the distal tibiae and metatarsals, as it is thought the muscle between skin and bone is simply too thick to cause marking on the other elements. The majority of skinning activity is present on the metatarsals, where meat ceases to be so abundant and where it is possible the removal of the hide was begun. This mirrors the activity seen on the metacarpals of the forelimbs. The marks on the astragali and calcanei thought to derive largely from disarticulation activity might in some cases be reasonably argued to be the result of skinning activity instead.

On the hindlimbs it appears the calcanei and astragali have the highest proportion of disarticulation marks, though it must be remembered that only a very limited number of these elements had any butchery marks visible at all. Almost a quarter of the marks present on the femora were also thought to indicate disarticulation. These were predominantly located around the distal articulation, so in a similar location to the marks present on the humerii in the forelimbs. Although the evidence is limited, it is perhaps possible to argue that the hindlimbs, as well as the forelimbs, were being disarticulated at this point, to be further disarticulated if or when required.

### 5.3.5 Feet

The feet of cattle comprise the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> phalanges. They are usually associated with skinning activity, and often in more recent times than the Neolithic, with the tanning activity that accompanies the removal of the hide. Of the 102 1<sup>st</sup> phalanges found at Etton, only four had been visibly butchered and the resulting marks were thought to be predominantly indicative of skinning activity. None of the 2<sup>nd</sup> and 3<sup>rd</sup> phalanges that were recovered had any indication that they had been subject to butchery activity. Most of the phalanges recovered were whole, and displayed no evidence of butchery whatsoever. It is plausible that the feet of cattle were being removed during primary butchery activity and disposed of immediately or put aside to be disposed of at a later point and not interfered with again.

### 5.4 Domestic Pig (*Sus scrofa*)

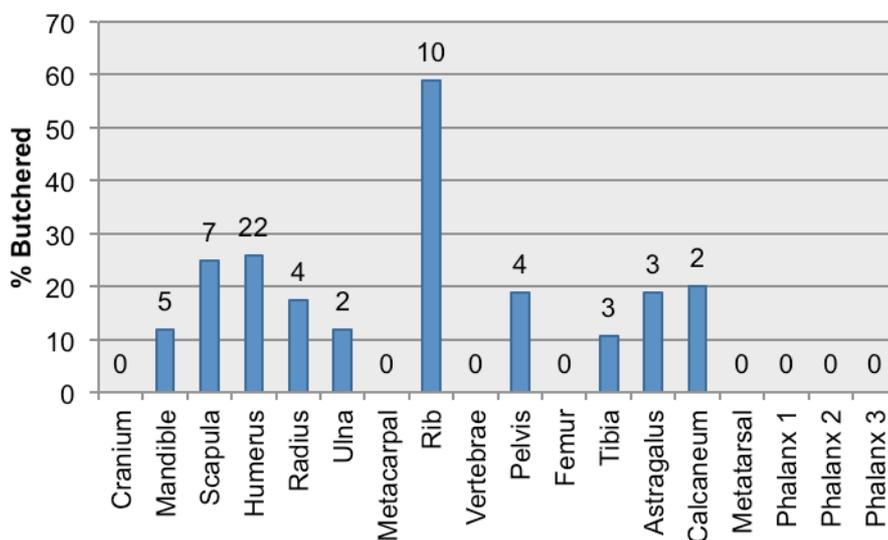
Domestic pig was the second most prevalent species on site, making up 14% of the total mid to late Neolithic faunal assemblage. In total, some 14% of the total pig bone appeared to have been butchered in some way. Despite the significant difference in the quantity of the material representing both domestic pig and cow, overall the proportion of butchered bone was not particularly dissimilar – perhaps giving an early indication that the manner in which the two species were butchered was relatively consistent.

Unlike the analysis of the cattle butchery, where large numbers of bones had been subject to butchery, the total numbers of butchered pig bones are so relatively small that to compare by context is unlikely to yield any kind of useful, or accurate, results.

Armour-Chelu identified butchery on four partial pig skeletons or bone groups. The first was a group of juvenile pig ribs from Ditch Segment 9, and are reported as defleshing marks. The remaining three are partial skeletons from Ditch Segment 9, and are suggested to be indicative of the disarticulation and defleshing of the animals prior to deposition (Armour-Chelu 1998, 280).

**Table 5.2: Total NISP, number of butchered elements and % of elements butchered belonging to pig from the Eton causewayed enclosure.**

Element	NISP	No. Butchered	% Butchered
?Rib	17	10	58.82
Humerus	85	22	25.88
Scapula	28	7	25.00
Calcaneum	10	2	20.00
Pelvis	21	4	19.05
Astragalus	16	3	18.75
Radius	23	4	17.39
Mandible	42	5	11.90
Ulna	17	2	11.76
Tibia	28	3	10.71
Femur	17	0	0.00
Phalanx 1	19	0	0.00
Metapodia	14	0	0.00
Vertebrae	5	0	0.00
Cranium	14	0	0.00
Phalanx 2	5	0	0.00
Phalanx 3	4	0	0.00
	365	62	16.99

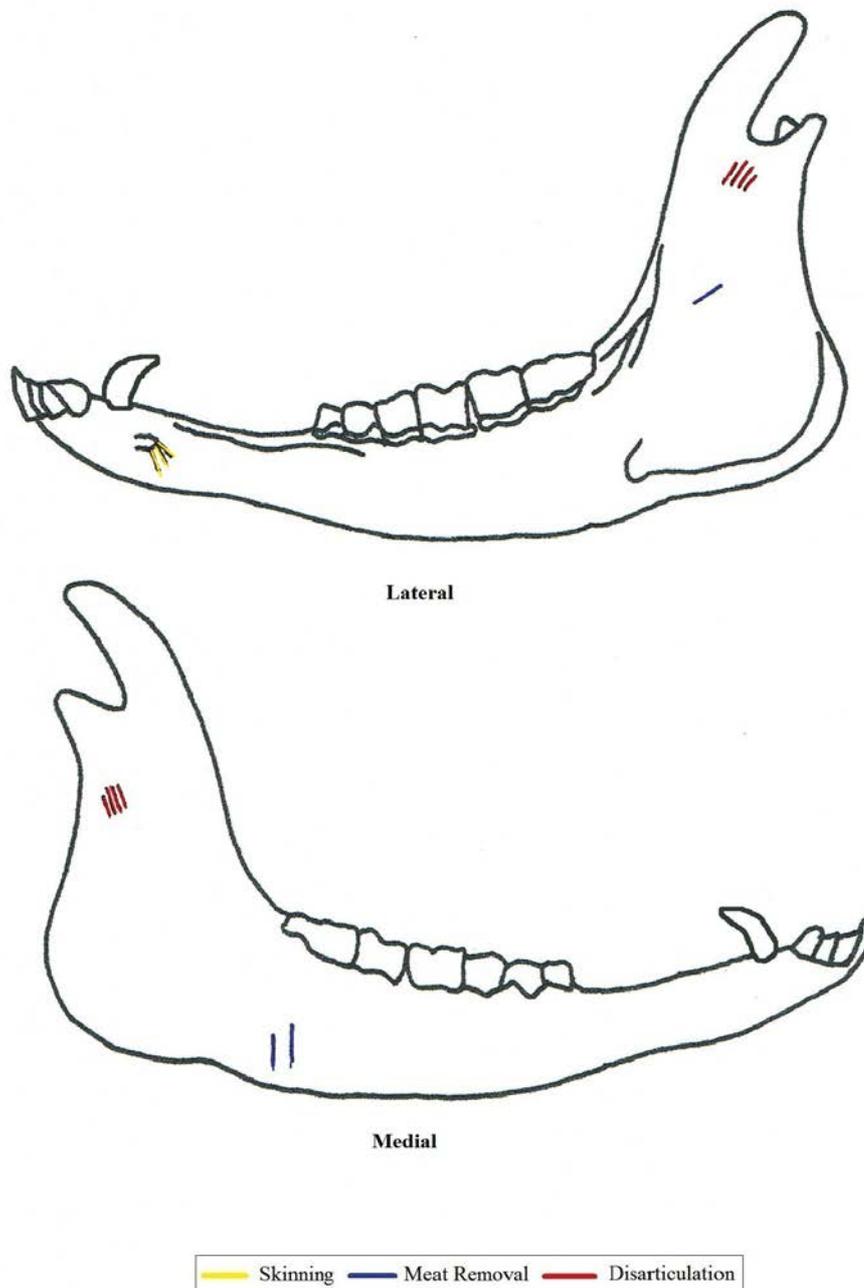


**Figure 5.19: Graph showing % of pig elements with butchery marks**

#### 5.4.1 Crania

No pig whole crania were present at the site. Just fourteen fragments of cranial material were identified as belonging to pig – none of these had butchery marks.

### 5.4.2 Mandibles



**Figure 5.20: Composite diagram showing all butchery marks present on mid-Neolithic pig mandibles present at Etton.**

Of the 40 mandibles attributable to domestic pig, 4 (10%) had butchery marks of some kind. Figure 5.20 illustrates all of these butchery marks. Marks representing skinning, meat removal and disarticulation activities are thought to be present.

**Disarticulation:** In exactly the same manner as the removal of cattle mandibles, the removal of the pig mandible tends to leave marks around the mandibular condyle and higher areas of the zygomatic process, where the two bones form a joint. Figure 5.20 shows that there are two incidents where this kind of activity is visible at Etton – one where a series of four short diagonal marks were made on the lateral side of the bone and one where marks of the same nature were made on the medial surface of the bone. The location of these marks, either side of the mandibular condyle is almost certainly caused by disarticulation of the mandible from the crania.

**Skinning:** One of the butchered pig mandibles had evidence of skinning by way of a cluster of short vertical marks on the diastema between the incisors and the tooth row. Given the small amount of meat in this area, and the lack of any articulating surfaces it seems that skinning is likely the only process that would have caused such marks. This location on the mandibles, as well as on the distal tibiae and proximal metapodia, is typical of the commencement of skinning activity at each end of the carcass.

**Meat Removal:** Though it obviously yields less meat than on cattle, the mandible of domestic pigs is worthy of exploitation for meat – particularly the tongue and cheek. The few marks identified on these elements as indicative of meat removal are a little longer than those that depict skinning and disarticulation activity, and are located on the lateral ramus and below the medial tooth row. Those on the lateral ramus most likely result from the removal of meat, whilst those on the medial side of the mandible are more likely the result of the removal of the tongue.

#### *5.4.3 Vertebrae*

No thoracic or lumbar vertebrae were confidently identified as belonging to pig. Those of the right kind of size tended to be assigned to the category of small mammal. Unlike cattle, whose predominance across the site meant that most

'large mammal' bones were likely from cattle, a more wide variety of small animals, with none showing any particular dominance, were recovered.

#### 5.4.4 Ribs

Similarly to vertebrae, no firmly identified pig ribs were recovered from the site, as most fall into the 'small mammal' category. Having said this, of those ribs that were speculatively associated with domestic pigs, over half had visible butchery marks, making them the most frequently butchered pig element present on the site.

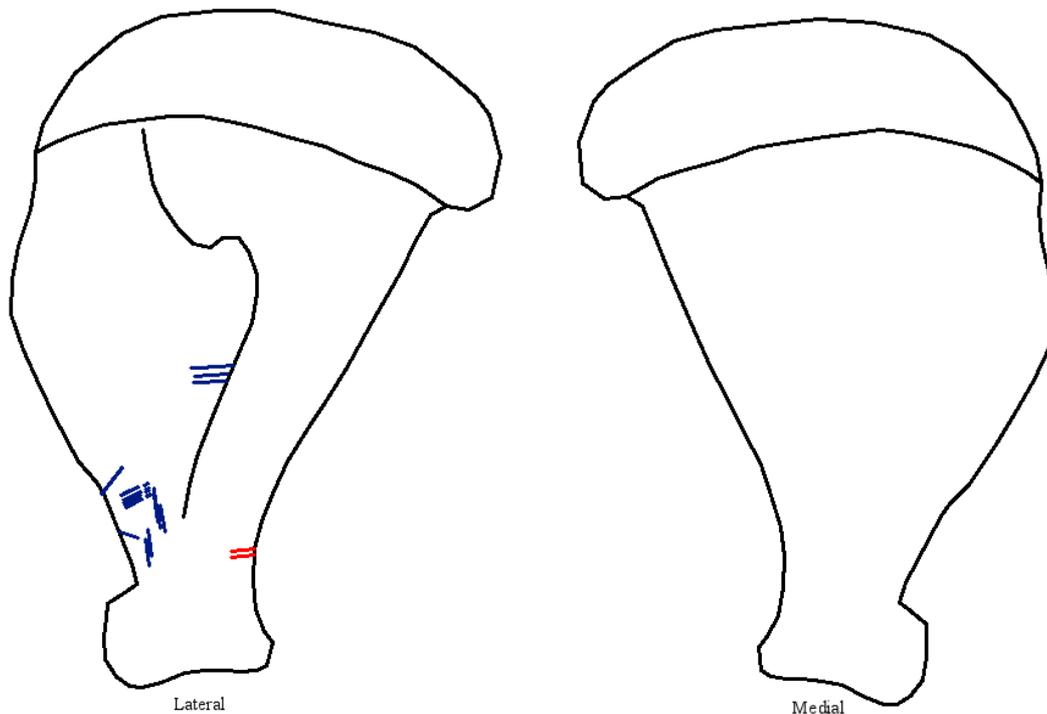
#### 5.4.5 Scapulae

Twenty-eight pig scapulae were recovered from mid to late Neolithic contexts at Etton, of which eight had evidence of having been butchered. It is thought that the majority of marks present on these scapulae were the result of meat-removal activity, with just one example thought to be indicative of disarticulation. The same caveat that was applied to cattle scapulae is also applied to those of pig – for the most part, the part of the scapulae present extended up to only the first third of the spine, so the absence of marks from the supraspinous/infraspinous fossa is not necessarily accurate, as this part of the element was only rarely encountered (Figure 5.21).

**Disarticulation:** Just two marks, at the base of the acromion, are thought to be indicative of the removal of the scapula from the humerus. No marks were evident any lower than this example, leaving the articular portion of the bone almost entirely devoid of any kind of butchery activity.

**Meat Removal:** Marks indicative of meat removal are predominantly located on the lateral scapulae, in the proximal portion of the neck, adjacent to the acromion. There are two distinct varieties of mark, though they are thought to represent the same activity. The first variety occurs on two of the eight scapulae and consists of relatively short, horizontal lines. These are present on the spine, and on the neck of the scapulae. Those present on the neck appear to have been interrupted mid stroke. The other group of lines are long vertical striations,

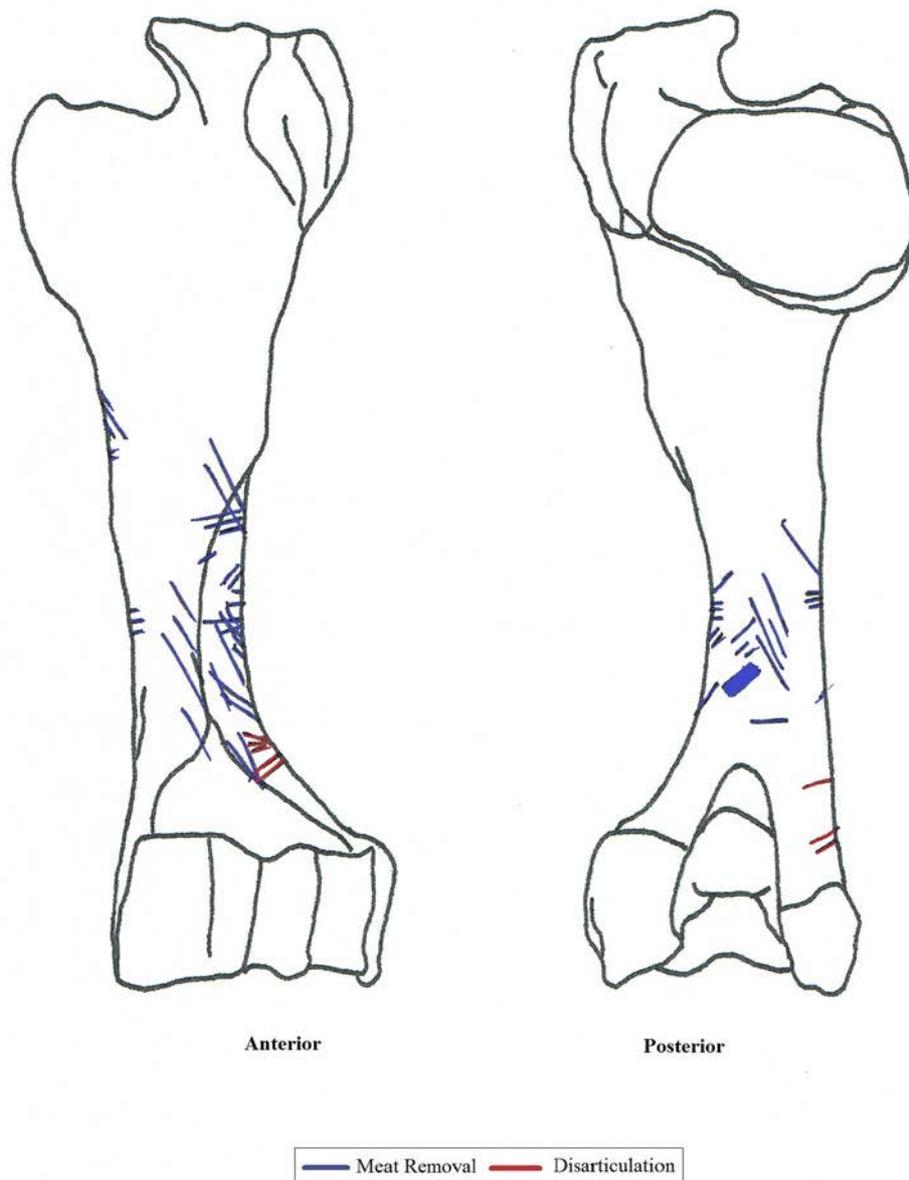
more typical of those traditionally regarded as being indicative of meat removal. All of these marks are thought to be the result of the removal of the infraspinatus muscle, with the exception of those on the spine of the scapula, which more likely to represent the removal of muscle attachments rather than the actual filleting of a muscle.



**Figure 5.21: Composite diagram showing all butchery marks present on mid-Neolithic pig scapulae present at Etton.**

#### *5.4.6 Humerii*

In total 85 pig humerii were recovered from Etton. Of these, 19.8% have butchery marks present (21 elements). Meat removal and disarticulation activities are evident on the humerii. In exactly the same way as was observable with the cattle humerii, it is interesting to note once again the absence of butchery evidence any higher up than the top of the deltoid tuberosity which is attributable to an almost complete absence of this part of the humerii at Etton.



**Figure 5.22: Composite diagram showing all butchery marks present on mid-Neolithic pig humerii present at Etton.**

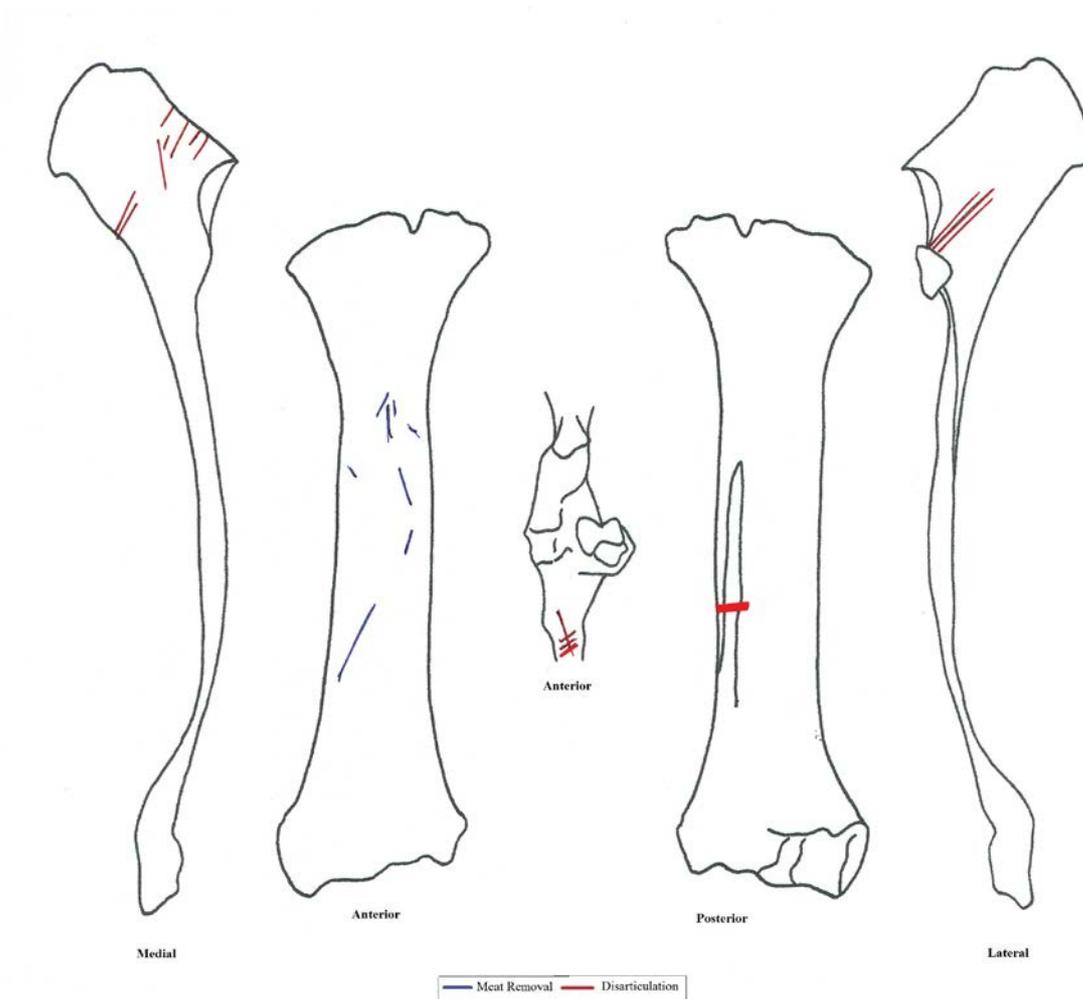
**Disarticulation:** Only a very few marks present around the anterior and posterior distal articulations are potentially the result of disarticulation of the humerii and radii and ulnae at this point. Three marks were located above the medial condyle and likely result from cutting through the articulating tissue between the ulnae and distal humerii. The remaining five marks are above the anterior barrel joint, and while they could also reasonably be interpreted as

being the result of meat-removal, they are distinct from those around them in terms of their orientation, which implies a different kind of action created them than created those in their immediate vicinity.

**Meat Removal:** Marks indicative of meat removal on the anterior and posterior humerii are located on the lower half of the shaft. They are, almost without exception, represented by long diagonal or vertical lines, which would have followed the striation of the muscle tissue. Most of the marks thought to indicate meat-removal are present in pairs or groups, where the same cut has evidently been made numerous times until the desired result was achieved. One mark, included in the category of meat removal, and present on the posterior shaft is distinct from the majority, as it appears to be some kind of chop mark. It is possible that this mark was created in order to remove sinew or ligament from the bone.

#### *5.4.7 Radii and Ulnae*

Twenty-three pig radii and 17 ulnae were recovered from Etton, of which four of the radii (17.3%) and two of the ulnae (11.8%) had evidence of butchery activity on their surfaces. Compared to cattle, for whom radii was the most abundant element, pig radii are relatively rare – especially in comparison to the other forelimb elements (with the exception of ulnae). Both elements were far better represented than any element of hind limb however (see below). On the radii and ulnae belonging to cattle, skinning marks were present as well as meat removal and disarticulation marks. Skinning marks are absent on the pig radii and ulnae. All the marks present on the radii are confined to the middle portion of the bone, and as such, all except for one thick chop mark are thought to represent meat removal activity. Contrary to this, all of the marks present on the ulnae are thought to represent disarticulation activity.



**Figure 5.23: Composite diagram showing all butchery marks present on mid-Neolithic pig radii and ulnae present at Etton.**

**Disarticulation:** One mark thought to be representative of disarticulation is present on the pig radii from the site. This mark consists of a thick chop positioned horizontally over the ulna scar and is thought to be the result of the disarticulation of the ulna from the radius. All of the marks present on the ulnae are thought to result from its disarticulation with the humerii. With the exception of one small group of marks just below the anterior articular surface of the ulna, all the marks are located between the process anconaeus and the olecranon. The majority of these lines are in groups of long thin striations, which appear to have been repeated a number of times in order to achieve the desired disarticulation. Disarticulation at this point would have required the butcher to cut through a good deal of thick sinew and tendon tissue before the bone was freed – the long striations are likely the result of this rather than the physical detachment of the two bones.

**Meat Removal:** The evidence pertaining to meat removal on the pig radii and ulnae is limited to the anterior face of the radii, where it is present in the form of a small number of diagonal or vertical cuts. These cuts are situated in the middle portion of the bone, making them unlikely to result from the disarticulation of the radii from surrounding elements, or the skinning of the radii. On cattle radii there is also a marked increase in the number of cut marks around the centre of the bone, making it likely that this was the part of the bone generally subject to the heaviest butchery activity. Also mirroring the evidence found on cattle bone, some of the marks thought to be representative of meat removal are rather shorter and sharper than might generally be expected – in the case of these marks it is their location which drives their interpretation as meat-removal marks.

#### *5.4.8 Metacarpals*

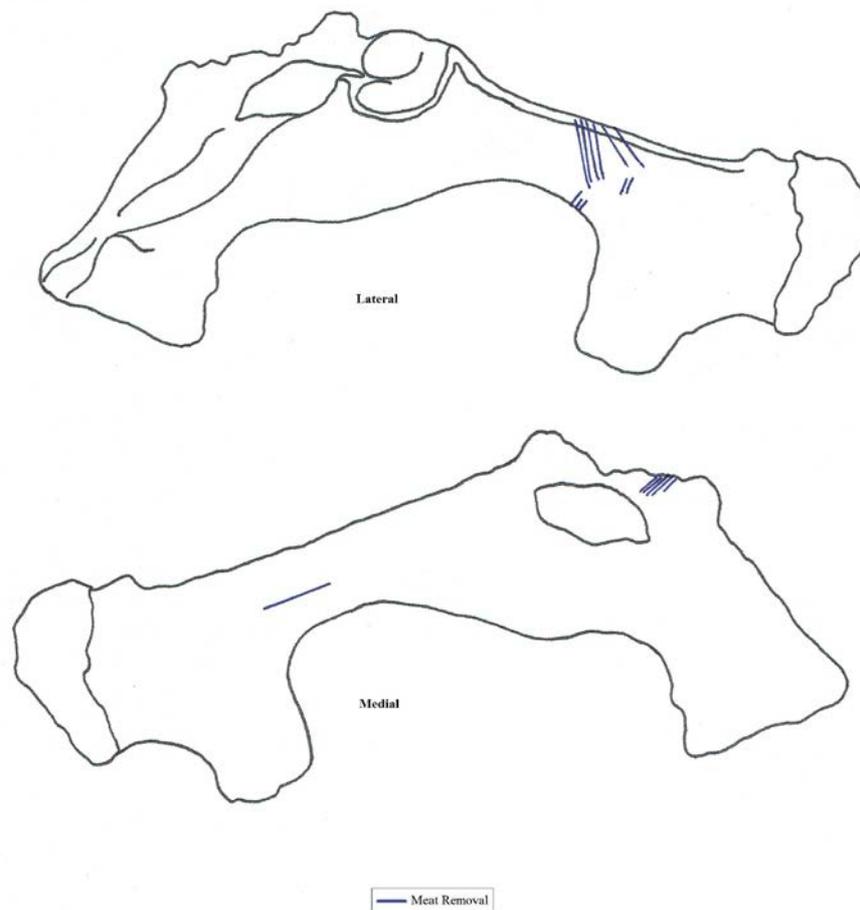
Seven pig metacarpals were recovered from the site, however none appeared to have any evidence of butchery.

#### *5.4.9 Pelves*

Of the twenty-one pig pelves recovered from Etton, 19.1% (4 elements) had visible butchery marks present on their surface. All of the butchery marks identified have been identified as being the result of meat removal rather than of disarticulation. This is largely due to their location, but also takes into account what the marks look like.

**Meat Removal:** Meat removal marks make up all of the butchery activity present on the pig pelves. They are largely present in three groups of repeated parallel striations positioned near vertically across the lateral portion of the ilium. A single long fine cut mark is present on the medial ilium. A fourth group of long parallel marks is present on the acetabular and symphyseal branch of the pubis. This fourth group of marks is the only group that could potentially relate to disarticulation activity, however as they resemble marks usually indicative of

meat removal, and are not on or directly adjacent to the acetabulum it is thought they probably represent meat-removal in this instance.



**Figure 5.24: Composite diagram showing all butchery marks present on mid-Neolithic pig pelvises present at Etton.**

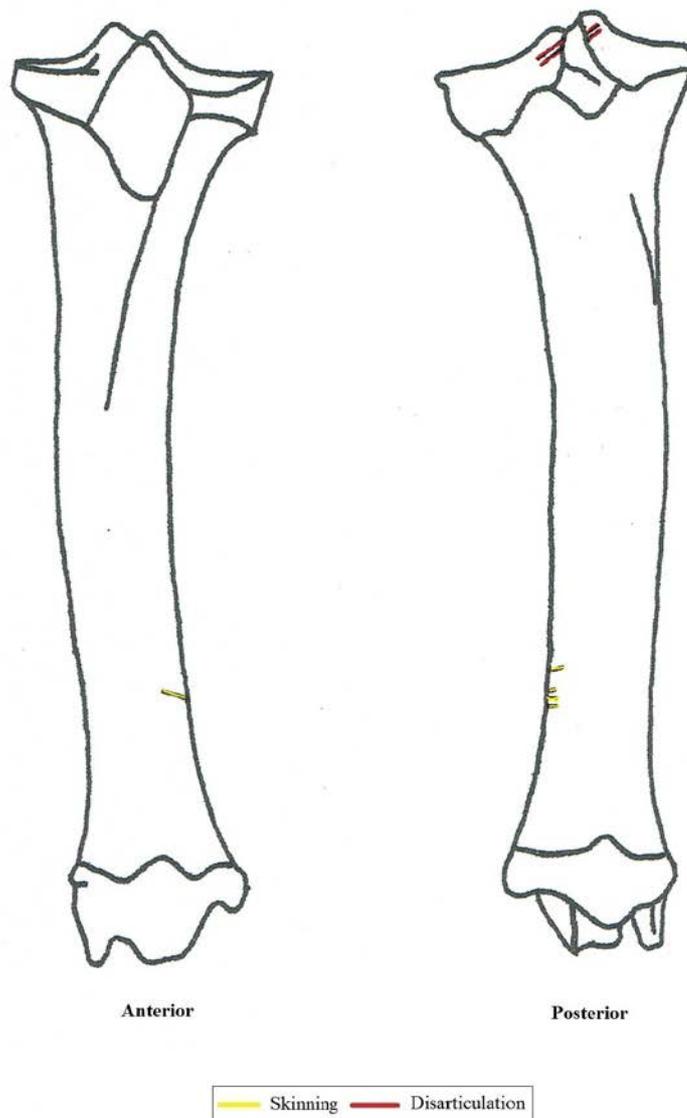
#### *5.4.10 Femora*

Seventeen pig femora were recovered from Etton, however none of these were observed to have any butchery marks.

#### *5.4.11 Tibiae*

Tibiae were the best represented of the pig hind limb elements represented at the site, with 28 recovered overall. Of these, 3 (10.7%) had visible butchery

marks. Surprisingly none of the marks observed are thought to relate to meat removal activity. The majority relate to skinning, though two marks are also thought to be the result of disarticulation.

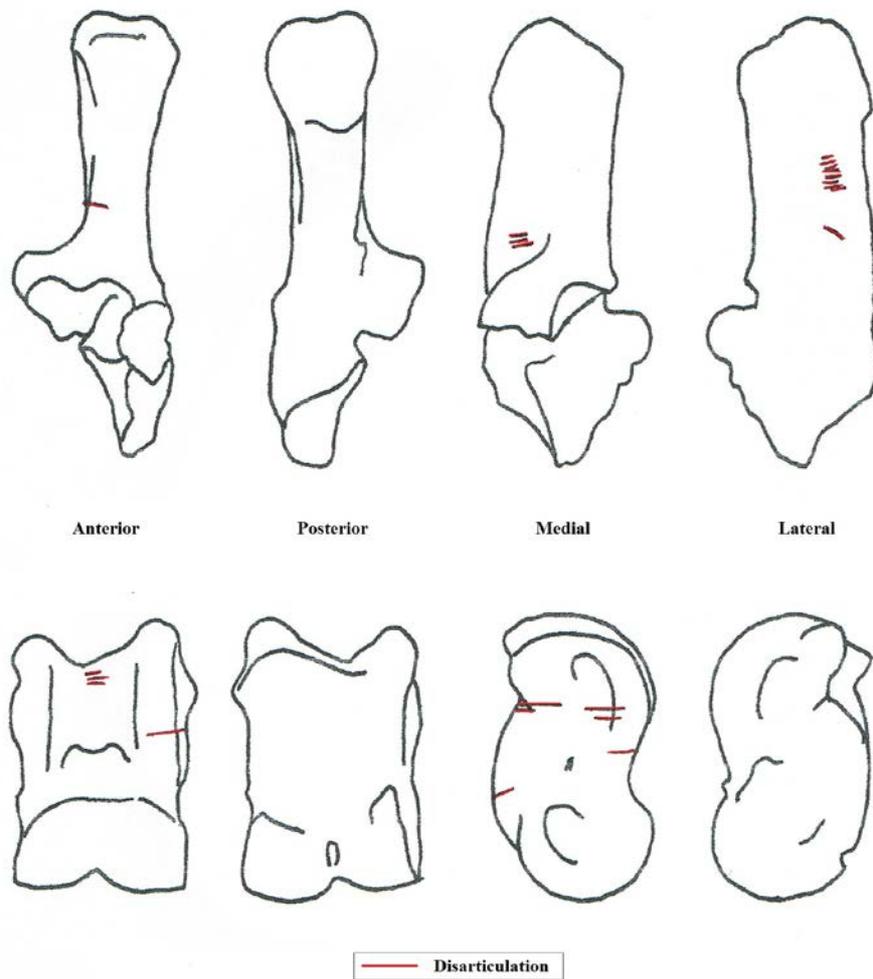


**Figure 5.25: Composite diagram showing all butchery marks present on mid-Neolithic pig tibiae present at Etton.**

**Disarticulation:** Two parallel marks running over the spines between the lateral and medial condyle on the proximal articulation of a tibiae are almost certainly the result of disarticulation activity aimed at separating tibiae from femora. These are the only marks relating to this kind of activity present on pig tibiae at Etton.

**Skinning:** Five marks thought to potentially represent skinning activity are present on the distal anterior and posterior portions of the bones. These marks are short, sharp nicks and are located on a part of the bone where meat would not have been particularly abundant. Similar marks in the same location are visible on cattle bones and have been afforded the same interpretation.

#### 5.4.12 Astragali and Calcanei



**Figure 5.26: Composite diagram showing all butchery marks present on mid-Neolithic cattle metacarpals present at Etton.**

Compared to many of the other pig elements discussed above, butchery of the calcanei and astragali is relatively well attested by marks present on the bones. In total ten pig calcanei and sixteen astragali were recovered from the site. Two

of the calcanei (20%) and three of the astragali (18.8%) were found to have some kind of butchery mark present on their surface. All of the marks present on these two elements are thought to relate to the disarticulation of the lower limbs from the rest of the carcass. The marks are all short, sharp and positioned horizontally across the bones. The majority are on the lateral side of the calcanei and the medial side of the astragali.

#### 5.4.13 Metatarsals

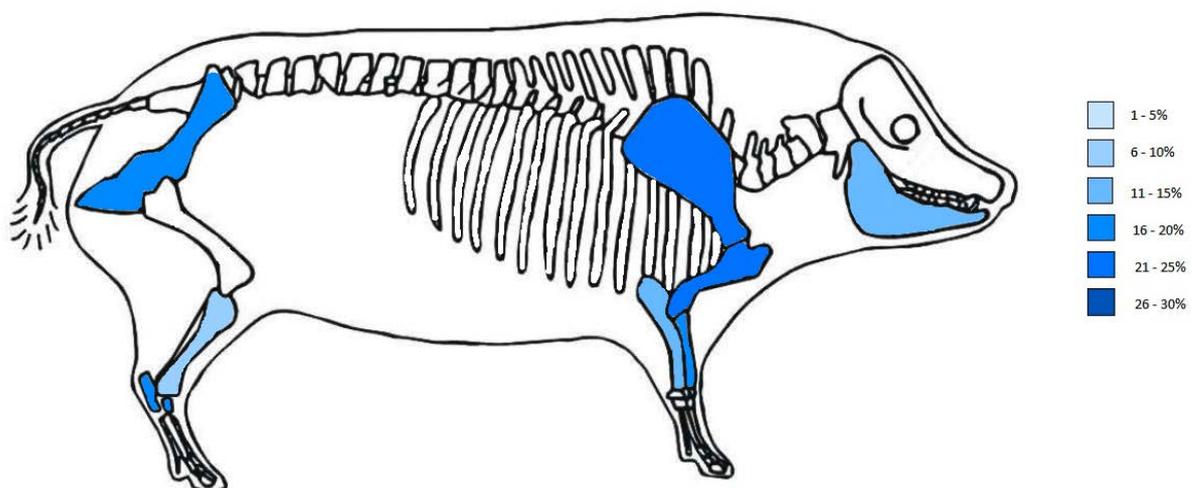
Although seven pig metatarsals were recovered from the site, none of these had any evidence of butchery.

#### 5.4.14 Phalanges

Nineteen first, five second and four third phalanges were recovered from the site. None of these had any indication of having been butchered.

### 5.5 Pig Butchery: Summary by body area

Having detailed the butchery evidence on the individual elements of the pig carcasses at Etton, it is useful to consider the more general patterns of butchery present on the different areas of the carcass – the head, torso, forelimbs, hindlimbs and feet. Figure 5.27 shows the percentages of each pig element that have visible evidence for butchery.



**Figure 5.27: Total percentages of butchery marks on pig bones.**

### 5.5.1 Head

As no pig crania were recovered from Etton, the only information we can glean regarding how pigs heads were butchered at Etton comes from the mandibles. Unfortunately, the marks present on the mandibles are fairly sparse, so although they provide an insight into the use of this element, the results are not necessarily conclusive. Marks representative of three different butchery activities – disarticulation, skinning and meat removal – are present on the pig mandibles.

Disarticulation marks make up 57.1% of the marks on the mandibles, so are the most abundant of the three types of mark. The location of the disarticulation marks, around the articulation of the mandible with the skull, implies the removal of the mandible at this point. In the case of cattle, it was speculated that the mandibles were being removed to facilitate the extraction of marrow, however only one of the pig mandibles recovered from Etton had any evidence of this kind of activity (Chapter 6), so it is not thought that it was occurring with any great frequency. This is probably due to the relatively small amounts of marrow that are retrievable from pig mandibles in comparison to cattle mandibles. It is possible that mandibles were being removed from the crania as part of the meat removal process. Ethnographic evidence also suggests that in some cultures mandibles were to some extent curated. Given that mandibles were the second most abundant pig element at the site, it is possible, though not provable, that this was also a consideration.

Marks representative of skinning made up 21.4% of the total number of marks visible on pig mandibles from the site. These marks were limited to a small group of short cuts on the diastema between the incisors and the tooth row. This is the place on the mandibles where the skin and the bone are closest, so attempts to detach the skin are highly likely to result in damage to the underlying bone. Similar marks, also indicative of skinning, were present on the cattle mandibles. This location is typical for marks of this kind as the hide of an animal tends to only need to be detached from bone here and at the feet, and can be pulled off over muscle across the rest of the carcass. This method of skinning limits the damage done to the middle of the hide, which would have

been a concern were it intended to be used for clothing, shelter or some other craft activity.

Meat removal marks are present in the same quantity of skinning marks. They are located around the cheek muscle, the only place on the mandible where the quantity of meat makes meat removal a worthwhile activity. Although the meat content of pig mandibles would clearly have been nowhere near the meat content of cattle mandibles, it is likely that there would have been enough meat present for exploitation to have sometimes have been carried out. The very small number of marks present on the mandibles discussed here implies that it was not an activity that was being done with regularity, however.

### 5.5.2 Torso

The torso comprises the spinal column and rib cage. Unfortunately, although it is likely that these elements belonging to pig were present at Etton, the highly fragmented nature of most, and the similarities between these elements for pig and other small mammals, has meant that most have been confined to the 'small mammal' category, rather than being positively identified as pig. Some ribs were identified as being potentially those of pig, and of these, 58% displayed marks thought to be indicative of meat removal. Were these positively identified this would make them the most heavily butchered pig element at the site by some considerable margin.

### 5.5.3 Forelimbs

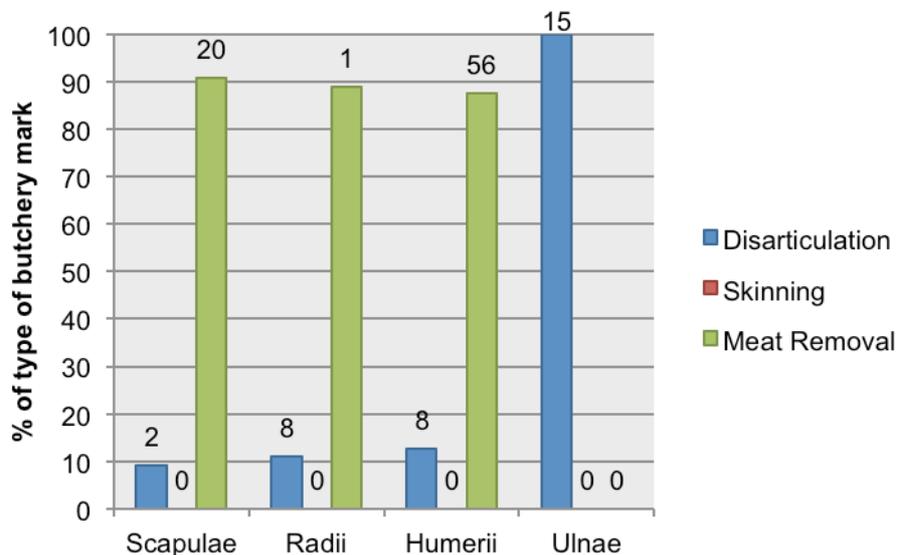
The forelimbs comprise scapulae, humerii, radii and ulnae and metacarpals. Much like cattle, the elements of the forelimbs were the most heavily butchered of all the areas of the pig carcass. Again like cattle, it is unsurprising that meat removal is the best represented of the various butchery activities. The only forelimb elements to show no evidence of butchery activity are the metacarpals (Figure 5.28).

As expected, the overall pattern of meat removal from the forelimbs is very similar to that witnessed on the cattle bones with the primary limb bones, the

scapulae, humerii and radii as the focus. Like cattle, the scapulae have the highest proportion of butchery marks thought to be indicative of meat removal, followed by the radii, and then the humerii (Figure 5.28).

While no meat removal marks are present on the ulnae, this is the element with the highest abundance of disarticulation marks of all the forelimb elements. A small number of marks are also present neat the articulation of the scapulae, and at the distal end of the humerii, suggesting these bones were sometimes being separated as part of the butchery process. The disarticulation evidence present on the ulnae suggests that it was being detached from the humerii at the articulation of the two bones with relative frequency, and that it was also sometimes detached from the radii. As with cattle, this appears to have been the most common location for disarticulation.

No evidence pertaining to skinning activity was visible on any of the forelimb bones. The only place where it might have been expected to see any would be the distal radius and metatarsals.



**Figure 5.28: Proportions of different butchery activities present on the pig forelimb bones from the Etton causewayed enclosure.**

The forelimbs were obviously being exploited for meat. It seems as though they were being disarticulated around the distal humerus, perhaps to separate a portion recognisable nowadays as the shoulder joint, with the lower leg, on

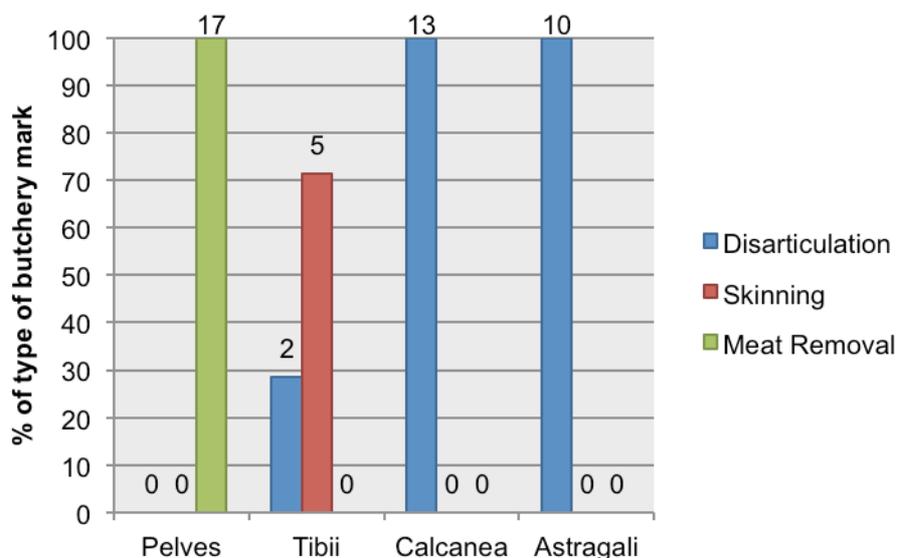
which there would not have been so much meat. As well as being exploited for their meat content, the humeri and radii were also being exploited for their marrow content, as will be demonstrated in Chapter 6.

#### 5.5.4 Hindlimbs

The hindlimbs comprise the pelvis, femora, tibiae, calcanei, astragali and metatarsals. Of the seventeen femora and seven metatarsals present at the site, none were found to have been butchered so are not included here. The calcanei are the most butchered bone in the hindlimb, with 20% of the total number displaying some evidence for butchery. The pelvis are next at 19.1%, and are followed by the astragali with 18.8% displaying butchery of some kind. The tibiae have rather less frequent marks, with just 10.1% showing some kind of butchery mark. Unlike the forelimbs, skinning marks were present alongside marks representing disarticulation and meat-removal.

The most common type of mark present on hind limb elements represents disarticulation activity (Figure 5.29). All of the marks on the calcanei and astragali are thought to be indicative of this kind of activity, and as such it is thought that the hind feet were regularly being removed from the more upper portion of the limb at this point. This was probably because of the minimal amount of meat present on pig legs below this point. The absence of metatarsals and phalanges might imply that these parts of the carcass were either being disposed of before transportation, or else in a context that was not encountered during the excavation of the site.

Meat removal activity is only visible on the pelvis, though this might be different if any femora had been recovered from the site. The presence of meat removal marks only on the pelvis, coupled with the removal of the lower limbs and the absence of meat removal marks on the tibiae perhaps implies that meat was left on the bone for the cooking process, and then removed by hand during consumption.



**Figure 5.29: Proportions of different butchery activities present on the pig hindlimb bones from the Etton causewayed enclosure.**

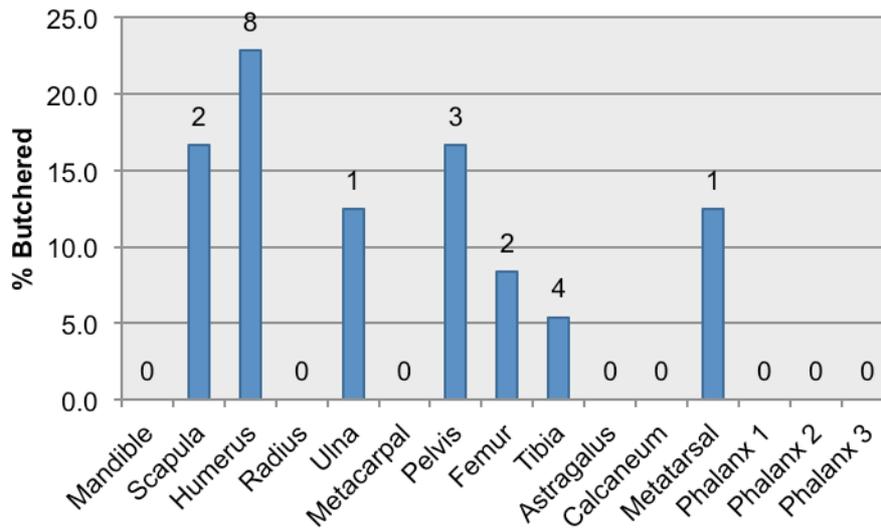
Skinning activity is only visible on the distal tibiae where it is represented by a very small number of short sharp nicks around the edge of the bone. It is thought likely, given the removal of the feet, that skinning activity may have started at this point on the tibiae as there is usually very little meat present here.

#### 5.5.5 Feet

Twenty-eight phalanges were recovered from the site, however none of these displayed any evidence of butchery activity. This is possibly because they were removed and discarded at the commencement of the butchery process, or if they were not discarded, they were used as intact feet during the cooking or consumption process.

### **5.6 Domestic Sheep/Goat (Ovis/Capra)**

Domestic sheep/goat were the third most prevalent species on site, making up 10% of the total mid to late Neolithic faunal assemblage. Of the 179 sheep bones recovered from the site, 21 had some evidence for butchery activity. Because the number of bones is so small, they are discussed en masse rather than by context.



**Figure 5.30: Graph showing % of sheep elements with butchery marks**

**Table 5.3: Total NISP, number of butchered elements and % of elements butchered belonging to sheep from the Etton causewayed enclosure.**

Element	NISP	No. Butchered	% Butchered
Humerus	35	8	22.9
Pelvis	18	3	16.7
Scapula	12	2	16.7
Metatarsal	8	1	12.5
Ulna	8	1	12.5
Femur	24	2	8.3
Tibia	74	4	5.4
Astragalus	2	0	0.0
Calcaneum	5	0	0.0
Mandible	8	0	0.0
Metacarpal	5	0	0.0
Phalanx 1	13	0	0.0
Phalanx 2	2	0	0.0
Phalanx 3	0	0	0.0
Radius	24	0	0.0
	238	21	8.8

The butchery of the sheep bone is given the most consideration during Armour-Chelu's original report. She identifies butchery marks on four partial skeletons from the enclosure ditch, and largely identifies them as being related to the defleshing and disarticulation of the carcasses prior to deposition.

### 5.6.1 Crania

No sheep crania were recovered from the site.

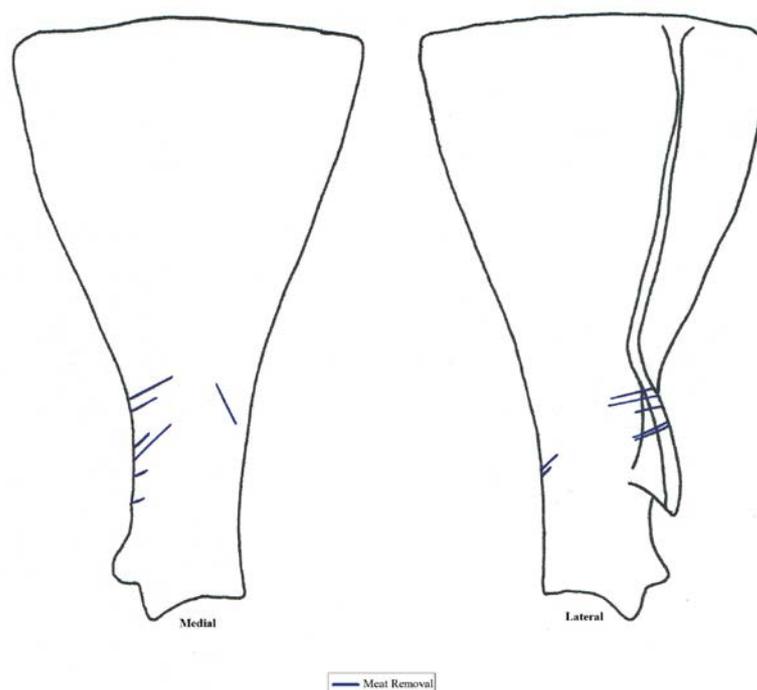
### 5.6.2 Mandibles

Eight sheep mandibles were recovered from the site, however none of these were found to have visible butchery marks.

### 5.6.3 Vertebrae and Ribs

Although it is likely that a number of sheep/goat vertebrae and ribs are present at the site, they have not been identified as such during this investigation. This is partially due to the relatively poor preservation of this material, and also due to the difficulties in distinguishing between sheep and other small mammals present on the site (namely pig).

### 5.6.4 Scapulae



**Figure 5.31: Composite diagram showing all butchery marks present on mid-Neolithic sheep scapulae present at Etton.**

Of the twelve scapulae present, two had been butchered (16.7%). All of the marks visible on these two elements are thought to result from meat removal. They are located on both the lateral and medial faces of the bone, largely on the proximal neck and also across the acromion. Almost without exception the marks are long, thin cuts orientated diagonally to horizontally across the bone. The most straightforward explanation of these marks is that those present on the neck result from the removal of the actual musculature around the scapulae, whilst those present on the acromion and spine represent the detachment of muscle attachments.

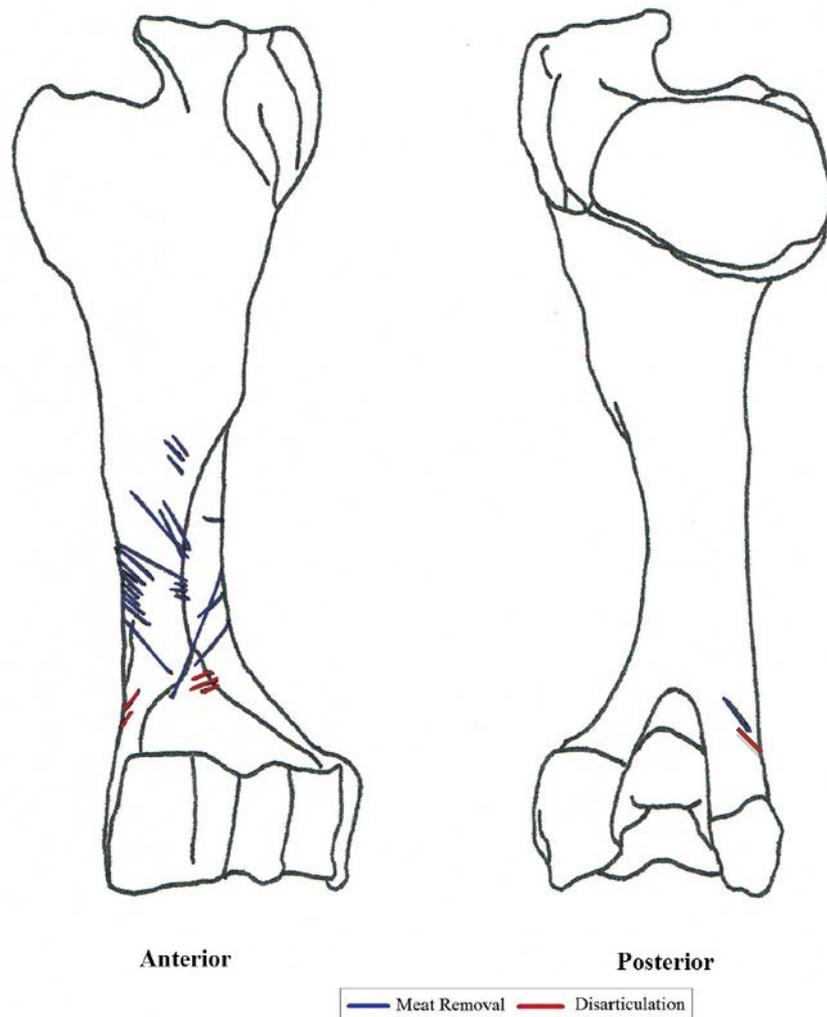
#### *5.6.5 Humerii*

Thirty-five sheep humerii were recovered, of which eight (22.9%) had visible evidence of butchery activity. The butchery marks present on these bones were indicative of meat removal and disarticulation activity. All but one of the marks are located on the anterior side of the bone, which differs to the pattern of butchery seen on cattle and pig humerii where the quantity of marks were much more evenly balanced around the whole bone.

**Disarticulation:** Six marks were thought to potentially represent the disarticulation of the humerii from the radii and ulnae. Five were located above the anterior barrel joint however, and potentially could be low, short meat-removal marks. The reason for their identification as disarticulation marks is the difference in orientation and form from those marks immediately above, which are thought to be more definitively the result of meat-removal. Rather than being long thin striations, they appear more as shorter thicker cuts, possibly more in keeping with the cutting through of sinew and tendons in order to facilitate the detachment of the humerii, radii and ulnae. The sixth was located on the posterior side just above the medial epicondyle and is thought to relate to the removal of the ulnae from the humerii.

**Meat Removal:** Marks indicative of meat removal are represented by relatively long diagonal lines, which would have followed the striation of the muscle tissue. They are all located around the distal anterior shaft. In comparison to the

marks thought to be representative of disarticulation, the marks representing meat removal are long, fine cuts on the shaft.

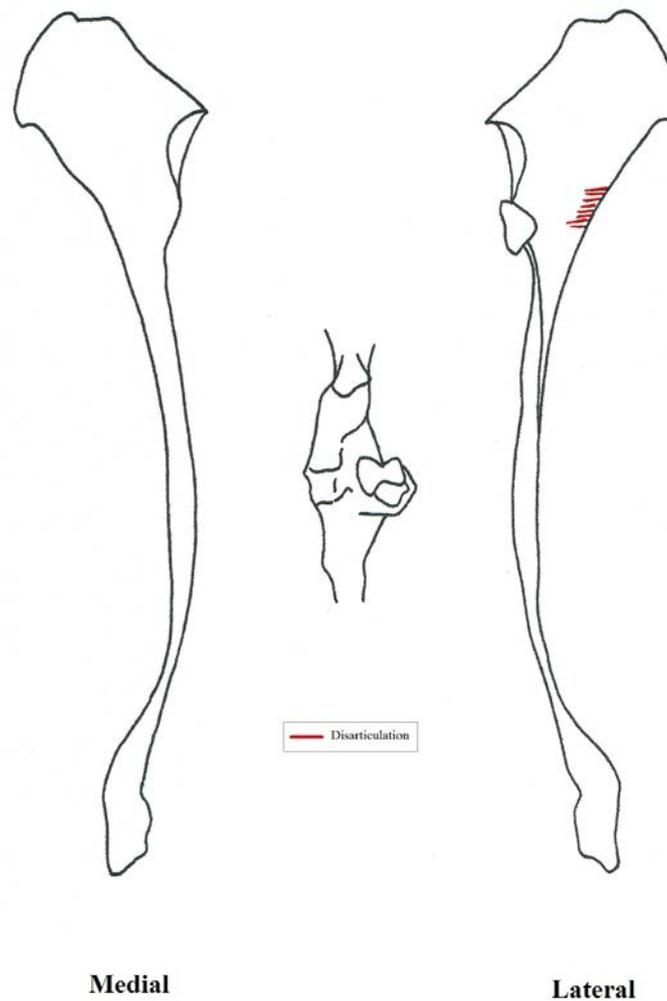


**Figure 5.32: Composite diagram showing all butchery marks present on mid-Neolithic sheep humeri present at Etton.**

#### *5.6.6 Radii and Ulnae*

Twenty-four sheep/goat radii and eight ulnae were recovered from the site. None of the radii appeared to have been butchered, and only one of the ulnae had been. The butchered ulnae had a very tight group of short, sharp parallel cuts at the top of the spine on the lateral surface of the bone. These are all thought to derive from one attempt to disarticulate the bone from the humerus to which it was attached. This part of the ulna has so little meat on it that it

seems unlikely meat removal could be the cause of such marks. Although not directly positioned on or around the articulating surface, cuts in this location could easily derive from the removal of tendon or sinew from the joint in order to facilitate the detachment of the two bones.

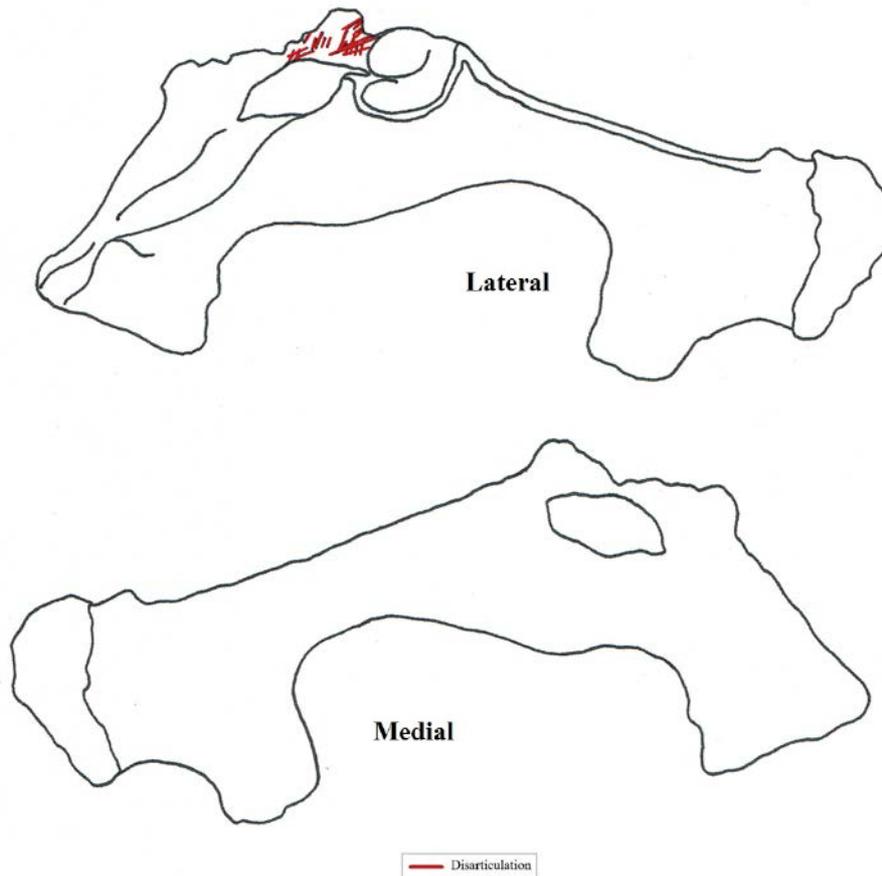


**Figure 5.33: Composite diagram showing all butchery marks present on mid-Neolithic sheep radii and ulnae present at Etton.**

### *5.6.7 Metacarpals*

Five metacarpals were recovered from the site, none of which seem to have been butchered.

### 5.6.8 Pelves

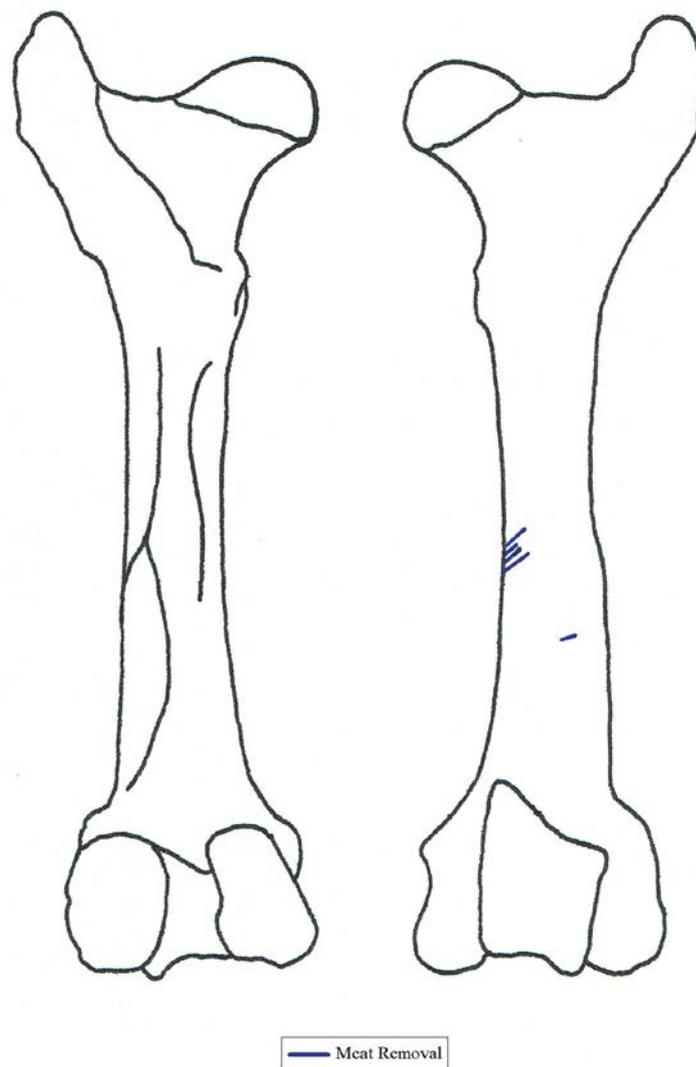


**Figure 5.34: Composite diagram showing all butchery marks present on mid-Neolithic sheep pelvises present at Etton.**

Eighteen sheep/goat pelvises were identified, of which three displayed evidence of butchery activity. On the three butchered elements, the marks, which were all in more or less the same position, are thought to represent the disarticulation of pelvis and femora. All of the marks are located on the public tubercle, adjacent to the acetabulum. The marks are all short, sharp and appear to have been repeated a number of times in order to complete the aim of the butchery. It is thought the most likely explanation for these marks is the removal of tendon tissue from around the acetabulum in order to detach the pelvis from the femur.

