A Zooarchaeological Study of Changing Meat Supply and Butchery Practices at Medieval Castles in England

Submitted by Hayley Jane Foster, to the University of Exeter as a thesis for the degree of Doctor of Philosophy *in Archaeology, November 2016.*

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

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Abstract

This thesis investigates the changing meat supply and butchery practices at medieval castles in England. The analysis represents a departure from prevailing zooarchaeological butchery studies in that it considers the importance of analysing butchery patterns to gain a better understanding of social status, diet and changes in how animals were exploited over time and in various geographic locations in England. This research highlights the potential of butchery studies and reveals previously unestablished information about how butchery was carried out, how meat was supplied and the practical and social reasoning behind why animals were slaughtered and consumed in a certain way.

A butchery methodology was implemented for identifying significant patterns detailing where butchery marks were occurring on bone. The methodology was tested on assemblages from three castle sites: Edlingham Castle, Portchester Castle and Beeston Castle. The methodology is further carried out in the form of assessments for comparison, on animal bone assemblages from medieval urban sites in Newcastle, Winchester and Chester.

The methodology is successful in showing that analysing butchery practices of an animal bone assemblage, has the potential to reveal previously unestablished information about past butchery practices and consumption patterns.

High status medieval castle assemblages predominately show a professional style of butchery, however this is not always the case. A key characteristic of this style is the longitudinal division of the spine of a carcass. This thesis hypothesises that a castle in close proximity to an urban area would display a professional style of butchery and therefore would likely have a significant amount of dressed carcasses brought to the castle from an urban centre. However, location is not the only variable to take in to consideration. This research shows that the level of status of a castle is also an essential factor to consider.

Aspects of this research can be implemented as an extension of existing methods available to zooarchaeologists in order to gain a better understanding of butchery practices and social status. Issues highlighted by the case studies in question are explored and ideas for future research are suggested.

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Chapter 1: Introduction and Research Aims

"Meat makes the meal. It is the dish that gets star billing at the table" (Ashbrook, 1955, p. 7)

1.1 Potential of Investigation

Meat was very much the hallmark of the medieval high status diet. The variety of species consumed and the elaborate and complicated dishes would be sure to impress on the table of any feast. These culinary traditions were admired by the lower classes and those in particular who were trying to climb the social ladder. The medieval castle diet has been explored by several zooarchaeologists in studies such as those from Dudley Castle (Thomas, 2005), Launceston Castle (Albarella & Davis, 1994) and Norwich Castle (Albarella, et al., 2009). These studies are comprehensive and provide good insight into status and dietary preferences in castle contexts and complement documentary based studies. Status and diet will very much be taken into consideration in this research, however, trends in how people were carrying out butchery processes will be the key focus in gaining an understanding of changes in diet over time, within a castle context and geographically across several different sites.

Audoin-Rouzeau (1987) stated that "The brutish, bloody, and commonplace associations of butchery cast a shadow over its respectability as a subject for academic investigation" (p.31). Butchery is still a subject that is not predominantly studied in great detail in zooarchaeology reports. Studies have explored butchery looking at what butchery marks represent (Rixon, 1988), which tools made such marks (Aird, 1985) and integrating butchery data with implement usage (Seetah, 1992). These topics are often overlooked when reporting on animal bone assemblages. This thesis seeks to provide an in depth study of butchery by analysing butchery marks on animal remains to understand how animals were exploited, and if these trends change within a site and across sites. This will provide a cultural understanding as to whether social status and/or geography play a role in how butchery of an animal is carried out. These ideas are not only to be investigated in medieval castle contexts but also in medieval urban contexts in close proximity to the castles that have been selected as case studies. This study addresses the deficiency in the lack of butchery data that has been provided in past zooarchaeological reports and places an emphasis on what insight a butchery study can provide. It is important to use a methodology that implements quantitative and qualitative research when carrying out butchery analysis. Research such as this will also provide evidence of how people were obtaining meat, whether through trade from an urban centre or obtaining their meat locally.

1.2 Butchery as a Topic of Study in Zooarchaeological Reports

Animal remains can often make up a large proportion of the artefacts that are recovered from an archaeological site, particularly at medieval habitation site. Due to the vast amount of bone that can be collected, butchery is often a part of the analysis that can be overlooked. The standard report provides information and data such as the range of species present in an assemblage, body part representation, ageing, sexing, measurements of bones and pathological changes. The data is applied to gain a better understanding of topics such as husbandry practices, seasonality, craftworking or industry on a site. Frequently these reports will draw upon butchery evidence in a minimal capacity. Many may dedicate a paragraph to butchery, mentioning if marks were visible and on which species of animal, but they will seldom report on quantification and precise locations of such marks. Examples of medieval castle animal bone reports that resemble these standard reports will be highlighted in chapter 2.

Studying butchery practices is not only investigating dietary preferences and what types of species people were consuming but also the styles in which people were butchering and preparing animals. This study will investigate the butchery trends that appear in an assemblage over time within a site, from the medieval period through to the post-medieval period.

1.3 Research Aims

The research aims on this project are on both an inter-site and intra-site specific level, meaning the evidence is not only important within each individual assemblage but more widespread to show the correlations across sites. In this thesis the case studies consist of three medieval castles of varying statuses across England.

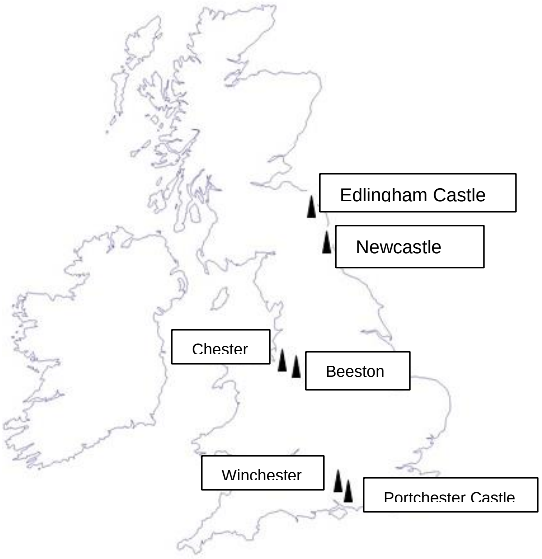

Figure 1: Locations of case studies and assessment assemblages.

These include Edlingham Castle, a medieval hall house in rural Northumberland (thirteenth to sixteenth century), Portchester Castle, a royal castle on the coast in Hampshire (twelfth to sixteenth century), and Beeston Castle a large hill-fort in Cheshire (thirteenth to post-seventeenth century). Assessments of assemblages from some of the closest urban centres to the castles were also carried out to compare and contrast exploitation on a more localised level.

1. The onsite specific aims:

   A. How were animals exploited over the duration of the medieval and post-medieval periods at the sites in question?
   B. Were there changes in the ways animals were butchered over the span of the periods studied (twelfth to seventeenth century)?
   C. Are there changes in species consumed with the fluctuation of wealth and social status of the residents of the castles?

2. Inter-site specific questions include:

   A. Are the trends in butchery and species consumption consistent across all castle sites within comparable time periods?

B. How do the urban sites and the castle sites compare in terms of butchery practices and are these findings regional? Or are they very much status dependent?

C. Is the butchering process occurring onsite or are dressed carcasses being brought to the castles from urban centres?

D. Are there indications of professional butchery and/or amateur butchery techniques and trends from the animal remains?

E. Is evidence of professional butchery techniques found on remains in castle contexts linked to the urban meat supply and the professional butchers based in urban centres?

These research questions will be explored to gain a better understanding of the high status medieval diet, the ways in which animals were exploited in the medieval and post-medieval periods and the social significance of the ways animals were butchered.

3. Methodological aims:

A. To implement a method of recording butchery that is efficient and can potentially be adopted by other zooarchaeologists as a useful tool when undertaking analysis.

B. To implement a method that can visually display large amounts of butchery data and frequencies with a high degree of accuracy.

1.4 Structure of Thesis

The thesis commences with the discussion of the literature pertaining to the high status medieval diet and how to distinguish butchery marks from other taphonomic processes. This is followed by a discussion of examples of published medieval castle zooarchaeological reports and how authors have approached butchery evidence in the past. This continues with an examination of literature on butchery, examining the types of tools used in medieval contexts, distinguishing different types of butchery marks and a review of some prime examples of previously published medieval case studies that have provided detailed butchery evidence. As the essential literature background information and research aims are complete the detailed methodology of the research will follow in chapter 3. The methodology explains the procedures that were used to carry out the recording of butchery data using ArcGis for the zooarchaeological assemblages.

Chapter 4 contains the background information to the first case study, Edlingham Castle, which discusses the history of the castle and the rise and fall of status of the inhabitants of the residence over the castles occupation. The chapter also looks at the archaeological excavations carried out and lays out the phasing for the site and animal bone. This is followed by chapter 5 which is the animal bone report which details the full recording of the Edlingham Castle faunal assemblage, as this was never carried out in full during the post-excavation of the site.

Chapter 6 displays and discusses the butchery evidence found at Edlingham Castle by implementing the ArcGis diagrams as a tool for collating and displaying the butchery data. The following two chapters (chapter 7 and chapter 8) discuss the background history, excavation details and site phasing for Portchester Castle; followed by the presentation of the butchery evidence and trends found at Portchester Castle. Chapter 9 details the historical background and excavation details of Beeston Castle followed by chapter 10 which discusses the butchery evidence and trends found at Beeston Castle. Chapter 11 explores the butchery evidence of the assessments carried out at sites in Winchester, Chester and Newcastle. The results of these assessments of the butchery trends were used to compare and contrast with the nearby castles' butchery evidence.

The thesis continues with chapter 12 which is the discussion of the results of the findings of the butchery evidence and delves deeper into specific butchery techniques, changes and the social and cultural implications of butchery practices. The final chapter presents the thesis conclusions, the fulfilment of the research aims, the limitations of the study and suggestions of ideas and related topics for future study.

Chapter 2: Understanding Butchery and the Medieval High Status Diet

Butchery marks can provide important insight into how animals were slaughtered and prepared for consumption, as well as subsistence patterns and resource use. This chapter will discuss the literature covering the identification of the types of butchery marks, and the methods and techniques used on animal bones to produce such marks. It intends to delve into the knowledge and approaches that have been studied in the past, and how butchery patterns have been used as tools for understanding how animals were exploited and what they can tell us about economic and subsistence patterns. A brief summary of the processes of butchery will also be described as understanding the methods is necessary for interpreting the zooarchaeological evidence. The butchery study from the site of Velim (Outram, et al., 2005) will be discussed as an example of how to collate, represent and interpret butchery data in a concise and visual manner.

Literature will be examined to understand what a 'high status' diet is and how we can utilise species exploitation, taphonomic processes and butchery analysis from a faunal bone assemblage to recognise social status and compare trends. Information will be presented on the ways that status can be interpreted from zooarchaeological remains. An overview of the high status medieval diet will also be highlighted as an introduction to the types of food that would have been commonly consumed, and the type of remains typically left behind by dwellers and visitors in medieval castles in England.

This chapter will also discuss previous zooarchaeological reports of faunal bone assemblages from medieval castles in England to examine the patterns of consumption, how butchery was recorded and the interpretations the authors provided. The studies will be implemented to provide a background to the research questions by demonstrating the effectiveness of zooarchaeological techniques, such as butchery analysis, to inform us about diet and patterns of trade and consumption.

2.1 What is involved in the Butchery Process?

Butchering a carcass during the medieval period differs from the way animals are butchered today mainly due to refrigeration and electric tools. In modern times meat would be chilled for preservation resulting in meat becoming more tender. Fresh meat can be tough, and therefore hanging or maturing meat such as beef, mutton and venison would be an option for tenderising meat (Ashbrook, 1955, p. 10). Evidence for flesh hooks have being found as various medieval sites in London, Flixborough and Thetford (Frantzen, 2014). Today butchers rely on electric saws and modern hoisting equipment instead of solely cleavers, knives and perhaps a wooden frame to hang a carcass.

Lyman defines butchery as “the human reduction and modification of an animal carcass into consumable parts” (Lyman, 1987a, p. 252). Lyman goes on to clarify that butchery is not one act but a series of acts or activities associated with the extraction of consumable resources. He defines *consumable* as “all forms of use of carcass products, including but not restricted to consumption of products as food” (*ibid*). Butchery is an involved process that can include numerous steps and depends on a number of variables. As researchers we need to be able to recognise the resulting effects butchering an animal has on bones and what signs to look for as indicators that a butchering process took place in the past. To recognise what butchery marks look like on a bone, it is firstly important to understand the process of butchering an animal. Rixon (1989) describes five categories of butchery: i. Primary butchery, which is the process of slaughter and dressing a carcass, ii. Secondary butchery, which involves dividing the carcass into major parts/cuts, iii. tertiary butchery, which is the reduction to “pot size” pieces, iv. utilisation for fat extraction and v. bone working. It is imperative to understand how to recognise the evidence that can place a bone or bone fragment into these categories of butchery. The order of butchering an animal for storage or consumption is most frequently skinning, dismemberment, filleting, and marrow consumption (Binford, 1981, p.106). The process of butchering a carcass is “culturally patterned” while also relating to the number of people to feed and how the food will be cooked, whether roasting, boiling and the size of the cooking vessel (Reitz & Wing, 1999, p. 269). Each process, depending on conditions, can correspond with a different type of mark left behind on the bone. For instance an example of skinning may be the presence of fine cut marks on a mandible for the removal of the pelt, and signs of dismemberment may include marks left behind on the bone from the separation of the mandible from the skull or the skull from the neck. Butchering an animal into small pieces may show cut marks on articulations where they have been chopped into pot-sized pieces, and if the shafts of long bones have been smashed this may be an indication of marrow extraction (Rackham, 1994, p. 15).

In Maltby's (1985) study of urban-rural variations in the butchering of cattle in Romano-British Hampshire, Maltby found that the most common mark seen on the mandible was a chop or saw on the caudal surface, which were determined to most likely be associated with detachment of the mandible. There was a recognised slight variation in technique which was concerned with the position of the head of the animal when dismembering, which may have played a factor in marked butchering variation. Dismembering an animal is a process that should cause a limited amount of breakage and only cause a minimal amount of damage to the bones (Binford, 1978). In regards to filleting, a common example would be the entire removal of or part of the lateral spine of the scapula, which would involve removing the flesh with a knife. Lyman (1994) explains what the key indicators of the processes of skinning, disarticulation and filleting are. Skinning marks are generally found on the shaft of the lower leg and phalanges also on the skull and mandible, signs of disarticulation are cut marks on the articular surfaces of the ends of long bones and on the pelvis and vertebrae. Filleting marks are usually seen as cut marks parallel to the long axis of the bone (*ibid*).

2.2 Fracture and Marrow Extraction

Indications of marrow extraction and bone grease exploitation can be seen in various ways throughout the archaeological record, one in particular is a high amount of fragmentation of the bone. To exploit bone marrow an individual has to get inside the medullary cavity of a long bone by effectively breaking the bone (Outram, 2003). When investigating levels of fat extraction it is necessary to address certain variables. These variables include assessing the level of fragmentation, level of gnawing, level of burning and presence of any post mortem destruction (Outram, 2004). It is important to analyse bone fractures, to be able to understand how fractures associated with marrow extraction would appear, and how they are different from those that are unrelated. One must look at fracture angle, texture of fracture, and based on whether the fracture is fresh or dry, point of impact or fracture outline (*ibid*). When bones are fractured in a fresh state, the resulting effect is helical fracture lines radiating from the impact point, leaving behind a dynamic impact scar (Outram 2003; Outram 2004, Johnson 1985). A helical fracture is a curved fracture that spirals its way round the diaphysis. As bone ages and loses its organic components the way it reacts to fracture is somewhat different. Bones will have a tendency to break in more straight lines leaving behind a rough texture (*ibid*). One will frequently see cracks and steps in the fracture outline of a dry fracture. The fracture angle on fresh fractures will generally be an acute or obtuse angle, while a dry fracture will most likely be at a right angle.

When analysing fracture, it is key to look at three criteria: the fracture outline (shape of the fracture), the fracture angle to the cortical surface and the fracture surface (whether rough or smooth). The fracture freshness index is a useful tool that can be implemented when trying to discern whether a fracture is associated with marrow extraction. The index examines fracture angle, outline and edge texture. These criterions are then scored in a simple and efficient manner then assigned an index ranging from zero to six. The index can help determine whether a fracture was due to marrow extraction and examine other taphonomic processes (*ibid*). The index has been applied to a number of assemblages and could be a useful tool when dealing with a large assemblage with a sizeable amount of fracture evidence. Other methods for quantifying bone marrow and bone grease exploitation include Binford's bone marrow and grease indices that he applied to caribou bones exploited by the Nunamiut (1978); and Davis' (1985) fracture classification system, which was a more descriptive method and less of an analytical tool, rather than implicating a fracture agent (Lyman, 1994).

Lyman (1978) discusses that it was necessary to come up with a way of determining natural fracturing from cultural fracturing. Potts and Shipman (1981) came up with a procedure to assess broken butchered bones. The first step involved only comparing breakage between bones of similar structures, and similar animals, the second step involved using a standard classification system to assess fracture types, and the third was to consider the patterns of breakage and then compare to an assemblage with a known history. As Lyman (1978) discusses the first step is logical yet the second and third steps could cause some problems as each bone does not break in exactly the same way and each bone undergoes its own taphonomic processes which may not be identical to the rest of the bones in an assemblage. Besides the problem of not knowing a site's taphonomic history, obtaining an assemblage with a 'known' history may not be possible. It is again important to emphasize that not all bones would have been broken by humans and that taphonomic processes should also be considered.

For this thesis, a detailed fracture analysis was not carried out due to time limitations and was deemed not as imperative to quantify for the research goals. Fracture was however taken in to consideration when trying to distinguish fractured bone from butchered bone.

2.3 Distinguishing Tool Type

Greenfield (1999) looked at distinguishing metal tool cut marks from stone tool cut marks. In the experiment, Greenfield found that metal knives produced V-shaped grooves with a prominent apex or a broader shaped groove and a flat bottom. Greenfield also noted that knives make more uniform patterns and produce cleaner cuts. Though it should be noted that this experiment was conducted on wood not bone.

The shape of tool marks left behind on bone can vary in the way pressure was applied and the angle in which the tool was applied, the length of the blade and the motion used to make the mark are all factors that can affect the resulting mark (Walker & Long, 1977). As seen in Greenfield's experiment Walker and Long's earlier study found that steel tools, such as axes and knives produce the V-shaped groove, whereas bifacial flaked stone tools show a greater deal of variability, making their marks harder to distinguish. The depth and angle at which a butcher is using the tool can also affect how a mark appears. It is also important to take into account other factors such as why a tool mark would be found at a particular location on the bone and what action could have produced the mark. Distinguishing tool type and butchery marks will be discussed in further detail in the following chapter.

2.4 Taphonomic Processes

Taphonomy has a few varying definitions in an archaeological and palaeontological sense. Gifford (1981) defined taphonomy as an area of research "that defines, describes, and systemises the nature and effects of processes that act on organic remains after death" (p.366). Taphonomy was defined by Orton (2010) as "the study of all processes intervening between a live community of animals and the records in an analyst's database" (p.1). Orton's definition of taphonomy is a more current usage of the term and is more of an umbrella term that encompasses modifications and processes carried out by humans on bone. R. Thomas (2005) uses a similar definition which includes "all the processes from the death of the fauna to the retrieval of the sample" (p.12). Some of the factors that are essential to consider are recovery, butchery, fragmentation, gnawing and condition (degradation). These factors can cause taphonomic biases and it is the role of the zooarchaeologist to consider the animal bone assemblage as a whole, taking into account the geographic, cultural and ecological context.

Orton (2010) discusses the idea of social zooarchaeology and how taphonomic analysis can provide cultural information. For example, by investigating the frequency and severity of gnawing and weathering and looking at fragment size we can gain insight into refuse practices. Analysing breakage and fragmentation can provide information on food practices and preparation, as does looking at frequency and location of burning and butchery marks (*ibid).* There have been a range of studies on how to distinguish what is a sign of butchery and what is not.

Researchers have tried using a variety of methods including experimental archaeology and microscopic analysis to produce key clues in deciphering what is a case of butchery. Butchery marks made by tools can show similar, and sometimes even mimic, patterns that could possibly be confused with other taphonomic processes such as trampling, abrasion, carnivore gnawing or other post-mortem destructions. It is down to the zooarchaeologist to be able to confidently deduce which taphonomic processes are not present and provide an educated decision on what is seen. Though caution should be implemented, as researchers who process bone, words such as "possibly the result of" and "may have been due to" should be used when drawing any such conclusions (Rixon, 1989, p. 60).

2.4.1 Trampling

Researchers have also studied the effects of trampling on bone surfaces versus butchery marks. Trampling is a taphonomic process that can cause spatial and physical modification. Spatial aspects are considered horizontal or vertical movement or rotation, and physical aspects are breakage and surface modification (Olsen & Shipman, 1988). Horizontal movement is related to soil compaction whereas vertical movement is more frequently seen in experimental trampling (*ibid*). Breakage from trampling occurs at the weakest part of the bone, therefore there is no specific breakage pattern. Olsen and Shipman (1988) attempted to distinguish other surface modification patterns in order to determine if they could tell if there was patterning. They found trampling produced shallower grooves than those from a chopper, and that trampling marks were shorter and not anatomically significant like scraping marks (*ibid*). Trampling would be more widespread and would have no systematic patterns. Butchering an animal is an extensive and purposeful process, with transverse cuts frequently seen around the joints. Cut marks have internal parallel line whereas trampling produced smooth-walled lines (*ibid*). They found that it didn't matter which sediment size; they tested none of them showed the same parallel lines and grooves as cut marks. Behrensmeyer et al. (1986) found that trampling could cause psuedo-cutmarks that could be confused with actual cut marks on bone. The authors found that microscopic analysis alone could not definitively distinguish between trampling and human made cut marks. They found similar striations between scratching of bone with sediments and slicing marks with stone tools. In a study by Domínguez-Rodrigo et al. (2009) a new protocol was used in differentiating trampling from butchery marks. They used multivariant analysis on a number of variables; they found that trampling had a specific micromorphology, by observing marks with a low magnification lens. Discriminating between trampling and cut marks was found to be successful in 90% of the cases using the multivariant analysis. Overall no concrete conclusions were formulated but the idea that context and environment need to be considered when attempting to distinguish between such bone alterations was deemed imperative.

2.4.2 Gnawing

By studying gnawing on animal remains we can gain insight into refuse disposal practices. The presence of carnivore gnawing can imply that remains were not buried immediately and were exposed for a period of time (Orton, 2010). By comparing gnawing evidence from remains from different phases it is possible to see whether there is variation in depositional practices throughout a site's occupation (*ibid*). Gnawing can also be used to identify site formation processes and patterns of activity. Binford (1981) looked at how to separate those marks made by animals gnawing and tooth marks from those that could be considered butchery marks. He described four types of tooth marks made on bone: punctures, pits, scores, and furrows, and explained similarities between butchery marks. Scoring, which is dragging teeth across compact bone, can mimic cut marks. Other cut marks that are the result of filleting, skinning or disarticulation are distinct and with intent, not random like the marks made by an animal can be. Cut marks as a result of disarticulation generally occur on articular surfaces, the ends of long bones, or on the surfaces of the vertebrae or pelvis. Filleting marks are usually parallel to the axis of the bone whereas scoring would be transverse to the long axis (Binford, 1981, p. 44). A typical pattern of gnawing on a long bone would be teeth marks on the epiphyses, as bone is the softest at the ends, followed by scooping out of the marrow cavity (*ibid*). Therefore, it is important to not only look at how the mark is made but where the mark is located, taking into consideration the associated butchery action that may have occurred, such as filleting, disarticulating or skinning. Random and irregular marks are most likely not evidence of butchery.

A study by Blumenschine et al. (1996) found that problems with mimicry among cut marks, percussion marks and carnivore tooth gnawing were greatly exaggerated in previous studies. Their study conducted blind tests with novices, having only three hours of training, found that they could differentiate between cut marks, percussion marks and gnawing marks 86% of the time and those having several more hours of practice diagnosed with 95% accuracy. The study also claimed that a hand lens is sufficient for this kind of analysis and that a scanning electron microscope (SEM) is unnecessary in the majority of cases.

Gnawing was not very common on the assemblages studied for this thesis. Gnawing was noted and care was taken when deciphering what was a butchery mark and gnawing with the aid of a hand lens.

2.4.3 Post-mortem Destruction

Studies of post-mortem destruction have been successful in determining differences from butchery. A study by P.M. Aird (1985) looked at distinguishing butchery marks from other types of post-mortem effects. The study was successful in isolating the effects of butchery, as more than one taphonomic agent can affect any one bone or assemblage. Fragmentation and surface cuts were analysed in this study of faunal remains from Roman Lincoln. Broken bones were grouped into types according to their shape and then divided into factions along the medial/lateral, anterior/posterior and distal/proximal planes, the types were then plotted on drawings and edges were marked as freshly broken, chewed, broken in antiquity, or could not be determined. This study showed that butchery could be differentiated by colour and texture. For example carnivore gnawed bone exhibited a pitting and crenulated texture, fresh breaks were differentiated by colour and cut marks generally had a granular texture and straight edge.

2.4.4 Craftwork

Evidence of bone working is frequently seen on cattle metapodia, where sawing marks may be present. Cattle metapodia are useful for this as there is no meat surrounding the bone, which would be an indication that the saw marks wouldn't be evidence of butchery, and a chopper would more easily be used for marrow extraction (Lyman, 1978). While cattle metapodia are probably the most common bone used for craftwork, other elements can be used to make crafts or tools. For example at the high status site of Castlefarm in Co. Meath, Ireland, people were using pig fibula to create bone pins (Foster, 2009). Antler is of course also a prime example of animal material that would be used for craftworking. Antler was frequently used as knife handles, pins and combs during the medieval period. The early medieval period saw a decline in antler found in towns compared to the Saxon period, most likely due to the stricter hunting rules (McGregor, 1987).

Though evidence of antler craftwork was found at a variety of high-status medieval sites. Though it is important to reiterate that antler is not a definitive sign of status, as shed antler can be used for craftwork (Ashby, 2002).

2.4.5 Burning

While burning is not one of the taphonomic processes that would be confused with butchery marks, it is a process that in certain circumstances can provide a great deal of information about the exploitation and cooking of an animal. Burning can tells us about food preparation and play a factor in the level of bone fragmentation of an element. Burnt patches on the shaft of a bone would likely be more of an indication of utilising a bone for marrow extraction as opposed to roasting (Orton 2010). Roasting creates a pattern in which the exposed articular surfaces of joints are charred, while the other parts are not (Russell, 1999). Location and frequency of burning are important to note as they can hold potential social information such as how food was prepared and how refuse was disposed (*ibid*). The colour of bone can provide information on the range in temperatures that bone was reaching. Shipman's (1988) study showed that bones that were lightly heated to less than 400℃ tend to not show a dramatic change in colour and will appear neutral or yellowish. Bones heated to between 400℃ and 800℃ may appear yellow-red in colour, bones heated to temperatures above 600℃ can also appear purple or blue in colour. They found that several colours can include a range of temperatures. The bones that are heated the most, appearing incinerated or calcined will appear grey or white in colour, while a black colour may be indicative of burning, it could also possibly be a result of staining by manganese and or iron oxides. In a study by Shahack-Gross et al. (1997), the authors developed a method that would purify oxides from the bone, which would then be analysed by Fourier Transform Infra-red Spectroscopy (FTIR) which aids in determining whether a bone is burned, stained or burned and stained. Their conclusions indicated that one cannot base on sight alone whether a bone is burned. Regardless, the structure of the bone will be modified with burning and heating, as can the colour, texture, weight and robustness (Colley, 1990; Rackham, 1994). Any sort of cooking will cause the fats and proteins in the bone to break down which in result makes the bone more brittle and less likely to survive in the soil.

2.5 Quantification and Presentation of Butchery

In zooarchaeological reports there is often a lack of detailed butchery evidence, this can impact the credibility of the zooarchaeologist's interpretations. Mark Maltby (1985) argues that quantification of butchery marks and fracture patterns is vital to obtain a better understanding of carcass utilisation. Some of the problems involved with quantification are that factors such as weathering and scavenging can damage cut marks and cause further fragmentation. Differential preservation may also play a part, for example dog gnawing tends to occur on the articulations, this in effect could destroy any cut marks that may have originally been present (*ibid*). Factors such as the time available to record butchery, skill level of the zooarchaeologist, and the methods used to record are all problems that could play a part in accurately recording. Maltby (1985) stresses that it is highly important to make detailed recording of fragmentation to assess butchery evidence and make solid interpretations. More recently, during the later stages of this research, a system of recording butchery was published by Albert Fischer and Anita Cornwell (2015) that was devised with the help of a computer programmer. The method was presented as a poster at the Postgraduate Zooarchaeology Forum, and the program made accessible for other zooarchaeologists to use for free in their own research. As this software has only become recently available, it was not a consideration when conducting recording of my own case studies. The authors wanted to produce this system as they believed butchery data was getting lost or was just inaccessible to other researchers. The program is a system to record and present butchery data. There are templates of various bones with posterior, anterior, proximal, distal and medial and lateral views. The zooarchaeologists enter the data in a specialised database that is programmed with algorithms. The database adapts the data so that the dataset can be exported to programs such as Excel and SPSS. This data can then be combined to present the findings visually. Other programs such as Illustrator have also been used in the past by researchers to layer many images to depict results.

2.5.1 Velim: A Study of Butchery and Fracture

A detailed study of butchery was conducted on faunal remains from the site of Velim in the Czech Republic (Harding, et al., 2007; Outram, et al. 2005; Knight, 2002). While Velim dates to the Bronze Age it is a strong example of presenting zooarchaeological butchery data visually. Butchery marks were recorded on diagrams of cattle, ovicaprids, horse and pig. Each mark was recorded on the diagram as chop, cut or scrape and the location shown. The images were then layered to compare and show overall where the majority of the carcass separation was taking place. Fracture analysis was also undertaken, in which fracture angle, shape, surface texture and colour were taken into consideration. They were recorded as either being helical, dry, mineralised or new fractures. From the data compiled it was possible to determine where the most common modifications were on the bones. They found that cattle showed a higher number of butchery marks with the majority associated with filleting and disarticulation. The cattle remains also showed the highest number of helical fractures, which is possible evidence of marrow extraction. Taphonomic processes such as gnawing, burning and root etching were also recorded for comparison. This method of recording butchery and fracture is a simple yet detailed way to visually represent a large amount of data to get an overall understanding of the most common butchery marks and fractures.

2.5.2 Exeter: Exe Bridges and St Katherine's Priory

Another study that implemented visual diagrams to summarise butchery patterns was a review of two sites in Exeter, Exe Bridges (Levitan, n.d.) and St Katherine's Priory (Levitan, 1987). The diagrams of cattle and sheep showed all of the cut and chop marks on skeleton outline diagrams comparing the two sites. The Exe Bridges study (Levitan, n.d) additionally showed similar skeleton outline diagrams with fracture evidence. The butchery diagrams for these studies are similar to those produced for Velim including summary diagrams showing the main trends that were produced.

Butchery is a complex process that can appear in many different ways on archaeological faunal material. It is important to decipher firstly what is a case of butchery, and then look at what possible tool was used, where the marks are located and what would be the purpose of such marks. It is also necessary to consider whether there are any other taphonomic processes that could disguise or mimic butchery marks, or whether such taphonomic processes are present alongside butchery. Investigating fracture patterns can provide information such as whether possible marrow or grease extraction took place. The butchery study of the animal remains from Velim is an interesting example of how butchery marks can be recorded in order to provide an overall picture of the most common trends in butchery. By layering images of where the marks occur, it is possible to determine where the most frequent cuts, chops, and scrapes were taking place.

2.6 Interpreting Status from Animal Remains

Social status can vary cross culturally and through time, therefore understanding the criteria of what makes a group of people high status is essential. Social status is not interchangeable with socioeconomic status, as socioeconomic status connotes income level (Lyman, 1987b). In many cases the two may still go hand in hand as income can certainly impact social status. A number of factors should be considered when determining social status through the study of zooarchaeological remains. Analysis of taxonomic distinctions, abundance of domestic versus wild species, element distribution, identifying portions of meat, body part frequencies, age profiles, butchering patterns, style of butchery and cooking methods should all be addressed (deFrance, 2009; Ashby, 2002).

In medieval England, a presence of deer, pig and wild bird bones may be an indicator of higher status, as is a higher ratio of wild taxa. The wealthier classes didn’t have to raise livestock and could have the option of eating animals that produce no secondary products. Obtaining access to certain species, such as game, is dependent on social status in society, as is location and social relationships (Beglane, 2015). High quantities of deer bones can be an indicator of status such as at Launceston Castle (Albarella and Davis, 1996), Greencastle (Beglane, 2007) and Okehampton Castle (Grant, 1992), yet deer antler may not be a good indicator of high status. Antler may have been collected after shedding or the presence of antler with butchery mark is generally much more of an indicator of lower status as it is associated with craftworking (Ashby, 2002).

Identifying the portions of meat present can often provide insight into where and how an animal has been butchered. If there is a high proportion of meaty bones of a particular animal and only a small amount of cranial elements one can assume that the animals were not being butchered on site, and instead were being brought to site already butchered or partially butchered. As at the sites of Launceston Castle (Albarella and Davis 1996) and Okehampton Castle (Maltby,1982), deer bones from the hindquarter far outnumbered any other elements, again an indication that animals were most likely not butchered on site but were brought to site already dressed ready for preserving or consumption. Certain portions of meat can sometimes be given to specific people based on hierarchy. For example McCormick (2002) looked at evidence from Ireland where portions of meat were divided based on an individuals' role. At a banquet at Tara, an artisan would be given the lower shank, the royal jester would have the ribs, and a king would receive the tenderloin (p.27).

Ageing data can also suggest clues about socioeconomic status. Age profiles can show when animals were killed, whether at the optimum age for consumption or whether at a point where they were no longer economical. An example would be that peasants didn't have the luxury to butcher their animals at their optimum age, as the secondary products would be more important and the animal would be exploited until it was no longer economical for the animals to be kept (Grant, 1992), whereas the elite could butcher younger animals when their meat would be tenderer. For example at Dudley Castle, from the fourteenth century, there was a decline in the age cattle were slaughtered and an increase in the age sheep were slaughtered (Thomas, 2005). This was due to the rise of cattle dairying and an increase in urban meat demand, whereas for sheep it was for wool production (*ibid*). An increase in the number of cattle at elite homes and a decrease in the number of sheep during the later medieval period was also related to the preference of cow's milk over ewe's milk (Wilson, 1973, p. 150).

The methods by which animals are butchered can be telling of who the meat is being provided for. For example heavy fragmentation of bone can be an indication that people were extracting every possible sustenance from the bone, possibly a characteristic of a lower status way of life (deFrance, 2009). It is also important to be cautious when looking at cuts of meat, what is considered a superior cut of meat in the present day was not necessarily culturally considered in the same way in the past (*ibid*). The ways in which food is cooked could also potentially be an indicator of status. Cooking is subject to culture and the ways in which food is prepared and cooked could provide insight into social and cultural patterns (Subías, 2002). Determining how meat was prepared can be subjective because cooking increases pre and post cooking fragmentation (*ibid*). Pearce and Luff (1994) investigated whether it was possible to determine whether a bone was boiled, roasted, or was fresh bone. They found that colour was a poor indicator but found that boiled bones tended to split in a longitudinal manner and were lighter in weight and that roasted bones showed more fragmentation. Overall, cooking would affect bone preservation yet may be a process that would prove difficult to distinguish in a large assemblage with many other factors affecting the bones. Transmission electron microscopy has also being implemented to look at heat damage of collagen after mild heat exposure, though this can be affected by soil conditions at the age of an individual at death (Koon, 2003).

Geography can also play a role in regards to accessibility and availability of certain types of foods. For example, high and low status medieval urban populations may not have had such easy access to deer as the medieval high status rural populations. While upper class medieval populations would have had more influence in trading and obtaining foods such as fish, wild birds and other exotic species, a lower class coastal group may have more access to fish.

2.7 The Pitfalls of Identifying Social Status from Zooarchaeological Evidence

There are possible pitfalls of discerning social status solely based on zooarchaeological evidence. One needs to always consider the cultural context and environment. It is also important to consider if there are any preservation or taphonomic biases, or any recovery technique issues. For example if a site was excavated and no sieving was carried out, the presence of fish or bird on site will likely be diminished. It is essential that these biases are carefully considered in order to provide a logical interpretation. The Nunamiut, for example, have a particular cultural preferences for certain caribou parts depending on the season, they also make a distinction between what they consider ‘good’ meat and lesser meat which of course can be culturally different (Binford, 1978). An interesting example of a site that was known to have a gradual decline of high status was Launceston Castle, yet the faunal record shows no significant change in how they were eating (Albarella and Davis, 1996). This ambiguity proves an interesting subject and should be researched further. Researchers need to use other types of evidence in conjuncture with zooarchaeological evidence, such as historical sources and other archaeological evidence to comprehend the complexity of status as a subject of study (Ashby, 2002; Crabtree, 1990; deFrance, 2009).

2.8 The Medieval Castle Diet and High Status Foods

"Aristocratic households acted as leaders in fashions of consumption elsewhere, in monasteries, among the gentry, and upper echelons of the peasantry" (Woolgar, 2006, p. 91)

The medieval diet has been documented historically and archaeologically in regards to 'high status' dining of the period. The medieval aristocrat would have found it essential to stand apart from the lower ranks of society, they were "conspicuous" with flaunting their wealth and set the standard for the knights, gentry and those further down the social ladder (Emery, 1996, p. 2). Quality and variety of meat was important, and animals that had been hunted for meat would have played a central role in feasts as a means to visually displaying their status (Seetah, 2007). The diners of a medieval castle expected a variety of dishes on their menus and their preferences had little to do with species availability but more to do with exclusivity. Castle animal bone assemblages in the late medieval period tended to not follow patterns seen in urban and rural animal bone assemblages as they were more associated with economic means and availability (Sykes, 2006). The castle diners had the prerogative to be selective because they could base their diets on their personal preferences. Castle sites provided an excellent example of the high status diet, with species including wildfowl, fish, and venison being exploited during this time period.

Wild birds played more of a role as a symbol of status than they did in subsistence (Albarella & Thomas, 2002). Wild birds may not have always been a staple of a meal but they would have made an impression on tables and at feasts (*ibid*). A high number of bird bones have been documented at many medieval castle sites including Launceston Castle, Portchester Castle, Norwich Castle and

Okehampton Castle. Wild birds such as gannet, heron, crane, pheasant and swan are seen more frequently on high status sites, as they generally have larger bones (*ibid*). These species have larger bones than many bird species, and they are more likely to survive in deposits and to be recovered during excavation. Peacock remains have been recovered from some castle sites as they were sometimes used as centrepieces on tables at feasts (Ashby, 2002). Dovecotes were also kept at many castles with an increase of dove bones recovered from the fourteenth and fifteenth centuries (Grant, 1988). They were often kept as a ready source of meat, along with chickens and partridge. The variety of bird bone recovered gives us an indication about how far away people were obtaining their food. The presence of short winged and long winged hawk skeletons and their typical prey, partridges, lapwings, and pigeons, shows evidence of possible falconry (Serjeantson, 2006). Falconry is again another symbolic representation of high status. Birds of prey were also represented at times as emblems on crests and seals of the nobility (Creighton, 2009). In later medieval assemblages there were a higher percentage of wild birds, which would infer increased consumption (*ibid*). According to Dyer (1989) before the Black Death, birds accounted for a tenth of the diet of high status households. After the Black Death there was an increased demand for geese and capons which were sold at a high price (Stone, 2006, p.155). The increase in the amount of wild birds that were eaten by the upper class was a direct relationship with the lower classes consuming more meat, the increased consumption of wild birds was to cement their status (Thomas, 2005). The demand for birds that were popular with the elite would in effect increase the demand in other social groups.

As mentioned above fish are more likely to be recovered when sieving is implemented in excavation, but overall fish remains have been recovered from many medieval castles. For example at Okehampton Castle (Higham et al., 1982) over 3,000 fish fragments were recovered and 27 species identified (Creighton, 2002, p.15). During Lent, meat and dairy products were not consumed for the six week period. The church would also frequently designate days when meat could not be eaten outside of Lent (Grant, 1985). Though the wealthy households would find their protein in a variety of fish they would have also preserved them. Fish such as herring, salmon and haberdines were popular (Dyer, 2006, p202). Freshwater fish such as pike and carp were considered to be for the wealthier classes while sturgeon, whale and porpoise were for royalty (Ashby, 2002). Larger households and castles would often have freshwater fish ponds on their land and their own fisherman (Woolgar, 1999). It is documented that sea fish would be brought to the upper class by pack-horse for a speedy delivery (*ibid*).

Pigs were at times food of the rich and food of the poor. Pigs were common on aristocratic tables in medieval England, and were even more common in the Southwest and Northwest where there was more woodland (Albarella, 2006). The elite dined on pigs and from time to time they consumed suckling pigs (*ibid*). Likewise, during the early medieval period the Domesday survey said that "pigs were regarded as animals of the poor…" (p.79). Pigs are fairly easy to raise and are adaptable to towns, therefore they were ideal for peasants to keep (*ibid*). Pigs slowly declined as woods were replaced with arable land. The decrease in the amount of woodland also meant the availability of mast as a food for pigs was limited (Thomas, 2005).

As well as young pig, young sheep and goats were also a speciality. Roasted or stewed kid was a popular dish after Lent (Wilson, 1973, p.80). Hares were a common roasted dish to appear on the menu. Hares were more everyday food whereas roasted coneys were a speciality at feasts, both were also used in pottages (Wilson, 1973). Rabbits were reintroduced back to Britain from France in the later medieval period, as they temporarily disappeared in the early medieval period (Wilson, 1973). It is believed this reintroduction occurred during the thirteenth century (Warner, 2001, p.102). Man-made rabbit warrens were often set up by the elite in the later medieval period. The warrens themselves were considered an elite status symbol of the landscape (Williamson, 2008). Rabbits were often exchanged as gifts for those of high-status for setting up warrens of their own (Creighton, 2002). To avoid rabbit poaching these warrens may also have been fortified, as rabbits were not only desired for their meat but also their fur (*ibid).* It is documented at Portchester Castle that the king had a rabbit warren in Kingsden spread over 24 acres (Cunliffe and Munby, 1985).

Venison was a popular choice for the aristocracy. Venison can be considered a high status food for a number of reasons. More rural medieval castles are often located on or near a deer park, therefore they would be more easily accessible to the elite. More importantly there is a prestige in the act of hunting deer and it would be held in high esteem; deer were considered “pride of place” over wild boar and wolves (Warner, 2001, p.1010). Peasants would not be allowed to engage in hunting. Up until the Saxon times, hunting could be conducted by all classes, but that changed when the Kings enforced regulations of ownership on land and animals (Wilson, 1973). Deer poaching was an issue for many park owners as peasants would seek an opportunity and lay snares (Birrell, 1992). Deer poaching is another indication of the value associated with deer, and the want to have what the upper classes could obtain easily. According to Drummond (1958), poaching laws were not tightly enforced until around 1650 when tighter laws came into effect, yet according to Grant (1988), the upper class went to extreme lengths to protect their deer and enforced penalties of death for poaching. Smith (2009) regards poaching by the peasantry as a “resistance activity” against the elite classes (p.406). Smith suggests that in a small village, deer poaching would not have been able to be kept a secret; therefore hiding this kind of illegal activity would have proved difficult if the peasantry had not allied together in rebellion against the elite (*ibid).*

Deer farming was taken seriously but was not commercial in being produced for the market (Birrell, 1992). Deer would be hunted according to the season when the meat would be at its best. It would be stored in larders and salted, the quality would depend on the length of time it was stored and how much it was salted (*ibid*). It was a popular meat to be consumed in the winter months as it would have been preserved and stockpiled (Drummond, 1958). At Barnard Castle and Okehampton Castle deer remains were as frequent as those of pig, cattle and sheep combined (Grant, 1988). Venison was very popular in the castles, yet the proportions dropped in the late fifteenth and sixteenth centuries.

In medieval society the majority of the parts of an animal would be utilised in some way in the cooking process. Meat drippings used as cooking fat, stews made with liver, heads and gizzards of chickens and bone marrow used to make broth and enrich tarts (Henisch, 1978). Marrow was also put into pies and added to stuffing (Wilson, 1973). Brawn was often sliced like sausage and meat jelly made from calves’ feet was also used (*ibid*). The heads of wild boar were a presence on tables and their brawn evolved into a traditional Christmas dish (Wilson, 1973).

A particularly impressive meat dish that would have been saved for the most exclusive parties was a manufactured creature of sorts. A capon and a pig would be cut in half and sewn together, the front of one with the hind of the other. It would be filled with stuffing and then roasted (*ibid*).

Refrigeration was obviously not an option during medieval times therefore preserving food was a priority. Besides the sheer variety of species consumed being a marker of status, fresh foods were also considered a status marker. Household accounts have shown that the flesh, or skin, of the boar was usually eaten fresh and the meat salted or kept in brine and preserved in barrels (Woolgar, 1999, p.116). An example mentioned in Woolgar (1999) comes from Goodrich Castle in which 81 pigs were slaughtered as soon as people arrived at the castle. On the second day they would consume four chines, which is the backbone and adjoining area, and the entrails of four pigs. The presence of chines shows seasonality. It is documented that a feast took place on 25th of November, the feast of St. Katherine's, in which 28 chines would be consumed. Household accounts document that a large portion of the remaining slaughtered pigs would have been preserved for 5 or 6 months, through the period of Lent (p.117).

Historical records from an upper class household document that they consumed 45.5 beef carcasses, 64 sheep, 3 lambs, 53 pigs, 1 boar and 32 piglets in a year (Woolgar, 2006, p.91). They consumed an excessive amount of meat, particularly after the Black Death. In an elite household it was approximated that an individual would consume 1.84 lbs of beef, 1.28 lbs of mutton in just two meals of the day *(ibid*). Their diets were reliant on substantial amounts of animal fat and protein (Drummond, 1958). Some of the foods we eat in the modern day were influenced by the medieval diet, such as turkey or goose at Christmas and dried fruit cake (*ibid*). Though the medieval diet went through certain fads, foods that we would consider healthy today were considered indigestible and unappealing, such as fresh vegetables, whereas other food which we would not even consider consuming were thought to have beneficial and aphrodisiac properties (Warner, 2001). Eels were considered a favourite, particularly with royalty (*ibid*).

Simple pottages such at porridges and soups were consumed by higher status people and peasants alike (Hieatt, 2002). Dishes such as frumenty, which is a wheat porridge, and thick pea and bean soups were also consumed (*ibid*).

Medieval evidence for the use of spices in food is documented in the Lacnunga (Pettit, 2001) a medical recipe book that contained recipes for ailments, which does mention the use of a few spices to be used in dishes, which included pepper, cumin and ginger.

The inhabitants and visitors to medieval castles had endless choices in the foods they could indulge in. The lavish meals would have been quite a spectacle and would have surely impressed important guests. From historical and archaeological records we can see the scope and variety of animals the elite were consuming. Preference over availability is evident and varied greatly from the diet of the peasant.

2.9 Documented Trends in Medieval High Status Butchery

A common feature seen in medieval high status assemblages is the more frequent presence of chop marks, this suggests the use of heavy chopping tools whereas in Roman and Saxon times the presence of knife marks is more prevalent (Grant, 1985). A butchering technique that did not appear in high status assemblages until the late eleventh to twelfth centuries was a carcass being hung up and divided in half (O'Connor, 1982; Sykes, 2007). This technique coincides with a documented higher proportion of cattle and sheep meaty bones included in high status assemblages (Sykes, 2006). This suggests that people were starting to obtain their meat already butchered (*ibid*). The dominance of meat bearing elements was also apparent at Okehampton Castle, suggesting animals were butchered elsewhere and skull, mandible and extremities were discarded elsewhere also (Maltby, 1982). A method that is commonly seen in assemblages from the fifth to eleventh century is splitting of long bones. The long bone is split down the length of the marrow cavity, interpreted as a preference for soups and stews (Sykes, 2006). There is also evidence that suggests there is a higher percentages of burnt bone present at high status sites, which may be an indication of roasting, as this was considered more costly and boiling more efficient (*ibid*).

2.10 Medieval Castle Examples

Zooarchaeological reports can be written in many different formats. Some authors chose to focus on the data and less on the hypotheses and interpretations, while others give full detailed accounts of the results from the compiled data. Butchery is frequently brushed over and not always documented in detail in such reports. The subject may be mentioned in regards to the number of occurrences, the type of mark, or the tool used but reports often lack any detailed interpretations. In commercial archaeological reports there may be a limited time and a limited amount of money to produce the animal bone reports which can consequently cause restrictions in content. The following section will look at some examples of animal bone assemblages from five medieval castles across England and compare and contrast how the data was reported and the results presented and interpreted. The sites were selected as they are examples of urban and rural medieval castles.

2.10.1 Baynard's Castle

Baynard's Castle is a good example of an urban medieval castle assemblage. Located in London on the edge of the Thames, the faunal assemblage comes from three rubbish dumps dating from the mid fourteenth century until around 1520 AD. The analysis, conducted by Philip Armitage (1977) for his PhD thesis, includes a fairly detailed account of butchery. He includes diagrams of cattle, sheep, pig, red deer and fallow deer, showing locations where marks made by choppers or cleavers were located on the skull or long bones. There was a presence of fragments of skull, metapodials and phalanges of sheep and pig, providing strong evidence that butchering of these animals occurred on site. The head and extremities of the limbs of the animal were removed during the dressing down stage and would not have been present if they were to have been butchered at an alternative location. Armitage goes on to explain that animals were not supposed to have been butchered in the city as there was a parliamentary ordinance that forbade people to do so. There was significant evidence from the site that showed primary, secondary and tertiary butchery of cattle. The horns were removed and carcasses were skinned; knife marks around the ends of the metapodials were an indication of this. There was evidence of disjointing in which joints were “crudely” removed from the carcass. Interestingly Armitage goes on to explain that “only a few of the bones with chop marks can be ascribed to known joints of meat” (Armitage, 1977, p. 136). The chop marks on the middle segment of the ribs was the cut that we would likely see in the present day. There was evidence of quaternary butchery in the form of marrow extraction. There were large numbers of spiral fractures and straight edge breaks seen in the assemblage. Sheep followed a similar butchery pattern to cattle, the only noticeable difference is that disjointing was carried out with more finesse and precision for sheep. This consequently meant that the defined chop marks, unlike with cattle, did closely resemble the modern cuts of meat that we would see in our butchers. The evidence for pig butchery was also along the same lines, the carcass would have been split in half and hung up to carry out the butchering process.

Two of the rubbish pits where the animal remains came from were from inside the castle wall, with the third being just outside the walls. The pits were used to try and gain some perspective on status and diet, and if any differences could be observed in what city people and nobility were eating. One observation was that the cattle remains from the castle pits were all large in size whereas the cattle from outside the castle were mixed in size. The explanation the author provides is that the castle pits may have been from refuse from one or two months, and the cattle that would have been provided to the castle may have been from the same farm or herd. Kill off patterns were rather random and may show that people were eating old and young animals.

Unlike a lot of specialist reports on animal bone assemblages, Baynard’s gives a fairly comprehensive account of the butchery techniques and shows the reader visually where these marks would be on the butchered animals. The author provides logical interpretations of the evidence, and even tries to manipulate the butchery evidence to see whether it was possible to determine the cuts of meat that people were favouring; an idea that would be interesting to explore in further detail. He also comments on the presence of fractures and the evidence of marrow extraction, which would be a topic that could be explored and analysed a little more in depth.

2.10.2 Dudley Castle

Dudley Castle, in Dudley in the West Midlands, was excavated between 1983 and 1993, and the animal bone studied by R. Thomas (2002 and 2005). The findings from this assemblage are detailed and extensive as it was the topic of Thomas' PhD thesis and later a BAR volume. The report examines how we can gain insight about economic and social status of the people of Dudley Castle by analysing the animal bones deposited on site. The report gives percentages on the number of butchery marks present in each of the species collected and then divided down into the type of butchery mark. Unlike at Baynard's Castle, illustrations were not provided on the exact locations of the marks but summarising interpretations were provided. Some of the 'high status' characteristics are observed here such as a strong presence of pig and deer, and a prevalence of birds such as heron, peafowl and woodcock.

Cattle were the most abundant species and from the archaeological evidence they were imported as complete carcasses. The butchery marks found included signs of dismemberment and skinning, with only three examples of possible craftwork. There were a high proportion of atlas and axis chops and chop marks on the mandible which are signs of decapitation and marrow extraction. The slaughter pattern of cattle was somewhat interesting as they seemed to be slaughtered at an older age when they were no longer required for work. It was dually noted that the age slaughter pattern decreased as there was a rise of horses being used for ploughing, consequently showing more reliance on beef. Sheep were primarily kept for wool, though there were butchery marks on 32% of the sheep bones recovered. Pigs do not produce secondary products therefore they were slaughtered as juveniles or subadult stages. Thomas did note an interesting change in pig management between the early medieval period and the fourteenth century. During the early medieval period it was possible to keep pigs in the woodland areas, yet from the fourteenth century, sty farming became more common which meant that fewer pigs could be kept. There was further evidence for butchery of horse, deer and birds.

The evidence from Dudley Castle provides an insightful look at how animals can represent social status and how butchery evidence can paint a picture of the species that were being exploited in a medieval castle. The report does detail the species present, the percentages of bones with butchery marks and the type of marks on the butchered bone, but it does not fully interpret the evidence, such as why were animals being butchered this way and how this may be reflected socially. Some of the questions that Thomas poses would be interesting to study further and apply to this research. For example, the author questions whether the fluctuation of money at the castle affected the types of animal consumed or the way in which they were exploited. Thomas also explores the idea of how animals may have been used to negotiate social relationships. In comparing multiple assemblages from different locations and social ranks, these questions could explore a multitude of ideas and contrasting trends.

2.10.3 Southampton Castle

Southampton Castle, in Hampshire, is an urban castle, excavated in various stages in the 1960s and 70s, and the animal bone was reported on by J. Bourdillon (1986). The assemblage from Southampton Castle was not as large as the previous assemblages discussed, yet from the evidence some of the same high status patterns are still apparent. Bone was recovered from castle contexts, castle ditches and an area just outside the castle, Maddison Street. The deer bones present were the meaty joints and show various signs of butchery. There was evidence of wild birds such as raven, gull, crow, but poultry was low in number. There was only a small amount of fish bones recovered, but this is most likely due to the lack of sieving during excavation. The butchery was noted as being very fine and professionally undertaken, a “high quality” of meat preparation (*ibid*). The author also noted an interesting finding, it was found that for cattle there were a high number for young cattle and old cattle, yet the prime meat age range was not well represented. It is unclear in the report as to why this was the case. It could possibly be because the remains of slaughtered animals were dumped elsewhere or that they were not as reliant on cattle as their main meat source as most medieval castles seemed to be. The author also mentions the size of animals, noting that sheep and cattle were small. While the report was short overall having only 2937 fragments, mainly recovered from Maddison Street, where butchery marks are located and exactly how many were observed is absent from the report. A visual interpretation of where the marks are located and which tools were used would have been beneficial to this report, as it specifically emphasises fine techniques and a high quality of meat preparation, yet does not support this with quantitative or qualitative data. As the assemblage was not as large as some of the other medieval castle assemblages discussed, the smaller amount of butchery evidence may not have been sufficient enough to make any detailed interpretations.

2.10.4 Castle Rising Castle

The castle is located on the south side of the Babingley River in the village of Castle Rising in Norfolk. The animal bone report for Castle Rising Castle was by R.T Jones et al. (1997) and the fish bone report was by Alison Locker (1997). The animal bone report gives standard NISP (Number of Identifiable Specimens) and ageing information, yet lacks any kind of interpretation of the data for the main species. There were a large number of bird bones including 1348 chicken fragments, there were also swan, heron, pigeons, corvids, spoonbill and waders recovered. There were also large numbers of fish bones from the medieval kitchen waste. A variety of species of fish were recovered, including roach, perch, trout, cod, ling, eel and smelt. Eel and smelt are migratory estuary fish, and their presence may be an indication that the kitchen was being supplied by a fishery (*ibid*). The butchery evidence is not shown in a visual manner, yet the report describes the occurrences of butchery marks according to species and element for those that are identifiable. The mammal bone butchery information is included as supplementary information on an accompanying microfiche. There are no accompanying interpretations about the butchery mark observed or any diagrams or detailed tables.

2.10.5 Launceston Castle

There were 9,000 bones and teeth recovered from Launceston Castle ranging in dates from the thirteenth to seventeenth centuries. Launceston Castle is located in Cornwall on the River Kensey. The animal bone report was written by Albarella and Davis (1994). The report gives a detailed evaluation of the animals present on site and gives insightful interpretations about species frequencies and husbandry changes over time. There was a high prevalence of deer present, particularly hind limbs, again an indication that deer were being brought to the site already detached from the pelvis (*ibid*). The assemblage had a wide variety of birds present, including the presence of crane and Manx shearwater. In the later period of occupation 1660-1840, there is a shift in diet, what the authors' state as a more "urban" diet as the castle declined in status (*ibid*). Pig became less important and the number of high status species decreased. The section on butchery explains which species showed signs of butchery and whether they were chop or cut marks. The majority of the bird bones and artiodactyl bones showed signs of butchery, with a few cases of cattle and horse butchery. The report goes on to highlight this significance by giving examples of horse flesh consumption in other parts of Europe. There are no diagrams of butchery marks on animals and only brief interpretations of butchery patterns. The report discusses the presence of chop and cut marks yet it does not make any quantifications about the percentages of butchered bone or quantities present per element or taxon.

2.11 Gaps of Research and Areas of Interest Pertinent to Study

The majority of zooarchaeological reports are restricted in what content can be provided, whether financial constraints or time limitations. In these reports, butchery is often a short concise paragraph summing up the types of marks present and the frequency of such marks. An in depth study of butchery would provide another angle on comparing dietary preference, that would have previously been looked over. Analysing which species are present is a basic building block to understanding which animals are present and/or exploited on site. Yet to understand how these animals were being exploited, butchery analysis is imperative. Butchery analysis can help us understand preferences in what people were choosing to consume and how those animals were being slaughtered.

Ideas initially addressed in the literature and zooarchaeological reports will be explored further in depth to aid in answering the research questions. I plan to look at the ways in which an animal is butchered and the idea drawn upon by Armitage's (1977) concept, that was briefly mentioned in the report on Baynard's Castle, of whether it is possible to determine the specific cuts of meat by collating where the most common butchery marks appear on an animal. I want to apply a similar method as used by Harding et al.(2007) at the site of Velim, to show how visually representing where butchery marks appear, is possible to show where the most common cuts would have been and the way in which they have been carried out.

The first step will be determining if there are any significant changes between butchery practices and species exploitation in medieval castle assemblages, and what are the observable trends? What does this imply about dining habits within the different contexts? The original zooarchaeological reports will be consulted and then analysis of the bones that show evidence of butchery and the location on the bone that the butchery marks appear will be recorded. This research aims to go one step further, not only to present the evidence but to show the changing trends. An aim is to see whether the patterns in species distribution and butchery styles are visible over all of the medieval castle faunal assemblages that will be studied or whether patterns can be observed. As mentioned in the previous section about the pitfalls of observing social status from zooarchaeological remains, an interesting topic to further explore would be the idea of whether, based on historical evidence, status correlates with the faunal evidence.

2.12 Butchery Processes and History

Butchered bone can provide a wealth of information about activity, behaviour and cultural practices. The marks generated can provide insight into how animals were butchered, prepared and consumed. This section will look at how to distinguish butchery marks and their associated activity. It will also discuss specialised butchery and butchery variation highlighting two medieval urban examples. The role of the butcher’s guild will be discussed and the impact it had on regulating the butchery industry and setting standards for butchers and the meat they were preparing and selling.

2.13 Butchery Marks and Associated Activity

Seetah (2006a) is a useful text that highlighted the importance of using butchery data integrated with implement usage. The type of butchery marks one would see on archaeological animal bone were analysed followed by the discussion of activity/function that would be a consequence of such marks. The paper is an in depth and detailed look at butchery mark types and the evidence left behind. For example those marks left behind by a cleaver/chopper would produce a smooth surface on the cancellous bone at the point of impact (Seetah 2006a p.7).

Other butchery marks present on bone were identified as:

Slice- V cross-section, short cut mark.

Point insertion mark- Only blade tip is used, obvious entrance and exit marks.

Blade insertion- Smooth entrance/exit points.

Scoop- Where the blade has been used along the length of a bone, a type of blade insertion.

Knick- Small mark found where bone is more complex (ex. distal humerus).

Saw- Clear striations present (ex horncores, metapodia).

The activities that go along with these marks are key as the marks are evidence of the function carried out on a carcass. The activities identified in the article include:

Skinning- Point used to puncture skin, or tip used to fillet flesh from muscle attachments. Cuts usually found around lower limbs, phalanges, and skull.

Disarticulation- Marks on joints and joint articulations.

Portion/jointing- Removing muscles from the bone and dividing carcass.

Paring/meat removal- Marks result of removing small pieces of flesh from the bone.

Filleting- Similar to paring, mainly using the blade tip, common of bones such as vertebrae and scapulae.

Bone breaking/pot sizing- Characterised by more than one cut surface (ex. ribs having cut marks at both ends).

It is necessary to be able to correctly identify the type of mark present on a bone in order to be able to narrow down the type of activity carried out. It is also helpful to be able to identify which tool created the type of butchery mark. Distinguishing marks made by a knife and marks made by a cleaver can sometimes be precarious as cleavers can also produce light cut marks not just heavy chop marks. Light cuts by a cleaver can be a result of less force being applied or perhaps because once the cleaver has gone through the flesh of an animal that is the resulting mark left behind (Rixon 1989). It should also be emphasised that the vast majority of cut marks that would have occurred on a carcass would not necessarily be visible archaeologically as these marks would have been left on the cartilage or periosteum of the bone which would not have survived in the archaeological record (Rixon 1989).

2.14 Tools Used for Butchery

2.14.1 Knives

Medieval knives were forged with a combination of steel and iron, and as steel was very expensive, usually minimal amounts were used (Goodall, 2001). The addition of steel to knives increased durability, resulting in knives having to be sharpened less frequently and increased the complexity of the tools from those produced in the Roman period (Seetah, 2007). Some of the knives used include whittle tang knives and scale tang knives. Whittle tang knives were practical and used throughout the medieval period, whilst scale tang knives were more expensive to produce (Goodall, 2011). Scale tang knives were flattened to fit in the knife handle, while whittle tang were formed in to a funnel shape to fit in a handle (Goodall, 2011). Smaller knives were generally used for preparing carcasses and for consuming food (Frantzen 2014). Knives also held a symbolic value with many people carrying a knife, and knives also appeared as common grave goods (Frantzen, 2014).

2.14.2 Saws

Saws were mainly used for craftworking and not frequently implemented for butchering carcasses of meat in the medieval period. Sawing marks are commonly found on horncores, antler and sometimes on metapodia. Occasionally saw marks do appear on other bones. Though the question is, why would saws be used to cut meat when knives and cleavers were freely available? One of the answers may be that butchers did not want to fracture the bone due to aesthetic requirements (Seetah, 2004, p.24). Saws are also not the most practical tool to use for cutting through dense long bones for example, as they would become more easily blunt and it would be more time consuming to use a saw opposed to a cleaver. Saws were not ideal for cutting through tissue either as the teeth would become clogged (Seetah, 2006b). Most iron saws would have been used for wood working or stone working.

2.14.3 Cleavers

During the Roman period cleavers were used for both slicing and chopping unlike in modern times (Seetah, 2006b). Cleavers are used frequently to butcher carcases in the medieval period to disarticulate joints. Historically they would have had suspension hooks on the blade or handle and the handles would have either been solid or have whittle or scale tangs (Goodall, 2011). Cleavers were also often depicted in medieval art as having riveted handles. Riveted handles made a cleaver more durable and using steel as a component of the blade, made it last longer (Seetah, 2007).

2.15 Specialised Butchery

Specialised professional butchery generally occurs in more urban areas as there would have been higher demand for meat and more demand for employment of a full-time butcher (Albarella, 2004). As a full-time butcher their skills would have been more honed and specialised resulting in more standardised butchery practices such as carcases being hung up and split longitudinally down the centre of the spine (Albarella, 2004). These specialist butchers who are dealing with many animals will have methods that are most likely distinct from repetition (Maltby, 2007). It can also be assumed that a professional full-time urban butcher would require a certain amount of space, and a standard set of tools and equipment would be required to carry out such tasks. Sturdy equipment would be required to hoist a large cattle carcass in order to slaughter it by splitting the animal into two halves. In the eighteenth century it was common for carcasses to be suspended from a “beef tree” which supports the animal and enables the butchery to be able to split the carcass (Rixon, 2000, p. 195). Specialist butchery occurred due to a number of possible contributing factors. Jervis (2012) highlighted factors such as the rise of wealth of the urban population and the need to divide a carcass due to craft activities as such reason for specialisation (p. 472). The author also suggests an interesting point that '…butchery provided the ability to enact meat as a mediator of social hierarchy through the differential consumption of meat joints, both within and between households' (p. 472). This point relates back to the idea that meat and animals are in many ways material culture that embody the idea of hierarchy and social status in both elite and non-elite households. Furthermore this idea can be applied to the specialisation of butchery practices as butchery itself is a form of material culture that can emphasise these differences of urban versus rural, and elite versus non-elite groups.

2.16 Butchery Variations

There are immense variations in the way animals are butchered between the medieval period and the way carcasses are butchered today. Whole carcasses are not usually butchered in butcher shops anymore and modern butchers rely on electric saws to divide a carcass instead of knives and cleavers in the past. Regional and cultural variations in the way carcasses are divided into joints can vary drastically.

In Swatland's (2000) book 'Meat cuts and muscle food' patterns of meat cutting were defined for beef, pork, lamb, fish and poultry based on ethnic and regional differences. Many of the examples in the book are from within the past hundred years, yet what is considered a choice cut of meat can vary drastically. The way beef is cut in Liverpool in the twentieth century, even varied from the way it was cut in the West of England. Beef was cut in to 11 cuts in the West and 13 cuts in Liverpool, with Liverpool favouring a wider variety of rib cuts (Swatland, 2000, p. 63). It is important to look at butchery trends, taking in to account regional and cultural variation, from other medieval sites to compare and contrast such trends from those observed in the case studies that will be examined in this research.

2.16.1 Variations in Butchery in Medieval Exeter

While the animal bone from Exeter was not recovered from a castle site, the butchery evidence from medieval Exeter was more detailed than most butchery studies dating to the medieval period. The butchery evidence was not visually presented in diagrams but a solid amount of detail was provided about specific marks and trends observed. The following butchery evidence is documented within Maltby's (1979) study of the medieval animal bone from Exeter.

Butchery to the mandible included marks around the dorsal condyle which was probably associated with detachment of the skull and removal of the tongue.

Long bones cut marks were common on the long bones and disarticulation of the forelimb at the scapula was a usual occurrence. Knife cuts were present on the distal humerus, the proximal radius and ulna in all periods. The marks on the radius and ulna are signs of the removal of meat from the elbow joint, the radius was also frequently broken transversely at the mid-shaft which is possibly a sign of marrow removal which is also observed on the metapodials. There were chop marks present on the proximal femora indicating a disarticulation from the hip.