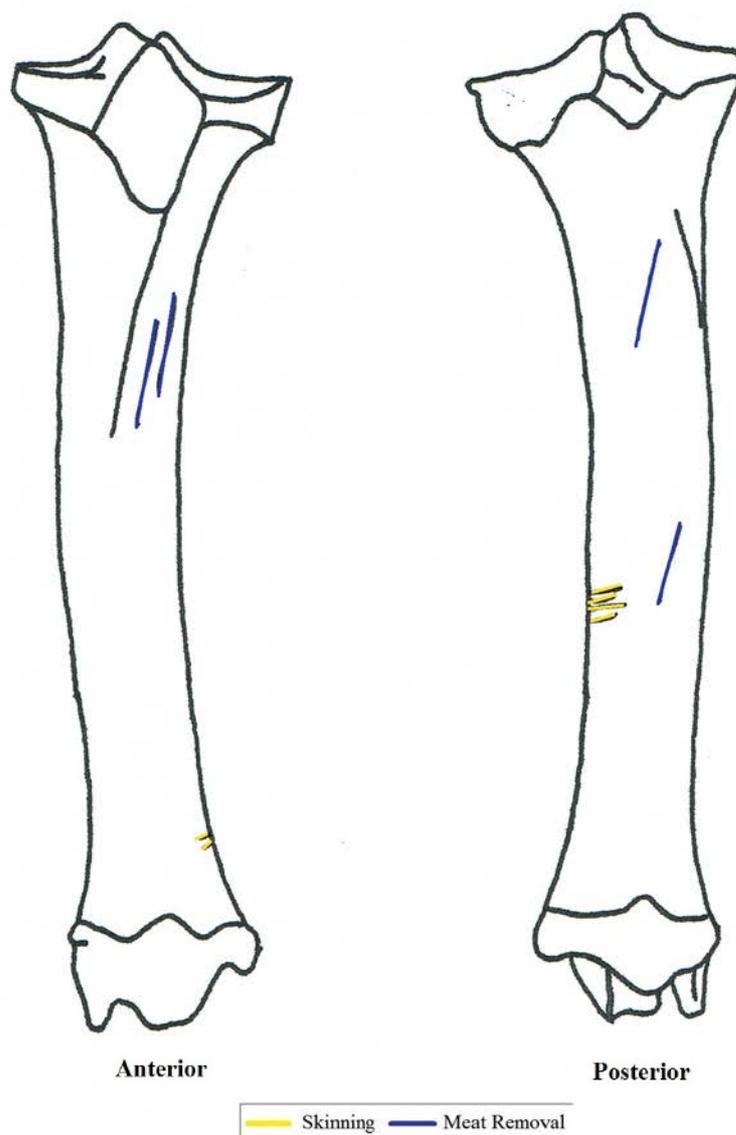
### 5.6.9 Femora

Twenty-four femora belonging to sheep/goat were recovered from the site, of which two appeared to have been butchered. Butchery marks on these two bones comprised just five marks. Four of the five marks are present in a group of diagonal parallel lines roughly halfway up the anterior shaft of the bone. The fifth mark was present slightly below this group, still on the anterior shaft of the bone. All of the marks on the femora are thought to represent the removal of meat.



**Figure 5.35: Composite diagram showing all butchery marks present on mid-Neolithic sheep femora present at Etton.**

### 5.6.10 Tibiae



**Figure 5.36: Composite diagram showing all butchery marks present on mid-Neolithic sheep tibiae present at Etton.**

Seventy-four tibiae were identified as belonging to sheep/goat, making it the most abundant element by some considerable margin. Despite its abundance however it is proportionally the least frequently butchered element, out of those elements on which butchery activity was evident. The marks present on the four tibiae that were butchered were split almost equally between marks representative of meat removal and skinning.

**Meat Removal:** Four marks are thought to be representative of meat removal. These comprise two, long parallel striations, present on the anterior shaft on the medial side of the crest and two similar marks, though spaced further apart, on the posterior face.

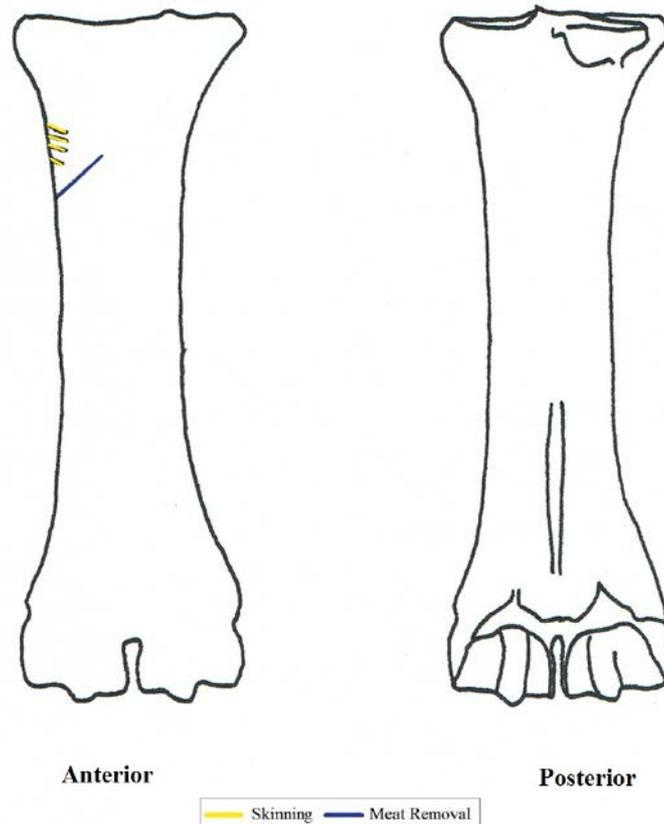
**Skinning:** Six marks thought to be indicative of skinning were present on the distal shaft of the tibiae. Four of these were in a small cluster just below the halfway point of the shaft, and two were close to the distal articulation on the anterior side of the bone. These marks are quite distinct from the meat removal lines; they are orientated horizontally across the bone and are short and sharp, rather than long and fine. Their presence, roughly halfway up the shaft, is roughly where the meat becomes far less abundant on the tibiae as the hind limbs descend to the feet, and is typical of skinning activity.

#### *5.6.11 Astragali and Calcanei*

Five sheep/goat calcanei and two astragali were present at the site, however none of these had visible butchery marks.

#### *5.6.12 Metatarsals*

Eight sheep/goat metatarsals were identified, of which one had visible butchery marks on its surface. All of the marks present on the bone were thought to represent skinning activity. Four of the marks were in a tight group of four short parallel notches located at in the proximal part of the shaft of the bone, just below the articulation. The fifth mark was located below these and is somewhat longer and thinner. Were these marks on individual bones the fifth mark might be interpreted as being the result of meat removal, however the amount of meat covering the metatarsal, especially on sheep, is so minimal at this point it seems unlikely to result from this process. Marks indicative of skinning are typically located on the metapodia as this is the location at which the process of removing a skin from an animal tends to start following the disarticulation of the feet.



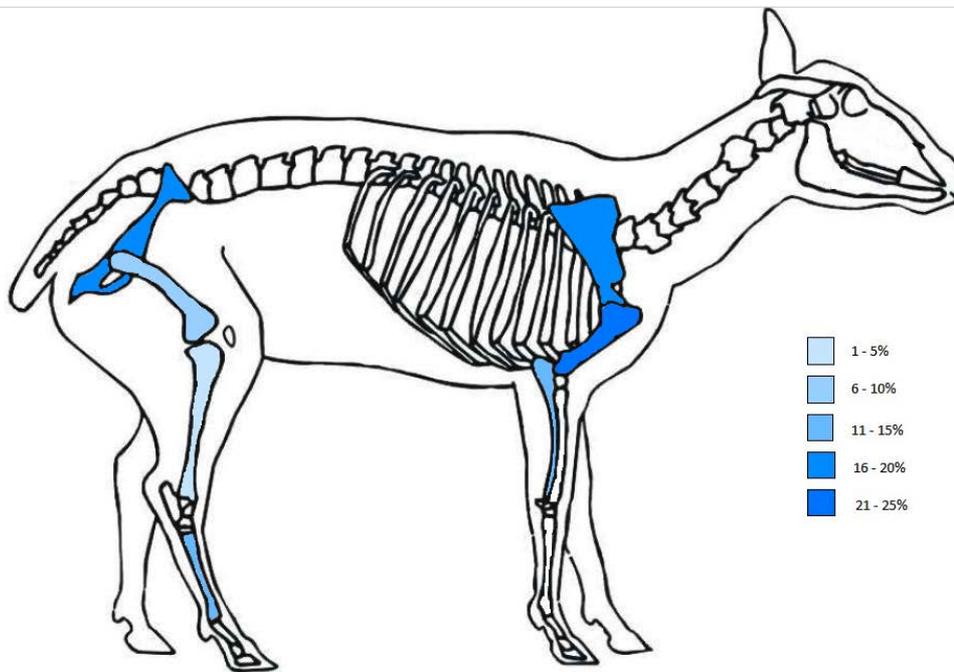
**Figure 5.37: Composite diagram showing all butchery marks present on mid-Neolithic sheep metatarsals present at Etton.**

### 5.6.13 Phalanges

Two second and thirteen first phalanges were found at Etton. None of these appeared to have been butchered.

## 5.7 Sheep Butchery: Summary by body area

None of the head or torso elements that were identified as belonging to sheep had any visible butchery marks, so these body areas have been excluded from the following summaries by body area. The very small number of butchered sheep bones present should be remembered at this point as it makes it difficult to draw any conclusions regarding general butchery patterns of sheep at the site. Figure 5.38 shows the proportion of recovered bones that did have visible butchery marks.



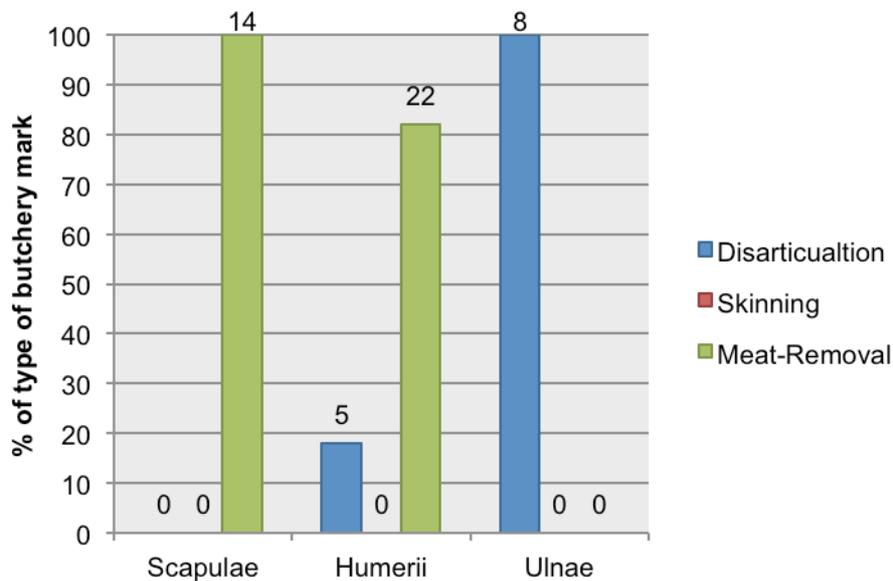
**Figure 5.38: Total percentages of butchery marks on sheep bones.**

### 5.7.1 Forelimbs

Scapulae, humerii, ulnae and metacarpals represent sheep forelimbs. These are the most heavily butchered group of elements from the sheep carcass. Meat-removal marks are the most abundant on these elements, followed by disarticulation marks and then skinning marks (Figure 5.39). Radii were present, but show no evidence of having been butchered. Disarticulation marks were only present on the distal humerii and proximal ulnae, suggesting that the detachment of these two bones at this point was perhaps standard practice at Etton. A similar pattern is seen on pig bones and has been discussed above. This tentatively leads to the suggestion that sheep legs were being portioned into joints for the purpose of cooking and eating, though unfortunately the very small sample size severely limits the usefulness of this assertion.

Meat-removal marks are the most common of the butchery marks visible on sheep forelimbs. They are proportionally most abundant on the scapulae, followed by the humerii and absent on the ulnae, radii or metacarpals. It is possible that the meat removal marks present on the scapulae may relate the removal of meat to facilitate the disarticulation of the forelimb at the scapula. As well as being exploited for their meat content, the humerii and radii were

also being exploited for their marrow content, as will be demonstrated in Chapter 6.

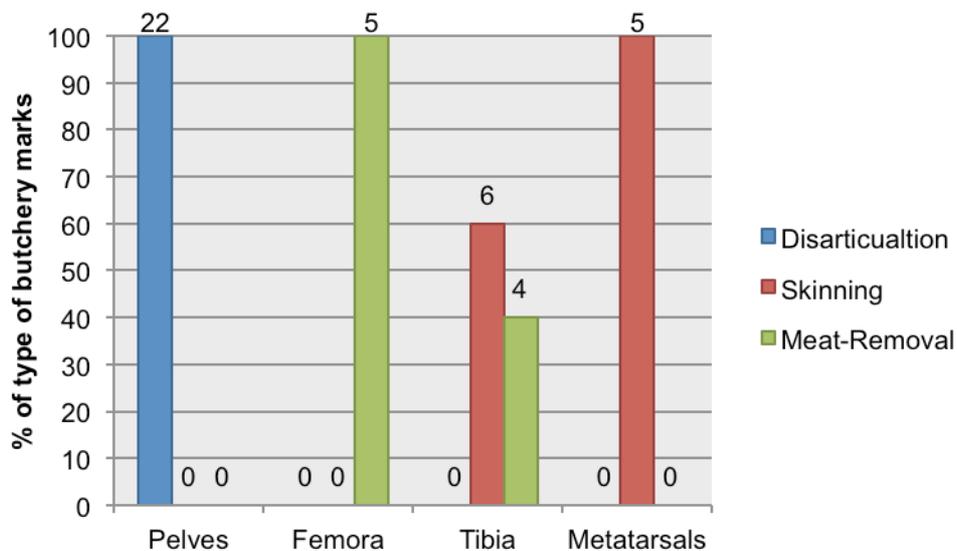


**Figure 5.39: Proportions of different butchery activities present on the sheep forelimb bones from the Etton causewayed enclosure.**

### 5.7.2 Hindlimbs

Pelves, femora, tibiae and metatarsals represent the butchered elements of sheep hind limbs. Astragali, calcanei and first and second phalanges were also present, but had no visible evidence of being butchered. The pelves were the most heavily butchered hind limb element, with 16.7% of the bones having some kind of butchery mark present on their surface. 12.5% of metatarsals, 8.3% of the femora and 5.4% of the tibiae also had butchery marks. The marks present on the pelves are all located around the area of the acetabulum and as such are thought to represent the removal of the hind leg from the rest of the carcass. Meat-removal is the best-attested activity taking place on the hind limb elements (Figure 5.40). All of the marks present on the femora and 40% of those on the tibiae are thought to be the result of meat-removal activity. All of the marks on the metatarsals appeared to be the result of skinning activity, and some skinning marks were found around the distal tibiae, where the meat on the bone becomes significantly less abundant. The relative absence of the lower hind limb elements (the metatarsals and phalanges) when compared to

the number of tibiae (NISP: 74) perhaps indicates that these elements were being removed and disposed of very early in the butchery process.



**Figure 5.40: Proportions of different butchery activities present on the sheep hindlimb bones from the Etton causewayed enclosure.**

### 5.8 Wild Species Butchery

Wild species as well as domestic species displayed evidence of having been butchered – both red deer and aurochs appeared to have been butchered at Etton. Red deer are proportionally the most highly butchered species on site, with six of the twenty-five elements (24% of the red deer assemblage) having butchery marks. The butchered red deer elements comprise a radius, two metatarsals and three humerii. The radii had just two marks present on its anterior surface, towards the upper part of the distal shaft. These marks were both long and thin, and were positioned close by and parallel to one another, which suggests that they were made at the same time during the same process. It is most likely that these two marks were the result of meat removal, as their location is commensurate with the area around which meat becomes less abundant on radii.

Most of the butchery marks present on the metatarsals and humerii are not thought to be the result of meat-removal. Those present on the metatarsals are thought to most likely result from the skinning of red deer. All of the marks present on this element are short, and most are positioned horizontally across

the shaft of the bone. As has been mentioned many times already in this chapter, this location is typical of the commencement of the removal of hide from a carcass, as is the presence of these kinds of butchery marks.

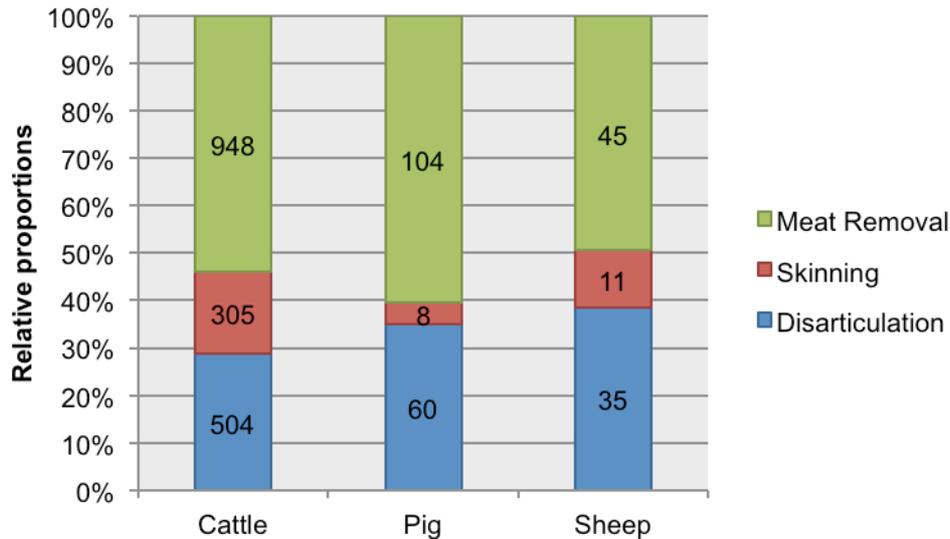
All of the red deer humerii recovered from the site had evidence of butchery activity on their surfaces. Most of the butchery marks present on the humerii appear to be indicative of the disarticulation of the distal humerii from the proximal radii and ulnae as they are all located around the distal articulation of these bones, and most abundantly where the ulnae and humerii interlock. Two marks on the anterior surface of the humerii and two on the posterior surface, in roughly the mirroring locations are perhaps a little too high for disarticulation to be a convincing explanation however. These marks, which are orientated diagonally across the bone, and which are both in pairs of parallel lines, may be the result of meat-removal from the humerii.

As well as red deer, butchery marks were also present on one aurochs humerii. Three marks, present just less than half way up the anterior shaft and orientated diagonally across the bone, are thought to represent the removal of meat from the humerii.

## **5.9 Summary**

Skinning, disarticulation and meat removal were visible in varying proportions for all of the three main domestic species present at the Etton causewayed enclosure. Overall, skinning, the first process to which a carcass is usually subject, was the least well represented of the three processes, especially with regards to pig, for which about 5% of the total number of butchery marks could be attributed to this process. Meat removal is the most represented process of the three, which perhaps is not surprising, as it is often the case that more marks will be made during this process than during skinning or disarticulation.

Unfortunately the sample sizes for pigs but to a far greater extent for sheep are somewhat smaller than ideal, so it is difficult to make direct interpretations as a result of the data they provide. It is possible, however, to see whether the evidence that we have fits the overall pattern of data for each process identified.



**Figure 5.41: Proportions of different butchery activities present on the three main domesticates at the Etton causewayed enclosure.**

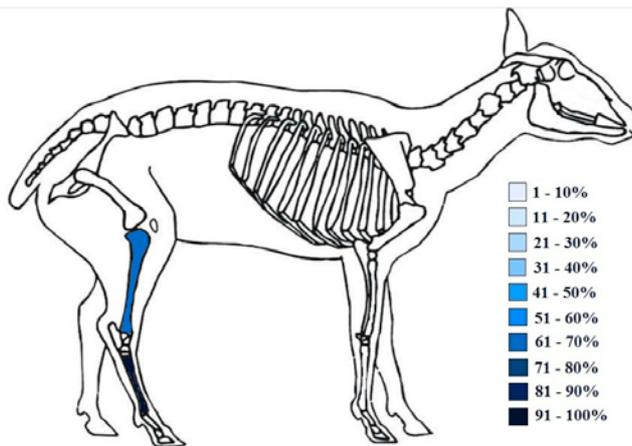
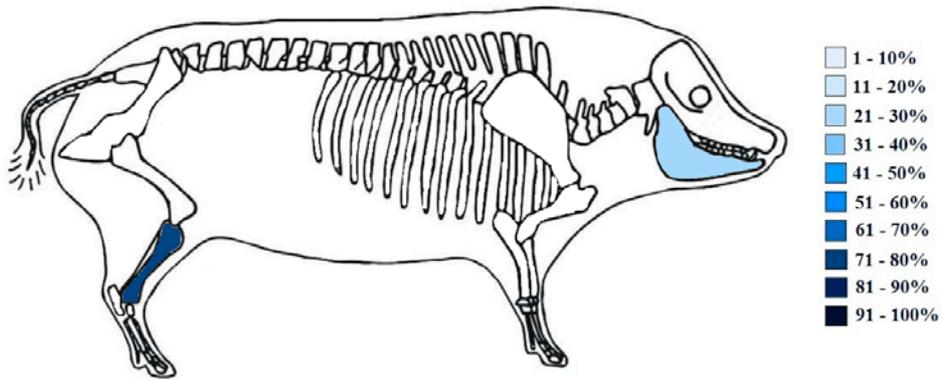
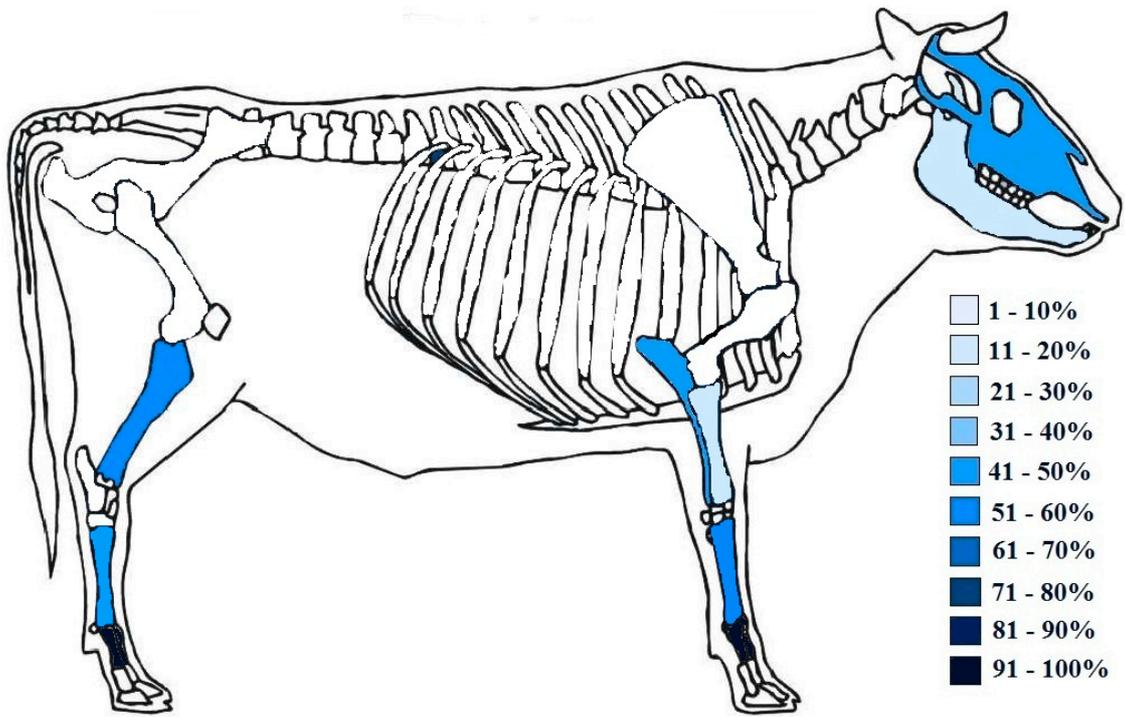
#### 5.9.1 Skinning:

Skinning tends to be one of the first processes applied to an animal carcass, after the actual slaughter of the animal. It was included, along with slaughter and evisceration, in the primary butchery category of the five stages of butchery highlighted by Rixon (1988). On most domestic species the skin is not regarded as being edible, so is removed both to facilitate the further processing of the carcass, and to be used for clothing, craft or similar activities. In order for the skin to be useful for these activities, it needs to be removed intact, or as intact as possible. As such, the hide tends to be detached from the carcass in as few places as possible – these places tend to be where it is as close to the bone as can be, making the most likely places for skinning marks around the skull, mandibles and metapodia (Knight 2003, 68). These locations for skinning marks have been observed in many different ethnographic contexts (Binford 1981, 107; Dobney *et al.* 1996; Wilson 1978) as well as in modern butchery contexts. In some instances the skinning of an animal includes the disarticulation of the feet and skull from that animal, with these elements left attached to the hide. This process is behind the notion of Neolithic head and hoof burials (Piggott 1962), where skulls and elements of the lower limbs and feet are found in close context with one another giving the impression of the deposition of an entire

hide. This practice is visible both in Britain (Robertson-Mackay 1980) as well as much further afield in Russia and the near East (Piggott 1962, 112 – 116) and is most usually associated with the deposition of cattle and horse remains. No evidence of this practice is present at the Etton causewayed enclosures.

The evidence for skinning at Etton is fairly consistent across four of the five species with visible butchery marks recovered from Etton. The only species for which butchery was recorded but for which skinning was not visible is aurochs, however, only butchered humerii were recovered and skinning activity is not often associated with this element. Figure 5.42 shows the proportions of marks on each element for cattle, pigs and sheep that were deemed to be the result of skinning. It is clear from these figures that skinning activity is focused around the lower limbs and crania (including mandibles), which is typical from this kind of activity. Proportionally, skinning activity is concentrated a little lower down the limb, around the first phalanges and distal metapodia, in cattle than in pig or sheep where it is around the proximal metapodia and distal radii/tibiae. This is possibly related to the difference in size between these species and the amount of meat present on the lower limb bones.

Unfortunately, the sample sizes for both pig and sheep are so limited that it is difficult to discern how representative they are of the overall patterns of skinning applied to the two species. Having said this, it is interesting to notice that although sheep were comparatively poorly represented even compared to pigs, and also had comparatively far fewer butchery marks, more skinning marks were present on sheep than pigs. This is possible a result of the fact that sheep fleece is entirely non-edible, but extremely versatile for craft and clothing. Pig skin can also be used for these purposes, however pig skin is edible and, were pigs sometimes being cooked in their entirety, it would be expected that the skin would be left on the carcass (Morris 2008, 359).



**Figure 5.42: Proportions of skinning marks present on the various elements of cattle, pig and sheep at the Etton causewayed enclosure.**

### 5.9.2 Disarticulation:

The disarticulation of an animal carcass can occur by a number of means, both human and natural. For the bones from Etton on which butchery marks are present, it is possible to ascertain whether or not human action was the result of their disarticulation from the carcass. Rixon identified two stages of disarticulation in his butchery categories (1988); secondary butchery, whereby the main joints of the carcass are dismembered potentially for transporting from kill site to butchery or consumption site, and tertiary butchery, where these joints are then divided into smaller 'portions' and then perhaps distributed (*Ibid*; Grant 2002).

Dismemberment of the carcass has been seen to regularly result in the removal of the head, neck and fore and hind limbs from the torso, and the removal of the feet from the legs (Binford 1981; Gifford 1977; Yellen 1977). These processes, which have been observed in hunter-gatherer contexts, respond to the need to transport the most important parts of a carcass from wherever an animal was killed back to their camp. Disarticulation of animals at Neolithic sites, such as Etton, where the main domestic species of cattle, pig and sheep seem to have been kept in close proximity to the site, may not have faced the issue of transportation.

It is possible that there were instances where disarticulation of carcasses was not necessary, for example if meat was being removed directly after skinning of the animal. This is more likely to have been happening at a site like Etton than in the observed activity at a hunter-gatherer site, because, as has been mentioned above, transport is unlikely to have been such a concern. Another instance whereby disarticulation would not have been necessary is where animals were being roasted whole. This is unlikely to have been the case with cattle, but may well have been a method of cooking both pigs and sheep.

Contrary to Figure 5.42, we would expect that cattle would have the highest proportion of disarticulation marks present, as it is by far the largest species, and would require processing into smaller parts for cooking. The fact that the graph shows sheep as having proportionally the most disarticulation marks in

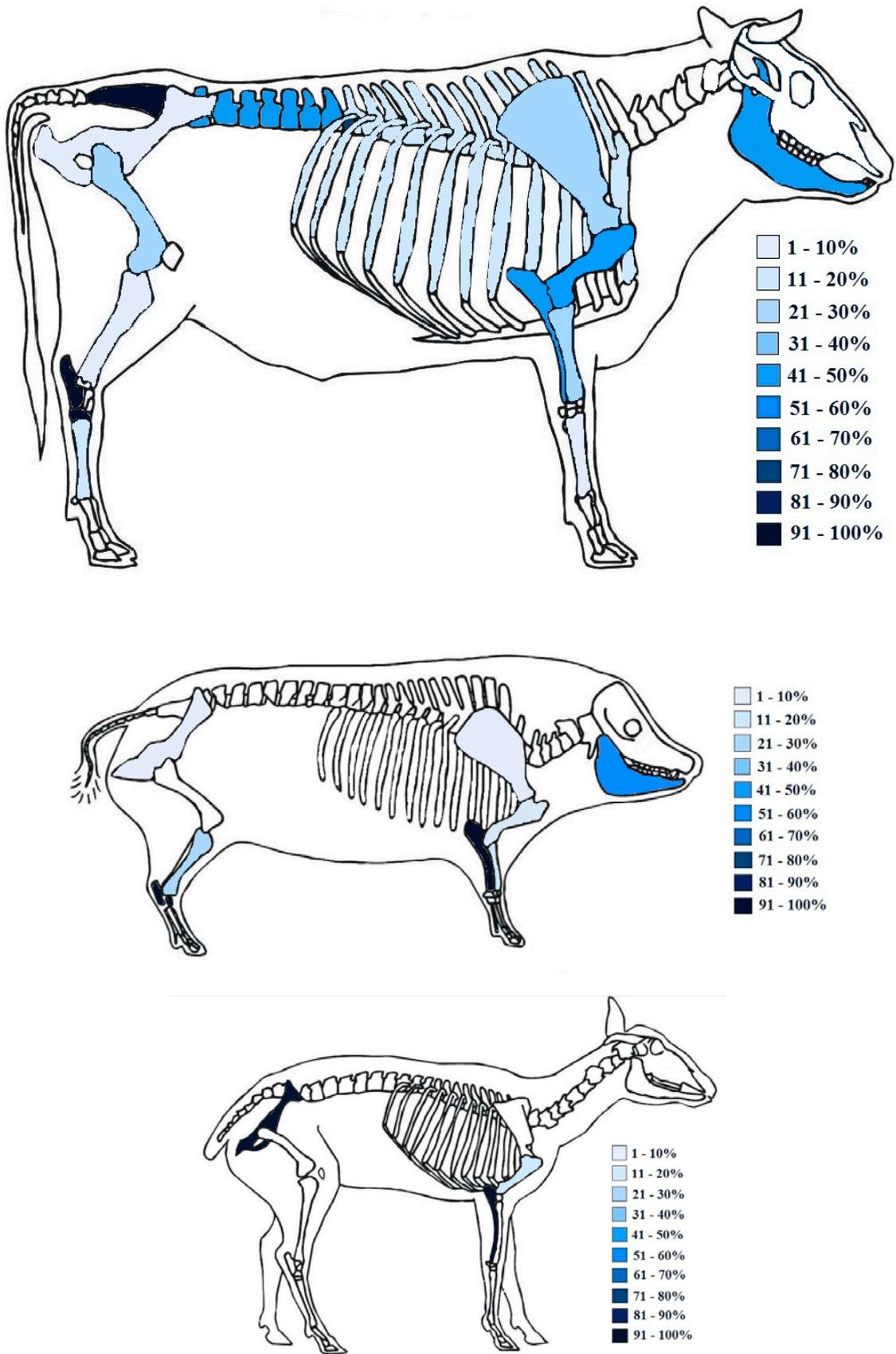
undoubtedly an anomaly caused by the tiny sample size. Despite this, there is significant evidence to suggest that cattle carcasses were being fairly intensively disarticulated, or portioned into small pieces.

Evidence of the disarticulation of cattle, pigs and sheep is again fairly consistent (Figure 5.43). In cattle, the high concentration of disarticulation marks present on the sacra and lumbar vertebrae are a little misleading, as they relate to a very small number of marks, 100% of which appear to have been caused by disarticulation. They do not in any way correlate to the proportions of disarticulation marks present on other bones. They do show, however, that disarticulation activity as taking place in the lower spinal region.

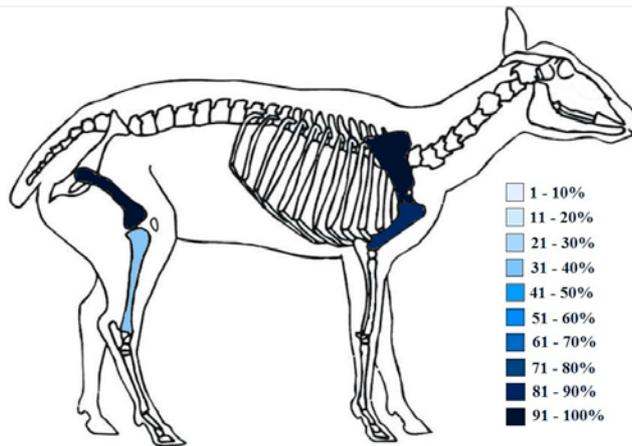
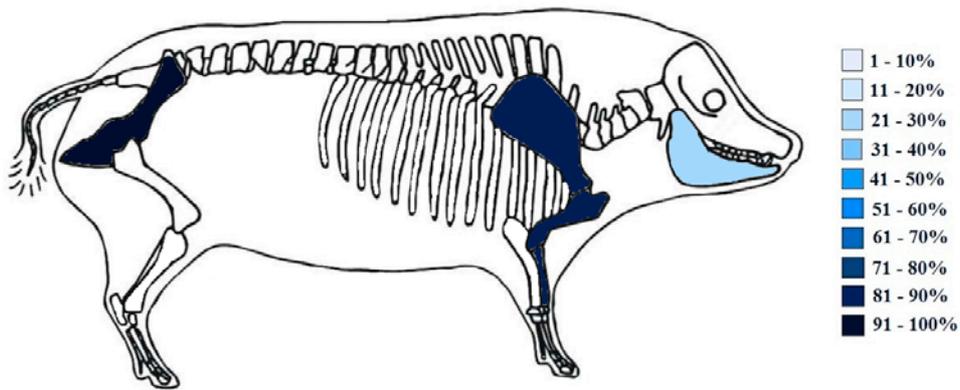
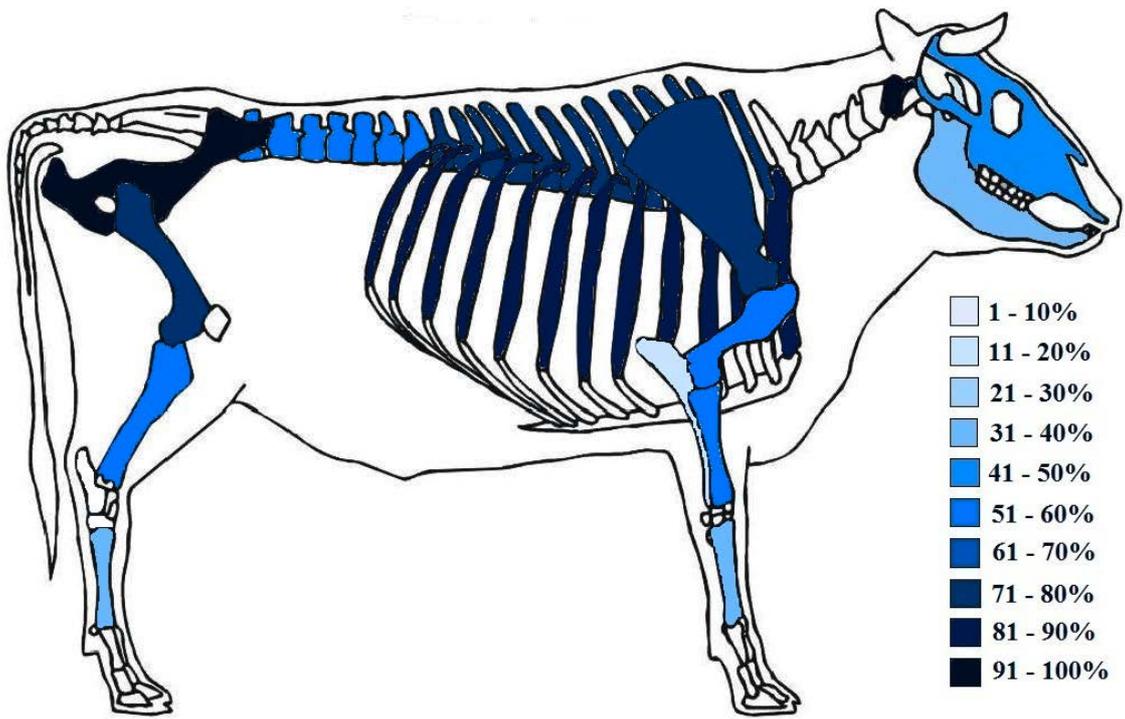
In both cattle and pigs, the highest proportions of disarticulation marks are present around the calcanei and astragali. The process of removing feet has already been discussed above, and is a typically thought to be a precursor to skinning, one of the first processes to which a carcass is subject as it is butchered. Both species also have a smaller concentration of disarticulation marks around the mandibular condyle, suggesting that the removal of the mandibles was a fairly regular process at Etton. This is likely to have been the result of attempts to access head meat such as the tongue.

All three species appear to have had the lower forelimbs regularly disarticulated from the upper forelimbs, at the articulation of the distal humerii and proximal radii. There is some evidence for the disarticulation of the scapulae and proximal humerii. It is possible that the scapulae was being removed whole from the animals, during the disarticulation of the forelimb from the torso, and that the marks present on the humerii, radii and ulnae are the result of an activity more akin to portioning, whereby an entire joint is divided into more manageable parts.

Some disarticulation marks present on the pelves of cattle, pig and sheep indicate the removal of the whole hind limb. For cattle and pig, disarticulation marks are also visible around the distal femur and proximal tibiae, suggesting further division of the carcass at this point, again potentially as a result of portioning activity.



**Figure 5.43: Proportions of disarticulation marks present on the various elements of cattle, pig and sheep at the Etton causewayed enclosure.**



**Figure 5.45: Proportions of meat-removal marks present on the various elements of cattle, pig and sheep at the Etton causewayed enclosure.**

### 5.9.3 Meat-Removal

The removal of meat from bones can happen at any stage of the butchering process after skinning is complete. It can also happen once meat has been cooked. It is traditionally believed that the removal of meat from a cattle carcass is more likely to happen when raw, due to the size of both the muscles and the bones (Knight 2003, 70), while pigs and sheep are more likely to have been roasted whole. This perspective is especially pertinent with regards to current perceptions of feasting and ceremonial activity occurring at sites like causewayed enclosures, as roasting tends to be associated with this kind of activity (Serjeantson 2011, 64).

At Etton, marks indicative of meat removal make up the majority of the marks present on the bones of cattle, pigs and sheep. These marks were predominantly long and sharp, often in groups of repeated cuts, and were located around muscle attachments or on the shaft of long bones. It is unclear whether these cuts were occurring before or after bones had been cooked. Serjeantson suggests that the predominance of meat-removal marks is unusual, as disarticulation marks would usually be present in the highest concentrations (2011, 59).

The bones proportionally most affected by the removal of meat appear to have been the scapulae and pelvises. 71% of the marks present on cattle scapulae and 100% of the marks on pig and sheep were the result of the removal of meat from this element. The concentration of meat-removal marks on the scapulae is well attested ethnographically (Binford 1981) as well as archaeologically. Similar marks to those seen at Etton are also seen on cattle scapulae from Fordington Farm, Runnymede, the South Street long barrow and Firtree Field (Serjeantson 2011, 59). It is possible that the removal of meat from the scapulae facilitated the detachment of the forelimb without the need for large amounts of force (and without resulting in the creation of many butchery marks). The pelvises of cattle and pigs also had high concentrations of butchery marks, mostly around the iliac spine. Again, it is possible that the removal of meat from this location aided the detachment of the hindlimbs.

It was possible to observe that cattle ribs had been extremely thoroughly butchered for their meat (see Figure 5.4 – above), but unfortunately sheep and pig ribs were not distinguished between, so it is not possible to see what patterns of butchery they were subject to.

Pig and sheep humerii had high proportions of meat removal marks, suggesting they were a focus for this kind of activity. Similar proportions of meat-removal marks were present on cattle and sheep femora. As these are the highest meat-yielding bones, the proportion of meat-removal marks is not surprising. Moderate concentrations of meat-removal marks present on the tibiae and radii suggest that meat removal was occurring at in all areas of the forelimbs and hindlimbs.

## **5.10 Conclusions**

It was the intention of this chapter to demonstrate that considerably more butchery activity appears to have been occurring at Etton than was either anticipated or previously seen. Butchery marks were found to be visible on 10% of the identifiable bone from the Etton causewayed enclosure. This is considerably more than the 3% stated in the original report (Armour-Chelu 1998, 274). This percentages increases when separate species are considered individually - red deer were found to have the highest prevalence of butchery marks (24%). This is not surprising, as it is likely that as a hunted species, fairly intensive but not necessarily careful butchery of the red deer carcass would have occurred at the kill site in order to transport the meat back to the Etton. Cattle were the next most highly butchered species, with 18.1% of the identified elements displaying some evidence for butchery. Pig and sheep followed, with 14% and 10% (respectively) of bones having visible evidence of butchery.

The difference between the original percentage of butchered bone and the revised one is somewhat troubling. It begs the question of to what extent such inaccuracies are present in our published archaeological record and how far such inaccuracies have influenced our current thinking and theory. It also shows that if the statement made by Thomas (1999) at the start of this chapter was valid (with reference to butchery marks at causewayed enclosures) at time

of writing, it certainly is not now, and as such requires a re-evaluation of the usage of causewayed enclosures.

The notion that feasting is synonymous with the function of causewayed enclosures, henge monuments and funerary monuments is widely accepted with regards to the British Neolithic, and is one of the main lines of evidence used to suggest that causewayed enclosures were the sites of intermittent gatherings, ceremonies and other communal occasions (Parker-Pearson 2003). The deposition of partial skeletons has been associated with feasting activity and although partial skeletons are present at Eton they are far over-shadowed at Eton by the deposition of highly fragmented, intensively processed (butchered and purposely broken) animal bone. Not only this, but although it was difficult to fully understand the nature of the partial skeletons based on the archived material, it was clear that although deposited together some (not all) of the groups of bone were not articulated at the time of deposition. Evidence for the disarticulation of animals was also abundant, suggesting that they were heavily portioned. Although feasting activity does not preclude the portioning of animals or meat, it does not traditionally support it.

At the original estimation of 3% of the bones displaying butchery marks, the proportion of butchered bones would have been in line with assemblages from barrow and henge sites such as Coneybury Henge, Down Farm Wyke Down Henge and Seven Barrows Gallop, as well as pits sites like Down Farm Firtree Field and Roughground Farm. With 10% of the bone showing some kind of butchery, and this totally likely to have been more if the bone in the higher levels had not been subject to water logging and surface deterioration, the amount of butchery is much closer to the level seen on the pig remains from Runnymede – an assemblage which has always been identified as being ‘domestic’ in nature, and Durrington Walls, where between 10% and 20% of the cattle and pig remains showed cut marks.

## **6. Fracture and Fragmentation**

## 6.1 Introduction

This chapter presents the results of the analysis of fracture and fragmentation patterns at Etton. These results are supported, where applicable, by similar analyses conducted at the Staines causewayed enclosure. In terms of the analysis of fracture patterns, the material from Staines offered considerably less information than the material from Etton. This was due in part to there being a far smaller quantity of bones to which the analysis could be applied, but also due to the fact that the contextual data pertaining to the Staines material was poor. In terms of material suitable for the analysis of fragmentation patterns however, the nature of the Staines material and its curation was eminently more suitable than the Etton material, as will be explained below. A methodology for this chapter can be found in Chapter 3.

Bone processing, both in terms of marrow extraction and production of bone grease, has not been discussed with reference to many British Neolithic sites. Given that the majority of sites which have been excavated and from which animal bone assemblages have been recovered are interpreted as having been constructed and used for activities other than general domestic settlement, this is perhaps not surprising. While some level of marrow extraction from cooked bone might be reasonably expected from sites at which large scale feasting and celebrations were occurring (possibly as a by-product of large scale meat consumption), it is not thought likely that there would be any evidence for systematic bone processing for either marrow or grease. This activity, especially if it were occurring on uncooked bone, is presumed to be much more likely to be visible on a domestic settlement than in a ritual context. The quote from Thomas' 'Understanding the Neolithic' used in the previous chapter with regards to butchery marks, is once again pertinent here.

*“At none of these [causewayed enclosures] is there extensive evidence for...bone-processing, marrow-splitting and butchery marks...” (Thomas 1999, 27).*

When considered with bone fracture (marrow-splitting) in mind, we know for a fact that this quote cannot have been based on any empirical evidence for the simple reason that, at time of writing, no research had been conducted into the

presence or absence of bone fat processing at causewayed enclosures or any other Neolithic monument sites. Much of what we currently understand about the Neolithic comes from the publication reports for Windmill Hill and Hambledon Hill. Although graphs illustrating the levels of fractured bone are presented in the form of graphs in the Windmill Hill report (Grigson 1999), neither report contains any real consideration of the implications of the fragmentary assemblage, and make no reference to fracture patterns. Curiously, one of the only sites at which the fracture and fragmentation of bones has been considered is Durrington Walls (Albarella and Serjeantson 2002). Here, the argument is made that pig carcasses were subject to less intensive than 'normal', where 'normal' is defined by the level of fragmentation at Runnymede, which is reportedly around 98%, though it is unclear how this number has been reached (*Ibid*). Durrington Wall's 80% fragmentation is supposed to appear low in comparison, despite the fact that by the author's admission, shaft splinters were not collected (*Ibid*). Marrow extraction has been identified on a 'fair proportion' of bones from Durrington, but exploitation is not thought to have been 'systematic' (*Ibid*, 41). This in itself, despite the author's downplaying of the role of fat exploitation in favour of a feasting interpretation, contradicts Thomas' statement. When Albarella and Serjeantson published their 2002 paper, the interpretation of the site remained as a ritual centre. Subsequent interpretations suggest the site was an auxiliary settlement to Stonehenge (Parker-Pearson 2012). It is interesting to wonder whether this downplaying of the fat processing at the site would have occurred, were the animal bones being interpreted with this in mind.

Despite the groundwork that has been done for the use of bone fracture work more generally in zooarchaeology, it remains a poorly understood and underused facet of zooarchaeological study – especially within the context of British archaeology, and more specifically to this investigation, the British Neolithic. This has not prevented such patterns from being alluded to by some authors (Thomas 1999, Albarella and Serjeantson 2002) writing about Neolithic sites, but for the most part any assertion made regarding the absence of evidence for fat extraction and bone processing (and any conclusion reached as a result of this) is based on little empirical evidence whatsoever, as this chapter is about to demonstrate.

The purpose of analyzing the fracture and fragmentation of the bones within the Etton animal bone assemblage is to confirm or refute the above hypothesis by Thomas using, for the first time, an empirical set of data.

### *6.1.1 Fragmentation in the original report*

Fragmentation was not considered in the original report, with the exception of one sentence which relates to the partial skeleton of a sheep present in Ditch Segment 3. The sentence reads thus; “The tibia and femur were fragmented, suggesting that they had been smashed to extract marrow fat. This pattern of butchery for marrow fat extraction was atypical, and no other examples were noted from the partial skeletons” (Armour-Chelu 1998, 279).

## **6.2 Sample**

When looking at fracture patterns across the two sites, every identifiable element, suitable for the processing of marrow fat was included in the analysis. At Etton this meant that 1589 bones were involved in the investigation, while at Staines just 124 bones could be included.

Contrary to the need for identifiable specimens for the fracture analysis, the fragmentation analysis required bones that were too highly fragmented to be confidently attributable to element or species. The majority of the material present in the Staines assemblage can be included in this category, and was easily accessible, as all unidentifiable material had been put into boxes. Unfortunately around a third of this material was impossible to narrow down to context so was left out of the analysis, leaving 1430 bone fragments for inclusion. These fragments came from four different contexts, two from the inner ditch (OD16(i)4 and OD16(ii)4) and two from the outer ditch (ID40FA5 and ID32RA5) of the enclosure.

The selection of material from Etton was more problematic, largely due to the nature of its curation. For the most part the assemblage from Etton was stored in such a way that every single bone fragment, part bone and whole bone,

regardless of condition or size was individually wrapped in two paper bags and then placed in another bag or box according to context. This has meant that very little damage has occurred to the assemblage during the 30 years of its storage but somewhat hampered the intention to conduct a comprehensive analysis of the fragmented remains. This was because although the numbers of every one of the unidentifiable fragments was recorded during the investigation, to unwrap, measure and weigh these was impracticable during the time spent with the assemblage. Fortunately for this analysis (though perhaps not so for the actual material) the faunal remains that were excavated during the first season of work at Etton have not been stored with such precision. They are stored loose, by context, in archive boxes and are therefore much more accessible. The sample of fragmented bone from Etton is somewhat meagre compared to that from Staines, comprising just 481 individual specimens from eight contexts.

Although it is recognised that the sample from Etton is smaller than is ideal, from time spent looking at the assemblage as a whole it is thought that the sample is representative of the broader picture of fragmented material from the site. The correlation between the sample from Etton and that from Staines serves to enforce this belief further.

## **6.3 Fragmentation Patterns**

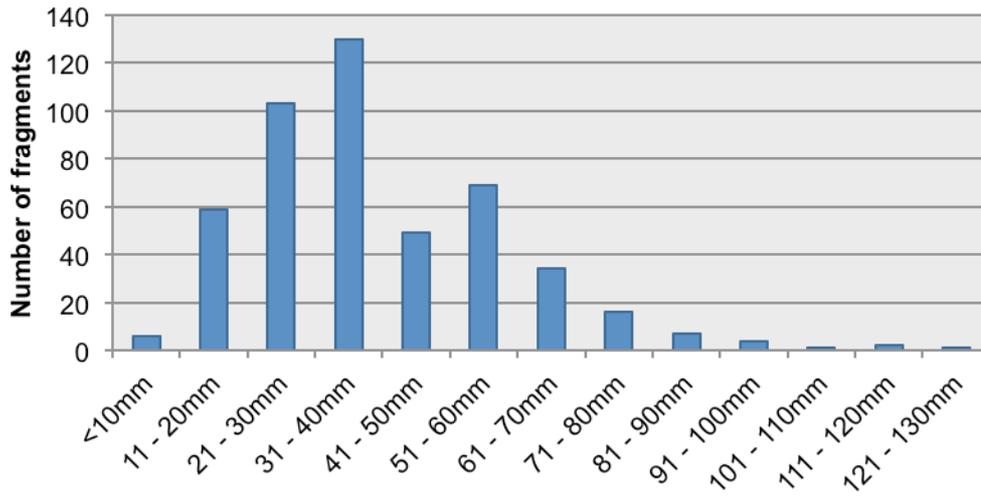
### *6.3.1 Overview*

In total 481 bone fragments from Etton and 1430 from Staines are included in the following analyses. The proportions of bone fragments in the various size and mass groups are very similar between the two sites. At Etton, the number of fragments peak at 31 – 40mm, while at Staines the peak is one size group lower at 21 – 30mm. In terms of the amount of bone present in each size group according to mass, the same displaced concentration is present at both sites, with the peak in mass happening one or two size groups later than the peak by numbers of bone; at Etton the amount of bone by mass peaks between 51mm and 70mm, and at Staines the peak is between 31mm and 50mm.

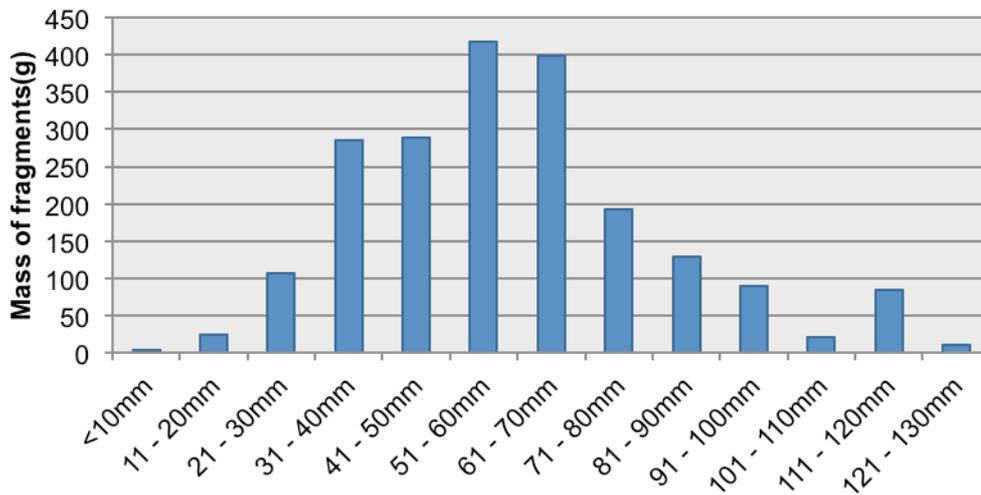
Figures 6.1 and 6.2 show the numbers of fragments present in the Etton sample according to size (mm) and mass (g), and figures 6.3 and 6.4 show the same information from the Staines sample. The two graphs are not dissimilar where the size of fragments is being considered, with a peak on both between 21 and 40mm. Another smaller peak is visible on the Etton graph two size groups later, and the numbers drop off significantly on both graphs as the fragments get larger. On the graphs showing the mass of each size group, the peak at Etton occurs around 51 – 70mm, displaced from the peak by quantity by two size groups. At Staines the peak is between 31 and 50mm, displaced from the peak by quantity by one size group. This displacement between quantity and mass is to be expected given the likely increase in density with the size of fragment.

At Etton, seven ring-ditch contexts (all from Ditch Segment 1) and one internal feature were included in the sample. There was very little difference between the two different contexts in terms of quantity or mass of bones in the different size groups. Figures 6.5 and 6.6 show the numbers of bone fragment per size group for the ditch segment fragments and the internal feature segments separately, and figures 6.7 and 6.8 show the same information but by mass. From the evidence it might be possible to discern a slight preponderance of smaller fragments within the internal feature than the ring ditch contexts, however this is extremely tenuous given the very small sample sizes.

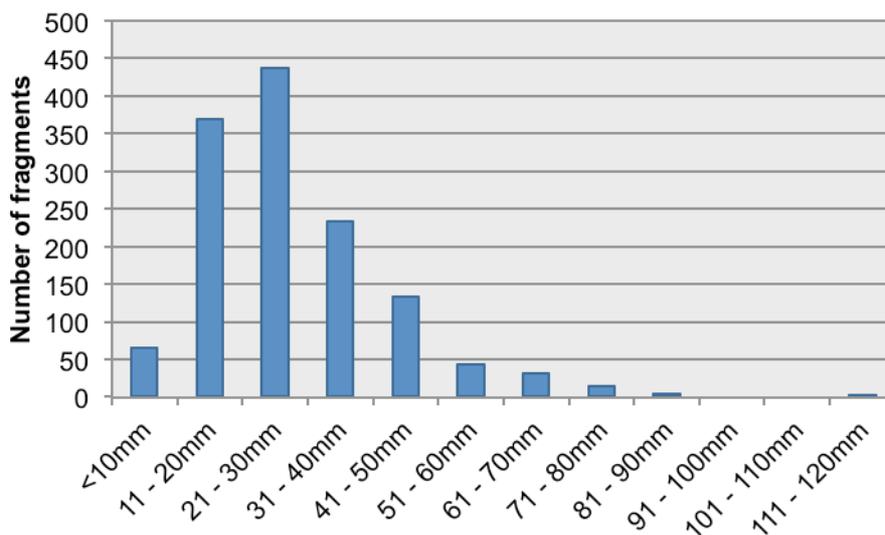
At Staines, four different contexts were included in the sample – two from the inner ditch and two from the outer ditch. Figures 6.9 to 6.10 show the quantity of fragments per size group, and figures 6.11 to 6.12 show the mass of each size group. From these graphs we can see that there is a slight preponderance of smaller fragments in the outer ditch, though once again this is tenuous.



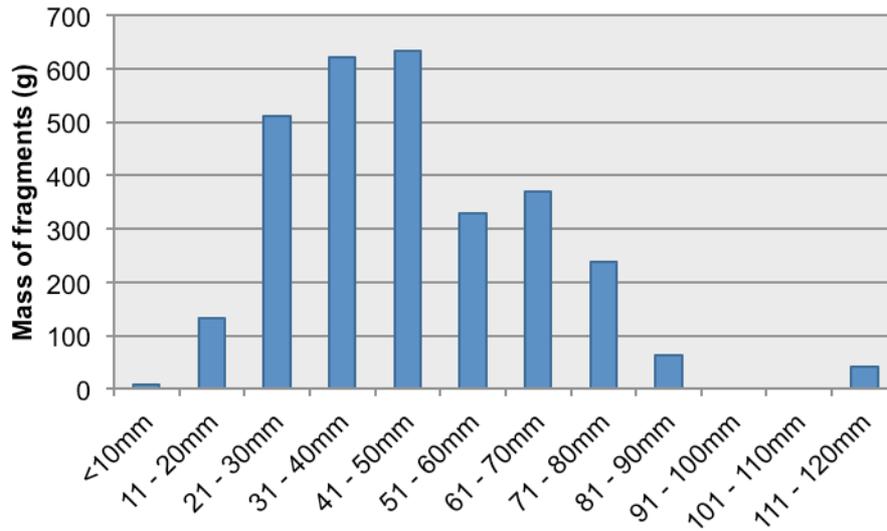
**Figure 6.1: Graph showing the number of fragments in the Etton sample present per size group**



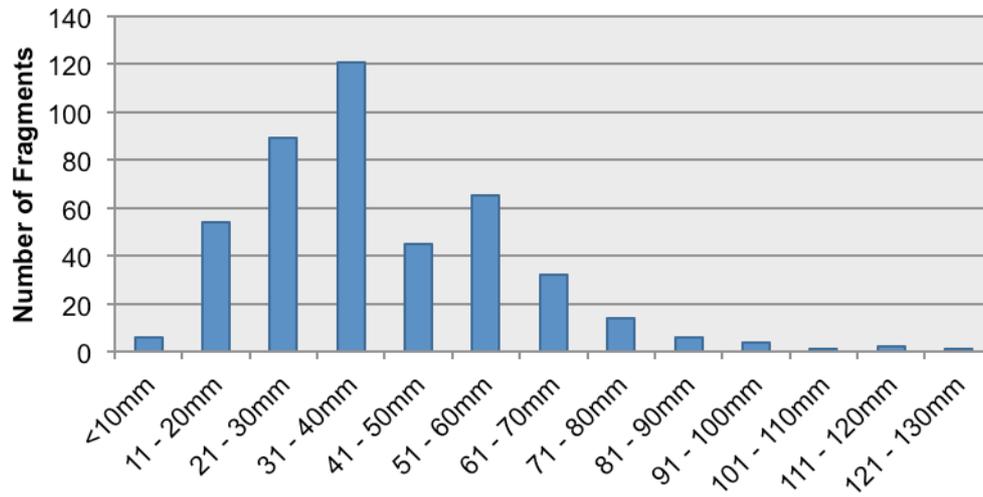
**Figure 6.2: Graph showing the mass of fragments in the Etton sample present per size group**



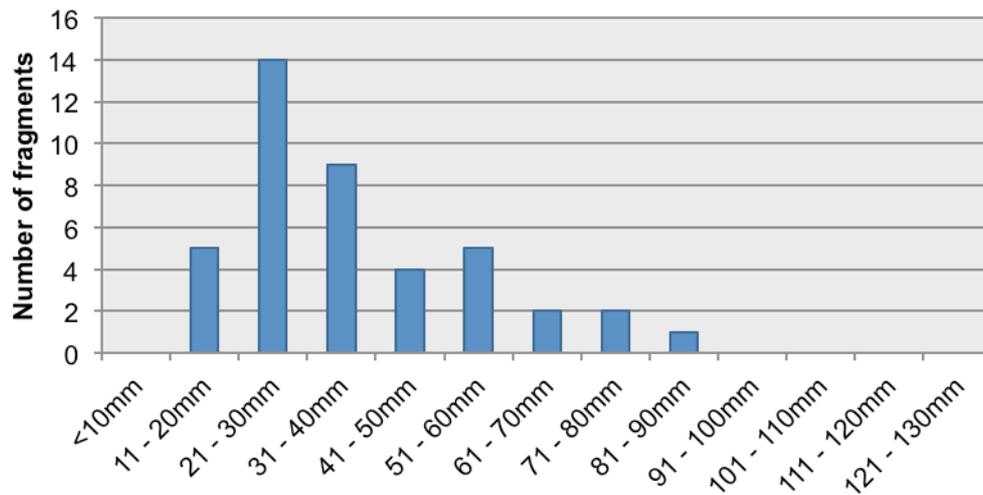
**Figure 6.3: Graph showing the number of fragments in the Staines sample present per size group**



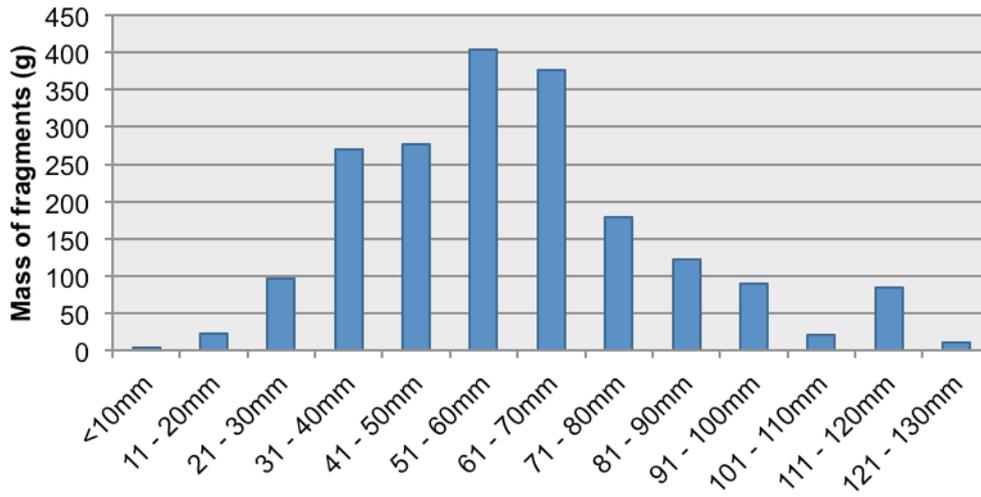
**Figure 6.4: Graph showing the mass of fragments in the Staines sample present per size group**



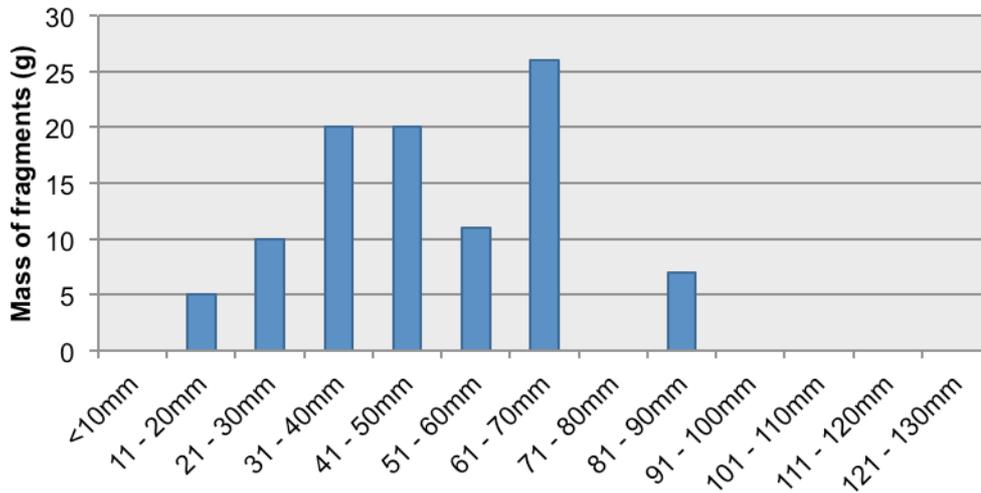
**Figure 6.5: Graph showing the number of fragments from the Etton Ditch Segment 1 sample by size group**



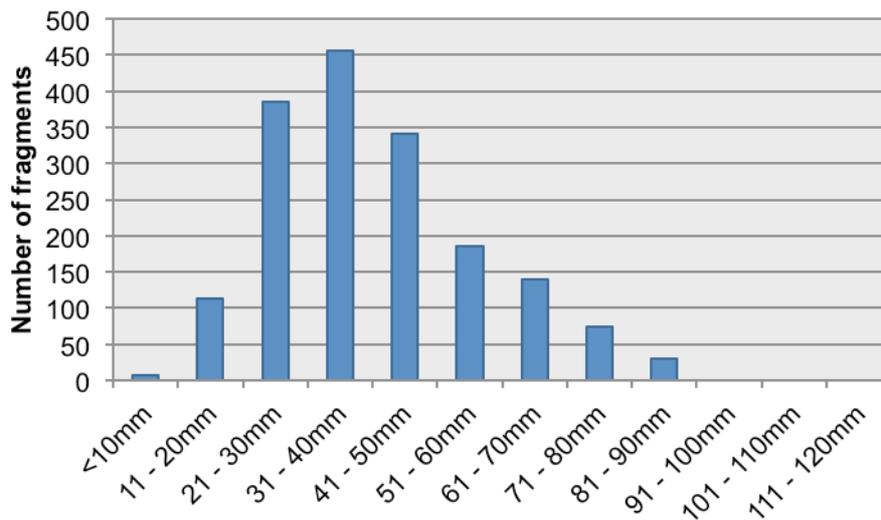
**Figure 6.6: Graph showing the number of fragments from the Etton Internal Feature F28 sample by size group**



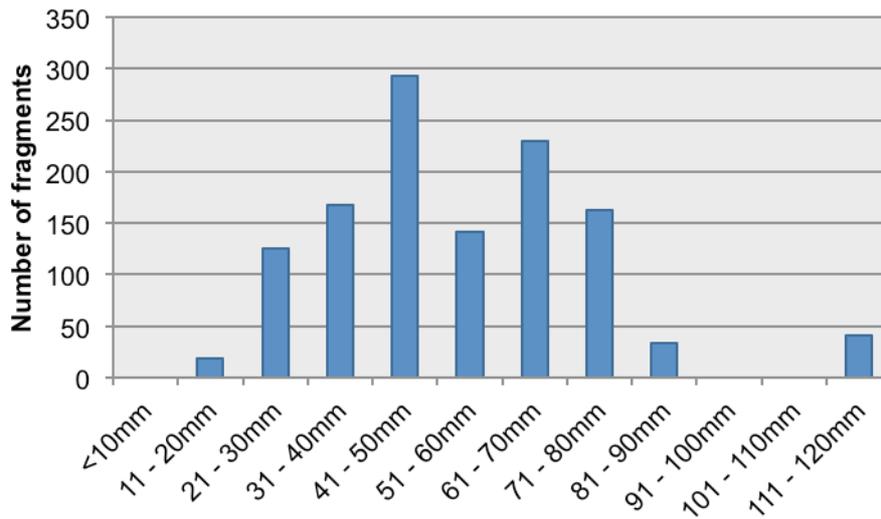
**Figure 6.7: Graph showing the mass of fragments from the Etton Ditch Segment 1 sample by size group**



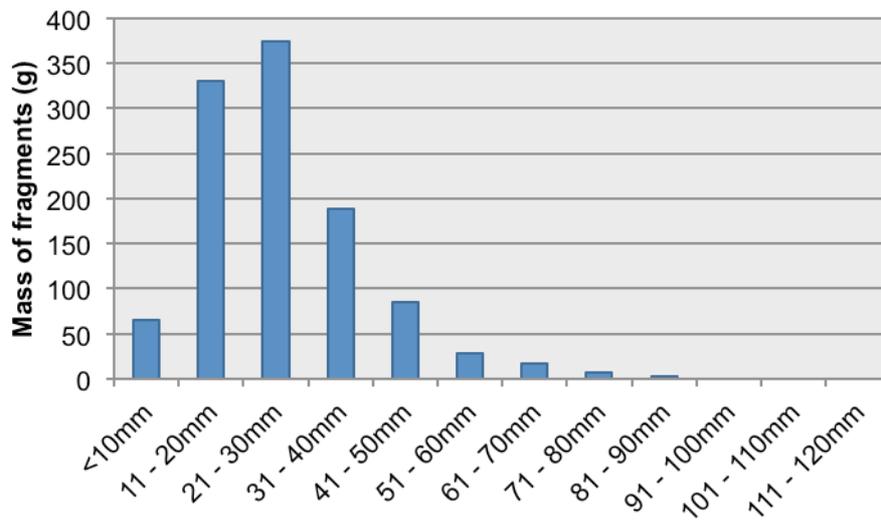
**Figure 6.8: Graph showing the mass of fragments from the Etton Internal Feature F28 sample by size group**



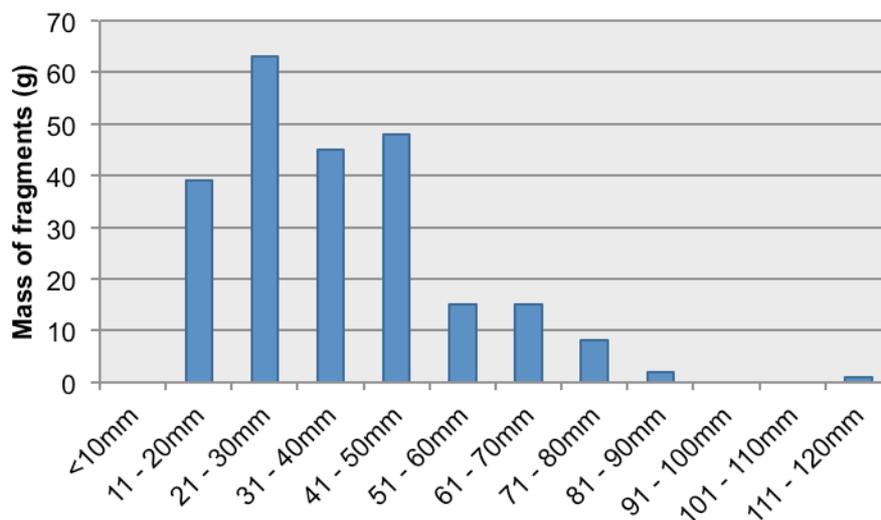
**Figure 6.9: Graph showing the number of fragments from the Staines Outer Ditch sample by size group.**



**Figure 6.10: Graph showing the number of fragments from the Staines Inner Ditch sample by size group.**



**Figure 6.11: Graph showing the mass of fragments from the Staines Outer Ditch sample by size group.**



**Figure 6.12: Graph showing the mass of fragments from the Staines Outer Ditch sample by size group.**

### *6.3.2 Diaphyseal and Cancellous Bone*

The more intensely bone is fractured, the harder it is to identify it to species or element, but this does not mean that no useful information can be gathered from it, especially when it is looked at generally rather than specifically. It remains possible to usefully distinguish between diaphyseal bone, which is the cortical material from which the shafts of long bone are made, and cancellous bone, which is spongy and present in the epiphyses of bones, even when fragments are only 10mm in length. It is also often possible to identify cranial fragments. Such a distinction is useful because while diaphyseal bone tends to be associated with bone marrow, cancellous bone can be intensively processed for the bone grease contained within its spongy structure.