2.16.1.1 Sheep and Pig Butchery

The sheep bones were very fragmentary but the most common butchery marks were chops to the mid-shaft of the tibiae, which is a fairly common practice today, and chops to the distal humerus (Maltby, 1979, p.53). The radius would have formed a separate joint but possibly the meat was used for stews. For pigs the marks were similar to those seen on the sheep remains. There was no evidence of vertebral splitting down the axis of the spine until the sixteenth century (Maltby, 1979, p.54).

2.16.1.2 Vertebrae Butchery Practices

The practice of longitudinal splitting of the vertebrae was uncommon at Exeter until the post-medieval period. Before this time period the vertebrae were cut transversely. This suggests that the change in this practice probably indicates that by the sixteenth century it was common policy to butcher the carcass into sides of beef. Before that date, the trunk of the body must have been cut transversely along the flanks of the animals (Maltby 1979, p.39).

2.16.1.3 How Meat was Butchered and Sold

It is believed that animals were driven to Exeter on hoof and then slaughtered, though as discussed above there was a change in the sixteenth century in that carcasses were divided into sides of meat and their head and feet removed (Maltby, 1979, p.40).

There was also a decrease in the number of skull fragments in the post-medieval period which may indicate a change in butchery practices. This shift may be due to outside butchers coming to the markets for a certain amount of time, a day or two a week, and therefore bringing dressed carcases into the town having butchered them before (Maltby, 1979, p.87).

2.16.2 Butchery Techniques from the French Quarter of Southampton

Another significant medieval urban animal bone assemblage was the bone from the French quarter of Southampton documented in Brown et al. (2011). Approximately 10-20% of the bone showed evidence of butchery marks, with knife marks being the most common evidence and cattle limbs being the most common elements exhibiting butchery marks (Bates 2011, p.227). A few findings observed were marks on the cranium showing evidence of decapitation and cutting of the cheek muscles, some cattle metapodials were split for marrow extractions with marks occurring at one end of the bone (*ibid*). For sheep remains the same pattern on the skull was observed, chop marks were observed on the diastema, another sign of marrow extraction. Removal of horncores and skinning evidence were prominent in the medieval period on sheep remains. Pig butchery marks were relatively infrequent but there were a few marks to the skull relating to removal of the tongue and brain (Bates 2011, p.227).

The way that meat is supplied to urban areas can often be seen through body part representation and the way an animal is butchered. In the late medieval period in Southampton, butchering was going on in butcher's shops. There was also an increase in mutton in the late medieval compared to the early medieval, which was most likely a result of the wool industry and a surplus of sheep.

2.17 Butcher's Guilds

It was in the medieval period that the number of butchers increased in urban and rural areas, and landscapes adapted to pasture land to deal with the meat need (Dyer, 1998, p.67). Butchers guilds were an integral part of upholding good standards for butchery in the medieval period. It was in the 1300s when the guild of butchers was established (Seetah, 2007). This set standards and regulations for apprentices and training, rules and penalties for the selling of poor quality meat and became a regulatory body by setting standards for cutting practices (Seetah, 2007). There were also regulations of where meat could be sold, for example in Norwich in 1441, butchers were forbidden from selling meat anywhere except the market (Woolgar, 2016, p.68).

Punishment for selling meat that was not of standard could be severe. One of the punishments resulted in the butcher being placed in the stocks (Seetah, 2007). According to the York civic ordinal of 1301, butchers may not sell meat that they did not slaughter themselves and could be imprisoned for forty days (Prestwich, 1976). The ordinance also stated that if a butcher was found guilty of this, the poor quality meat would be given to the lepers and the fresh meat would be sold but the money would go toward the city's profit (Prestwich, 1976).

Butchers were known to have strong associations with royalty and the nobility (Seetah, 2007). These relationships would have been important to the high classes in guaranteeing that they were obtaining the highest quality meat.

2.18 Summary

The above background information shows firstly how to recognise what is a case of butchery on animal bone material, and how the marks can correspond with the particular actions of butchering an animal. The method of analysing butchery patterns highlighted at the site of Velim (Harding, et al., 2007), provides an insightful and comprehensive way of visually representing on diagrams, of animals, the manner in which those animals were most frequently butchered and the implications of those butchery patterns.

Methods of interpreting status from zooarchaeological remains are also discussed, factors such as species distribution, identifying portions of meat, methods of butchering and ageing profiles. Culture and environment as well as any recovery or taphonomic biases need to be taken into account when piecing together interpretations.

The high status medieval diet is one of luxury and choice. Diners of medieval castles could indulge in a wide range of species, including deer, wild birds, fish and pigs to name a few. They were the envy of the lower classes and led in what was fashionable in terms of sporting activities, like hunting, and the elaborate meals that were on their tables.

The literature discussed here will aid in piecing together the author's own research and highlighting ideas of interest that are pertinent for future study. This study will utilise butchery and taphonomic evidence to gain a more detailed perspective on species exploitation and consumption.

The study will veer away from the standard zooarchaeological report and present more detailed butchery interpretations. In delving into the historic background of medieval castle life, it will be important to draw upon the social importance of which animals people were consuming and the manner in which they were consuming them. The high status medieval diet has been discussed in terms of historical sources and zooarchaeological reports. The aim of this research is to utilise what is known about the high status medieval diet and compare the data from medieval castle animal bone assemblages to determine whether the same patterns appear. This data along with the author's own research of butchery patterns will be analysed to see whether there is a significant social or fashionable change in diet between sites.

Cut placement and activity should be taken into consideration when conducting an in-depth butchery study. The integration of both can provide a better understanding of what actions were carried out on a carcass. The variations in butchery styles need to be carefully examined when comparing multiple studies. The introduction of the butcher's guilds provided a system of regulations that revolutionised the way people were obtaining their meat.

Chapter 3: Methodology

As discussed in chapter 2, butchery marks do not appear on the majority of bone fragments in an archaeological animal bone assemblage. Therefore it is vital to document the instances when these marks do appear and the type of butchery marks that are present. Butchery can be interpreted as a form of material culture in that we can learn about the butcher's skill level, methods and what cuts of meat are generally favoured by a group of people. A highly skilled butcher may produce few or no butchery marks when dismembering a carcass, hence it is imperative to record any physical indications of animal exploitation. While methods of butchering can differ depending on the skill level of the butcher, societal differences of groups consuming the meat and geographic location may also play a factor. As previously discussed in chapter 2, the social status of a group of people can be inferred from a number of factors associated with the faunal evidence of their food waste, such as the variety of species present. The methodology aids in facilitating the investigation into whether there were apparent social changes in diet and changes in methods in the ways animals were slaughtered for castle diners and urban centres.

Identifying patterns of butchery can help interpret how an animal was slaughtered and exploited. By looking at such patterns in terms of context, a better spatial understanding can be recognised. This spatial analysis can provide insight into where animals were being slaughtered, and what the osteological remains were a result of, whether primary butchery, kitchen waste or perhaps craftworking.

Most of the assemblages that were implemented in the study were analysed in previous studies and have standard published zooarchaeological reports written. These reports contain species presence within contexts (NISP), therefore in these cases only the material that demonstrates signs of butchery were recorded in detail. Firstly a review of the initial reports was undertaken to gain an overview of the type of species making up the assemblage and any comments originally reported on about butchery and other taphonomic changes by the zooarchaeologists. Comments on butchery were taken into consideration, but were closely studied to detail whether the comments were also verified by this research.

A full zooarchaeological study of Edlingham Castle needed to be carried out with the methodology for the analysis detailed in chapter 5 in conjunction with the following detailed butchery methodology.

3.1 Methods

3.1.1 Recording Procedures

The faunal remains that present evidence of butchery are initially recorded in a Microsoft Access database so that each fragment could be assigned a record id, species, bone type, side and epiphyseal fusion state. There was also a notes section on the database to record more detailed descriptions of butchery. Access was more heavily implemented for the Edlingham Castle case study as the assemblage had not previously been recorded, and that specific methodology is detailed in Chapter 5. Bones were analysed with a 10x magnification hand lens for identification of finer and smaller cut marks on the bone surface. References to Hillson (1992), Schmid (1972), and von den Driesch (1976) were used where needed for identification of species, as was the reference collection at the University of Exeter. Vertebrae and ribs were attempted to be identified based on a size basis and use of a reference collection. Burning was recorded on butchered fragments Evidence of burning can provide details about what temperatures the bones were reaching based on colour and texture, which can also be an indication of possible marrow or grease extraction and cooking procedures. The burning data collected was so small that is was not deemed worthy of quantification.

3.1.2 Usage of ArcGis

ArcGis was implemented as a tool in the methodology as it is a practical and visual method of representing and mapping large data sets through a visual medium. The templates used in this study were those designed by Michael Coutureau (Yvinec, et al., 2007) and converted into shape files and implemented by David Orton (2010) to display and disseminate anatomical data. The diagrams were designed to treat skeletal data much like a map so that data can be displayed visually and further manipulated. Using ArcGis allows the user to link data to the templates, view frequencies and view butchery and taphonomic variables (*ibid*). The template files also enable the user to display the data by element and/or portion.

The only template used for each species was the elements template, which is a representation of the skeletal elements with each element/portion as a separate feature. For the purposes of recording butchery, the element template was the only necessary layer needed. Templates were used for cattle, sheep, deer, and pig. The ArcGis templates were adapted so that bones were divided up into several sections so that identifying butchery pattern locations would be more detailed and clear. Each bone was assigned a compcode, and then in order to adapt and advance the templates to be more beneficial and specific for recording butchery, further partcodes were assigned to those areas by cutting the polygons (bones). This allowed for the recording process to be fast and efficient as the code can be directly entered into an Excel worksheet and the appropriate butchery mark(s) (cut/chop/sawn) present can be recorded. For cattle and sheep the majority of long bones were divided into two sections for the proximal end, two sections for the shaft and two sections for the distal end (see table 1). This was so that identifying the location would be more accurate and identifying patterns would be clearer. Deer and pig long bones were divided into just three sections, proximal, distal and shaft, as there were far fewer butchery marks recorded for these species and unnecessary to have as many zones. If several chop/cut marks were found in the same zone of one bone that it is recorded as multiple marks.

ID	Element	Portion
0	antler	
1	skull	
20	mandible	mandible
20.1	mandible	mandible hinge
22	horn core	horn core
26	atlas	atlas
27	axis	axis
28	cervical vertebra	
29	thoracic vertebra	
30	lumbar vertebra	
31	sacrum	
32	caudal vertebra	
33	rib	rib
34	costal cartilage	
35	sternum	
36.1	scapula	articulation
36.2	scapula	blade
38.11	humerus	upper proximal
38.12	humerus	lower proximal
38.21	humerus	upper shaft
38.22	humerus	lower shaft
38.31	humerus	upper distal
38.32	humerus	lower distal
39.1	radius	proximal
39.21	radius	upper shaft
39.22	radius	Lower shaft
39.3	radius	distal
40.1	ulna	Proximal
40.2	ulna	distal
41	carpals	
57.1	metacarpal	proximal
57.21	metacarpal	upper shaft
57.22	metacarpal	lower shaft
57.3	metacarpal	distal
70.1	pelvis	Illium upper
70.2	pelvis	Illium lower
71	pelvis	Ischium
72	pelvis	pubis
74.11	femur	head
74.12	femur	upper proximal
74.13	femur	lower proximal
74.21	femur	upper shaft
74.22	femur	lower shaft
74.31	femur	upper distal
74.32	femur	Lower distal
75	patella	patella
76.11	tibia	upper proximal
76.12	tibia	lower proximal
76.21	tibia	upper shaft
76.22	tibia	lower shaft
76.31	tibia	upper distal
76.32	tibia	lower distal
79	astragalus	astragalus
80.1	calcaneus	upper
80.2	calcaneus	lower
87	navicular-cuboid	
95.1	metatarsal	proximal
95.21	metatarsal	upper shaft
95.22	metatarsal	lower shaft
95.3	metatarsal	distal
109	first phalanx	first phalanx
110	second phalanx	second phalanx
111	third phalanx	third phalanx

Table 1: Coding system used for cattle in ArcGis.

Once all butchery data had been collected, Microsoft Excel tables were imported into ArcGis to join the butchery data to the correct species element template. The Excel tables included the following fields: **ID-**this number comes from the numbering system implemented on the animal remains from Çatalhöyük (Russell and Martin, 2005); **Cuts/Chops/Sawn-**The number of bone fragments that showed evidence of these marks from a particular species (each element will be coloured according to this value); **N-**The number of total fragments of a species.

The coding for the diagrams, as mentioned previously, was based on the code used by Coutureau (Yvinec, et al., 2007) which was developed from Russell and Martin (2005). This list above (table 1) contains the list of codes used for cattle.

Once the Excel data was imported each species can be viewed in terms of cuts, chops, and/or saw marks. Data was also viewed in terms of phase for intra and inter site comparisons. The data in this form is the raw data, but was adapted as frequencies to produce the visual diagrams. Frequencies for the purposes of this research were percentage of butchered bone, this is what was displayed in the diagrams. The diagram keys that go alongside the outline images are generated by ArcGis to provide a graduated colour key to display the frequencies in groups from lowest to highest. An incremental key that showed percentages such as 0-10 for example may be beneficial to users to maintain a standard across sites. For the diagrams in this research the Jenks natural break key was used to determine the best arrangement of values. Each site was recorded on separate Excel sheets then entered into ArcGis. A collated version of the excel sheets is given below the diagrams in this thesis to show the raw data that was imported into the templates. The diagrams do not represent percentages of butchered versus non-butchered bone, but this method could be easily implement should researchers be recording an animal bone assemblage from scratch. As the assemblages used in this research, except Edlingham Castle, were already published animal bone reports, this method was not viable due to time constraints.

3.2 Summary

Using spatial software to present the data in a visual medium will provide a clearer picture of where major carcass divisions/disarticulations were situated and if there is evidence of skinning and filleting. Recording butchery data in this manner helps demonstrate which species were being exploited, how they were being butchered, to what degree they were being butchered and what methods people were favouring to prepare their animals for consumption.

By using inter-site comparisons it is possible to compare the percentage of butchered bones, the ways in which the animals were butchered and give an overall view of which area of any specific bone was most commonly butchered. As the three assemblages were from castles in varying regions of England, spanning varying medieval dates with varying social statuses and geographic locations, inter-site comparisons should highlight important differences in diet and dining habits. Comparing and contrasting the presence of species (what inhabitants and visitors were consuming), and butchery patterns can provide a new angle on the trends in how animals were being prepared for consumption and the cuisine and dietary habits of the inhabitants and diners of medieval castles in England.

3.3 Case Studies and Methodological Aims

There were initially challenges when deciding which case studies would be used for this research project. The three case studies that originally were considered, were Portchester (Cunliffe 1977; Cunliffe and Munby 1985) Okehampton (Higham et al. 1982) and Launceston Castles (Saunders, 1984). Portchester was able to be selected as the assemblage was housed in its entirety at Fort Brockhurst in Portsmouth. The assemblage for Okehampton Castle was not in one location and upon contacting Okehampton museum they could only account for less than half of the boxes of animal bone. After following up various other sources to obtain possible whereabouts for the remaining boxes, there was no success in tracing the remaining boxes. Launceston Castle was also initially considered as it is a large assemblage and has a comprehensive published animal bone report. When trying to obtain the animal bone from Launceston Castle via several email communications, I was informed that the bone whereabouts was uncertain as English Heritage (now Historic England as of 2015) was in the process of moving stores. After further communication I was told that the bone was no longer in labelled contexts and was now stored in unmarked bags. As the contextual information seemed to be lost from

Launceston Castle, it was dismissed as a potential assemblage for this butchery study. The selection of Edlingham Castle (Fairclough 1982 and 1984) and Beeston Castle (Ellis, 1993) as the other two case studies alongside Portchester was made because, upon researching the castles' backgrounds, they had quite different histories from that of Portchester Castle and seemed like they would be interesting studies to compare patterns with. Edlingham and Beeston Castle animal bone assemblages were both housed at the Historic England stores in Helmsley and were able to be transported to the University of Exeter archaeology department for analysis.

The zooarchaeological assemblages that were analysed to conduct this research were Edlingham Castle located in Northumberland, Portchester Castle in Hampshire and Beeston Castle in Cheshire. These particular samples were selected as they all have suitable samples of animal bone to conduct butchery analysis and allowing for an appropriate amount of taphonomic evidence to be recovered for more detailed interpretations to be made. All of the assemblages have archaeological site reports and apart from Edlingham Castle all have published animal bone reports. Comparative sites were also assessed to compare local urban animal bone butchery to the butchery data from the three castle assemblages. The three urban centres that were studies as comparative assemblages to the castles were, Newcastle (Nolan, 1993), Winchester (Serjeantson and Rees, 2009) and Chester (Matthews, 1995).

Recording butchery is sometimes considered a factor worth noting in published reports, yet it is frequently presented as a summary. This important element of zooarchaeological study is infrequently recorded in detail, if recorded at all. This results in generalisation and broad interpretations and conclusions being drawn in regards to animal exploitation. One cannot provide detailed insights about dietary habits and changes in exploitation practices over time if the only data collected from an animal bone assemblage is NISP. NISP can tell researchers the number of specimens that are present and which species are present on a site yet that data alone does not prove the degree that animals were exploited and consumed. By recording butchery data in this manner, the evidence greatly increases which allows for more detailed, plausible and evidence supported conclusions to be made. The method highlighted in this research is a valuable tool that zooarchaeologists can implement in faunal analysis as it is a comprehensive and systematic way of recording butchery that could be beneficial in larger assemblages and also in comparing comparative zooarchaeological assemblages to one another.

This study moves beyond the work of previous studies as it encompasses a wider range of data from multiple sites to demonstrate chronological and regional variations in dietary trends. The data allows for social zooarchaeological interpretations allowing for the cultural aspects of the diet and apparent changes in butchery practices to be further explored.

3.4 Glossary of Terminology

Longitudinal butchery Sagittal butchery Median butchery	All of these butchery types refer to the splitting of the carcass vertically down the spine into two halves. This is seen through a vertical chop mark(s) through the vertebrae.
Para-median butchery	This type of butchery is similar to the above types yet it is parallel to the median, but to one side.
Transverse butchery	This type of butchery is characterised by horizontal chops to the vertebrae.
Cut marks	Cut marks in this study are characterised by knife marks left behind on bone. They appear on the bone as blade marks or blade insertions and are thinner than chop marks.

Chop marks	Chop marks in this study are characterised by cleaver marks left behind on bone. They appear on the bone as wider that cuts and have a plane chop surface.
Saw marks	Saw marks are characterised by distinct striations produced by the blade of a saw

Terms such a dorso-ventral and medio-lateral, refer to extending from one axis to another, refer to figure below for directional terminology.

[redacted]

Figure 2: Key directional terminology (Schmid, 1972, p.70). This image has been removed by the author of this thesis for copyright reasons.

Chapter 4: Edlingham Castle Background

4.1 Setting and Historical background

[redacted]

Figure 3: Map of Edlingham castle: location and floor plan (Fairclough, 1982, p. 384). This image has been removed by the author of this thesis for copyright reasons.

Edlingham is a small hamlet in central Northumberland located six miles southwest of Alnwick. In the twelfth century, the hamlet was part of the serjeanty of Beanley, controlled by the Earls of Dunbar. The area was granted to the son of the second Earl, Edward, and it was in the thirteenth century that the family built a large hall house and took the name Edlingham (Fairclough, 1982, p.373). Today Edlingham is made up of three farms and a few houses and cottages

(Roberts, 1987, p.96). Edlingham Castle is located at the east end of the medieval village, which is now mostly deserted. In 1981 phosphate analysis (Figure 4) was carried out on the village on areas where buildings would have once stood. This can detect land that has been lived upon by analysing the levels of organic material such as urine, manure and general household waste (Roberts, 1987, p.96).

[redacted]

Figure 4: Phosphate survey map of Edlingham (Roberts, 1987, p. 97). This image has been removed by the author of this thesis for copyright reasons.

The castle stands at the lowest part of the rid, on a gravel spur surrounded by

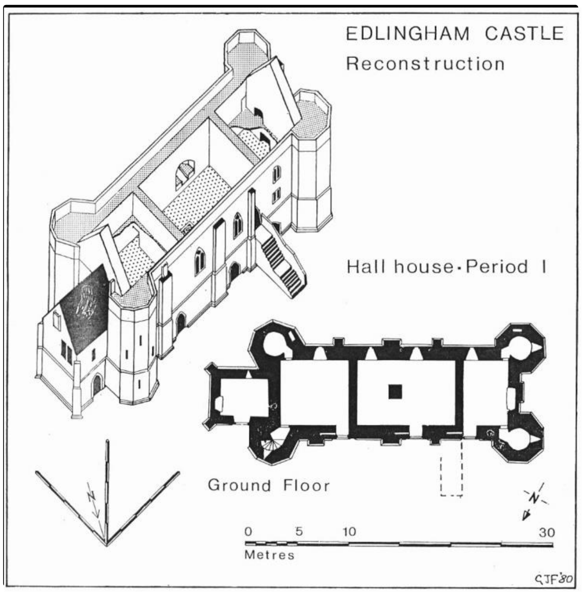

Figure 5: Reconstruction of Edlingham castle as a thirteenth century hall house (Fairclough, 1982, p. 386). This image has been removed by the author of this thesis for copyright reasons.

fast moving springs (*ibid*). The first mention of the castle was in a post-mortem inquest in 1396 (King, 2007, p.376). The castle was built to be a thirteenth-century hall house (figure 5), and developed through time to become a more defensible and elaborate structure. The progression of the building can be seen architecturally from a hall house to a fortified manor, to the addition of a solar tower, and then in the later medieval period, a house that had fallen in to disrepair.

The house was likely to have been built in the thirteenth century by John de Edlingham. In 1294 Edlingham Castle was acquired by William Felton from Thomas de Edlingham. The main block of the house was made up of two floors, and contained four main rooms on the ground floor. Living rooms were generally on the first floor with service and storage areas located on the ground floor, lit only by small slit windows (Fairclough, 1982, p.376). There were no signs of fortification and minimal signs of security apart from draw-bars on the doors during this time period (*ibid*).

4.1.1 Fortified Manor House

Northumberland landowners in the thirteenth century often lived in halls with wooden palisaded banks occasionally surrounded by a moat (Newton, 1972). Northumberland became a place of “fortified houses” in the fourteenth and fifteenth centuries (Fairclough, 1984, p. 40). The increase of these fortified houses, or small castles, was often considered due to the close proximity to the Scottish border and the threat of war. During the fourteenth century, manor houses and castles in southern England were generally becoming less militaristic in architectural style, while the houses and castles in the north were adapting theirs for defensive purposes. Before the fourteenth century, Northumberland was considered a relatively safe and secure place, and houses did not need towers or curtain walls (*ibid*). Northumberland had relatively few castles compared to most southern counties, yet this swiftly changed with the county becoming "the most heavily encastellated county in England" (King, 2007, p.373). King (2007) suggests that while the threat of war and English victory over the Scot's at Neville's cross are concurrent with the rise in the number of castles in Northumberland however, the increase is more likely a reflection of societal trend and the ever growing importance of status in Northumberland society (p.384).

Edlingham Castle (figure 5) architecturally shared similar characteristics to other hall houses of Northumberland. Haughton Castle shared the same rectangular floor plan with a hall-and-chamber on both floors and a solar tower (Dixon, 1992). In the mid-fourteenth century Houghton added the second floor with arched buttresses. Edlingham also closely resembles Tarset Castle, in that they were both rectangular buildings enclosed by a ditched courtyard and an embankment, with turrets on the corners of the hall (*ibid*).

Edlingham was not however typical of the castles that were solely designed and constructed for defensive reasons. For example, Thirwell Castle which was located in the west of Northumberland, was windowless, dark but practical, unlike Edlingham which was ostentatious and elaborate. With showy casement windows designed to impress it was largely different from the narrow loops which lit Belsay tower or Thirwell (King, 2007, p.384).

Security became an important factor in the late medieval period, which is reflected in the architectural design of the castle. "The moated hall was augmented and defended by curtain walls, ditches, and a gatehouse to its north, and by a fortified solar tower to its south" (Fairclough, 1982, p. 377). The architecture was typical of the militaristic style seen in Northumberland at the time. A gate and gatehouse were erected and walls were put up around the courtyard which became an impressive monument supported by large buttresses (*ibid*). The house was now made up of multiple suites and living spaces that shared the main hall, and the house could now accommodate a substantial number of people. The castle was ostentatiously decorated on the interior and contained elaborate fireplaces (*ibid*). All of the important living rooms were located on the first floor, with mainly storage and other additional rooms on the ground floor. The first floor hall was thought to have been very impressive, and included a two-storey, lofty, rib-vaulted ceiling with diagonal buttresses and octagonal turrets (Pevsner, 1957, p.143). The ribs of the vaulted ceiling were on corbels that included caryatid figures (*ibid*). It is thought the atypical floor plan is due to security and defensive reasons but also for social reasons (Fairclough, 1982). A layout such as this was seen as high status with several buildings in Scotland and the north of England with similar characteristics (*ibid*). The castle was designed elaborately to express the status of the Feltons, with an older house design to show wealth of lords of the past (*ibid*). The accessibility to certain areas of the buildings was also related to high-status. Access to turret-top spaces on the roofs were restricted as they were more private areas and were not as easily connected as the rooms on the lower floors (Creighton, 2009, p.18).

4.1.2 Solar Tower

The solar tower was later added in c.1360-80 by the second William Felton (Fairclough, 1982,p.379). The tower was decorated to a high standard and had luxurious facilities which were added as the status of the family was on the rise and increasing defences was imperative. The tower itself stood three storeys tall and was made up of a single large square room on each floor. The chambers on each floor contained elaborate fireplaces and carved figureheads. During this time the castle became much larger, with the addition of more living space and overall more opulent décor.

[redacted]

Figure 6: Floor plan of solar tower at Edlingham Castle (Fairclough, 1982, p. 58). This image has been removed by the author of this thesis for copyright reasons.

Solar towers were built in the thirteenth and fourteenth centuries, predominately in northern England. Dixon (1993) explains that whilst a tower would have been used for defence, it was more likely to have been used for signalling from the lord's apartment above the roofs of surrounding buildings (p. 95). The rooms in the tower would have also produced a fair amount of light for activities such as reading and produced elevated views to admire the surrounding landscape (Creighton, 2009). Figure 6 above shows the floor plan of Edlingham's solar tower.

Fairclough adds "It also displays the confidence of a second generation in the status, fortune, and prospects of his family" (1984, p. 48). The solar tower was a statement to the surrounding community and to flaunt the family's high status to the rest of Northumberland. The Feltons may not have been the highest rank in society, yet they were well thought of within the "governing class" of Northumberland (Fairclough, 1982, p. 374). Felton had a stellar military career and climbed up the ranks for a career in the royal service. He also owned a vast amount of land through his marriage to his wife, a native of Northumberland and the daughter of an Earl *(ibid).* This period saw the rise in importance of Edlingham; with the addition of fortified defences, the structure was now most definitely considered a castle in the eyes of the people of Northumberland. Interestingly in 1368, the half-brother of the third William Felton inherited Edlingham as “a chief messuage”, but died leaving behind “a castle” (Fairclough, 1984; NCH VI p. 118-19). The change in definition could be a social change based on the idea of what constitutes ‘a castle’ in Northumberland, or the change in title could be down to the expansion and additions to the building (*ibid*).

4.1.3 Late Medieval House

The Feltons owned Edlingham until 1420, followed by the Hastings until 1519 and then the Swinburnes thereafter (Fairclough, 1982, p.379). The Felton family built a barbican and extended a passage onto the gatehouse, once again more likely for appearance than defence (King, 2007, p.382).

By the sixteenth century the castle belonged to the Swinburnes and was remarkably different than in the centuries before. Defence was still important in Northumberland but as the family had no military connections, the castle became more of a domestic family home (Fairclough, 1982, p379). The hall also was not a central part of the house during this time period and the living quarters probably only accommodated the immediate members of the Swinburne family. A new kitchen was added in the courtyard, and the hall house and tower were redesigned (*ibid*).

Not long after, the house was slowly falling into disrepair with major structural failures and collapses. The curtain wall collapsed and there were various issues throughout the building. There seemed to be efforts to reinforce the structures, but they were not all successful. The west part of the courtyard was abandoned and the east part was altered to become stock housing, which may be an indication of moving towards pastoralism or just an overall restructuring of the castle (*ibid*).

Edlingham Castle was abandoned in the seventeenth century and the structure itself continued to fall apart with stones being deliberately robbed and stolen from the structures (Fairclough, 1984). Edlingham became somewhat of a quarry for the surrounding area as a source of building materials (*ibid*). A similar scenario occurred at Wharram Percy where stone robbing was described as an example of “peasant resistance” (Smith, 2009, p.406). As high quality stone was rare, peasants would reuse stone from the manor and church to build their own structures (*ibid*). Villagers also set up large scale quarrying, and these actions were a signal to the lords that they could do as they wish and use material in the ways they wanted (*ibid*).

From the evidence one can assume the lords of these houses along the Scottish border would have been minor nobility or politicians, in the local surrounding areas. They all would have been of wealth and as is seen at Edlingham, Aydon Castle was part of a barony that could not maintain the family’s status which led to a decline (Dixon, 1992).

4.2 Excavation and Post Excavation

Edlingham Castle was excavated between 1978 and 1982 by the Department of the Environment. The below-ground remains that were still intact made the castle a site of interest for excavation. For excavation purposes the site was divided into ten periods, and in some documents in the archive divided into six periods, with some degree of overlap between them.

Periods 1 and 2: The Earliest Moats Dates tentatively to first half of the thirteenth century from pottery sherds found in period 2 ditch. Period 3: The Moated Enclosure Most likely dates to mid-late thirteenth century, the work of the Edlingham family. Period 4: The Hall house Building of the Hall house within the existing moat. Dates to end of the thirteenth to early fourteenth centuries. Ownership was with William Felton. Period 5: Expansion and Fortification

Residential accommodation improved and building of the solar tower and forebuildings. Dates to mid-fourteenth century (c. 1330-1368), the work of the second William Felton. Period 6: Change and Development The gate was enlarged, the east curtain wall rebuilt and new buildings constructed on both sides of the yard. This was followed by a period of inactivity. Dates to late fourteenth to early sixteenth century. Structural work occurring during the ownership of John or Elizabeth Felton. The period of inactivity was the Hastings ownership following Elizabeth Felton's death. Period 7: Refurbishment Minor structural changes to the principle buildings of the castle and extensive building work in the courtyard. Dates to c.1514 to c.1530 during the ownership of George Swinburne. Period 8: Minor Changes The kitchen underwent small renovations. Dates to mid-sixteenth century, during the ownership of Thomas Swinburne. Period 9: Change of Status Domestic building replanned and the ground floor of the tower blocked off due to structural issues. The ground floor of the hall house changed to animal stables, the gate bridge was removed, and most of the ditches silted up. Dates to c.1572-1650s Thomas Swinburne and his successors. Period 10: Final use and Disuse The kitchen collapsed, the ground floor of tower reopened (perhaps as a stable). The castle later became a quarry for stone and timber from the 1660s. Dated to 1650s onwards.

The architectural and archaeological evidence from Edlingham shows a castle that underwent a varied social journey, through rises and falls in status of the families who made Edlingham their home or merely their possession in name. By analysing the zooarchaeological remains from Edlingham Castle, one might expect to see a similar social evolution in subsistence practices. This study explores the relationship between status and diet and delve into the dynamic between the two factors. Butchery analysis was conducted to provide insight into whether the rises and falls in status can be seen through the recovered faunal remains across the site through time.

Was the social rise mirrored in the range of species eaten? Is it possible to see the pattern of social rise and subsequent fall through the animal remains? Are there apparent changes in the ways in which animals were butchered?

The animal bone from Edlingham Castle was initially analysed by Lynn Blackmore in 1988. The information was in the form of an old style print out of the data on green bar paper. The bone was analysed by species, bone type and did include brief butchery descriptions when present. There was a substantial amount of bird bone with approximately half assigned to species, with the remaining bird bones grouped as non-identifiable bird. There were also no distinctions between small ungulates; they were all labelled as “small ungulates” and not to species. There was limited recording of ageing or sexing information, yet metric data was collected in a separate document. On inspection of the archive at English Heritage/Historic England in Helmsley in Yorkshire, it was soon realised that the context numbers on the printed out animal bone data documents did not correspond with the context numbers on the bags and boxes of animal bone or the stratigraphic context sheets. The context numbers were four digit numbers on the animal bone data print out and the context numbers found everywhere else in the archive were three digits with one letter and two numbers. There was no key present that converted the four digit numbers to a three digit context number; therefore it was decided that the animal bone would need to be reanalysed to determine which bones come from which contexts. In order to provide significant evidence of a social change in diet it is vital to provide in depth and detailed data. Therefore, an overall analysis of the assemblage, to collect as much data as possible, in the allotted time, will be carried out to provide a better understanding of changes in foodways through time.

Chapter 5: Edlingham Castle Faunal Bone Report

5.1 Site Research Aims

This study aims to answer a number of important questions regarding the role of animals at Edlingham Castle and in the broader context of late medieval England. These questions include:

- Which animals were being exploited at Edlingham Castle and in what manner were they being exploited?
- Do changes in the status of the castle over time affect which species are present and how they are exploited?
- How does the way in which animals were exploited provide insight into social changes on site and the wider context?