The proportions of diaphyseal and cancellous bone at Etton and at Staines appear quite distinct, and are possibly indicative of differing practices of bone exploitation or deposition. Figures 6.13 to 6.18 show the proportions of cancellous and diaphyseal bone present overall at Etton, as well as by the different contexts. They also show the different proportions of each bone type according to size. Figures 6.19 – 6.24 show the same information, but for the material from Staines. At Etton there is consistently more diaphyseal material, regardless of the size of the fragments. This appears to even out somewhat when the fragments from internal feature F28 are considered, however the usefulness of this observation is limited by the very small amount of material. At Staines, there is generally a higher proportion of cancellous bone to diaphyseal bone however this trend tends to reverse when fragments are larger than 60mm, after which point diaphyseal bone is as prevalent, if not more so than cancellous bone.

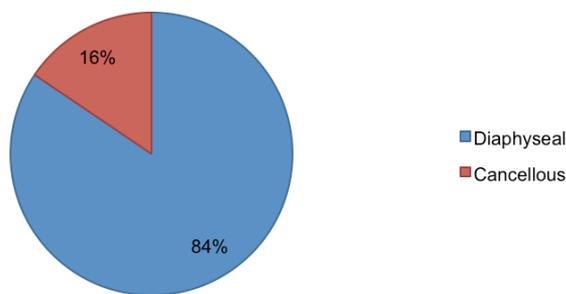
At Etton, the prevalence of diaphyseal over cancellous fragments could be either due to pre- or post-depositional processes, or just a result of the small sample size. In terms of post-depositional processes, it is possible that fragments of cancellous material did not survive deposition or the subterranean conditions on the site, which we know to have been frequently waterlogged. Structurally it is significantly weaker than diaphyseal bone, so may have disintegrated whilst fragments of diaphysis survived. Generally speaking

though, preservation conditions appear to have been very good, so this explanation may not be applicable. The alternative explanation is that cancellous material was available for deposition in much smaller quantities than diaphyseal material because of the processes to which it was subject for the rendering of bone-grease. The comminution and boiling up of cancellous material for the extraction of bone grease is very labour intensive, and as such is often identified at sites where the inhabitants are thought to have suffered severe nutritional stress (e.g. Outram 1999) - it is therefore unlikely it will be visible at Etton. In circumstances where there is severe nutritional stress, large quantities of cancellous bone are broken up and boiled in order to extract all possible nutrients. This process leaves very little cancellous bone in the archaeological record. Such levels of nutritional stress are not thought to have been a problem in the British Neolithic.

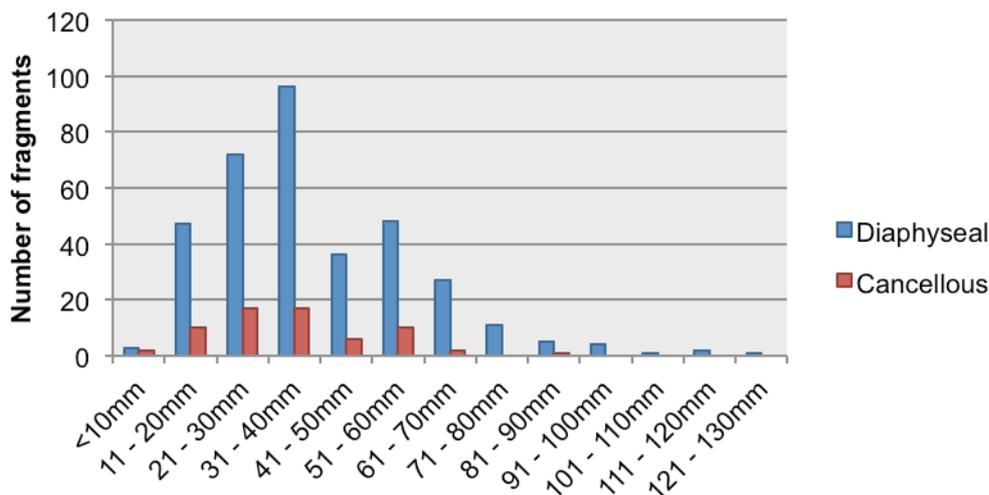
The prevalence of cancellous material at Staines suggests that bone-grease was not being rendered at the site. It is interesting to note that the surface preservation of bone at Staines was overall considerably worse than that at Etton, making it unlikely that the preservation at Etton was the cause of the lack of cancellous material. At Staines, the decreased prevalence of cancellous bone as fragment size increases is a result of its physical properties. Cancellous bone is spongy and once dry, relatively weakly structured making it likely to fragment to a much greater degree than dense, strong diaphyseal bone. It must also be mentioned that as cancellous bone is present largely in the epiphyses of long bones, it does not have the same opportunity as diaphyseal bone to fragment into particularly large pieces, though it can be considerably thicker. As cancellous bone does not fracture with the same properties as diaphyseal bone it is difficult to postulate at which point this material came to be fragmented, however it is thought most likely that this would have occurred when the bone was dry or mineralized, rather than fresh. This may still have been a result of human, rather than natural processes, such as recutting and redeposition, which could have caused significant amounts of disturbance to the bones.

The increase in prevalence of diaphyseal bones corresponding with increasing fragment size might also be due to the fact that the physical properties of the

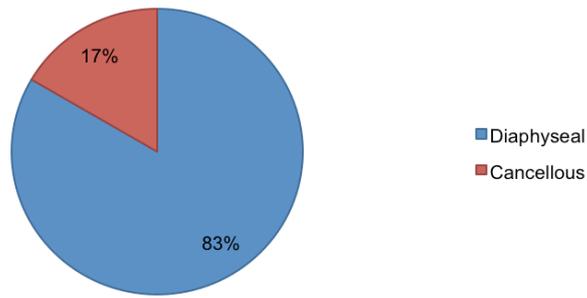
bone predetermine that it will fragment less intensely as a result of taphonomic processes acting upon it. It is almost the structural antithesis of cancellous bone, and as such might be expected to react to deposition in a dissimilar way. We know from looking at the fracture types present (see below) on the fragmented diaphyseal bone that it was largely fractured for the first time when dry, and that roughly a third of the bone was subject to subsequent fracture in a mineralized state (Figure 6.27). The presence of helical fractures on between 25% and 30% of the diaphyseal bone suggests that a significant amount of marrow extraction was occurring, but for this to be carried out it is not necessary to fragment the bone with any great intensity. Usually, simply removing the epiphyses of the bones allows enough access to the marrow within the long-bone cavity to facilitate its removal (Outram *et al.* 2005, 33).



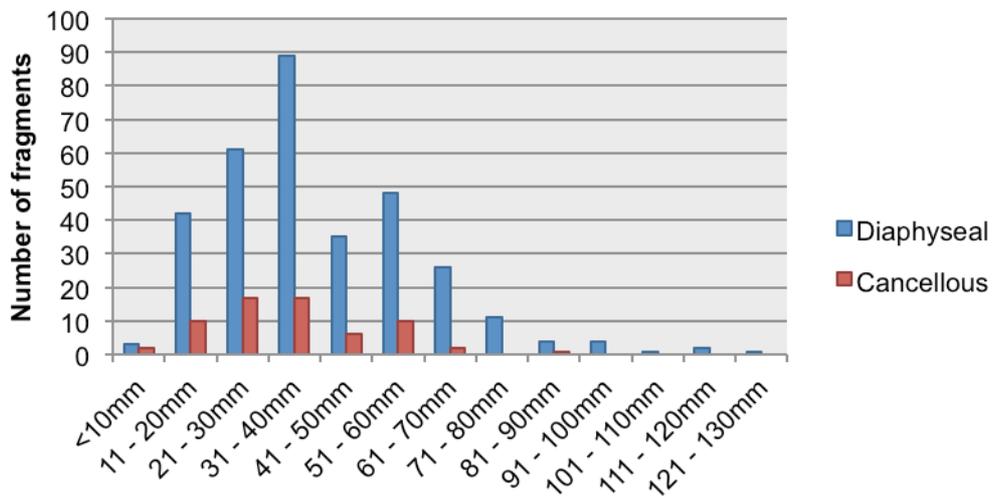
**Figure 6.13: Pie chart showing the overall proportions of diaphyseal and cancellous bone present in the Eton assemblage.**



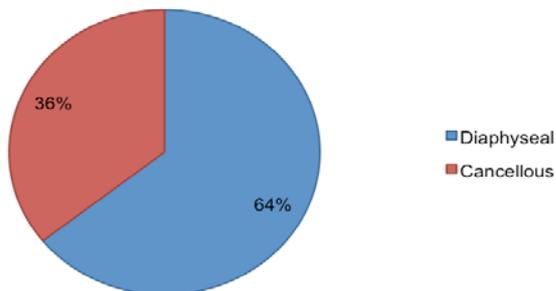
**Figure 6.14: Graph showing the overall number of diaphyseal and cancellous bone present in the Eton assemblage, by size.**



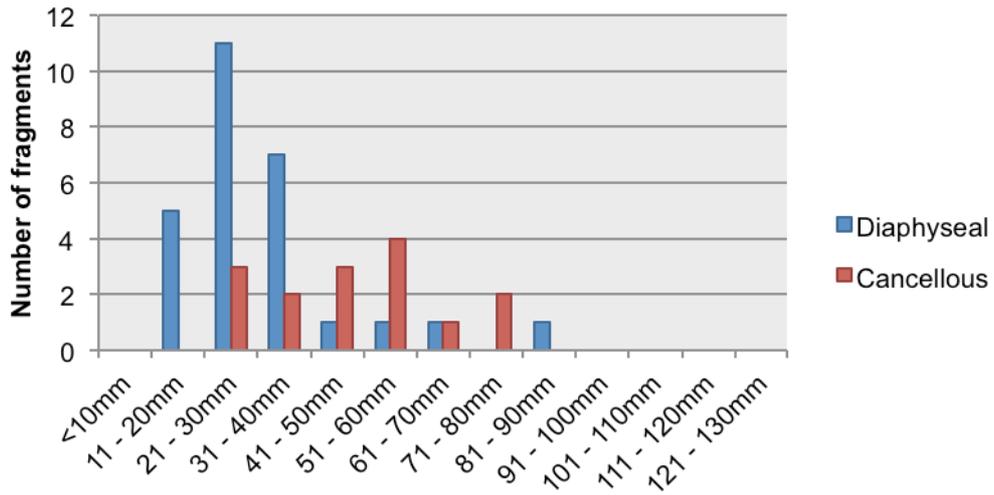
**Figure 6.15: Pie chart showing the proportions of diaphyseal and cancellous bone present in Ring-Ditch Segment 1 sample from the Etton assemblage, by quantity.**



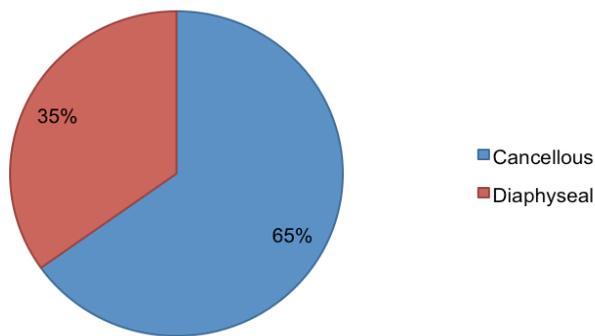
**Figure 6.16: Graph showing the quantity of diaphyseal and cancellous bone present in Ring-Ditch Segment 1 sample from the Etton assemblage, by size.**



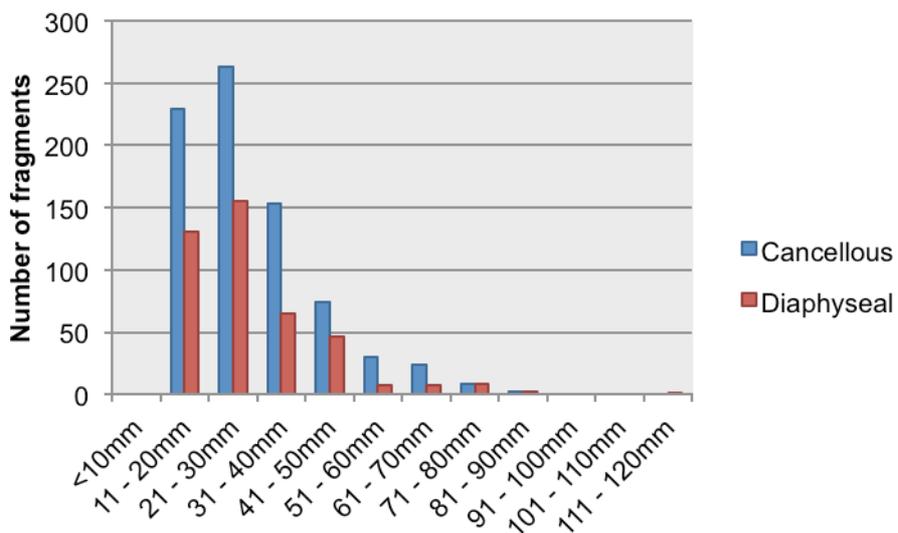
**Figure 6.17: Pie chart showing the proportions of diaphyseal and cancellous bone present in the Internal Feature F28 sample from the Etton assemblage, by quantity.**



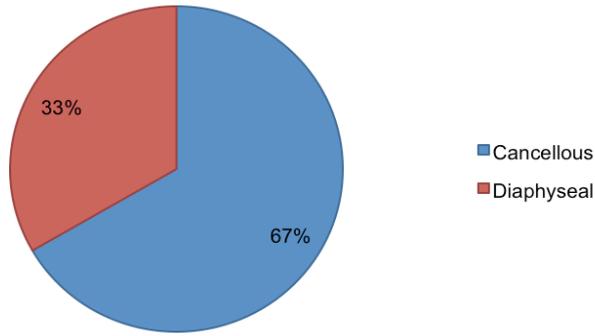
**Figure 6.18: Graph showing the quantity of diaphyseal and cancellous bone present in the Internal feature F28 sample from the Etton assemblage, by size.**



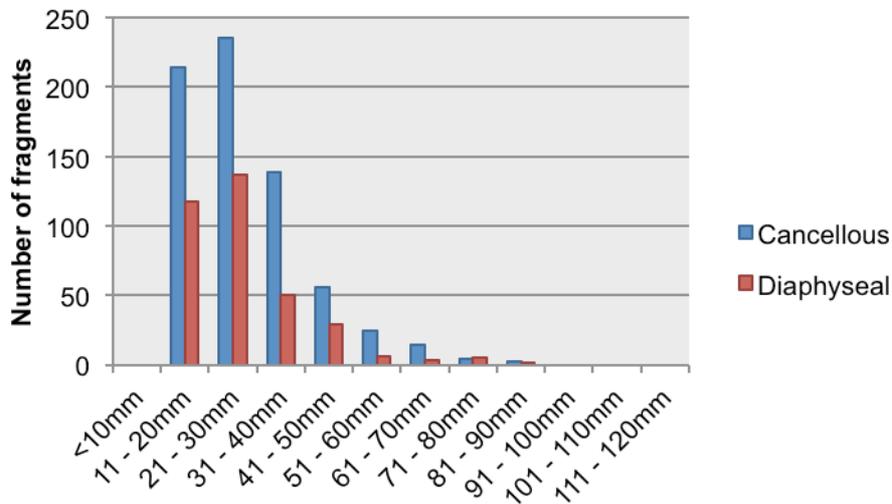
**Figure 6.19: Pie chart showing the overall proportions of diaphyseal and cancellous bone present in the Staines assemblage.**



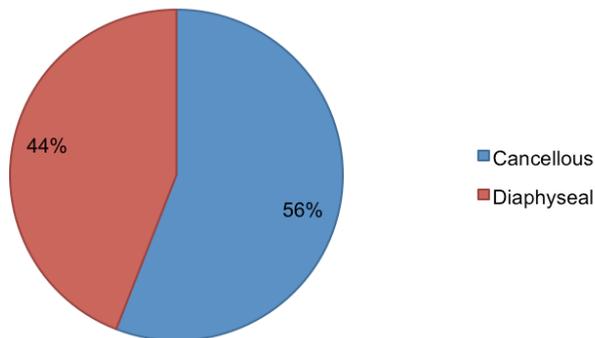
**Figure 6.20: Graph showing the overall quantity of diaphyseal and cancellous bone present in the Staines assemblage, by size.**



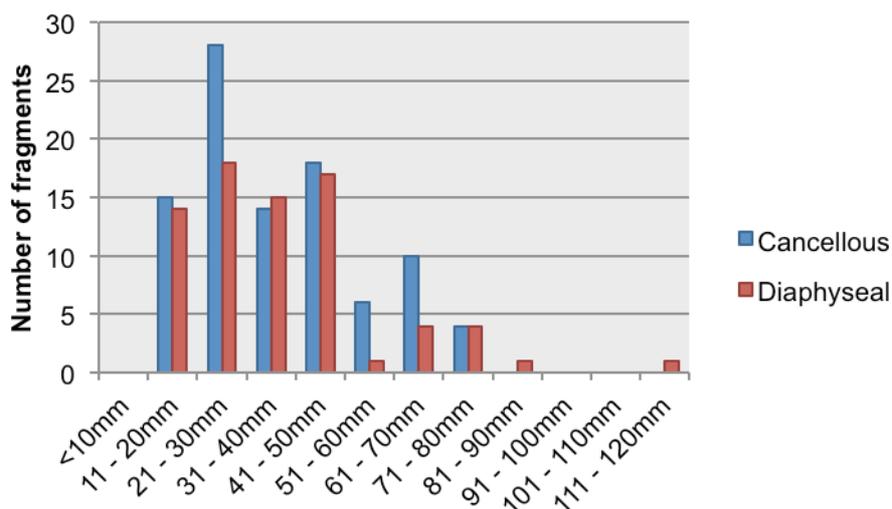
**Figure 6.21: Pie chart showing the proportions of diaphyseal and cancellous bone present in the Outer Ditch sample from the Staines assemblage, by quantity.**



**Figure 6.22: Graph showing the numbers of diaphyseal and cancellous bone present in Outer Ditch sample from the Staines assemblage, by number.**



**Figure 6.23: Pie chart showing the proportions of diaphyseal and cancellous bone present in the Inner Ditch sample from the Staines assemblage, by quantity.**



**Figure 6.24: Graph showing the numbers of diaphyseal and cancellous bone present in Inner Ditch sample from the Staines assemblage, by number.**

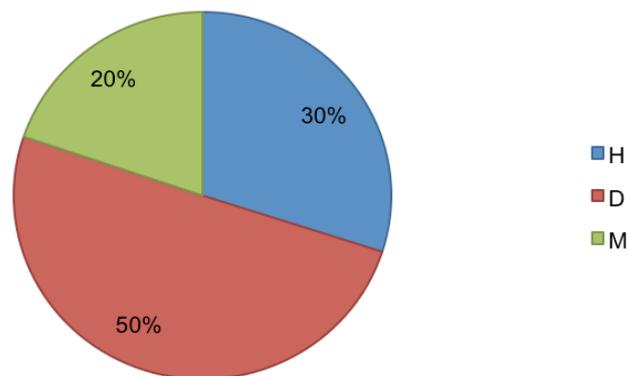
#### 6.4 Fracture Patterns at Staines

The fracture patterns at Etton and Staines provide the majority of the data relating to fragmentation practices at these sites. At both, the nature of fracture was considered on both partial bones and on the fragments included in the samples discussed above. Staines will be presented first here, as the amount of material, thus the amount of data retrieved, was far less substantial than could be gathered from Etton.

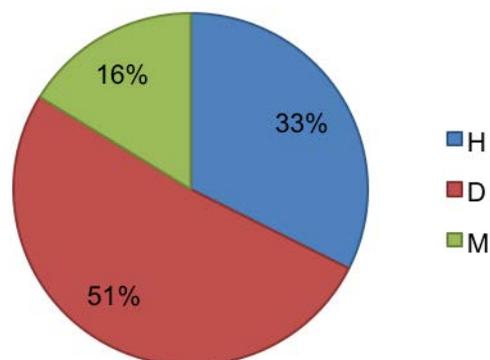
All of the partially complete bones were analyzed for the kind of fracture they displayed, the results are presented at the end of this section. The fragmented bone was also analyzed for fracture type, though this was only possible on bone over 31mm in length. At this size, the presence of helical (H), dry (D) and mineralized (M) fractures was clearly visible. Figures 6.25 to 6.29 show the proportions of each different fracture type from the fragmented samples.

The most prevalent type of fracture is clearly dry, and would have occurred once much of the collagen content had gone from bone, but probably before the bone had been buried in the position in which it would eventually be recovered during excavation. It is most likely that this fragmentation occurred at some stage in the peri-depositional taphonomic processes in action at the site, and possibly as a result of disturbance during recutting of the enclosure ditch. It was

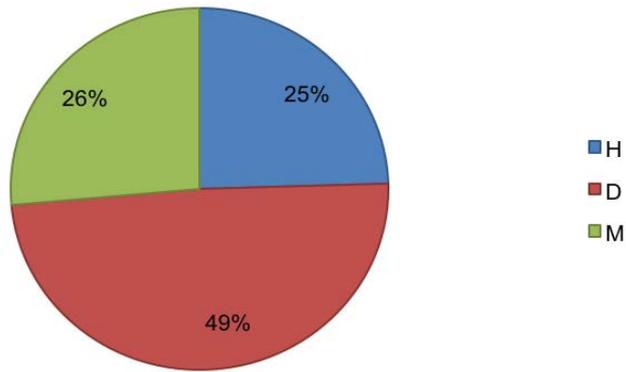
initially thought that there was no evidence for recutting at the site, and that the ditch continued to be filled with material and 'naturally filled' until their use ended (Robertson-Mackay 1987, 23 and 34). Bone with only mineralised fractures was least prevalent, with only 15% of the total amount of bone falling into this category.



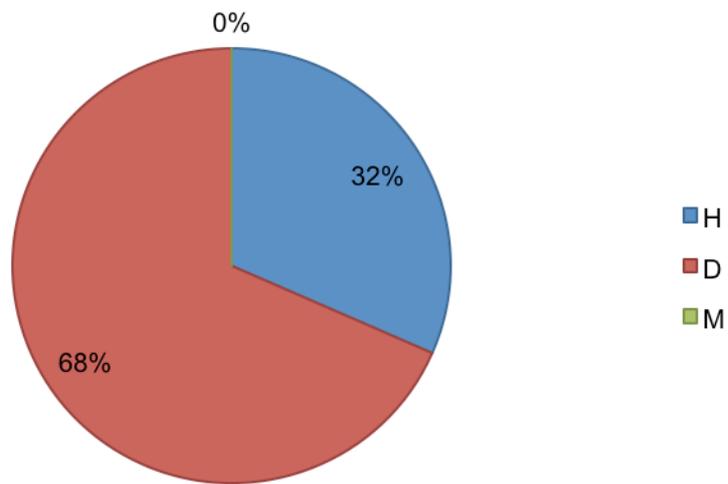
**Figure 6.25: Total proportions of helical (H), dry (D) and mineralised (M) fracture present in the fragmented samples from the Staines causewayed enclosure.**



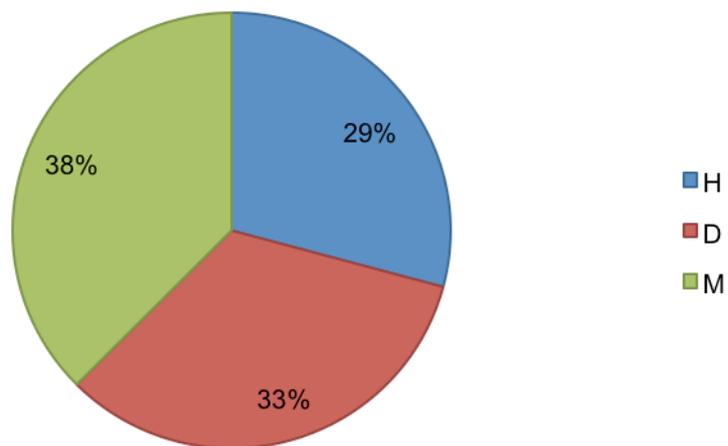
**Figure 6.26: Proportions of H, D and M fractures present in the fragmented sample from OD16(i)4 in the Staines causewayed enclosure.**



**Figure 6.27: Proportion of H, D and M fractures present in the fragmented sample from OD16(ii)4 in the Staines causewayed enclosure.**



**Figure 6.28: Proportion of H, D and M fractures present in the fragmented sample from ID37RA5 in the Staines causewayed enclosure.**

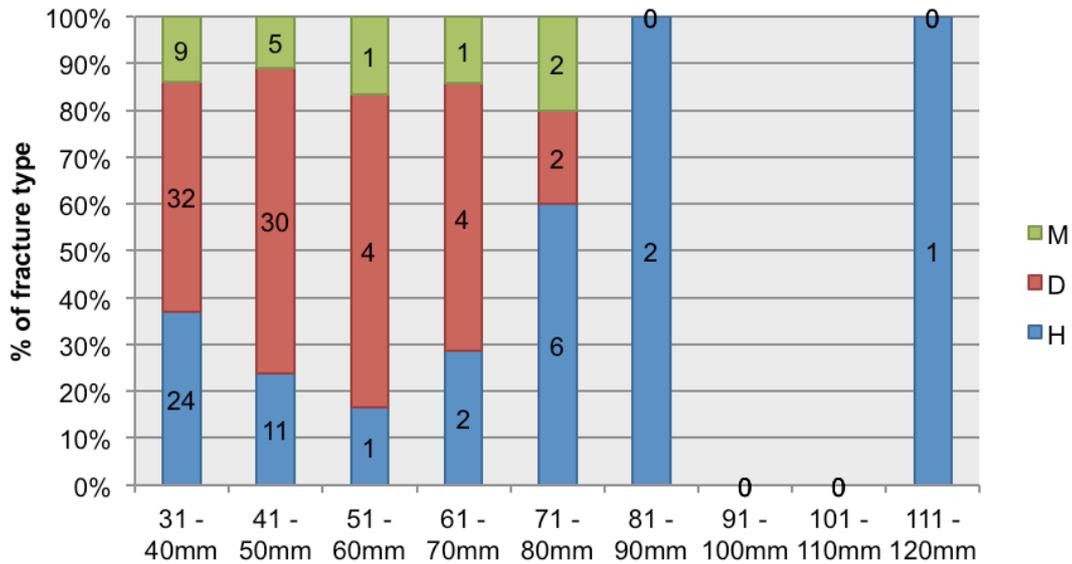


**Figure 6.29: Proportion of H, D and M fractures present in the fragmented sample from ID40FA5 in the Staines causewayed enclosure.**

Helically fractured bone is present in significant quantities across the site. The smallest percentage of bone displaying fresh, or helical fractures was 25% from OD16(ii)4. The highest percentage was 32% in both OD16(i)4 and ID40FA5. The average percentage across the sampled context was 29.5%, which neatly fits in with the total across the entire site, at 29%, and the total for the four sampled contexts at 30%. These figures indicate that although bone fracture for marrow extraction was perhaps not an aspect of butchery that was practiced all of the time, it did feature quite prominently as a method of processing animal remains.

The composition of the inner ditches is again, slightly at odds with the composition of the outer ditch and the site averages. ID37RA5 is the only context in which bone with only mineralised fractures dominates the assemblage. Completely contrary to this, ID40FA5 contained no bone displaying only mineralized breaks. It seems likely that the nature of the inner ditch assemblages is more a result of there being comparatively little material from these contexts, and that such a small proportion of this was partially complete bone. It is largely the partially complete bone which has yielded detailed information regarding fracture freshness for the outer ditch contexts sampled, and throughout the rest of the site.

Figure 6.30 is a graph showing the prevalence of fracture type by fragment size. The percentage of bones displaying only mineralized fractures stays roughly the same (where such bone exists at all). It is interesting, though not unexpected, to note that the switch in prevalence between dry and helical fractures, the larger the fragment size. This indicates that bones broken by human action tend to break into larger fragments than bones fractured as a result of pre- or post-depositional taphonomic processes. It is entirely plausible that the larger fragments created by bone processing, likely for the extraction of marrow, were subsequently subject to dry fracture causing the loss of the helical signature on their edges. This is impossible to say from the results gathered.

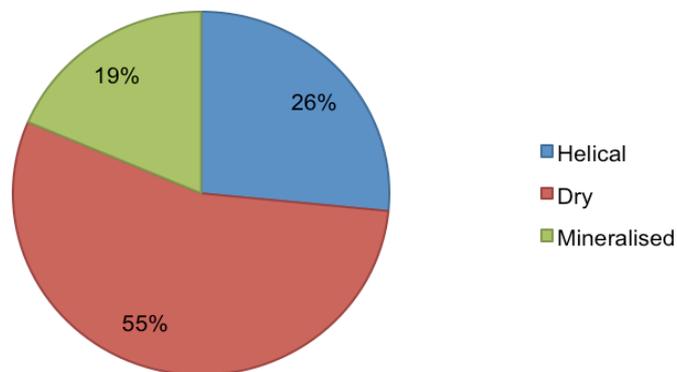


**Figure 6.30: A graph demonstrating the prevalence of fracture types by fragment size category from the Staines causewayed enclosure.**

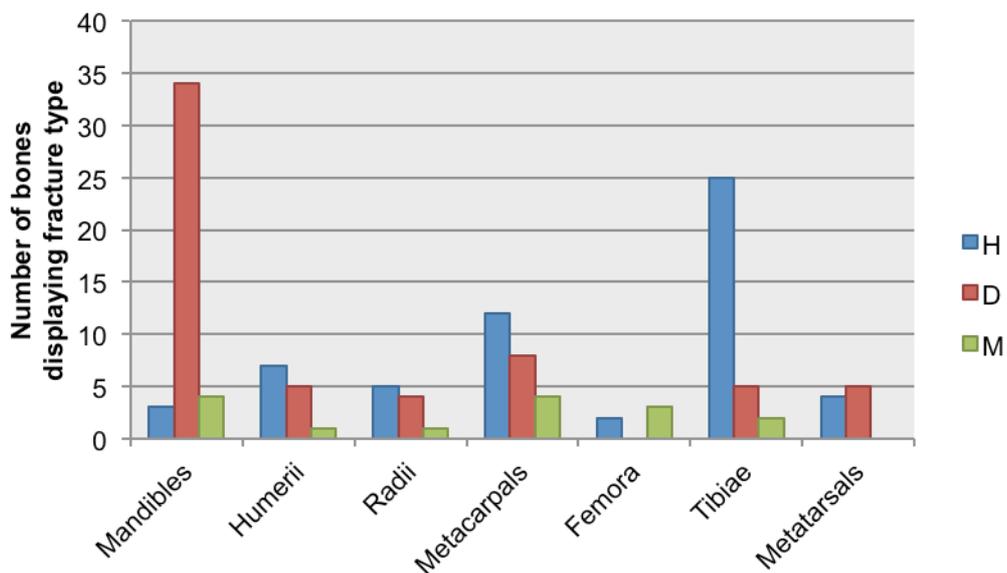
The results of the analysis of different fracture types presented above are based on the least recent fracture taking precedence over all other fracture types visible on the surface of a bone. The picture appears quite different if we take into account all of the fracture types present on bones. Figure 6.31 shows the total number of partial bones showing each fracture type (this level of analysis was not carried out on the fragments). Bones that had H, D and M fractures will be represented three times in this graph, making it difficult to draw any particularly pertinent conclusions from the results. What can be said is that fracturing of the bone when it was mineralized was clearly occurring at a greater level than it appears from looking at the results above, where it is very clearly in a minority.

The amount of partial bone (identifiable to species and element) present in the sample ditches was relatively small for the total amount of partial bone present in the entire assemblage, and as such may easily have been overwhelmed by the amount of highly-fragmented material, thus by the prevalence of dry fracture. As mentioned above, the complete assemblage was scanned for species, element and fracture type and from this data it is possible to elucidate the nature of bone fracture at Staines. In order to do this it is important to consider how bone fracture has been employed on marrow-yielding elements (as defined by Outram and Rowley-Conwy 1998). The analysis of fracture by element was conducted only on the cattle bones. Figure 6.32 shows the

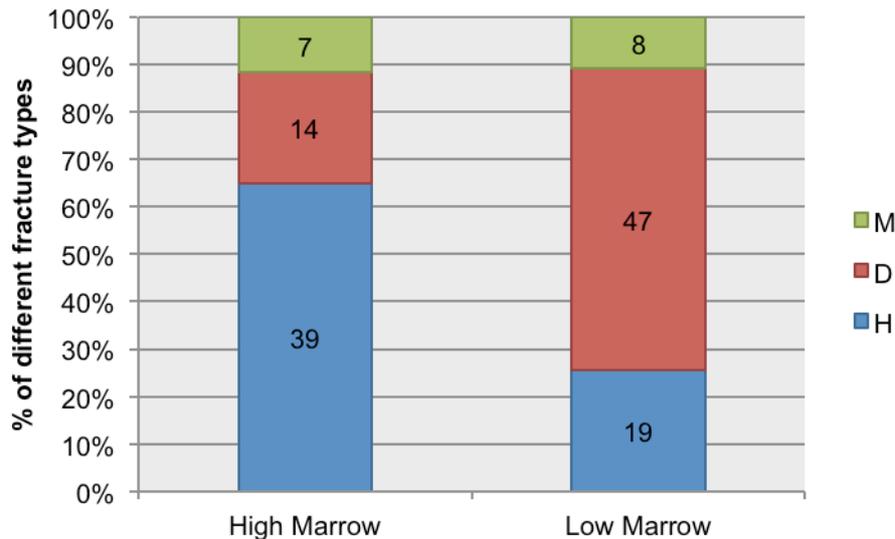
numbers of fracture type by marrow-yielding element, and figure 6.33 shows proportions of fracture type by high and low marrow-yield groups of elements (Knüsel *et al.* 2007).



**Figure 6.31: A graph showing the total numbers of each fracture type on the partial bones present across the whole causewayed enclosure at Staines.**



**Figure 6.32: Graph showing fracture type by marrow-yielding element in decreasing order of helical fractures from the Staines causewayed enclosure.**



**Figure 6.33: Graph showing total proportion of fracture type present for high and low marrow elements.**

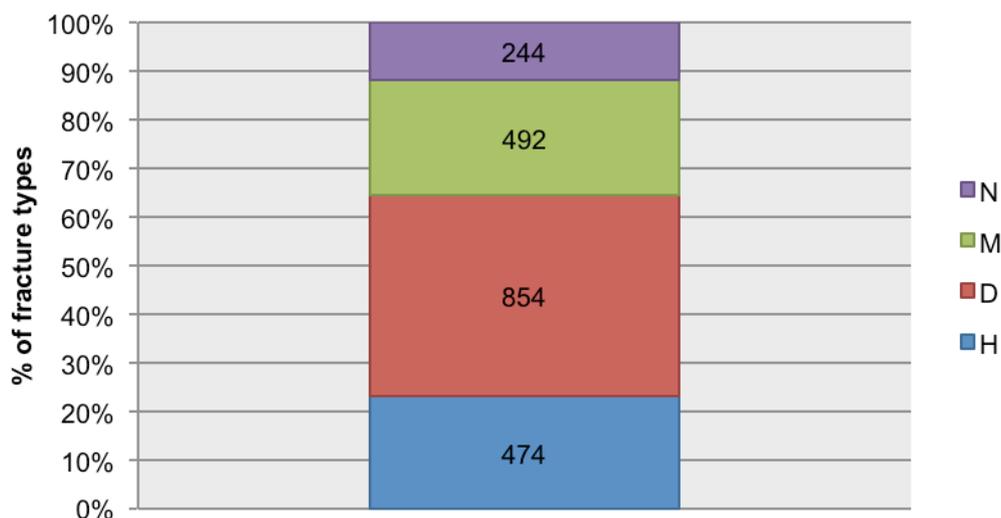
These two graphs make it clear that the results of the fracture type analysis on the samples were definitely skewed by the numbers of very small fragments displaying dry fractures and show that fresh fractures are significantly more evident than previously supposed. Figure 6.32 shows that the majority of the partially complete humerii, radii, tibia and metacarpals were fractured when fresh. The humerus, radius, tibia and femur contain by far the most marrow of any elements found in the skeleton, so it is highly probable that where marrow extraction is occurring, these elements will be processed first and most intensively. Figure 6.33 shows this to be quite clearly the case at Staines, where almost 60% of the total number of partially complete high-marrow yielding elements were obviously fractured when still very fresh. The elements with a lower marrow content (mandibles and metapodia) were also processed for marrow in significant numbers, though nowhere near the extent of the high marrow content bones. The very high presence of dry fractured mandibles suggests that these were not being processed on a regular basis, but were instead being disposed of or deposited intact and were subject to fragmentation at some point after this.

Taking the above into account, it seems likely that the helical fractures present on the fragmented diaphyseal bone were created as part of the processing for marrow that is so obvious amongst the partially complete bones, but that

taphnomic processes active after the disposal/deposition of the bone caused them to be further fragmented. It is likely that this was the result of differential disposal/deposition conditions such as water-logging or exposure.

### 6.5 Fracture Patterns at Etton

Of the 4794 bones identified to animal species and element from across the site, 1949 were elements that are usually associated with marrow fat extraction. Of these, fracture types were recordable for 1589 bones. These form the basis for the analysis presented below. Figure 6.34 shows the total numbers of all the fracture types present on bones suitable for this kind of analysis, regardless of species or element. Helical fractures (H) are easily recognisable from their smooth spiralling shape. These are created when a bone is broken when fresh or green, soon after its exposure from a carcass. Overall, 23% of the marrow-yielding bones were broken at this point, before they had had a chance to dry out. Dry fractures (D) are rather rougher and straighter than fresh or helical fractures as a result of some of the organic matter within the bones drying out. Just over 41% of the marrow-yielding bones were fractured when they were dry.

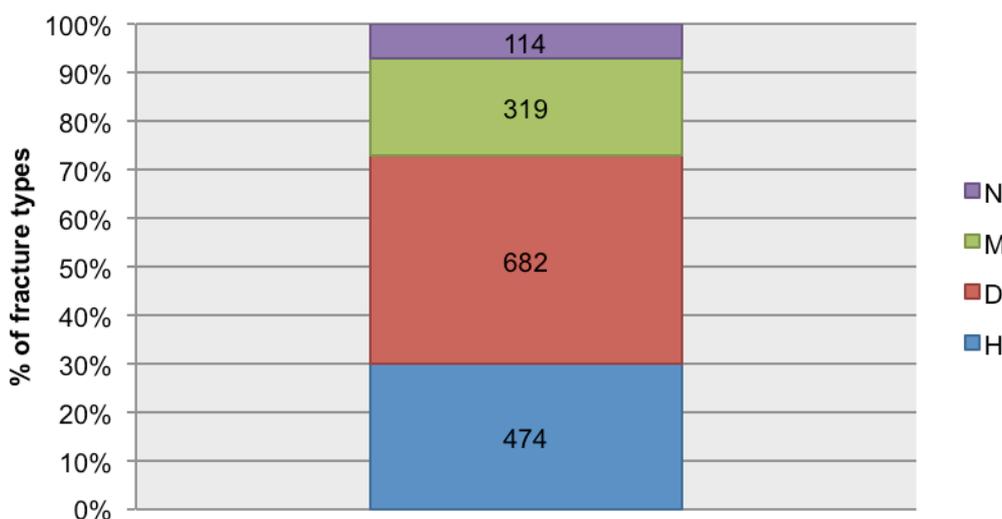


**Fig 6.34: A graph illustrating the proportions of Helical (H), Dry (D), Mineralised (M) and Newly (N) fractured bone at the Etton causewayed enclosure.**

Mineralised (M) fractures are found on bone that has almost completely lost its organic matter. Often it occurs when bone is disturbed after its primary deposition. Mineralised fractures are characterised by their rough and granular

fracture surfaces, which tend to be straight rather than spiralling. Re-cutting of the ring-ditches at Etton may be one explanation for why bone would be fractured once mineralised. In total, 23.7% of the fractured marrow-yielding bones had mineralised fractures. It is possible to distinguish between fractures made on a bone when mineralised and those made on a bone in the excavation process (newly (N) fractured bone). At Etton 11.8% of marrow-yielding bones display new fractures, implying that they were fractured when they were being excavated. This is a relatively low proportion, suggesting that the excavation was carried out carefully and precisely.

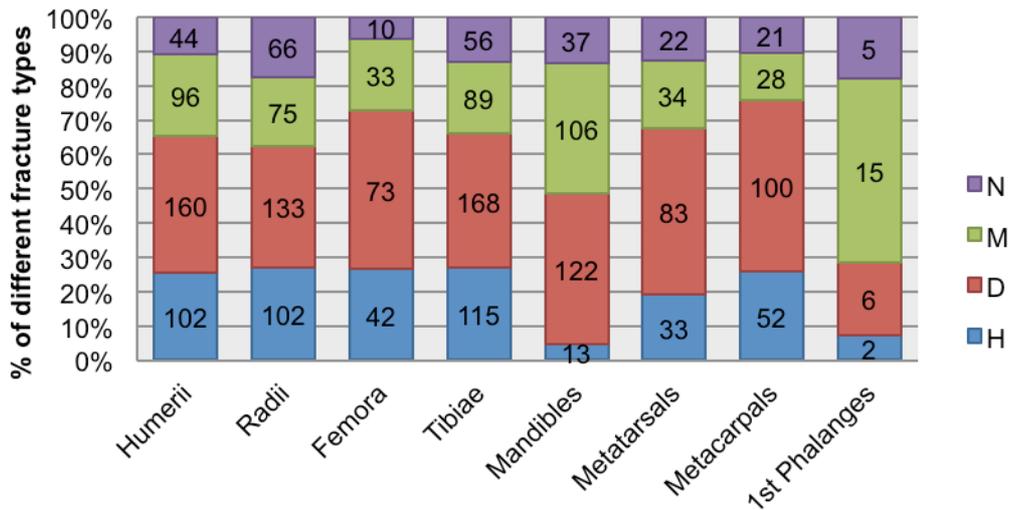
Figure 6.35 shows the percentages of first evident fracture on the same bones. By comparing Figures 6.34 and 6.35 it is possible to see the diminishing effect including repeated bones had on the percentage of helically fractured bone, and the increase of fracture types as time lapsed from initial interaction with the bone to it being discarded, deposited, potentially disturbed and finally excavated. Although these two graphs are relatively meaningless in terms of actual interpretation of what is going on at the site, they do illustrate the average proportions of each fracture type. Both 23% and 29.8% fresh or helical fracture on the bones present from Etton are exceptionally high percentages given the implication up to now that there is no evidence for this bone processing activity at this kind of site.



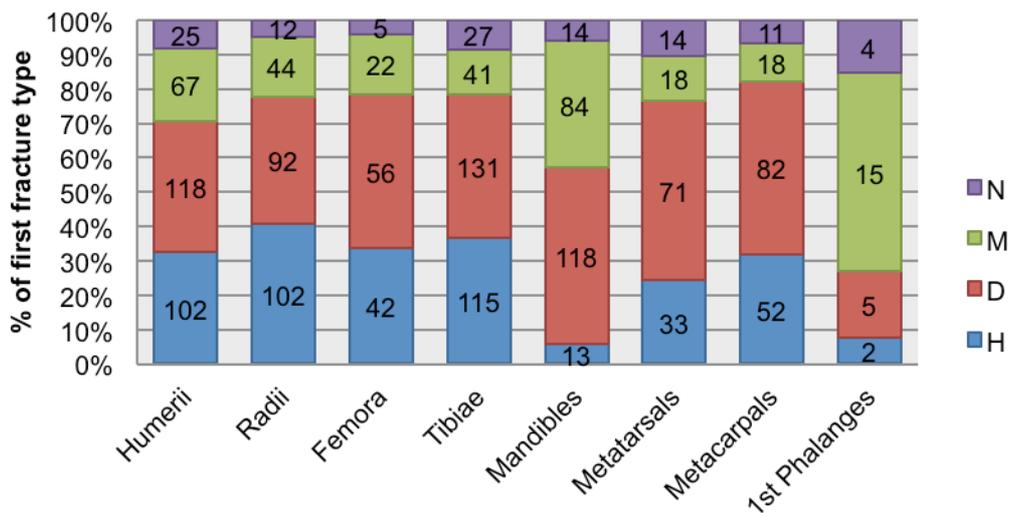
**Fig 6.35: A graph illustrating the proportions of first evident fractures (Helical (H), Dry (D), Mineralised (M) and Newly (N) fractured) on bones from the Etton causewayed enclosure, demonstrating at what stage of the taphonomic process bones were first broken.**

In order to refine these results further, it is important to consider the elements that are potentially being exploited for their marrow content. As mentioned above, not all bones would be selected for marrow extraction. Eight elements are usually associated with this activity - humerii, radii, femora and tibiae (which are high-yield elements) and mandibles, metatarsals, metacarpals and 1<sup>st</sup> phalanges (which are low yield). Figure 6.36 shows the proportions of all fractures present on these bones, and figure 6.37 shows the first fractures to have occurred to these bones. It is clear from these two figures that there is a difference in exploitation practices applied to the high and low marrow yield bones. Of all of the fractures present on the high marrow yield bones, between 25.4% and 27.1% were created when the bone was fresh. Rather more of the bones (between 35.4% and 46.2%) had dry fractures, or had dry fractures as well as fresh fractures. The proportion of bones fractured when mineralised (19% -23%), implies that once the material had been deposited, it was subject to some, though not a great deal of disturbance by subsequent activity until it was excavated, when between 6% and 10% were subject to new damage. If we lose the repeated elements from the percentages and look at the proportions of first fractures on the bones the picture is somewhat different. In this case the proportion of high yield bones displaying fresh fractures is elevated - between 33% and 41%. Ever so slightly more (between 37.8% and 44.8%) were not fractured until they had dried out at least partially, however considerably fewer apparently remained intact until they were mineralised, and less still appear to have been fractured for the first time when being excavated.

The percentages of high-yield bones displaying helical fractures are roughly commensurate in the graph demonstrating the overall numbers of fracture. There is no one element that obviously takes precedence as one that is favoured for this kind of activity. In the graph displaying first fractures however, radii are clearly the most frequently freshly fractured element, with some 40% displaying this kind of fracture. Tibiae are close behind, followed by femora and then humerii, which were fractured at a rate of 8% less than the radii.



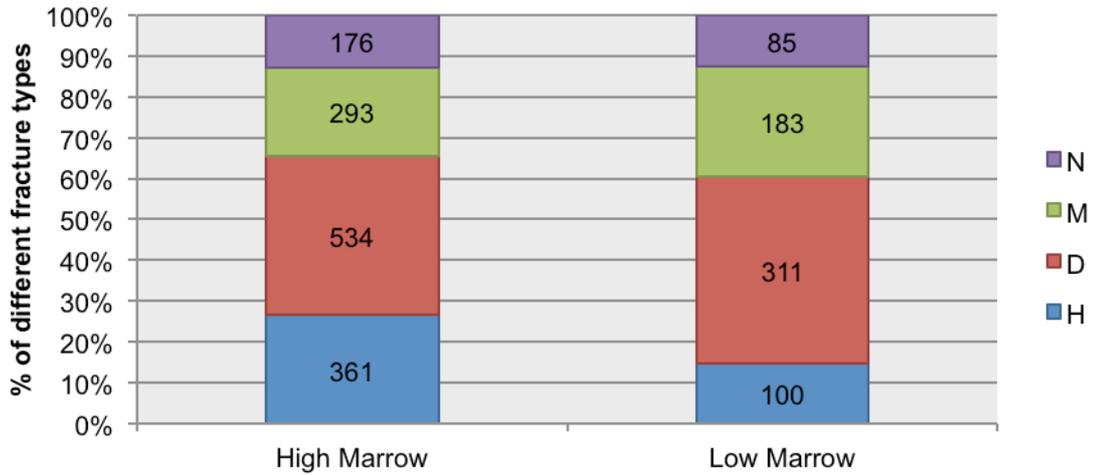
**Figure 6.36: A graph showing the total proportions of helical (H), dry (D), mineralised (M) and new (N) fractures present on bones from the Etton causewayed enclosure.**



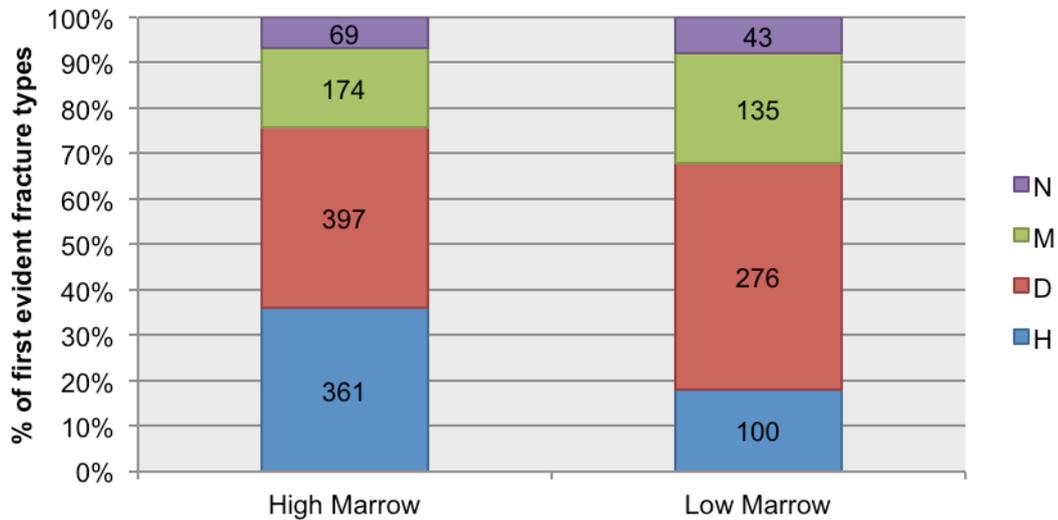
**Fig 6.37: A graph showing the proportions of helical (H), dry (D), mineralised (M) and new (N) fractures that the bones from the Etton causewayed enclosure were *first* subjected to.**

The pattern of fracture visible for the low marrow yield bones is predictably different from that revealed for the high marrow yield bone. In both graphs fewer helical fractures are present than for the high-yield elements, suggesting that these bones were not being exploited to the same degree of intensity. Having said this, the proportion of helically fractured bone is still considerably higher than has traditionally been considered at sites of this nature. According to the total number of fractures present on the low yield bones, between 4% and 25.9% were fractured when fresh (between 5.7% and 31.6% only counting first

evident fractures). The difference here is too large to be particularly meaningful, because the numbers of fresh fractures present on metacarpals and metatarsals (25.9/31.6% and 19.2/24.3% respectively) are quite distinct from those present on the mandibles and 1<sup>st</sup> phalanges (4.7/5.7% and 7.1/7.7% respectively), and appear to be more in line with the numbers found on the high-yield elements.



**Figure 6.38: Composite graph demonstrating total percentages of different fracture types present on high and low marrow elements from the Etton causewayed enclosure.**



**Figure 6.39: A composite graph demonstrating the percentages of different first evident fracture types present on high and low marrow elements from the Etton causewayed enclosure.**

Figures 6.38 and 6.39 are composite graphs showing the total number of different fractures (Figure 6.38) and the percentages of initial fractures (Figure 6.39) on high and low marrow yield elements. They clearly show the difference between the numbers of helical fractures present on these two groups of elements, despite the high percentages of fresh fractures present on the metapodia included in the low yield categories.

In order to refine this information into something useful for understanding the role of animals at Etton, it is necessary to consider the roles of the different species present at the site with regards to the exploitation of bones for fat. We would expect for there to be different patterns of exploitation between the major domestic species of cattle, pig and sheep/goat, not only because they were present in very different quantities on the site, but also because according to the data presented in previous chapters, it seems that they would have served different economic purposes. The following sections consider the fracture types present on each species encountered at the site. As with the data above, the percentages of fracture will be presented in two ways; proportion of total fractures as well as the first evident fracture on an element. The category of 'new' fracture has been removed for the purposes of the rest of this investigation, as it does not have any relation to activity contemporary with the inhabitation of the site, just to the excavation process.

#### *6.5.1 Domestic Cattle (*Bos taurus*)*

Domestic cattle were by far the most prevalent species at Etton, and are therefore the species for which we have the most data pertaining to bone fracture patterns. Of all of the species thought to have been involved in activity at Etton, it is cattle that we would expect to see being the most heavily processed for their marrow, if only because they were the basis of the Neolithic economy and present in much larger numbers than any other species.

Figure 6.40 shows the total number of helical, dry and mineralised fractures present on cattle elements from all Neolithic contexts at Etton. Counting all visible fractures on marrow-yielding bones, almost a third (31%) are helical, so must have been created when the bone was fresh. Most fractures were created

when the bone was dry (44.7%), with only a quarter (24.3%) being created once the bone had become mineralised. If we consider the first evident fractures however, we discover that nearer to 38.8% of the total marrow-yielding bones had helical fractures, whilst the number of bones fractured for the first time when dry drops ever so slightly to 42.2%, and those being fractured for the first time when mineralised drops to just below a fifth (19.1%).



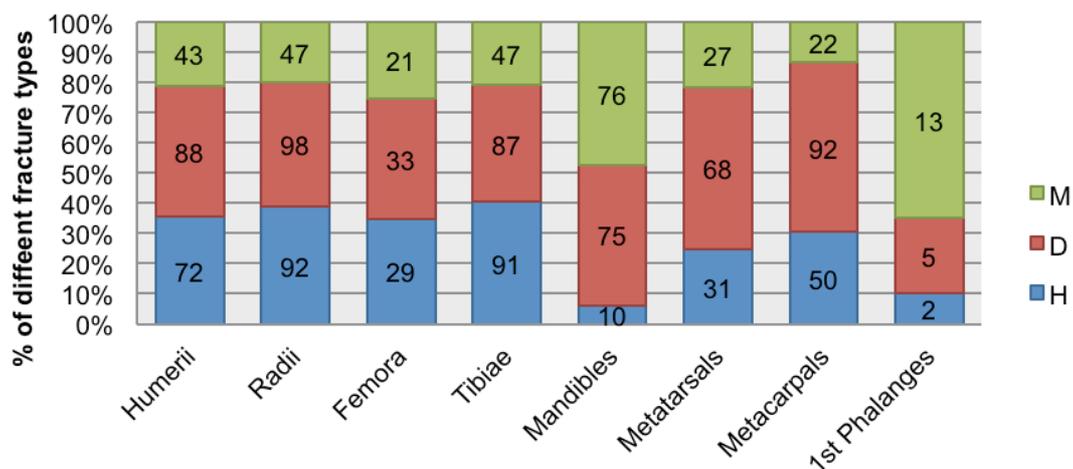
**Figure 6.40: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding cattle bone from all Neolithic contexts at the Etton causewayed enclosure.**



**Figure 6.41: Graph showing the percentages and numbers of the first evident fractures (helical (H), mineralised (M) and dry (D)) on marrow-yielding bone from all Neolithic contexts at the Etton causewayed enclosure.**

Clearly a considerable proportion of marrow-yielding bones are being subjected to fracture with relative immediacy following the butchery of a carcass, implying

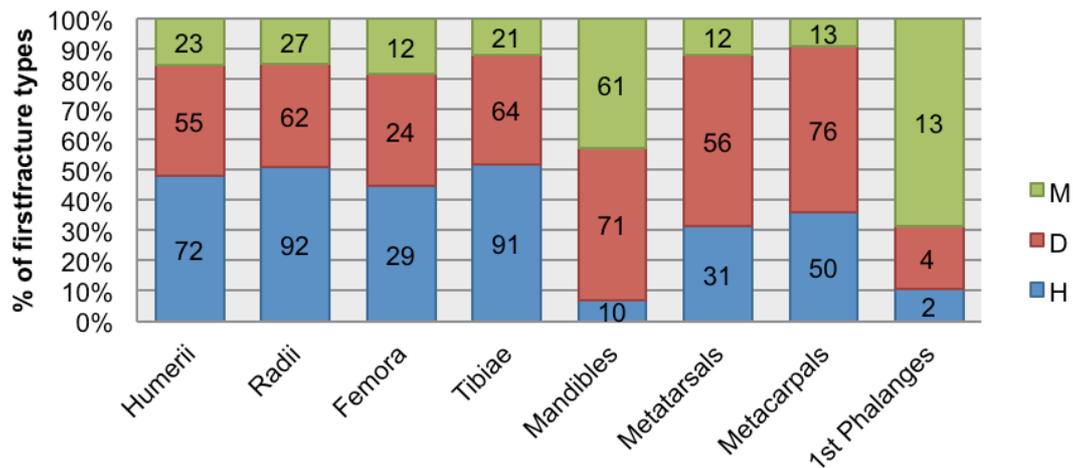
a considerable amount of bone processing is happening at Etton. This picture is enhanced when we consider the proportions of helical fractures present per element, and cumulatively for high and low marrow yield elements. In cattle, as in most species, it is the primary limb bones that yield the highest quantities of marrow – the humerii and radii from the forelimbs and the femora and tibiae from the hindlimbs. These are also the primary meat-yielding bones. As well as these bones the mandibles, metatarsals, metacarpals and 1<sup>st</sup> phalanges also yield bone marrow, though usually in considerably smaller quantities. In an economy that is not struggling for calories it is usual to see the high-yield marrow bones being exploited for their fat content, and while we would expect to see some exploitation of the low-yield bones, it would not be anticipated that this would be on the same scale as on the high-yield bone. The correlation between helical fractures and high marrow yield elements suggest a deliberate human choice to break these bones. We would not expect to see such obvious correlation were the helical fractures the result of other taphonomic processes such as trampling.



**Figure 6.42: Graph showing the total number of different fracture types present on the different marrow-yielding cattle elements. The first four columns represent high-marrow yield elements; the last four are low-marrow yield.**

This hypothesis is largely corroborated by the results shown in Figures 6.42 to 6.44. Figure 6.42 shows the total number of first fractures present on all elements; we can see helical fractures are present on between 34.9% and 40.4% of the humerii, radii, femora and tibiae, rather more than the average of 31% indicated above. There is a definite deficit of this kind of fracture present

on the mandibles (6.2% and 1<sup>st</sup> phalanges 10%), however this deficit is not nearly so pronounced for the metapodia, of which 24.6% of the metatarsals and 30.5% of the metacarpals display helical fractures. Though slightly less than the percentages of helical fracture on the more typically high-yield elements, the exploitation of the fat within metapodia is clearly more in line with these high-yield elements than the more definitively low-yield mandibles and 1<sup>st</sup> phalanges.



**Figure 6.43: Graph showing the number of first evident fractures present on the different marrow-yielding cattle elements. The first four columns represent high-marrow yield elements; the last four are low-marrow yield.**

In terms of how many bones were exploited over the course of the site, figure 6.43 suggests that in the region of half of the high-yield elements were subject to helical fractures, which means roughly the same number of bones were not fractured for the first time until they were either dry or mineralised. That around 50% of the high-yield elements were being fractured when fresh is extraordinary considering that this kind of activity is not supposed to be happening at these sites (Thomas 1999; Albarella and Serjeantson 2002).