The animal bone from Edlingham Castle was grouped for this study according to the phases from the original archaeological archive and interim reports by Graham Fairclough (1984,1982). The site sequence was divided into ten periods, which was based on building sequences and stratigraphy. For the purposes of analysis some phases were grouped together due to smaller sample sizes and chronological and contextual relevance. No animal bone came from phases 1 to 4. Phases 5, 6, 7, 8, 9 and 10 all contained animal bone. Phases 5 & 6 were grouped together as were phases 7 & 8. Detailed phase descriptions can be found in chapter 4 in brief:

Phase 5: Period of expansion and fortification (mid-fourteenth century)

Phase 6: Period of change and development (late fourteenth and early sixteenth century)

Phase 7: Refurbishment and minor structural changes (1514-1530)

Phase 8: Minor changes (1530-1550)

Phase 9: Major change in status (1572-1650s)

Phase 10: Final use and disuse (From 1650s)

The species represented at Edlingham Castle included cattle (*Bos taurus*), sheep (*Ovis aries*), sheep/goat (*Ovis/Capra*), horse (*Equus cabullus*), pig (*Sus* spp.), dog (*Canis familiaris*), cat (*Felis catus*), deer consisting of red deer (*Cervus elaphus*), fallow deer (*Dama dama*), and roe deer (*Capreolus capreolus*), fox *(Canis vulpes*), rabbit (*Oryctolagus cuniculus)*, mouse (*Mus musculus*), rat (*Rattus sp*) and various species of birds.

5.2 Methodology

5.2.1 Quantification

It should be emphasised that the animal bone assemblage had not been analysed in full in the past, therefore in order to conduct an in depth butchery study it was important to have an overall picture of what species were present and what patterns emerged. The methodology provided below was used as it was efficient and can still provide the necessary information that was required before the butchery analysis could commence.

The method used to quantify this assemblage was based on that used for Knowth by McCormick and Murray (2007) which is modified from Albarella and Davis (1996). This method involves analysing and recording bones from the assemblage, but omitting those fragments that are considered 'low grade' and not worthy of being counted. In order for an element to be recorded, 50% of the diagnostic zone on a bone must be present. This method narrows down the assemblage so that fragmented elements are not counted multiple times. Elements that are quantified and recorded include:

- The proximal and distal epiphysis of long bones where at least 50% of the zone is present. This includes the humerus, tibia, radius, femur, metapodia (minus the lateral metapodia of horse and pig), and phalanges.
- The scapula with the presence of the glenoid articulation.
- The ulna with the presence of the olecranon process.
- The astragalus, where the distal end is present.
- The calcaneum, with the presence of the sustentaculum.
- The pelvis, where the illium and/or ischial part of the acetabulum are present.

- Loose mandibular teeth and loose teeth (which include loose maxillary teeth and teeth that could not be identified as maxillary or mandibular).
- The atlas and axis, with at least 50% present.
- The patella, with at least 50% present.
- The cranium, with the presence of the zygomatic arch or the maxilla with at least three teeth (or alveolus) from the dP4/P4-M3 row.
- The mandible, with at least one tooth (or alveolus) from the dP4/P4-M3 row, or the presence of the mandibular hinge.
- Horncores with a complete transverse section.

However, any fragments that did not fit into the above criteria but were still of interest, which may include butchery marks, gnawing, or pathology, would be considered ‘non-countable’. These fragments were recorded but not included in the quantification. Ribs and other vertebrae were not counted.

5.2.2 Database Recording

Recordable elements were separately recorded on an electronic Microsoft Access database. Information recorded includes: context, species, element, side, condition, state of fusion, zone present, percentage present, signs of butchery, gnawing, pathology, measurements, ageing, fracture and any other observations worthy of noting.

5.2.3 Identification

References to Hillson (1992), Schmid (1972) and von den Driesch (1976) were used, where needed, for identification. The comparative collection in the Archaeology department at the University of Exeter was also used, where needed, for identification. Attempts to distinguish between sheep and goat were carried out based on morphological characteristics and metrical data. If fragments from the two species could not be definitively identified as either sheep or goat, they were then assigned to the category sheep/goat.

5.2.4 Ageing

Two methods of ageing were implemented when analysing the mammalian bone remains. These methods include observing dental eruption and wear and epiphyseal fusion. Dental wear stages and eruption were recorded for dp4 (deciduous fourth premolar), P4 (fourth premolar), Ml (first molar), M2 (second molar), and M3 (third molar) for sheep/goat, pig and cattle. When analysing tooth wear of sheep/goat, tooth wear stages by Payne (1973 and 1987) were implemented. Tooth wear stages by Grant (1982) were implemented when assessing wear for cattle and pig. Higham (1967) mandibular wear stages were assigned to loose mandibular M3s and mandibles with the innermost tooth still present. The Higham wear stages are used to estimate a minimum age of an individual animal.

The state of epiphyseal fusion is determined by examining the metaphysis and diaphysis of a bone. The stage of fusion was assessed and recorded in the database. A specimen can be recorded as fused (F), where the bone is completely fused and there are no signs of fusion lines, and fusing (J), where the fusion line is still present and the metaphysis and diaphysis are not completely separated and are being held together by bony spicules. Specimens can also be recorded as unfused metaphysis (UM), unfused epiphysis (UE) and if the epiphysis and metaphysis of a particular bone are found together but are unfused (UX).

5.2.5 Metrical Data

Measurements were taken on all fused bones and bone fragments where appropriate. Measurements were taken using digital callipers or a bone board. Measurements were taken according to the specifications of von den Driesch (1976), Payne and Bull (1988) and Davis (1992). All measurements were recorded in millimetres. Estimated shoulder heights were calculated from the metrical data gathered wherever relevant. Factors used for calculating estimated shoulder heights were taken from von den Driesch and Boessneck (1974).

5.2.6 Sex Determination

Sex could be determined for two species through analysing certain elements. Examination of the distal breadth (Bd) of cattle metacarpals can be used to estimate whether an animal is male or female (McCormick and Murray 2007) Pig mandibular and maxillary canine root morphology can also be used as an indication of sex. If the alveolus is present but the canine is absent, distinction between male and female is still possible *(ibid*).

5.2.7 Gnawing and Burning

Specimens were also inspected for burning, which if present, would be classified as singed, calcined, or burnt/blackened. Rodent and carnivore gnawing were also recorded where present.

5.2.8 Butchery

Evidence of butchery was recorded as either chopped, cut, sawn, or chopped and sawn (if both apparent on the same fragment) initially in the database. Butchery marks were recorded wherever present on the bone fragment regardless of how much of a zone is present. Butchery marks were then recorded in detail in Microsoft Excel spreadsheets divided by species listing by ID number, which is determined from the relevant ArcGIS templates, type of mark and phase. This data is then imported into ArcGIS so that the butchery diagrams can be produced, as described in more detail in chapter 3.

5.2.9 Pathologies/Injuries

All pathological conditions or injuries observed in the specimens were recorded in detail.

5.3 Results of Analysis

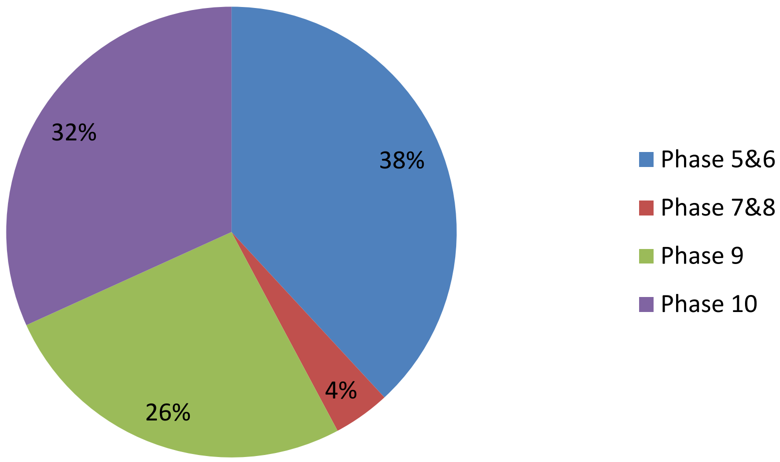

Figure 7: Edlingham Castle percentage NISP values for all phases (Ph 5 & 6: N=776, Ph 7 & 8: N=83, Ph 9: N=530, Ph 10: N=647).

Following inspection of the assemblage, 2046 fragments were considered 'countable' and 259 fragments were 'non-countable'. The non-countable fragments contained signs of butchery, fracture, burning or exhibit signs of pathology. Figure 7 represents the percent NISP breakdown of the phases of the assemblage. NISP is primary data that can be used to estimate relative frequency of taxa (Reitz and Wing, 1999.). NISP tables of each phase are included in the appendix in table 48-51. A large majority 75% of the fragments were in good condition, 23% in fair condition and the remaining 2% were either classified as excellent or poor.

5.3.1 Cattle

Cattle were the most frequent species across all phases at Edlingham Castle. They made up approximately 40% of the NISP for all phases containing animal bone. Cattle would have played an important role as the main meat source but also for dairying and traction.

Across every phase all of the main anatomical elements were represented. Each phase varied slightly on the amount and type of elements that were present. There can be an effect on bone survival rates, depending on the type of element. The more robust elements such as metapodia are more likely to survive while elements such as the proximal humeri are less dense and more susceptible to damage. Most phases contained a reasonably high number of mandibles and loose teeth. There was also a strong presence of metapodia and other long bones and meat-bearing joints (see Appendix tables 48-51). The data suggests that animals were butchered on site as whole carcasses as the majority of elements were present. Phase 7 & 8 had mainly metapodia and forelimb elements, though the sample size from this phase is much smaller than other phases. If joints were being imported it would be expected that there would be a higher proportion of meaty joints such as scapula, pelvis, and humerus in comparison to other elements. Taphonomic factors such as burning, gnawing and butchery all can contribute to making bone more fragile and breakable. The techniques of recovery will also play a role in which elements made it to zooarchaeological analysis. It would appear that the majority of the animal bone from the assemblage was hand collected, though this was not documented in the archive.

5.3.1.1 Ageing

5.3.1.1.1 Tooth wear

From the tooth wear data alone it is difficult to see a pattern as to what age most cattle were slaughtered. Each phase shows a presence of young and older animals. Ages range from Higham wear stage 5 (6-7 months) up to stage 23 (over 50 months). Phase 5 & 6 has the greatest number of mandible wear stages. There are several animals being slaughtered at stage 11 to stage 13 (18-30 months) and another equal size group slaughtered at stage 21 to 23 (40-over 50 months). The kill off strategy seems to follow the same pattern throughout the occupation of the site as all phases show similar age ranges in regards to tooth wear.

The presence of mandibles from young animals (less than 6 months of age) may be an indication that people at Edlingham Castle were including veal as part of their diet. The increased presence of young cattle mandibles is a pattern that can be seen in the fifteenth to sixteenth centuries (Grant, 1988). This mortality trend can be seen in other medieval castle sites including Sandal Castle (Griffith, et al., 1964), Dudley Castle (Thomas, 2005), Prudhoe Castle (Davis, 1987a) and Launceston Castle (Albarella & Davis, 1994).

Another possibility to consider for the presence of calves at Edlingham Castle is that during the late medieval period there was a decline in the use of cattle for traction and an increase in the use of horses. This in turn altered the primary function of cattle from traction to a more heavy reliance on meat and dairying (*ibid)*. Calves may have also been used for proliferating milk production by "stimulating lactation" (Thomas, 2005, p.33). Grant (1988) suggests that the calves that were consumed would have been the weaker animals or possibly "surplus to agricultural requirements" (p.156).

5.3.1.1.2 Epiphyseal Fusion

The fusion data presents a much clearer representation of when cattle were butchered onsite. The fusion data shows that only a very small number of cattle were slaughtered before two years of age. Only six fragments were unfused in the early fusion stage. There were more unfused (middle fusing) elements in phase 9 & 10 possibly indicating a decrease in the age of slaughter. It is unclear as to why the tooth wear and fusion data differ, yet both data sets show a strong presence of animals around two to three years of age, which would be an optimal age of slaughter. When animals reach an age where growth rate decreases it becomes uneconomical, which is usually just before reaching maturity (Davis, 1987b).

5.3.1.2 Metrical Data

There were 11 estimated shoulder heights that could be calculated for cattle. The cattle from the earliest phase, phase 5 & 6 contained animals with the largest shoulder heights, 121.9 cm and 123 cm. The later phases all showed evidence of cattle of a small shoulder height average of 110.2 cm. While the number of shoulder heights that could be calculated is a small sample size, it is possible that the decrease in size from phase 5 & 6 to later phases may have to do with an increase in the overall size of cattle. This pattern is uncommon in the medieval period as cattle generally were much smaller in the eleventh-thirteenth centuries and then began to increase in size. For example, at Prudhoe Castle, Northumberland, there was evidence of a size increase in cattle between the fourteenth to seventeenth centuries (Davis 1987a). The small sample size should be taken into consideration and may not be indicative of the pattern that was actually occurring during this time period.

Other interesting measurements are the noticeably large third phalanges in phase 5 & 6 and a decrease in size in the later phases. Phase 5 & 6 have two, third phalanges with greatest lengths (GL) of 87.1 cm and 83.3 cm, which is drastically larger than any other specimens from the phase and other phases. The average GL for third phalanx for phase 5 & 6 is 69.7 cm, the same average as phase 9, while phase 7 & 8 is 64.5 cm and phase 10 is 58.2 cm. This change in size may be due to a change in the numbers of male versus female animals or perhaps genetic variation in which different breeds were introduced. As the two specimens from phase 5 & 6 are considerably larger than any other third phalanx, it may be a different breed of cattle entirely. Chillingham cattle were bred in Northumberland and were found in and around the area of Chillingham Castle a mere 15 miles away from Edlingham. This breed often referred to as “wild cattle” are giants in comparison to common medieval cattle. The Chillingham cattle gained public attention in the mid eighteenth century yet first written records describing these huge creatures appear in the 1640s (Ritvo, 1992).

5.3.1.3 Sexing

Fock (1966) looked at size difference between males, females and castrates by looking at metacarpal measurements of greatest length and distal breadth. There is a degree of overlap in greatest length yet it is difficult to differentiate distal breadth in steers and bulls. Based on those measurements there are six specimens that have both measurements, all of which would fall in the female cattle spectrum, most specimens coming from phase 9 and phase 10, and one specimen from phase 5 & 6.

The small sample size limits possible interpretations about husbandry and livestock patterns but a dominance of female cattle in the later periods may be an indication of dairying. Slenderness index calculations for determining sex can also be somewhat misleading as they don't take into account activity, such as that of working animals that may have more robust metacarpals as a result.

5.3.1.4 Gnawing and Burning

Gnawing can cause substantial damage to bone and destroy small bones entirely. Gnawing occurs on approximately 1.8% of cattle bone in the assemblage. Gnawing from phase 5 & 6 was only seen on phalanges and an astragali, all of which were produced by a carnivore. Phase 7 & 8 only had two cattle fragments with signs of carnivore gnawing, phase 9 had six fragments and phase 10 had two fragments. Gnawing was most common on distal shaft fragments and the epiphysis. In regards to the taphonomic process the presence of gnawing may be an indication that bone was re-deposited and an absence of gnawing can be an indication that bone was buried soon after death.

5.3.1.5 Butchery

Butchery was evident on approximately 8% of recorded and non-countable fragments of cattle fragments in the assemblage. In depth interpretation and analysis of butchery marks, patterns and trends will be discussed in chapter 6.

5.3.1.6 Pathology

Evidence of pathological conditions were not very common on cattle remains. There were two cases of possible dental pathology which involved unusual v-shaped wear patterns of maxillary teeth. While it is possible that this wear pattern is a result of a pathological condition, it is most likely a genetic absence of the second premolar which would cause this pattern. There were a few cases of pathology in the lower limbs which demonstrated signs of possible osteoarthritis. In the phalanges (phases 5 & 6 and 10) there was evidence of lipping on the proximal margins and exostosis on the proximal metatarsal (phase 10). Similar pathologies in the phalanges of cattle were also seen at Prudhoe Castle (Davis, 1987a). This pathological evidence is most likely a sign of animals being used as draught cattle (Bartosiewicz, et al., 1997). As the number of fragments exhibiting these conditions is very small it is not possible to make interpretations about the extent of which cattle were been used for traction purposes.

5.3.2 Sheep/Goat

Sheep/goat made up between 30-36% of each phase of the assemblage. Of all the fragments classified as sheep/goat, 93 were recorded and identified as sheep. Sheep fragments were firmly identified based on physical characteristics, bone morphology, and metrical data (Boessneck 1969, p.339-341, p.350-357). There was only one element positively classified as goat in the assemblage and it was a horncore.

Bone survival for sheep/goat is somewhat different than for cattle, sheep/goat overall had fewer phalanges and metapodia compared to cattle. Phase 5 & 6 had a strong presence of tibiae and tarsals. Phase 7 & 8 has no phalanges or mandibles but a fair number of scapulae, tibiae, calcanei and astragali. Phase 9 had a high number of mandibles and a strong presence of long bones such as humeri, radii, metatarsals and tibiae, phase 10 also had a high number of mandibles and scapulae. The lower number of metapodia and phalanges in the early phases compared to cattle may indicate that sheep/goat were being brought to site but the feet and skin were sold on to tanners. As there is a greater presence of mandibles and teeth it would seem that they were being brought to site ‘on hoof’ as opposed to being brought to site as dressed carcasses. It is also important to mention that sheep bones are smaller and less dense than cattle bones which may have affected overall bone rate survival. A smaller amount of phalanges were also evident at Prudhoe Castle. Davis (1987a) suggests that this may indicate that sheep were imported without their feet and their feet may have been sold to the poor, or that sheep skins along with the feet were removed elsewhere and taken to a tannery (p.5).

5.3.2.1 Ageing

5.3.2.1.1 Tooth wear

The tooth wear data for sheep/goat showed a mixture of age ranges. All phases had evidence of adult mandibles but also young animals too. The characteristic of having a wide range of different aged specimens was apparent across all phases. The presence of animals with Higham MWS (mandible wear stage) 3 or 4 indicated that there were animals of only a few months of age. This suggests that there was somewhat of a multi-use mixed economy in regards to sheep/goat. The presence of young juveniles is often an indicator that the young were males slaughtered as they were not needed as studs (Davis, 1987b). These specimens may also have been weak animals, or possible surplus. Adult animals may have been kept for secondary products such as milk and wool, while those animals at 2-3 years of age were probably exploited for meat.

5.3.2.1.2 Epiphyseal Fusion

The fusion data for sheep/goat shows a dominance of animals under 30-42 months of age. Much like the tooth wear data the fusion data shows a mixture of very young animals and older animal. There is a majority of elements that are fused in the early and middle fusion stages with unfused elements higher in the later fusion stage. There is a shift from stage 5 & 6 (mid fourteenth to early sixteenth century) to the later stages in that the percentage of fused elements in the middle and late fusion stages is noticeable higher in the phase. This could be due to the higher status and that sheep are been exploited for primary and secondary products, but could be depending more on milk and wool than in later periods. At Prudhoe Castle, there was a more distinct change in the age of sheep after the sixteenth century. The age of sheep increased which was interpreted as the growth in importance of the wool industry in the north of England (Davis, 1987a).

5.3.2.2 Metrical Data

There were 30 estimated shoulder heights for sheep/goat. The measurements ranged from 49.2 cm - 64.4 cm with the mean height as 56.4 cm. The estimated shoulder heights for sheep/goat were similar to those from Castle Rising Castle with a mean height of 58 cm. There was no noticeable difference in the size of sheep/goat between the phases.

5.3.2.3 Gnawing and Burning

There were nine cases of gnawing on sheep/goat fragments from the countable material. All cases were of carnivore gnawing with 6 being in the early stage 5 & 6. The heavier presence of carnivore gnawing may be down to re-deposition of the bone. Gnawing mainly occurred on the proximal and distal ends of radii, humeri, and metapodia.

5.3.2.4 Butchery

A total of 50 butchery marks were recorded on sheep/goat fragments. Details of butchery marks and pattern evidence will be discussed further in chapter 6.

5.3.2.5 Pathology

Two cases of pathology were observed for sheep/goat. They were both examples of dental pathologies in which a molar had been lost ante-mortem and the mandible had fully resorbed the tooth, leaving the tooth row filled in by bone. This is likely caused by periodontal disease or abscess formation (Baker & Brothwell, 1980).

5.3.3 Pig

Pig made up 14.3% NISP in phases 5 & 6 then decreases throughout each phase to only 3.25% in phase 10. The decrease in pig remains over time may have been due to a decreased reliance on the animal for food. As pig produce no secondary product, the presence on site would solely be for dietary purposes.

Nevertheless, meat value calculations indicate that pig produced more consumable meat in phases 5 & 6, 7 & 8 and 9 than sheep/goat did. At Prudhoe (Davis, 1987a) and Barnard (Jones, et al., 1985) castles, pig followed a similar pattern and declined after the late fourteenth century. Davis (1987a) states that after the sixteenth century mutton played a more important dietary role than pork did. This can be seen in phase 10 (Appendix table 85) where sheep/goat over takes pig in terms of percentage of consumed meat.

Bone survival patterns show a high percentage of mandibles, humeri, radii, ulnae and metapodia. There was a small presence of phalanges in all phases but was limited to first phalanges, they are generally more robust than the second and third, but may also be a size bias. Also, as pigs appear to have been slaughtered at a reasonably young ages their bones would have been more porous and more likely to be damaged. As most elements are present, it is likely that onsite butchering occurred.

5.3.3.1 Ageing

5.3.3.1.1 Tooth wear

Tables 65-68 shows that there were 17 Higham mandible wear stages that could be estimated for pigs. These stages varied from stage 5 (2-4 months) up to stage 22 (25-27 months). The data is what we would expect from pig slaughter patterns as there would not be animals older than 27 months. Pigs are slaughtered when they reach their optimum weight around one to two years. The tooth wear data is a small sample size though the trend does seem to show that pigs were slaughtered most often around stages 14-20 (12 months to 23 months).

5.3.3.1.2 Epiphyseal Fusion

The epiphyseal fusion data (Appendix table 71) demonstrates that approximately 60% of pigs were slaughtered before 30 months of age. There was only a presence of animals 42 months or older in phase 5 & 6 and phase 10. This phase was the only phase with a large enough sample set to properly analyse epiphyseal fusion. Approximately 86% of pig elements overall were unfused in this phase with 33.3% of elements fused in the early fusion stage. As discussed in chapter 2 suckling pigs became somewhat of a delicacy as pigs in general may have become less of a high status food. This may be the case at Edlingham as there is a larger amount of unfused bone in the early fusion stage. As later phases do not have an adequate amount of pig bone to draw comparisons with the earliest phase, it is unclear as to whether the pattern seen in phase 5 & 6 carried through the occupation of the site. The ageing data for pig is somewhat consistent with other medieval castles. At Baynard's Castle there was a strong presence of young pigs similarly to phase 5 & 6, where 66.7% of elements were unfused before 18 months of age (Armitage, 1977).

5.3.3.2 Metrics

There were two estimated shoulder heights that could be calculated for pig and they were both from astragali in phase 5 & 6. The shoulder heights were 58.4 cm and 57.8 cm. The obvious limit in sample size means interpretations about pig size cannot be made. However, pigs from Prudhoe Castle showed to have no change in size over time, which may or may not have been the case at Edlingham Castle.

5.3.3.3 Sex Determination

Pig sexing can be determined by the shape and size of the mandibular and maxillary canines. There were 18 pig canines that could be used for sexing. Eight were classified as female and 11 classified as male. There were more male canines in all phases apart from phase 10 where there were one male and five female canines. The higher number of male canines overall may be due to the fact that female canines are smaller and therefore less likely to be recovered.

5.3.3.4 Burning and Gnawing

There was one case of burning, which was in phase 5 & 6 on a femur showing evidence of a calcined femoral head. There was also only one case of gnawing which was on a fourth metacarpal exhibiting evidence of carnivore gnawing.

5.3.3.5 Butchery

There were only eight cases of butchery recorded for pig specimens. Of these eight cases, six were heavy chop marks. Further discussion of pig butchery and more detailed interpretations will be provided in chapter 6.

5.3.3.6 Pathology

There was no evidence of pathology for pig in any phase at Edlingham Castle.

5.3.4 Dog

The dogs from Edlingham Castle vary in size and make up 10-15% of the NISP for phases 9 and 10. There was evidence of dog in most phases except phase 7 & 8. Several contexts such as F56, F116, from phase 9 and F108 from phase 10 have a greater presence of dog than any other species, while not all elements were recovered it would be safe to assume these were mostly full dog skeletons. There was a presence of most cranial and post-cranial skeletal elements from dogs including small bones such as metapodia, phalanges and teeth and the majority of these bones were in good condition.

5.3.4.1 Ageing

5.3.4.1.1 Epiphyseal Fusion

There were 163 dog elements that could be assessed for fusion, only 10 elements were unfused and they were later fusing elements at +12 months. These are show in table 73 but dog elements could only be assessed for fusion for phase 10.

5.3.4.2 Metrical Data

There were 22 shoulder heights that could be calculated for dog, ranging from 29.6 cm up to 79.6 cm. This shows the presence of a very large dog and a much smaller breed. There seems to be a wide range of dog sizes with animals between 30-52 cm shoulder heights and then a group 76-79 cm. Romano-British dogs show a similar variability in size from lap dogs to large hounds/hunting dogs (Davis, 1987b). The larger sized dogs in the Roman and Anglo-Saxon period were believed to be used for hunting, guarding or fighting (*ibid*). This is likely the case for the medieval hounds at Edlingham Castle. While the hounds stand tall at 79 cm they are only slightly larger than some other specimens seen at other medieval contexts such as Baynard's Castle (Armitage, 1977) and Dudley Castle (Thomas, 2005), which had animals ranging from around 40 cm up to 75 cm.

Hounds would have been kept for hunting large prey but also would have provided their owners with protection and allow them to pass through large crowds easily (O'Connor, 1992). Hounds in the medieval period included lymers, brachs, greyhounds, mastiffs and alaunts (Warner, 2001). The life of a dog in a medieval castle would have been very good as they would have been permitted to live and eat with humans (*ibid*). The household of Joan de Valence kept a pack of dogs which were solely for the estate and it is documented that other packs of dogs would have visited the estate (Woolgar, 1999). The shoulder heights and bone morphology correspond with large hounds, not wolf, though wolves were around during part of the medieval period. Destruction of the wolves' habitat through deforestation may have led to the eventual extinction of wolves in Britain (Yalden, 1999). Wolves apparently remained common around 1547-87, but then were thought to have become extinct by 1684, 20 years after they were last mentioned in text (*ibid*).

5.3.4.3 Burning and Gnawing

There was no evidence of burning or gnawing on any of the fragments of dog remains.

5.3.4.4 Pathology

There was one suspected case of pathology from phase 9 in which the third metatarsal was fused at the proximal end to the fourth metatarsal.

5.3.5 Horse

Horse bones only made up a small percentage of the overall NISP. The phase with the largest amount of horse bone was phase 10 with 12.21% NISP and an MNI of three. There was no evidence of butchery and only one incident of gnawing which was seen on a calcaneus in phase 9. The lack of butchery evidence on horse fragments cannot rule out that horse was not consumed for meat by humans or dogs.

5.3.5.1 Ageing

5.3.5.1.1 Epiphyseal Fusion

All horse bones were fused except five fragments from phase 9. All unfused elements were those that fuse after 15 months of age (see table 72).

5.3.5.2 Metrics

There were nine estimated shoulder heights for horse ranging from 126.9 cm to 152.2 cm. The range in heights may be an indication of the presence of ponies and horses. The average height is approximately 14 hands which is similar to the height of horses at Dudley Castle (Thomas, 2005).

5.3.5.3 Burning and Gnawing

There was no evidence of burning on any of the horse remains and there was only one incident of gnawing on a calcaneus by a carnivore.

5.3.5.4 Pathology

There were also a few signs of pathology in phase 10 for horse. A metacarpal exhibited signs of mild exostosis, and a metatarsal with spavin that has caused severe extra bone growth and fusion with the tarsals. Spavin causes limited movement in the lower joint and mild lameness (Baker & Brothwell, 1980). The aetiology of the disease is unknown, but believed suggestions are that it is hereditary or caused by excessive work (*ibid*).

5.3.6 Deer

Deer made up a small proportion of the overall NISP for the assemblage, the majority of deer fragments were red deer, though there was evidence of roe deer and fallow deer antler. Deer remains were present in each phase of the assemblage. Bone survival seems to be dominated by meat bearing elements such as scapulae, humeri and also limb bones such as tibiae and metapodia. There was evidence of crania but no mandibles or loose teeth recovered. Deer were uncommon at Prudhoe Castle also, but the majority of deer fragments represented were from roe deer (Davis, 1987a).

5.3.6.1 Ageing

5.3.6.1.1 Epiphyseal Fusion

There were no deer mandibles recovered from the assemblage. There were also no unfused early stage fusion elements and out of 38 elements, only 4 of those were unfused. As the data set is very small it is difficult to make any interpretations besides the idea that most remains were not young animals (less than a year).

5.3.6.2 Burning and Gnawing

There were no cases of burning on deer fragments and there was one case of gnawing on a distal tibia by a carnivore.

5.3.6.3 Butchery

There were 13 incidences of butchery on deer remains, on femora, tibiae and antler. Detailed descriptions and interpretations of the butchery marks will be provided in chapter 6.

5.3.7 Other Species

5.3.7.1 Cat

There were only five fragments belonging to cat in the assemblage. All fragments were fused and were dated to phases 9 and 10. Cat bones were found in contexts with other comingled bone from various species. There was no evidence of gnawing, burning or butchery.

5.3.7.2 Rabbit

Rabbit bones were found in phases 5 & 6, 9 and 10. Phase 10 had the highest number of rabbit remains with a NISP of 69 and an MNI of 7, phase 9 had only 2 rabbit fragments and phase 5 & 6 had 5. The rabbit remains from phase 10 mostly came from context F2 (Gatehouse: building collapse layers). Rabbits from this context were also mainly unfused bones particularly tibiae and femora. As discussed in chapter 2, rabbits were known for being owned and traded by the wealthy and maintained in warrens. Rabbits may have been used as a source of fur or food but it is difficult to know how much they contributed to the diet of the wealthy (Grant, 1988). There was also no evidence of butchery, burning or gnawing on the rabbit remains. When analysing rabbit remains it is important to take into consideration that the remains may not always date to the contexts they were found in as they are burrowing animals.

5.3.7.3 Fox

There were two fragments of fox from phase 9, a tibia and a femur. The tibia had a deep cut mark in the upper shaft, close to the proximal end, evidence of possible skinning.

5.3.7.4 Rat and Mouse

There was one fragment of rat from phase 5 & 6 and one fragment of mouse from phase 10. There was no evidence of burning, gnawing or butchery.

5.3.7.5 Bird

Bird made up 21 of the countable fragments found at Edlingham Castle. In a preliminary assessment found in the archive it was suggested that there was evidence of tawny owl and barn owl, yet these fragments were not found in the assemblage boxes and may have been removed from the rest of the collection at some point during original assessment. Most of the bird bone came from phase 5 & 6, with one fragment from phase 9 and one from phase 10. The bird bone that came from context A254 consisted of 15 bones and was mostly goose and chicken bones, with five unfused fragments. Most bone belonged to domestic fowl, though there were two goose bones and a swan tibia.

The animal bone from Edlingham Castle has provided a wealth of information about the species present during the occupation of the site and the nature of animal exploitation. The following chapter will discuss the analysis of butchery and how the manner in which animals were exploited correlates with the changes in social status of the site over time. The faunal evidence has shown several similarities to other comparative sites of the time, yet provides insight into how Edlingham Castle is different.

5.3.8 Species Represented

Cattle were the most abundant species and would have provided the most meat overall. The age/slaughter patterns suggest that cattle were being killed at optimal age for a meat based economy with animals slaughtered around the 2-3 year age range. There was also pathological evidence that cattle were being used for traction. The presence of young calves remains suggests possible veal consumption. From the bone survival data it suggests that cattle were slaughtered onsite as the majority of elements were present.

Sheep/goat had a varying age distribution between early and later phases of occupation. In the later periods the data indicates that sheep/goat were slaughtered at an early age suggesting the animals were being exploited primarily for meat, whereas in earlier phases animals seemed to generally be slaughtered slightly later, suggesting a dairy or wool economy. The presence of young animals may also be an indication that males were used as studs and slaughtered at a young age. Sheep/goat appear to have been brought to site on hoof, though there may have been a mixture of onsite slaughter and dressed carcasses being brought to site. The decrease in age of slaughter for sheep most likely relates to the decline in pig remains, and that mutton was having to make up more of the diet.

As pigs do not provide secondary products they are slaughtered when they have reached optimum weight for consumption, which is the case at Edlingham, around the one to two year age range. The proportion of pig declined from the earlier phases of occupation to the later phases, which show less reliance on the species as a meat source. The presence of young pig remains suggests possible consumption of suckling pig. The bone survival data for pig also suggests on site butchery was taking place through much of the occupation of the site.

Hunting dogs were present at Edlingham, but there was also evidence of varying ranges of smaller dogs on site. Several fragments of horse recovered exhibited signs of possible work related pathologies such as exostosis and spavin.

Red deer were the most common deer species present though there was evidence of roe and fallow deer antler, with signs of butchery which are indications of probable craftwork activity.

General increase in the size of domestic species is typically considered an indication of changes in the dynamic of improved husbandry techniques. The data from Edlingham Castle is a small sample size in terms of being able to collect metrical data. For cattle there was actually a decrease in the size of cattle, though this may merely be a pattern that is insignificant and related to the small sample size. There was no noticeable size increase over time for sheep/goat, which was also the case for pig.

5.3.9 Evidence of High Status

The exploitation of such a variety of species is what one would expect from a high status medieval castle assemblage. The presence of wild species such as deer, a heavy presence of meat bearing elements, presence of rabbits, hunting hounds, swan and young pigs and young cattle are all characteristics that are indicative of a medieval elite diet and lifestyle. Hunting would have been a popular activity of the lords of the castle evident from the large hunting dogs found on site. The presence of rabbit on site could potentially be a sign of the elite keeping rabbit warrens, another pastime of the social elite.

The ways in which animals are butchered at Edlingham also provides details about the methods of processing and the dietary preferences. The butchery data and social implications will be presented and further discussed in chapter 6 to delve further into the correlation between social status and the manner in which animals are exploited. The assemblage has provided many insights into what the elite were choosing to consume and how that shifted over the occupation of the site.