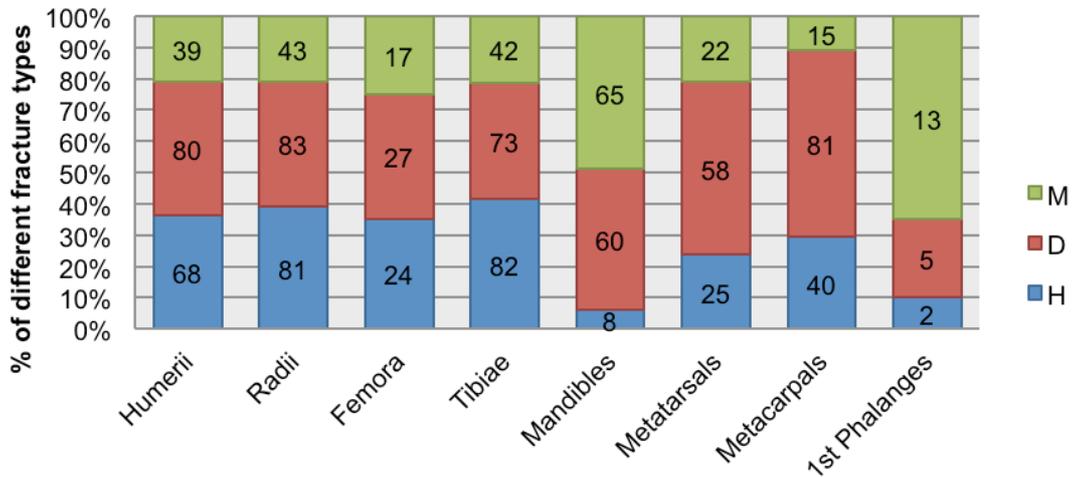
It is interesting to consider the potentially different activities indicated by material present in the ring-ditch compared to that within the internal pits and other features. Because the majority of the material was recovered from the ring-ditch, the general proportions of fracture types from this large feature were very similar to the overall proportions shown above (see Figures 6.44 and 6.45). The only really notable difference is that when looking at the number of bones being fractured whilst fresh, the percentage rises slightly so that exactly 50% of humerii and radii displayed helical fractures, and the percentage of freshly

fractured tibiae also rises slightly. The numbers of freshly fractured femora appear to stay more or less static. There is virtually no difference in the proportions of low-marrow yield being freshly fractured, and once again the metapodia display helical fractures in numbers more consistent with the high-yield elements.

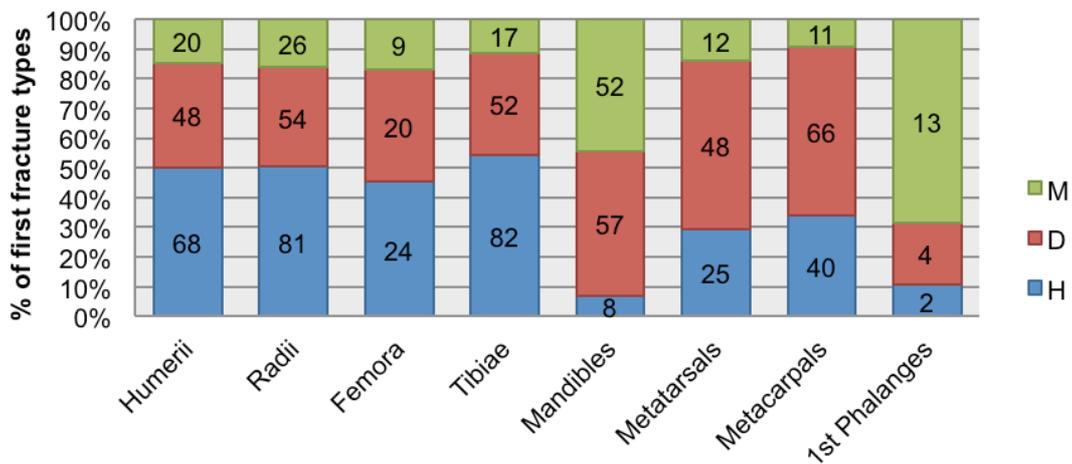
Generally the proportions of different fracture types present in the internal features are slightly different from those observed in the ring-ditch (Figures 6.46 and 6.47), however it must be remembered that the quantities of marrow-yielding bone (or any kind of bone) were considerably less in these features than were present in the ring-ditch. The overall number of high-yield bones displaying fresh fractures was lower than the number in the ring-ditch, at between 25% and 36.7% (compared to between 35.3% and 41.6%), as was the percentage of fresh fractures present on bones in relation to the Neolithic use of the site (between 28.6% - 55% compared to 45.3% - 54.3%). It is interesting to notice that by both methods of counting (overall fracture vs. initial fracture) metacarpals appear to have been freshly fractured in higher proportions than humerii, femora or tibiae. Similarly, metatarsals display fresh fractures in higher proportions than humerii according to overall fracture, and higher proportions than humerii, femora or tibiae according to initial fracture. This could be a genuine prevalence of fresh fracture on these elements in these features, or potentially it could relate to there being a higher relative number of these elements within the internal pits compared to the other elements than in the ring-ditch.

Either way, when taken in conjunction with the high numbers of freshly fractured metapodia present in the ring-ditch it seems clear that these elements are not being distinguished as being low-marrow yield elements, and are being exploited for their fat content in almost commensurate numbers to the high-yield elements. Having said this, it must be remembered that such small numbers are not ideal for this kind of analysis that relies on creating a 'bigger' picture of the site in order to understand generally, rather than specifically, the kind of activity occurring at the site. Results such as those presented in this paragraph are interesting, but could so easily be dramatically skewed by the addition or

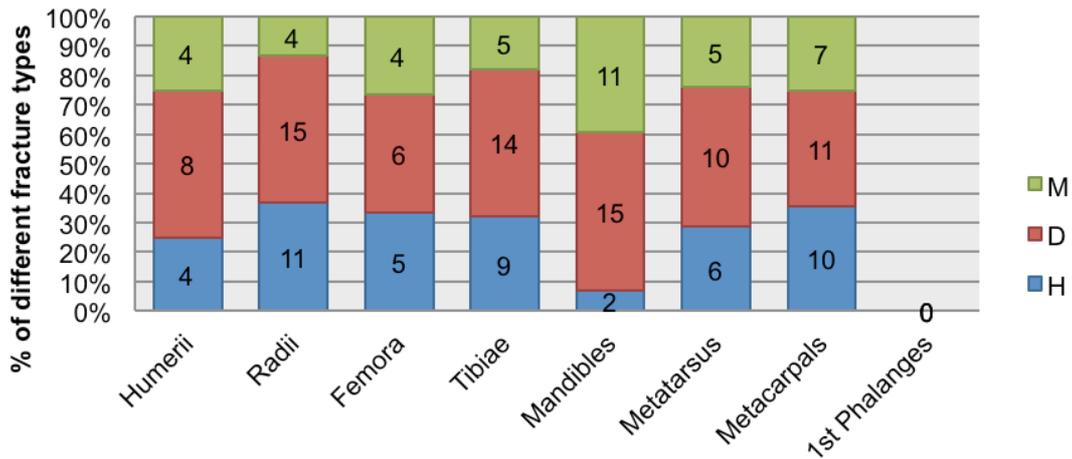
removal of one or two elements that their real value comes when they are integrated with the site as a whole.



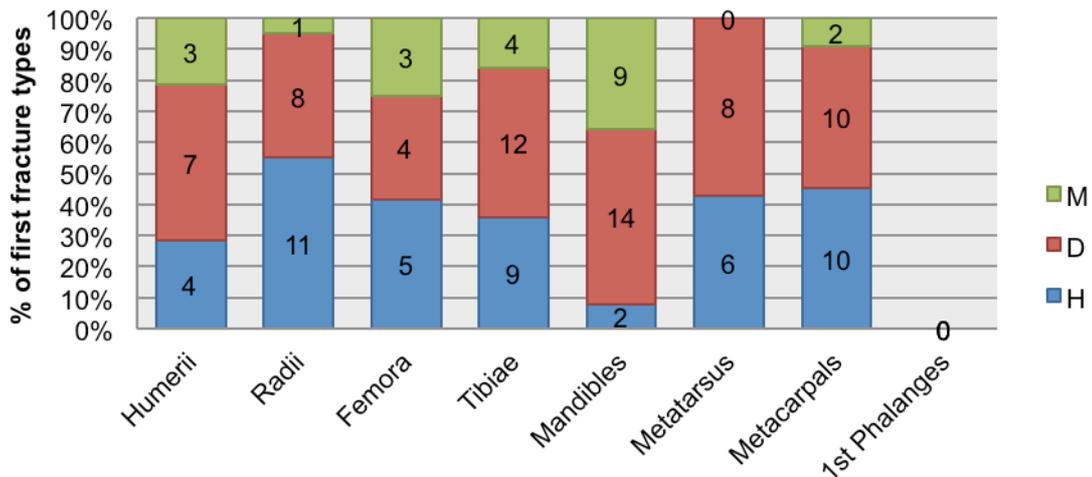
**Figure 6.44:** Graph showing the total number of different fracture types present on the different marrow-yielding cattle elements recovered from the Neolithic enclosure ditch at Etton (F1). The first four columns represent high-marrow yield elements; the last four are low-marrow yield.



**Figure 6.45:** Graph showing the number of first evident fractures present on the different marrow-yielding cattle elements recovered from the Neolithic ring-ditch. The first four columns represent high-marrow yield elements; the last four are low-marrow yield.



**Figure 6.46: Graph showing the total number of different fracture types present on the different marrow-yielding cattle elements recovered from the internal features at the Etton causewayed enclosure (F40, F203, F227, F228, F247, F251, F307, F313, F314, F360, F363, F442, F505, F563, F624, F638, F644, F698, F746, F748, F784, F798, F848, F981, F994, F1032, F1051, F1052, F1054, F1056 and F1060).**



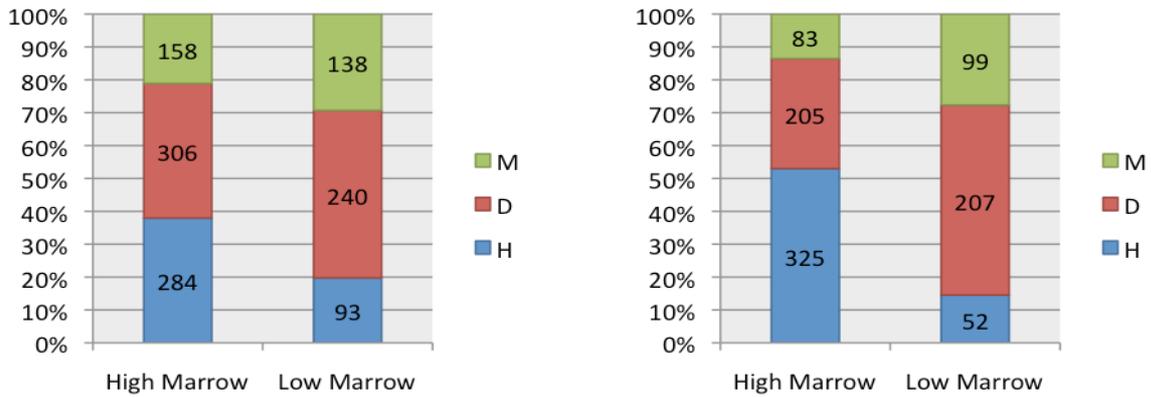
**Figure 6.47: Graph showing the number of first evident fractures present on the different marrow-yielding cattle elements recovered from the internal features at the Etton causewayed enclosure (F40, F203, F227, F228, F247, F251, F307, F313, F314, F360, F363, F442, F505, F563, F624, F638, F644, F698, F746, F748, F784, F798, F848, F981, F994, F1032, F1051, F1052, F1054, F1056 and F1060).**

Although no 1<sup>st</sup> phalanges are present on the graph, it ought to be noted that 17 were recovered from the internal pits, however all were whole. This number is relatively high for an element that is present in considerably lower quantities than most within the ring-ditch, and, when considered in light of the relatively

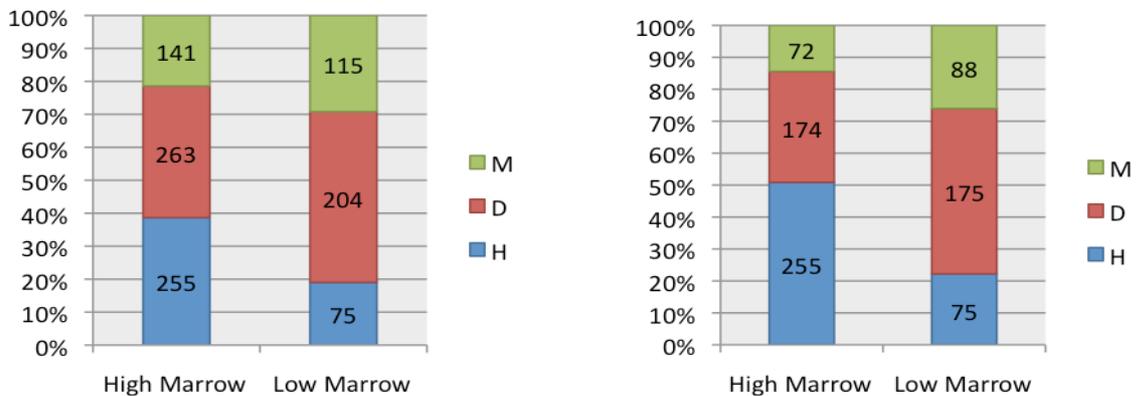
high activity present on metapodia from these features, may suggest a propensity to deposit lower limb elements in the internal pits.

All of the above results can be combined into graphs where the high and low marrow yield elements have been amalgamated (overleaf – Figures 6.48 – 6.53). What these graphs make clear is that the percentage of bones being freshly fractured at the site can only be properly understood by looking at the initial fractures present on the bones. Without so doing, the number of later fractures and repeated bones dramatically biases the truth of the proportion of bones apparently being exploited for their marrow content at the site. The figures also demonstrate that generally speaking the bones that yield lower amounts of bone marrow are being featured less regularly than those that yield more significant quantities. Having said this, it is clear from looking at the graphs that display the data for individual elements that the metapodia are also being regularly exploited, though in the ring-ditch this is not happening in quite the same quantities as in the internal features. In this instance this is unsurprising as cattle metapodia would have contained more marrow than many high-yield pig and sheep bones, and given their abundance at the site, not to utilise these elements for fat exploitation would have been counter-intuitive. Nevertheless, the metapodia seem to be a key part of the fat exploitation industry at the site.

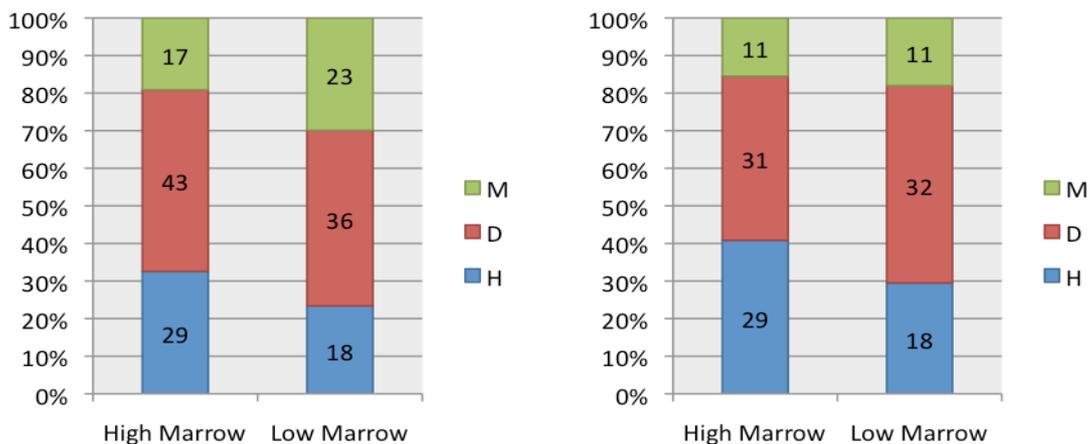
What is apparent from these results is that the processing of cattle carcasses involves the fracturing of bones for the extraction of fat, and that this seems to have been an activity that was done with considerable regularity. It is suggested therefore that fat extraction from cattle would have contributed in no small way to the economy of Neolithic Etton. Traditionally it is argued that the absence of this kind of activity at causewayed enclosure sites and other sites thought to be of 'ceremonial' or 'ritual' origin is indicative of the economy at these sites not being representative of a standard 'domestic' or 'settlement' economy (Thomas 1999, 27 - 28; Armour-Chelu 1998, 284; Serjeantson 2011). Following the examination of the fat extraction industries surrounding the other species present at the site it may be possible to re-examine this view.



**Figures 6.48 and 6.49:** Graph on the left shows the total number of fractures present on high and low marrow yield elements from all Neolithic features. Graph on the right shows the first fractures to be present on high and low marrow elements from the same features.



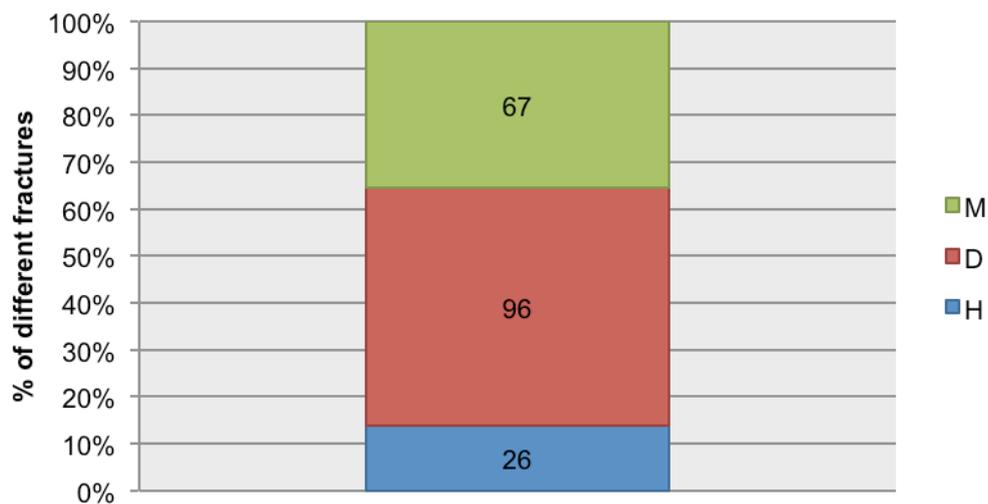
**Figures 6.50 and 6.51:** Graph on the left shows the total number of fractures present on high and low marrow yield elements from Neolithic ring-ditch. Graph on the right shows the first fractures to be present on high and low marrow elements from the same feature



**Figures 6.52 and 6.53:** Graph on the left shows the total number of fractures present on high and low marrow yield elements from all internal Neolithic features. Graph on the right shows the first fractures to be present on high and low marrow elements from the same features.

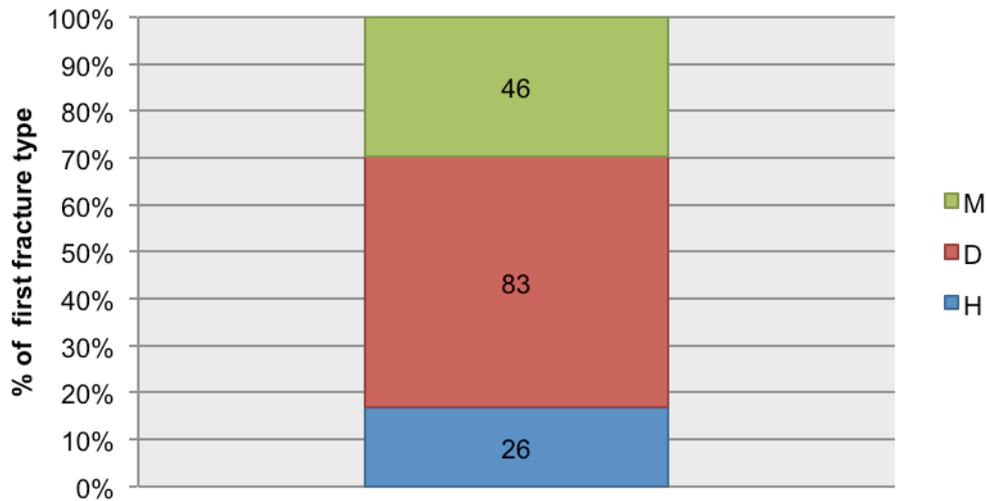
### 6.5.2 Domestic Pig (*Sus scrofa*)

Domestic pigs were the second most abundant species at Neolithic Etton, though they were present in considerably fewer numbers than cattle. It was anticipated that fresh fractures would be evident on marrow yielding bones, however because they are considerably smaller than cattle it was expected that lesser numbers of elements (both high and low yield) would have been exploited for their marrow content. Of the 232 marrow yielding elements present at the site, fractures were recorded on 173. Those elements for which the fracture could not be recorded were either whole, gnawed, unfused or in too poor a condition to allow for accurate analysis.



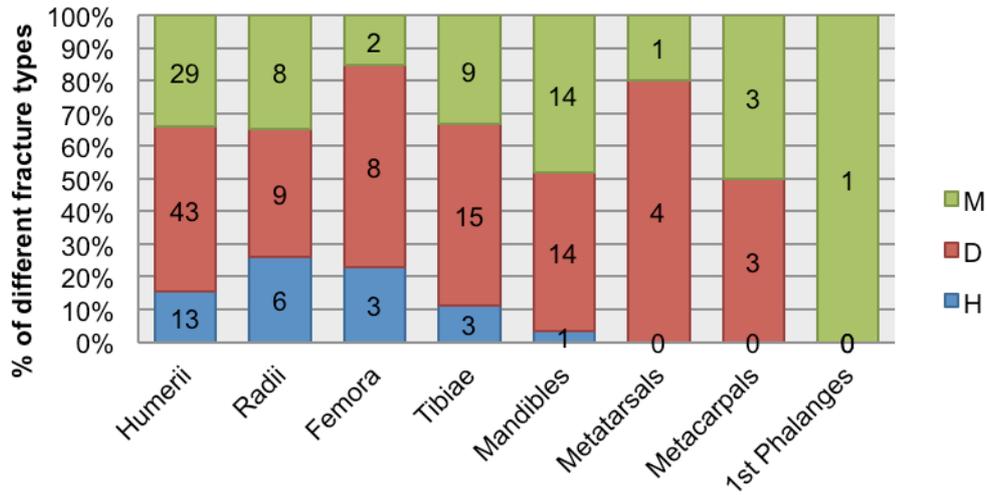
**Figure 6.54: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding pig bone from all Neolithic contexts at the Etton causewayed enclosure.**

Figure 6.54 shows the total percentages of the different fracture types present on pig bones. At 13.8% the total percentage of helically fractured bone is clearly substantially less than was present on cattle bone. Regardless of this difference however, the number remains considerably higher than would traditionally have been anticipated on any kind of bone from a causewayed enclosure site. Figure 6.55, which shows the first evident fractures, suggests a slightly higher percentage of bones were being fractured when fresh - around 16.8%. Again, this is nowhere near the number of cattle bones being fractured whilst fresh, but is still a significant total.

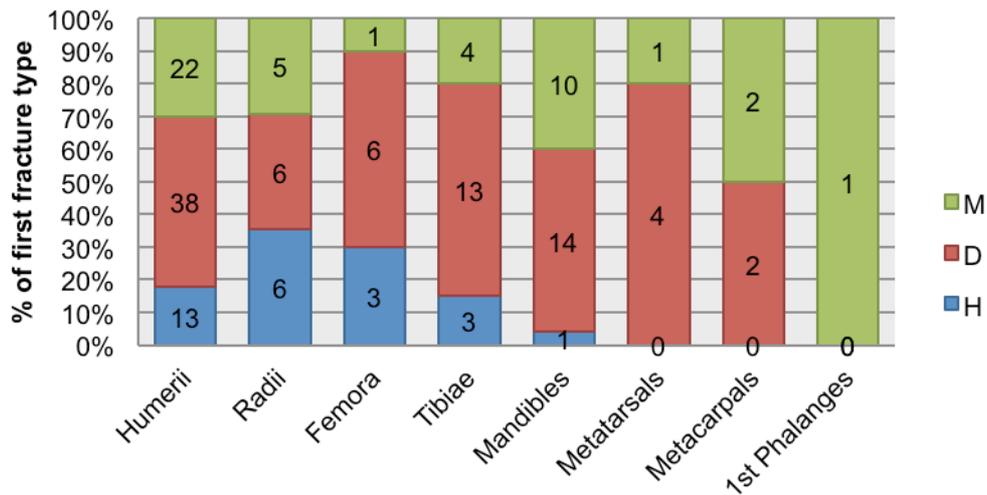


**Figure 6.55: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding pig bone from all Neolithic contexts at the Etton causewayed enclosure.**

By breaking down these totals by element, it seems that there is a different overall pattern of exploitation occurring between cattle and pig. Where both high and low marrow yield cattle elements were being fractured whilst fresh, with the exception of one mandible, only high-yield pig elements seem to be being targeted for fat extraction. This is likely due to the fact that the marrow cavities within the low-yield elements are so small. It could also be in part to do with the fact that so few low-yield elements were actually recovered from the site. The most common freshly fractured element were radii, of which 26.1% were helically fractured according to overall fracture prevalence, and 35.5% according to the first evident fracture. Femora were the second most frequently freshly fractured element, with 23.1% displaying fresh fractures according to overall fracture prevalence, and 30% according to first evident fracture. Humerii and tibiae were relatively less well represented; humerii with 15.8% and 17.8% and tibiae with 11.1% and 15% helical fractures by overall prevalence and first evident fracture respectively.



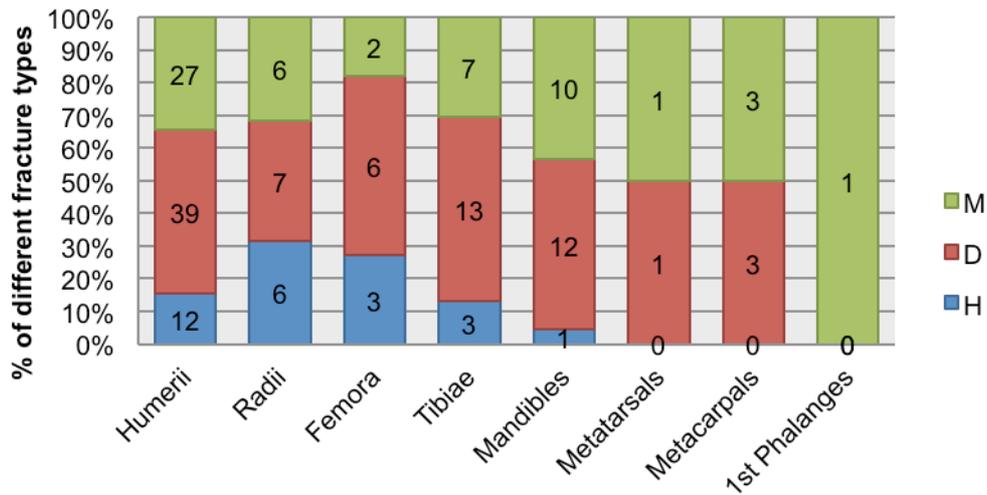
**Figure 6.56: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding pig bone from all Neolithic contexts at the Etton causewayed enclosure.**



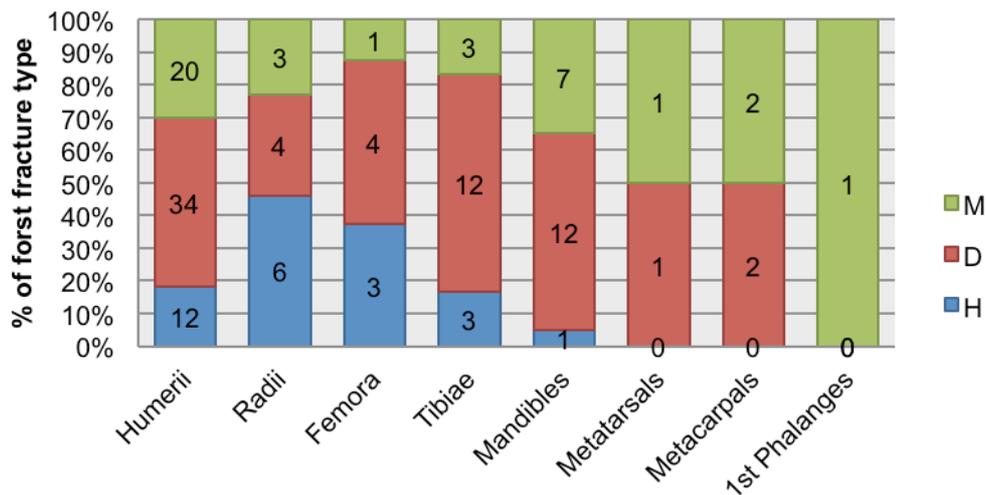
**Figure 6.57: Graph showing the first evident fractures present on marrow yielding pig bone from all Neolithic contexts at the Etton causewayed enclosure.**

Comparison of the material recovered from the ring-ditch and the internal features is limited by the small quantity of material recovered from the internal features; however some aspects of this analysis are worth discussing. Because of the relatively small amount of material present in the internal features, it was expected that the proportions of fracture types on bone exclusively from the ring-ditch would be more or less identical to the results shown in Figures 6.56 and 6.57, and for the overall counts of fractures this is certainly the case (see Figure 6.58). However, when figure 6.59 is considered the proportions of radii and femora being freshly fractured and deposited in the ring-ditch rise to 46.2%

and 37.5% respectively, significantly higher than of the elements, and much more in line with the proportions witnessed for high-yield cattle elements. At the same time, none of the radii present in the internal features displayed any helical fracture whatsoever. Once again these results must be considered bearing in mind the caveat that we are looking at much smaller quantities of material, nevertheless, it seems that radii were subject to significantly more prolific exploitation than any other pig element.



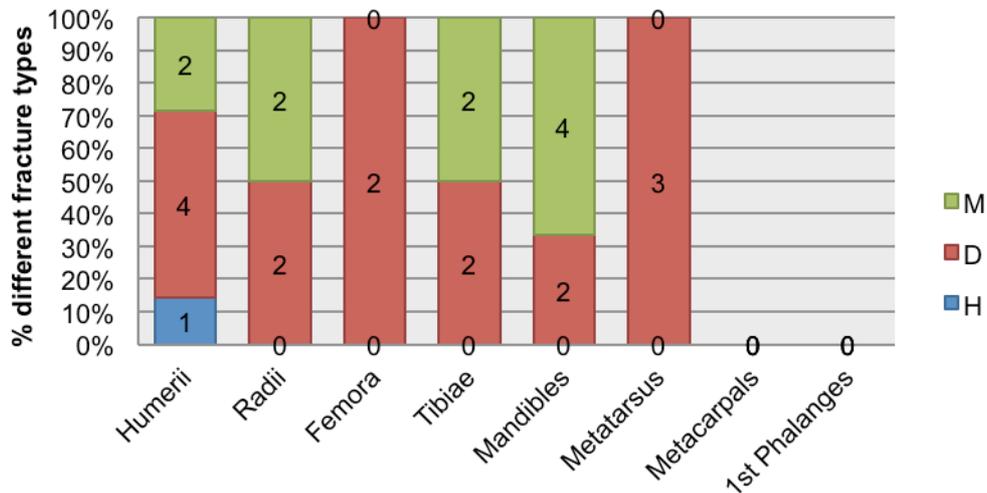
**Figure 6.58: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding pig bone from the Neolithic enclosure ditch at Etton.**



**Figure 6.59: Graph showing first evident fractures present on marrow-yielding pig bone from Neolithic enclosure ditch at Etton.**

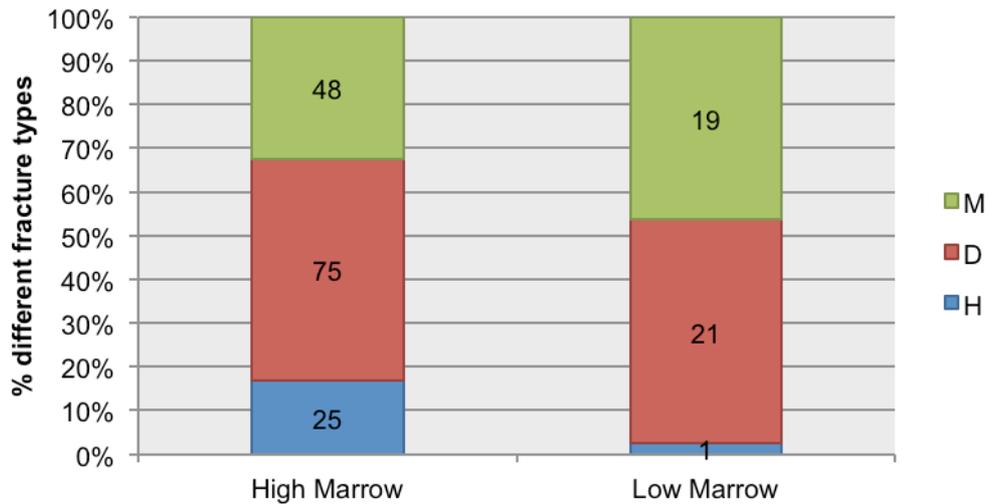
Pig remains were present in just four of the internal features excavated at Etton. With the exception of a single humerii, none of the elements from these features were found to show any signs of having been freshly fractured. Figure

6.59 shows the proportions of fracture type by first evident fracture – the graph for the overall number of fractures present is almost identical to figure 6.60, with the exception that the quantities of tibiae were 2 dry and 2 mineralised (so the proportions remain identical), and that there was one more mandible with a mineralised fracture.

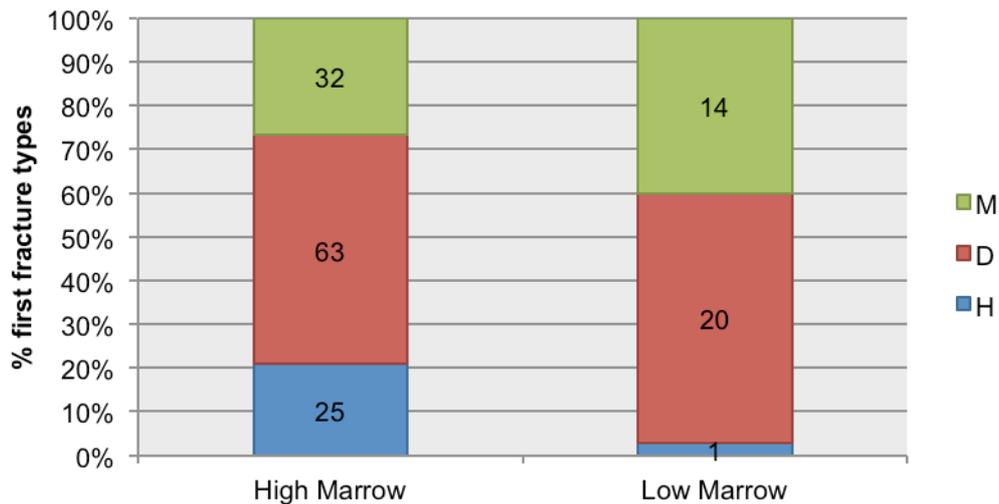


**Figure 6.60: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding pig bone from Neolithic internal features at Etton.**

By amalgamating the high and low marrow yielding-elements into composite graphs (Figures 6.61 and 6.62) it is easy to see that the assemblage is dominated by dry fractures to a far greater extent than was seen in the cattle assemblage. In fact, for both high and low yield elements, and both the overall fractures and the first evident fractures, there are more dry fractures than helical and mineralised fractures put together at between 50.7% and 57.1%. This should not diminish the presence of helical fractures however – between 16.9% and 20.8% of the high yield elements displayed fresh fractures, which is clearly a significant proportion.



**Figure 6.61: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding pig bone from Neolithic internal features at Etton.**



**Figure 6.62: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on high and low marrow-yielding pig bone from Neolithic internal features at Etton.**

It seems most likely that the smaller quantities of helical fractures present on pig bones are primarily the result of these animals not being exploited for their fat to the same degree as cattle because they were not only present in significantly smaller numbers (so were likely less easily accessible and less commonly used), but that they were simply significantly smaller animals. While it would probably have been necessary to butcher cattle prior to their consumption, this may well not have been the case with pigs that could have been cooked whole. The butchery of animals makes their bones rather more available for fat extraction than when an animal is cooked in its entirety. The concluding chapter of this thesis will consider the fracture evidence in

conjunction with the results of butchery analysis to see whether there is evidence for this.

### 6.5.3 Domestic Sheep/Goat (*Ovicaprid*)

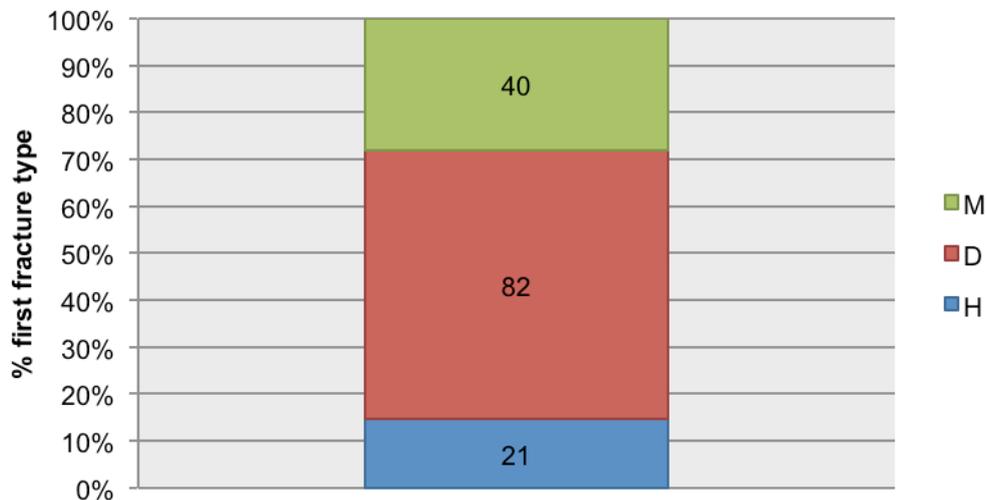
Domestic sheep/goats were the third most prevalent species on site, and made up just 9% of the total identified specimens. Because of the relatively small numbers of sheep/goat that appear to have been present at the site, it is anticipated that, much like was observable with pigs, they will not have been exploited for their fat to the same degree as the cattle. This is also anticipated because sheep/goats are so much smaller than either cattle or pigs, so the amount of retrievable marrow will be rather less. Of the 193 marrow yielding elements that were identifiable to sheep/goat and of these, fractures were recordable on 159. The majority of those elements for which fractures could not be recorded were whole 1<sup>st</sup> phalanges. The others had either been gnawed, were unfused, or were in too poor a condition for the fracture type to be accurately judged.



**Figure 6.63: Graph showing the total percentages and numbers of the helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding sheep/goat bone from all Neolithic features at Etton.**

Figure 6.63 shows the total number of helical, dry and mineralised fractures present on the sheep bone. The overall percentage of helically fractured bone was 12.3%, almost 20% less than cattle and but only just over 1% less than pig.

Fig 6.64 shows the percentage of bones that were actually fractured during the use of the site (first evident fracture). The increase between total fractures and first evident fractures is just 2.4% to 14.7%.

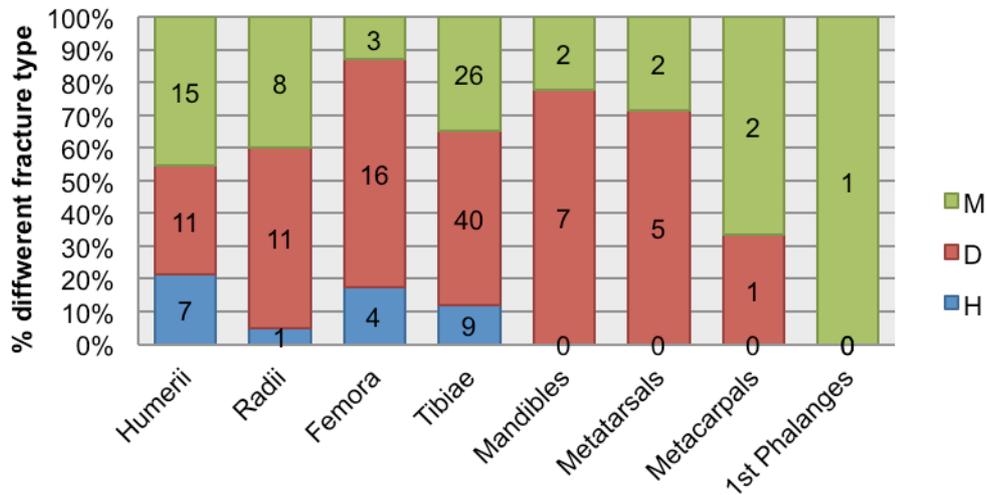


**Figure 6.64: Graph showing the percentages of first evident helical (H), mineralised (M) and dry (D) fractures present on marrow-yielding sheep bone from all Neolithic features at Etton.**

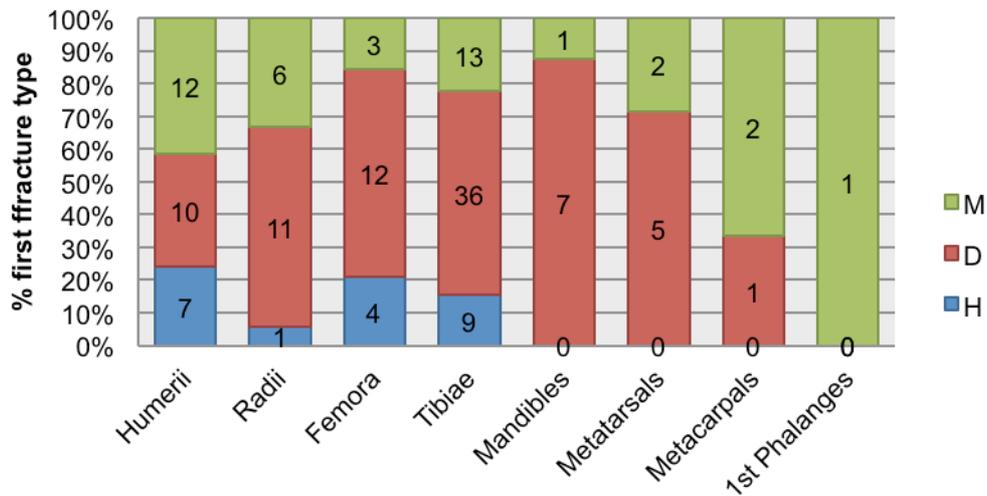
Of the four high marrow-yield elements, humerii were the most frequently broken when fresh, with 21.2% of the total number of fractures and 24.1% of the first evident fractures being helical (Figures 6.65 and 6.66). This pattern is contrary to that observed for cattle or pigs, where humerii tended to be the least, or second least frequently freshly fractured element. Similarly radii, which for cattle and pig was the most frequently freshly fractured element were the elements, was the least frequently freshly fractured with 5% of the total fracture and 5.6% of the first evident fracture being helical. Femora are the second most frequently freshly fractured element, with 17.4% of the total number of fractures and 21.1% of the first evident fractures being helical. Tibiae have the second fewest helical fractures after radii, with 12% of the total and 15.5% of the first evident fractures having been created when the bone was fresh.

Clearly from figures 6.65 and 6.66, none of the elements deemed to have lower marrow yields were found to have been fractured when fresh. This is fairly unsurprising – the size of the mandibles and 1<sup>st</sup> phalanges is such that the marrow cavity is really very small, and although it is slightly more substantial in the metapodia, it is not considerably so. While the effort required to extract the

marrow from these bones would certainly not need to be substantial, the gain would be negligible.

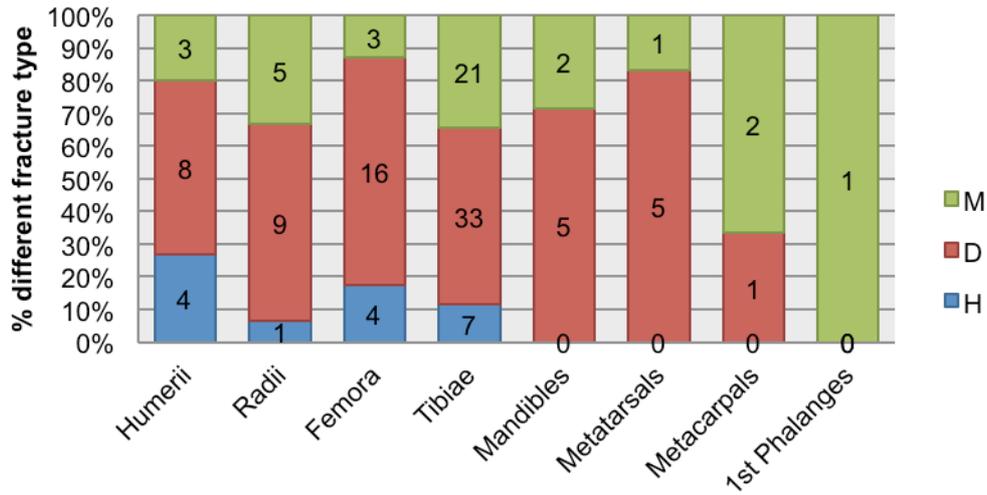


**Figure 6.65: Graph showing the total percentages of helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding sheep elements from all Neolithic features at Etton.**

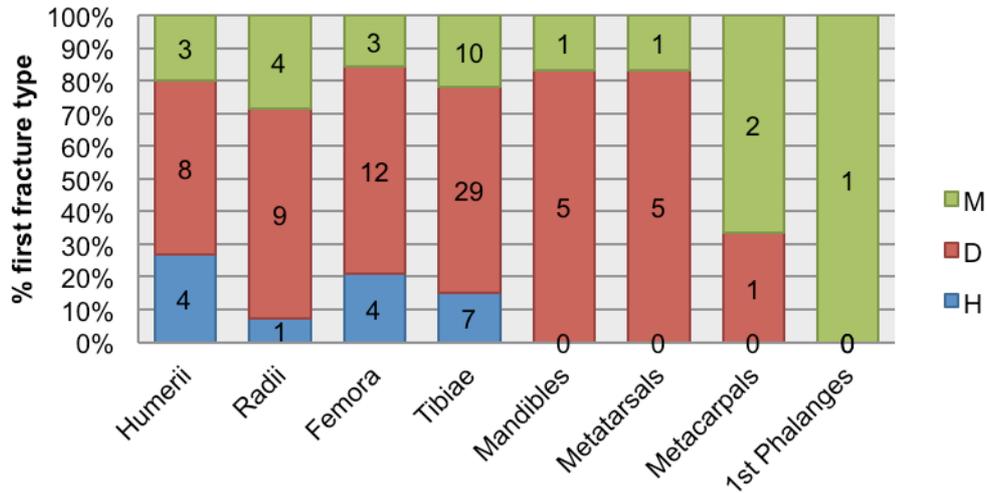


**Figure 6.66: Graph showing the percentages of first evident helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding sheep elements from all Neolithic features at Etton.**

The proportions of the fracture types present in the ring-ditch are almost identical to those displayed above, as only five of the helically fractured elements came from the internal features. The only difference is the slightly elevated percentages of helical fractures (and therefore slightly decreased percentages of the other fracture types). Figures 6.67 and 6.68 show the proportions of different fracture types present in the ring-ditch.

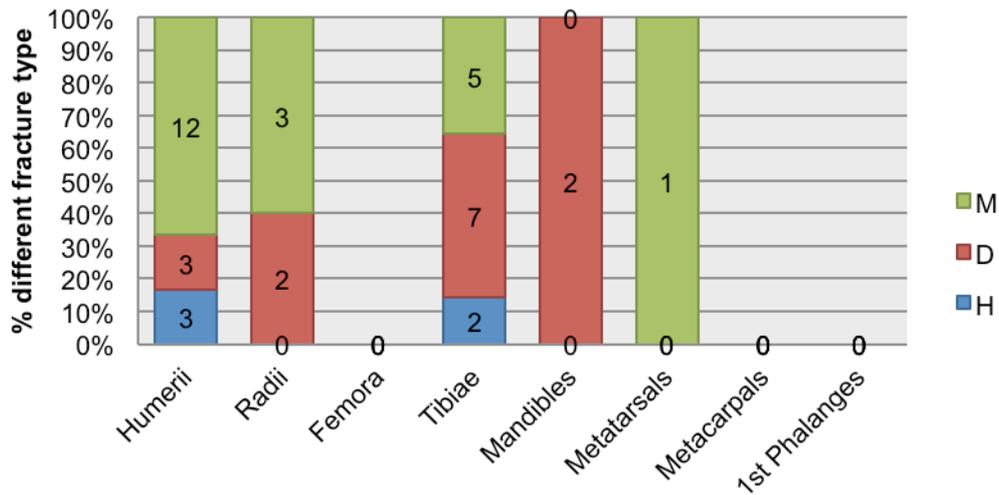


**Figure 6.67: Graph showing the total percentages of helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding sheep elements from the enclosure ditch at Etton (F1).**

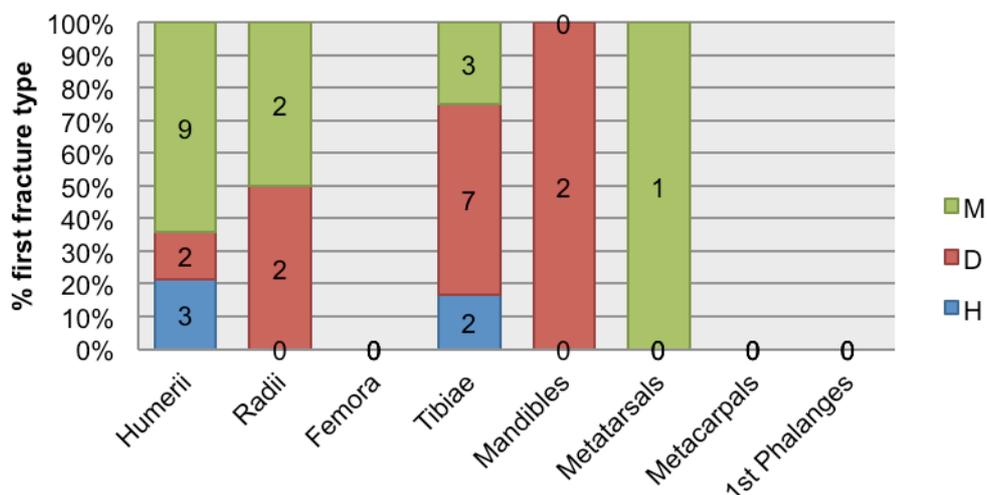


**Figure 6.68: Graph showing the percentages of first evident helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding sheep elements from the enclosure ditch at Etton.**

Sheep/goat remains were recovered from 16 internal features, but only in very small quantities. Figures 6.69 and 6.70 are slightly misleading, as two 1<sup>st</sup> phalanges and a femur were also recovered, however, these were unfractured. No sheep metacarpals were recovered from the internal features at all. The proportion of freshly fractured humerii present in the internal features is c. 10% less than was present in the ring-ditch; however the proportion of freshly fractured tibiae is roughly the same. No other freshly fractured elements were recovered from the internal features.

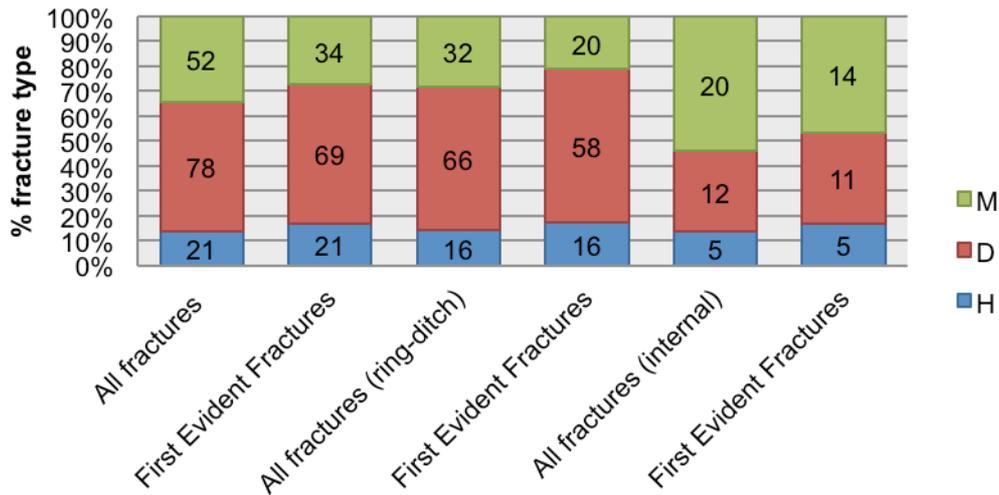


**Figure 6.69: Graph showing the total percentages of helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding sheep elements from the Neolithic internal features at Etton.**



**Figure 6.70: Graph showing the percentages of first evident helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding sheep elements from the enclosure ditch at Etton.**

No fresh fractures were present on any of the low marrow-yield sheep/goat elements present in the ring-ditch or the internal features. Figure 6.71 is a graph that amalgamates all of the various proportions of both total and first evident fractures present on high marrow yield elements from the site as a whole, the ring-ditch and the internal features. It is obvious by looking at this graph that for sheep/goat, the proportion of helical fractures on high marrow hovers around the 15% (between 13.5% and 17%), less than half of cattle, but only slightly lower than pig.

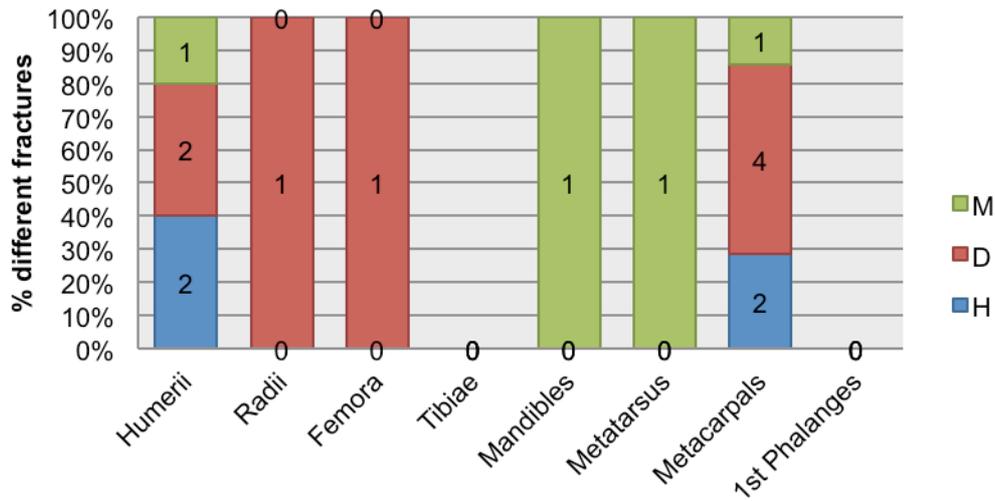


**Figure 6.71: Composite graph showing various proportions of fracture types on high marrow yield elements according to total fractures, first evident fractures and location of the material at Etton.**

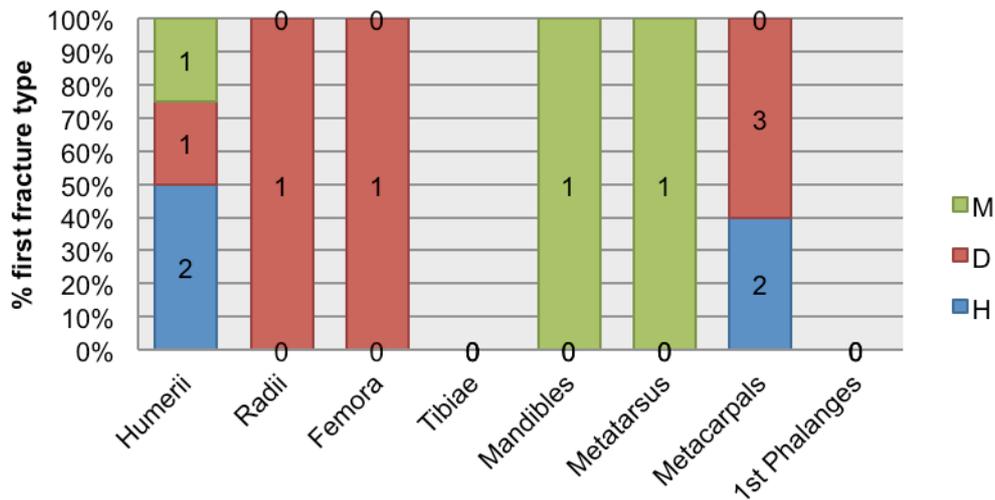
#### 6.5.4 Aurochs (*Bos primigenius*)

Aurochs was the most prevalent wild species present at the site, but even so was only represented by 25 elements. Sixteen of these had recordable fractures present on their surface, the remaining 12 were either complete, or were in too poor a condition for fracture to be reliably assessed. The sixteen elements recovered comprised 5 humerii, a radius, a femur, a mandible, a metatarsal and 7 metacarpals. Of these, only the humerii and metacarpals had fresh fractures. Figures 6.72 and 6.73 show the proportions of the different fracture types present for all of the aurochs bone recovered from the site. Despite the small quantities of aurochs bone recovered, the proportions of helical fractures on the humerii and metacarpals, both according to overall fractures and first evident fractures, appears to be roughly commensurate with the proportions shown for the same cattle elements.

The below figures show the results from the fracture analysis on all of the aurochs bone regardless of its context. Three of the metacarpals were recovered from internal pits F644 and F1054. Of these, one had a helical fracture.



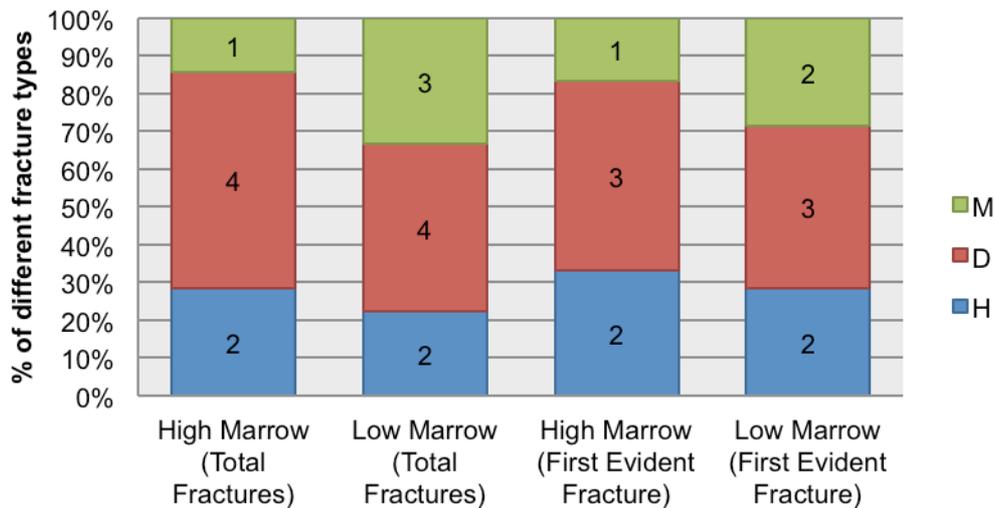
**Figure 6.72: Graph showing the total percentages of helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding Aurochs elements from all Neolithic features at Etton.**



**Figure 6.73: Graph showing the percentages of first element helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding Aurochs elements from all Neolithic features at Etton.**

There are a number of differences between the fractures present on aurochs and domestic cattle, not least the quantity of bones involved in the analysis, and the absence of helical fractures on certain bones. A particularly interesting difference, albeit limited in its value by the extremely small amount of data, is that the difference in proportion of helically fractured high/low marrow yield elements (specifically between humerii and metacarpals) is much smaller (Figure 6.74). This is not surprising considering the difference in size between the aurochs and domestic cattle elements – it appeared during the analysis that as much marrow could be extracted from aurochs metapodia as could be from

many high marrow yield domestic cattle elements, so their heightened exploitation is economically sound. This in fact adds to a pattern visible from aurochs through to sheep/goat whereby the discrepancy between proportions of helically fractured bones present in the high and low marrow yield groups declines as size increases.

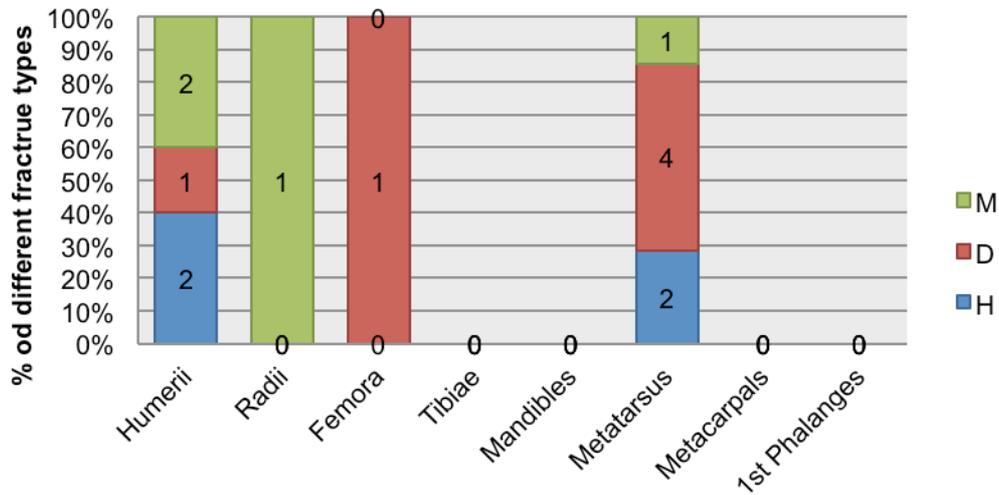


**Figure 6.74: Graph showing the total percentages of helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding Aurochs elements from all Neolithic features at Etton.**

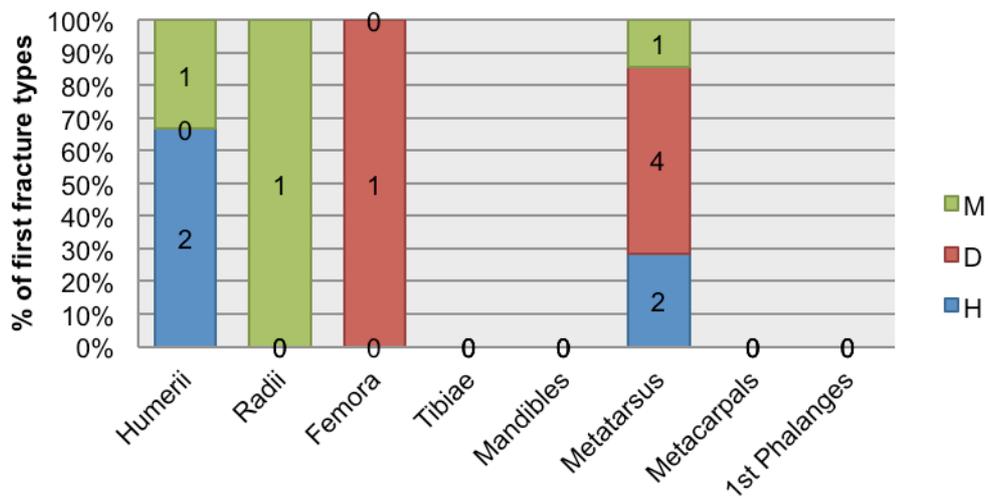
#### 6.5.5 Red Deer (*Cervus elaphus*)

Red deer were the second most prevalent wild species present at Etton, represented by just one less element than aurochs. They would likely have been at least the same size as, if not larger (taller) than domestic cattle. Of the twenty-four elements identified as belonging to Red Deer, eleven are included in this fracture pattern analysis. In a remarkably similar pattern to aurochs, helical fractures were only evident on humerii and metatarsals (Figures 6.75 and 6.76), though this similarity is potentially exacerbated by the absence of other elements. Once again, despite there being really very few elements, the proportions of helical fractures to the other types of fracture present is very similar to both cattle and aurochs (Figure 6.77), implying a similar level of marrow extraction was occurring on each of these species, cattle as a matter of course and aurochs and red deer as and when they were present on the site. Just one metatarsal was recovered from the internal features. This had been fractured when mineralised. Because it appears to be only the humerii and the

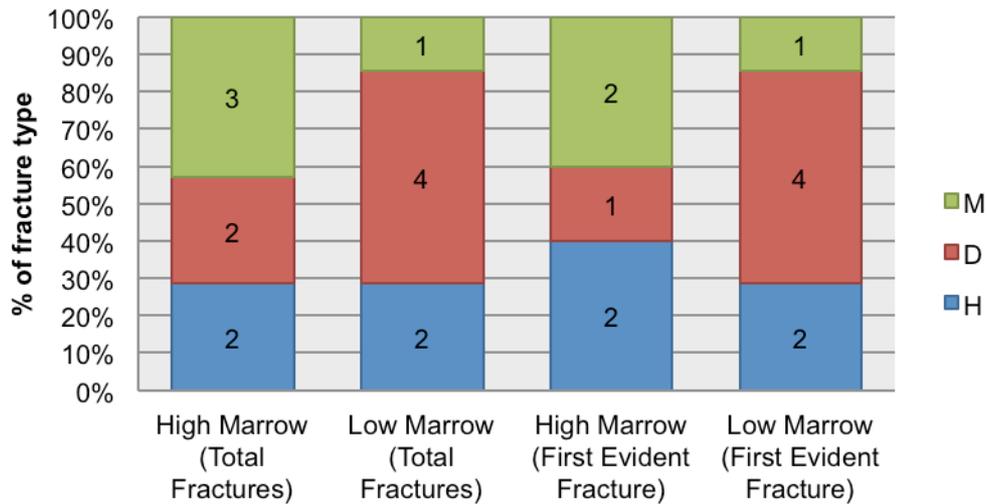
metatarsals that were freshly fractured, it is possible that these elements were subject to some kind of pattern of exploitation or consumption which made them easily accessible for marrow extraction. This has been discussed in Chapter 5, where butchery evidence has been considered.