Cattle played an important dietary role across all phases of occupation containing animal bone. Cattle were largest in size during phase 5 & 6, which could suggest preference of a larger breed. Consumption of pig was the highest during phase 5 & 6 as would be expected as this is the highest status period when the hall house was owned by the Feltons during the period of expansion and fortification. The highest NISP percentage for deer was also during phase 5 & 6, which would go along with the high status trend. A shift in status occurred in phase 9 which saw the castle fall on hard times. This is not necessarily reflected in the animals consumed but by phase 10 a decline in the amount of pig consumed is apparent. The next chapter will look further at how status affects exploitation by analysing the butchery data and providing further interpretations about the rise and fall of status at Edlingham and how methods and types of butchery correlate with this.

Chapter 6: Edlingham Castle Butchery Evidence

As discussed in chapter 3 every fragment, countable and non-countable, exhibiting signs of butchery evidence was recorded on an Excel worksheet that was imported into ArcGis models of the corresponding species. The purpose of recording butchery evidence in this manner was to provide a specific and visual reference to show the area on the bone where marks appear and what type of mark (chop, cut or sawn) were present. Other variables noted were, if there were multiple occurrences per bone, the implement used and what the function of the mark would have been. This chapter will look at the butchery evidence in detail for cattle, sheep, pig and deer and discuss patterns over time, and what the social variations and implications are.

6.1 Cattle

In analysing the cattle butchery data as a whole, several apparent findings emerged. The most numerous cut marks are seen on rib fragments, which would have been caused by a sharp knife stripping flesh from the carcass. There was also a large presence of chop marks on the ribs which could also be related to the removal of flesh but also disarticulation into joints.

Phase 5 & 6 had a high number of cut marks on the proximal radii and several other post cranial cut marks on the scapulae blade and the lower distal humeri.

Chop marks were the most frequent on mandibles and the distal humeri. Chop marks on the mandible, particularly the ramus, can be related to the removal of the cheek muscle as a meat source (Rixon, 1989). There were only cut marks evident on the ramus yet there was evidence of chop marks on the mandibular bodies. Evidence of sawing was only present on three bone fragments, three saw marks on a small humerus fragment, two marks on a tibia and one saw mark on the lower illium. Saws are used by modern butchers and it would be more than likely that if used during the medieval period that they were used for craftworking (Armitage, 1977).

Figure 8: Cattle mandible fragment with cut marks (Photo by Hayley Foster).

6.1.1 Data- Quantification

The butchery evidence for cattle consisted of 160 cut marks, 69 chop marks and 6 saw marks. Approximately 13 percent of the bone recorded showed signs of butchery. Figures 9 and 10 show cut and chop mark frequencies.

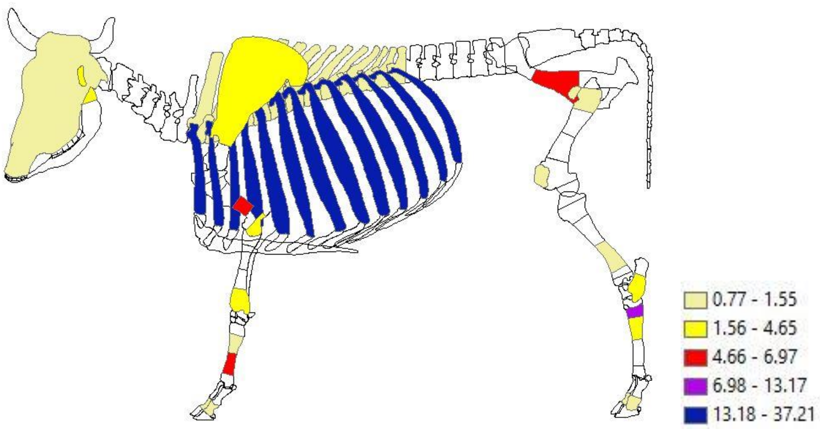

Figure 9: Cut mark frequencies overall for cattle from Edlingham Castle.

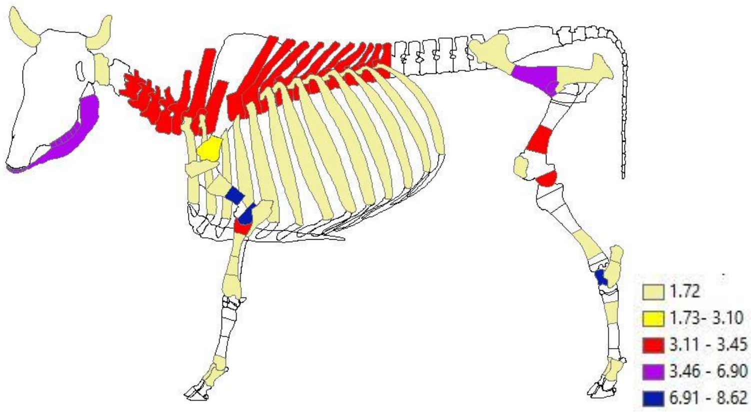

Figure 10: Chop mark frequencies overall for cattle from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop	%sawn
1	skull	skull	1			0.78		
20	mandible	mandible		4			6.90	
20.1	mandible	mandible hinge	5			3.88		
22	horn core	horn core		1			1.72	
26	atlas	atlas		1			1.72	
28	cervical vertebra			2			3.45	
29	thoracic vertebra		1	2		0.78	3.45	
33	rib	rib	48	1		37.21	1.72	
36.1	scapula	articulation		4			3.10	
36.2	scapula	blade	3			2.33		
38.11	humerus	proximal upper		1			1.72	
38.21	humerus	upper shaft		1	3		1.72	75.00
38.22	humerus	lower shaft	8	5		6.20	8.62	
38.32	humerus	lower distal	5	5		3.88	8.62	
39.1	radius	proximal		2			3.45	
39.21	radius	upper shaft		1			1.72	
39.22	radius	lower shaft		1			1.72	
39.3	radius	distal	4	1		3.10	1.72	
40.1	ulna	proximal		1			1.72	
57.21	metacarpal	upper shaft	2			1.55		
57.22	metacarpal	lower shaft	8			6.20		
57.3	metacarpal	distal		1			1.72	
70.1	pelvis	illium upper		1			1.72	
70.2	pelvis	illium lower	9	3		6.98	5.17	
71	pelvis	ischium		1			1.72	
74.11	femur	head	2	4		1.55	6.90	
74.13	femur	proximal lower	1			0.78		
74.22	femur	lower shaft		2			3.45	
74.32	femur	lower distal		2			3.45	
75	patella	patella	1	1		0.78	1.72	
76.22	tibia	lower shaft	2	1	1	1.55	1.72	25.00
79	astragalus	astragalus		5			8.62	
80.1	calcaneus	upper		1			1.72	
80.2	calcaneus	lower	5	1		3.88	1.72	
95.1	metatarsal	proximal	17			13.18		
95.21	metatarsal	upper shaft	6	1		4.65	1.72	
109	first phalanx	first phalanx		1			1.72	
110	second phalanx	second phalanx	1			0.78		

Table 2: Butchery data overall for cattle from Edlingham Castle.

The below data shows cattle butchery frequencies by phase. Dividing the data this was way can potential show butchery practices changes over time.

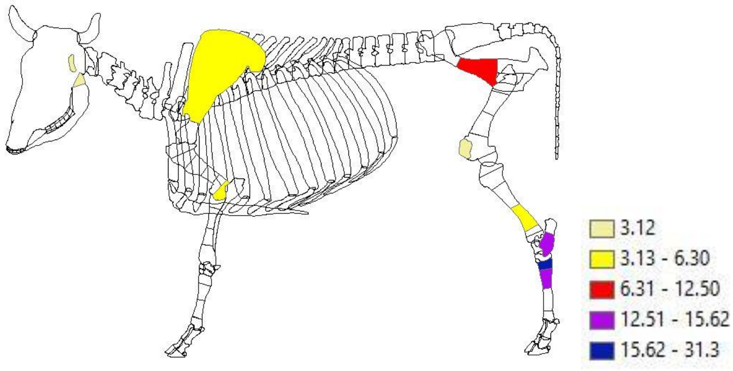

Figure 11: Cut mark frequencies for phase 5 & 6 for cattle from Edlingham Castle.

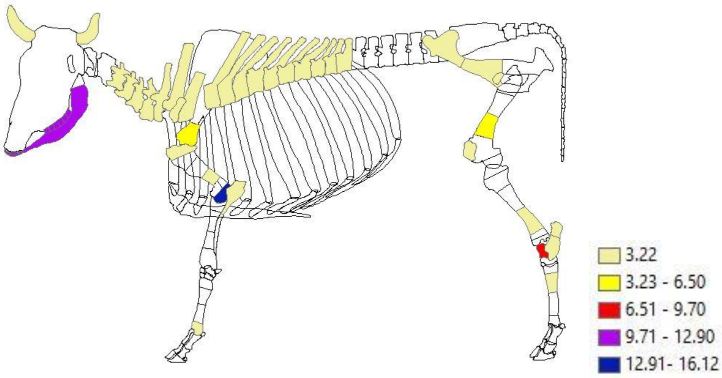

Figure 12: Chop mark frequencies for phase 5 & 6 for cattle from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop
20	mandible	mandible		4			12.9
20.1	mandible	mandible hinge	1			3.1	
22	horn core	horn core		1			3.2
28	cervical vertebra			1			3.2
29	thoracic vertebra			1			3.2
36.1	scapula	articulation		2			6.5
36.2	scapula	blade	2			6.3	
38.11	humerus	proximal upper		1			3.2
38.22	humerus	lower shaft		1			3.2
38.32	humerus	lower distal	2	5		6.3	16.1
40.1	ulna	proximal		1			3.2
57.3	metacarpal	distal		1			3.2
70.1	pelvis	illium upper		1			3.2
70.2	pelvis	illium lower	4	1		12.5	3.2
74.11	femur	head		1			3.2
74.22	femur	lower shaft		2			6.5
75	patella	patella	1	1		3.1	3.2
76.22	tibia	lower shaft	2	1	1	6.3	3.2
79	astragalus	astragalus		3			9.7
80.1	calcaneus	upper		1			3.2
80.2	calcaneus	lower	5	1		15.6	3.2
95.1	metatarsal	proximal	10			31.3	
95.21	metatarsal	upper shaft	5	1		15.6	3.2

Table 3: Butchery data for cattle from phase 5 & 6 from Edlingham Castle.

As there was such a small amount of data for phase 7&8 for cattle, diagrams were not produced (see table 4).

ID	Element	Portion	Cuts	Chops	%cut	%chop
28	cervical vertebra			1		100
33	rib	rib	3		100	

Table 4: Butchery data for cattle from phase 7 & 8 from Edlingham Castle.

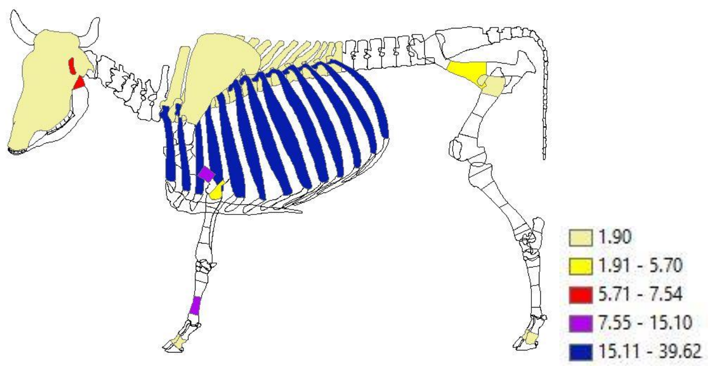

Figure 13: Cut mark frequencies for phase 9 for cattle from Edlingham Castle.

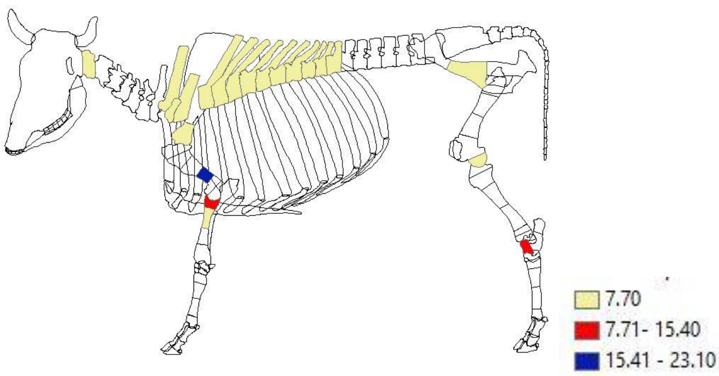

Figure 14: Chop mark frequencies for phase 9 for cattle from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
1	skull	skull	1		1.9	
20.1	mandible	mandible hinge	4		7.5	
26	atlas	atlas		1		7.7
29	thoracic vertebra		1	1	1.9	7.7
33	rib	rib	21		39.6	
36.1	scapula	articulation		1		7.7
36.2	scapula	blade	1		1.9	
38.22	humerus	lower shaft	8	3	15.1	23.1
38.32	humerus	lower distal	3		5.7	
39.1	radius	proximal		2		15.4
39.21	radius	upper shaft		1		7.7
57.22	metacarpal	lower shaft	8		15.1	
70.2	pelvis	illium lower	3	1	5.7	7.7
74.11	femur	head	1		1.9	
74.13	femur	proximal lower	1		1.9	
74.32	femur	lower distal		1		7.7
79	astragalus	astragalus		2		15.4
110	second phalanx	second phalanx	1		1.9	

Table 5: Butchery data for cattle from phase 9 from Edlingham Castle.

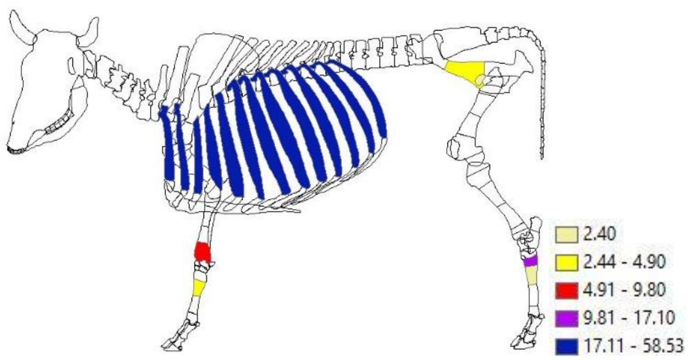

Figure 15: Cut mark frequencies for phase 10 for cattle from Edlingham Castle.

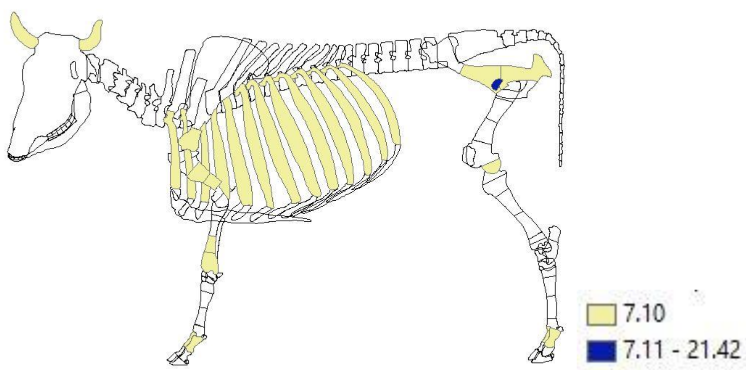

Figure 16: Cut mark frequencies for phase 10 for cattle from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop
22	horn core	horn core		1			7.1
33	rib	rib	24	1		58.5	7.1
36.1	scapula	articulation		1			7.1
38.21	humerus	upper shaft		1	3		7.1
38.22	humerus	lower shaft		1			7.1
39.22	radius	lower shaft		1			7.1
39.3	radius	distal	4	1		9.8	7.1
57.21	metacarpal	upper shaft	2			4.9	
70.2	pelvis	illium lower	2	1		4.9	7.1
71	pelvis	ischium		1			7.1
74.11	femur	head	1	3		2.4	21.4
74.32	femur	lower distal		1			7.1
95.1	metatarsal	proximal	7			17.1	
95.21	metatarsal	upper shaft	1			2.4	
109	first phalanx	first phalanx		1			7.1

Table 6: Butchery data for cattle from phase 10 from Edlingham Castle.

6.1.2 Skinning/filleting/disjointing

Skinning marks are characteristically seen on the lower limbs and the head and produce fine slice cut marks, for example on the phalanges and crania.

Filleting marks are characterised by cut marks as a result of detaching all possible meat, these marks are likely to appear on muscle attachments.

Disjointing or disarticulation will result in butchery marks on the articulation of the surface of the joint. Chop marks seen frequently on the lower shaft or distal humeri are evidence of disjointing. Chop marks on the cattle fragments were infrequently clean chops, with evidence of multiple attempts at disarticulation, showing an unmethodical and non-specialist approach to dismemberment.

6.1.3 Trends in Medieval Butchery

The animal bone assemblage for Edlingham Castle did not contain a vast amount of butchery evidence but some important trends were discovered. Cattle at Edlingham Castle were not butchered with a single division down the centre of the carcass. This type of division differentiates the left and right side of the carcass in the butchery process. Rixon (1989) states that dividing a carcass into two sides would have begun around the sixteenth century as butchers favoured chopping carcasses into separate joints of meat. There is no evidence of this type of carcass division at Edlingham, in fact there is evidence that vertebrae were not chopped longitudinally. Figure 17 shows evidence of a dorso-ventral chop to the vertebrae. For example, at Baynard's Castle the butcher split the animal by cutting through the pubic symphysis and chopping the vertebral column down the centre of the carcass (Armitage, 1977), whereas this is not evident at Edlingham. This will be further discussed in chapter 12.

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Figure 17: Unfused cattle vertebra from Edlingham Castle showing a dorso-ventral chop through body (Photo by Hayley Foster).

Heavy chop marks can be seen on distal humeri, proximal and distal radii and the astragali. From the assemblage data, it would be fair to say that most butchery was happening onsite. What this implies is that the butchers slaughtering the animals at Edlingham were not necessarily professional. There was very little evidence of bone splitting or fracture evidence that would support extensive exploitation of marrow at Edlingham. It is imperative to take into account the small sample size, as from the literature it is known that marrow was consumed as part of the medieval menu, for example pottage which was based on bone stock served as an everyday meal or at feasts (Black, 1985). In regards to differences between earlier and later phases, the samples size doesn't allow for distinct differences to be distinguished. Cuts were still occurring on the upper metatarsal in phase 10, and disarticulations were still occurring at the major joints.

6.2 Sheep/Goat

Butchery evidence for sheep/goat consisted of 50 butchery marks overall. Figures 18 and 19 depict cut and chop mark frequencies for sheep/goat overall. The most common findings were cut marks on rib fragments. Differentiating rib fragments by species is not always possible and generally they are classified on a size based process therefore, it was not possible to definitively conclude that all of the ribs assigned to sheep/goat are in fact sheep/goat. Chop marks on the lower shaft of the tibia and cut marks on the upper shaft of the radius were common for sheep/goat. Chop marks on the distal humeri were also fairly common, as evidence of disarticulation. Chop marks on the distal humeri and tibial shafts were not always smooth lines, but rather crude looking marks much like those seen on the cattle remains. For sheep/goat the highest amount of butchery occurred in the first two phases, yet was still a small sample making it difficult to make any strong interpretations to compare the trends over the span of the site.

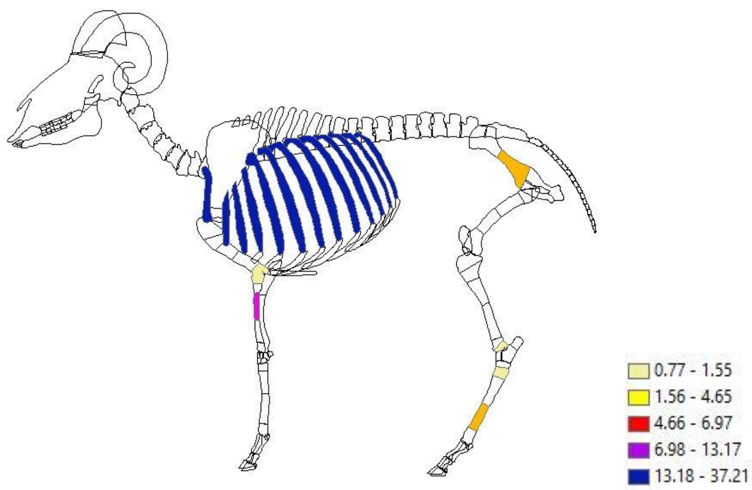

Figure18: Cut mark frequencies overall for sheep/goat from Edlingham Castle.

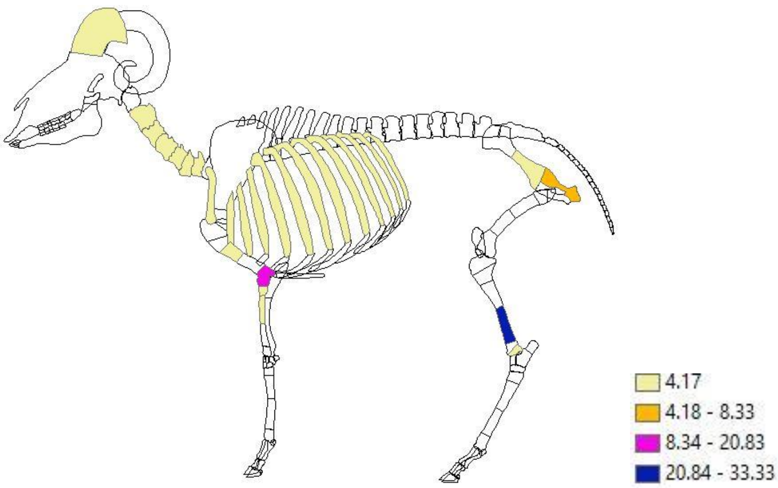

Figure 19: Chop mark frequencies overall for sheep/goat from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
22	horn core	horn core		1		4.17
27	axis			1		4.17
28	cervical vertebra			1		4.17
33	rib	rib	16	1	57.14	4.17
38.21	humerus	upper shaft		1		4.17
38.22	humerus	lower shaft				
38.3	humerus	distal	1	5	3.57	20.83
39.1	radius	proximal		1		4.17
39.21	radius	upper shaft	5	1	17.86	4.17
70.2	pelvis	illium lower	2	1	7.14	4.17
71	pelvis	ischium		2		8.33
76.22	tibia	lower shaft		8		33.33
76.32	tibia	lower distal	1	1	3.57	4.17
95.1	metatarsal	proximal	1		3.57	
95.22	metatarsal	lower shaft	2		7.14	

Table 7: Butchery data overall for sheep/goat from Edlingham Castle.

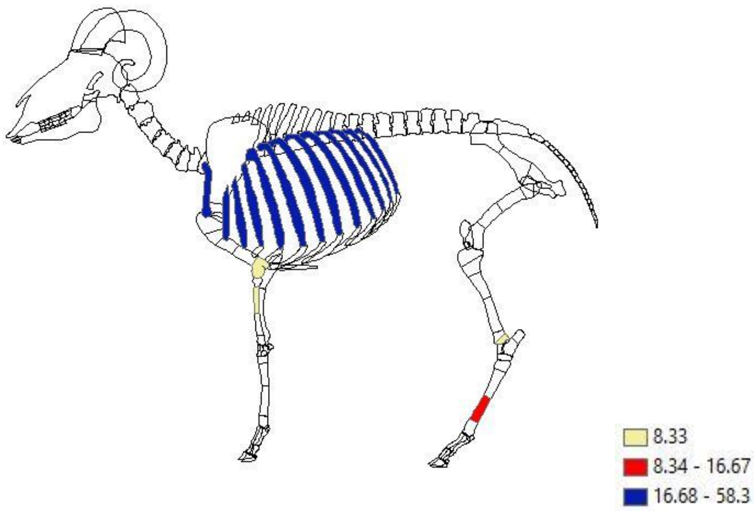

Figure 20: Cut mark frequencies for phase 5 & 6 for sheep/goat from Edlingham Castle.

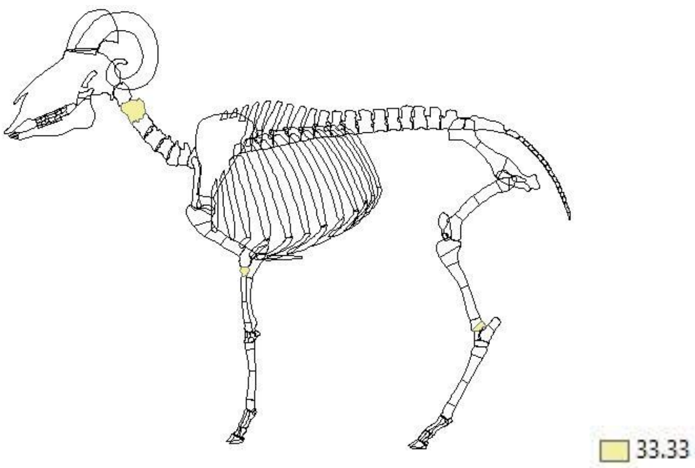

Figure 21: Chop mark frequencies for phase 5 & 6 for sheep/goat from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
27	axis			1		33.3
28	cervical vertebra					
33	rib	rib	7		58.3	
38.3	humerus	distal	1		8.3	
39.1	radius	proximal		1		33.3
39.21	radius	upper shaft	1		8.3	
76.32	tibia	lower distal	1	1	8.3	33.3
95.22	metatarsal	lower shaft	2		16.7	

Table 8: Butchery data for sheep/goat for phase 5 & 6 from Edlingham Castle.

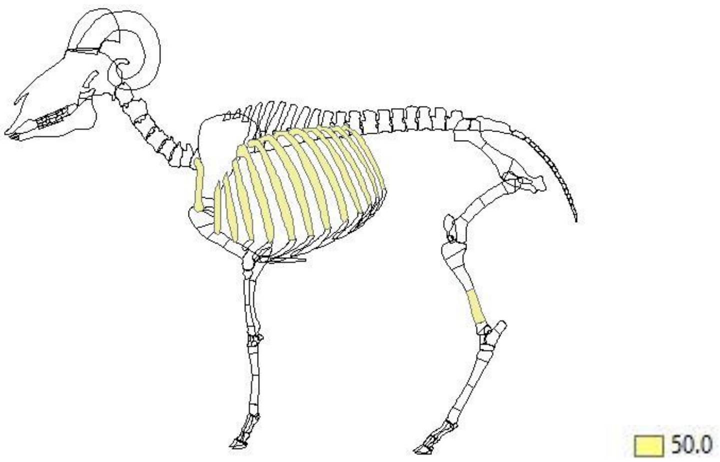

Figure 22: Cut mark frequencies for phase 7 & 8 for sheep/goat from Edlingham Castle.

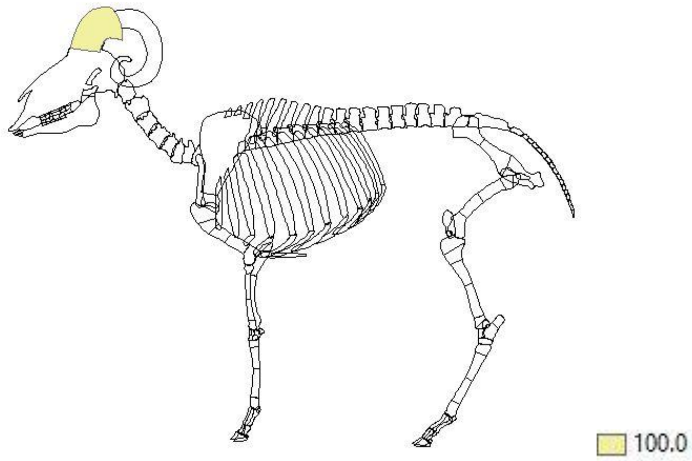

Figure 23: Chop mark frequencies for phase 7 & 8 for sheep/goat from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
22	horn core	horn core		1		100.0
33	rib	rib	8		50.0	
76.22	tibia	lower shaft	8		50.0	

Table 9: Butchery data for sheep/goat for phase 7 & 8 from Edlingham Castle.

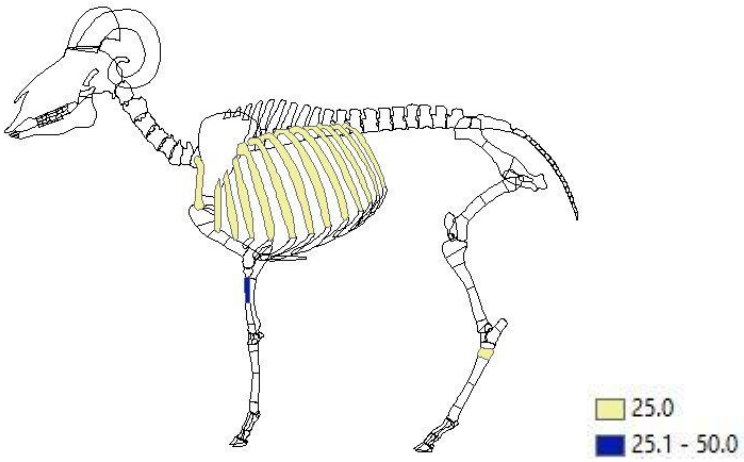

Figure 24: Cut mark frequencies for phase 9 for sheep/goat from Edlingham Castle.

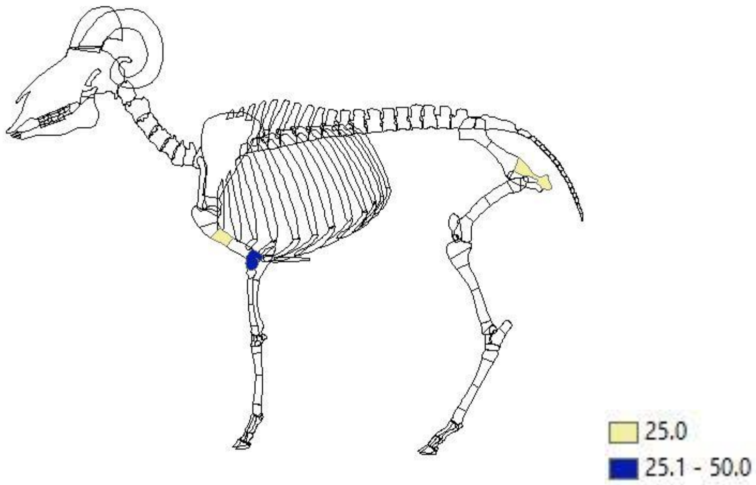

Figure 25: Chop mark frequencies for phase 9 for sheep/goat from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
33	rib	rib	1		25.0	
38.21	humerus	upper shaft		1		25.0
38.3	humerus	distal		2		50.0
39.21	radius	upper shaft	2		50.0	
71	pelvis	ischium		1		25.0
95.1	metatarsal	proximal	1		25.0	

Table 10: Butchery data for sheep/goat for phase 9 from Edlingham Castle.

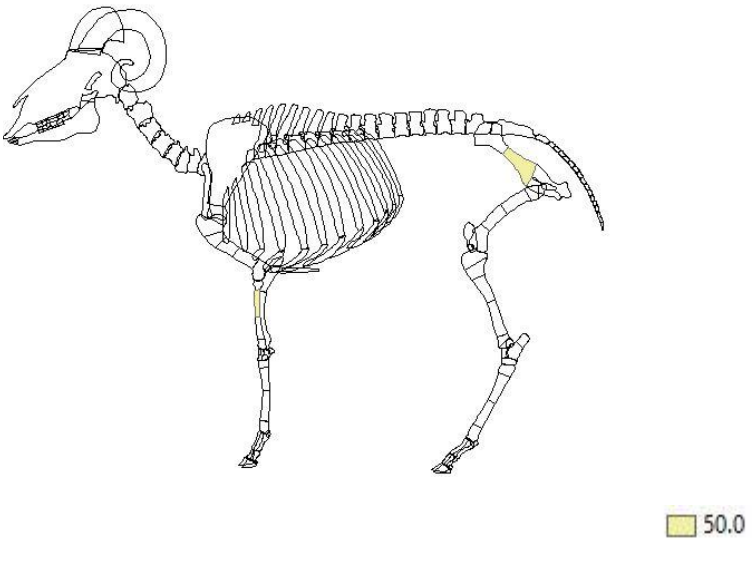

Figure 26: Cut mark frequencies for phase 10 for sheep/goat from Edlingham Castle.

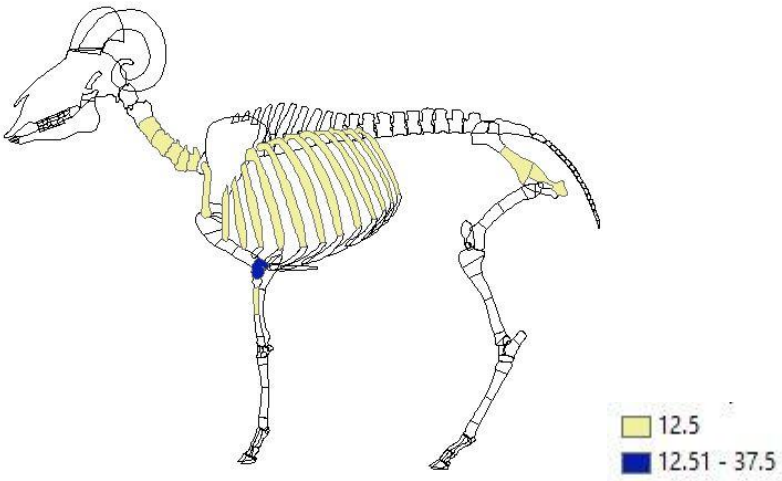

Figure 27: Chop mark frequencies for phase 10 for sheep/goat from Edlingham Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
28	cervical vertebra			1		12.5
33	rib	rib		1		12.5
38.3	humerus	distal		3		37.5
39.1	radius	proximal				
39.21	radius	upper shaft	2	1	50	12.5
70.2	pelvis	illium lower	2	1	50	12.5
71	pelvis	ischium		1		12.5

Table 11: Butchery data for sheep/goat for phase 10 from Edlingham Castle.

The data above shows the butchery data from the individual phases for sheep/goat. Highlighting the butchery in each phase can allow for changes in butchery patterns over time to be seen. For the case of Edlingham, the modest amount of data is not necessarily as helpful in deciphering butchery practice changes. The most amount of data on sheep/goat occurred during phase 5 & 6 and phase 10.

6.3 Pig

There was not a great deal of butchery evidence for pigs at Edlingham, the data showed two cut marks and six chop marks. Cut marks were seen on the radial shafts and chop marks occurred on the proximal radii, lower shafts of the humeri and the blades of the scapulae. There was too little evidence to make any interpretations about cultural changes or specific trends in methods of butchery. The chop marks that are present are consistent with joint disarticulation. Pigs would have been slaughtered solely for meat, as they produce no secondary products and produce more meat than a sheep or goat would. However, It is also a possibility that some of the rib fragments assigned to sheep/goat could have belonged to pig as is near impossible to differentiate as they share a similar size. Contexts with a dominance of pig fragments were considered pig ribs for the sake of this study.

6.4 Deer

Only five fragments exhibited evidence of butchery for deer. All of these butchered elements belonged to red deer. Two of these fragments were pieces of antler with cut marks from a sharp knife, while the others were cut marks on femora and a chop mark on a tibia.

6.5 Social Implications

The earliest phases containing animal bone would have been at the peak of high status for the residents of Edlingham Castle. From the faunal remains evidence we can see this from the variety of species included in the earliest and latest phases, however meat values indicate a decrease in pork and mutton in the diet. The butchery does not show a great deal of variation from early to later phases of occupation. Phase 5 & 6 has the highest amount of butchery marks, though this phase also had a higher NISP which would be expected. Phases 9 and 10 are when the shift in social status occurs, and the butchery evidence indicates less chops on the mandible and an increase in chops to the femora and rib cuts.

Household accounts from nobility include Henry Stafford's household in 1409 show that besides the butchering of the head, chine (vertebrae) and entrails of a carcass of an older cattle, would be butchered into four quarters and divided into four rounds, twenty portions per round (Woolgar, 1999, p. 12). From the butchery evidence at Edlingham we can conclude that head and feet were being removed, carcasses were not been split in halves through a longitudinal division down the vertebrae, and there was evidence of skinning and filleting of meat from the meaty joints. The evidence does not allow for determining specific cuts of meat though with a larger sample this may very well have been possible. In analysing the case studies to follow it will be possible to look at social and geographical similarities and differences in the way people were exploiting animals.

6.6 Conclusions

The surface condition from the bone was generally in good condition, while there were some cases of carnivore gnawing and root etching, these taphonomic factors did not make evaluating butchery marks an issue for this assemblage. The small sample size does somewhat limit comparing trends over the occupation of the site, yet looking at the butchery evidence overall we can piece together that most likely onsite butchery was occurred in conjunction with the evidence that most types of skeletal elements were present onsite. The butcher or butchers at Edlingham were most likely not professional such as those who would have worked in medieval towns. Professional medieval butchers would have been more methodical, and precise and uniform in terms of viewing the skeleton in two equal halves. Several marks on articulations seen in and around the same area, imply that it took the butcher several attempt to disjoint a carcass and cut flesh off of the bones.

Identifying specific cuts of meat was not possible as there is not sufficient data to draw definitive patterns. The butchery evidence gathered from the animal bone assemblage was not extensive, but a sufficient initial data set to use for comparison against the larger assemblages of the case studies to follow.

Chapter 7: Portchester Castle Background

Portchester originated as a Roman coastal fortification in the third century, re-occupied as a Saxon elite site and a medieval castle (Cunliffe, 1977, p. 2).

The faunal bone material analysed for Portchester Castle came from the medieval periods of occupation from the inner and outer bailey. Although a large amount of bone from the site came from the Roman and Saxon layers of occupation this was not included for the analysis of butchery for this study.

Portchester Castle was excavated between 1961 to 1972 by Barry Cunliffe and Julian Munby. Reports on the findings of the excavation were divided into five volumes. The first two volumes were on the Roman (Cunliffe, 1975) and Saxon (Cunliffe & Munby, 1975) periods of occupation, however the medieval period was divided into two volumes with data separated by the inner bailey (Cunliffe & Munby, 1985) and the outer bailey (Cunliffe, 1977) of the castle. A small fifth volume also includes material from the post-medieval period (Cunliffe & Garratt, 1994).

The aims of the excavation were to look at the development and transformation of the site from prehistory to the nineteenth century. The initial excavation strategy was to look at the Roman defences and settlement continuity (Cunliffe, 1975). Excavation commenced in the south-west corner of the fort in 1961 looking at the landgate and surrounding areas, and continued every year until the summer of 1972 (Cunliffe 1975, 1976, 1977).

According to the excavation reports there was 6998 bone fragments recovered from the outer bailey (Grant, 1977) and 8000 bones recovered from the inner bailey from the medieval layers (Grant, 1985).

7.1 History and Function of the Castle

Portchester Castle is located on the south coast of England on Portsmouth harbour. The castle had a multitude of uses and functions during its period of occupation. Portchester was a Roman fort, a Saxon settlement and a Royal burh (Munby, 1990).

7.1.1 Roman and Saxon

The Romans referred to the harbour as *Portus Magnus* and it is also believed that Vespasian landed at Portchester upon first arriving in Britain and resided in Portchester during a period of his stay (Timbs & Gunn, 1872). Coins, pottery, jewellery, shoes, and metal and antler work were evidence of Roman occupation (Munby 1990, p.31).

Portchester was occupied from 285 AD and into the Saxon period. The castle was used as a burh as defence against possible attacks from the Vikings (Cunliffe, 1975, p. 1). Evidence was found from the seventh to ninth centuries indicating timber houses wells, and rubbish pits (Munby, 1990, p.32).

[redacted]

Figure 28: The castle as it would have looked in 1211. Drawing by Tony Ball, (Munby, 1990 p.49). This image has been removed by the author of this thesis for copyright reasons.

7.1.2 Early Medieval

In 1004 AD Portchester was acquired by King Edward the Elder in exchange for Bishops Waltham (Munby, 1990). According to the Domesday Book, in 1086 Portchester was a rural manor, in the hands of William Manduit, the chamberlainship of the Exchequer (Rigold, 1965; Colvin, 1963). Upon Manduit's death the castle was passed to Henry II. When Manduit's daughter married, the land and offices were given to William de Pont de L'Arch, but the castle was kept by the crown (Rigold, 1965). Henry II most likely had possession of Portchester from 1154 with evidence that he stayed there in 1164 and 1167 (Colvin, 1963; Munby, 1985).

The medieval castle was built in a corner of the Roman fort, the inner bailey, which was created by the Normans and was the main part of the castle through the medieval occupation. There was a one storey castle keep which was located in the northwest corner of the inner bailey, with several forebuildings guarding the entrance of the keep (Rigold 1965; Munby 1990, p.35).

In the twelfth century, the Roman fort was adapted to become a tower keep reaching beyond the original Roman walls (Colvin, 1963). During this time, the inner bailey and the defences were constructed. Repairs were carried out on the castle as a precaution against possible attacks in 1173-4 (*ibid*).

The early thirteenth century saw improved domestic accommodation and minor works on the castle, this was also around the time that King John used the castle as a base for his hunting excursions in the Forest of the Bere (Munby 1965, p.3). In 1216, the castle was surrendered to prince Louis of France, but recovered a year later and repairs made (Colvin, 1963). The castle was retained by the crown and saw investment and visits from Edward I and Edward II.

[redacted]

Figure 29: Map of Portchester Castle (Rigold, 1965). This image has been removed by the author of this thesis for copyright reasons.

7.1.3 Late Medieval

Portchester Castle saw intensive military activity in the fourteenth century. The defences needed to be refurbished as castles all along the coast felt the threat of war from France (Munby, 1990; Cunliffe & Munby, 1985).

The fourteenth century saw Portchester used as a royal palace. The western part of the inner bailey was the designated royal quarters. Richard II's palace was constructed between the years 1396-99 in the western section of the bailey (Rigold, 1965). He also improved the gates and keep at this time.

Architecturally Portchester has been built with defensive and militaristic purposes in mind, but when peace was made with France concentration was shifted to construction of elaborate domestic buildings and offices (Colvin, 1963).

Into the fifteenth century the castle started to become dilapidated and some areas became ruinous with very little money being spent on the up keep of the castle or improvements. Robert Thorp was appointed clerk of works and remained in charge of the castle, yet there was no evidence that he was allowed to carry out repairs and no evidence that he received any money to do so (Colvin, 1963, p.792). According to Munby (1985) the last renovations occurred at the beginning of the seventeenth century by the Constable Sir Thomas Cornwallis and sold by Charles I, in 1632, to Sir William Uvedale, resulting in the castle no longer belonging to royalty (p. 4).

Portchester Castle had many functions over time, as mentioned above. The castle was a periodic royal residence and hunting seat for Henry II, King John, Richard II and Henry V. Portchester was used as a departure point for several military campaigns, including success at Agincourt (Munby, 1990). It was also the centre of a manor and was tied to the sources of its hinterland, such as field systems, woodland, salt-pans and surrounding forests. Portchester Castle was unique in that the Crown owned a third of the castle while the remainder belonged to Tichfield Abbey (Creighton, 2002, p.177). The adjoining village of Portchester was once a settlement that's origins are not entirely known (Munby 1977, p.4). It is thought that it was perhaps a peasant village during the Saxon period, or made up of enclosures during the Roman period (*ibid*).

The site continues to be of interest to archaeologists and in recent years a group from the University of Southampton have been conducting a survey to look at other areas within the castle interior and those area outside of the defences.

7.2 Phasing

The outer bailey was grouped into 5 phases:

1. Saxo-Norman A.D 1000-1100
2. Early medieval tradition A.D 1100-1200
3. Developed medieval tradition A.D 1200-1300
4. Late medieval tradition A.D 1300-1400
6. Painted ware tradition A.D 1470-1570

(No bones were identified for group 5).

The Inner bailey was grouped into 3 phases.

A.	Pits + occupation	pre-1320
B.	Pits + occupation	1320-1400
C.	Pits + occupation	1500-1600

Thus groups 3 and 4 from the outer bailey correspond with group A and B respectively. These corresponding phases produced the largest amount of bone, thus making these phases the most important for comparing and contrasting butchery patterns over time.

7.3 Previous Analysis

The animal bone from the inner and outer bailey was originally analysed and reported on by Annie Grant in 1985. The overall analysis of the data was sufficient, though the butchery data was still limited in describing where marks were occurring on the bones and interpreting the data. This assemblage is a large data set that will provide a wealth of important data on butchery practices and dietary trends during the medieval period of occupation of the castle.

The information from Grant's (1985) reports that provides relevant insight into status, diet and butchery practices is detailed below:

7.3.1 Inner Bailey vs. Outer Bailey

Inner Bailey

- The inner bailey saw better recovery methods, as the proportion of smaller animals was higher.
- No animals lived in the inner bailey besides dogs, cats and birds.
- The assemblage contained a low number of heads and feet indicating initial butchery not occurring in the inner bailey, yet did contain major meat bearing elements.

- Remains did include pig heads, but these were often cooked whole and considered a delicacy.
- The remains were almost all food refuse.
- Dogs found were possibly hunting dogs.
- High number of fish and bird bones recovered
- Knives and chopping tools used.
- More frequent use of chopping tools than knives, in comparison to the Roman and Saxon periods.
- Assemblage was more fragmented and cut into small pieces making them hard to identify.
- For cattle, butchery marks were mainly seen on humerus, pelvis, femur, calcaneus, astragalus, radius and ulna.
- For sheep, marks were mainly on femur, humerus and radius.
- For pig, marks were mainly on humerus and pelvis.

Outer Bailey

- Mostly consists of rubbish from the inner bailey.
- Animal stabled or grazing here.
- Knives and chopping tools used.
- Most frequent butchery marks were chops marks around the epiphyses.
- Bone splitting not common.
- Vertebrae mainly found transversely butchered, group 4 and 6 saw vertebrae split longitudinally.
- No bone tool industry.

With the large amount of bone retrieved from the inner and outer bailey the evidence should be plentiful and provide a great deal of insight into how animals were being exploited. Comparing trends between the inner and outer bailey and the other case studies examined will give a clearer picture of how animals were being exploited. It should also be possible to see clearer results develop in exactly how animals were being slaughtered. The preliminary evidence of longitudinal vertebral splitting may also provide evidence of professional butchery.

Chapter 8: Portchester Castle Butchery Evidence

As discussed in the previous chapter, when the medieval faunal assemblage from Portchester Castle was previously analysed by Annie Grant (1977, 1985) comments were made on a select few butchery patterns, yet there was no quantification, detailed descriptions, or visual representation of these butchery marks. Some observations made by Grant (1977) included that three types of tool were identified, marks around the epiphyses of the bone were the most common on cattle remains and sharp marks on the tibia show the cutting of ligaments. Another interesting insight that will be compared to the data collected is: "Vertebrae were generally found cut at right angles to the line of the spine, but in groups 4 and 6 vertebrae were found that had been split longitudinally along the line of the spine" (Grant 1977, p.223). No interpretation was given by Grant as to why this may be the case, though this is an interesting piece of social evidence that will be further explored on the new butchery evidence collected. Discussion in the original report on the inner bailey amounted to half a page on the butchery evidence, while the outer bailey report has one page dedicated to butchery. Grant comments in the report from the outer bailey that "The sample was not large enough to allow anything more than a brief outline of the butchery practices" (Grant 1977, p.223). As butchery was rarely discussed extensively in zooarchaeological reports in the past, it is more than likely that collecting butchery evidence was not necessarily a primary focus. There were some 2,285 butchery marks recorded from the material from the inner and outer bailey in this new study. As a result, using the methodology implemented for this case study, trends will be identified and interpretations made as there is enough evidence to provide these more detailed interpretations, as opposed to just a simple outline of butchery practices. As previously outlined, the inner bailey material consisted predominately of food waste from the kitchen within the castle, while the outer bailey assemblage also consisted of food waste found in the pits and gullies (Grant, 1977; Grant, 1985).

There were 8,000 bones overall from the inner bailey and 6,998 bones from the outer bailey (Grant, 1977; Grant, 1985). Approximately 15% of the faunal material exhibited signs of butchery. It is difficult to say whether this is a typical figure as there are few reports that go into detail with the exact number of butchery marks recorded and on how many elements. It is important to mention that most bones were butchered but archaeologically we cannot always see the evidence of this as cut marks do not always go deep enough to go below the periosteum.

The butchery data will be discussed in terms of location (inner vs. outer bailey) and time (overlapping time periods). Therefore, when examining which phases overlap between the inner and outer baileys, phase A from the inner bailey corresponds with phase 3 of the outer bailey and phase B corresponds with phase 4.

8.1 Phasing of the Animal Bone

Inner Bailey	Context	Date
A	Pits & occupation	Pre-1320
B	Pits & occupation	1320-1400
C	Pits & occupation	16th-17th century

Table 12: Phases and dates for inner bailey (Grant 1977).

Outer Bailey	Group	Context	Date
1	Saxo-Norman	Pits	1000-1100
2	Early med tradition	Pits	1100-1200
3	Developed med tradition	Pits & Gullies	1200-1300
4	Late med tradition	Gullies	1300-1400
6	Painted ware tradition	Gullies	1470-1570

Table 13: Phases and dates for outer bailey (Grant 1977).

8.2 Cattle Butchery

Butchery evidence on cattle remains consisted of 1,665 butchery marks from the medieval layers of the inner and outer bailey. Chop marks outnumbered cut marks in both the inner and outer baileys. There were only 26 saw marks identified, 24 of which came from the outer bailey. Figure 30 and 31 show frequencies of cut and chop marks for cattle overall.

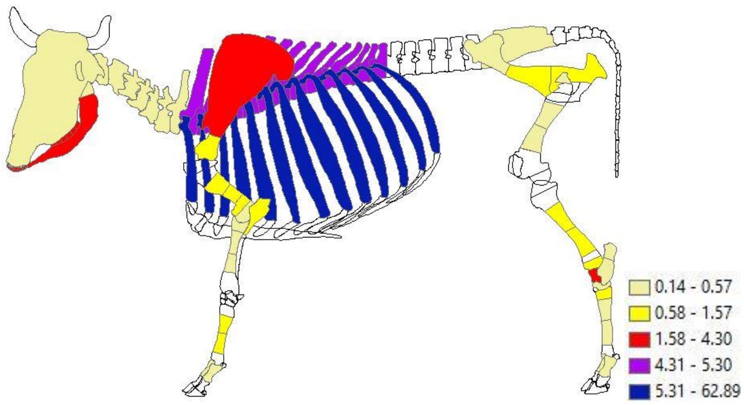

Figure 30: Cut marks frequencies overall for cattle from Portchester Castle.

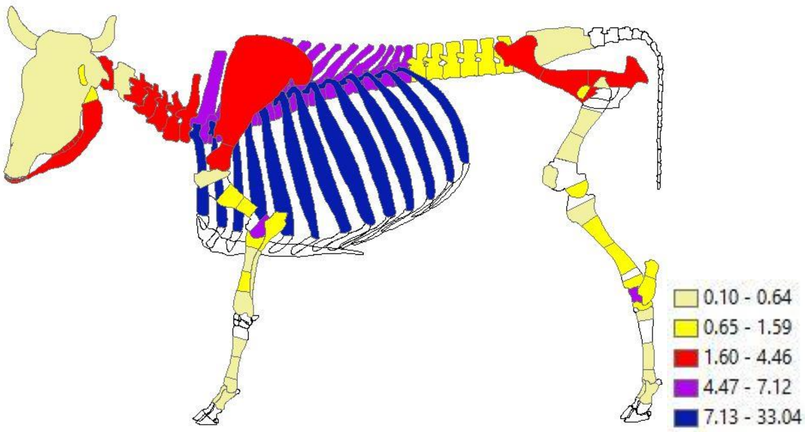

Figure 31: Chop mark frequencies overall for cattle from Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop	%sawn
1	skull	skull	3	3		0.4	0.3	
20	mandible	mandible	24	19		3.4	2.0	
20.1	mandible	mandible hinge	1	13		0.1	1.4	
22	horn core	horn core		6			0.6	
26	atlas	atlas	1	22		0.1	2.3	
27	axis	axis	2	6		0.3	0.6	
28	cervical vertebra		1	26		0.1	2.8	
29	thoracic vertebra		37	67		5.3	7.1	
30	lumbar vertebra			13			1.4	
31	sacrum		1	1		0.1	0.1	
33	rib	rib	439	311		62.9	33.0	
36.1	scapula	articulation	6	42		0.9	4.5	
36.2	scapula	blade	30	20	2	4.3	2.1	7.7
38.11	humerus	proximal upper		4			0.4	
38.21	humerus	upper shaft	6	15	4	0.9	1.6	15.4
38.22	humerus	lower shaft	11	9	2	1.6	1.0	7.7
38.31	humerus	upper distal	7			1.0		
38.32	humerus	lower distal	4	61	2	0.6	6.5	7.7
39.1	radius	proximal	1	12		0.1	1.3	
39.21	radius	upper shaft	2	3		0.3	0.3	
39.22	radius	lower shaft	1	10		0.1	1.1	
39.3	radius	distal		4			0.4	
40.1	ulna	proximal	8	11	1	1.1	1.2	3.8
40.2	ulna	distal		2	1		0.2	3.8
57.21	metacarpal	upper shaft	6	1		0.9	0.1	
57.22	metacarpal	lower shaft	9	2		1.3	0.2	
57.3	metacarpal	distal		4			0.4	
70.1	pelvis	illium upper	2	24	2	0.3	2.6	7.7
70.2	pelvis	illium lower	8	24		1.1	2.6	
71	pelvis	ischium	8	35	1	1.1	3.7	3.8
74.11	femur	head		9			1.0	
74.12	femur	proximal upper	1	6		0.1	0.6	
74.21	femur	upper shaft	2	2	4	0.3	0.2	15.4
74.22	femur	lower shaft	4	1	2	0.6	0.1	7.7
74.32	femur	lower distal		12			1.3	
75	patella	patella		3			0.3	
76.1	tibia	proximal upper	11	7		1.6	0.7	
76.12	tibia	proximal lower		1			0.1	
76.21	tibia	upper shaft	6	13	4	0.9	1.4	15.4
76.22	tibia	lower shaft	10	10		1.4	1.1	
76.32	tibia	distal lower	7	10	1	1.0	1.1	3.8
79	astragalus	astragalus	16	61		2.3	6.5	
80.1	calcaneus	upper	1	9		0.1	1.0	
80.2	calcaneus	lower	3	9		0.4	1.0	
87	navicular cuboid		3	8		0.4	0.9	
95.1	metatarsal	proximal	9	3		1.3	0.3	
95.21	metatarsal	upper shaft	2			0.3		
95.22	metatarsal	lower shaft	1	4		0.1	0.4	
95.3	metatarsal	distal		1			0.1	
109	first phalanx	first phalanx	4	2		0.6	0.2	

Table 14: Butchery data for cattle overall at Portchester Castle.

Head:

Marks seen on the crania include chop and cut marks on the mandible and a small number of cut marks on the skull. There are cut marks on the mandible that are indicative of skinning but the heavy chops seen on the mandible body and the mandible hinge would suggest a heavy use of force for dismembering the mandible from the skull and removing cheek meat. There was evidence of chopping through the vertical ramus which can be an indication of removing the tongue (Rixon, 1989). There were saw marks seen on horns which would have been used as tools or a result of craftworking waste. Saw marks are easy to pick out as they are characterised by deep striations.

Neck and Axial:

Atlas: Heavy chop marks were the most common butchery evidence on the atlas. There were far more chop marks on the atlas versus the axis. The chop marks were at varying angles but none were perfectly transverse or longitudinal. These marks suggest attempts at separating the head from the rest of the vertebral column.

Axis: Less than 10 butchery marks were seen on the axis. Again, there were more chop marks than cut marks suggesting the dismemberment of the head from the rest of spine.

Cervical Vertebrae: There were mainly chop marks, as opposed to cut marks, including 11 chops from the inner bailey and 15 from the outer bailey. Chop marks are mainly transverse.

Thoracic Vertebrae: Heavy chop marks were present on vertebral bodies and transverse processes. As Grant (1977) mentioned, there was evidence that the majority of vertebrae were being cut transversely opposed to being cut longitudinally, yet in the butchery analysis process the findings indicate while there are more longitudinal chops this process is not an overwhelming majority. There was evidence of 51 chop marks on thoracic vertebrae from the outer bailey and 16 from the inner bailey. Cut marks for this study were consisted of small nicks to the facets and processes. The chops through the processes are likely an indication of the removal of flesh from around these areas (Rixon, 1989).

Lumbar: There were far less butchery evidence on the lumbar, with only 13 chop marks from the outer bailey and none from the inner bailey. The majority of the chop marks were longitudinal chops in line with the spine.

Pelvis: Butchery marks on the pelvis were dominated by chop marks on the ischium. There were also two cases of sawing on the illium and ischium on pelvis fragments from the outer bailey.

Sacrum: There was only one occurrence of butchery on the sacrum and that was one cut mark from the outer bailey.

Appendicular Skeleton:

Scapula: The most common butchery evidence was chop marks on the articulation/neck region of the element. These chop marks are indicative of dismemberment of the scapula from the humerus. There was evidence of cut marks from a knife along the blade of the scapula, which indicate removal of flesh and skinning.

Humerus: Some of the most common butchery marks overall were chops to the lower distal humerus (see figure 16), particularly in the outer bailey material, where there were 53 chops. This point is a common point of disarticulation between the upper and lower forelimb. Chop marks were also common to the upper and lower shaft. There were also a few circumstances where sawing was observed on the lower distal and upper and lower shaft.

Figure 32: Cattle chopped distal humerus, Portchester Castle (Photo by Hayley Foster).

Radius: Cut marks on the shafts were the most common, again this would most likely be a result of removal of flesh and cutting of ligaments.

Ulna: Ulnae in the inner bailey showed evidence of cut and chop marks mainly on the proximal end. While in the outer bailey there were more chops and also saw marks on the proximal. Many of the chop marks to the proximal were clearly attempts to chop through the olecranon to separate the ulna from the humerus. This joint is difficult to separate with a knife hence why the high number of chop marks.

Metacarpal: There were limited number of cut marks on the shafts of metacarpals, no chop or cut marks on proximal and distal articulations.

Femur: The inner and outer bailey showed evidence of femora being chopped on the head, proximal and distal. The bone from the outer bailey also showed a good deal of chops and cut marks on the upper and lower shaft. These chops to the head and neck area are dismembering the femur from the pelvis. It requires much less effort to use a chopper to dismember the hip joint as opposed to cutting the ligaments in and around the acetabulum and proximal femur with a knife (Rixon, 1989).

Tibia: There were a high number of cut marks on the upper and lower shafts of the tibiae.

Metatarsal: Not a great deal of butchery evidence on the metatarsals. There were no distinct trends just a few cut and chop marks on the proximal and shafts in the inner bailey and similarly for the outer bailey with also a few cut marks on the distal.

Figure 33: Cattle metatarsal with chop mark evidence (Photo by Hayley Foster).

Figure 33 is a cattle metatarsal that exhibits evidence of chop marks. What is evident is that the chop did not go the entire way through the shaft of the bone, leaving a less than clean surface. In this example, it is more than likely that the butcher could not chop straight through the bone, this snapped it at the point where the chop mark stops. The marks above are also likely chop marks that were failed attempts to chop through the bone.

Astragalus: Cattle astragali had over 62 chop marks. The chop marks were heavy, and somewhat clumsy and haphazard in appearance. They were not chopped up into small pieces, they were either chopped in half, and a portion of the proximal or distal chopped off, or hacked at. Therefore, this evidence is dismemberment as opposed to tertiary butchery, where the astragali would have been exploited for marrow or soup making, for example (Rixon, 1989).

Figure 34: Evidence of chop marks on a cattle astragalus, Portchester Castle (Photo by Hayley Foster).

Figure 34 is not an example of a clean chop, it appears that the butcher was attempting to disarticulate the astragalus from the tibia but needed several attempts, which resulted in several chops marks appearing on the lateral side of the bone.

Calcaneus: There was much less butchery evidence on the calcaneus as opposed to the astragalus, although similar heavy chop marks were noted.

Phalanges: There was a substantial amount of butchery evidence found on the first phalanges, the majority of which were sharp knife marks. These marks suggest detachment of ligaments and skinning.

8.2.1 Inner versus Outer Bailey

There were some 1697, cattle fragments with butchery marks in total with 20% of butchery marks from the inner bailey and 80% from the outer bailey. In the inner bailey chop marks were more common with evidence of 70% chops opposed to 30% cut marks.

Chop marks were more common than cut marks, in both the inner and outer bailey.

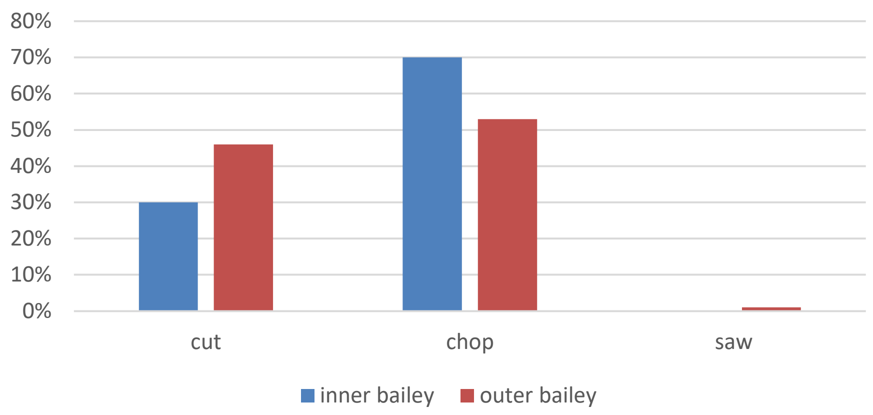

Figure 35: Percentage of butchery marks in inner versus outer bailey at Portchester Castle.

There was similar butchery evidence that tended to have the highest number of chop marks in both areas of the site. For example, for the pelvis there were high numbers of chop marks to the ischium, high number of chop marks to mandibular body, scapular neck and the distal humerus. From the butchery evidence it is clear that the bone from the inner and outer bailey consisted of butchery waste. There is no clear divide between primary and secondary butchery waste as both the inner and outer bailey show similar heavy chops on astragali and distal humeri for example.

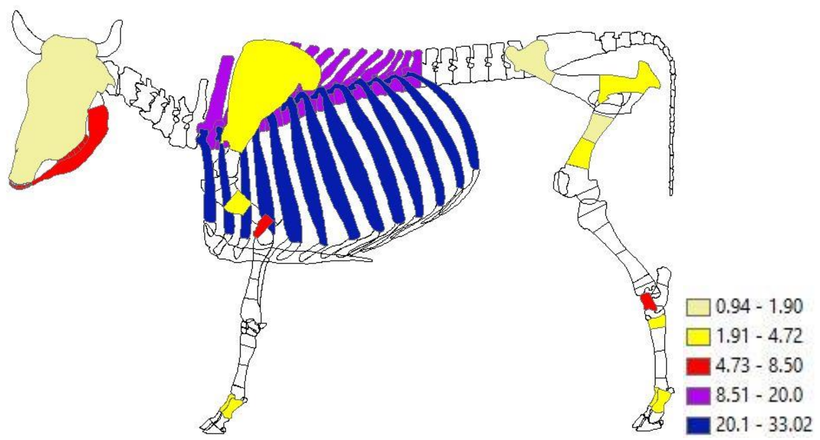

Figure 36: Cut mark frequencies for cattle from the inner bailey at Portchester Castle.

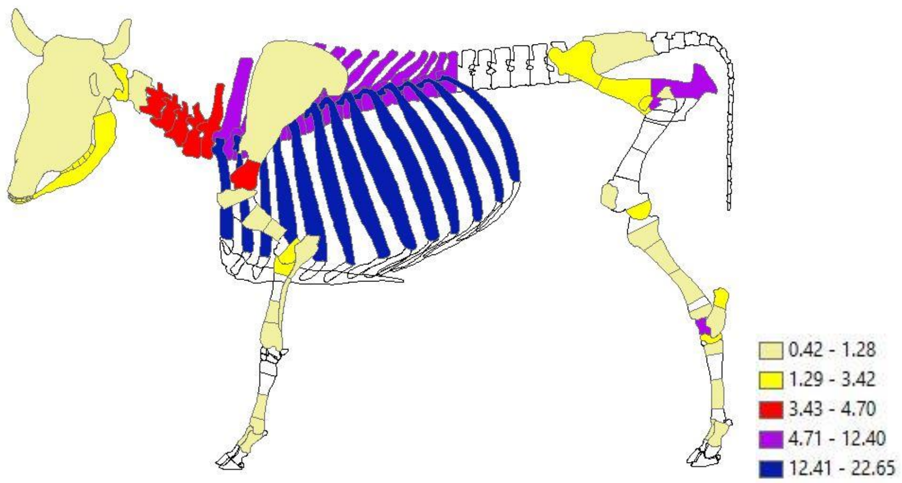

Figure 37: Chop mark frequencies for cattle from the inner bailey at Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop	%sawn
1	skull	skull	1	1		0.9	0.4	
20	mandible	mandible	8	6		7.5	2.6	
20.1	mandible	mandible hinge		3			1.3	
22	horn core	horn core		1			0.4	
26	atlas	atlas		6			2.6	
27	axis	axis		3			1.3	
28	cervical vertebra			11			4.7	
29	thoracic vertebra		21	16		19.8	6.8	
31	sacrum			1			0.4	
33	rib	rib	35	53		33.0	22.6	
36.1	scapula	articulation		10			4.3	
36.2	scapula	blade	3	2		2.8	0.9	
38.11	humerus	proximal upper		1			0.4	
38.21	humerus	upper shaft	5	3		4.7	1.3	
38.22	humerus	lower shaft		1			0.4	
38.31	humerus	upper distal	6			5.7		
38.32	humerus	lower distal		8	1		3.4	50.0
39.1	radius	proximal		6			2.6	
39.22	radius	lower shaft		1			0.4	
39.3	radius	distal		1			0.4	
40.1	ulna	proximal		3			1.3	
40.2	ulna	distal		1	1		0.4	50.0
57.22	metacarpal	lower shaft		1			0.4	
57.3	metacarpal	distal		2			0.9	
70.1	pelvis	illium upper	2	7		1.9	3.0	
70.2	pelvis	illium lower		6			2.6	
71	pelvis	ischium	5	18		4.7	7.7	
74.11	femur	head		6			2.6	
74.12	femur	proximal upper		1			0.4	
74.21	femur	upper shaft	1			0.9		
74.22	femur	lower shaft	3			2.8		
74.32	femur	lower distal		4			1.7	
75	patella	patella		3			1.3	
76.12	tibia	proximal lower		1			0.4	
76.21	tibia	upper shaft		2			0.9	
76.22	tibia	lower shaft		1			0.4	
76.32	tibia	distal Lower		1			0.4	
79	astragalus	astragalus	9	29		8.5	12.4	
80.1	calcaneus	upper		4			1.7	
80.2	calcaneus	lower		2			0.9	
87	navicular cuboid			4			1.7	
95.1	metatarsal	proximal	3	1		2.8	0.4	
95.22	metatarsal	lower shaft		1			0.4	
109	first phalanx	first phalanx	4	2		3.8	0.9	

Table 15: Butchery data for cattle from the inner bailey at Portchester Castle.