**Figure 6.75: Graph showing the total percentages of helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding Red Deer elements from all Neolithic features from Etton.**



**Figure 6.76: Graph showing the first evident (H), mineralised (M) and dry (D) fractures present on the various marrow yielding Red Deer elements from all Neolithic features from Etton.**



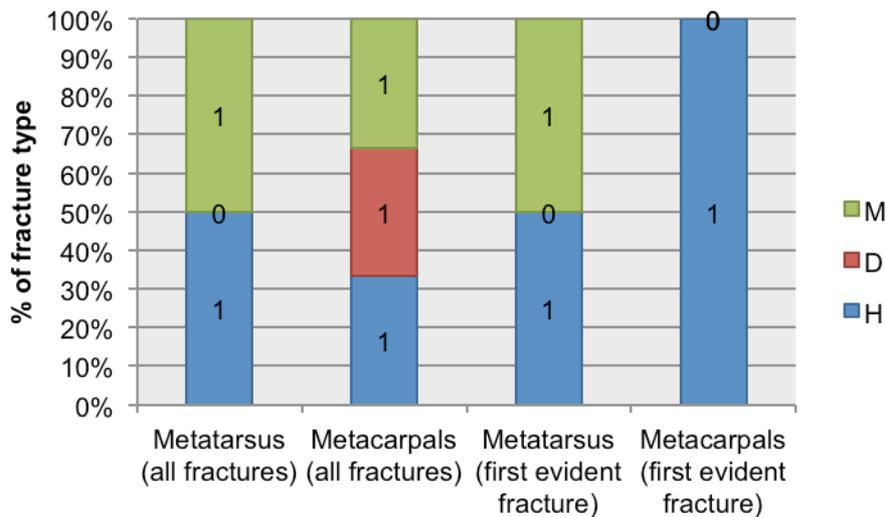
**Figure 6.77: Graph showing the total percentages of helical (H), mineralised (M) and dry (D) fractures present on the various marrow yielding Red Deer elements from all Neolithic features from Etton.**

Figure 6.77 shows the various proportions of helically fractured bone present in all Neolithic features. By total number of fractures, there is no difference between the high and low marrow yield elements, however by first evident fracture there is roughly 12% difference between the high and low marrow yield elements. This is a larger gap than was present for the aurochs, but smaller than cattle. If we consider the apparent pattern of size of animal to gap between high and low marrow yield elements, the red deer fit the pattern of decreasing difference (between M high and low yield) to increasing size.

#### 6.5.6 Roe Deer (*Capreolus capreolus*)

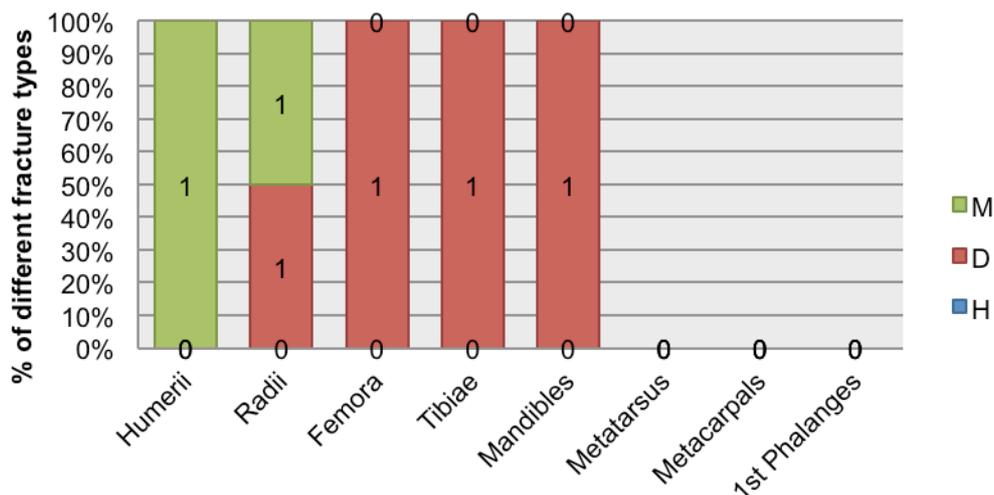
Aside from fragments of antler, roe deer was represented by just five elements – two metatarsals, one metacarpal, a 1<sup>st</sup> phalanx and a calcaneum. Of these five elements, two had been fractured when fresh - a metatarsal and a metacarpal (Figure 6.78). On the face of this, the proportion of fresh fractures puts Roe Deer as the most heavily exploited animal on site for bone marrow (Figures 6.80 to 6.82), however the small number of elements must be taken into account, as the Roe Deer is the least well represented food species on the site. The two helically fractured elements are both low marrow yield; with no high marrow yield elements present it is impossible to compare the discrepancy between proportions of fresh fractures on the high and low yield elements. It would appear that, although roe deer did not seem to be very regularly present

on the site, when they were they were exploited for their meat and marrow, as well as potentially for other purposes.



**Figure 6.78: Graph showing proportions of helical (H), mineralised (M) and dry (D) fractures (both total, and first evident fractures) present on roe deer elements from all Neolithic features at Etton.**

#### 6.5.7 Unfractured Species



**Figure 6.79: Graph showing proportions of helical (H), mineralised (M) and dry (D) fractures present on Dog elements from all Neolithic features at Etton. The total and first evident fractures were present in identical numbers, so this graph represents both kinds of count.**

As well as cattle, pigs, sheep/goat, aurochs, red and roe deer, three species were present at the site to which no helically fractured bones were attributable. These species included dogs, foxes and humans, all animals that today in

western cultures are considered as non-food species. The dogs on site were represented by fourteen individual marrow yielding elements. Partial skeletons of dogs were also present but the only fractures present on these were new. The fourteen marrow yielding elements included a 1<sup>st</sup> phalanx, two radii, two femora, two humeri, three tibiae and four mandibles. Of these, eight were either whole, had been newly fractured or were in too poor a condition to be accurately analysed for fracture, leaving six for analysis. Figure 6.79 shows the proportions of the fracture types on these six elements. It is clear that none of them had been subject to fracture when fresh.

Three fox elements were also present at the site, two mandibles and a metacarpal. The metacarpal was whole, however the two mandibles were fractured, one when dry and one when mineralised. Like with dogs, no fresh fractures could be recorded from these bones, and no butchery evidence was present either. The final non-food species represented by skeletal elements at Etton was human. Nine human elements were recovered from the site, as well as some apparently human cremated material. Of the nine human bones recovered, three would be classed as high marrow yield bones – two femora and a tibia. None of these elements displayed any fresh fracture; neither did any of the other human remains present at the site. Nor did they display any evidence for butchery. The implications of the absence of helical fractures on the non-food species at the site are important and discussed below.

## **6.6 Dynamic Impact Scars**

It was intended that as well as recording fracture types as evidence for bone processing and fat exploitation, dynamic impact scars would also be recorded as direct evidence for this kind of activity. However, rather unusually there were only four bones on which this kind of evidence could be observed, two tibiae, a humerus and a metatarsal, all belonging to cattle. Such a dearth of direct evidence for the impact leading a bone to be broken is unusual but need not necessarily imply that bones were not being directly impacted in order to break them. In order for dynamic impact scars to be created the creating strike needs to be very direct. It is entirely possible that the impact on the bones was simply not direct enough to cause an impact scar. It is also possible that the

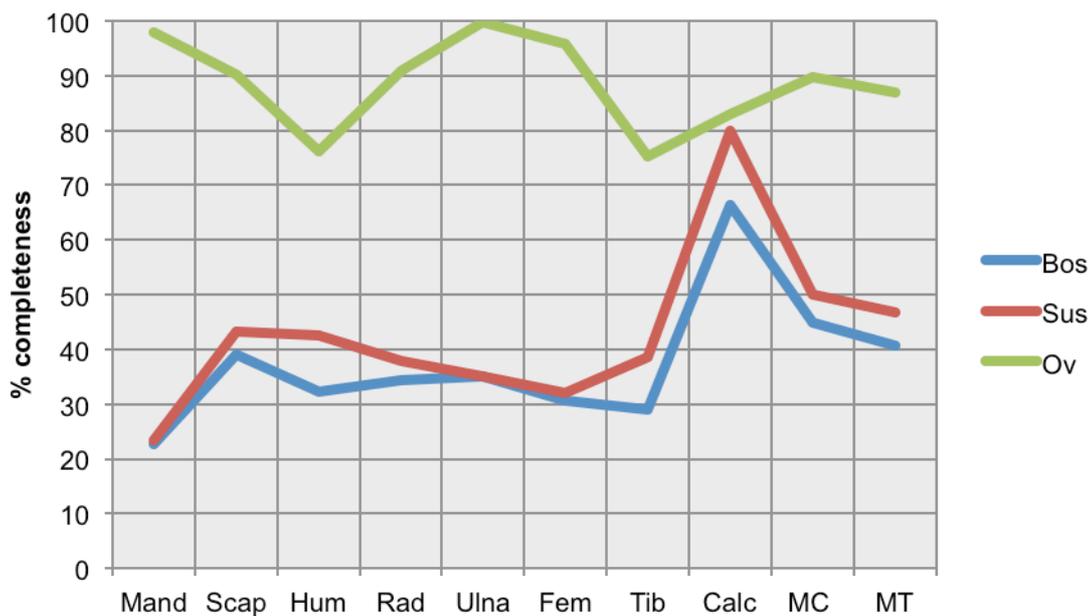
periosteum was not being removed from the bone prior to fracture, which would have affected the creation of dynamic impact scars. It is impossible to see how such a large proportion of helically fractured bones, as are present at Etton, would have come to be so fractured were it not for impact related breakage.

## 6.7 Percent Completeness of Elements

Figure 6.80 shows the percent completeness for the three main domestic species. This analysis could be carried out because during the identification and recording of the bones the present bone zones (after Dobney and Rielly 1998) were noted. These zones were then used to create an overall picture of the completeness of the major elements (see Knüsel *et al.* 2007, after Morlan 1984). From the figure it is clear that there is a distinction between the survivorship of cattle and pig bones compared to sheep bones. Elements of cattle and pig are between 23% and 81% complete, while sheep bones appear to be between 77% and 100% complete. This suggests that sheep were not being nearly so highly fragmented as the other domestic species and implies a distinct way of exploitation for this species. Given the size of sheep, it is possible that they were largely being kept complete for the purposes of consumption. It seems as though they were not being processed to the same extent as cattle or pig, however we know from the previous data presented in this chapter that 17% of broken sheep bones displayed helical fractures, just shy of the proportion of pigs that were broken in the same way. One explanation for this is that sheep bones did not require processing to the same intensity as cattle or sheep bones, so were broken in such a way that more of the bone (thus more of the bone zones) were retained. There is a slight indication of this with the pig bones also, which are overall a little more complete than those of cattle.

From the data presented in Figure 6.80 it is also evident that some bones have much better survivorship than others, especially for cattle and pig. The calcanei of cattle (66.4%) and pigs (80%) were by some considerable margin the most complete element present. This was followed, for these two species, by the metapodia (between 44% and 50% completeness) and then, a little surprisingly, the scapulae (between 39.1% and 43.4%). The seemingly high percent

completeness of the scapula feels somewhat contradictory to the actual remains, which predominantly featured the neck and lower blade and spine of scapulae. The high percent completeness is thought to derive from the fact that there is a concentration of bone zones in the area of the scapulae that is most commonly encountered, whilst fewer areas, relative to their size, represent the proximal blade and spine. The cattle and pig humerii, radii and ulnae were the next most complete (32.4% to 42.6% completeness). The least well-represented elements in terms of percent completeness, are the mandibles (22.8 – 23.3%), femora (30.7 – 32.1%) and tibiae (29 – 38.6%). Not included on Figure 6.80 are vertebrae, crania and ribs. From the analysis it was clear that crania are almost entirely fragmentary, however vertebrae and ribs were often largely complete. In general the marrow yielding bones seem to have been highly fragmented for both cattle and pigs. For sheep the humerii and tibiae of sheep are the most fragmented elements, which correlates with their marrow yield.



**Figure 6.80: Graph showing the completeness of these elements according to the number of recorded bone zones (after Dobney and Reilly 1988).**

## 6.8 Conclusions

It is presumed that the cattle, pigs, sheep/goat, aurochs and red and roe deer were present on site largely as a result of being part of the Neolithic diet. All of

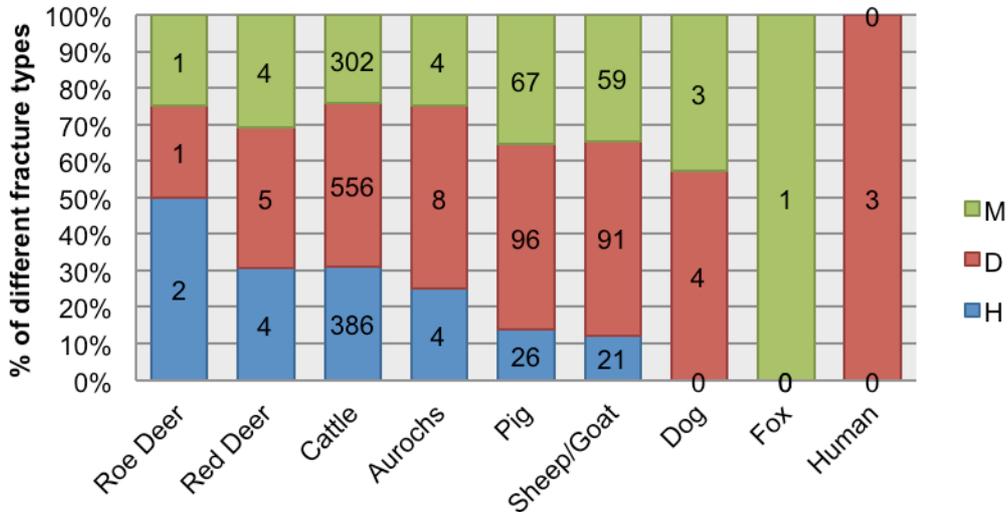
these species appear to have been regularly butchered for their meat (see Chapter 5), as well as being exploited for their marrow. Cattle are generally thought to be the mainstay of the Neolithic economy, with pigs supporting throughout the early and middle period, gradually, though not completely being replaced by sheep into the late Neolithic and early Bronze Age. Aurochs, red deer and roe deer would all have been hunted throughout the Neolithic period, possibly to enhance the everyday diet of the inhabitants of Etton and Staines, possibly only when a 'special occasion' dictated the need for something out of the ordinary.

The wild species are present in such small numbers compared to the primary domesticates that it is clear they were not a large part of the Neolithic economy, this is not to say that they were not important however. It is obvious that as well as being exploited for their meat, aurochs and red and roe deer were also a source of bone marrow whenever they were available. That marrow extraction appears to have been limited to humerii and distal limb bones on the wild animals requires a good deal of future work to be of empirical value, but is potentially interesting, as no such discernment of elements appears to have been true for the domestic species.

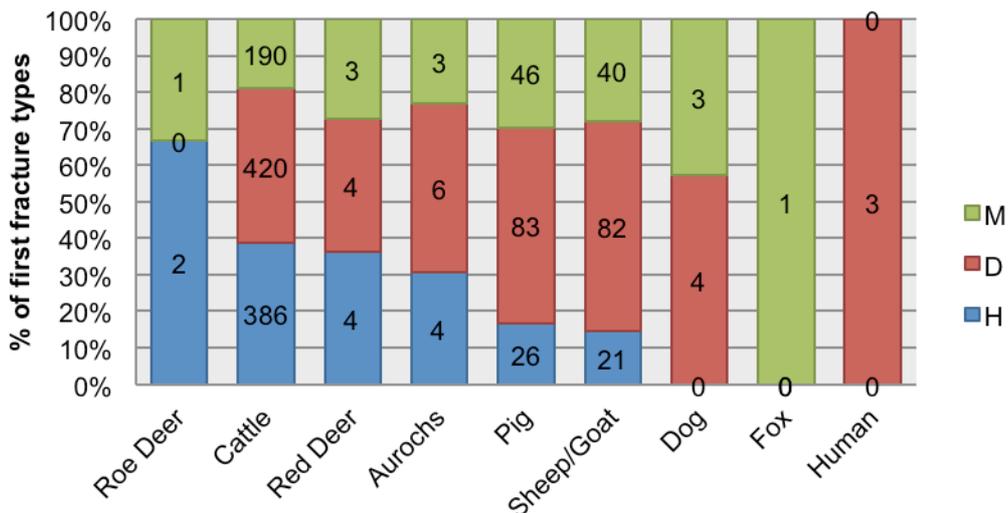
Figures 6.81 and 6.82 show the proportions of helical fractures present on the bones recovered from Etton, according to the different species present. The difference between the food species and non-food species are very clear. Regardless of the number of elements actually representing the food species, helical fractures are present on between 50% and 13.5% of bones. Interestingly, the wild species, which were represented by substantially fewer elements than domestic pigs and sheep/goats, had significantly higher proportions of helical fractures than pigs and sheep/goats.

The helical fractures on the bones belonging to food species makes the absence of this kind of fracture on the non-food species more pertinent as it implies that the helical fractures were likely not the result of some peri-mortem activity unrelated to marrow extraction. Were helical fractures present across all species, including the non-food species it would be much more difficult to make

the argument that the helical fractures were the result of deliberate processes with the intention of economic gain.



**Figure 6.81: Graph showing the decreasing proportions of helical fractures by species according to the total number of fractures.**



**Figure 6.82: Graph showing decreasing proportions of helical fractures by species according to the first evident fractures.**

Figure 6.83 refines the data presented on the above figures by splitting the species by high and low marrow yield element to give a more detailed picture of the percentages of helical fractures present on all of the bones recovered from Neolithic contexts across the site. This makes the dearth of helical fractures on the non-food species even more obvious. The only elements from a food species not fractured when fresh were the low marrow yield sheep bones, which, as has already been discussed, contain so little marrow that breaking them in order to extract it would be hardly worth the effort.

Overall, the proportions of helical fractures present at the site are remarkable. Before beginning this investigation it was believed that the proportions of helically fractured bone present would be negligible, as it was not thought that the processing of bones for fat extraction is not something which would normally occur at causewayed enclosure sites like Etton. With similar evidence also visible at the Staines causewayed enclosure, it is clear that this kind of activity was happening with far more regularity than previously anticipated. The prevalence of helical fractures present on the food species, and the complete absence of this kind of fracture on the non-food species, coupled with the obvious focus of bone breaking on those elements that yield the most significant amounts of marrow has to suggest that deliberate human action is responsible for the pattern of fracture at both Etton and Staines and that it cannot be put down to natural or other taphonomic processes.

The implications of this for the more general kind of activity are potentially substantial. Marrow extraction, and fat processing are generally associated with domestic activity, hence, why they had previously been thought not to be taking place at sites more commonly associated with 'ritual' or 'ceremonial' activity. Their significant prevalence at Etton and Staines implies that activity of a far more domestic nature was occurring at these sites than anticipated. Obviously this is only one line of enquiry and is by no means conclusive, but it certainly provides food for thought and will be considered in the concluding chapters in light of all the other kinds of evidence analysed in this thesis.

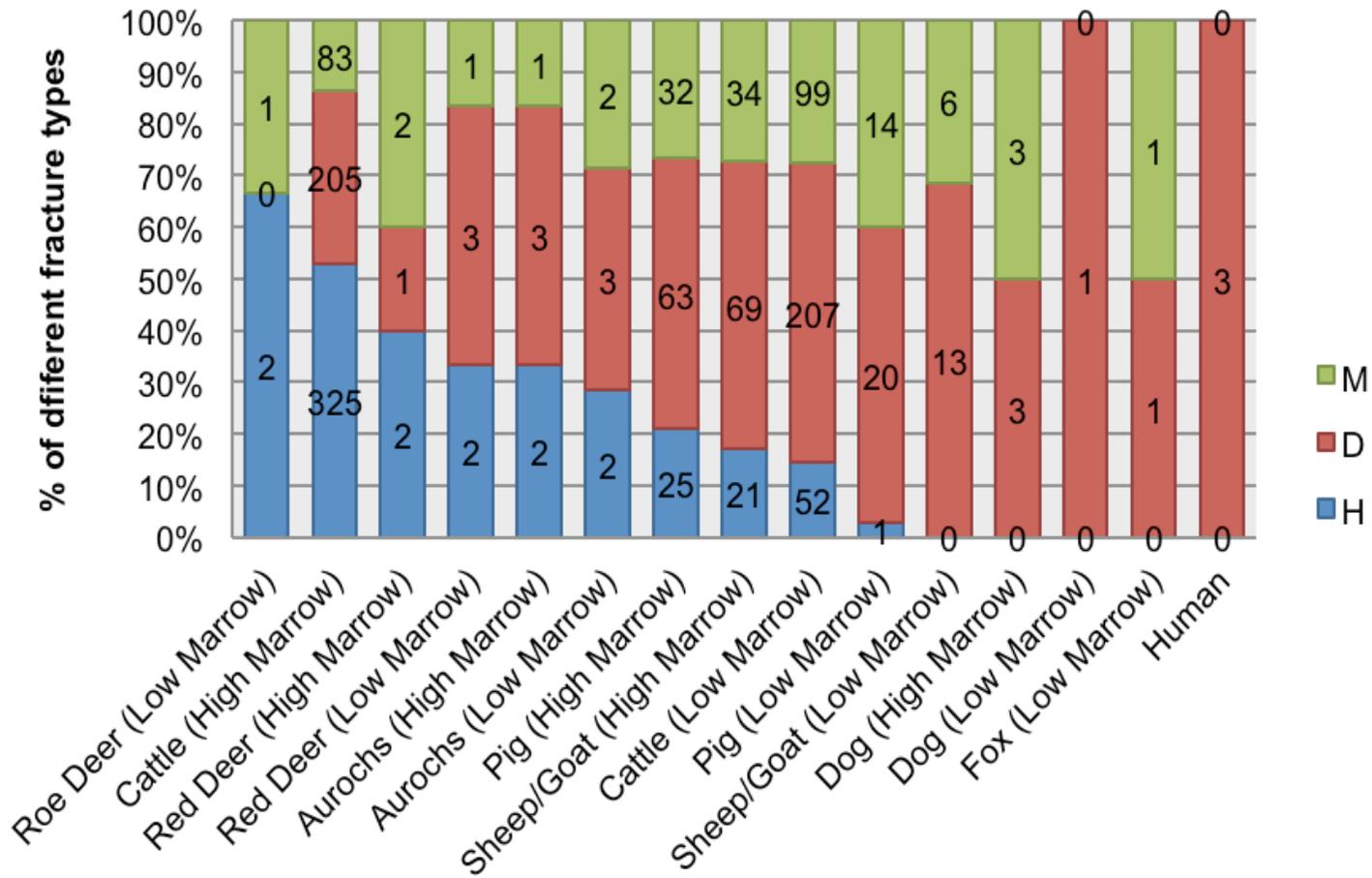


Figure 6.83: Graph showing the proportions of fracture types for high and low marrow yield (according to first evident fractures) bones across all species present on site in order of descending proportions of helical fractures. High marrow yield roe deer and low marrow yield fox are not included as no elements were recovered belonging to either of these group.

## **7. Distribution Analysis**

## 7.1 Introduction

The distribution of material within the ditches of causewayed enclosures has been the subject of a significant amount of analysis and debate (Pryor 1998; Edmonds 1999; Thomas 1999; Oswald 2001; Pollard 2001; Harris 2003, 2005; Oswald 2011). This debate has largely concluded that the materials present within the ditches of causewayed enclosures was purposefully selected, carefully deposited material, intended to commemorate, memorialize or in some way honour a person or event. Unfortunately, as has been discussed in previous chapters, there has been a tendency during this kind of analysis to focus on deposits which stand out or are unusual for some reason, to the detriment of the understanding of the vast majority of the material recovered from these ditch contexts. The following analysis seeks to take a broader view of the material recovered from Etton in order to compare the entirety of ditch fills and to ascertain whether or not there was any differentiation in the choices made regarding the deposition of animal bone from one ditch segment to the next, and to see whether the same principles determining the deposition of animal remains in the external ditches also governed the deposition of animal remains in the interior of the site.

As has already been stated, the enclosure ditch at Etton comprised 14 ditch segments (1 – 14) and 15 causeways (A – O). The first five ditch segments and five causeways have traditionally been assigned to the ‘western’ arc of the enclosure ditch, and the remaining ditches and causeways are assigned to the ‘eastern’ arc. The western and eastern arcs are separated by Causeway F, which is thought to have been a substantial timber gateway. Although the eastern arc of the ditch had rather more ditches than the western arc, the visible extents of both were of roughly equal length and followed roughly the same arc from the most southwestern point to the most southeastern.

Whilst not doubting their ‘symbolic unity’ (Pryor 1998, 369), Pryor has identified differences in the construction and use of both the eastern and western arcs, as well as the individual ditch segments. He considers that the initial construction of the ditch was part of one ‘event’ of activity but that after its completion the

western arc of the enclosure was left open and the eastern arc was backfilled following the deposition of 'structured' or 'arranged' artefacts and bone groups (*Ibid*, 356). Analysis of the distribution of materials over the enclosure ditch and the internal features was considered in some detail in the original report (Pryor 1998, Chapters 2 and 3). What became obvious to Pryor is that the western arc of the enclosure (segments 1-5) was inundated by water for at least the wettest parts of the year. Pryor argues that this water logging would have "forced" a distinction in the nature of activities being practiced in both sides of the enclosure (Pryor 1998, 364). His suggestion is that the western arc and western side of the site was the place for more functional deposits related to cattle husbandry and woodworking, as well as for pottery and human and animal bone, while the eastern arc and eastern half of the site were more related to the deposition of 'placed' or structured deposits.

The western arc segments all contained deposits which appear to have been scattered along their bases and which include the remains of activities such as wood, bark and antler working and bone, but comparatively little pottery. The eastern arc on the other hand contained significant amounts of pottery and flint as well as 'pyre material', quern stones and bone (including the two partial dog skeletons and the complete fox, aurochs and cattle skulls) (*Ibid*, 67). It was perceived by Pryor that the while both arcs of the ditch contained apparently structured or 'symbolic' deposits, those present in the western arc were isolated events that had no particular relevance or interaction with each other. This is thought to have been contrary to the deposits within the eastern arc of the ditch, which are thought to be far more contiguous (*Ibid*, 365).

Deposition strategies at Etton have been the subject of a number of more recent investigations. In 2001, Josh Pollard considered this subject at both Windmill Hill and Etton and came to the conclusion that both the selection of material, and the nature of its deposition at causewayed enclosures may have been directly dependent on the 'world view' of the 'actors' (Pollard 2001, 322). Also considering Windmill Hill and Etton and utilising the work of social philosophers such as Foucault and Butler, Harris (2003) has focussed on the creation of identities through performance and deposition, with the aim of 'creating' narratives of identity, personhood and regulatory ideas as he argues

that western notions of leadership and governance have permeated our interpretation of the Neolithic.

Harris (2003), Whittle (2003) and Albrecht (2011) all consider in detail the deposition of animal remains from the enclosure ditch at Etton. Their individual investigations were all based on Armour-Chelu's original faunal analysis present in the site report (Pryor 1998), which we know now to be largely factually inaccurate. However, they serve to highlight the dangers of both taking the accuracy of a report for granted, and of the obsession with understanding unusual deposits at the expense of the main body of material. This will be discussed with reference to the results presented in this chapter in the concluding part of this chapter.

Harris notes that at Etton cattle bone were deposited in both the eastern and western enclosure arcs (Harris 2003). However, he also notes the differences with which cattle bones were treated in comparison to other species from the site. The primary difference he observes is the absence of complete or partially complete skeletons and a focus on the selection of meat bones. He states that the complex assemblages of bone were not the result of feasting, but were more the result of careful selection and placement of material. Harris also states that the absence of canid gnawing on cattle bone suggest a very rapid filling of contexts in which animal bones were recovered. Both Whittle (2003) and Harris (2003) state that the ditches of the enclosure at Etton were dominated by different species and that this suggests that relationships with animals were "not simplistic". They also note that ditch termini were "hugely significant" and were associated with the repeated deposition of cattle skulls.

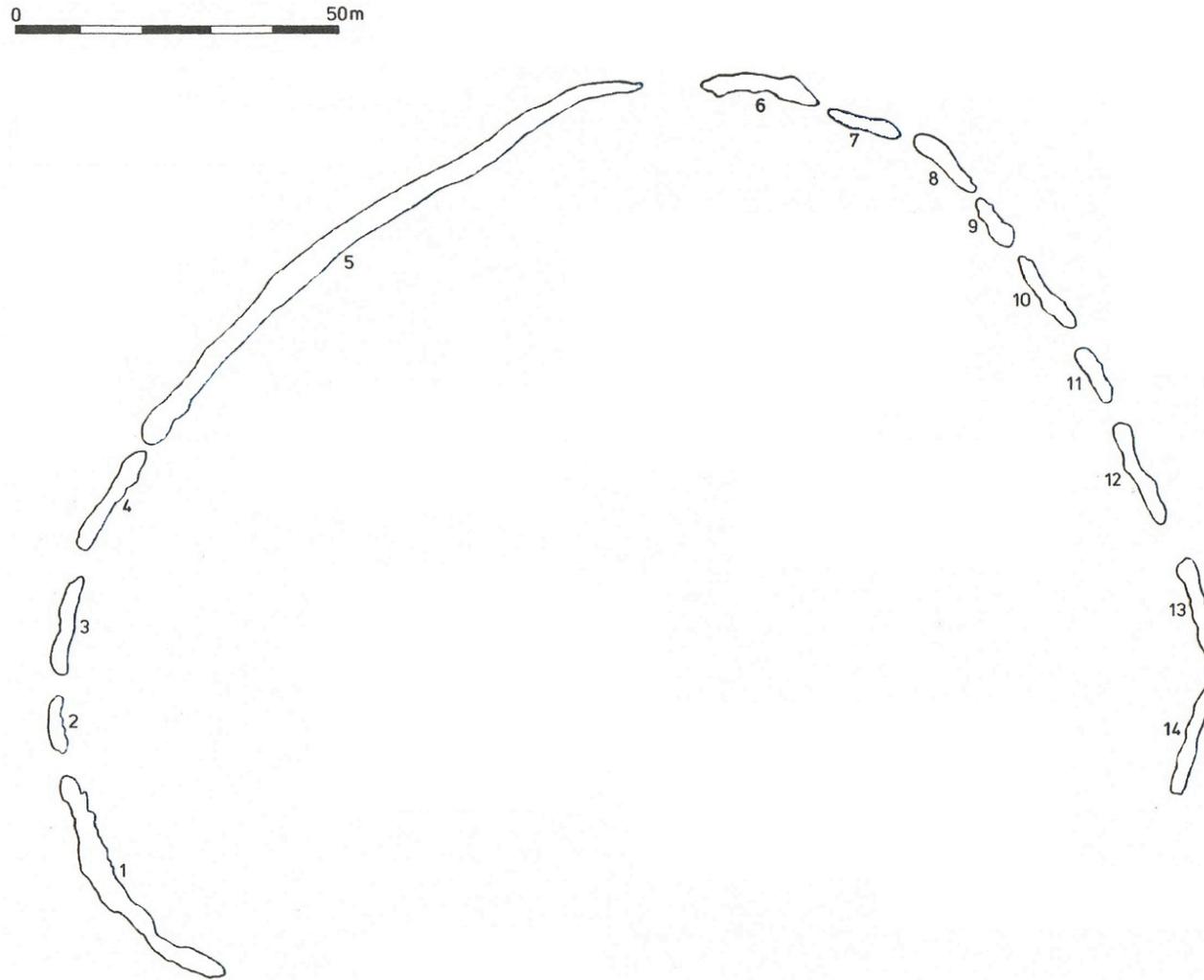
Going into the distribution analysis presented below, the expected result, based on the work of the authors summated here and the original site report, was that there would be 'unusual' groupings of bone positioned 'atypically' within different ditches, and that these would include relatively large numbers of skulls and partial skeletons, with the skulls being most prevalent in the ditch termini.

## 7.2 Overall Distribution of Species

The overall proportions of species represented at Etton are presented in Table 7.1, and in detail in Chapter 4. They are considered once again here so that deviations from the overall percentages can be understood across all the ditches of the causewayed enclosure, and the paucity or predominance of species ascertained. Table 7.2 presents the percentages of each of the species within the individual ditch segments of the enclosure ditch, and also provides the averages for the western and eastern arcs.

**Table 7.1: Proportions and averages of individual species per ditch segment and arc.**

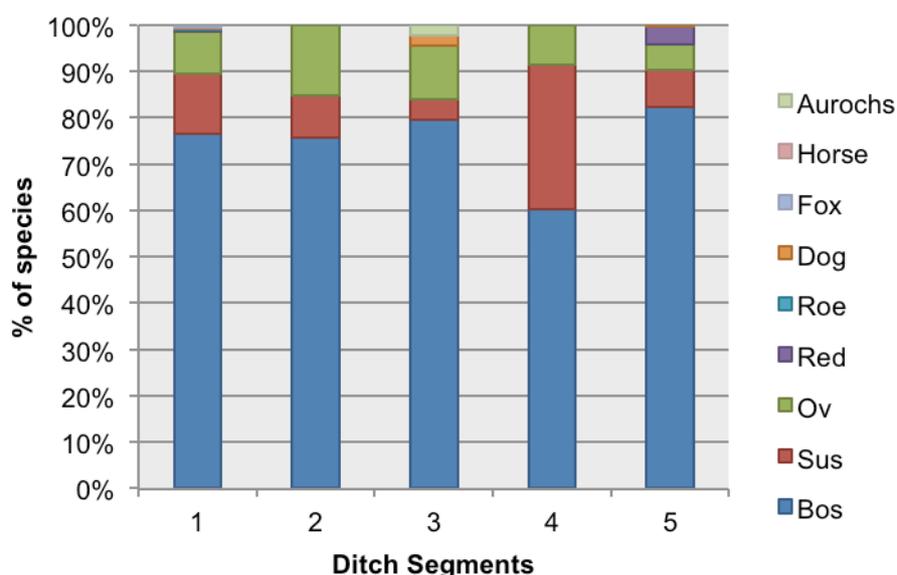
Ditch Segment	Cattle	Pig	Sheep/Goat	Red Deer	Roe Deer	Dog	Fox	Horse	Aurochs
1	76.5	12.9	9.1	0.3	0.3	0.2	0.7	0.0	0.0
2	75.8	9.1	15.2	0.0	0.0	0.0	0.0	0.0	0.0
3	79.5	4.5	11.4	0.0	0.0	2.3	0.0	0.0	2.3
4	60.3	31.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0
5	82.5	7.9	5.5	3.8	0.0	0.4	0.0	0.0	0.0
<i>Average</i>	<i>74.9</i>	<i>13.1</i>	<i>10.0</i>	<i>0.8</i>	<i>0.1</i>	<i>0.6</i>	<i>0.1</i>	<i>0.0</i>	<i>0.5</i>
6	86.7	6.2	2.8	1.9	0.0	1.4	0.0	0.0	0.9
7	85.9	3.8	5.1	3.8	0.0	0.0	0.7	0.7	0.0
8	79.2	12.5	6.3	2.1	0.0	0.0	0.0	0.0	0.0
9	77.8	12.8	4.3	1.7	2.6	0.9	0.0	0.0	0.0
10	77.3	13.3	6.0	1.8	0.3	1.3	0.0	0.0	0.0
11	76.0	14.0	5.8	2.3	0.0	0.6	0.0	0.0	1.2
12	83.6	8.1	3.6	0.7	1.9	0.0	0.0	0.0	2.1
13	62.2	16.6	16.1	1.6	0.5	2.1	0.0	0.0	0.9
14	91.3	5.2	1.7	1.7	0.0	0.0	0.0	0.0	0.0
<i>Average</i>	<i>80.0</i>	<i>10.3</i>	<i>5.7</i>	<i>2.0</i>	<i>0.6</i>	<i>0.7</i>	<i>0.0</i>	<i>0.1</i>	<i>0.6</i>



**Figure 7.1: Plan of the ditch segments of the Eton causewayed enclosure. Ditches 1 – 5 make up the western arc and ditches 6 – 14 make up the eastern arc (after Pryor 1998)**

### 7.2.1 Western Arc

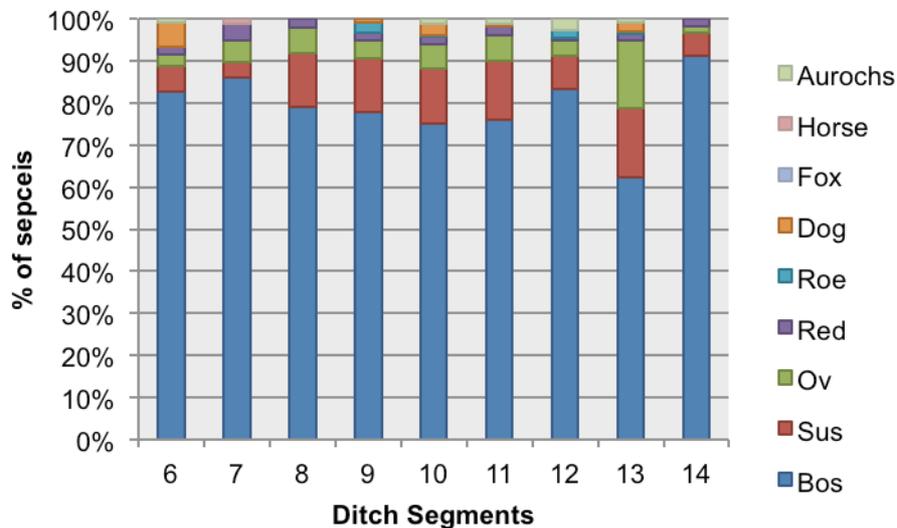
Figure 7.2 shows the proportions of each species present in the first five ditch segments of the enclosure ditch. These segments make up the western arc of the ditch. It is clear that in all instances cattle make up the majority of the bones recovered, at a mean of 74.9%, and with usually 75 – 85% of the total assemblage, with the exception of Ditch Segment 4, where the proportion of cattle was only 60% (cattle are discussed at length in Section 7.3 of this chapter). In this ditch, pig make up the majority of the rest of the assemblage (30.1%), however, in the other ditches of the western arc, pig and sheep are much more evenly balanced in terms of the percentage of the assemblage they form (8.6% and 10% respectively – pig and sheep are discussed in detail in sections 7.4 and 7.5 of this chapter). Red deer were present in very small numbers in Ditch 1 (0.3%), and in numbers equal to sheep in Ditch 5 (3.7%), but were entirely absent from the middle three ditches. Aurochs, dog and fox were the only other species present in the western arc of the enclosure ditch, but were only present in very small numbers – aurochs and dog comprised 2.3% each of the Ditch 3 assemblage and dog was 0.2% and 0.4% in Ditches 1 and 5 respectively. Fox was only present in Ditch 1, and here only at 0.7% of the assemblage.



**Figure 7.2: Chart illustrating the relative proportions of each species present in the ditch segments of the western arc of the Etton causewayed enclosure.**

### 7.2.2 Eastern Arc

Like the western arc, cattle bones make up the majority of the assemblage from the eastern arc, with a slightly higher mean of 80% and usually between 78 – 85% of the assemblage. There are two exceptions to this – Ditch Segment 13 had just 62.2% cattle bone, and Ditch Segment 14 had over 91% cattle bone. Contrary to the western arc, pigs generally make up more of the eastern arc ditch assemblages than sheep with an average of 10.3% compared to the 5.7% of sheep. The only ditch where there is an obvious discrepancy is Ditch 13, where cattle only comprise 62.2% of the assemblage, and sheep are present in exactly the same numbers than pigs (16.6%). There is generally a greater diversity of species in the eastern arc of the causewayed enclosure, with aurochs, horse, dog, red deer and roe deer present, albeit in very small numbers, alongside the main domestic species. Of these other species, the best represented is red deer, with 2% of the total eastern arc assemblage. The other species all comprise less than 1% of the total eastern arc assemblage.



**Figure 7.3: Chart illustrating the relative proportions of each species present in the ditch segments of the eastern arc of the Eton causewayed enclosure.**

Even taking into account the deviation from the average cattle numbers visible in Ditches 4 and 13, there is no surprising density of any species in any one particular ditch. The general spread of proportions of the species present in each ditch roughly mirrors the overall proportions of species present throughout

the mid to late Neolithic features on the site. Ditches 5 and 7 have obvious, yet still very small, concentrations of red deer remains, most of which are partial antlers. This may have some significance and will be discussed in section 7.6 of this chapter. Dog remains appear spread across the enclosure, though partially complete skeletons were present in Ditches 6 and 10, which will be discussed in section 7.9. Fox was only present in Ditch 1, and is represented by just 4 elements. Roe deer was present in just one segment of the eastern arc (Ditch 1), but was a little more frequent in the eastern arc, with small amounts of material present in Ditches 9, 10, 12 and 13. Aurochs was similarly only present in one of the western arc ditches (Ditch 3) but in four of the eastern arc ditches (6, 11, 12 and 13). Horse was represented by just one metacarpal found in Ditch 7.

As well as the animal bone discussed above, human bone was recovered from eight of the fourteen ditch segments. The amount of human material recovered from these ditch segments never exceeded 2.2% of the total assemblage, and in all but the case of Ditch 3, amounted less than 1% of the total. The nature of the human bone recovered from the ditches will be discussed in greater detail in section 7.12 of this chapter.

### **7.3 Comparison with Original Animal Bone Report**

The original animal bone report made use of a segment-by-segment summary of the faunal remains present in the enclosure ditch to draw conclusions regarding differences in the nature of deposition of the difference species present on site, and from this extrapolated possible reasons for such differences such as the heightened importance or symbolism of particular species (Armour-Chelu 1998, 288). The differential deposition by segment is also used to imply both a deviation from typical domestic deposits and the special significance of various bone groups (structured deposits) present within the enclosure (*Ibid*, 275, 285; Pryor 1998, 357) We now know this report was incomplete, therefore it is important to understand the impact that this could have had on the interpretation of the site more broadly. \*

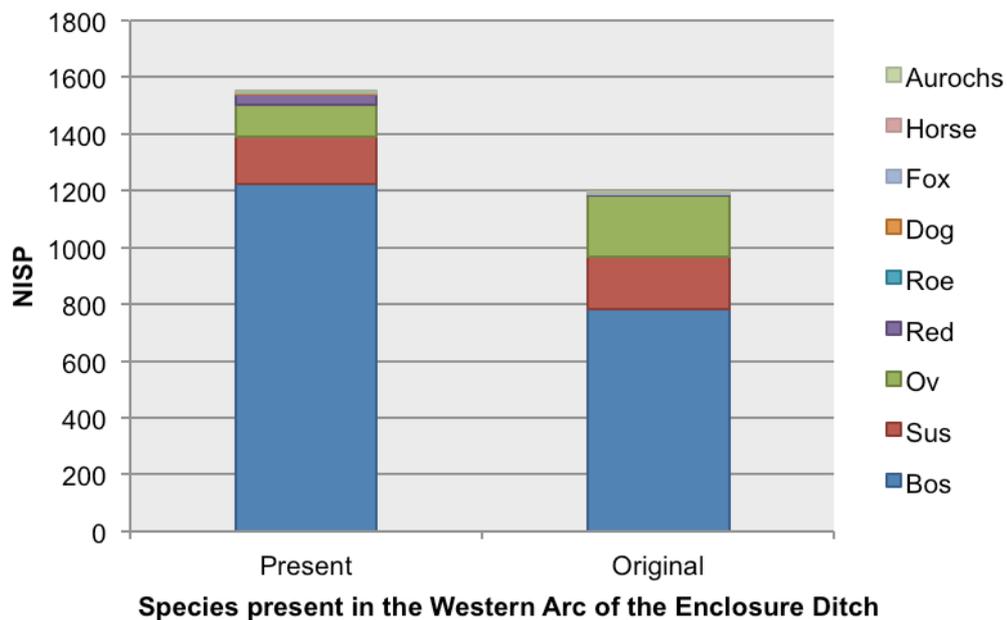
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\* All references to Armour-Chelu are from the animal bone report in Pryor 1998, pp. 273 – 288.

Unfortunately it is impossible to know precisely which bones are being referred to in the original report as no bone numbers are given. As such, it was impossible to identify with any level of certainty the majority of the material that is considered in any detail. It was also particularly difficult to identify the partial skeletons and bone groups, which make up the bulk of Armour-Chelu’s discussion. Nevertheless, the following section will attempt to compare what was reported on in the original report, with what was encountered in the present analysis of the material.

The results of butchery and fracture analysis have already been covered at length in previous chapters and are considered once again on a segment-by-segment basis later on in this chapter. For this reason, unless Armour-Chelu’s observations on this kind of processing activity are directly comparable with our own, her results are presented but ours are not.

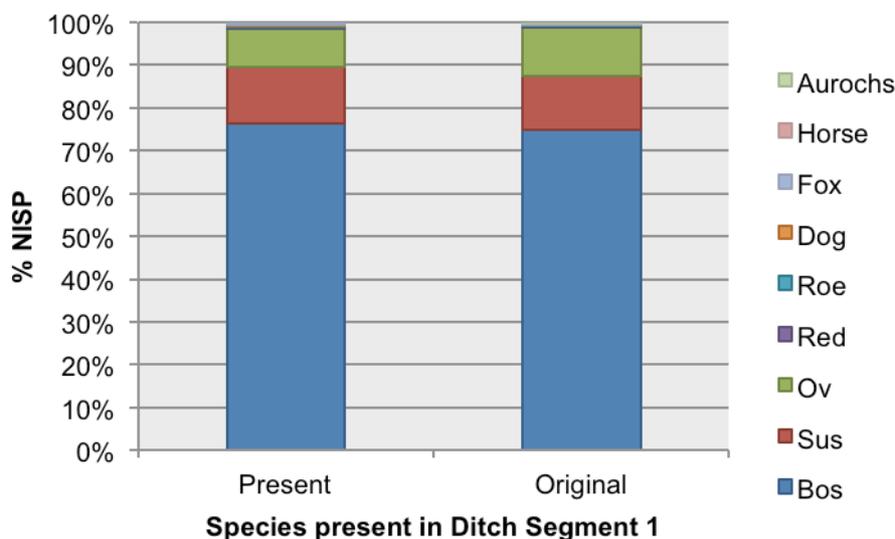
### 7.3.1 The Western Arc



**Figure 7.4: Comparison of NISP for species present in the western arc of the enclosure ditch.**

### 7.3.1.1 Ditch Segment 1:

According to the original report, Ditch Segment 1 of the western arc of the enclosure ditch had by far the most abundant animal bone with 1627 elements, of which 880 were identified to species. The present analysis identified somewhat fewer bones to species, with 604. It is possible that the original report was including large mammals in the count. Though this is not clear, it does not seem to be the case. Despite the discrepancy in numbers, it appears as though cattle make up almost exactly the same proportion of both species counts, at around 75% (Figure 7.5). The proportion of pigs and sheep/goat is also roughly commensurate across the two studies, though sheep are slightly better represented by the original.



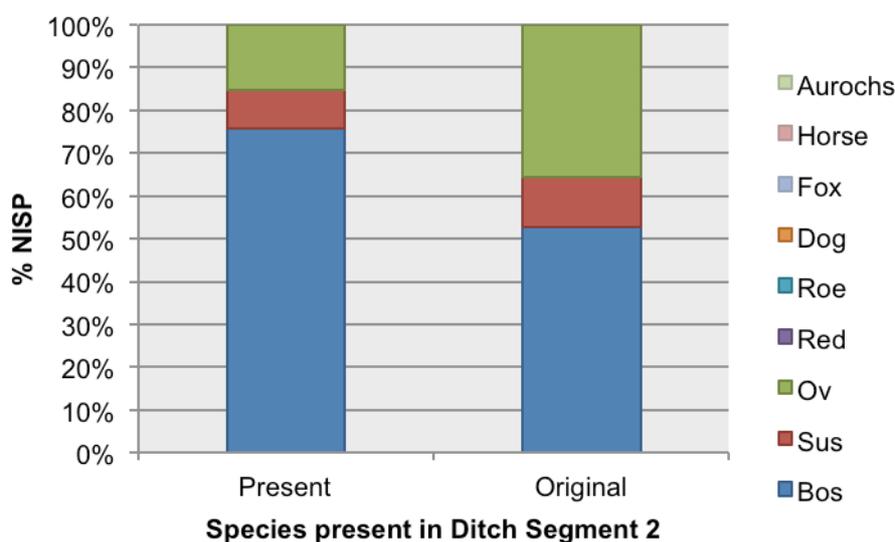
**Figure 7.5: Relative proportions of each species present in the present and original analysis of Ditch Segment 1.**

Apart from giving a basic breakdown of the NISP, the original report focusses on the partial skeletons and bone groups present in Ditch Segment 1, of which there were three. One was a partial sheep skeleton, represented by 56 elements including a mandible, vertebrae, pelvis, ribs and limb bones. Armour-Chelu notes that fifteen of these elements displayed cut marks which she thought were indicative of the defleshing and disarticulation of the animal. Fifty-five sheep bone were identified from this feature during the present study, all of which could conceivably have been from this partial skeleton, though no

particular association or similarity in the morphology of the bones was noted during analysis.

Two bundles of cattle rib were also identified within Ditch Segment 1. These were encountered again during the present analysis, and Armour-Chelu's observations regarding the presence of cut marks, likely indicative of disarticulation and defleshing were corroborated.

### 7.3.1.2 Ditch Segment 2:

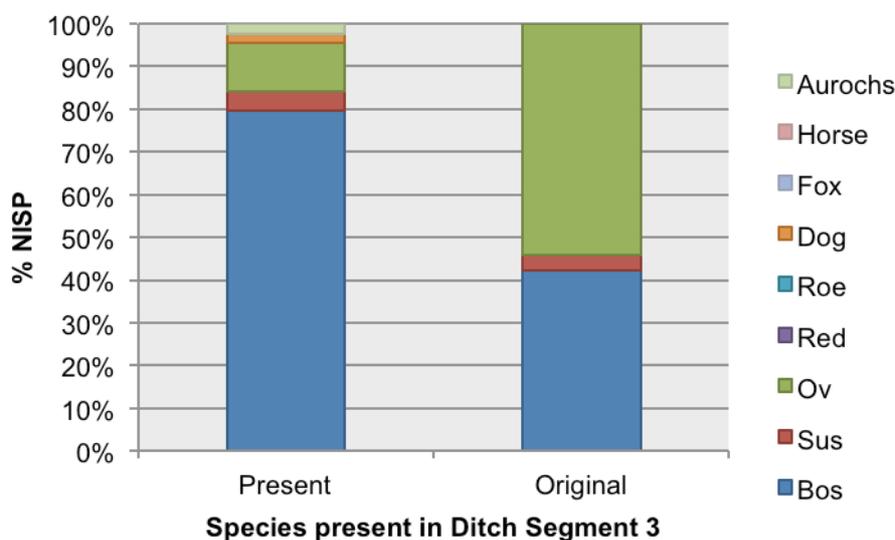


**Figure 7.6: Relative proportions of each species present in the present and original analysis of Ditch Segment 2.**

The original report of bone in Ditch Segment 2 was limited to a breakdown of the NISP. Like Ditch Segment 1, more bones were identified during the original analysis. Unlike Ditch Segment 1 however, the proportions of species identified varied considerably between the two analyses, with just over 50% of bones in the original report identified as cattle compared to 75% of bones in the most recent analysis (Figure 7.6). The proportion of pig bone identified in each analysis remains more or less the same, however the original report suggests that Ditch Segment 2 contained a much higher proportion of sheep bone than was shown in the most recent analysis.

### 7.3.1.3 Ditch Segment 3:

Discussion on Ditch Segment 3 in the original report was limited to the presence of a partial sheep skeleton, which, it is reported, comprised just over 50% of the total assemblage (Figure 7.7). This partial skeleton was not encountered in the most recent analysis, and once again, proportions of species follow the previous Ditch Segments very closely, with cattle making up around 75% of the assemblage followed by sheep/goat and pig. Dog and aurochs were identified in this Ditch Segment during the most recent analysis, but not in the original analysis.

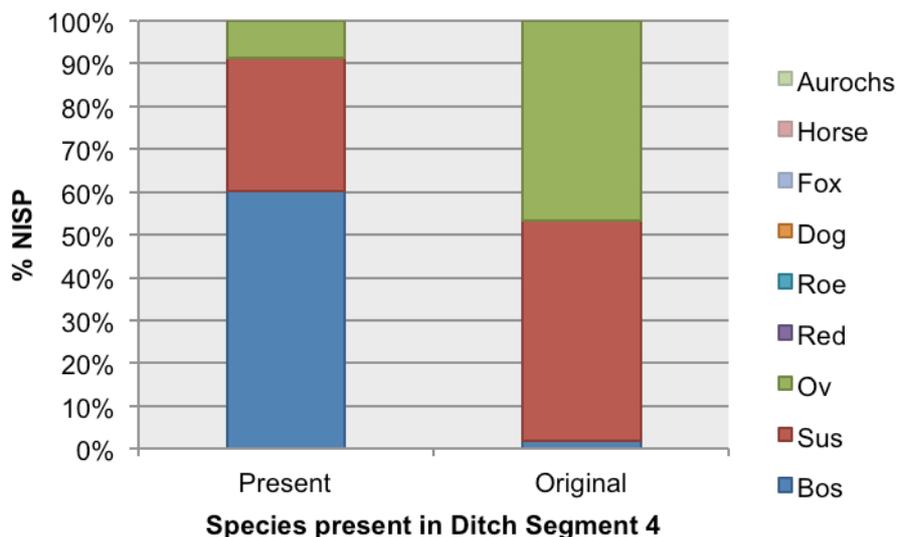


**Figure 7.7: Relative proportions of each species present in the present and original analysis of Ditch Segment 3.**

### 7.3.1.4 Ditch Segment 4:

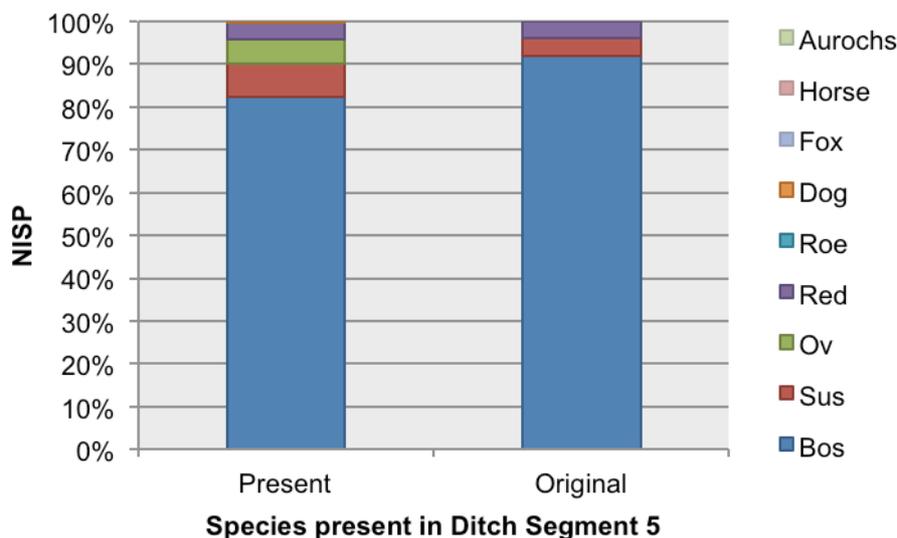
The original report identified just two cattle elements in Ditch Segment 4, compared to the 35 identified more recently. The rest of the assemblage was considered to comprise roughly equal proportions of sheep/goat and pig. The more recent analysis did identify an unusually high proportion of pig within this feature, but the higher proportion of cattle tempered this (Fig 7.8). Armour-Chelu believed that the pig bone, which was all recovered from a ditch terminus deposit, was the remains of three animals, buried in one event. A partial sheep skeleton was also identified in the same context. Although Armour-Chelu does not mention the presence of butchery marks on the bone within this feature,

both cattle and pig bones were noted to have higher levels of butchery evident during the most recent analysis.



**Figure 7.8: Relative proportions of each species present in the present and original analysis of Ditch Segment 4.**

7.3.1.5 Ditch Segment 5:



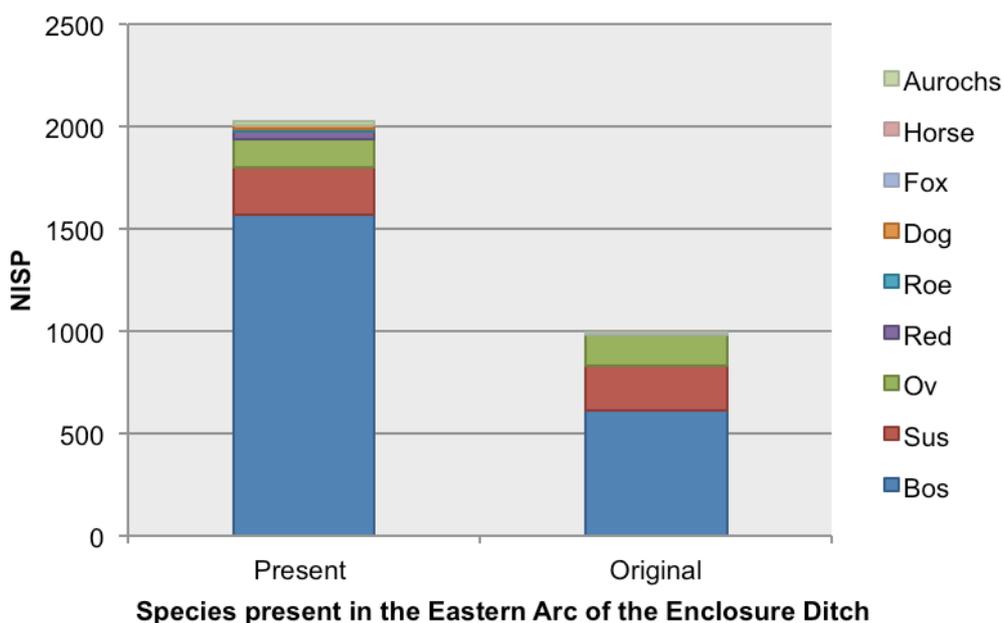
**Figure 7.9: Relative proportions of each species present in the present and original analysis of Ditch Segment 5.**

Ditch Segment 5 represents the most alarming deviation from the original report. Armour-Chelu identified 67 bones from this feature during her analysis of

the site, however on reanalysis, 973 could be identified (Fig. 7.9) – the largest number from any feature anywhere on the site. Armour-Chelu comments no further than to give a break down of the proportion of species and to comment that cut marks were visible on four cattle bones, and on the presence of a red deer crown associated with evidence of antler working.

The most recent analysis of the animal bone identified almost 700 cattle bones from this feature, as well as 64 pig bones, 45 sheep/goat bones and 31 pieces of bone and antler belonging to red deer. The presence of the antler corroborates Armour-Chelu’s notion that antler working may have been associated with this feature.

### 7.3.2 The Eastern Arc

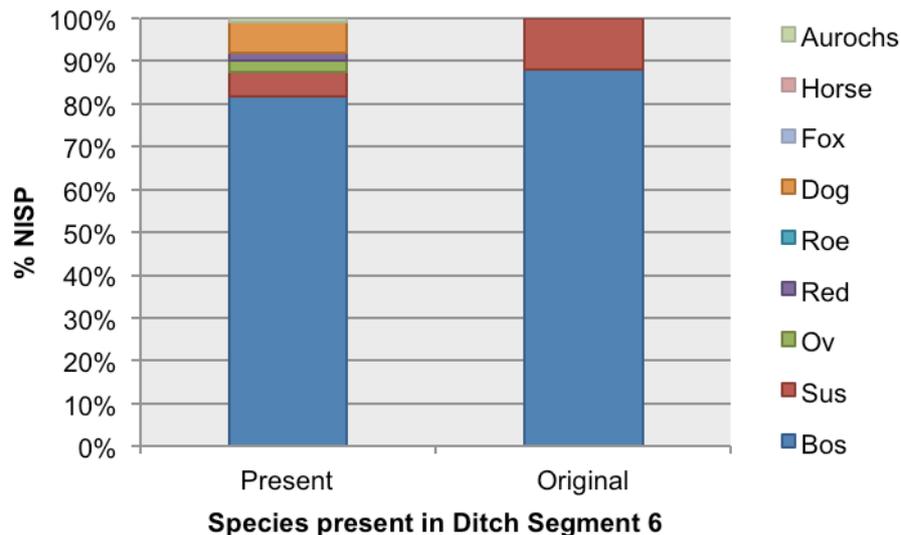


**Figure 7.10: Comparison of NISP for species present in the western arc of the enclosure ditch.**

Double the amount of bone was identified in the most recent analysis in the eastern arc of the enclosure ditch than in the original. Because of this, a much larger number and much broader set of wild species were identified (Fig. 7.10).

### 7.3.2.1 Ditch Segment 6

Armour-Chelu identified 22 cattle bones and three sheep bones from this Ditch Segments. She only discusses the three sheep bones, which were lumbar vertebrae that she believes, due to a lack of butchery marks, were deposited as a unit. The most recent analysis identified 183 cattle bones and 6 sheep bones, as well as 13 pig bones, 4 red deer bones, 16 dog bones and 2 aurochs bones (Fig. 7.11). The majority of the dog bones came from the deposition of an apparently complete neonate puppy in ditch terminus by the north northern entrance to the site. Even to one so sceptical about the identification of so-called 'special deposits' the location of this puppy burial is without doubt an auspicious one and it seems unlikely to have any economic or functional motive.

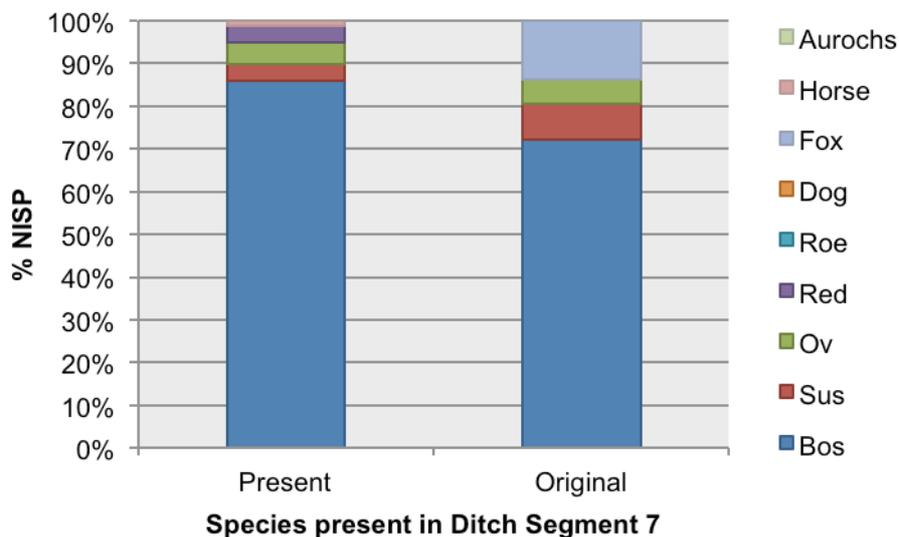


**Figure 7.11: Relative proportions of each species present in the present and original analysis of Ditch Segment 6.**

### 7.3.2.2 Ditch Segment 7

Thirty-one cattle bones, three pig bones and one sheep bone, as well as the skull and partial spine of a fox were identified in this feature during the original analysis. Six of the cattle elements were lumbar vertebrae, which are thought to have been deposited as a unit due to lack of butchery marks. The fox remains were not encountered during the most recent analysis, however 67 cattle bones, 3 pig bones, 4 sheep bones and 3 red deer bones were identified. The

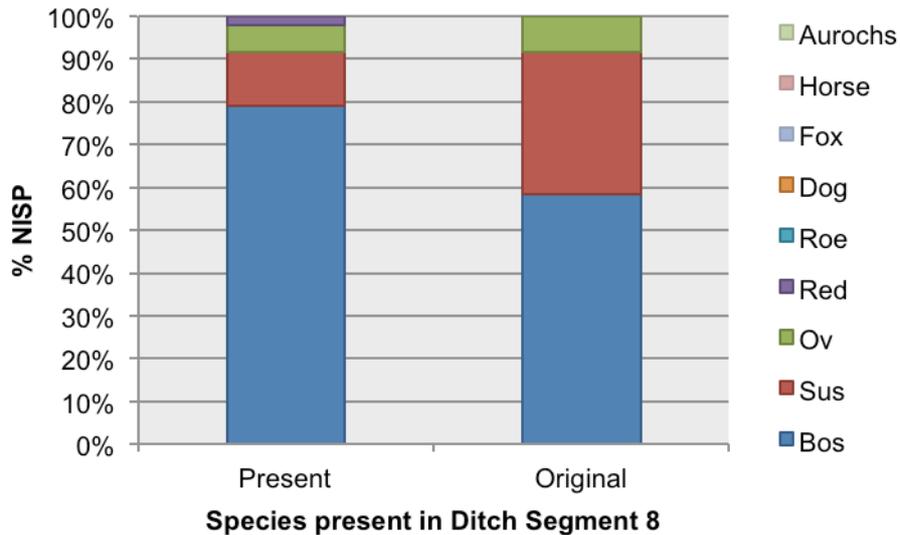
proportion of cattle remains is rather high in the current analysis compared to the original analysis. This is likely to be, at least in part, due to the presence of the 'partial fox skeleton' identified by Armour-Chelu.



**Figure 7.12: Relative proportions of each species present in the present and original analysis of Ditch Segment 7.**

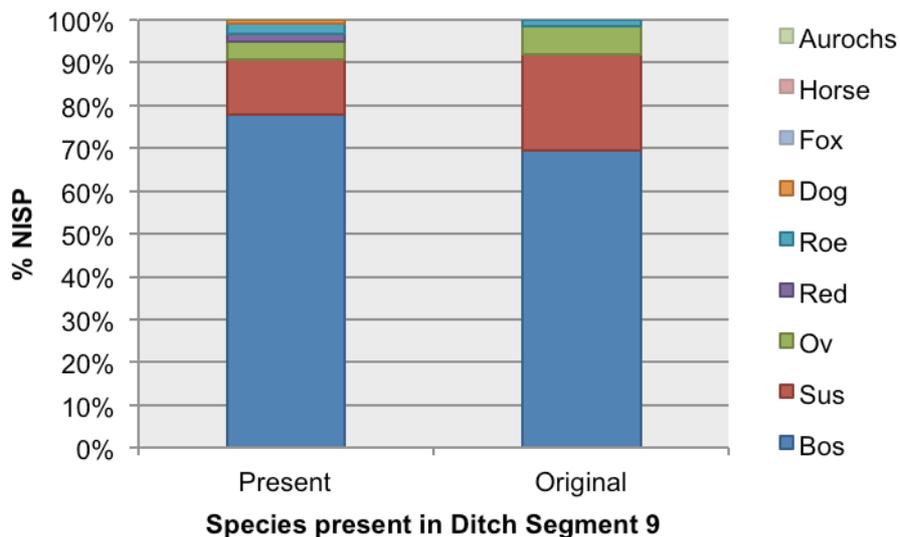
### 7.3.2.3 Ditch Segment 8

The original discussion of Ditch Segment 8 is limited to a break down of the number of elements for each species, however both captions given (one for 'Phase 1B' and one for 'Phase 1C', are identical, reading "A total of 19 bones were recovered from this phase: cattle (seven bones), pig (four bones), sheep (one bone), and seven bones of large ungulate size." (Armour-Chelu 1998, 280). It seems unlikely that this was the case for both of these contexts. The current analysis identified 76 cattle bones, 12 pig bones, 6 sheep bones and 2 red deer bones. The proportions of each species are much more in line with the general trend seen across the site from the current analysis than the original (Figure 7.13).



**Figure 7.13: Relative proportions of each species present in the present and original analysis of Ditch Segment 8.**

7.3.2.4 Ditch Segment 9



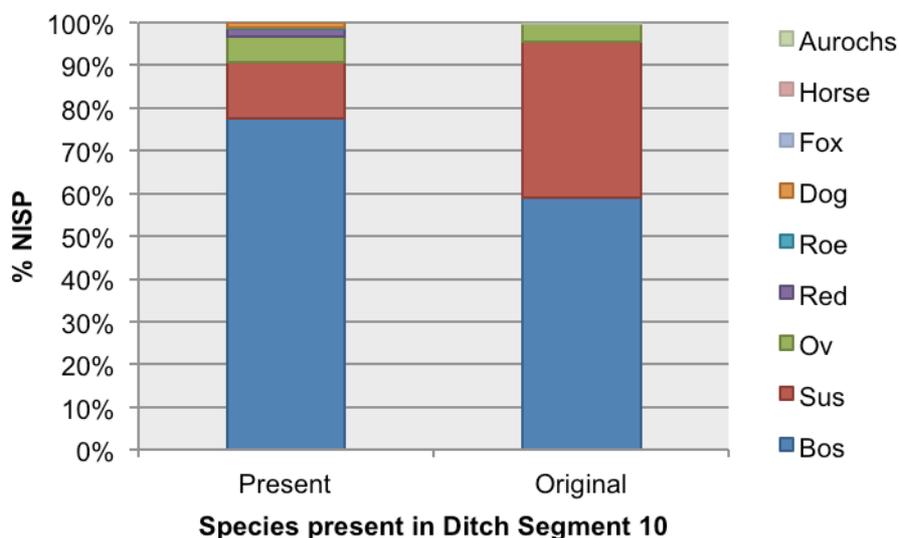
**Figure 7.14: Relative proportions of each species present in the present and original analysis of Ditch Segment 9.**

Armour-Chelu identifies the principle deposit in this Ditch Segment as a group a juvenile pig ribs, all from the left side of the body, almost certainly all from one individual. She identified cut marks on five of these, and suggests that these are indicative of defleshing and disarticulation. These ribs, and the cut marks, were identified in the present analysis. Also identified during the original analysis

were 43 cattle bones, 4 sheep bones, four pig bones and one roe deer metatarsal, thought to have been from a ditch terminus deposit. The present analysis identified 91 cattle bones, 15 pig bones, 5 sheep bones, 2 red deer bones, 3 roe deer bones, and one element belonging to a dog (Figure 7.14).

### 7.3.2.5 Ditch Segment 10

Three partial pig skeletons were identified within this feature during the original analysis. One, from the middle of the ditch, was thought to be a juvenile animal. Cut marks present on some of the elements showed that it had been disarticulated and defleshed prior to burial. The two further partial skeletons were recovered from the southern ditch terminus. One of the skeletons is thought to have been a young adult animal. Cut marks present on the spine suggested that the animal had been disarticulated and defleshed prior to deposition. As well as 96 pig bones, 155 cattle bones, 6 sheep bones and one aurochs bone were identified. Two heavily fragmented cattle skulls were identified as being from mature animals, and as being complete when ‘buried’.

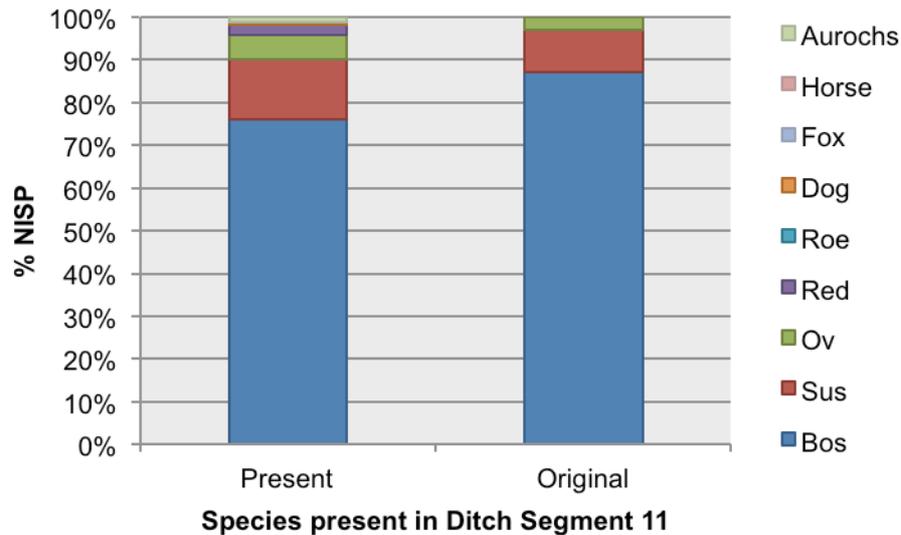


**Figure 7.15: Relative proportions of each species present in the present and original analysis of Ditch Segment 10.**

Just over half the number of pig bones (51) were identified in the present analysis than were in the original, as well as 299 cattle, 23 sheep/goat, 7 red deer, 1 roe deer and 5 dog elements.

### 7.3.2.6 Ditch Segment 11

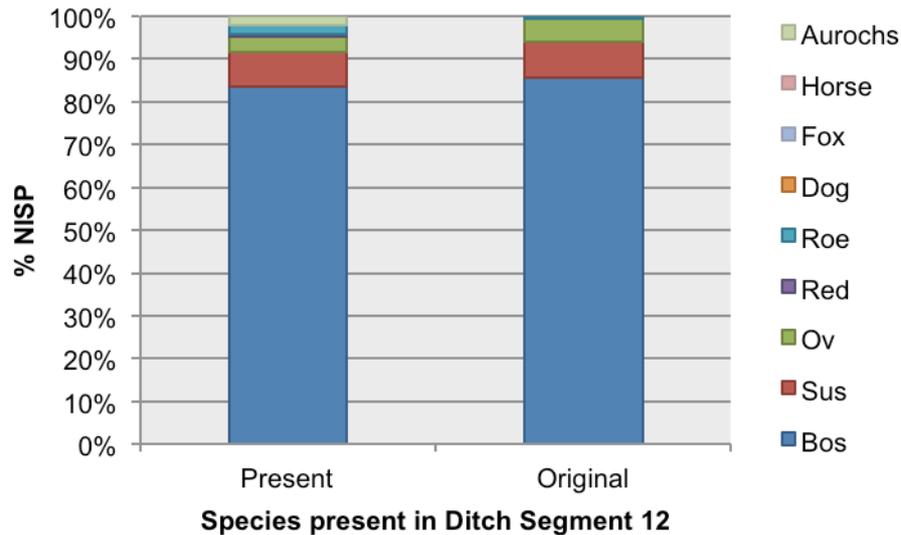
The description of animal remains in Ditch Segment 11 comprises simply a break down of the numbers of species, including 61 cattle, 7 pig, and two sheep bone. The bone identified in the present analysis was considerably more numerous and more varied, numbering 130 cattle, 24 pig, 10 sheep/goat, 4 red deer, 1 dog and 2 aurochs elements.



**Figure 7.15: Relative proportions of each species present in the present and original analysis of Ditch Segment 11.**

### 7.3.2.7 Ditch Segment 12

The original analysis identified 171 cattle, 16 pig, 12 sheep and 1 roe deer bone. The majority of the discussion focuses on the sheep bone, which comprised a group of vertebrae and left and right mandibles, all of which are thought to derive from one sub-adult animal. The roe deer element comprised a skull recovered from the southern ditch terminus. Once again, the amount of bone identified during the most recent analysis was both more numerous and the selection of species much wider; 351 cattle bones, 34 pig bones, 15 sheep/goat, 8 red deer and 9 aurochs bones. The sheep vertebrae identified by Armour-Chelu was found, and were able to be fitted together, implying that they had indeed come from the same animal.



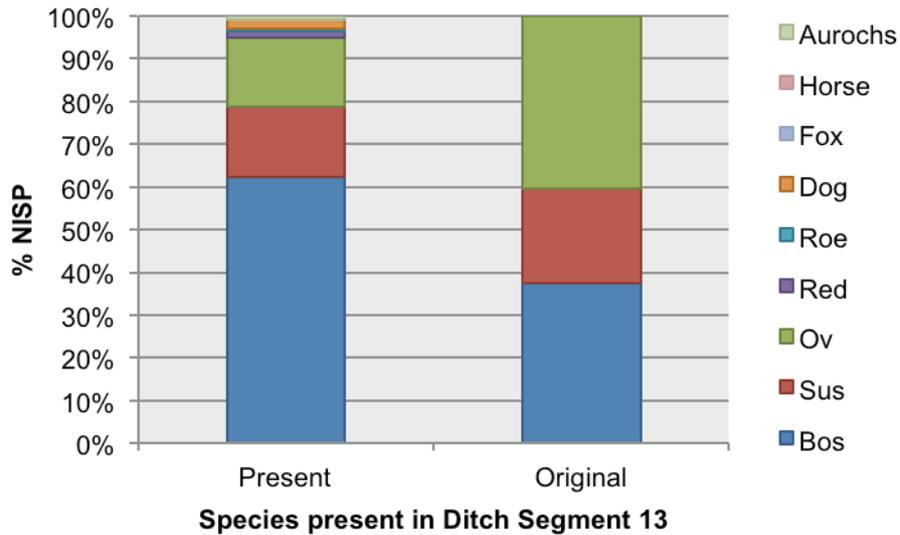
**Figure 7.17: Relative proportions of each species present in the present and original analysis of Ditch Segment 12.**

#### 7.3.2.8 Ditch Segment 13

The large proportion of sheep bone identified in the original report came from a dense deposit of bone in the northern ditch terminus (Figure 7.18). It was, apparently, impossible to discern independent skeletons during the excavation, and was only during post-excavation analysis that it was established that the bones came from two partial juvenile skeletons, which were about 3 months old. At least three further partial sheep skeletons are thought to have been present in the same context. One, comprising eleven bones, most of which were vertebrae, was thought to be a male. Cut marks indicative of defleshing and disarticulation were present on these bones. At least two further individuals, comprising 92 bones, also had butchery marks indicative of defleshing and disarticulation. Alongside these sheep skeletons were four neonate cattle bones.

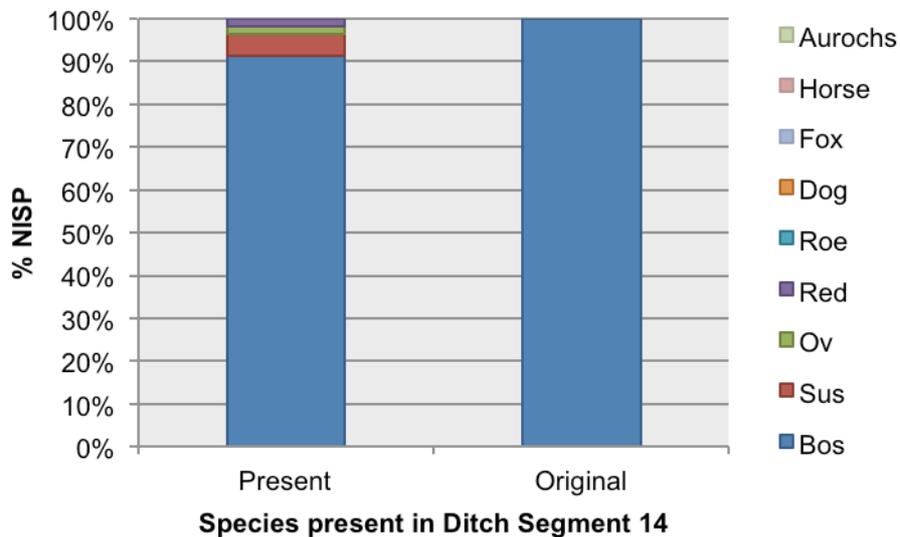
One further partial sheep skeleton was thought to have been present in the southern terminus of the same ditch. It comprised fourteen elements, most of which were vertebrae.

The present analysis identified 267 cattle, 71 pig, 69 sheep/goat, 7 red deer, 2 roe deer, 9 dog and 4 aurochs bones.



**Figure 7.18: Relative proportions of each species present in the present and original analysis of Ditch Segment 13.**

7.3.2.9 Ditch Segment 14



**Figure 7.19: Relative proportions of each species present in the present and original analysis of Ditch Segment 14.**

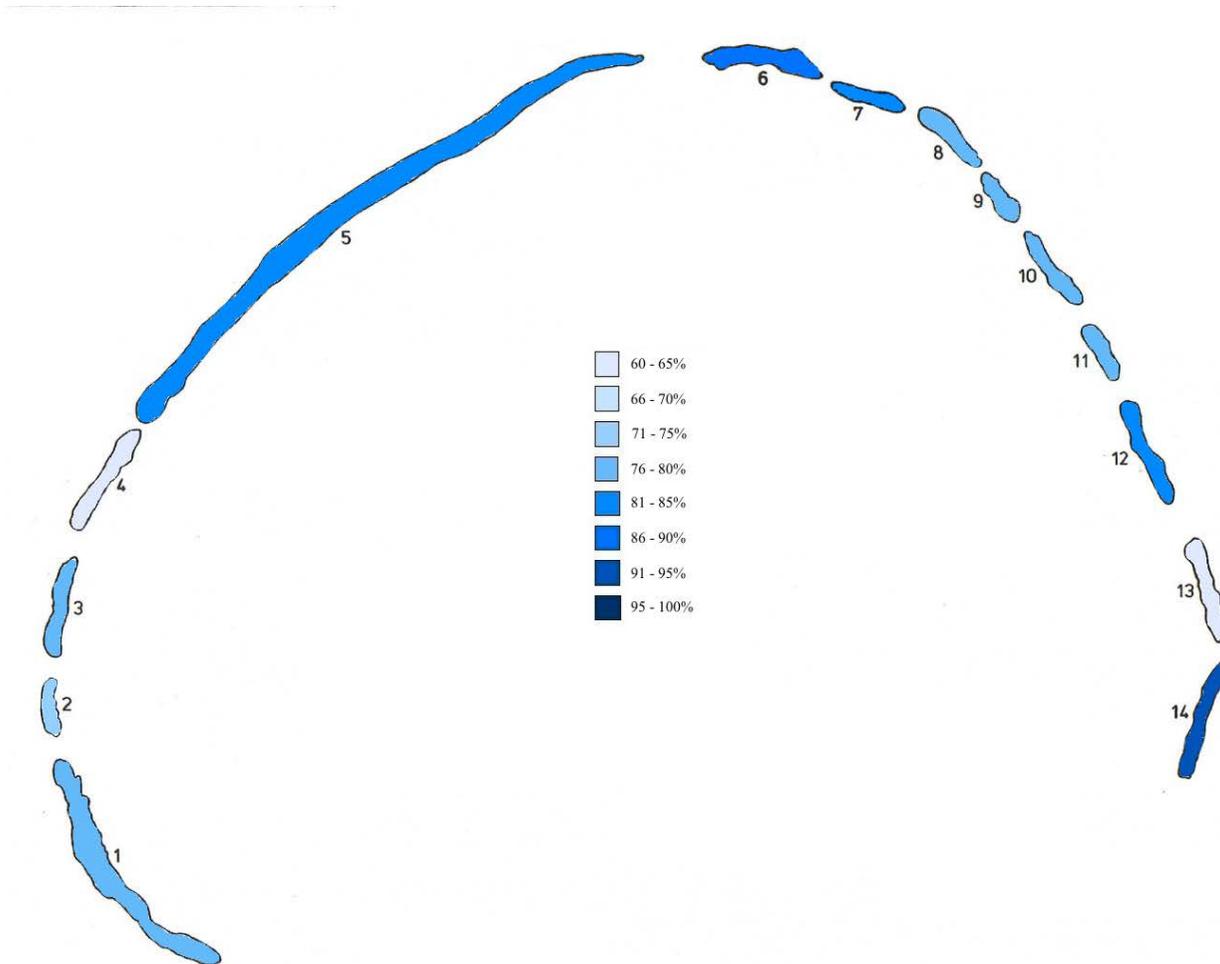
Just eleven cattle bones were identified during the original analysis, of which none were commented upon in further detail. Contrary to this, the most recent analysis identified 105 cattle bones, 6 pig bones, two sheep/goat bones and two red deer elements (of which one was antler). The proportion of cattle in the

most recent analysis is high compared to most other ditch segments (Figure 7.19), but was certainly not 100% as suggested by the original analysis.

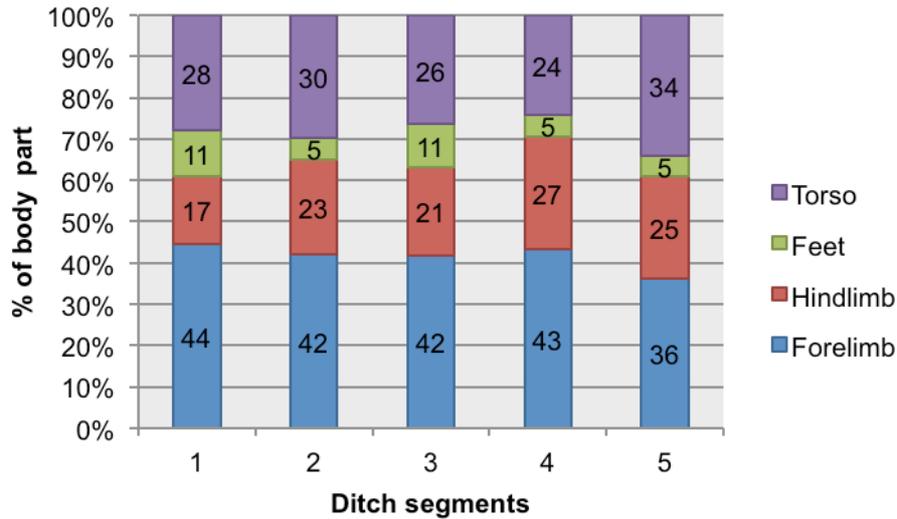
#### **7.4 Distribution of Cattle Bones**

Considerable quantities of cattle bone were present in all of the excavated ring-ditch segments. On average, cattle comprised 78.2% of the assemblage from each ditch, though their actual proportion fell as low as 60.3% in Ditch Segment 4, and climbed as high as 91.3% in Ditch Segment 14 (Figure 7.20).

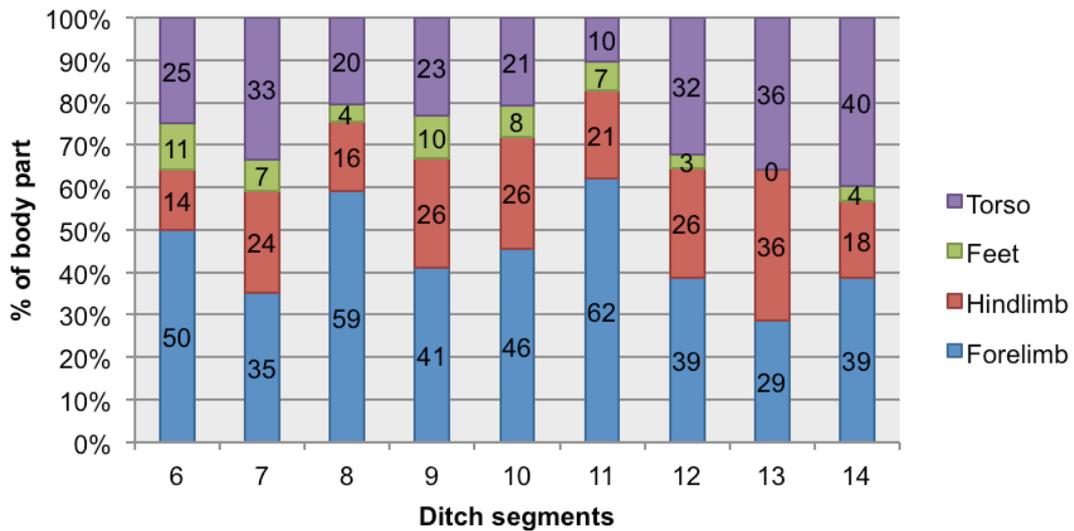
Figures 7.21 and 7.22 present the distribution of the various cattle bones sorted into forelimb, hindlimb, torso and feet elements. Forelimbs are evidently the most prevalent cattle body part within the ditches. The overall proportions of forelimb bones seem to remain roughly equal across all ditch segments in the western arc, making up between 36% and 44% of the total assemblage. The range for the proportion of forelimb bones present in the eastern arc is rather wider – between 29% and 62%. Similarly, the proportion of bones belonging to the hindlimbs, torso and feet stays roughly the same across the western arc ditch segments, and is much more variable across the ditches of the eastern arc. Ditches 8 and 11 appear to have particularly high proportions of forelimb bones (59% and 62%). Ditch 13 is the only segment in which the proportion of hindlimb bones is higher than the proportion of forelimb bones, and the only ditch with no evidence of feet bones. It is also one of the ditches with the highest proportion of material from the torso.



**Figure 7.20: Plan of the Etton causewayed enclosure showing the proportion of NISP for each ditch to be identified as cattle or large mammal (most likely cattle).**



**Figure 7.21: Graph showing the proportions of the main body parts (excluding crania) present in the Ditch Segments of the western arc of the Eton causewayed enclosure.**



**Figure 7.22: Graph showing the proportions of the main body parts (excluding crania) present in the Ditch Segments of the eastern arc of the Eton causewayed enclosure.**

By looking at Figure 7.23 it is clear that there is no remarkable amount of any particular body part in any ditch of the enclosure. The spread of material appears to be roughly balanced across the enclosure ditch as a whole. Figure 7.24 considers the spread of crania across the enclosure ditches. The scale is rather smaller than in Figure 7.23, which makes concentrations appear denser than they are in actuality. Were it produced on the same scale as Figure 7.23 it would look remarkable similar to the plan showing the proportions of feet

present in the ditches. Only two complete skulls of domestic cattle were recovered from the enclosure ditch during the excavation. These were recovered from the central part of Ditch Segment 10. Aside from these two skulls, the material from the crania largely comprises fragments of cranial bone and horncore as well as occasional partial horncores. The densest concentrations of this kind of material were recovered from Ditch 2 in the western arc and Ditch 11 in the eastern arc. Here the proportions of the assemblage represented are 12% and 11.1%.

**Table 7.2: Table showing NISP (cattle) for each ditch segment, and percentage of NISP to have been affected by butchering, burning and gnawing.**

Ditch Segment	NISP	Butchered	Burned	Gnawed
1	462	17.1	2.4	17.3
2	25	15.0	0.0	10.0
3	35	12.5	3.1	9.4
4	35	39.4	3.0	33.3
5	672	18.2	0.9	18.4
Segment Average		20.4	1.9	17.7
6	183	17.0	0.0	13.8
7	67	6.6	3.3	8.2
8	76	14.1	0.0	4.7
9	91	23.9	4.5	9.0
10	297	12.4	1.1	6.0
11	130	19.6	0.9	3.7
12	351	16.2	0.0	6.3
13	267	14.7	0.9	7.1
14	105	17.4	1.2	3.5
Segment Average		15.8	1.3	6.9
Total Average		18.9	1.7	12.0

A more precise analysis of the locations of the cranial material recovered from the site show that while there are concentrations in the butt-ends of some of the ditch segments, the material is fairly well spread throughout the ditches in which it is present, and the complete and partially complete skulls do not tend to sit within the termini of the ditches. There will be a more thorough consideration of specific butt-end deposits at the end of this chapter; however, it is traditionally

believed that these would be the locations of the more 'spectacular' deposits, such as complete skulls.

Figure 7.25 shows the proportion of butchered cattle bone present in each of the ditches of the causewayed enclosure ditch. As seen with the proportions of body parts present in each ditch, the percentage of butchered bone tends to be roughly equal across the site – between 12 and 20% of the bone present in each ditch has visible butchery marks. The proportion of butchered cattle bone per ditch is slightly raised from the overall percentage of butchery across the site, which is 11%. There are three exceptions to this. The first is Ditch 7 in the eastern arc with just 6.6% butchered bones. Although a noticeable difference, the actual distance between the proportions of butchered bone in this ditch is not too dissimilar to other ditches however. 23.9% of the bone in Ditch 9 had evidence of butchery but again; this is only a slight deviation from the general pattern. Ditch 4 is the other exception and is potentially more significant, as it had almost 20% more butchered bone than any other ditch on the site, with 39.4% of the bone appearing to have been subject to butchery activity. Unfortunately Ditch 4 was one of the ditches with the smallest sample size, however ditches with similar numbers of bone, such as Ditches 2 and 3, have proportions of butchery much more in line with the overall proportion for the site. The concentration of butchered bone in Ditch 4 possibly implies that the bone being deposited of in this location had been subject to either different pre-depositional processes, or had been selected for deposition according to different criteria from surrounding ditches. This will be further discussed in the summary and conclusions at the end of this chapter.

Figure 7.26 shows the proportion of burnt bone present in the ditch segments. The maximum percentage of burnt bone present in any enclosure ditch context was just 4.5% (in Ditch Segment 9), indicating that burnt bone was not being regularly deposited within the ring-ditch. The two ditches with the highest concentrations of burnt material were both in the eastern arc, however, the average amount of burnt material was higher in the western arc, though only by 0.6%, so it is unlikely that this is of any particular significance to the practices governing the deposition of material in the ditches.

Figure 7.27 provides perhaps the most compelling evidence for a difference in practices governing the deposition of material in the western and eastern arcs of the enclosure ditch. It shows the proportions of gnawed bone present in the ditch segments of the enclosure. Generally the proportion of bone that appeared to have been gnawed by either rodents or canids was between 3 and 18%, with the exception of Ditch 4 in which 33.3% of the bones had been subject to gnawing. This was the same ditch that saw the significantly elevated proportions of butchery. As can be seen from figure 7.27, there was considerably more evidence for the gnawing of bones recovered from the western arc (with an average of 17.7% of the bones having been gnawed) than the eastern arc (with an average of 6.9%). This has implications for the purpose of this section of ditch during the use of the site, as well as the practices by which people deposited material in these ditch segments. Pryor has previously suggested that while the eastern arc was dug, deposits made and then rapidly backfilled, the western arc remained open for some considerable time. If the bone were being gnawed *in situ* within the ditch (as the significant amount of rodent activity may suggest), then the raised proportion of gnawed bone in the western arc corroborates this hypothesis. An alternative explanation might be that the material being deposited in the western arc was material that had been left about the site for some time prior to its deposition, so was potentially more like midden material. Both of these suggestions will be discussed in much further detail both in the summary and conclusions of this chapter, and in the concluding chapter of this thesis.

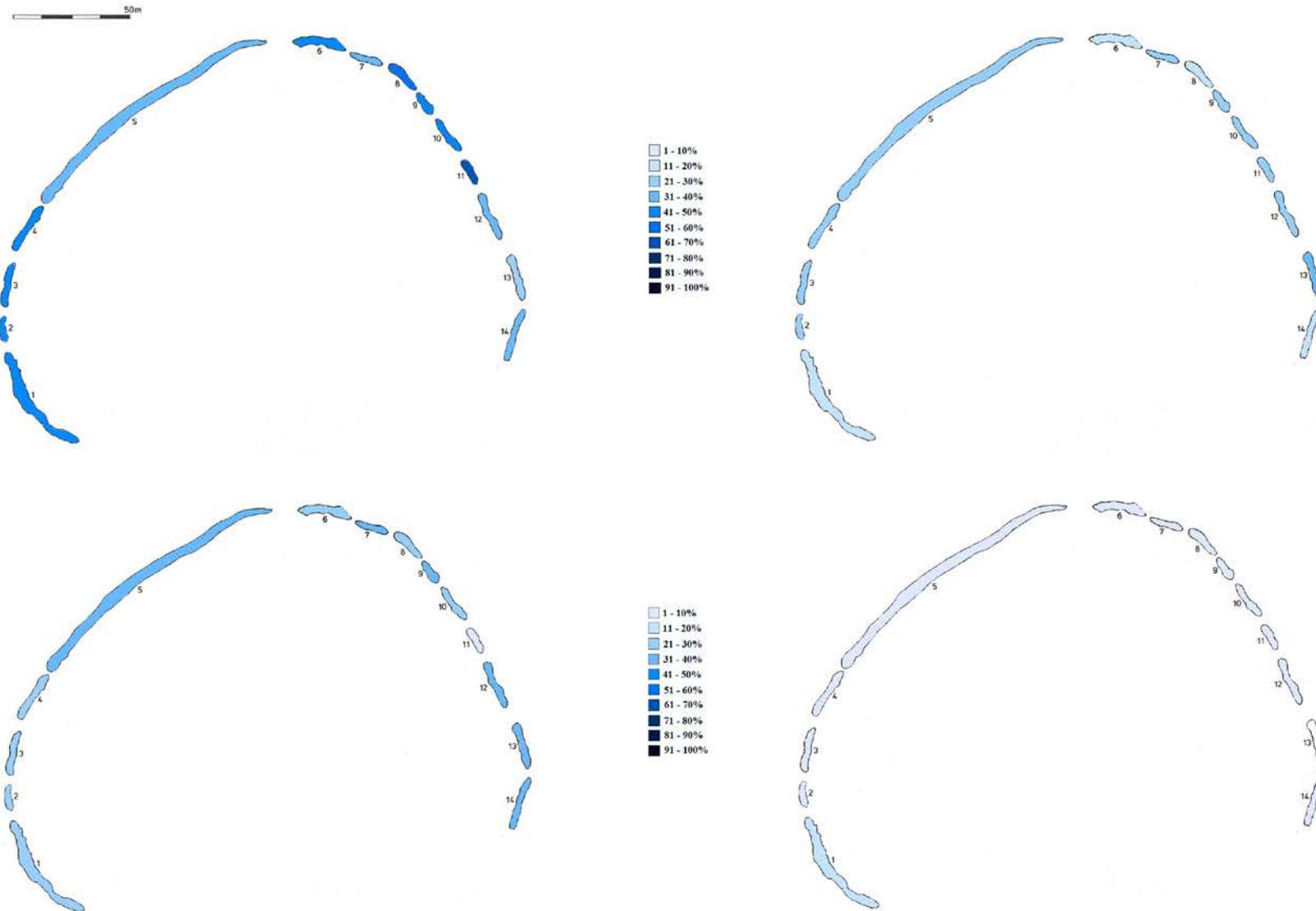
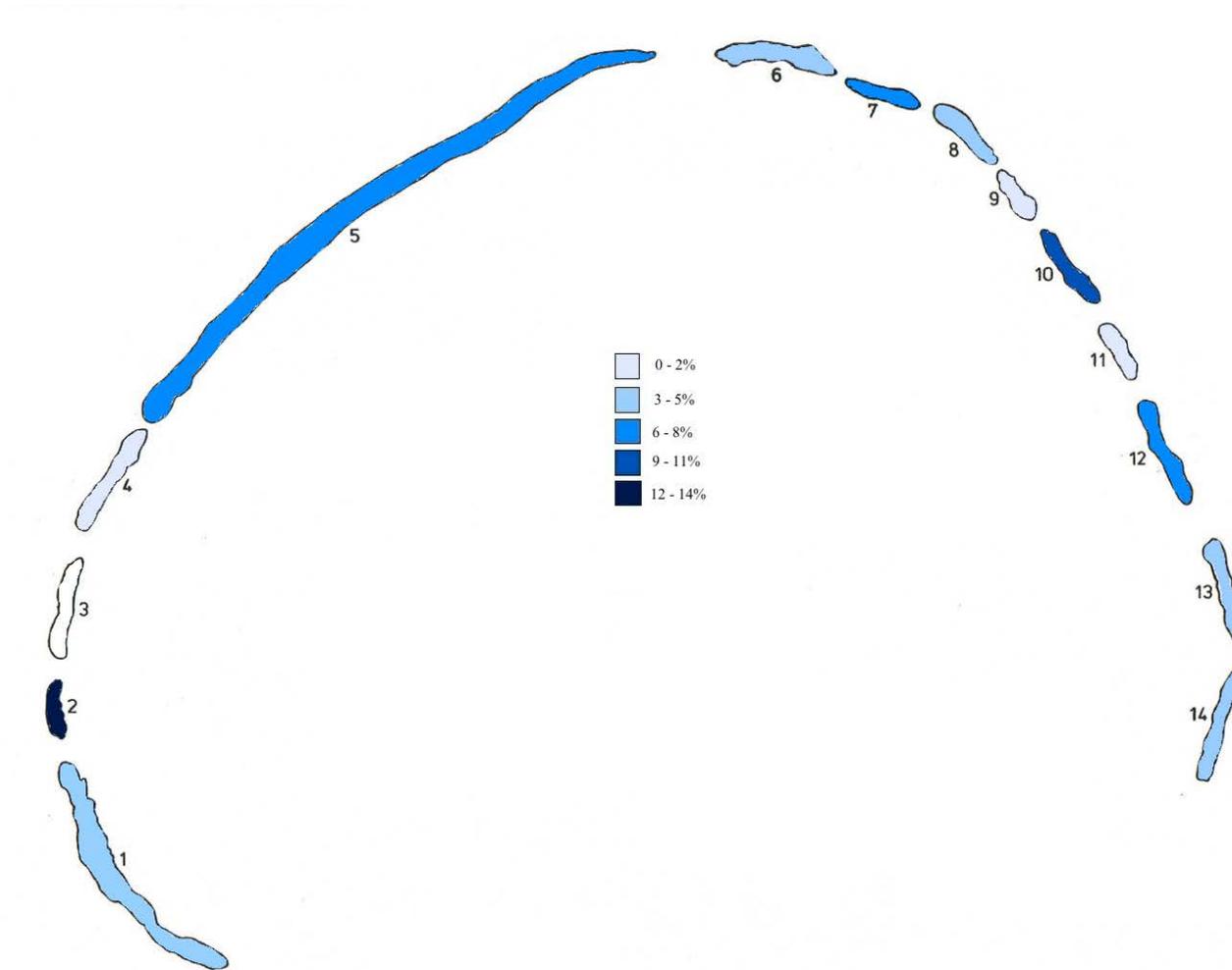
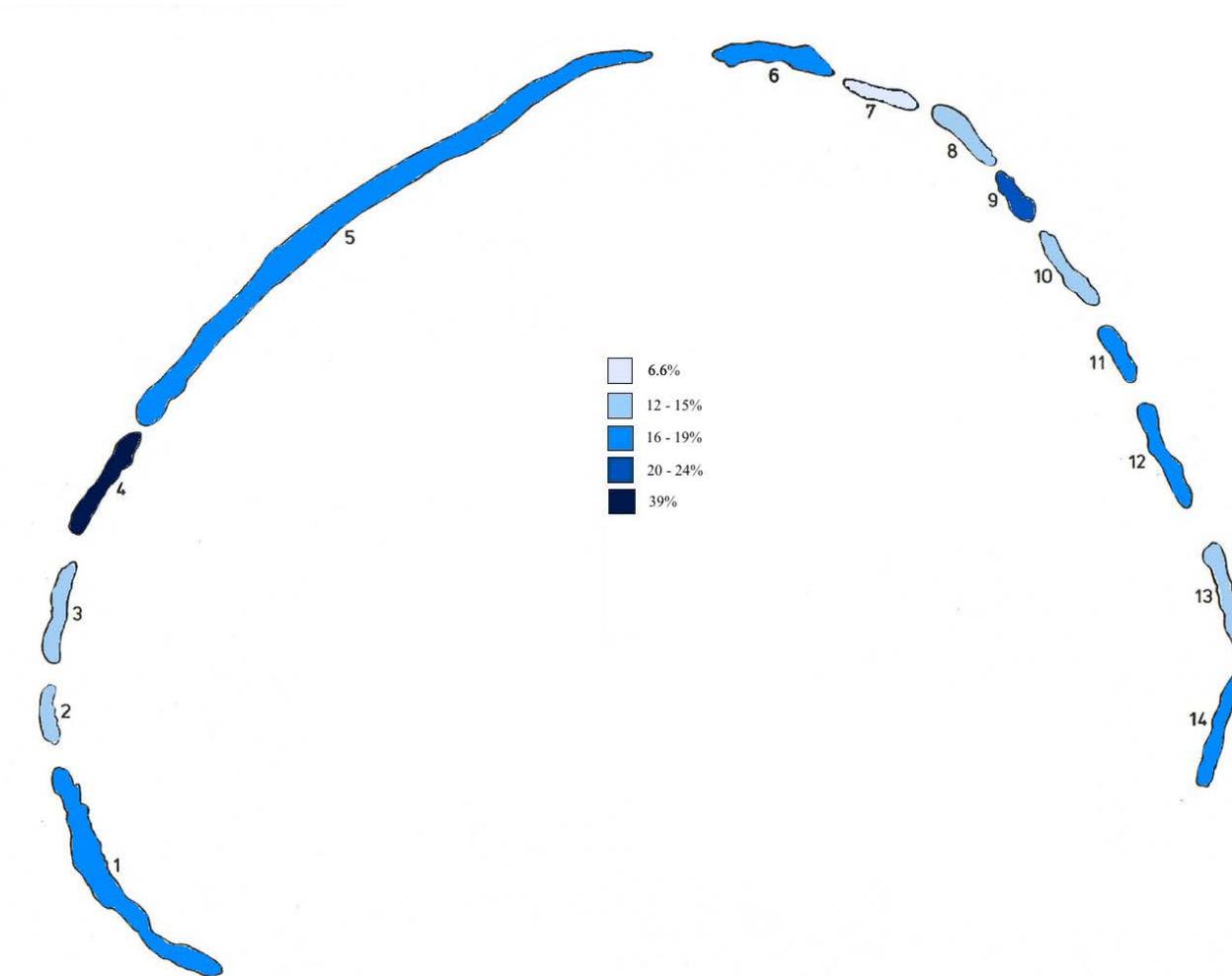


Figure 7.23: Plans of the Etton causewayed enclosure showing distribution of cattle and large mammal bone by body part = forelimbs (top left), hindlimbs (top right) torso (bottom left) and feet (bottom right).



**Figure 7.24: Plan of the Eton causewayed enclosure showing the proportion cattle bone that identified as belonging to the crania**



**Figure 7.25: Plan of the Etton causewayed enclosure showing the proportion cattle bone to have visible butchery marks present**

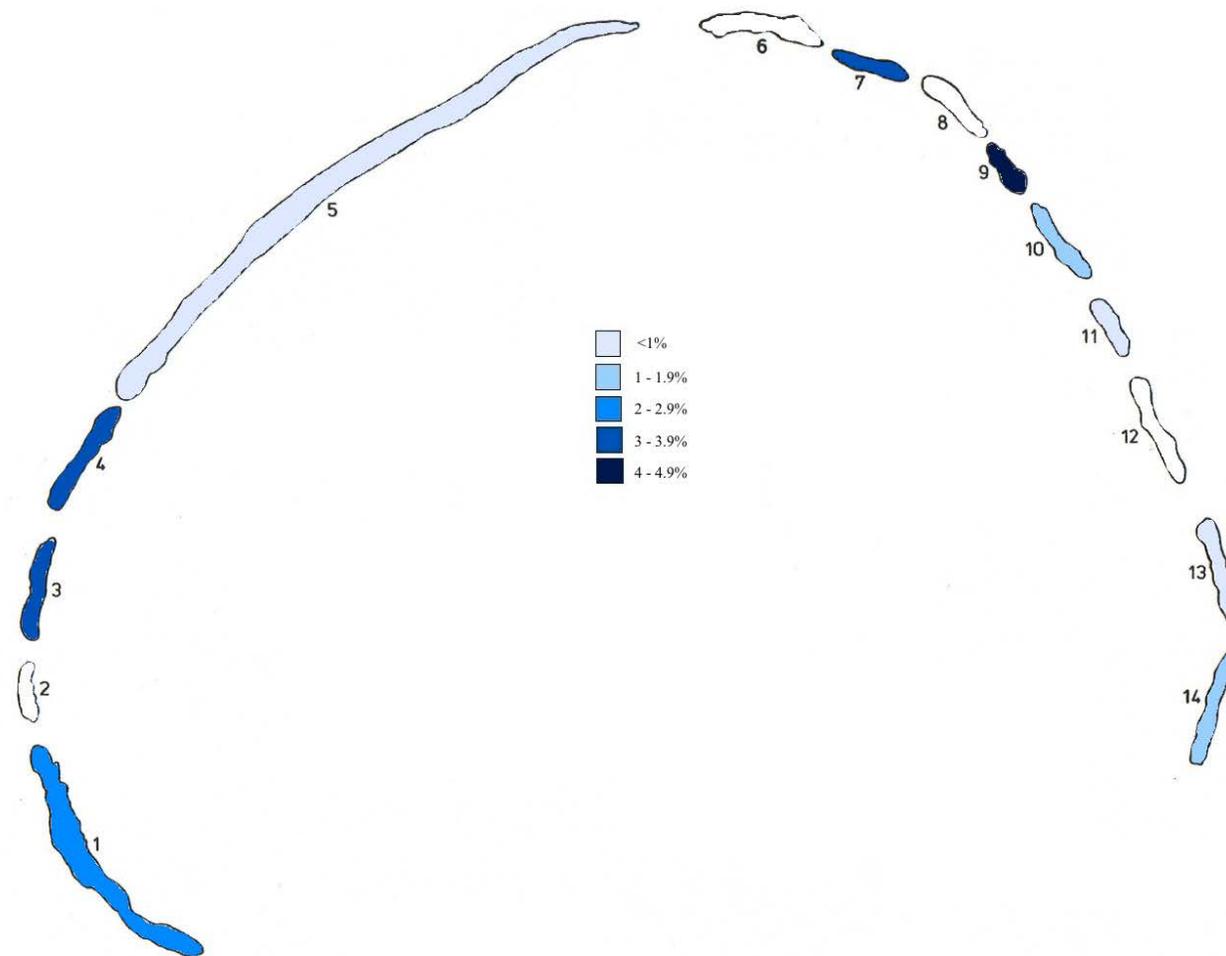
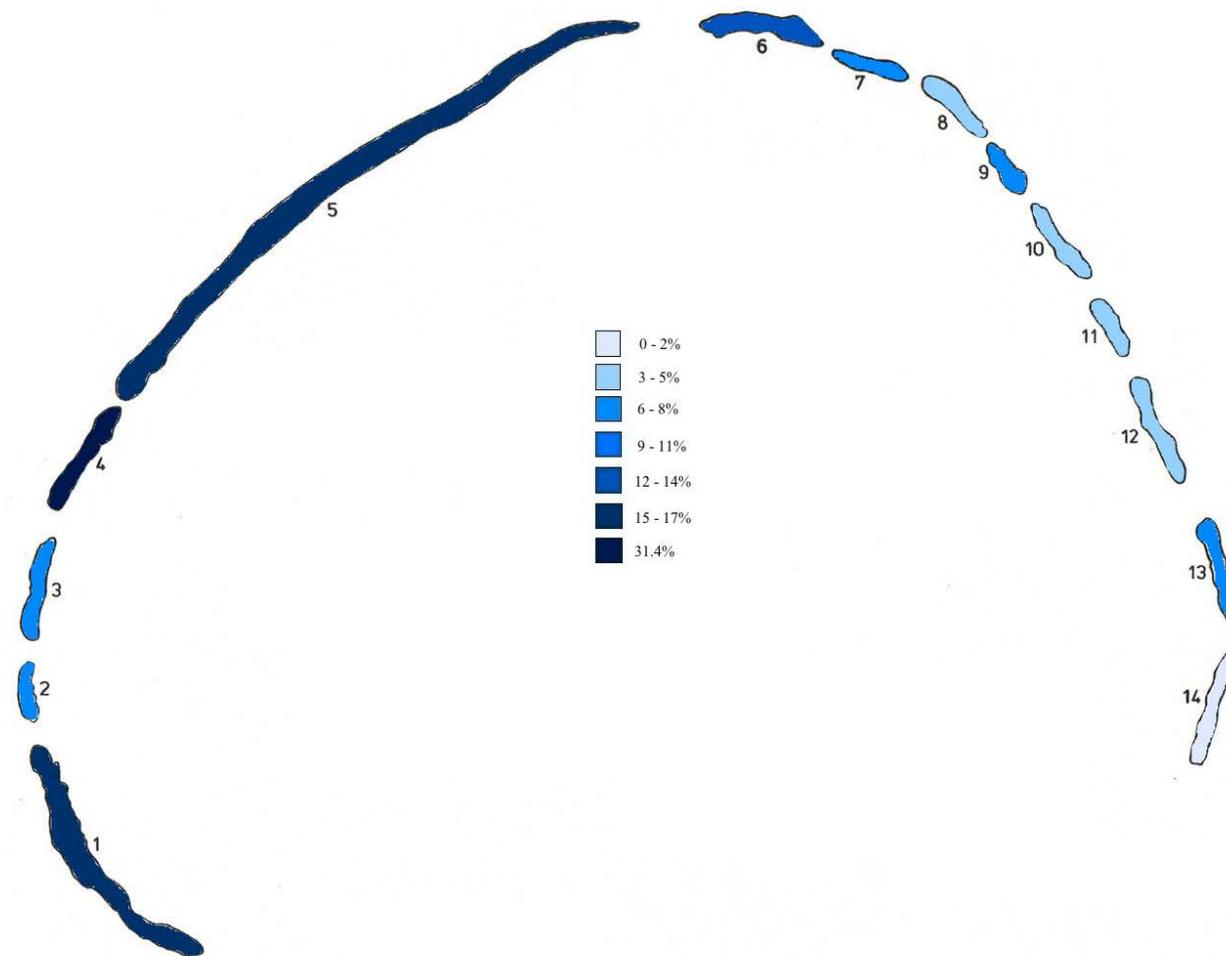


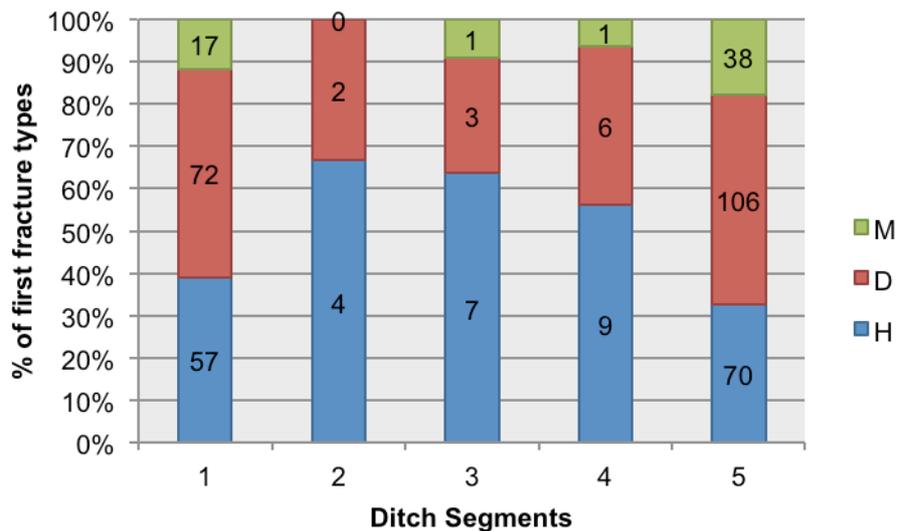
Figure 7.26: Plan of the Etton causewayed enclosure showing the proportion cattle bone to have visible burning.



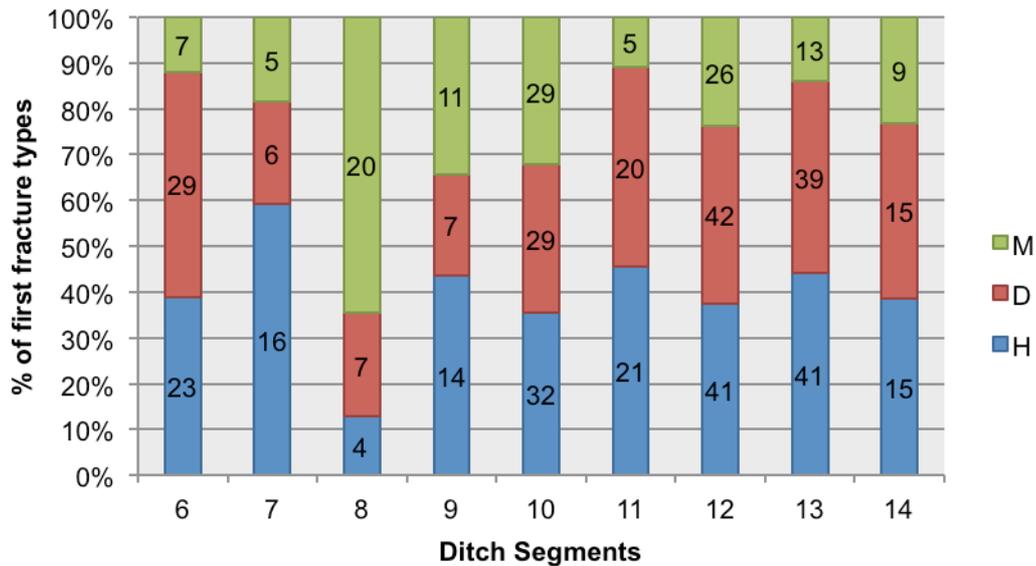
**Figure 7.27: Plan of the Etton causewayed enclosure showing the proportion cattle bone that appeared to have been gnawed by canid, rodent or both.**

### 7.3.1 Distribution of Fracture Types

The different types of fracture to which bones can be subject were discussed at length in Chapter 6. Here, the distribution of these fracture types on cattle bones throughout the enclosure ditch is considered. The overall proportion of helical (fresh) fracture present on cattle bone across the site is a little 38.8%. The proportion of this same fracture type in the ditch segments of the western arc appear rather higher than this at 51.7% overall and ranging from 32.7% to 66.7% across the five segments. The overall percentage of helical fractures was rather lower in the eastern arc, at 39.6% overall and ranging between 12.9% and 59.3% across the nine ditch segments.



**Figure 7.28: Graph showing the proportions proportions of first fracture types present on cattle bone in each of the ditch segments of the western arc.**



**Figure 7.29: Graph showing the proportions proportions of first fracture types present on cattle bone in each of the ditch segments of the eastern arc.**

Ditch Segment 8 appears to have an anomalously high level of mineralised bone, with only a very low amount of freshly fractured bone compared with the other ditches. In all other respects the level of the various taphonomic processes visible in Ditch Segment 8 are unremarkable and give us no indication that any different activity was occurring here than was occurring in any other ditch segment during the time that the site was occupied. It is possible that the high levels of mineralised fracture mask the true levels of helical fracture present in the feature.

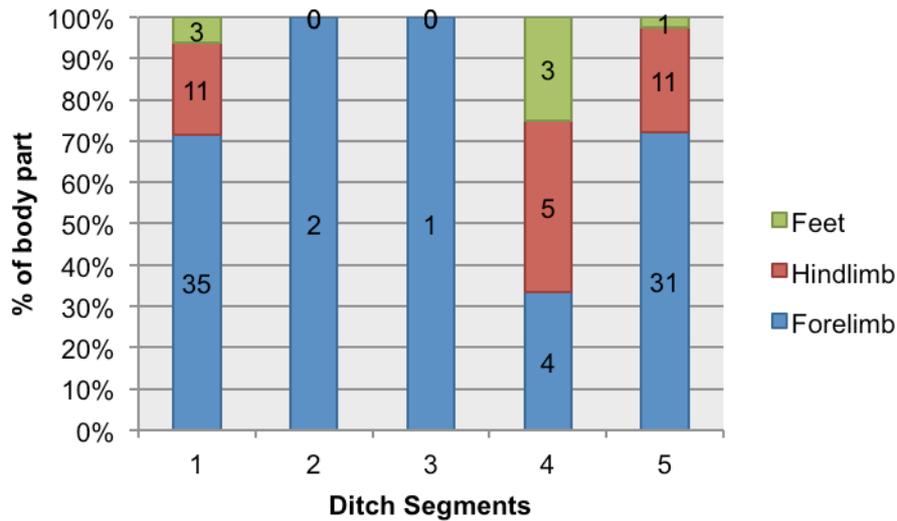
### 7.5 Distribution of Pig Bones

Pig were the second most abundant species present at Etton, but even so were only present in very small numbers when compared to cattle. On average pigs make up 13% of the total assemblage recovered from the site, accordingly their average presence within the western arc was 13.1% and in the eastern arc was 10.3%. Proportions within individual ditches fell as low as 3.8% in Ditch 7, however, and were as raised as 31% in Ditch 4. Figures 7.30 and 7.31 show the distribution of the pig bones present in the ditches sorted into forelimb, hindlimb and feet elements. Unlike cattle, the proportions of torso bones (ribs

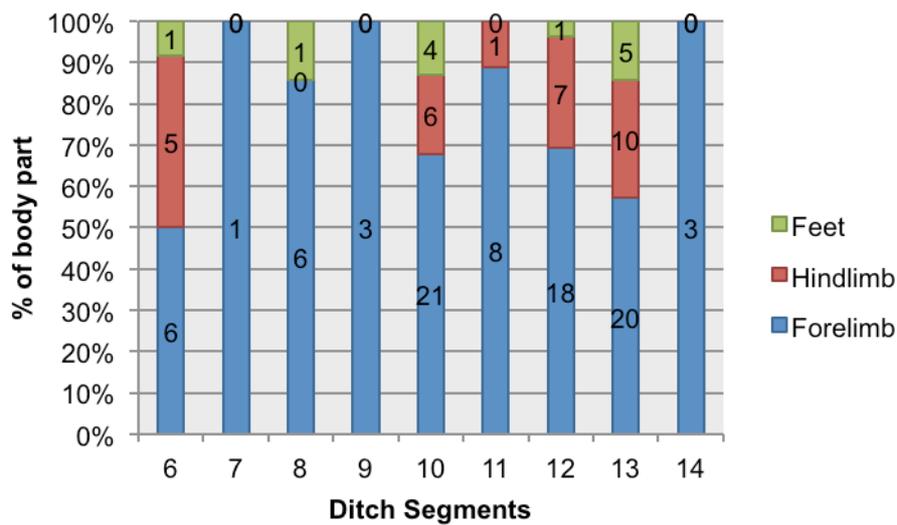
and vertebrae) could not be included in the count due to the difficulties in distinguishing between pig and sheep with regards to these elements.

To an even greater extent than cattle, forelimbs were the overwhelmingly dominant body part present throughout the ditches. The variability in the proportions of the body parts is also considerably more marked than with cattle. The western arc ditches comprised between 34% and 100% forelimb elements, while the eastern arc ditches had a slightly lower range of 50% - 100%. The difficulty with interpreting the ditches with 100% forelimb elements as being significant is the fact that the assemblages for those ditches tended to be so small – the highest number of pig bones found in any of the contexts where the forelimb bones make up 100% of the assemblage is just three. The proportion of hind limb bones ranges between 0% and 45% in the eastern and western arcs – this range is also thought to be due largely to the same problem of small NISPs. Feet bones were only present in five of the fourteen ditches, where they make up between 2% and 25% of the assemblages.

By looking at Figures 7.30, 7.31 and 7.32, it is clear that the dominance of forelimb elements is persistent across all ditches of the enclosure. The only instances where forelimb bones are not in the majority for the entire ditch assemblage are in Ditch 4, where forelimb elements only make up 33% of the assemblage and are outnumbered by hindlimb elements, and Ditch 9 where forelimbs make up 50% of the assemblage. The apparently more variable deposition of pig indicates that pig was subject to substantially different depositional practices at the site. It is possible that because cattle were the dominant domestic food species their presence and role at Etton was consistent as reflected in their deposition. Pigs, which appear to have been much less consistently present or used at Etton, would not only be visible in far fewer numbers, but would also likely be utilized quite differently.



**Figure 7.30: Graph showing the proportions of the main body parts (excluding torso and crania) present in the Ditch Segments of the western arc of the Etton causewayed enclosure.**



**Figure 7.31: Graph showing the proportions of the main body parts (excluding torso and crania) present in the Ditch Segments of the eastern arc of the Etton causewayed enclosure.**

No complete pig skulls were encountered during the excavation of the ring-ditch, but fragmented cranial material was recovered. Figure 7.34 shows the density of cranial material in each of the causewayed enclosure ditches. The proportion of assemblages made up by this material ranges from nothing to 16.7%, a very similar range to that seen in the cattle bone. Generally only very small quantities of pig crania were recovered, and these tended to be highly fragmented. This is possibly the result of the crania being relatively weak to taphonomic processes, thus easily fragmented to the point where it would not

be included in the NISP, but could also reflect the decision of the inhabitants of Etton not to deposit this kind of material in the enclosure ditch. The only ditch where the quantity of cranial material is significantly raised is Ditch 14, at the end of the visible eastern arc. Here, cranial material accounted for 16.7% of the entire assemblage.

Figure 7.35 shows the proportion of butchered pig bone present in the enclosure ditch segments. The main range in the proportion of butchered bone is between 6% and 33.3% with one outlier at 100% (Ditch 3). The raised proportion of butchered bone in this ditch is a result of the fact that just one pig bone was recovered from the context, which had butchery marks on its surface. The overall proportion of butchered pig bone in the western arc was 33.4%. This is likely to be artificially high due to the 100% butchered bone (1 element) in Ditch 3. Without including this bone, the average falls to a more realistic 22.6%. The overall percentage for butchery in the eastern arc of the enclosure was lower at 13.5%. The overall percentage of butchered pig bone from the enclosure ditch (excluding the 100% result from Ditch 3) was 14.5% - slightly raised from the 11% of butchered bone across the site as a whole. As was seen from the results of the distribution analysis for cattle butchery, the result from Ditch 4 sits above the average proportion for the western arc, the enclosure ditch and the site as a whole. This adds weight to the argument that something distinctive was governing the deposition practices for this ditch, though interpretations are hampered by the small sample size.

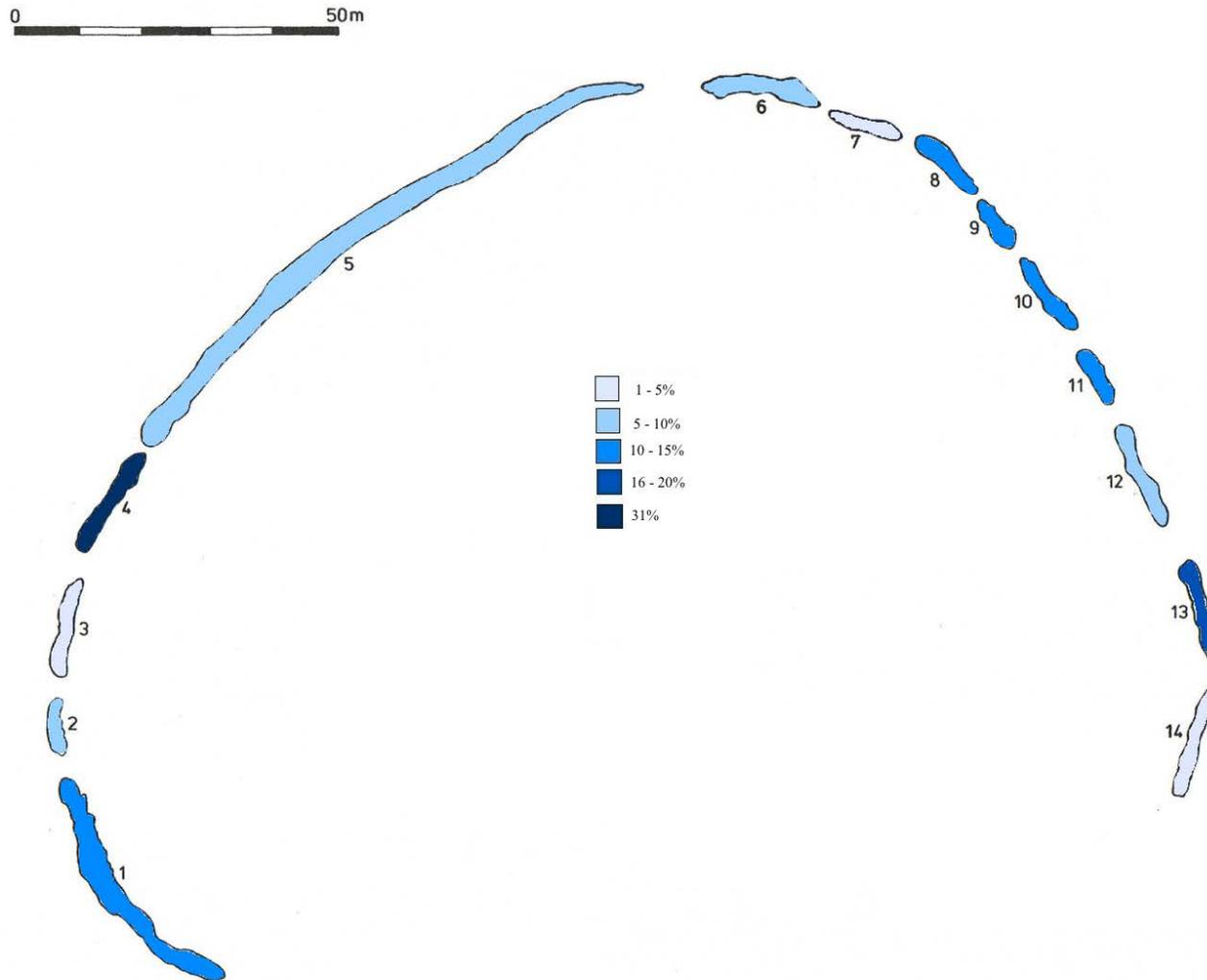


Figure 7.32: Plan of the Etton causewayed enclosure showing the proportion of NISP for each ditch to be identified as pig.