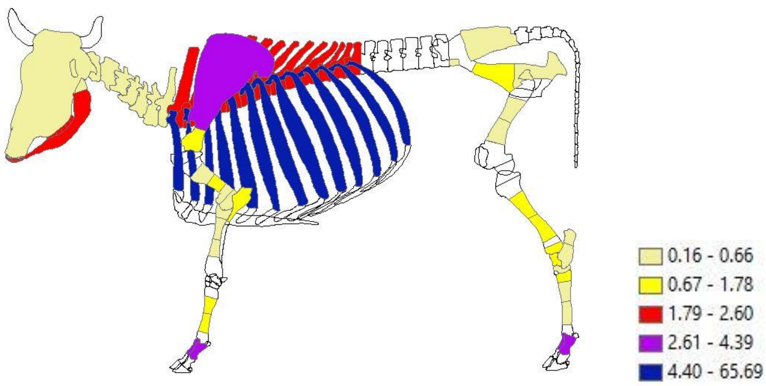

Figure 38: Cut mark frequencies for cattle from the outer bailey at Portchester Castle.

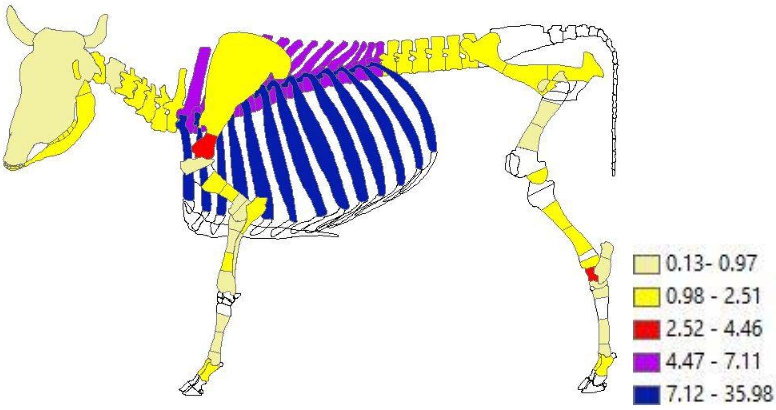

Figure 39: Chop mark frequencies for cattle from the outer bailey at Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop	%sawn
1	skull	skull	2	2		0.3	0.3	
20	mandible	mandible	16	13		2.6	1.8	
20.1	mandible	mandible hinge	1	10		0.2	1.4	
22	horn core	horn core		5			0.7	
26	atlas	atlas	1	16		0.2	2.2	
27	axis	axis	2	3		0.3	0.4	
28	cervical vertebra		1	15		0.2	2.1	
29	thoracic vertebra		16	51		2.6	7.1	
30	lumbar vertebra			13			1.8	
31	sacrum		1			0.2		
33	rib	rib	404	258		65.7	36.0	
36.1	scapula	articulation	6	32		1.0	4.5	
36.2	scapula	blade	27	18	2	4.4	2.5	10.5
38.11	humerus	proximal upper		3			0.4	
38.21	humerus	upper shaft	1	12	4	0.2	1.7	21.1
38.22	humerus	lower shaft	11	8	2	1.8	1.1	10.5
38.31	humerus	upper distal	1			0.2	0.1	
38.32	humerus	lower distal	4	53	1	0.7	0.6	5.3
39.1	radius	proximal	1	6		0.2	0.8	
39.21	radius	upper shaft	2	3		0.3	0.4	
39.22	radius	lower shaft	1	9		0.2	1.3	
39.3	radius	distal		3			0.4	
40.1	ulna	proximal	8	8	1	1.3	1.1	5.3
40.2	ulna	distal		1			0.1	
57.21	metacarpal	upper shaft	6	1		1.0	0.1	
57.22	metacarpal	lower shaft	9	1		1.5	0.1	
57.3	metacarpal	distal		2			0.3	
70.1	pelvis	illium upper		17	2		2.4	10.5
70.2	pelvis	illium lower	8	18		1.3	2.5	
71	pelvis	ischium	3	17	1	0.5	2.4	5.3
74.11	femur	head		3			0.4	
74.12	femur	proximal upper	1	5		0.2	0.7	
74.21	femur	upper shaft	1	2	4	0.2	0.3	21.1
74.22	femur	lower shaft	1	1	2	0.2	0.1	10.5
74.32	femur	lower distal		8			1.1	
76.1	tibia	proximal upper	11	7		1.8	1.0	
76.21	tibia	upper shaft	6	11	4	1.0	1.5	21.1
76.22	tibia	lower shaft	10	9		1.6	1.3	
76.32	tibia	distal Lower	7	9	1	1.1	1.3	5.3
79	astragalus	astragalus	7	32		1.1	4.5	
80.1	calcaneus	upper	1	5		0.2	0.7	
80.2	calcaneus	lower	3	7		0.5	1.0	
87	navicular cuboid		3	4		0.5	0.6	
95.1	metatarsal	proximal	6	2		1.0	0.3	
95.21	metatarsal	upper shaft	2			0.3		
95.22	metatarsal	lower shaft	1	3		0.2	0.4	
95.3	metatarsal	distal		1			0.1	
109	first phalanx	first phalanx	23	10		3.7	1.4	

Table 16: Butchery data for cattle from the outer bailey at Portchester Castle.

8.2.2 Phase A and 3

As phase A from the inner bailey and phase 3 from the outer bailey fall within the same time period range, the figures below depict the butchery evidence from those phases.

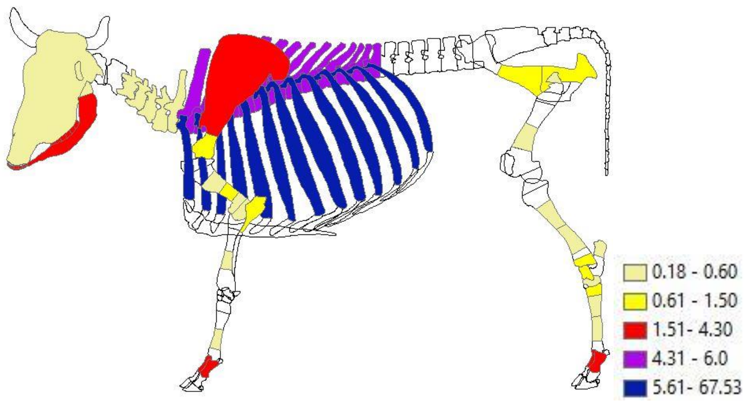

Figure 40: Cut mark frequencies phase A and 3 for cattle from Portchester Castle.

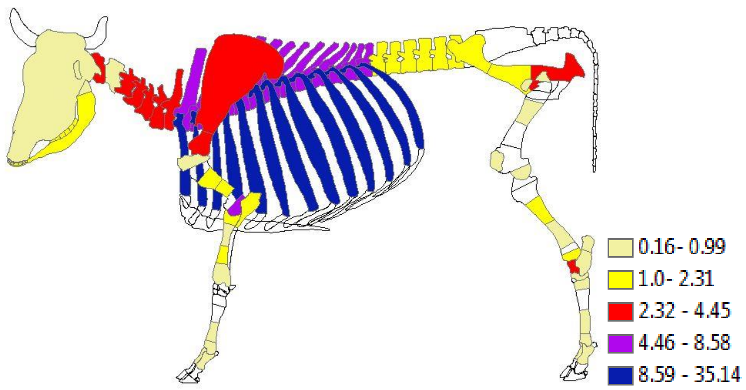

Figure 41: Chop mark frequencies phase A and 3 for cattle from Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop	%sawn
1	skull	skull	2	3		0.4	0.5	
20	mandible	mandible	16	11		3.0	1.8	
20.1	mandible	mandible hinge	1	4		0.2	0.7	
26	atlas	atlas		16			2.6	
27	axis	axis		1			0.2	
28	cervical vertebra		1	18		0.2	3.0	
29	thoracic vertebra		32	52		6.0	8.6	
30	lumbar vertebra			11			1.8	
33	rib	rib	362	213	12	67.5	35.1	60.0
36.1	scapula	articulation	6	27		1.1	4.5	
36.2	scapula	blade	21	15	2	3.9	2.5	10.0
38.11	humerus	proximal upper		4			0.7	
38.21	humerus	upper shaft	1	7	4	0.2	1.2	20.0
38.22	humerus	lower shaft	6	8	2	1.1	1.3	10.0
38.31	humerus	upper distal	3		2	0.6		10.0
38.32	humerus	lower distal	1	46	2	0.2	7.6	10.0
39.1	radius	proximal		8			1.3	
39.21	radius	upper shaft		3			0.5	
39.22	radius	lower shaft	1	9		0.2	1.5	
39.3	radius	distal		1			0.2	
40.1	ulna	proximal	7	8	1	1.3	1.3	5.0
40.2	ulna	distal			1			5.0
57.22	metacarpal	lower shaft	2	1		0.4	0.2	
57.3	metacarpal	distal		1			0.2	
70.1	pelvis	illium upper		14	2		2.3	10.0
70.2	pelvis	illium lower	8	14		1.5	2.3	
71	pelvis	ischium	6	15	1	1.1	2.5	5.0
74.11	femur	head		4			0.7	
74.12	femur	proximal upper	1	5		0.2	0.8	
74.21	femur	upper shaft		2	4		0.3	20.0
74.22	femur	lower shaft	1		2	0.2		10.0
74.32	femur	lower distal		4			0.7	
75	patella	patella		2			0.3	
76.1	tibia	proximal upper		7			1.2	
76.21	tibia	upper shaft	3	10	4	0.6	1.7	20.0
76.22	tibia	lower shaft	3	6		0.6	1.0	
76.32	tibia	distal Lower	6	13	1	1.1	2.1	5.0
79	astragalus	astragalus	8	23		1.5	3.8	
80.1	calcaneus	upper	1	5		0.2	0.8	
80.2	calcaneus	lower		6			1.0	
87	navicular cuboid		3	3		0.6	0.5	
95.1	metatarsal	proximal	8	1		1.5	0.2	
95.21	metatarsal	upper shaft	2			0.4		
95.22	metatarsal	lower shaft	1	2		0.2	0.3	
95.3	metatarsal	distal		1			0.2	
109	first phalanx	first phalanx	23	2		4.3	0.3	

Table 17: Butchery data for cattle from phase A and 3 at Portchester Castle.

There were a high number of cuts and chops to the mandibular body. Chops to thoracic vertebrae and distal humeri were the most common after butchery marks on the ribs. Other cut mark evidence was seen on the first phalanges and the scapulae blade.

8.2.3 Phase B and 4

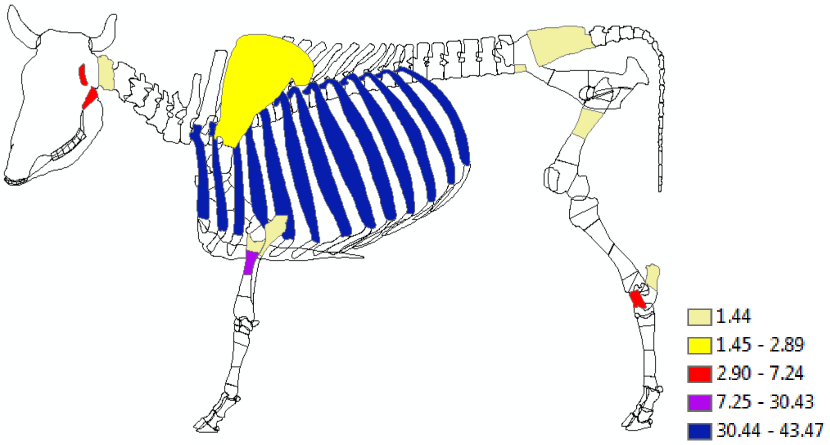

Figure 42: Cut mark frequencies phase B and 4 for cattle from Portchester Castle.

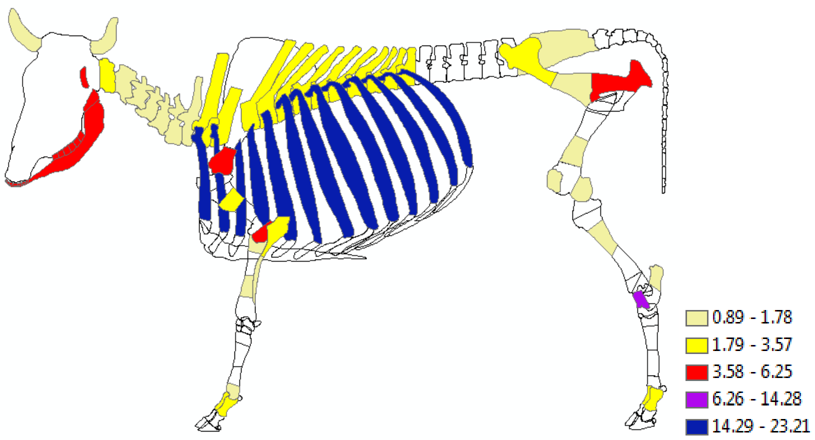

Figure 43: Chop mark frequencies phase B and 4 for cattle from Portchester Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
20	mandible	mandible		6		5.4
20.1	mandible	mandible hinge	5	6	7.2	5.4
22	horn core	horn core		1		0.9
26	atlas	atlas	1	3	1.4	2.7
27	axis	axis		1		0.9
28	cervical vertebra			1		0.9
29	thoracic vertebra			3		2.7
31	sacrum		1	1	1.4	0.9
33	rib	rib	30	26	43.5	23.2
36.1	scapula	articulation		7		6.3
36.2	scapula	blade	2		2.9	
38.21	humerus	upper shaft		4		3.6
38.32	humerus	lower distal		5		4.5
39.1	radius	proximal	1	2	1.4	1.8
39.21	radius	upper shaft	21		30.4	
39.22	radius	lower shaft		1		0.9
40.1	ulna	proximal	1	3	1.4	2.7
40.2	ulna	distal		1		0.9
57.3	metacarpal	distal		2		1.8
70.1	pelvis	illlium upper		3		2.7
70.2	pelvis	illium lower		2		1.8
71	pelvis	ischium		7		6.3
74.21	femur	upper shaft	1		1.4	
74.22	femur	lower shaft		1		0.9
74.32	femur	lower distal		2		1.8
75	patella	patella		1		0.9
76.21	tibia	upper shaft		1		0.9
76.32	tibia	distal Lower		1		0.9
79	astragalus	astragalus	5	16	7.2	14.3
80.2	calcaneus	lower	1	1	1.4	0.9
109	first phalanx	first phalanx		4		3.6

Table 18: Butchery data for cattle from phase B and 4 at Portchester Castle.

Phase B and 4 do not necessarily follow the exact same trends as the previous phase but there are also far less fragments coming from phase B and 4 versus A and 3. For example there are still a high frequency of chops to the astragalus and mandible body and hinge, there are also a high number of butchery marks on the thoracic vertebrae and distal humerus.

For the other phases within the inner and outer baileys there are somewhat less butchery evidence. Phase C of the inner bailey show similar patterns to the earlier phases with a lot of butchery marks on the ribs, there are less chops to the distal humerus, and more vertebrae split longitudinally much like in the later phase in the outer bailey.

8.3 Sheep/Goat Butchery

There were 485 butchery marks for sheep/goat from the medieval layers of the inner and outer baileys.

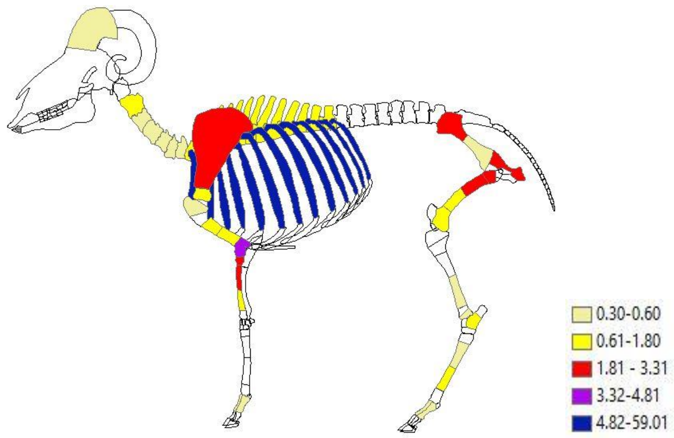

Figure 44: Cut mark frequencies overall for sheep/goat from Portchester Castle.

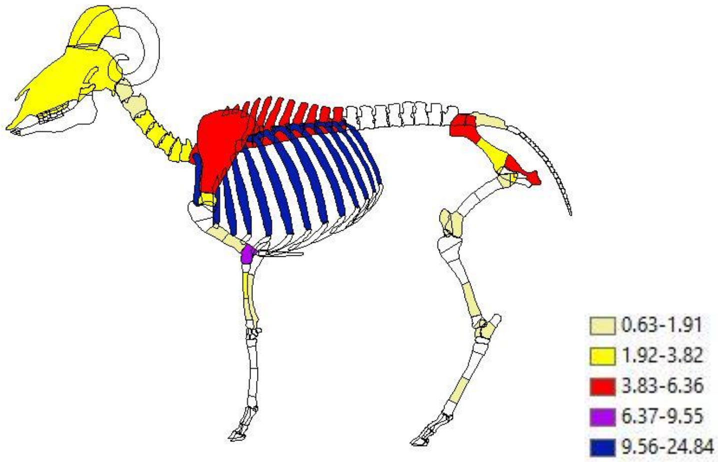

Figure 45: Chop marks frequencies overall for sheep/goat from Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop	%sawn
1	skull			4			2.5	
2	mandible			5			3.2	
22	horn core	horn core	2	4		0.6	2.5	
26	atlas			1			0.6	
27	axis		4	1		1.2	0.6	
28	cervical vertebra		2	6		0.6	3.8	
29	thoracic vertebra		4	8		1.2	5.1	
31	sacrum			2			1.3	
33	rib	rib	196	39		59.0	24.8	
36.1	scapula	articulation	3	4		0.9	2.5	
36.2	scapula	blade	8	7		2.4	4.5	
38.11	humerus	upper proximal		1			0.6	
38.12	humerus	lower proximal	1			0.3		
38.21	humerus	upper shaft	4	1		1.2	0.6	
38.22	humerus	lower shaft	5	2	1	1.5	1.3	50.0
38.3	humerus	distal	16	15		4.8	9.6	
39.1	radius	proximal	11			3.3		
39.21	radius	upper shaft	8	6		2.4	3.8	
39.22	radius	lower shaft	4	2		1.2	1.3	
40.2	Ulna	lower		3			1.9	
57.2	metacarpal	upper shaft	2			0.6		
70.1	pelvis	illium upper	9	10		2.7	6.4	
70.2	pelvis	illium lower	1	6	1	0.3	3.8	50.0
71	pelvis	Ischium	7	7		2.1	4.5	
74.12	femur	proximal upper		4			2.5	
74.13	femur	proximal lower	9	2		2.7	1.3	
74.21	femur	upper shaft	8			2.4		
74.22	femur	lower shaft	4			1.2		
74.3	femur	distal	3	2		0.9	1.3	
74.3	tibia	upper shaft	6	7		1.8	4.5	
75	patella			1			0.6	
76.22	tibia	lower shaft	1	2		0.3	1.3	
76.32	tibia	lower distal	2	1		0.6	0.6	
79	astragalus			1			0.6	
80.1	calcaneus	upper	3	1		0.9	0.6	
95.21	metatarsal	upper shaft	2			0.6		
95.22	metatarsal	lower shaft	6	2		1.8	1.3	
109	phalanx	first phalanx	1			0.3		

Table 19: Butchery data for sheep/goat overall at Portchester Castle.

Head: Minimal evidence: Two cuts on a horncore from the inner bailey, and three chops to the skull in the outer bailey (less 3.82%).

Neck and Axial:

Vertebrae: There was not an extensive amount of butchery on the vertebrae but those vertebrae displaying chop marks were split longitudinally.

Pelvis: The lower illium area had the most chop marks and there was also evidence of sawing.

Sacrum: There were two chops on a sacrum from the outer bailey.

Appendicular Skeleton-

Scapula: There were similar numbers of chops versus cuts on the blade of the scapula.

Humerus: The dominant pattern of butchery to the humerus is heavy chop and cut marks to the distal. There was also evidence of cut marks to the upper and lower shafts and proximal depicted below (Figure 46). These marks are most likely indications of filleting which is characterised by slice cut marks indicating the activity involved removing flesh from the bone surface.

Figure 46: Sheep humerus with cut marks on shaft and proximal (Photo by Hayley Foster).

Radius: The patterning of butchery for the radius is made up of cut and chop marks to the upper portion of the bone. Cuts and chops on the proximal and on the upper shaft.

Ulna: The only evidence of butchery on the ulnae were three chop marks to the distal ulna in the inner bailey.

Metacarpal: No butchery evidence present on metacarpals for sheep/goat.

Femur: The lower proximal region had the highest number of cut marks with 13.

Tibia: In the outer bailey cut and chop marks were exclusively on the lower shafts and distal tibiae, while the bones from the inner bailey consisted of butchery marks to the upper shafts only.

Metatarsal: Only evidence consisted of cut marks on the upper and lower shafts.

Astragalus: There was one chopped astragalus recorded.

Calcaneus: The outer bailey contained calcanei with a cut and a chop.

Phalanges: There was one cut on a first phalanx from the outer bailey.

8.3.1 Inner Bailey versus Outer Bailey

There were 201 butchery marks from the inner bailey with 129 cut marks, 71 chop marks and one saw mark for sheep/goat and 284 butchery marks for the outer bailey including 194 cut marks, 88 chop marks and 2 saw marks for sheep/goat.

Inner: There were no cuts/chops on the scapulae blade, no cuts/chops on the proximal humeri, and no butchery to the tibiae. There were more chops to the upper illium.

Outer: There were no butchery marks on the ulnae. Overall there were similar patterns of butchery between inner and outer baileys.

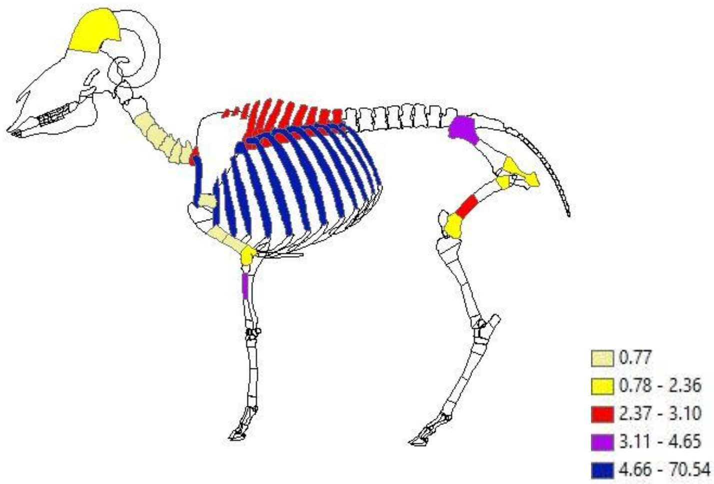

Figure 47: Cut mark frequencies from the inner bailey for sheep/goat from Portchester Castle.

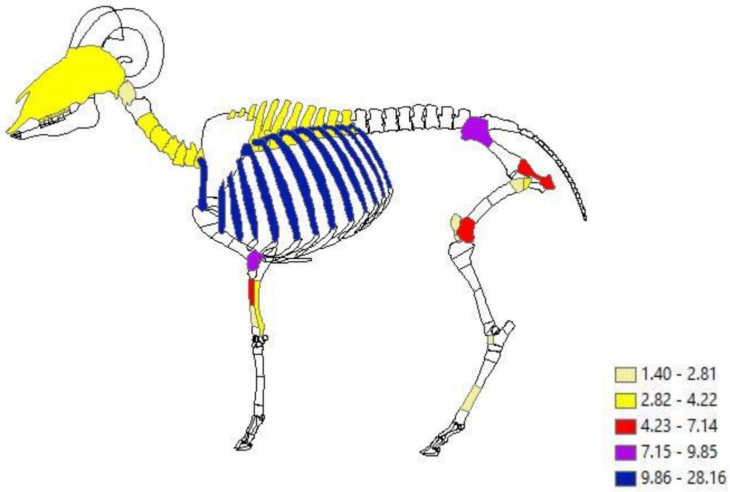

Figure 48: Chop mark frequencies from the inner bailey for sheep/goat from Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop
1	skull			3			4.2
22	horn core	horn core	2			1.6	
26	atlas			1			1.4
28	cervical vertebra		1	3		0.8	4.2
29	thoracic vertebra		4	3		3.1	4.2
33	rib	rib	91	20		70.5	28.2
36.1	scapula	articulation	1			0.8	
38.21	humerus	upper shaft	1			0.8	
38.22	humerus	lower shaft	1		1	0.8	
38.3	humerus	distal	2	7		1.6	9.9
39.21	radius	upper shaft	6	4		4.7	5.6
39.22	radius	lower shaft		2			2.8
40.2	Ulna	lower		3			4.2
70.1	pelvis	illium upper	6	6		4.7	8.5
71	pelvis	ischium	2	4		1.6	5.6
74.12	femur	proximal upper		3			4.2
74.13	femur	proximal lower	3	2		2.3	2.8
74.22	femur	lower shaft	4			3.1	
74.3	femur	distal	3	5		2.4	7.1
75	patella			1			1.4
79	astragalus			1			1.4
95.22	metatarsal	lower shaft		2			2.8

Table 20: Butchery data for sheep/goat from the inner bailey at Portchester Castle.

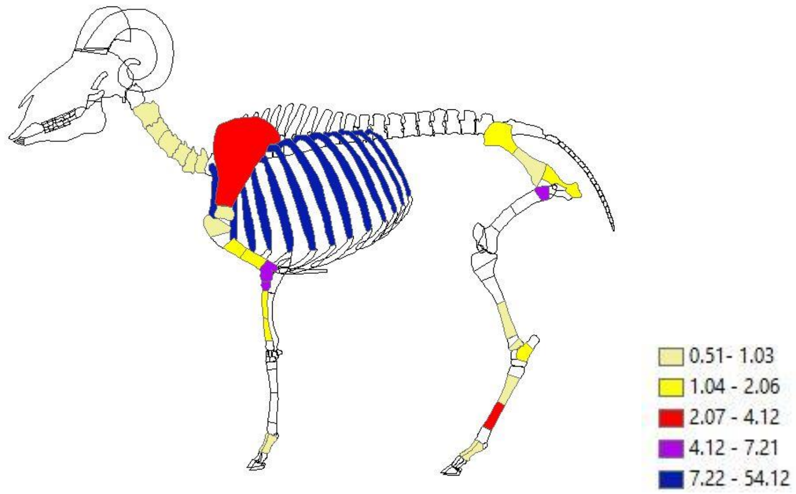

Figure 49: Cut mark frequencies from the outer bailey for sheep/goat from Portchester Castle.

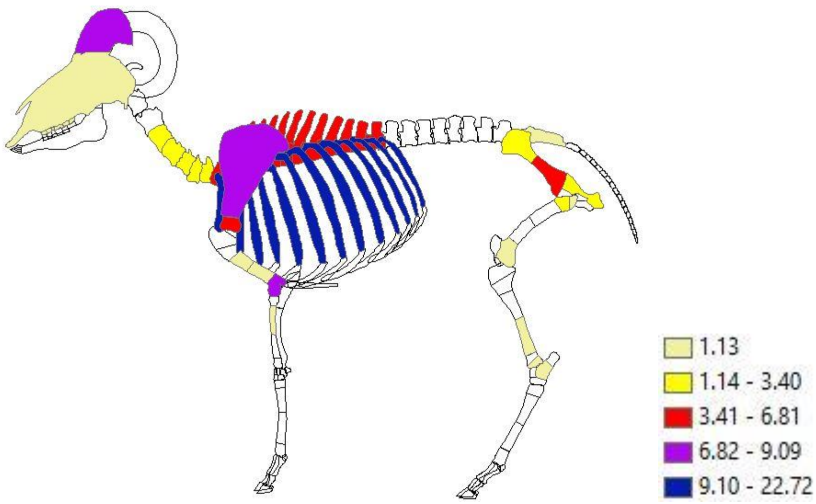

Figure 50: Chop mark frequencies from the outer bailey for sheep/goat from Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop
1	skull			1			1.1
2	mandible			5			5.7
22	horn core	horn core		7			8.3
27	axis		2			1.0	
28	cervical vertebra		1	3		0.5	3.4
29	thoracic vertebra			5			5.7
31	sacrum			2			2.3
33	rib	rib	105	20		54.1	22.7
36.1	scapula	articulation	2	5		1.0	5.7
36.2	scapula	blade	8	7		4.1	8.0
38.11	humerus	Upper proximal		1			1.1
38.12	humerus	lower proximal	1			0.5	
38.21	humerus	upper shaft	3	1		1.5	1.1
38.22	humerus	lower shaft	4	2	1	2.1	2.3
38.3	humerus	distal	14	8		7.2	9.1
39.1	radius	proximal	11			5.7	
39.21	radius	upper shaft	4	2		2.1	2.3
39.22	radius	lower shaft	4			2.1	
70.1	pelvis	Illium upper	3	4		1.5	4.5
70.2	pelvis	Illium lower	1	6	1	0.5	6.8
71	pelvis	ischium	3	3		1.5	3.4
74.12	femur	upper proximal		1			1.1
74.13	femur	proximal lower	13	3		6.7	3.4
74.3	femur	distal		1			1.1
76.22	tibia	lower shaft	1	2		0.5	2.3
76.32	tibia	lower distal	2	1		1.0	1.1
80.1	Calcaneus	upper	3	1		1.5	1.1
95.22	metatarsal	lower shaft	6			3.1	
95.21	metatarsal	upper shaft	2			1.0	
109	Phalanx	first phalanx	1			0.5	

Table 21: Butchery data for sheep/goat from the outer bailey at Portchester Castle.

The butchery patterns show that there was more variety of butchery marks in the outer bailey, as would be expected as the outer bailey assemblage would have being made up predominantly of dumped food waste and butchery waste.

8.3.2 Phase A and 3

There was not a vast amount more butchery evidence in group A and 3 versus group B and 4. Group A and 3 contained 245 cuts, 98 chops and 1 saw mark, while B and 4 consisted of 20 cuts and 14 chops. The figures below depict the frequencies of cut and chop marks.

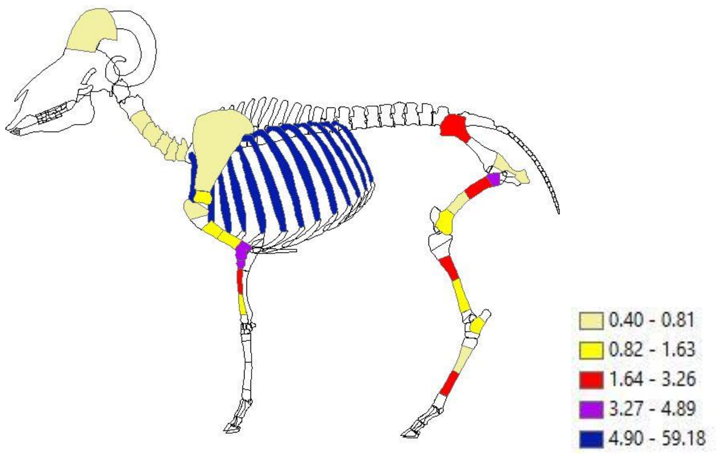

Figure 51: Cut mark frequencies phase A and 3 for sheep/goat from Portchester Castle.

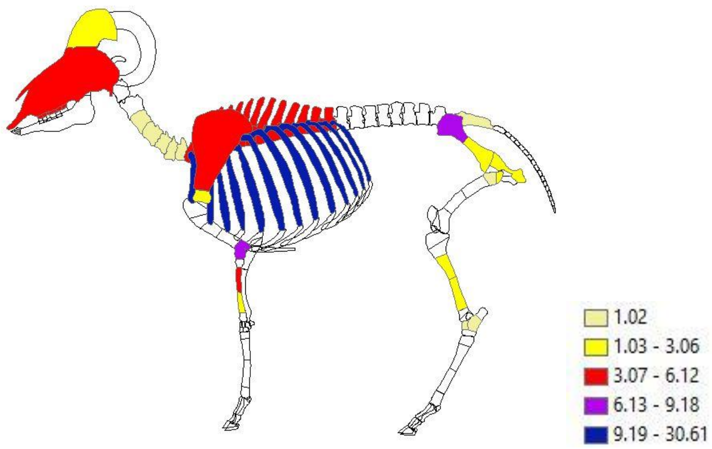

Figure 52: Chop mark frequencies phase A and 3 for sheep/goat from Portchester Castle.

The element with the most cut marks from phases A and 3 are by far the ribs, followed by cuts at the joint of the humerus (distal) and the radius and ulna (proximal).

ID	Element	Portion	Cuts	Chops	Sawn	cut %	chop%
1	skull			4			4.1
2	mandible			5			5.1
22	horn core	horn core	2	4		0.8	2.0
28	cervical vertebra		1	3		0.4	1.0
29	thoracic vertebra			5			5.1
31	sacrum			1			1.0
33	rib	rib	145	30		59.2	30.6
36.1	scapula	articulation	3	2		1.2	2.0
36.2	scapula	blade	2	6		0.8	6.1
38.11	humerus	upper proximal		1			1.0
38.12	humerus	lower proximal	1			0.4	
38.21	humerus	upper shaft	4			1.6	
38.22	humerus	lower shaft	3			1.2	
38.3	humerus	distal	12	7		4.9	7.1
39.1	radius	proximal	11			4.5	
39.21	radius	upper shaft	5	4		2.0	4.1
39.22	radius	lower shaft	3	2		1.2	2.0
57.2	metacarpal	upper shaft	2			0.8	
70.1	pelvis	illium upper	7	9		2.9	9.2
70.2	pelvis	illium lower		2	1		2.0
71	pelvis	ischium	2	2		0.8	2.0
74.12	femur	trochlea		2			2.0
74.13	femur	proximal lower	9	1		3.7	1.0
74.21	femur	upper shaft	8			3.3	
74.22	femur	lower shaft	2			0.8	
74.3	femur	distal	3			1.2	
76.21	tibia	upper shaft	6	3		2.4	3.1
76.22	tibia	lower shaft	3	3		1.2	3.1
79	astragalus			1			1.0
80.1	calcaneus	upper	3	1		1.2	1.0
95.21	metatarsal	upper shaft	2			0.8	
95.22	metatarsal	lower shaft	6			2.4	

Table 22: Butchery data for sheep/goat from phase A and 3 at Portchester Castle.