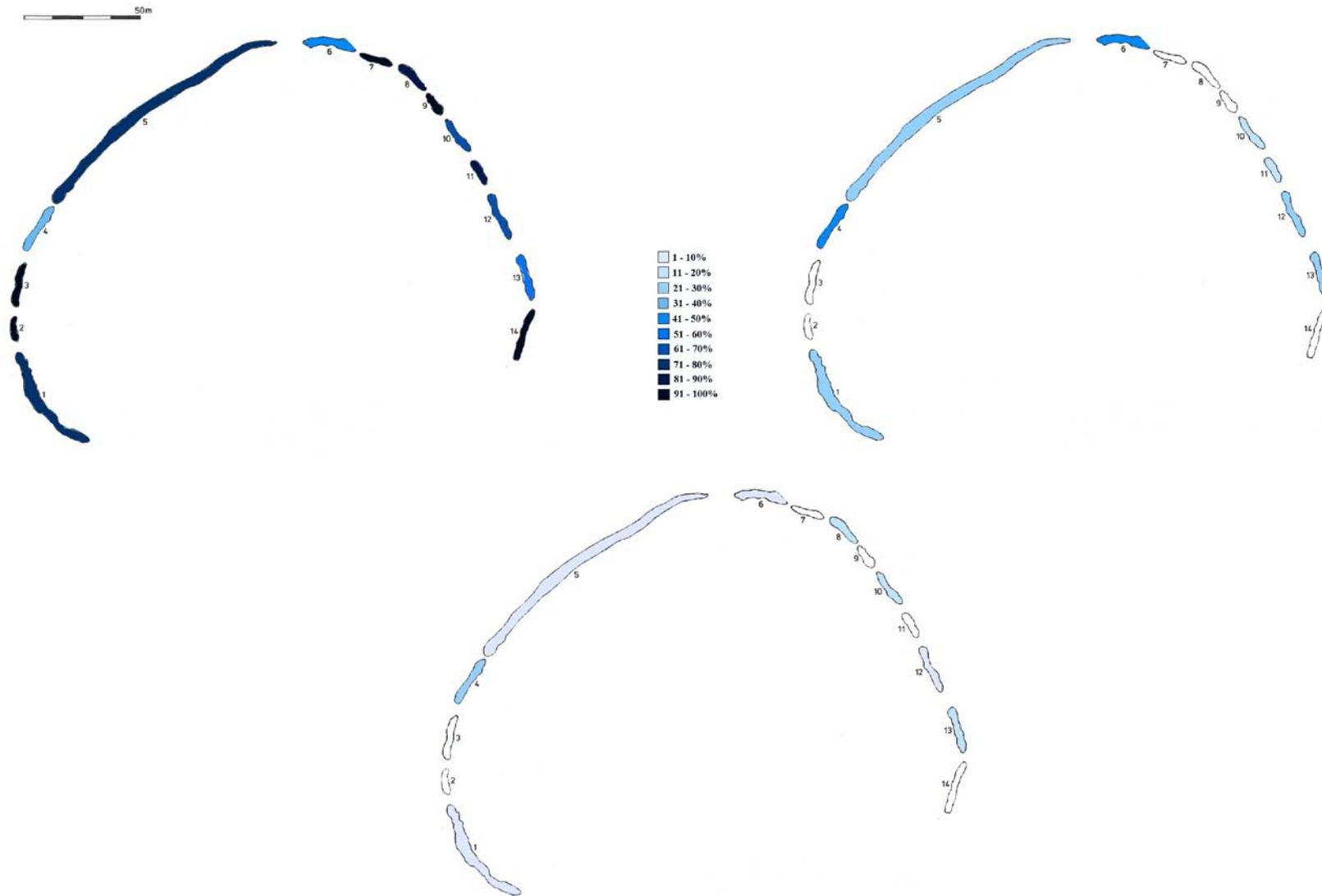


Figure 7.33: Plans of the Eton causewayed enclosure showing distribution of pig by body part = forelimbs (top left), hindlimbs (top right) torso (bottom left) and feet (bottom right).



Figure 7.34: Plan of the Etton causewayed enclosure showing the proportion pig bone that were identified as belonging to the crania

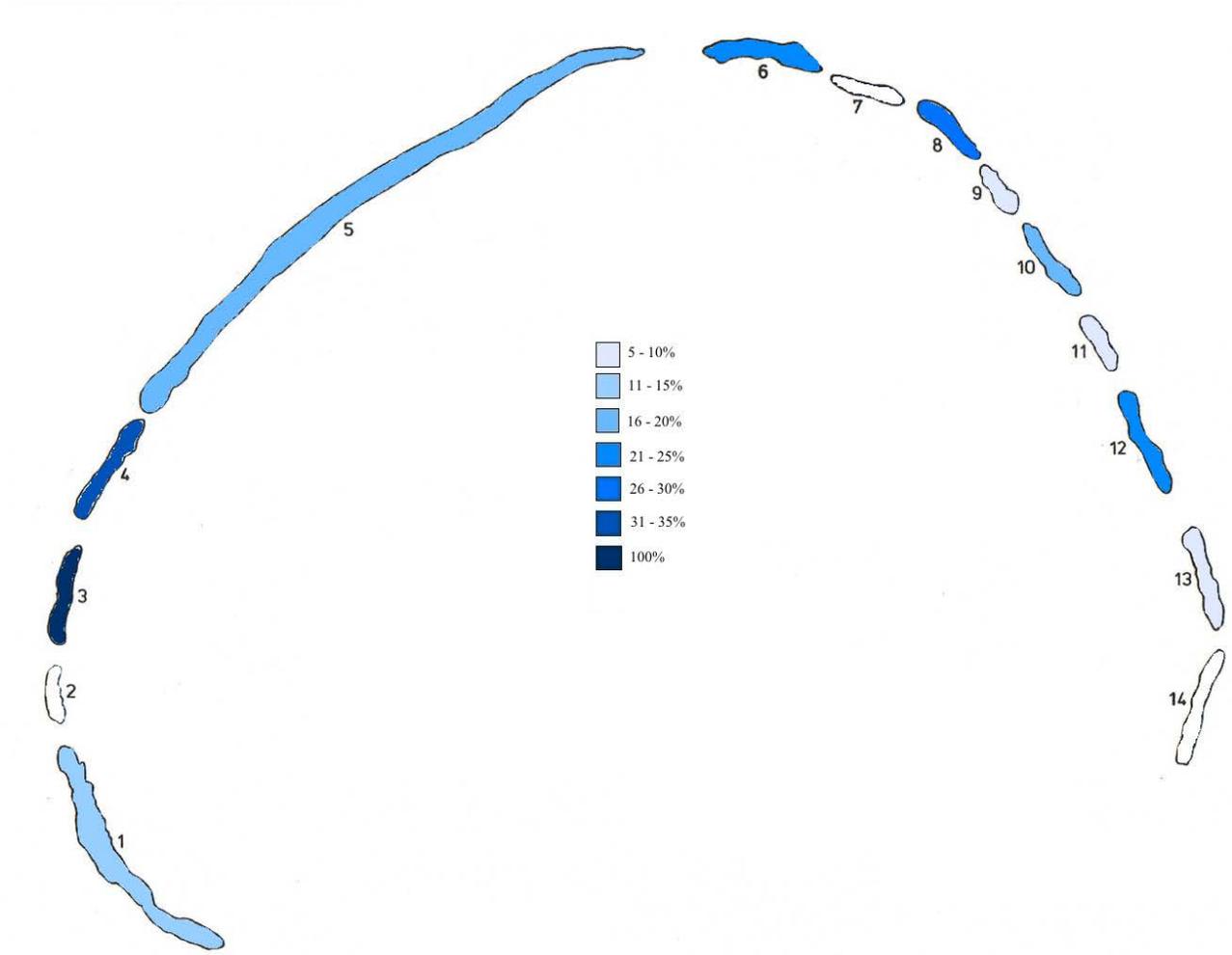


Figure 7.35: Plan of the Etton causewayed enclosure showing the proportion pig bone to have visible butchery marks present

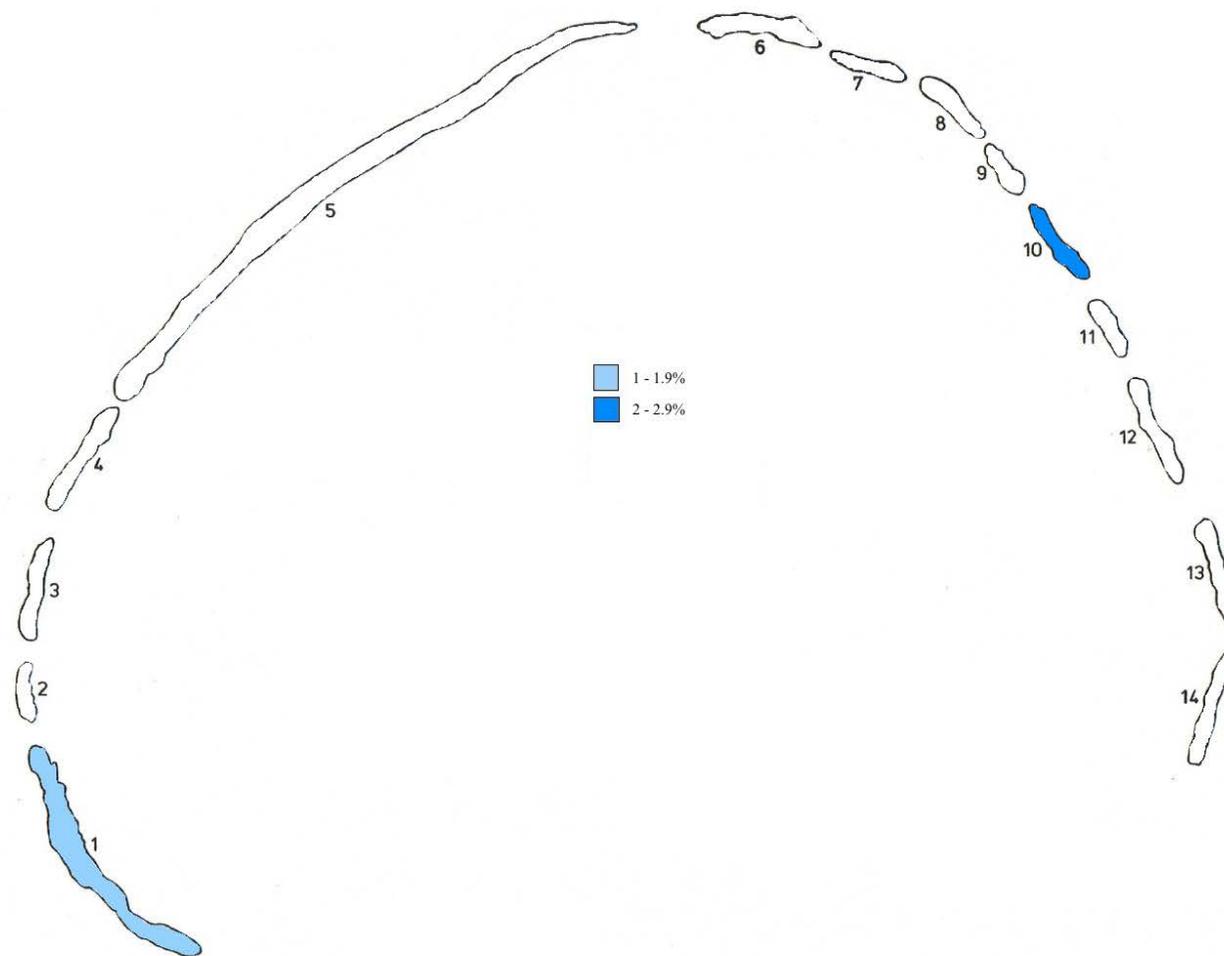
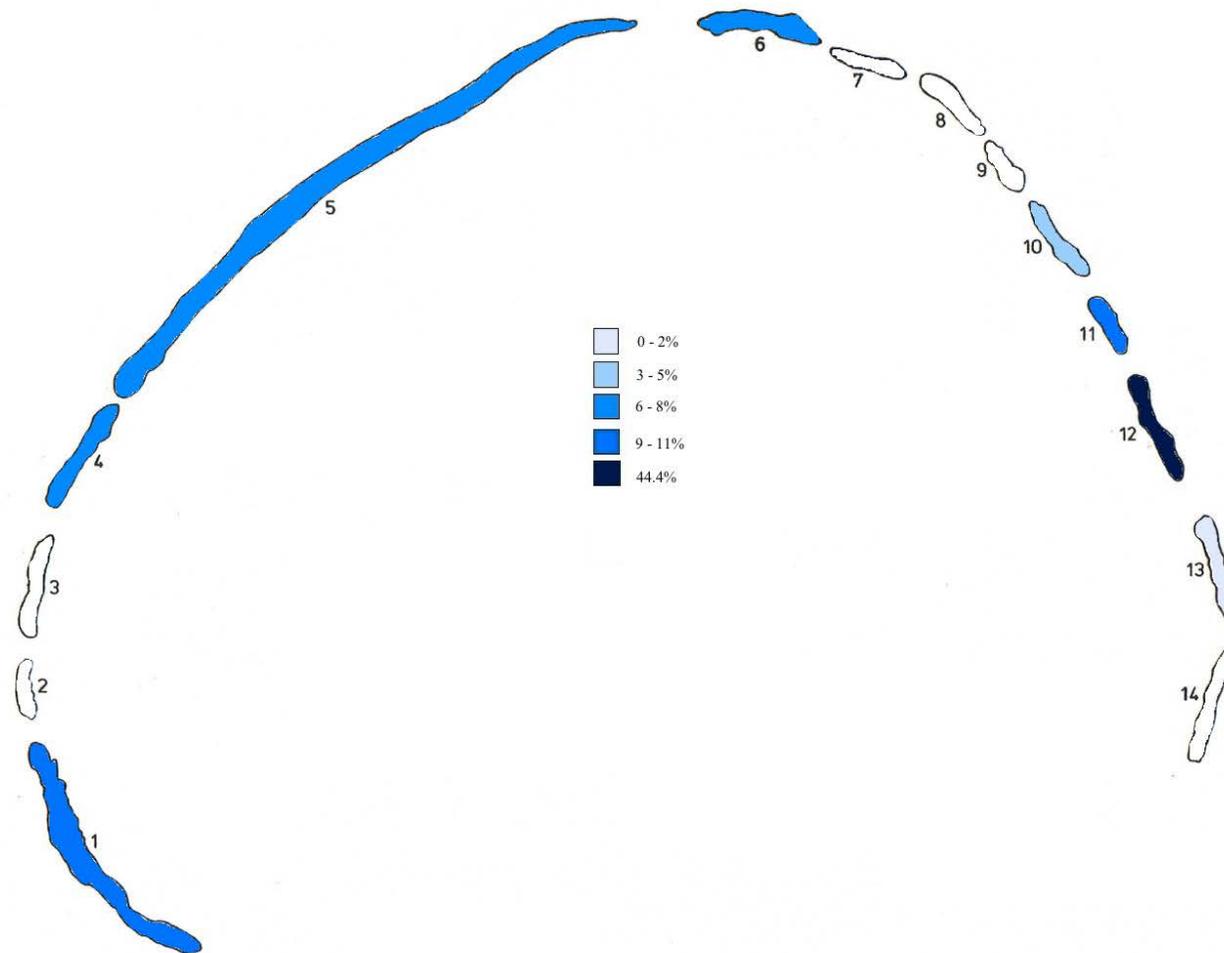


Figure 7.36: Plan of the Eton causewayed enclosure showing the proportion pig bone to have visible burning.



**Figure 7.37: Plan of the Etton causewayed enclosure showing the proportion pig bone that appeared to have been gnawed by canid, rodent or both.**

Figure 7.35 shows the proportion of burnt bone present in the ditch segments. Only two ditches were found to contain burnt pig bone, and each of these contained just one burnt element. As with cattle, it is clear that burnt material was only very infrequently being deposited in the enclosure. The average amount of burnt material for both the western and eastern arcs is just 0.3%.

The evidence for rodent and canid gnawing (Figure 7.37) on animal bones was more evenly distributed for pig than was seen for cattle (above), with the exception of the bones in Ditches 2 and 3 (which contained 2 and 1 element respectively), the proportion of butchered bone in the western arc was generally between 7% and 10%, which is slightly less than was observed for cattle in the same contexts. The eastern arc is slightly more variable, with between 1 and 10% of bones gnawed in most of the contexts containing gnawed bone, however with the exception of Ditch 12, in which almost half (44.4%) of the bones appeared to have been subject to gnawing. This is potentially significant, as the percentage of gnawed cattle bone in the same context was only 6.3%. The implication is that the pig remains were kept open and accessible to rodents and canids prior to their deposition, whilst the cattle material was not.

## **7.6 Distribution of Sheep/Goat Bones**

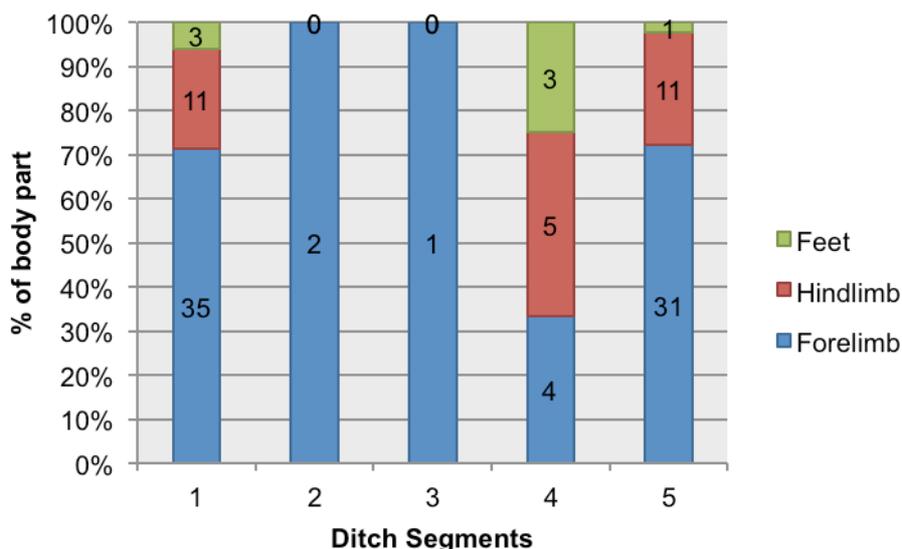
Sheep/goat were the least abundant of the three main domesticates, making up only 10% of the total mid to late Neolithic assemblage from the site. This was also the average for sheep bones in the western arc of the enclosure ditch, while the eastern arc average was rather lower at 5.4%. Proportions within individual ditches ranged from 1.7% in Ditch 14 to 16.1% in Ditch 13. Figures 7.38 and 7.39 show the proportion of sheep/goat body parts present in each ditch (by forelimb, hindlimb and feet). Like pig, the torso bones were not included in the counts due to the ambiguity of their identification.

There were three ditches (Ditches 3, 8 and 13) in which only forelimb bones were identified. These only contained a very small number of sheep bones overall, so the fact that all of these were forelimbs is perhaps not so statistically relevant as it initially appears.

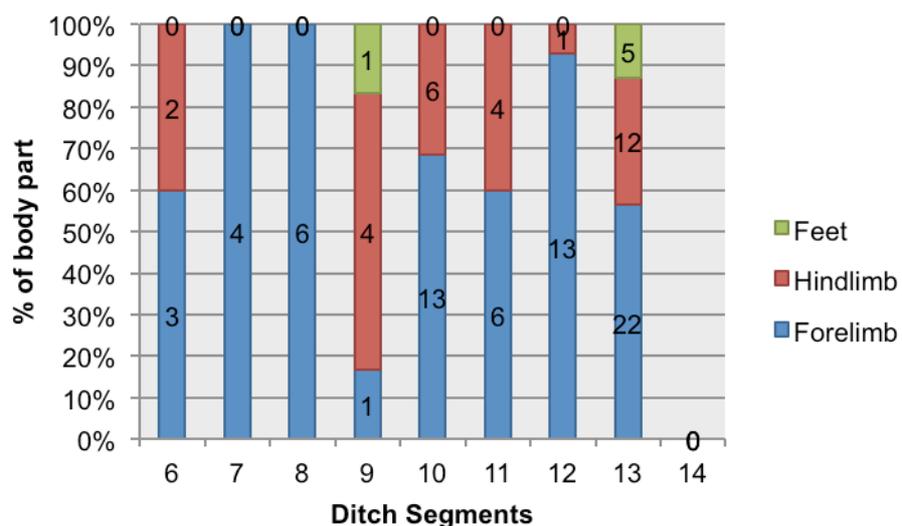
The proportion of hindlimbs in the ditch segments averages 30.7%, but ranges from 14.3% to 50%. There is very little variation between the two ditch arcs, hindlimb elements in the western average 29.4% and in the eastern average 31.9%. Feet are considerably less well represented, and were only present in five of the fourteen ditches of the enclosure. The overall average for foot bones in the enclosure is 14.7%, with averages of 13.6% in the western arc and 12.4% in the eastern.

No sheep skulls were recovered from any of the ditches of the causewayed enclosure, but some fragmented cranial material was present in four of the ditches (Figure 7.40). In total the cranial fragments belonging to sheep make up less than 2% of the whole sheep assemblage. The average amount of cranial material in the western arc is 3% and in the eastern arc is 1.7%, the range however is between 2.9% and 9.8%. The highest density of cranial material was found in Ditch Segment 13 – this does not appear to correspond with any similar accumulations of cranial material from other species, or any other particularly distinctive material from this ditch. As was said for pig bone, it is possible that the dearth of this kind of material is the result of its limited structural integrity in the face of taphonomic processes; however, it could also be that the Neolithic inhabitants of Etton were purposefully disposing of this material elsewhere.

Butchery marks were present on an average of 9.2% of the sheep bone recovered from the enclosure ditches – 5% less than pig and 9% less than cattle (Figure 7.42). Contrary to both cattle and pig, butchery was more prevalent in the eastern arc of the causewayed enclosure – the average amount of butchered bone in the western arc was 8.5% compared to 9.9% in the eastern arc. The range in proportion of butchered bone (not including those ditches in which it was completely absent) is from 6.6% in Ditch 13 to 40% in Ditch 6. This extremely high proportion of butchered bone in Ditch 6 represented the highest density of butchered bone for any species in any one ditch context (with the exception of the ditch in which the one pig element present was butchered giving a proportion of 100%).



**Figure 7.38: Graph showing the proportions of the main body parts (excluding torso and crania) present in the Ditch Segments of the western arc of the Etton causewayed enclosure.**



**Figure 7.39: Graph showing the proportions of the main body parts (excluding torso and crania) present in the Ditch Segments of the eastern arc of the Etton causewayed enclosure.**

Overall, more sheep/goat bone seems to have been subject to rodent or canid gnawing in the western arc of the ditch than the eastern arc (Figure 7.43), though this is not so obvious as it was with cattle. The evidence for rodent and canid gnawing on animal bones was more evenly distributed for pig than was seen for cattle (above). With the exception of the bones in Ditches 2 and 3 (which contained 2 and 1 element respectively), the proportion of butchered bone in the western arc was generally between 7% and 10%, which is slightly

less than was observed for cattle in the same contexts. The eastern arc is slightly more variable, with between 1 and 10% of bones gnawed in most of the contexts containing gnawed bone, however, with the exception of Ditch 12, in which almost half (44.4%) of the bones appeared to have been subject to gnawing. This is potentially significant, as the percentage of gnawed cattle bone in the same context was only 6.3%. The implication is that the pig remains were kept open and accessible to rodents and canids prior to their deposition, whilst the cattle material was not.

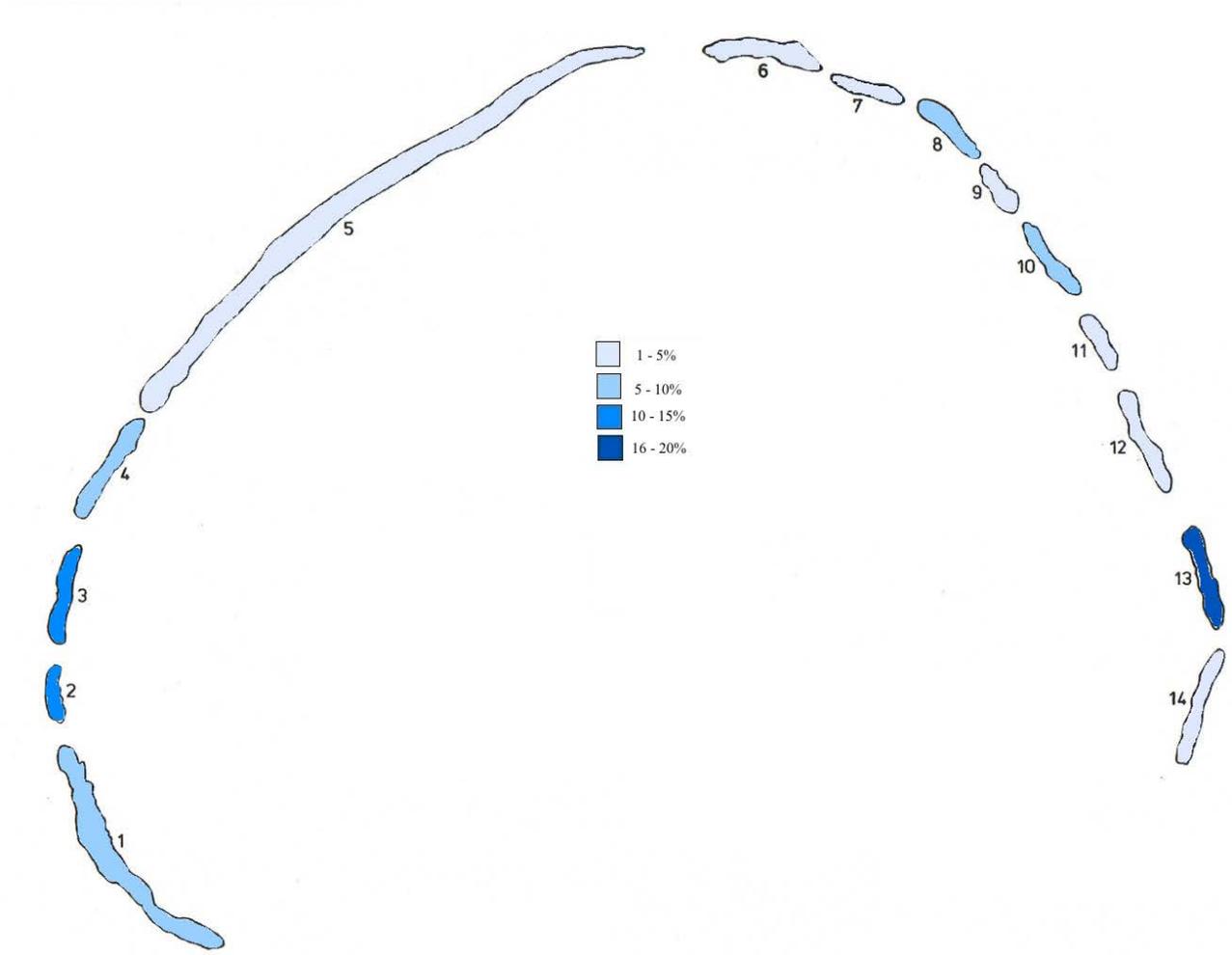


Figure 7.40: Plan of the Etton causewayed enclosure showing the proportion of NISP for each ditch to be identified as sheep.

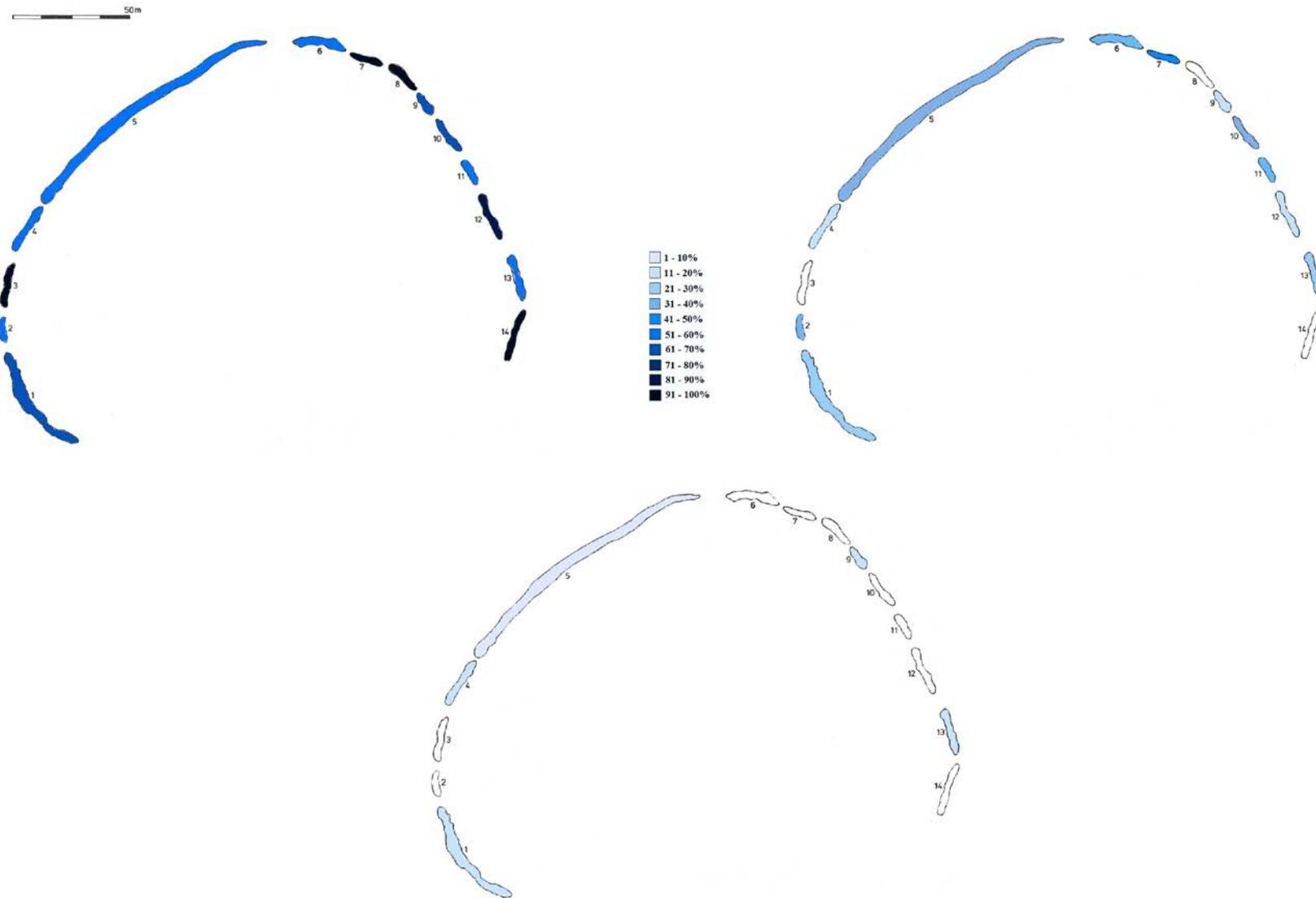


Figure 7.41: Plans of the Eton causewayed enclosure showing distribution of sheep by body part = forelimbs (top left), hindlimbs (top right) and feet (bottom).



**Figure 7.42: Plan of the Etton causewayed enclosure showing the proportion sheep/goat bone that identified as belonging to the crania**

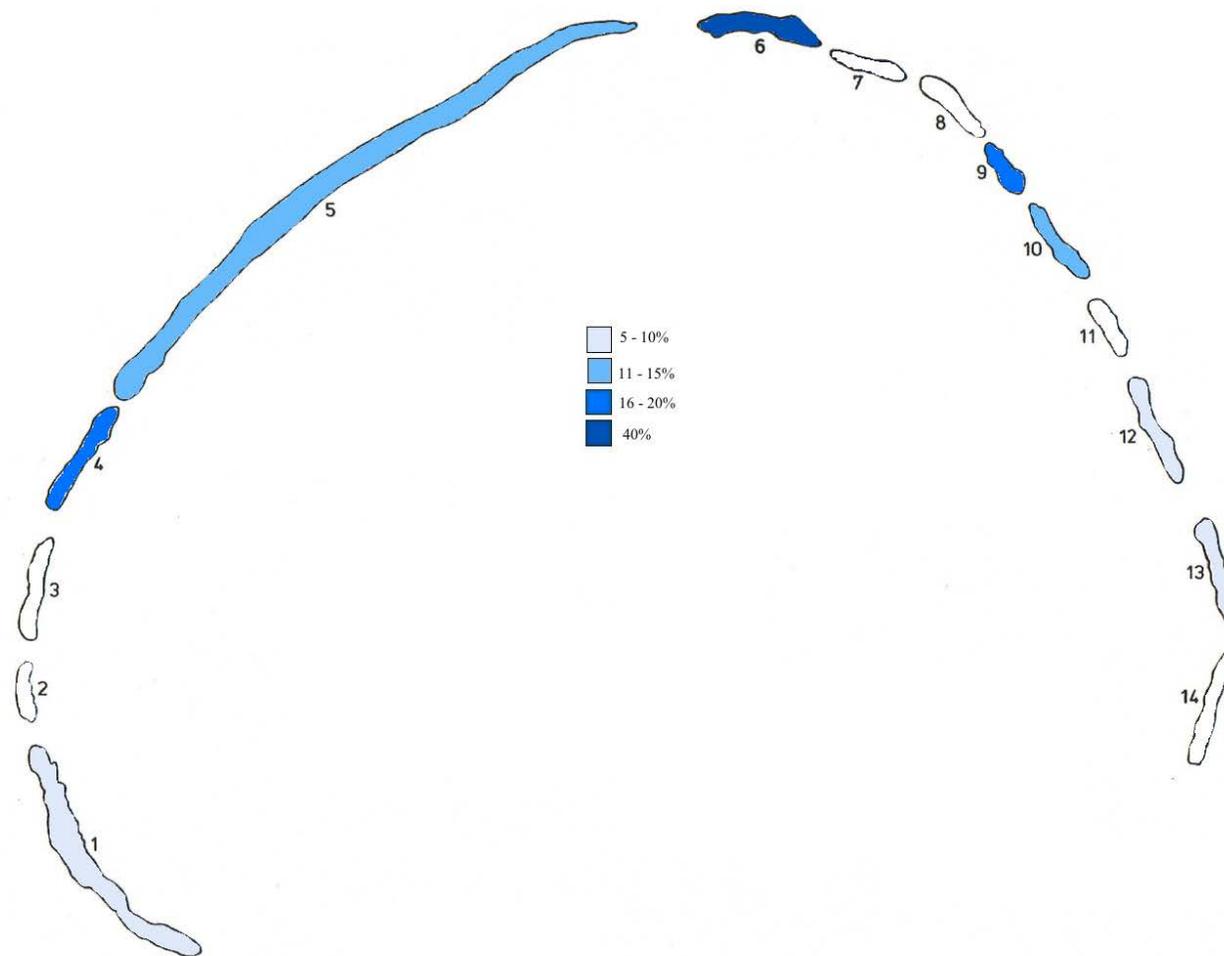
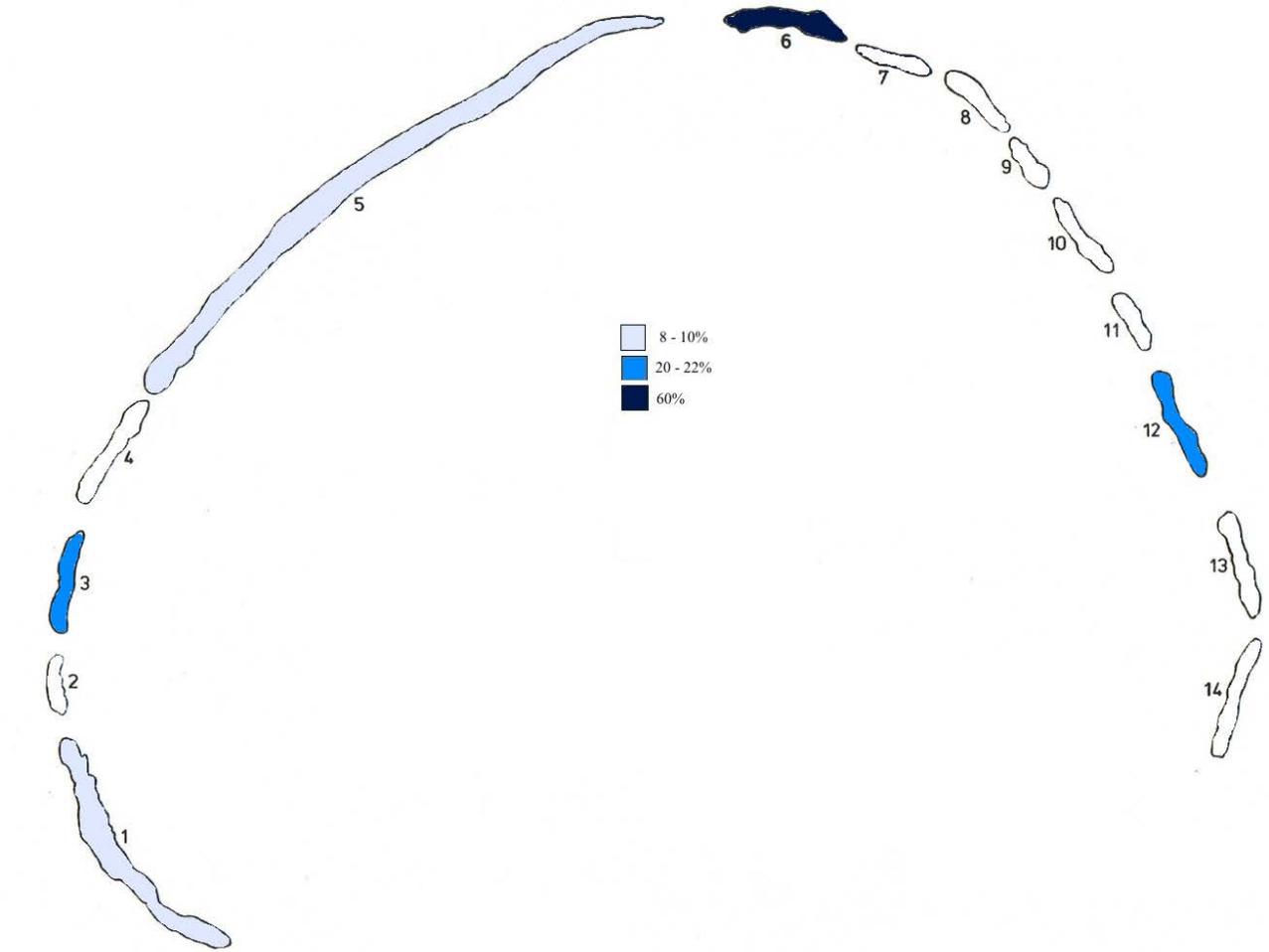


Figure 7.43: Plan of the Etton causewayed enclosure showing the proportion sheep/goat bone to have visible butchery marks present



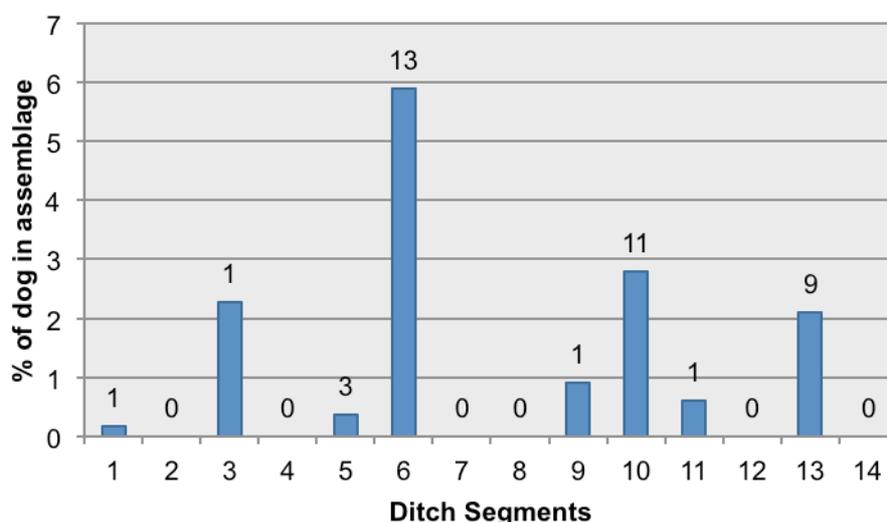
**Figure 7.44: Plan of the Etton causewayed enclosure showing the proportion sheep bone that appeared to have been gnawed by canid, rodent or both.**

## 7.7 Distribution of Other Species

As well as cattle, pig and sheep/goat, the remains of dog, red and roe deer, aurochs and fox were encountered at Etton. These species were only present in very small quantities however, which has meant that any hypotheses based upon them have to be regarded as somewhat tenuous. Nevertheless, the distribution of these species around the enclosure ditch is considered here.

### 7.7.1 Dog

Although present consistently across the enclosure ditch, dog remains never comprise more than 6% of any ditch segment assemblage (Figure 7.45), and generally comprises less than 3% of any assemblage. The only exception was within Ditch Segment 6, in the eastern arc, where the partial skeleton of a puppy pushes the proportion up to near 6%. Another partial skeleton, present in Ditch Segment 10, might explain the slightly elevated proportion in this ditch. In all other instances where dog remains were present it was in the form of isolated bones, both complete and partial.



**Figure 7.45: Proportion of Dog in assemblages of each ditch segment**

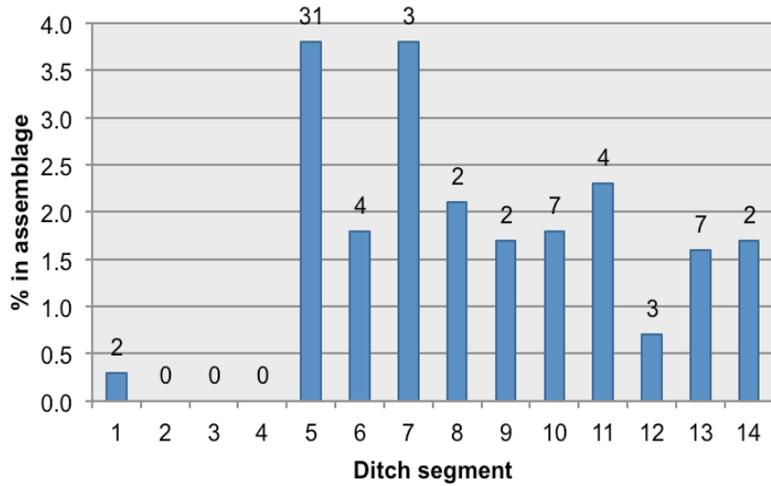
As well as there being no butchery marks present on the dog bones from Etton (discussed in Chapters 5 and 8), no gnawing (either rodent or canid) was recorded. Gnawing is prevalent across the site, even on human bone, so a complete absence of this kind of activity is potentially unusual. Cranial

fragments were present in two ditch contexts; as part of the partial puppy skeleton in Ditch Segment 6, and as a single piece of maxillary mandible in Ditch Segment 11.

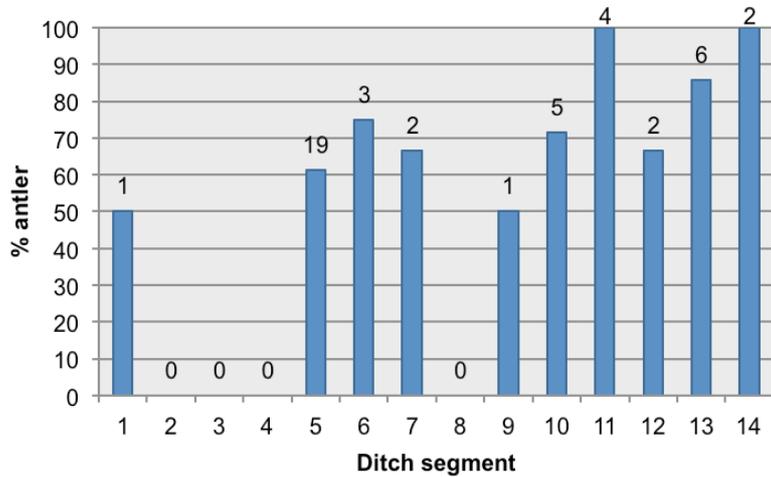
### *7.7.2 Red Deer*

Red deer was the most prevalent wild species on the site (Figure 7.46), but was most frequently identified by antlers rather than by bone (Figure 7.47). The implication of this is that red deer do not actually have to have been killed by the inhabitants of the site in order for their antlers to be present. The remains of red deer were present in Ditches 1 and 5 of the western enclosure, and all of the ditches of the eastern enclosure. In the eastern enclosure red deer averages 1.9% of the assemblages, with a minimum of 0.7% and maximum of 3.8%. In the western enclosure they made up 0.3% of the Ditch Segment 1 assemblage and 3.8% of the Ditch Segment 5.

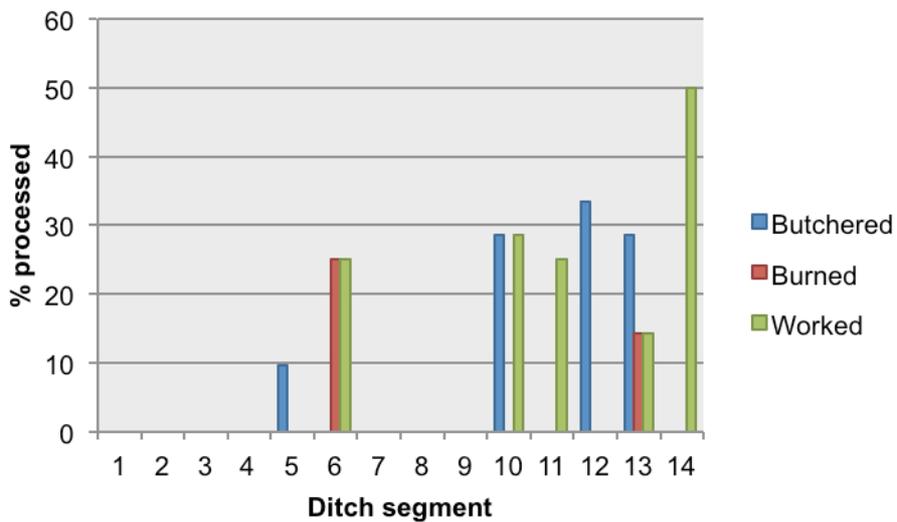
Butchery marks, burning and working were all visible on the red deer remains present in the enclosure (Fig. 7.48). All of these processes were more prevalent in the eastern arc, despite Ditch Segment 5 in the western arc containing the largest assemblage of red deer (31 identified specimens). In this context 10% of the assemblage had been butchered and no burning or bone/antler working was visible. This was the smallest proportion of processed red deer bone present where it was identified at all. The working of red deer remains was only visible on antlers, and not on bone remains. There appears to have been a trend towards the deposition of processed bone in the last five ditches of the eastern arc of the enclosure, however, it must be reiterated that the sample is very small, making the usefulness of these data questionable. No gnawing was observed on red deer remains.



**Figure 7.46: Proportion of Red Deer in assemblages of each ditch segment**



**Figure 7.47: Proportion of Red Deer assemblage comprised of antler in each ditch segment**



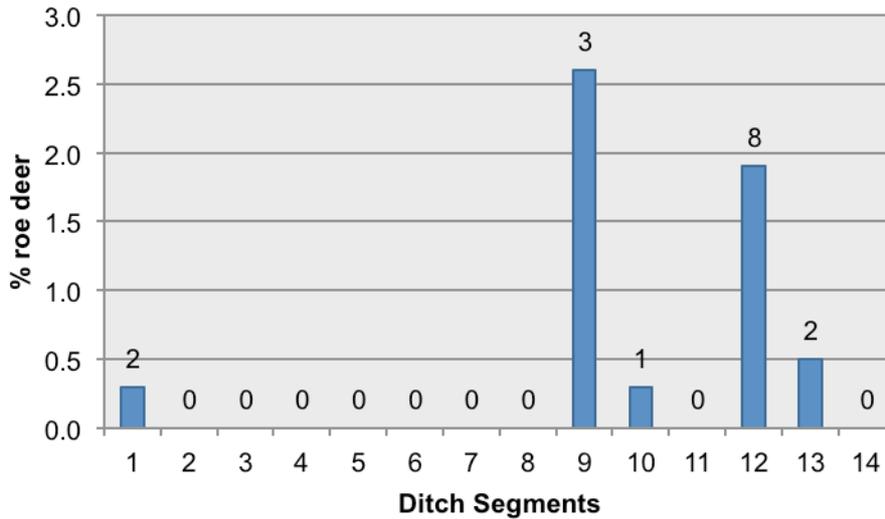
**Figure 7.48: Proportion of processed red deer remains present in the red deer assemblages for each ditch segment.**

### 7.7.3 *Roe Deer*

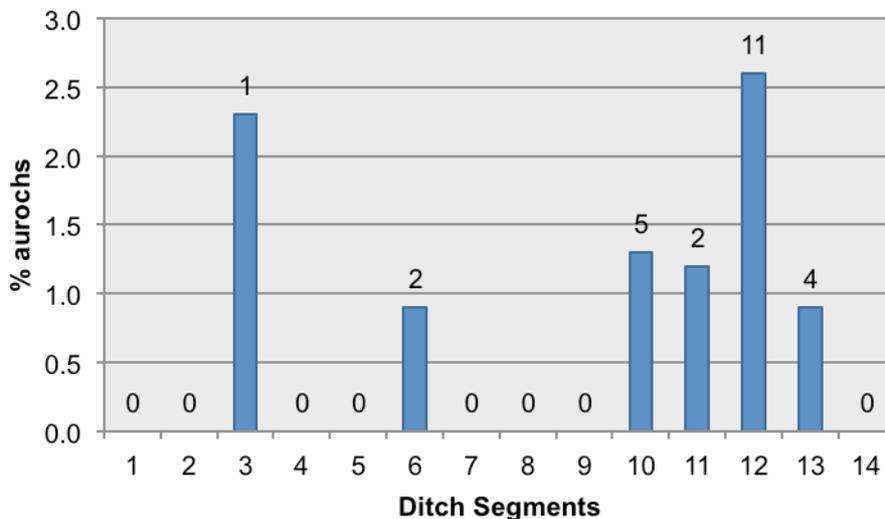
As with red deer, there appears to have been something of a concentration (albeit a very small one) of Roe Deer in the final five ditches of the eastern arc of the enclosure, with remains of this species only present in Ditch Segment 1 of the western arc (Figure 7.49). The numbers that make comprise this concentration are so small that it is difficult to judge their significance. Of all of the roe deer remains only one specimen had been butchered, and one had been gnawed. Two antlers, with cranial fragments attached, were present in Ditch Segment 12 – these indicate that in this instance at least, the antler had been removed from an animal following it being killed, rather than curated or picked up once shed.

### 7.7.4 *Aurochs*

Aurochs comprised between 1% and 2% of the total assemblage recovered from the site, and this is reflected in the proportion of aurochs present in each ditch segment of the enclosure (Figure 7.50). As with red and roe, there is potentially a trend towards the deposition of aurochs more in the eastern arc of the enclosure than the western, as over half of the eastern arc ditches contained aurochs, while only a fifth of the ditches in the western arc contained the species. Only four aurochs elements had any evidence of butchery, and these were in Ditch Segments 10, 12 and 13. Two skulls had been deposited in Ditch Segment 12 – these were the only examples of aurochs crania present on the site. No gnawing or burning was visible.



**Figure 7.49: Proportion of roe deer in assemblages of each ditch segment**



**Figure 7.50: Proportion of aurochs in assemblages of each ditch segment**

### 7.7.5 Fox

Fox remains were only present in Ditch Segment 1 of the western arc and Ditch Segment 7 of the eastern arc. It is likely that the four elements present in Ditch Segment 1 all belonged to the same animal and represents something of a partial burial. None of the elements had been butchered, gnawed or burned. A single skull was recovered from Ditch Segment 7.

## 7.8 Taphonomic Profiles of the Individual Ditches of the Western Arc

### 7.8.1 Ditch Segment 1

When looked at in sum, the animal bone assemblage present in Ditch segment 1 appears to be very typical of site, with few distinctive features. All species that were present on the site were present within this ditch segment, with the exception of aurochs and horse. The relative proportion of each species was around average for both the site as a whole, and the western enclosure ditch more specifically. Butchery was perhaps just less than average, but not considerably so. The evidence for burning was very sparse, mirroring the rest of the site. A relatively high proportion of the bones present in this ditch segment had been subject to both canid and rodent gnawing however. This perhaps implies that this ditch segment had been left open for sometime, allowing access to the bones by dogs and rodents.

While the majority of the animal bone evidence is indicative of a relatively mundane activity, Pryor's original publication gives information about more specific deposits present in this ditch, which are potentially indicative of rather more 'unusual' activity. A complete Mildenhall bowl on a birch bark mat was present in the southern terminus of the ditch (Pryor 1998, 23), and the northern terminus contained a bundle of cattle ribs. In the interior of the ditch was a large deposit of animal bone, pot-sherds and extensive wood-working remains (*Ibid*).

### 7.8.2 Ditch Segment 2

Only the three primary domesticates were present in Ditch Segment 2. This was the smallest of all the ditch segments that made up the enclosure ditch, and as such only contained 25 identifiable bones. While the proportion of cattle was in line with the rest of the enclosure ditch, Ditch Segment 2 was one of a small number of ditches in which sheep/goat outnumbered pigs. The overall numbers were so small however that this is thought of little significance. The proportions of butchery and gnawing in Ditch Segment 2 were very slightly lower than average, but not significantly. It was however the only ditch in the western arc not to have any burnt material at all. Ditch Segment 2 had the highest

proportion of bone that had been initially fractured when fresh of any of the enclosure ditch segments at c. 67%. A relative density of cattle crania was noted in Ditch Segment 2 (between 12% and 14% of the entire assemblage).

Aside from the typical finds recovered from Ditch Segment 2, a length of twine and a sheet of birch bark were found in the southern terminus, thought by Pryor to have been placed (Pryor 1998, 24). A dispersed group of sloe stones were found in the northern terminus (*Ibid*, 25). The original report also refers to a potentially significant group of neonatal cattle bones. It was not possible to identify these during the most recent analysis.

### 7.8.3 Ditch Segment 3

Ditch Segment 3 only contained 35 animal bones that were identifiable to species. The majority of these were cattle, pig and sheep/goat, with dog and aurochs also represented. Within this assemblage the proportions of cattle and sheep were elevated slightly above average, while pigs were relatively poorly represented (just one bone). The proportions of each body part represented were in line with the rest of the site. There were slightly lower than average percentages of butchered and gnawed cattle bones, but the instances of burning were the highest in the western arc (though the numbers remain so small that this cannot be considered to be of importance). Like Ditch Segment 2, there was a very high proportion of bones that had been initially fractured when fresh (c. 63%).

According to the original report, coppice stools, which had been growing *in situ*, had been preserved in the ditch. There was no evidence that these had been disturbed by recutting of the ditch, implying that the ditch had remained open for an extended period of time (Pryor 1998, 25). A partial sheep skeleton was apparently recovered from the southern ditch terminus, as well as neonatal cattle bones. No obvious partial skeleton was visible in the most recent analysis. A bone tally stick was present in the northern ditch terminus, but this does not presently seem to be with the rest of the assemblage.

#### *7.8.4 Ditch Segment 4*

Proportionally, Ditch Segment 4 contained the least cattle of all the enclosure ditch segments (60%), and the highest proportion of pigs (31%, average = 13.1%), but despite this the proportions of each body parts are in line with site averages. The only species represented are the three primary domesticates. The bones in Ditch Segment 4, particularly the cattle bones, were subject to very high proportions of butchery and gnawing, both well in excess of the site average. Although not as high as in Ditch Segments 2 and 3, over half of the bones had first been fractured when fresh. No ditch terminus deposits or other deposits of particular significance were encountered during the excavation, according to the original report (Pryor 1998, 25 – 26).

#### *7.8.5 Ditch Segment 5*

Ditch Segment 5 was by far the largest of the enclosure ditch segments. This ditch had the highest proportion of cattle of the ditches in the western arc, as well as very low proportions of pig and sheep/goat. Small numbers of red deer (3.8% of the total assemblage, and the highest proportion of red deer present in any one feature) and dog were also present. Butchery, burning and gnawing were generally in line with the averages for the site and enclosure ditch. Contrary to the previously discussed ditches, Ditch Segment 5 had one of the lowest proportions of freshly fractured bone of the entire enclosure ditch.

Both ditch termini contained large concentrations of animal bone and wood, including a red deer antler crown in the southern terminus. In terms of the wider site, this material was relatively unremarkable but for its quantity. Stone axe fragments and worked antler were present in the along the length of the ditch.

### **7.9 Taphonomic Profiles of the Individual Ditches of the Eastern Arc**

The following paragraphs summarize the animal bone data recovered from the individual ditches of the enclosure. They also present the data thought to be pertinent at the time of excavation and writing of the original report.

### *7.9.1 Ditch Segment 6*

Ditch Segment 6 was the first ditch segment to the east of the north entrance to the site. It contained the 2<sup>nd</sup> highest percentage of cattle bone present in any of the enclosure ditches (86.7%), and as well as pig and sheep/goat, contained red deer, dog and aurochs remains. The greatest concentration of dog remains were present within this ditch, many of which were thought to derive from the partially complete skeleton of a very young, if not newborn, puppy present in the terminus of the ditch abutting the entrance way. Roughly average proportions of the assemblage had been butchered and gnawed, but no evidence for burning was visible at all. Although the proportion of gnawed bone is roughly average for the site in general, this ditch contained the most intensive gnawing action of the eastern arc.

The original site report records a number of interesting finds from this ditch including the presence of a fragment of human crania and a red deer antler 'baton' in the ditch termini furthest from the entranceway. As well as these finds were the wooden skeuomorphs for Peterborough ware bowls, a large broken vessel and fragments of axe. It is noted that the deposits within Ditch Segment 6, of which the aforementioned animal bones were presumably part, was placed upon the clean gravel floor of the ditch and had the appearance of having been 'arranged' (Pryor 1998, 30).

### *7.9.2 Ditch Segment 7*

Cattle comprised a similar proportion of Ditch Segment 7 assemblage as the Ditch Segment 6 assemblage, however, sheep/goat were the next most abundant species. 3.8% of the assemblage was red deer bone, this was the equal highest proportion of red deer bone in any feature with Ditch Segment 5 in the western arc. The only horse bone recovered from anywhere in the site was recovered from Ditch Segment 7. Because the feature was sealed by later, datable, phases of activity, it appears as though this horse bone represents one of the earliest instances of domestic horse in Britain, however, permission for radiocarbon dating to confirm this is still pending. Fox remains were also present in this feature. Ditch Segment 7 contained the lowest proportions of

forelimb elements from the enclosure ditch. The percentage of butchered bone was also very low, and considerably lower than the eastern arc average or average for the site as a whole. The percentage of gnawed bone was also relatively low when compared to the western arc and the site as a whole, but in line with the rest of the features in the eastern arc. Proportions of both helically fractured bone and burnt bone were both relatively high in this feature.

Extensive structured deposits were identified in this feature during the original excavation, comprising fragmentary as well as more complete material. The most notable of these finds include fragmented pottery on a stone in the more northern of the ditch termini and a complex arrangement including two complete pots, an inverted fox skull and an antler comb in the more southern termini. Elsewhere in the ditch a group of clay objects was encountered and identified as a 'fertility' group (Pryor 1998, 32 – 33).

### 7.9.3 Ditch Segment 8

The three main domesticates were present in Ditch Segment 8, and these were present in proportions in line with the site as a whole and the British Neolithic more generally. Red Deer were the only wild species present in this feature. Roughly average percentages (for the eastern arc, though relatively low overall) of the bone had been butchered and gnawed, and none showed signs of having been burnt. Of all of the enclosure ditch segments, this feature contained the lowest proportion of bones to have been fractured when fresh, possibly as a result of a very high percentage of the bone being subject to mineralised fracture. There is no obvious reason for the large quantities of mineralised fracture in this feature. It was also the only ditch of the eastern arc to contain no red deer antler at all.

The finds were described by the excavator as being an “almost continuous spread of linear finds” including copious animal bone and flint. Deposits including a polished stone axe and a pitted crinoid interpreted as symbolizing a human head (Pryor 1998, 34) were recovered from the north ditch termini. A fragment of human skull and a fragmented pot were also present within the feature (*Ibid*).

#### 7.9.4 Ditch Segment 9

As with the previous ditch segment, the three main domesticates were present in accepted order of abundance in Ditch Segment 9. Also present were red deer, roe deer and dog. Making up just 2.6% of the assemblage, roe deer were proportionally more abundant in this ditch than any other in the enclosure. For the eastern arc, a relatively high percentage of the bones had been subject to butchery. Similarly, a relatively high percentage of the bone appeared to have been burnt.

A worked cattle scapula was present in the northern ditch termini, and fragments of a quern stone were present within the ditch itself. The southern ditch termini contained a large accumulation of animal bone fragments and pottery (*Ibid*, 38).

#### 7.9.5 Ditch Segment 10

Average proportions of the three primary domesticates were present in Ditch Segment 10, along with small numbers of red deer, roe deer and dog. This ditch contained the second largest concentration of dog bones, all of which are thought to derive from a partially complete skeleton. This ditch also contained the densest collection of cattle crania/cranial fragments of the enclosure ditch, and was one of very few ditches to contain fragments of sheep crania. Overall there was lower than average evidence of butchery on the assemblage from this feature, but slightly higher than average percentages of burning and gnawing. Other aspects of the assemblage, such as body part representation and fracture patterns were in line with those seen across the site.

Ditch Segment 10 contained a large, mixed and highly fragmentary assemblage some of which has been identified as being 'structured', while other material is thought to represent a natural accumulation (Pryor 1998, 41). A partial pig skeleton was found in the southern ditch termini together with a large fragment of human skull, and a roe deer skull and antler were present in the northern ditch termini. A complete quern was also recovered from this feature.

### *7.9.6 Ditch Segment 11*

Ditch Segment 11 contained the three main domesticates in predictable proportions, as well as red deer, dog and aurochs. Red deer were solely represented by antlers. Compared to other features within both the eastern arc and the enclosure ditch as a whole, Ditch Segment 11 had a relatively high proportion of forelimbs for cattle, pigs and sheep/goats. The levels of butchery in this assemblage were slightly higher than average for the eastern arc of the enclosure ditch, but around average for the site as a whole. Levels of gnawing were also less than average for the eastern arc. A very tiny amount of burnt bone was present. The animal bone was comingled with fragmented flint and pottery and concentrated in the upper layers of the feature (Pryor 1998, 45). Pyre material is thought to have been present in this ditch, but no other deposits regarded as being 'special'.

### *7.9.7 Ditch Segment 12*

As with the previous two ditches, average proportions of cattle, pig and sheep/goat were present in Ditch Segment 12. Red deer, roe deer and aurochs were also present in this feature, aurochs made up the highest proportion of this assemblage than of any of those within the enclosure ditches. Average levels of butchery were recorded, but no burning is thought to have been present. Levels of gnawing appeared to be average for cattle, but high for sheep/goat and extremely high (44%) for pigs.

A roe deer skull recovered in the northern ditch termini during the excavations was encountered again during this analysis; it comprised two antlers attached to cranial fragments. Located around this skull was a linear deposit of bone and further fragments of antler.

### *7.9.8 Ditch Segment 13*

Ditch Segment 13 contained the most diverse group of species including cattle, pig, sheep/goat, dog, red deer, roe deer and aurochs. The proportion of cattle bones in the assemblage was rather lower than has come to be expected

(62.2%), and the proportions of pig and sheep/goat were relatively high, and more or less equal (c. 16%). As well as being proportionally lower than usual, the proportion of cattle forelimbs was well lower than usual; however, the proportion of pig and sheep/goat forelimbs was average. Roughly average percentages of all the species appeared to have been butchered and gnawed. There was a small concentration of sheep crania in this feature.

No specific ditch termini deposits were identified during excavation, though a spread of animal bone, antler and pottery was noted in the northern termini. Elsewhere in the ditch a stone axe fragment, quern fragments and a quern rubber were found.

#### *7.9.9 Ditch Segment 14*

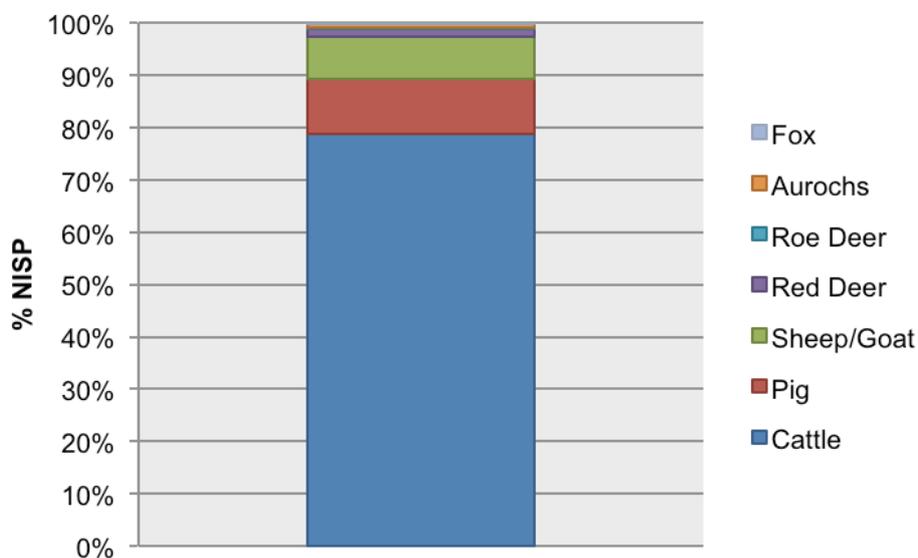
Ditch Segment 14 contained the highest proportion of cattle of any of the enclosure ditches (91.3%). The only wild species present was red deer, represented by two antlers, one of which had been worked. The percentage of butchered bone was around average, however, the percentages of burnt and gnawed bone were slightly less than the average for the eastern arc of the enclosure ditch. This feature contained a relative concentration of pig crania (16.7% of the pig remains were cranial fragments). This was by far the densest collection of pig crania recovered from anywhere in the enclosure ditch.

### **7.10 Internal Features**

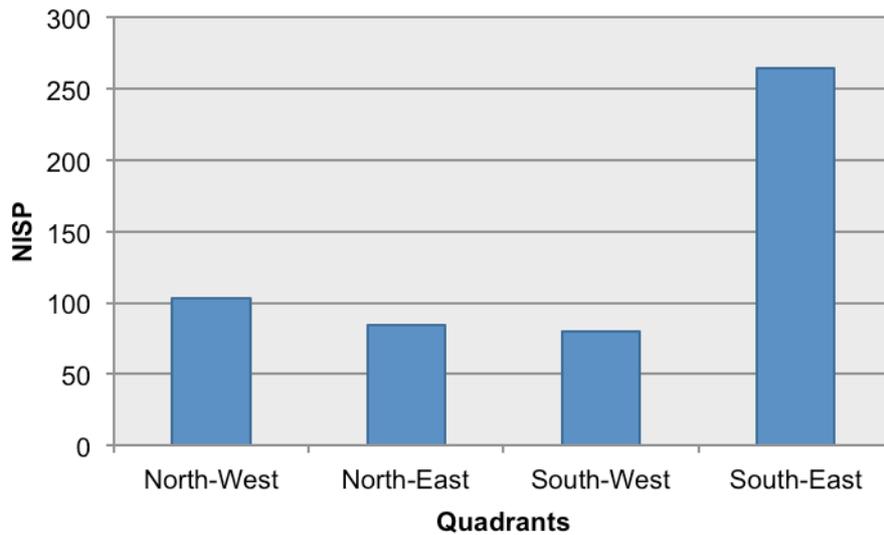
For the purposes of distribution analysis of the interior of the site, both in the original report and here below, the site is divided into quadrants – north-west, north-east, south-west and south-east. A physical division, contemporary with the use of the site, took the form of a shallow ditch and fence line. It is estimated that the pits, postholes and fence lines that survive in the central part of the site represent a small proportion of what would originally have been present. Most frequently discussed within the original reports are the ‘small-filled pits’ thought to be Phase 1 in date based on the material recovered from within them. These pits are scattered across the site but there was a distinct cluster around the segments of the eastern arc of the enclosure ditch. Pryor

argues that the material present within these pits reflects and complements the material found in the structured deposits of the enclosure ditch.

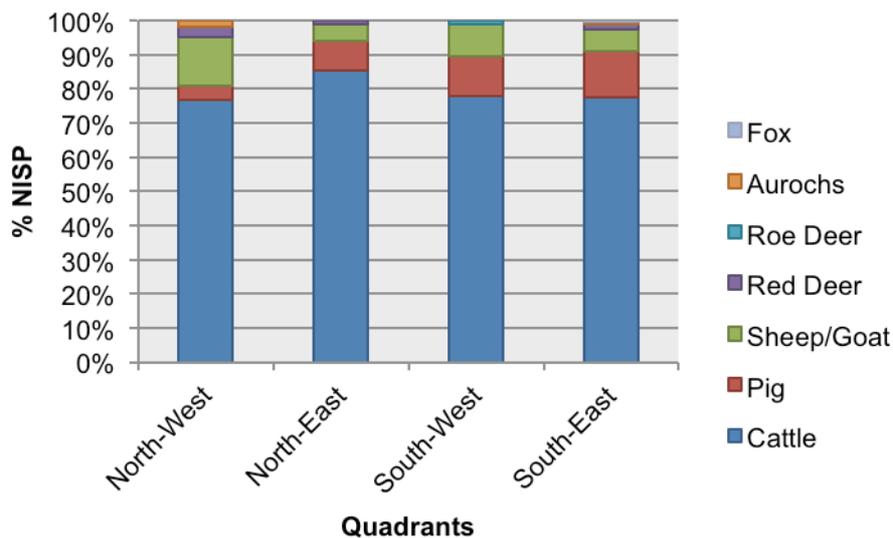
Unusually for a site of this type, much of the internal area of the enclosure was excavated alongside the enclosure ditch, making it possible to look at the distribution of animal bones within the area enclosed by the causewayed ditch. In the original publication the interior of the site was divided into quadrants – the distribution of animal bones will be analysed following these divisions. The total number of identifiable animal bones present in the internal features is considerably smaller than was present in the enclosure ditch. The proportions of each species are roughly equal to those seen throughout the enclosure ditch however (Figure 7.51), with cattle making up 78.7% of the total interior assemblage, pigs at 10.4% and sheep/goat at 8.2%. Red deer, roe deer, fox and aurochs were also present – the most prevalent wild species was red deer at 1.5% of the assemblage, the other wild species each amounted to less than 1%.



**Figure 7.51: Graph showing the proportions of each species present in the assemblage from the internal features of the site.**



**Figure 7.52: Graph showing the NISP for each quadrant of the site.**



**Figure 7.53: Graph showing the proportions of each species present in the assemblages from the quadrants into which the interior of the site is subdivided.**

Figure 7.52 shows that the south-eastern quadrant of the site contained by far the most animal remains of the four quadrants with the total NISP amounting to roughly the same as the other three quadrants together. This is largely because of the large volume of material recovered from Pit F1054 which was located in this area. Despite there being significantly more material recovered from the south-east quadrant, the proportions of species present therein remains much the same across the four quadrants and indeed across the site as a whole (Figure 7.53 and Table 7.4). It is evident from Figure 7.52 and Table 7.4 that

there is little deviation from the overall proportions of each species in the assemblages from each quadrant of the site. There is, however, an 8% increase in the amount of cattle present in the north-east quadrant and a 5% drop in the amount of pig, together with a 5% increase in sheep/goat present in the north-west quadrant.

**Table 7.3: Percentages of each species making up the assemblages for the site quadrants.**

	Cattle	Pig	Sheep/Goat	Red Deer	Roe Deer	Aurochs	Fox
North-West	76.9	3.8	14.4	2.9	0.0	1.9	0.0
North-East	85.5	8.4	4.8	1.2	0.0	0.0	0.0
South-West	77.9	11.7	9.1	0.0	1.3	0.0	0.0
South-East	77.6	13.3	6.5	1.5	0.0	0.8	0.4

#### 7.10.1 Comparison with original analysis

Armour-Chelu identified that 93% of the material she analysed had been burnt to such an extent that the fragments were usually <5mm in length, and c. 85% had been burnt white. The burning of the bones that Armour-Chelu analysed was not thought to have been occurring *in situ*, as none of the pits from which the material was recovered showed any sign of burning activity.

Armour-Chelu says that the intensity of the burning precluded the identification to species of the majority of the assemblage from the internal pits, but that those bones that could be identified to species made up the following proportions of the assemblage; cattle 12.66%, pig 5.66%, sheep, 0.43%. She also identified just 11 elements belonging to wild species. Of the bones that could not be closely identified to species, Armour-Chelu states that many were identifiable as being either large or small ungulate, and that both of these categories were present in over 50% of the pits within which bone was present. Armour-Chelu's overall interpretation of the material found within the interior features seems to be that the cremation of animal carcasses was being undertaken, and that following this, small 'scoops' of material from the cremation were ground up or pulverised before being removed to the small pits

that comprised the majority of the internal features. Considering that only a very small proportion of the bone were identifiable to species, the intensity with which the bones appear to have been being burnt, and that she believes that the bone was subject to some kind of grinding activity, it is difficult to see why Armour-Chelu concludes that the bone present most of these features, which were at time of excavation identified as being 'cremations', was animal bone. It is not thought that the bone was put through any kind of scientific analysis following its excavation, and certainly none which would definitively conclude whether the bone was animal or human. Were the bone in these 'cremations' human, it would certainly not be without precedent in causewayed enclosure contexts (e.g. Haddenham – Evans and Hodder 2006; Fowler 2010, 10) nor would the presence of human cremations necessarily preclude the inclusion of animal bones therein.

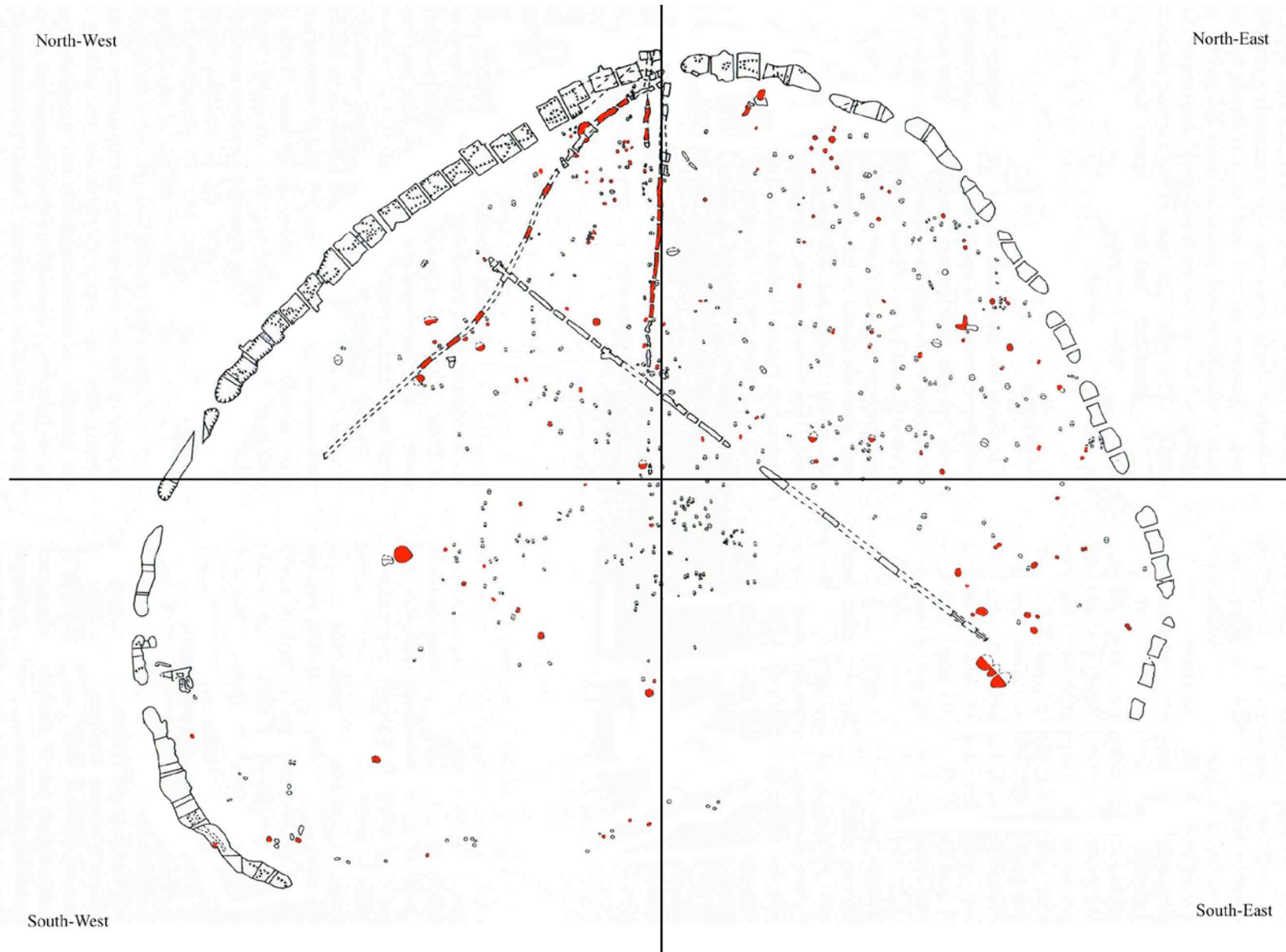
It is difficult to understand whether or not the material discussed by Armour-Chelu was present during the most recent analysis, as she gives little by way of contextual information and discusses all the material from the interior features in as one. Across the whole of the interior of the site, 142 features were found to contain some kind of animal remains, whether whole bones, partial bones or unidentifiable fragmented remains. Of these 142 features, just over half (73) contained burnt material, but in the majority of cases this was in the minority with just one or two fragments present. There were, however, twenty-eight features that were identified as being cremations, or at least as being collections of cremated bone, and which contained accumulations of white, heavily comminuted bone indicative of burning at high temperatures (Figure 7.55). All except four of these were located in the north-east quadrant of the site, and most were just inside the enclosure ditch. It is possible that these 'cremations' are the burnt bone that Armour-Chelu discusses, although the fragments present were not thought to number so many as 2000, and certainly do not equate to 93% of the bones excavated from the interior features. If these groups of burnt bone were indeed the material discussed in the original report, it would appear that without the application intensive scientific methods, there can be no way that the majority can categorically be identified as animal rather than human.

### *7.10.2 Body Part Distribution*

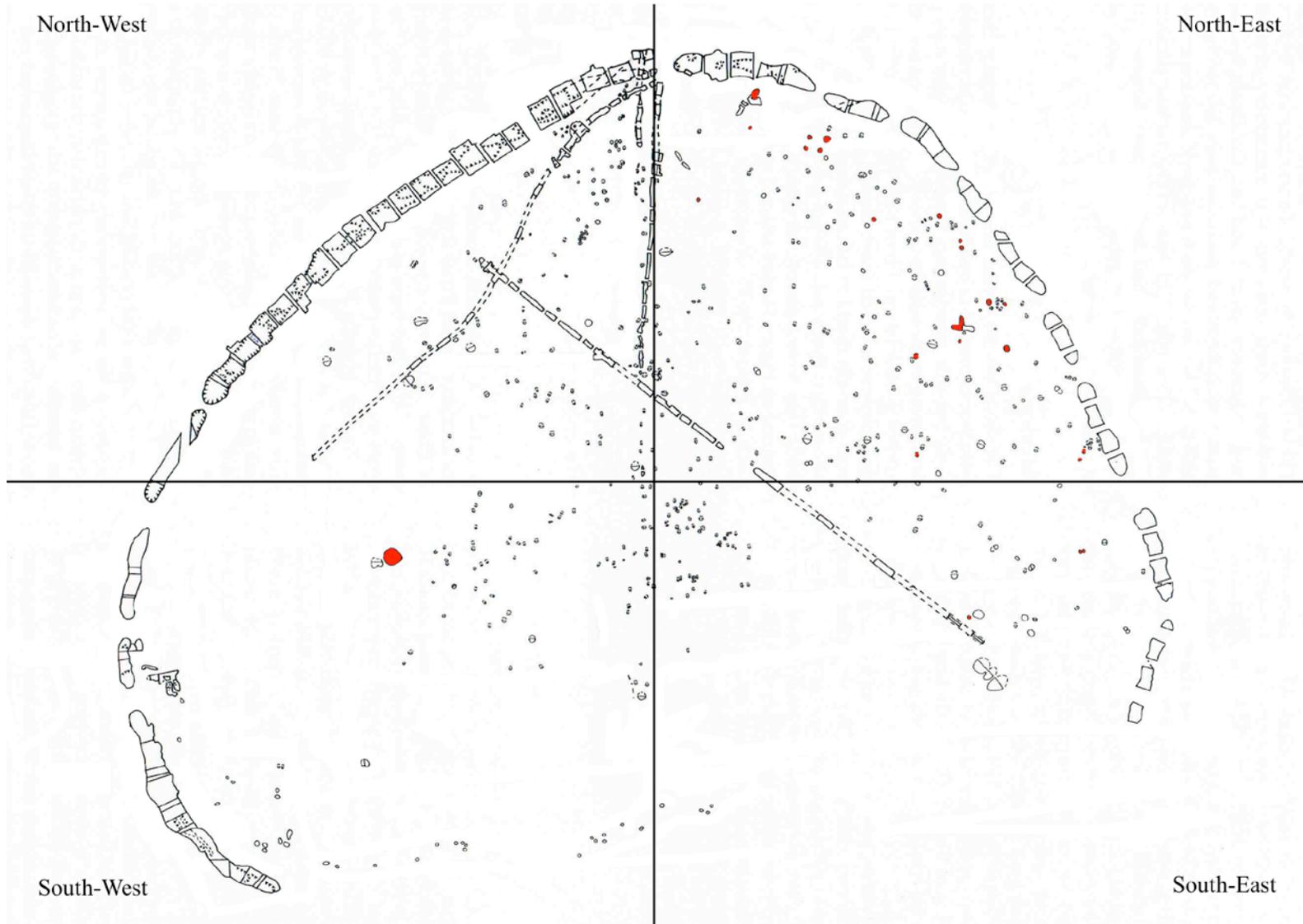
Within the enclosure ditch, forelimbs were consistently found to be the most abundant body part, regardless of context or species. In the interior features it is the hindlimbs are the most abundant body part for both cattle and pigs (Figures 7.56 and 7.57), but forelimbs are more abundant for sheep/goat (Figure 7.58). Regarding cattle, the prominence of hindlimbs is significant relative to the smaller numbers of all the other body parts – the torso is the second most abundant followed by forelimbs, head and feet. For pigs however, the hindlimb, forelimb and head are all represented in roughly equal measure, with only feet having significantly fewer elements present. For sheep/goat, forelimbs were the most abundant but only with three more elements present than hindlimbs. Sheep/goat head and feet were significantly less well represented however. Torso bones have not been included in either the pig or sheep/goat counts as they were generally too ambiguous and fragmentary to assign to one or other species.

Figure 7.59 shows the distribution of cattle body parts in each of the quadrants of the site. It is clear that in the north-west, north-east and south-west quadrants the numbers of hindlimb, forelimb and torso elements are roughly equal and the numbers of head and feet elements are generally less well represented. In the south-east quadrant, however, there was a significantly higher number of hindlimb elements, and a relatively high number of cranial elements, alongside a relatively small number of elements belonging to the feet.

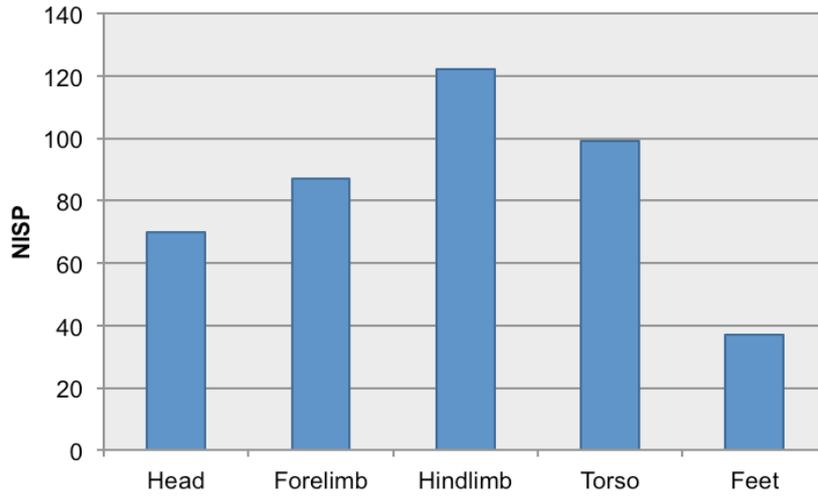
Figure 7.60 shows the same information but for the pig remains recovered from the interior of the site. Feet are clearly absent from all but the south-east quadrant, where they make up a relatively high proportion of the remains recovered. Head elements were present in all but the north-west quadrant and unlike cattle, were the most abundant body part in the north-east and south-west quadrants. These high numbers of pig cranial bones is unusual across the site, but ought to be considered in light of the very small numbers of elements present in the sample.



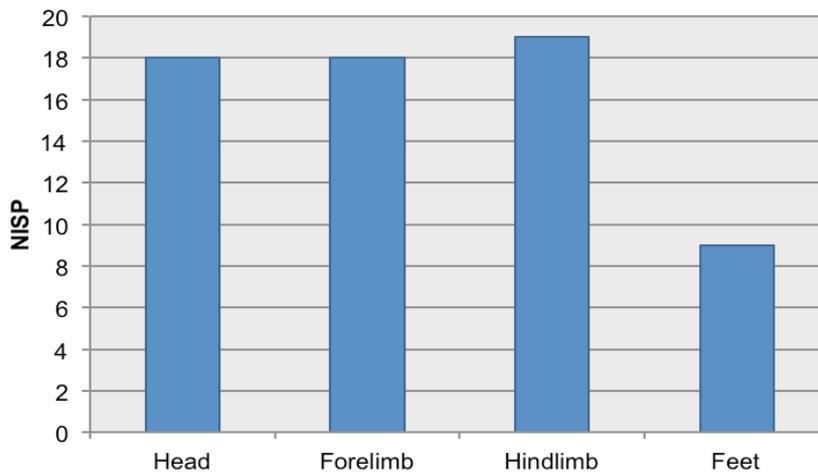
**Figure 7.54: Plan of the Eton causewayed enclosures showing internal features in which animal bone has been found.**



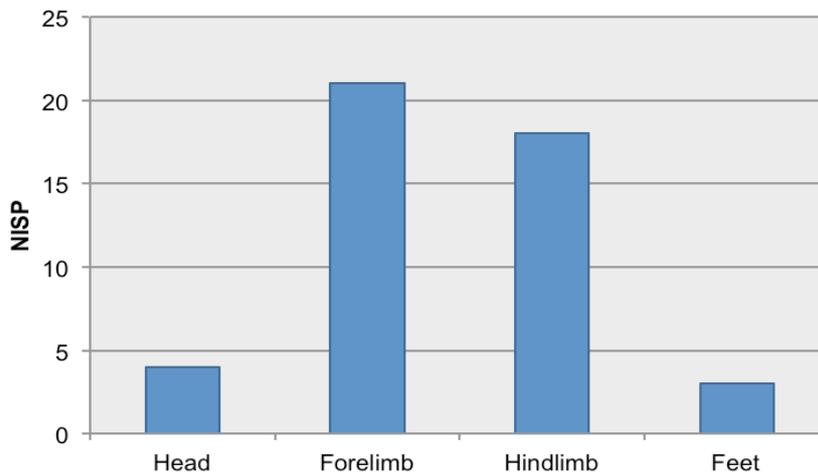
**Figure 7.55: Plan of the Etton causewayed enclosures showing internal features from which cremated material has been identified.**



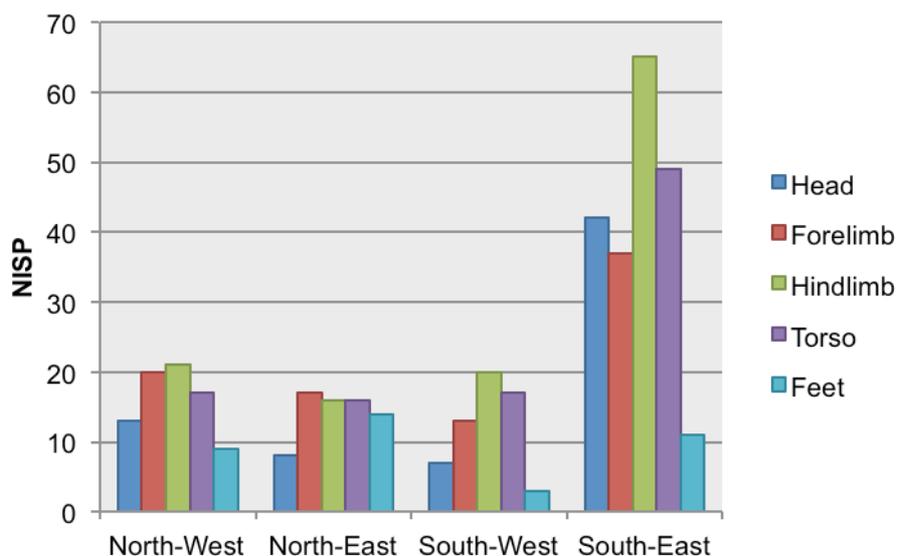
**Figure 7.56: Graph showing the number of cattle elements present in the interior features according to body part.**



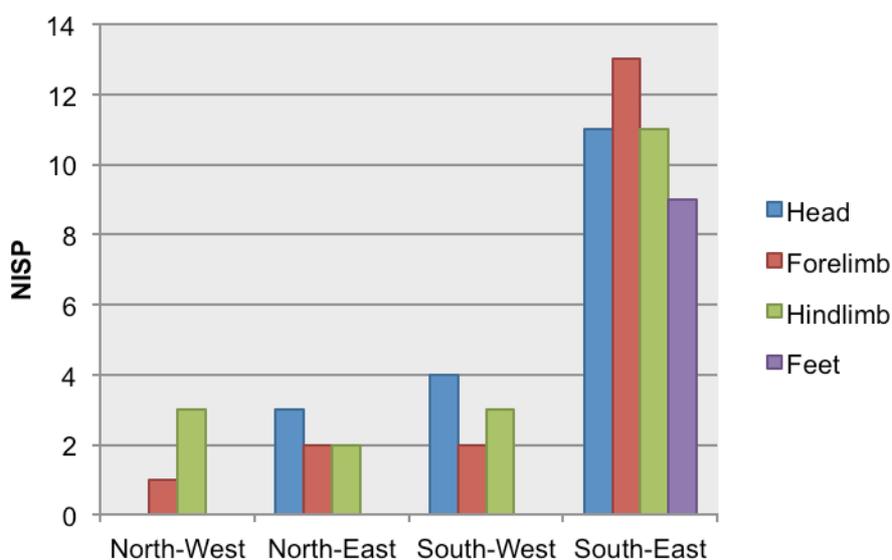
**Figure 7.57: Graph showing the number of pig elements present in the interior features according to body part.**



**Figure 7.58: Graph showing the number of sheep/goat elements present in the interior features according to body part.**



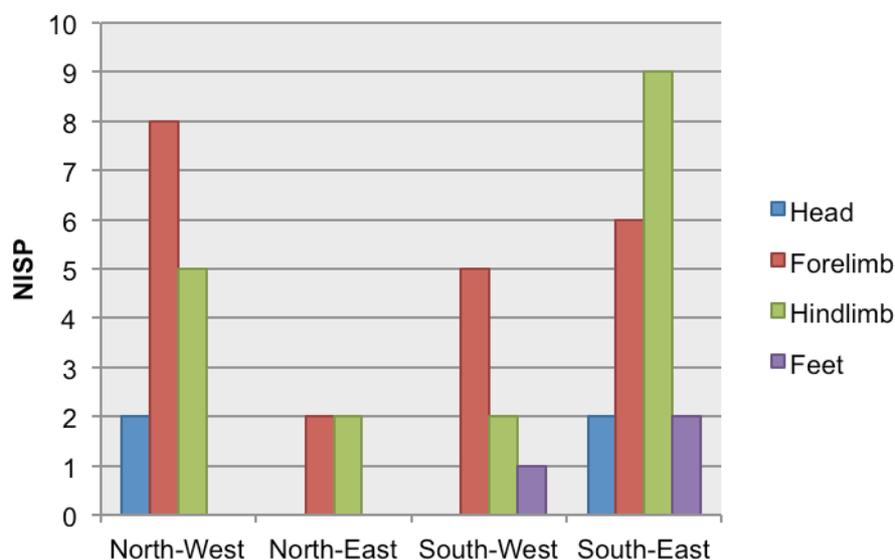
**Figure 7.59: Graph showing the number of cattle remains present for each body part in the interior quadrants of the enclosure.**



**Figure 7.60: Graph showing the number of pig remains present for each body part in the interior quadrants of the enclosure.**

Aside from the absence of cranial elements in the north-west quadrant, and feet in the south-east, the body parts are relatively equally represented in each quadrant with no obvious over-abundance. The representation of sheep/goat body parts across the quadrants is rather less even than pig or cattle (Figure 7.60). Forelimbs tend to be the most abundant body part, with the exception of the south-east quadrant where hindlimbs were the most abundant. Cranial elements were present in very small numbers in the north-west and south-east

quadrants and feet elements were present in equally small numbers in the south-west and south-east quadrants.

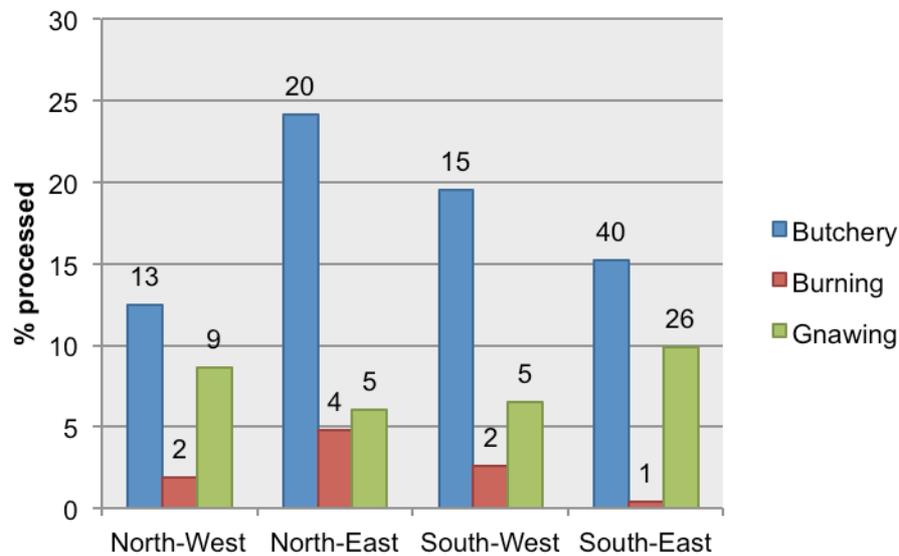


**Figure 7.61: Graph showing the number of sheep/goat remains present for each body part in the interior quadrants of the enclosure.**

### 7.10.3 Distribution of processing activities

The average proportion of butchered remains across the four quadrants of the interior of the site was 17.8%, ranging between 12.5% in the north-west quadrant and 24.1% in the north-east quadrant (Figure 7.62). This is roughly commensurate with proportion of butchered remains present across the entire site and present in the enclosure ditch. That almost a quarter of the bones in the north-east quadrant had been butchered is interesting and potentially implies that this kind of activity was occurring more frequently in this area than in the other areas, but having said this, butchered bone is present consistently across the interior of the site and the enclosure ditch, with very little discernable difference. 8.2% of remains in the interior features had evidence of gnawing – once again this is in line with the levels of gnawing across the site and in the enclosure ditch. There was no part of the interior of the site where gnawing seemed to be particularly prevalent, and unlike the western arc of the enclosure there is no increased proportion of gnawed bone in the western part of the interior. Levels of burning (on the identifiable bones) was slightly higher than was observed in the enclosure ditch at 2.4%, but not considerably so. The most

amount of burning (5% of the assemblage) was visible in the north-east quadrant.



**Figure 7.62: Graph showing the percentage of the assemblage from each quadrant subject to butchery, burning and gnawing.**

## 7.11 Conclusions

### 7.11.1 *The Enclosure Ditch*

This chapter has considered the animal bone data from the Etton in two ways, by group of features and by individual feature. It is clear that the more useful information can be gained from the former method of analysis. When an assemblage like Etton is regarded too closely, it becomes impossible to draw any kind of conclusion (with the exception of the basic zooarchaeological analyses) from the mass of disarticulated and fragmented material. As a result, archaeologists become inclined to focus on those particular pieces that are outstanding or peculiar. Unfortunately, this tends to be how very many sites have been and continue to be reported upon and creates an artificial bias towards material which falls into the category of being outstanding or peculiar, leading to the assumption that the site as a whole also falls into this category.

The introduction to this picture painted a fairly clear picture of what was expected from the analysis of deposition strategies at Etton. The site had been

the subject of at least three separate analyses of this kind prior to this study, all of which roughly corroborate each other, and as such, one might legitimately assume that there is not much to be added by further study. These earlier studies suggested that the bone found within the enclosure had been carefully selected and deposited, rather than casually discarded. As such, we expected to see the selection of specific species or elements within the enclosure ditches, as well as significant numbers of articulated bone groups (ABG's), skulls and other 'non-normative' selections not necessarily indicative of general consumption waste (as *per* Harris 2003 and Whittle 2003). It was also expected that there would be significant differences in the material deposited in the eastern and western arcs, and that the material in the western arc would display evidence of prolonged exposure to the elements, which would not be obvious in the eastern enclosure (as *per* Pryor 1998).

The last of these expectations was fulfilled very satisfactorily. The bone recovered from the eastern arc appears to have been subject to significantly less gnawing action by canids and rodents alike (6.9% of the eastern arc assemblage appears to have been subject to this kind of interference, compared to 17.7% of the western arc assemblage) suggesting that the bone deposited in these ditches was not as accessible for as long as the bone deposited in the western arc.

However, this was the only of our expectations that were fulfilled. One of the problems facing the three previous studies mentioned in the introduction (Harris 2003, Whittle 2003, Albrecht 2011) is that they were all relying completely on the original faunal remains report published in the site monograph (Armour-Chelu in Pryor 1998), which this thesis has shown to be largely fallacious. All of the studies have based their arguments on, at best partial, but in reality, also erroneous data. However they have also themselves presented often-spurious conjecture as fact. The outcome is that conclusions regarding the deposition of material at Etton have been disseminated relatively widely, which are both largely hypothetical and entirely erroneous.

Most importantly there was, in actuality, no particular propensity for the deposition of skulls or other 'non-normative' material in the termini of ditches.

There were a few instances where there were ditch termini deposits, which do appear to have been the result of the specific selection and placement of material, but generally speaking, cranial material was recovered from the central part of ditches.

The three primary domesticates were present in all of the ditch segments of both halves of the enclosure ditch. The percentage of each assemblage made of cattle bone was around 75% - 80%, with the exception of Ditch Segments 4 and 13, in which cattle made up nearer to 60% of the assemblage and Ditch Segment 14, where cattle made up 91%. Pigs and sheep/goats made up between 5% and 15% of each assemblage, usually with more pigs than sheep being present. The only exception to this was Ditch 4, where pig made up 31% of the assemblage. In all of the enclosure ditches, and across the site as a whole, these three main domesticated species were present in numbers commensurate with what is widely accepted of the Neolithic economy at the time Etton was an active site. Wild species were very scarce across the site as a whole, and though their numbers are so small, they were even scarcer in the eastern arc of the enclosure ditch than elsewhere. Red Deer, roe deer, fox, dog and aurochs are represented in the eastern arc by discrete bones with no species making up more than 1% of the total assemblage of any ditch segment. The same species are present in the western arc with the exception of fox, and also with one element of horse, however, their presence is slightly less ephemeral throughout this half of the enclosure ditch, with red deer making up an average of 2% of the assemblage (against the 5.7% of the assemblage made up of sheep/goat).

Levels of burning across the two halves of the enclosure ditch were almost identical. Levels of butchery were not too dissimilar, with 20% of cattle bones in showing evidence of butchery in the western arc and 15% in the eastern. Cattle crania were fairly evenly spread across both of the arcs of the enclosure ditch, with concentrations in Ditch Segments 2 and 10, however, pig and sheep/goat crania seemed to be more abundant in the eastern arc.

Pryor notes that many of the deposits in the western arc appeared to be *in situ* deposits, perhaps the results of woodworking or flint knapping. He differentiates

between this sort of deposit, and those present in the eastern arc, which he proposed seemed more indicative of individual acts of deliberate placement. It was impossible to comprehend the nature of the deposition from the curated animal bone material thirty years on from the excavation, but there is no reason to doubt that this difference was observable at the time. In terms of the composition of the animal bone deposits (nature of deposition and levels of gnawing notwithstanding), differences were only very slight. The only categorical difference between the two arcs, as indicated by the animal bone, is that the eastern arc was not subject to the same levels of gnawing as the western, therefore the material therein is likely to not have been accessible for as long. Clearly the evidence provided by curated animal bone can only be one-dimensional and anecdotal evidence regarding the contextual nature of the assemblage is important, however, it is clear that regardless of the nature of deposition, or duration of a feature, the animal bone being put into the ditches of the enclosure does not differ significantly from one ditch segment or arc to the next.

#### *7.11.2 The Internal Features*

The faunal assemblage recovered from the internal features on the site was considerably more limited than the assemblage from the enclosure ditch. Despite this, the proportions of each species are roughly equal to those seen throughout the enclosure ditch, however, with cattle, pig and sheep/goat being by far the most dominant. The most abundant wild species was red deer, making up just 1.8% of the entire internal assemblage. The south-eastern quadrant of the site contained by far the most animal remains of the four, largely because of the large volume of material recovered from Pit F1054 which was located in this area.

Throughout the enclosure ditch it was forelimbs which were found to be the best represented body part. Across the interior features, at least as far as cattle and pigs are concerned it is the hindlimbs which are most abundant. This is particularly noticeable in the cattle remains, as they are significantly more abundant than other parts of the body. It is possible that this is evidence of some kind of discrimination in what is being deposited in the interior features,

maybe as a result of the hindlimbs being utilised differently from other body parts.

Just less than one fifth (17.8%) of the interior assemblage showed evidence of butchery activity. The highest levels of butchery were found in the north-east quadrant, where almost a quarter of the remains appeared to have been processed. This possibly implies a raised level of butchery activity in this area of the site, though it must be acknowledged that if butchered bones are going to be taken as representative of *in situ* butchery activity, then butchery activity must be said to have been happening in almost all areas of the site. Levels of gnawing were roughly commensurate with though present across the entire site, but interestingly remain considerably less than the levels encountered in the western arc of the enclosure ditch, one again seeming to confirm that this part of the site was left open and accessible to predators for a far longer time than the rest of the site. Levels of burning (on the identifiable bones) was slightly higher than was observed in the enclosure ditch at 2.4%, and were certainly not encountered on the scale that was suggested by the original report (93%).

As was seen with the animal bone excavated from the enclosure ditch, there was little particularly significant or outstanding about the animal bone deposited within the internal features. The vast majority of the material was found in one large pit and appears to mirror the deposits found within the enclosure ditch very accurately.

## **8. Conclusions**

## 8.1 Introduction

The overarching aim of this thesis was to reanalyse the animal bone from the Etton causewayed enclosure in order to better understand the role of animals at this kind of Neolithic site. The impetus for the research derived from a desire to move away from the uneasy post-processual consensus regarding the nature of Neolithic activity at so-called 'ceremonial' sites, and to consider the sites from a more evidence based perspective. It was initially the intention that Etton would provide a sample along with a number of other Neolithic causewayed enclosures, and that a general picture of animal use would be achieved over the course of this work. However a cursory look over the Etton material revealed a plethora of issues with the original faunal analysis that could not be ignored. Not least of this was that the report present in the original publication (Armour-Chelu in Pryor 1998) is presented as considering all of the bone present from the site, when in actuality it covers just less than one third of the material currently present in the archive.

A number of reasons for this omission were considered, including that just a sample of the material was considered and this was not made clear in the report, or that the material omitted from the report could not be assigned to a secure context or phased with confidence. However, a discussion with Francis Pryor quickly made it clear that this should not have been the case. The implications of such an omission were significant enough that it was decided the whole of this thesis would be dedicated to the reanalysis of the material, as it was clear that the report present in Pryor's original publication (1998) simply could not be relied upon as accurate, and as such any interpretation or hypothesis he had made as a result of the animal bone could not be considered valid. The reanalysis of the material has considerably changed our understanding of the role of animals at Etton, and has the potential to change our perception of the role of animals more generally both at causewayed enclosure sites, and throughout the Neolithic.

The general motivation for this thesis was to answer the research questions set out in the introductory chapter;

- Why are causewayed enclosures interpreted as being the result of ceremonial or ritual activity as opposed to the result of domestic or settlement activity?
- What do the animal remains at Etton tell us about the role of animals at causewayed enclosures?

The first of these questions considers the current academic position on causewayed enclosures and the animal bones present therein and provides a background from which the second question, which relies upon the empirical evidence produced over the course of researching this thesis, can be answered.

## 8.2 Research Question 1

*Why are causewayed enclosures interpreted as being the result of ceremonial or ritual activity as opposed to the result of domestic or settlement activity?*

There is an abiding false dichotomy at the heart of the debate over the functionality of archaeological sites, which stipulates that a site that is ceremonial/ritual in nature is unlikely to be the result of domestic/settlement activity and vice versa (see for example Etton (Pryor 1998); the original Durrington Walls investigation (Richards and Thomas 1984); Windmill Hill (Whittle *et al.* 1999) and more generally Thomas 1999). Ironically, this false dichotomy has been identified for many years, and repeatedly discussed where notions of ritual vs. functionality are pertinent. There is a general consensus that the two spheres of activity are not mutually exclusive and cannot readily and should not necessarily be disentangled. It is entirely likely that behaviour or activity of a seemingly ritual nature is just as likely to have occurred at a domestic or settlement site as it is at an overtly ceremonial site. Nevertheless, it is near impossible to put this more evenly weighted perspective into action with regards to the British Neolithic, where there is a well-recorded dearth of any kind of settlement site and a comparative abundance of 'ceremonial' sites such as barrows, cursuses, causewayed enclosures and henges.

The interpretation of causewayed enclosures has always been somewhat changeable, and they have not always been regarded as ceremonial monuments. The earliest hypotheses regarding their purpose suggest that they were simply a temporary camp or settlement (Curwen 1930, Whittle 2001 *et al.*, 9), based on the fact that, without exception, large quantities of apparent occupational debris including animal bone, pottery and flint, stone, antler and bone tools had been encountered during enclosure excavations. However, the absence of structures or features indicative of structures (hearths, waterholes, house platforms), within the interior of the enclosures has resulted in abandonment of this hypothesis in favour of the notion that they were 'ceremonial' or 'ritual' (Mercer 1980; Legge 1981; Pryor 1998; Whittle *et al.* 1999; Oswald *et al.* 2001; Mercer and Healy 2008). Another functional explanation for causewayed enclosures is their use as defensive structures, evidence of violence is apparent at sites such as Carn Brae, Crickley Hill and Hambledon Hill. It seems likely that these sites did serve a defensive purpose at some point, but that they are the exception rather than the rule.

There are a number of reasons for a 'ceremonial' or 'ritual' explanation for causewayed enclosures being favoured, aside from the absence of features indicative of settlement activity. One is the presence of human remains at many of the sites, and is probably more telling of modern sensibilities towards the dead than any actual Neolithic inclination to remove them from the living. Certainly the human bone present at Etton numbers just fourteen highly fragmented identifiable specimens, and possibly up to twenty-four separate instances of cremated material (though this material was so heavily comminuted it is impossible to know whether it was human rather than animal). The human bone at Etton was also found interspersed among large assemblages of animal bone, with no apparent care taken in the manner of deposition, and shows evidence of having been gnawed by canids. It is difficult to come to the conclusion that this material was, in fact, regarded any differently from the rest of the material that found its way into the enclosure ditches. Armour-Chelu proposes that the human bone present in the enclosure ditch at Etton is possibly evidence of excarnation (1998, 272) occurring in the interior of the enclosure, and bases this on the absence of small bones, however, given

the extreme paucity of human bone (in comparison to animal bone), this seems like a poorly evidenced postulation.

Another hypothesis, which supports the idea of causewayed enclosures being ceremonial, is that they were intermittently used for feasting. This is largely based on evidence from Windmill Hill (Smith 1965), where large quantities of food waste and pottery thought to relate to the consumption of food were recovered. These kinds of finds typify assemblages recovered from causewayed enclosures around the country and may well result from large scale feasting, however, it is difficult to determine why this is more likely than it resulting from activity of a more domestic nature. The idea that at Windmill Hill (Whittle *et al.* 1999) it is the more mundane material, such as storage vessels, that are used to discern ritual is confusing when these same vessels would in other circumstances be used to discern domestic settlement. The notion that causewayed enclosures were places of feasting, where ceremonial gatherings were repeatedly held, whether seasonal, annual or more intermittently, has developed into the most popular current explanation of their use. This hypothesis allows for the many varied activities evidenced in the material record of the sites to be neatly explained.

With regards to feasting at Etton, Pryor states that “The deposition of partial skeletons [pig and sheep] was probably associated with feasting” (Pryor 1998, 361) but also that “[cattle bones] were not deposited as partial skeletons, and there was evidence for selection in favour of meat bones” (*Ibid*). He also associates the deposition of individual bones as being suggestive of feasting, though acknowledges that perhaps it was a “different type”. So here we have a situation where both partial skeletons, and disarticulated bones are being interpreted as the remains of feasting activity, but for no particular reason other than because that is what is felt ought to be being represented at a causewayed enclosure site. More recently, Serjeantson has set out criteria for the more precise identification of feasting remains. She identifies seven key points which indicates an assemblage is the result of everyday meat consumption; the selection of small animals, the disarticulation of all skeletal elements, the presence of all parts of a carcass, the absence of burning, the fragmentation of marrow bones, the absence of charring on marrow bone extremities and the

small overall number of bones. Etton conforms to all but the first and last of these. Contrary to this, Etton conforms to none but two of here criterion for the identification of feasting remains; an abundance of pigs, articulated joints, abundance of meat bearing elements, charring on articular ends, limb bones split once for the extraction of marrow, the charring or erosion of marrow bones shafts and large quantities of bone. This will be discussed in greater detail a little later in this chapter.

It is not just the nature of the material culture of causewayed enclosures that has led to their being assigned the role of the ceremonial meeting places of Neolithic society, but also the nature of the deposition of this material culture. Where they are encountered, complete or semi-complete skulls, spines and rib cages in the butt-end of ditches are identified as the premeditated and 'special' placement of this material into the ground (Thomas 1991, Chapter 4). Similarly the deposition of articulated limbs of animals is thought to represent the conspicuous waste of meat for some unknown yet special purpose (Morris 2008). At Etton, deposits in the ditch termini are often seemingly more precious than those in the length of a ditch, and sometimes include complete pots or small arrangements of material that are striking for their unusual and apparently deliberate composition, though equally frequently material such as this will be found in the middle part of a ditch.

There is no denying that during the Neolithic there are unusual instances of deposition, however, the issue is that these are not the norm, nor should they be assigned more importance when drawing conclusions about a site than very much more abundant, yet very much more mundane material such as broken bones and pottery. The deposition of birch bark, whole pots and bundles of cattle ribs at Etton (Pryor 1998, 365), a broken axe butt, human skull fragments and burnt material at Haddenham (Evans 1988, 134), a sheep's skull in the terminal of a ditch at Staines (Robertson-Mackay 1987, 46), skulls on the base of a ditch at Hambleton (Mercer 1980, 30) or complete burials in ditch termini at Offham (Curwen 1929), Whitehawk (Curwen 1934, 110) and the Trundle (Drewett 1977, 209) may all represent instances of premeditated deposition practices accompanied by some sort of ceremonial activity, but equally they may just represent people carefully depositing material that simply needed

depositing. There was no repeated deposition of unusual material at Etton. There are a few instances where unusual deposits were made, and these clearly deviate from the normal patterns of deposition demonstrated in Chapter 7, however the partial animal skeletons are identified as one as the primary instances of structured deposition, and their identification is somewhat misleading. The bones may have derived from the same carcass, but most display evidence of disarticulation so cannot have been deposited as a whole or even partially complete skeleton.

For activity to truly become 'ritual', that activity should be practiced time and time again – for example the deposition of material in a certain location, or the deposition of the same type of material. While it is possible to argue that the ditch termini receive greater attention in terms of deposition than other parts of the ditch, activity is not confined to these areas, nor is the same kind of material being deposited in these areas with any kind of regularity. Functionally, ditch termini are the most accessible part of a ditch, and therefore lend themselves to higher levels of deposition than other parts of the ditch. Even this however, is not overtly the case at Etton.

Using the material culture to determine the activity at causewayed enclosures as being ceremonial rather than domestic in nature not only perpetuates the false dichotomy mentioned above, but is also extremely tenuous. It is common to encounter phrases such as "it was not a typical domestic assemblage" (Pryor 1998, 361) when reading about causewayed enclosures, yet it is difficult to identify what it is that is particularly a-typical about the assemblage. There are certainly peculiarities in the archaeological record at causewayed enclosures, and instances where ritual explanations appear to be the most 'logical', however, such 'events' are not usually repeated or non-random, therefore do not conform to the requirements of a deposit to be identified as ritual. Even excepting these deposits however, the vast proportion of evidence recovered from these sites does not fall into this category and appears to be more commonplace. The limited archaeological record for the Neolithic in Britain, and more specifically for domesticity in Neolithic Britain means that it is almost impossible to judge the relative sacredness or banality of any material recovered. In fact, if one considers the material from causewayed enclosure

sites 'at distance', as has been done in this thesis with regards to the animal bone, it becomes very clear that there is nothing particularly different from the faunal assemblage at Etton than one would expect to see from the assemblage of any prehistoric settlement site.

Pryor acknowledges in his conclusions on Etton that, "with very few exceptions, excavated causewayed enclosures in Britain have produced material, usually 'occupation debris'...providing substantial evidence for settlement" and that "post-excavation analysis, however, has shown that such a simple explanation is no longer adequate". Based on what has been observed at Etton, it seems entirely possible that over-thinking during post-excavation analysis is in fact the problem. Similarly to the animal bone report, the pottery report focuses on the atypical and makes little or no mention of the vast majority of a massive assemblage of potsherds. Perhaps it is thought that there is nothing to say, but at least where partial and fragmented animal bones are concerned this thesis has shown that that is unlikely to have been the case.

### **8.3 Research Question 2**

*What do the animal remains at Etton and Staines tell us about the role of animals at causewayed enclosures?*

#### *8.3.1 Overview*

The species represented at Etton, and the proportions in which they were represented are very typical of Neolithic sites in Britain, with cattle making up around 70% of the total assemblage followed by roughly equal (with a slight bias toward pig) proportions of pig and sheep/goat. Wild animals make up just 3% of the total assemblage.

A huge majority of cattle appeared to be female, according to metrical analysis on their metacarpals. The ratio of male to female animals according to the morphology of the pelves was much closer, but it was noted during analysis that sexing could not be achieved on many pelves, which possibly accounts for the discrepancy. The apparent high proportion of females is indicative of a herd

used for dairying, however, analysis of the herd structure by bone fusion did not corroborate this particularly well as over 60% of animals were surviving until 3 or 4 years old at least, however, examples of sites with apparently entirely older female populations of cattle are not unknown and have tended to be associated with dairying (see Hambledon Hill [Legge 1981, 2008] and Kent in Kazakhstan [Outram Pers. Comm.]) Unsurprisingly the data relating to the herd structures of pigs and sheep/goats was quite different to cattle, with most pigs being killed before the age of 2 years and about 50% of sheep surviving to their fourth year. The large number of sheep surviving to this age potentially indicates their exploitation for wool. This is corroborated by the presence of at least two antler combs at Etton.

Partial skeletons and associated bone groups were identified during the original analysis and highlighted as being unusual. They were far outnumbered by the vast quantity of fragmentary bones recovered. It is the unusual nature of these deposits in comparison to the bulk of the assemblage that has caused them to be commented on at length in the past, and this in turn (and similarly unusual deposits of pottery, flint and other materials) has caused the definition of causewayed enclosures as ritual or ceremonial arenas. In actuality, aside from the few partial skeletons, the animal bone assemblage from Etton has no particularly outstanding features to support a ritual interpretation, in fact its most outstanding features (butchery and bone fracture evidence) tend to lean towards a much more mundane interpretation.

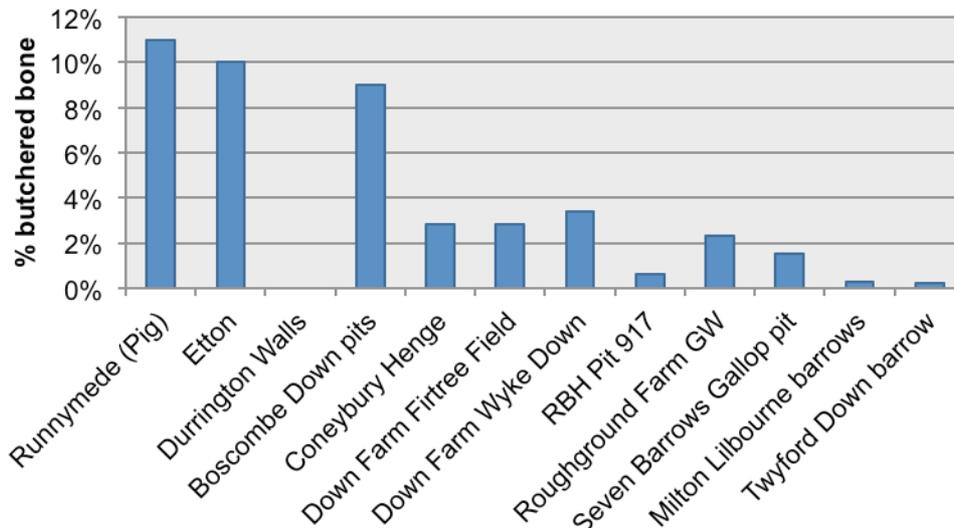
### *8.3.2 Butchery*

Butchery marks were found to be visible on 10% of the identifiable bone from the Etton causewayed enclosure. This is considerably more than the 3% stated in the original report (Armour-Chelu 1998, 274). Of all of the species present at Etton, four were found to have been subject to butchery methods which left the marks of this activity on the surface of the bone – these were the three primary domesticates (cattle, pig and sheep) and red deer. Despite being the least well represented of these species, red deer were found to have the highest prevalence of butchery marks (24%). This is not surprising, as it is likely that as a hunted species, fairly intensive but not necessarily careful butchery of the red

deer carcass would have occurred at the kill site in order to transport the meat back to the Etton. Cattle were the next most highly butchered species, with 18.1% of the identified elements displaying some evidence for butchery. Pig and sheep followed, with 14% and 10% (respectively) of bones having visible evidence of butchery.

The notion that feasting is synonymous with the function of causewayed enclosures, henge monuments and funerary monuments is widely accepted with regards to the British Neolithic, and is one of the main lines of evidence used to suggest that causewayed enclosures were the sites of intermittent gatherings, ceremonies and other communal occasions (Parker-Pearson 2003). The deposition of partial skeletons has been associated with feasting activity and although partial skeletons are present at Etton they are far over-shadowed at Etton by the deposition of highly fragmented, intensively processed (butchered and purposely broken) animal bone. Not only this, but although it was difficult to fully understand the nature of the partial skeletons based on the archived material, it was clear that although deposited together some (not all) of the groups of bone were not articulated at the time of deposition. Evidence for the disarticulation of animals was also abundant, suggesting that they were heavily portioned. Although feasting activity does not preclude the portioning of animals or meat, it does not traditionally support it.

At the original estimation of 3% of the bones displaying butchery marks, the proportion of butchered bones would have been in line with assemblages from barrow and henge sites such as Coneybury Henge, Down Farm Wyke Down Henge and Seven Barrows Gallop, as well as pits sites like Down Farm Firtree Field and Roughground Farm (see Figure 8.1 and Serjeantson 2011, 55). With 10% of the bone showing some kind of butchery, and this totally likely to have been more if the bone in the higher levels had not been subject to water logging and surface deterioration, the amount of butchery is much closer to the level seen on the pig remains from Runnymede – an assemblage which has always been identified as being ‘domestic’ in nature.



**Figure 8.1: Comparison of % of bones with butchery marks from mid to late Neolithic sites (after Serjeantson 2011, 55).**

### 8.3.3 Fragmentation

The analysis of the patterns of bone fragmentation across the site, and also at the Staines causewayed enclosure, provides possibly the most interesting data from this study. All of the species, both wild and domestic, which are traditionally considered as ‘meat-bearing’; cattle, pigs, sheep/goat, aurochs, red deer and roe deer appeared to have been exploited for their bone marrow. This is despite the fact that wild species are only present in extremely small numbers. The remains of dogs, foxes and humans (also only present in very small numbers), had no evidence for the exploitation of marrow. This indicates that the helical fractures present throughout the assemblage were at least largely the result of intentional bone breakage for access to the marrow cavity.

The proportions of helical fracture present across the site were both unexpected and extremely interesting. One of the premises upon which this study was constructed was that helical bone was present in only negligible quantities at causewayed enclosures. This assertion seemed unsupported given the fact that no investigations into the levels of different fracture types at causewayed enclosure sites has ever been investigated. The notion of there being no evidence for fresh bone breakage/marrow extraction derived from, and was used to bolster the idea that causewayed enclosures were somehow devoid of

settlement or domestic activity, Given this premise was so widely accepted by Neolithic specialists, the empirical fact that at Etton 29.8% of all identifiable bones appeared to have been fractured when fresh should be enough to turn the incorrect evidence for no settlement into a strong argument for settlement activity. Clearly, it cannot be this straightforward, however, more detailed consideration of the data presented in Chapter 6 only serves to strengthen the evidence for the routine marrow extraction.

As not all bones are suitable for the extraction of marrow, and some are more suitable than others, it is possible to be more precise with the data in constructing a picture of marrow extraction activity at both Staines and Etton. At Staines almost 60% of the bones known to yield high quantities of marrow appeared to have been processed for marrow extraction. At Etton around 35% of high marrow yield bones had been processed. More specifically, at Etton almost 40% of the high yield cattle elements and 21% of high yield pig elements had been processed when fresh. The number of high-yield cattle being processed rises to over 50% when just those present in the ring ditch are considered.

Although evidence of this activity does not necessarily prove the presence of domestic activity at Staines and Etton or at causewayed enclosures more generally, it certainly adds to the growing body of evidence presented in this thesis, that indicates that perhaps more mundane activities were occurring on a more regular basis than has previously been assumed.

#### **8.4 Feasting or eating?**

The original impetus for this thesis was to discover whether the animal bone assemblages at causewayed enclosure sites were genuinely distinct from what is thought to typify Neolithic domestic assemblages. The difficulty with reaching conclusions about this is that we still do not have a clear picture as to what a Neolithic domestic assemblage might look like, making it almost impossible to discern how causewayed enclosure assemblages deviate. Even those assemblages that have been investigated and published tend not to have been analyzed in any great depth for their butchery marks or patterns of bone

breakage, making it difficult to compare the patterns observed at Etton (and Staines). Nevertheless, some very important points can be made as a result of the research presented here.

The first is that the assemblage from Etton is not particularly distinct from any other large Neolithic assemblage (most of which come from causewayed enclosures). Cattle are the most numerous domesticates, followed by pigs and sheep/goats and only a very tiny proportion of the total assemblage represents wild species. It seems evident that domestic species were of paramount importance to at least the economy of the site, but there remains a query over whether or not this can be extrapolated to the Neolithic more generally, or whether the dominance of cattle is explained by the nature of the site as being ceremonial or ritual. By considering more nuanced aspects of the animal bone from Etton, we can see that some things thought to be indicative of the site having a ceremonial/ritual function simply do not exist. Most obviously there is a huge amount of evidence to suggest that bone fracture for marrow extraction was a common practice, something that had previously been denied. Serjeantson suggests that bones with single, central fractures may still be indicative of feasting (2011, 64) and while this was seen at Etton, much of the assemblage was far more fragmented than this, suggesting the activity was rather more intense and potentially more indicative of non-feasting, domestic activity (see Section 8.4.4)

The second point to make is that the butchery evidence presents a picture of very general activity occurring at Etton. Marks indicative of meat-removal were most prevalent, but whether this occurred before or after cooking cannot be said (see Section 8.4.4). Skinning marks were the least evident - that does not reflect the absence of this process, just its ephemeral taphonomic signature. Disarticulation of carcasses was occurring regularly on all three of the primary domesticates, though there was more evidence on cattle. Some disarticulation marks present on the pelves of cattle, pig and sheep indicate the removal of the whole hind limb. For cattle and pig, disarticulation marks are also visible around the distal femur and proximal tibiae, suggesting further division of the carcass at this point, again potentially as a result of portioning activity. There were very

few instances of the deposition of partial skeletons or of articulated limbs, which are sometimes given as evidence for feasting activity.

It is very clear now that at Etton, fragmentary animal bone remains were abundant, and very occasionally a more complete set of remains was encountered. While some of these fragmentary remains were deposited in a seemingly purposeful manner, it is difficult to understand why it was that the animal bone assemblage was originally decided not to be 'typical of a domestic assemblage' (Pryor 1998, 361). Serjeantson (2011, 64) has recently developed a list of criterion for differentiating between everyday meat consumption and feasting. Her indicators for the former are as follows;

- Small animals selected
- All skeletal elements disarticulated
- All parts of the animal present
- No traces of burning
- Marrow bones in several pieces
- Ends of marrow bones not charred or eroded
- Small total number of bones

With the exception of the first and last of these criterion, Etton conforms perfectly to Serjeantson's everyday consumption model. The vast majority of elements were found both disarticulated and fragmented, all parts of the carcass were represented (though lower numbers of peripheral bones have been recorded), burning is exceptionally rare at Etton, both on bone fragments of more complete bones, and marrow bones are often found in large fragments, rather than partial bones. When we compare this to Serjeantson's model for feasting activity it is clear with which model Etton has more in common –

- Abundance of pigs
- Some articulated joints
- Abundance of meat bearing elements
- Charring on articular ends of bones
- Limb bones split once for the extraction of marrow
- Marrow bones charred or eroded on shaft

- Large quantities of bone

Pigs are by no means abundant at Etton, articulated joints are rare, there is very little evidence of charring or burning, either on articular ends of bones, or on the shafts and limb bones are relatively highly comminuted. The only two of these points to which Etton conforms is that there is an abundance of meat bearing elements (such a bias is well known archaeologically, and is not necessarily representative of deliberate action), and that there are large quantities of bone. Both of these points could point to the fact that large amounts of food were consumed at Etton over its use, but this does not necessarily mean that ceremonial feasting was the only type of consumption occurring here. It is very likely that communal consumption was an aspect of Etton's usage, however, this ought not define what Etton was as a causewayed enclosure. Such evidence for communal consumption is likely to be visible wherever Neolithic people were living and working and eating, and until the evidence for it from causewayed enclosures is proved to be different from the evidence a definitively domestic site, it should not be presumed that it is the result of ceremonial feasting.

## **8.5 Conclusions**

A number of things are clear from the research presented in this thesis. The first is that, somewhat alarmingly, one should not necessarily trust data presented in existing archaeological reports. The animal bone from the old and new analyses of Etton are so completely distinct from one another that it is at times hard to see that they were in fact the same assemblage. The omission of large quantities of material, including some potentially very interesting pieces (e.g. an antler comb and an almost complete dog burial) is inexcusable given the fact that the director of the site, and author of the subsequent monograph, Francis Pryor (1998), believed that the whole assemblage had been analysed, and considering that this is also the picture presented by the original animal bone report.

The second is that premises and notions upon which our current understanding of the Neolithic in Britain are based have, in some areas, been found to be

seriously lacking any kind of empirical basis in fact or data. Unfortunately, this does not just apply to the faunal record, but also to other areas of environmental analysis, for example the usage of domesticated crops and the exploitation of cattle for their milk products. Assumptions were made on the roles of animals, crops and secondary products before any scientific evidence could be provided; yet subsequent to the provision of such data (which is largely contradictory to earlier theory), no, or insignificant revisions appear to have been made to former assumptions. This leaves us with two rather distinct schools of thought with regards to the British Neolithic. The first is purported by 'old-school' post-processual theorists and which focuses on the broad reconstruction of the Neolithic through theory and supposition, with particular emphasis on unusual, 'ritual' and ceremonial' aspects of the life of Neolithic people (Thomas 1991, 1999, 2007, 2013; Harris 2003; Pollard 2005). The second is a much more recent school, based on empirical data and scientific fact, but which does not present a broad view of the Neolithic, preferring to focus on narrower areas of data gathering (e.g. Bogaard and Jones 2007; Copley *et al.* 2003, 2005).

The implications of the decades of largely hypothetical Neolithic theory, with little grounding in fact, are wide ranging. For instance, data which has been alluded to, but which never existed, such as the absence of bone processing at Neolithic monuments, (e.g. Thomas 1999, 27), appears to have become widely understood to be factual, and thus has become very much a part of the picture of the Neolithic which is presented to, and by academics today. For this reason it has never really been questioned, but this thesis has demonstrated the importance of such questioning.

It also seems likely that the supposition of the nature of various site types, but in particular of causewayed enclosures, has, at least to a certain extent, dictated both the direction of any data gathering, and the interpretation of archaeological remains, material culture and environmental remains. This has meant that the idea of causewayed enclosures being sites of 'ritual' or ceremonial significance has been perpetuated, seemingly based on fact, but in fact based on 'data' focussed on for its unusual nature. As such there exists the false notion that sites, such as causewayed enclosures, are dominated by unusual, 'obviously

ritual' or at the least 'not indicative of normal domestic activity' deposits. This new analysis of the bone from Etton has proven that, here at least, the vast majority of the animal bone is highly fragmented, butchered and disarticulated.

More specifically to the content of this thesis, it is clear that the presumption that bone processing was not occurring at causewayed enclosures has no basis in fact, and is based more on the preconceived idea that causewayed enclosures were not places at which typical domestic activity was occurring, therefore that this kind of activity should not be occurring here either. It has been categorically proven that bone processing was occurring at causewayed enclosure sites, not only occasionally and in small numbers but with regularity and in significant quantities. The levels of bone processing, particularly of marrow extraction, are equal to those seen at domestic settlement sites (see Ludwinowo 2 – Pyzel 2012; Parmenter *et al.* forthcoming). While it would be a leap at this point to decide that permanent settlement was occurring at British causewayed enclosures, the results presented here at least open up the possibility that activity occurring at causewayed enclosures was more typical of everyday Neolithic life than has previously been acknowledged. We are beginning to learn from causewayed enclosure sites in Europe, that settlement did not necessarily exist within the site, but peripheral to the enclosure (Pyzel 2012). This is an area that is rarely excavated in Britain or further afield, and which potentially holds the key to the nature of activity at these sites

A great deal further work is required to fully understand the nature of the economies of causewayed enclosures. However, it is believed that enough of what is traditionally believed about the animal bone assemblages at Etton and Staines, and potentially therefore at other similar sites, has been proved either false or wanting, to warrant a more thorough investigation. Even after such a thorough investigation as has been carried out here, it is impossible to understand why it is that so many are so adamant that the animal bones do not represent domestic activity. Rather, it is suggested (as has been suggested so often before) that the notions of ritual and domestic activity in the Neolithic are entirely devoid of meaning, and postulated that causewayed enclosures represent a snapshot of an economy that was taken by the Neolithic people of Britain from place to place, and although we might find it to be concentrated at

sites such as these, and rather dilute across the wider Neolithic landscape, that is no reason to doubt its functionality as a day to day economic system, which encompassed both the sacred and the profane – and from which (with the exception of the intermittent obviously ‘atypical’ deposits upon which our current understanding of the Neolithic has been largely constructed) it is currently impossible to disentangle the two.

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