8.3.3 Phase B and 4

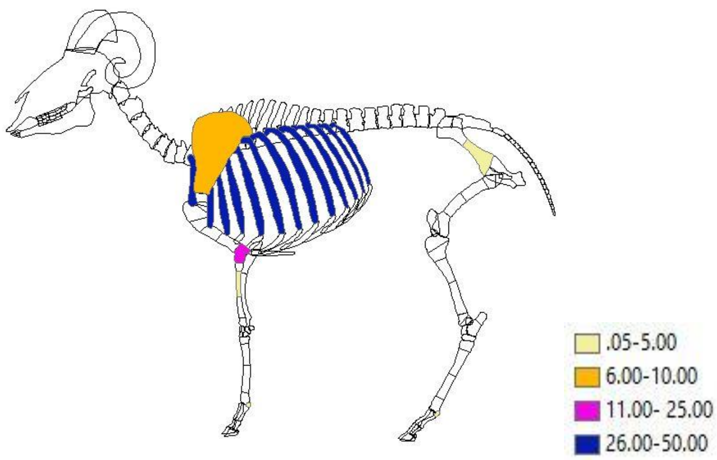

Figure 53: Cut mark frequencies phase B and 4 for sheep/goat from Portchester Castle.

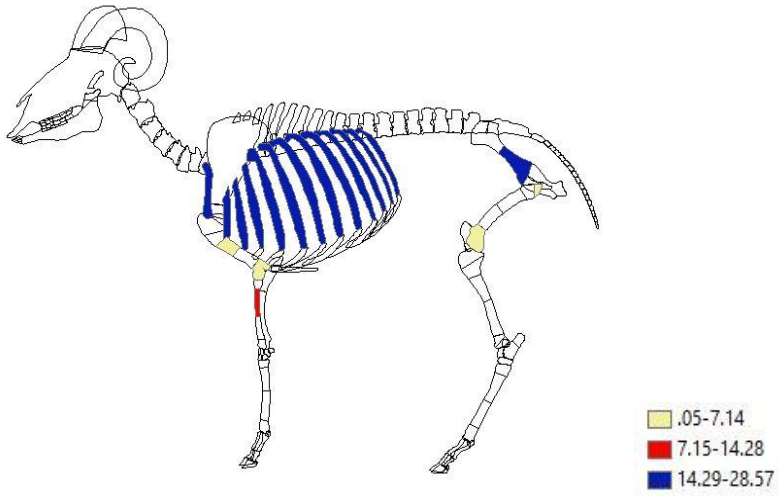

Figure 54: Chop mark frequencies phase B and 4 for sheep/goat from Portchester Castle.

ID	Element	Portion	Cuts	Chops	cut%	chop%
33	rib	rib	10	4	50.0	28.6
36.2	scapula	blade	2		10.0	
38.21	humerus	upper shaft		1		7.1
38.3	humerus	distal	5	1	25.0	7.1
39.21	radius	upper shaft	1	2	5.0	14.3
70.2	pelvis	illium lower	1	4	5.0	28.6
74.12	femur	trochanter		1		7.1
74.3	femur	distal		1		7.1
106	Phalanx	first	1		5.0	

Table 23: Butchery data for sheep/goat from phase B and 4 at Portchester Castle.

This group had far less butchery evidence and less fragments overall than phase A and 3, therefore there are no distinct pattern differences that can be determined. Cuts and chops were seen mainly on rib fragments and the distal humeri.

8.4 Deer Butchery

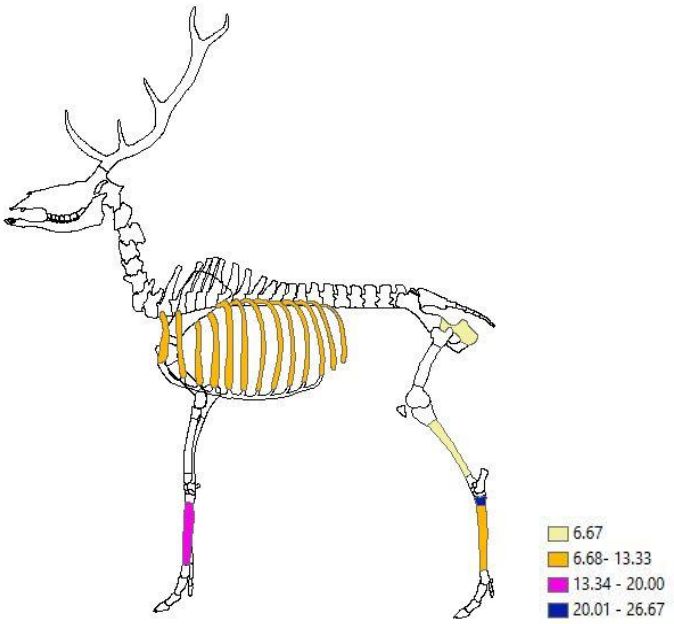

Figure 55: Cut mark frequencies overall for deer from Portchester Castle.

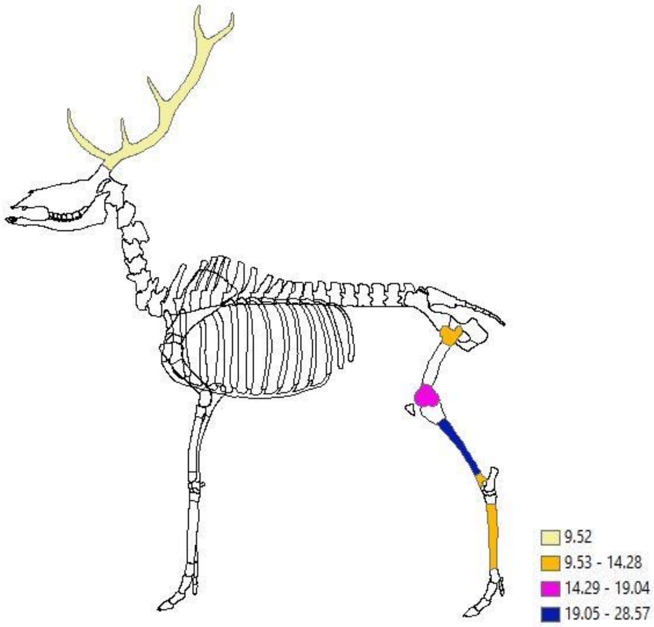

Figure 56: Chop mark frequencies overall for deer from Portchester Castle.

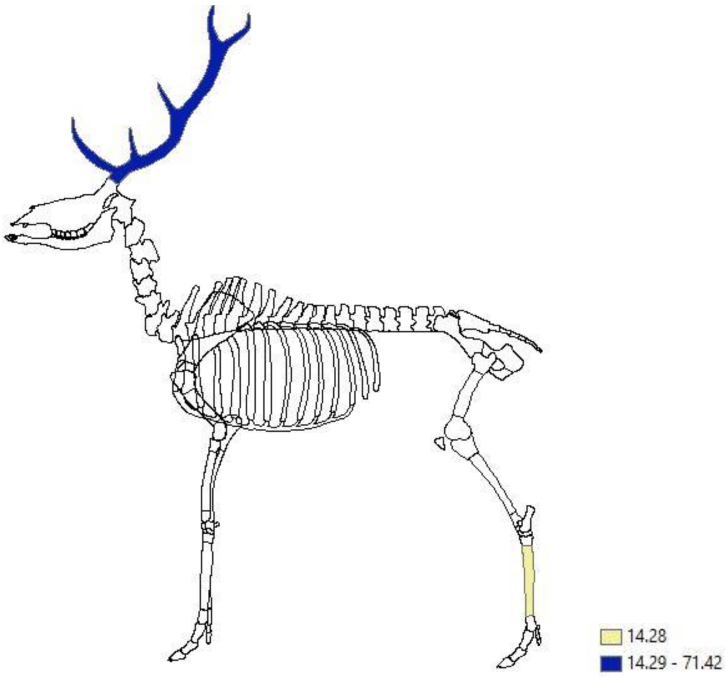

Figure 57: Saw marks overall for deer from Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop	%sawn
0	antler			2	10		9.5	71.4
33	rib		2			13.3		
71	pelvis	ischium	1			6.7	28.6	
74.1	femur	proximal		3			19.0	
74.3	femur	distal		4				
76.2	tibia	shaft	1	6		6.7	14.3	
76.3	tibia	distal		3			14.3	14.3
95.2	metatarsal	shaft	2	3	2	13.3	14.3	
95.1	metatarsal	proximal	4			26.7		14.3
95.2	metatarsal	shaft	2		2	13.3		

Table 24: Butchery data for deer overall from Portchester Castle.

Figure 58: Evidence of sawing on a deer antler from Portchester Castle (Photo by Hayley Foster).

Neck and Axial Skeleton: No butchery evidence was recorded on bone from the neck or axial skeleton, besides rib cuts. Antler fragments had evidence of ten saw marks and two chop marks. Figure 58 shows an example of sawing on a section of deer antler. This butchery evidence is a clear sign of craftworking for exploiting antler for tool use. The butchered antler fragments recorded were tools themselves or waste material from tool production.

Appendicular Skeleton:

Deer metatarsals show evidence of cuts, chops and saw marks on the shafts. There was one cut to the ischium of the pelvis. There were several cuts and chops to the tibiae shafts and distal articulations. The femur also had chops to the proximal and chops to the distal. There were three cuts to the metacarpal shaft too.

Summary

As there was only minimal amount of butchery evidence for deer, there are no obvious butchery practice differences between deer from the inner and outer bailey. There were more deer fragments and more deer butchery from the outer bailey and from phase B and 3.

8.5 Pig butchery

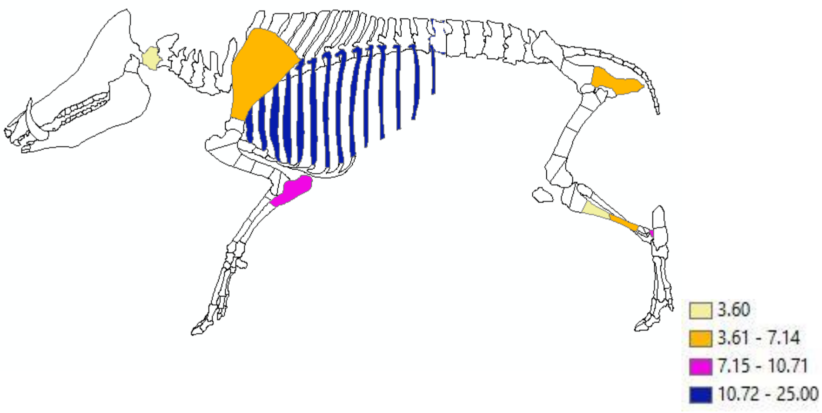

Figure 59: Cut mark frequencies overall for pig from Portchester Castle.

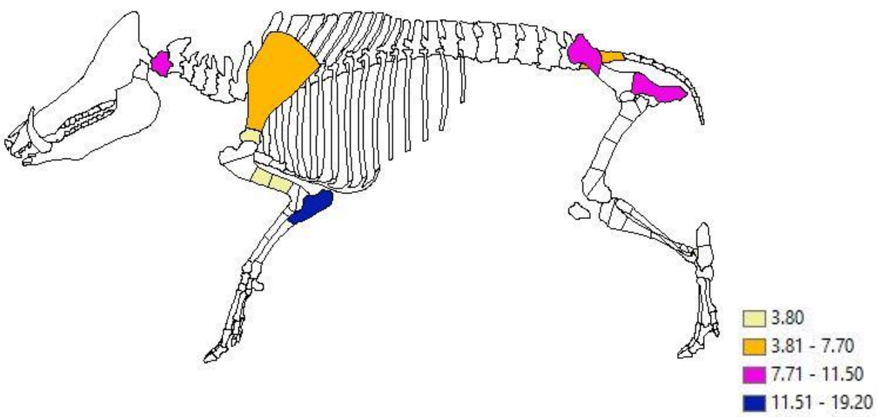

Figure 60: Chop mark frequencies overall for pig from Portchester Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop
26	atlas		1	3		3.6	11.5
31	sacrum			2			7.7
33	rib		7			25.0	
36.1	scapula	articulation		1			3.8
36.2	scapula	blade	2	2		7.1	7.7
38.22	humerus	lower shaft		1			3.8
38.3	humerus	distal	5	3	1	17.9	11.5
40.1	ulna	proximal	3	5		10.7	19.2
70.1	pelvis	illium upper		3			11.5
71	pelvis	ischium	2	3		7.1	11.5
74.1	femur	proximal		1			3.8
74.2	femur	shaft	2			7.1	
76.21	tibia	upper shaft	1			3.6	
76.22	tibia	lower shaft	2			7.1	
79	astragalus		3	1		10.7	3.8

Table 25: Butchery data for pig overall from Portchester Castle.

Not an extensive amount of butchery on pig remains from Portchester Castle, therefore were not divided by phase as there was no significant differences observed. There is slightly more butchery on pig elements from the inner bailey versus the outer bailey. There were more butchered pig remains from phases A and 3 compared to phase B and 4. The majority of the cut marks appeared on rib fragments. Ribs from pig can be difficult to differentiate between sheep/goat ribs, thus this should be taken into consideration. Therefore, contexts that contained ribs with butchery were solely or predominantly made up of pig remains were assigned to pig.

Head:

There was no evidence on any butchery marks to pig skulls or mandibles.

Neck and Axial Skeleton:

There were chops on three atlases, but no other vertebrae.

Appendicular Skeleton:

Most chops were seen on distal humeri and the proximal ulnae, which is a clear place for the disarticulation of the joint. There was evidence of cut marks of the scapula blade and on the articulation. There were also a few cuts on astragali and three chops to a section of ischium.

Summary

As the butchery evidence for pig is fairly minimal there were no obvious differences with the way pigs were butchered in the inner versus the outer bailey and over the occupation of the site. The evidence observed on pig remains was not uncommon from what would be expected. Chop marks to the ulnae, pelves, vertebrae are all common focal points for dismembering a carcass.

8.6 Butchery and Tool Use

The majority of butchery marks were carried out with a cleaver as there is a lot of evidence of heavy and forceful blows and the marks that are consistent with this type of tool. There was also evidence of knives and saws.

There are cases where butchery marks can be less obvious to recognise. For example in the figure below (Figure 61), the fragment has a fairly weathered surface and rough texture which produced many lines on the bone surface. In this situation the bone is far less weathered on the section where the cut marks appear, but this obviously in not always the case.

Figure 61: Cattle rib fragment with cut marks and other taphonomic changes (Photo by Hayley Foster).

The below cattle vertebral body shows a transverse chop mark, which may have been an attempt to split the vertebra or merely remove flesh.

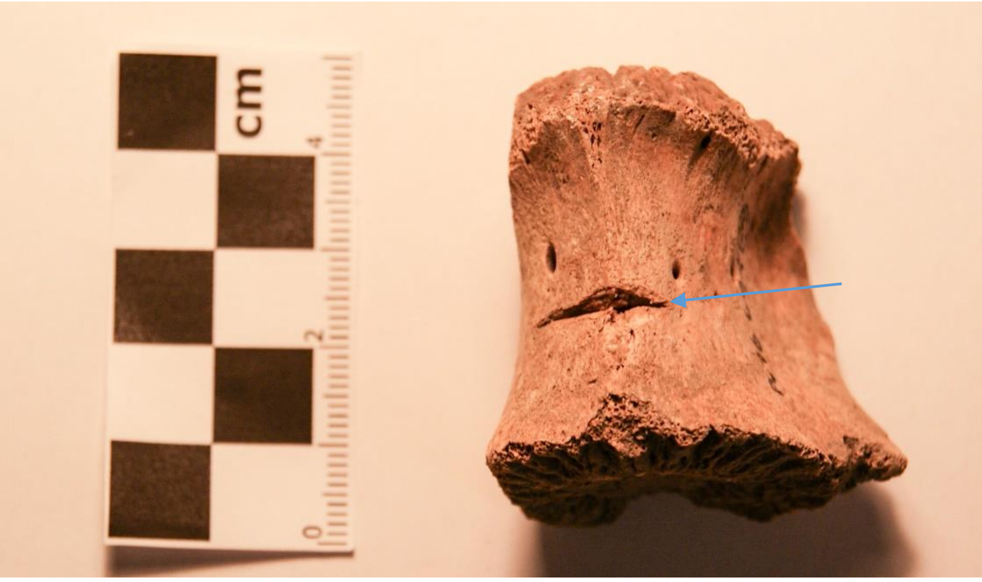

Figure 62: Transverse chop mark on unfused cattle vertebral body (Photo by Hayley Foster).

The figure below shows a close up section of a cattle pelvis. The distinct striations are typical of sawing however this type of butchery mark is generally not seen on the pelvis during this period, but mainly on antler and metapodia for craft purposes.

Figure 63: Sawn cattle pelvis fragment from phase 3 (Photo by Hayley Foster).

8.7 Methods of Butchery

The butchery evidence provides a solid amount of insight into how butchers were dismembering and slaughtering animals. For cattle, there was an abundance of heavy chop marks around the major joints. As briefly mentioned by Grant (1977), chop marks around the epiphyses were the most common butchery evidence. Chops were frequently done in a fairly haphazard and rough fashion, with several marks in and around the same area. Many of these marks appear to have been conducted in a way that suggests a more rapid approach at dismembering opposed to a methodical, precise approach. There was very little evidence of bone splitting of the long bones, which would indicate that marrow extraction was not implemented extensively. Overall the preservation of the bone was in good condition and the fragmentation was variable. Therefore, it is fair to say that there was not a "chop and slash approach" at Portchester (Rixon, 1989). This approach is not methodical and a somewhat crude way of dividing the carcass (*ibid*). From the butchery evidence there are indications that the carcass was divided into pot size portions by the butcher, yet the fragmentation of the bones was variable with often the presence of large chunks of bone, but then there were bones clearly divided into small pieces. While it is probable that a medieval castle was using marrow in their diet, as it was common in various dishes of the time period, they were not necessarily exploiting all possible sources of marrow from the bone but more than likely using the easy to obtain marrow such as that from long bones.

Vertebrae Trend: The butchery evidence patterns on the vertebrae is the most distinctly different method of butchering cattle in the whole assemblage. This trend was briefly mentioned by Grant (1977) and there is a distinct shift in the way animals were butchered during different time periods. For example in phase 4 and 6 of the outer bailey there was a clear dominance of cattle vertebrae been chopped longitudinally, whereas in earlier phases there is a dominance of transverse chopping of the vertebrae.

Transverse chopping to the vertebrae was seen in the early phases from the inner and outer bailey phase A and 3. These chops were at right angles to the line of the spine very much indicating that animals, mostly cattle, were not being divided in half down the line of the spine as a key method of butchering animals. Whereas in phase 4 and 6 of the outer bailey and phase B and C of the inner bailey more longitudinal chops of the vertebrae were present. A large amount of butchery on the vertebrae was seen on thoracic vertebrae. Rixon (1989) explains that butchery evidence in the past has indicated that chopping a carcass into sides began around the sixteenth century and that this procedure was not essential for butchering of cattle carcasses until the method of dividing a carcass into separate joints became necessary (p.54). At Portchester Castle this is slightly earlier than Rixon (1989) stated but later than O'Connor (1982) and Sykes (2007) believed this trend first appeared. Vertebrae from phase 4 of the outer bailey, which dates to the fourteenth to fifteenth century, had evidence of vertebrae being chopped longitudinally indicating the division of the carcass down the centre of the spine.

This type of vertebrae division has been documented at other medieval sites during the fourteenth and fifteenth centuries, and will be further discussed in chapter 12. This evidence strongly suggests that there was a shift in butchery practices, which more than likely would have been dictated by trends of the time and convenience. This shift was most likely a shift in preference of the butcher. The butchering trend of dividing a carcass down the spine is correlated with butchers dividing such carcasses into more obvious joints (Rixon, 1989). Sheep vertebrae did not follow such a distinct practice. While there were far less sheep vertebrae present than cattle vertebrae, sheep vertebrae were overwhelmingly chopped longitudinally down the centre, thus, strongly suggesting that sheep carcasses would have been hung up and split in half down the centre.

Clear Disarticulation Points

Chops to Distal Humeri: These chop marks were some of the most common chops observed. The heavy disarticulation marks were frequently seen on the posterior side of the trochlea mainly in cattle but also observed on sheep humeri.

Chops to Scapulae Articulation: Heavy chop marks to the neck of the scapulae and chops directly on the articular surface of the scapulae were common occurrences, particularly for cattle. This is clearly the use of heavy chopping tools to disarticulate the shoulder from the humerus. The placements of the chops vary slightly, but this variation may be down to the butcher as the variations occur in earlier and later periods.

Non-craftworking Sawing

There were only two incidents of sawing on cattle pelves (Figure 63). Though there were other non-craftworking sawing occurrences of sawing on long bones including humeri, tibiae and femora. There was also sawing evidence on the scapulae and ribs. All of the saw marks came from the earlier phases, phase A from the inner bailey and phase 3 from the outer bailey. This butchery evidence is somewhat unique as sawing is generally not a common butchery practice until much later. Also, sawing through a pelvis for example would have taken a great deal of effort on behalf of the butcher and that a butcher would not waste "valuable saws" on this type of butchery (Rixon, 1989, p.50).

Cuts on Anterior Metapodia Shafts: Sharp knife cuts marks were observed on the anterior side of the shafts (both medially and laterally) on the metacarpals and metatarsals. These marks are indicative of skinning. These butchery mark patterns were observed of remains from both the inner and outer bailey.

8.8 Social Implications of Diet

As discussed previously the diet of a royal castle is one of great variety with no expense spared. From Grant's (1977) report the variety of species was evident, with the presence of deer, fish and pig for example. From the butchery evidence at Portchester we can conclude that head and feet were being removed, carcasses were generally being split in halves through a longitudinal division down the vertebrae, and there was evidence of skinning and filleting of meat from the meaty joints.

8.9 The Royal Butcher?

Butchery in medieval towns is fairly well documented (Rixon 2000; Carr 2008), but who was responsible for the butchering of animals at Portchester Castle? Was there one designated butcher? Several individuals? Or perhaps the kitchen staff?

The overall zooarchaeological evidence would suggest that butchery is occurring onsite and possibly carried out by several butchers. The data from Grant's faunal reports (1977, 1985) suggests onsite butchery as all elements are represented, not just meat bearing joints, but also cranial fragments and phalanges for example. Therefore, it is unlikely that animals were being brought in from surrounding towns as dressed carcasses very frequently. In larger households it is believed that servants would often undertake the task of butchering carcasses (Rixon, 1989). Thus, for a castle such as Portchester that would have been inhabited fairly regularly and would have been a site of royal feasting, butchery would have been an important and involved task. It would therefore be right to assume that multiple people would have been responsible for taking on the task of butchering animals and preparing animals for consumption, whether servants or kitchen staff themselves. Butchery carried out with the heavy chopping tools was often haphazard and required several attempts to disarticulate. This could also be another indication that there were professional and more amateur butchers working at the castle.

8.10 Tanning

As there were phalanges and horns present, there is a possibility that tanning was occurring on the castle grounds. There was butchery evidence that was indicative of skinning such as cut marks on the skull and the phalanges. There was no definitive evidence such as waste pits of horncores or phalanges which would be associated with onsite tanning. Hides would be delivered to tanners with hooves and feet still attached (Cherry, 1991). During the medieval period tanneries were mostly found in towns and urban areas therefore it would be difficult to prove that any tanning was carried out at Portchester Castle, though from the skinning evidence mentioned it is possible that some hides were sent out of the castle grounds.

8.11 Other Taphonomic Processes

As not every single fragment was recorded for this butchery study solely those fragments that exhibited evidence of butchery, taphonomic processes were noted on those fragments that exhibited both butchery and any other distinguishing features and or processes.

Gnawing: Gnawing was low overall on the fragments observed and did not interfere with the identification of butchery marks. The lack of gnawing evidence would also suggest that once the bone was deposited it was not re-deposited to a different location or left on the surface for dogs to gnaw on for example.

Burning: While burning was evident on animal bone from the assemblage, burning did not play a factor in deciphering butchery marks as they did not interfere with any of the fragments that exhibited butchery evidence.

Root etching: Root etching was apparent on several fragments that also exhibited butchery evidence. The presence of root etching did make the identification of smaller cut marks slightly more difficult to decipher as the surface of the bone was uneven therefore the use of a hand lens was required for closer inspection of certain marks.

8.12 Conclusions

The medieval animal bone assemblage for Portchester Castle contained a significant amount of butchery evidence that allowed for specific trends to be identified and interpretations to be developed. As there was a substantial amount of data, particularly for cattle remains, the ArcGis diagrams were useful tools to observe where on the skeleton butchery marks are most likely to occur and patterns developing.

The most prominent patterns observed were the transverse and longitudinal splitting of cattle vertebrae, shifting from transverse chopping in the earlier periods, to longitudinal during the later time periods. Sheep vertebrae observed were chopped longitudinally. The heavy chopping of distal humeri for disarticulation was very common in cattle as were the sharp knife marks on anterior metapodia for skinning. Chops to the articulation of scapulae were also a common characteristic, varying to some degree in exact position of the chop, yet all attempting to disarticulate the shoulder from the forearm.

Tools used included sharp knives for activities such as skinning, filleting, meat removal and preparation and heavy chopping tools were used for disarticulating joints and jointing by removing muscles.

Grant (1985) commented that knife marks were only seen occasionally on remains from the inner bailey (p.252). From the data collected in this current study it would be unfair to say that knife marks were rare. As discussed previously chop marks do outnumber cut marks in the inner and outer bailey yet cut marks are far from infrequent. While chopping tools can produce cut marks, they cannot produce fine point insertion or slice marks that are indicators of skinning and filleting which were found on remains from Portchester. There were some fragments with butchery marks that were unidentifiable which Grant (1985) explains is due to bones being cut into smaller pieces in the medieval period as opposed to the earlier Roman faunal assemblage (p.252). Overall the majority of bones with butchery marks were identifiable usually including an articulation for the long bones. Approximately 9% of the medieval bone from the inner and outer bailey exhibited signs of butchery evidence, a similar amount seen in the first case study, Edlingham Castle, which had closer to 10% of the remains showing signs of butchery.

Chapter 9: Beeston Castle Background

9.1 History

Beeston itself is known for its dramatic location, sitting on a sandstone cliff edge, some 110 metres high, overlooking the Cheshire plains (Mackenzie, 1896). The medieval name for the castle was 'the castle of the rock', the castle was named from the crag that the castle stands on (Dodgson, 1971, p. 302). Beeston is located 12 miles southeast of Chester. The site of the castle has been an important location ever since the Bronze Age as a metalworking centre and later an Iron Age hillfort. Neolithic flint tools have also been found on the crag (Liddiard & McGuicken, 2007, p. 19). At Beeston during the Bronze-Age, defensive earthworks were constructed, where the castle's outer curtain wall stands. Artefacts including crucibles, moulds and axes were recovered, all evidence of the importance of Beeston as a metalworking centre (Ellis, 1993, p. 87). Bronze-Age pottery, pottery fabrics and urns were also recovered from the site (Ellis, 1993). The Bronze-Age enclosure was later developed into an Iron Age hillfort. During this time Beeston was an important centre for trade and a defended area for storing surplus of crops and salt (Liddiard & McGuicken, 2007, p. 21). Iron-Age evidence included artefacts such as pottery vessels and shale rings (Ellis, 1993, p. 90). Beeston was also believed to have been referenced in the fourteenth-century Middle English poem 'Sir Gawain and the Green Knight'. Beeston is believed to have been the castle of Sir Bertilak in the poem. The poem is vivid in the descriptions of the size, appearance and span of the trees and surroundings. The poet had a clear idea about how a castle should appear within the context, including the surrounding landscapes (Creighton, 2002, p.68). The quote from the poem is:

> 'Thrice the sign of the Saviour on himself he had made,
>
> When in the wood he was aware of a dwelling with a moat
>
> On a promontory above a plateau, penned in by the boughs
>
> And tremendous trunks of trees, and trenches about;
>
> The comliest castle that ever a knight owned,
>
> It was pitched on a plain, with a park all round,

Impregnably palisaded with pointed stakes,

And containing many trees in its two-mile circumference.

The courteous knight contemplated the castle from one side

As it shimmered and shone through the shining oaks.' (quoted from Stone 1959 pp. 54-55).

Beeston is believed to fit the description of the rocky terrain and surrounding forest, the later description of a large ditch are also possible clues that the castle is Beeston (Thompson, 1989). Beeston was also located near a deer park at nearby Peckforton (Liddiard & McGuicken, 2007, p. 24). The dialect the original poem was written in is also believed to be that of this area (*ibid*).

Construction of Beeston Castle began in 1225 by Ranulf, the sixth earl of Chester (Keen, 1993 p.93; Colvin, 1963, p.559). There are contradictory statements in the literature about what Ranulf's intentions were for building the castle. Colvin (1963) states that the Earl was a territorial and militaristic man who intended to use Beeston for defensive purposes, while, another view states it was a myth that the castle was built to guard the English border from the Welsh and that the castle was more for display to show the earl's strength and authority in England (Liddiard & McGuicken, 1997, p.23). It is also thought that Ranulf was inspired by the building of Château Gaillard, and therefore chose a similar high location for Beeston (Swallow, 2014). It was also thought to be a marker between England and Wales (*ibid*). Goodall (2011) states that the castle was built to protect the earldom from Hubert de Burghs (p.181). Another possibility is that he was advised by Henry III that protection was necessary and that Beeston was originally intended to be an administrative seat away from Chester (Pettifer, 1995, p. 14).

The earldom was strong and possessed land and property in the east and south, including Wiltshire and Gloucestershire (Keen, 1993, p. 93). Upon Ranulf's death in 1232 his possessions were divided between his siblings and their families (Keen, 1993). Ranulf's nephew, John, was his successor but died five years later in 1237 and the castle was appropriated by Henry III (Colvin, 1963, p.559; Keen, 1993, p.93).

The castle was given to the king's son, Edward I, when he became Earl of Chester and became an important military base for English campaigns (Colvin, 1963 p. 560; Liddiard & McGuicken, 2007, p.25). In 1277, 1282-3 and 1295 Edward led military campaigns against the Welsh, the result of which was the building of a network of new castles in Wales and improvements to castles along the border (Keen, 1993, p.96). Chester was an important centre for military operations and the focus was somewhat shifted away from Beeston with the majority of the military importance centred in Chester (Keen, 1993, p.96).

Rebuilding took place in the early fourteenth century, with three towers in the inner ward raised with timber being brought in from Delamere forest to use in the construction (Liddiard & McGuicken, 2007, p. 25). Timber from Delamere was also used to repair churches and religious houses of Chester (Laughton, 2008). Repairs were later undertaken at the castle between 1359 and 1361 under Richard II (Colvin, 1963, p.560). Richard II kept the earldom of Chester as he had no heir, and thus appointed a constable and a janitor (Keen, 1993, p.97). Cheshire briefly became a principality in 1398 under Richard II and a year later he was captured by the future Henry IV upon returning from an expedition to Ireland (Liddiard & McGuicken, 2007). Henry's trip to Ireland was to "avenge the death of the Earl of March" taking a portion of his treasure with him (Keen, 1993, p.97). Henry reduced Chester back to an earldom a year later. There is a legend that the King hid some of the treasure at the castle before he departed to Ireland, though it has been suggested he hid treasure in several different castles (Keen, 1993 p.97; Liddiard & McGuicken, 2007 p.26).

By the reign of Henry VIII the castle had been neglected and was somewhat ruinous, it was briefly used during the Civil War as a fortification in the early sixteenth-century (Keen, 1993, p.98). During this time period, Cheshire was divided, in that Chester was royalist and the surrounding areas of the county were held by Parliamentarians (Keen, 1993, p.98). In January 1643 Sir William Brereton arrived at Beeston and a month later he placed between 200 and 300 men there (Barratt, 1995). The Parliamentarians occupied the castle under Sir William Brereton in 1643 but surrendered the castle to the Royalist army under Captain Sandford (Keen, 1993, p.98). Not long after, in 1644, the Royalist were defeated and Beeston was surrendered in 1645 (Keen, 1993). Upon its surrender the castle was garrisoned by Parliamentarian troops until the following spring

(Barratt, 1995). There was an order to dismantle the castle and it was mostly torn down in the seventeenth century and left to decay (Colvin, 1963, p.560).

[redacted]

Figure 64: Beeston Castle station photograph around 1905 (Liddiard & McGuicken, 2007, p. 12). This image has been removed by the author of this thesis for copyright reasons.

In later years the castle was used as the site of the Beeston festival and became a tourist attraction in the nineteenth century when Lord Tollemache allowed the Chester to Crewe railway line to be built on his land under the condition that it included a station at Beeston where the express trains would stop (Liddiard & McGuicken, 2007). The castle was also very much a favourite with artists for paintings and drawings around this time period (Keen, 1993). The Ministry of Works looked after the castle from 1959 and was then passed on to English Heritage in 1984 (Liddiard & McGuicken, 2007).

9.2 Castle Design

The overall castle plan comprised a masonry inner ward set in the north-west corner of a much larger outer ward that was also defined by a curtain wall. The plans of both features are to a large extent dictated by natural topography. A rock-cut ditch separated the inner ward from the outer ward, which was surrounded by a curtain wall and also defended by a two-towered gatehouse (Liddiard & McGuicken, 2007, pp. 11-13). To the east and west of the gatehouse there were two more towers and another tower on the eastern section of the curtain wall. There was no castle keep at Beeston, but the residential accommodation was in the inner ward (Liddiard & McGuicken, 2007, p. 11). What is also unusual about Beeston is that there is no solid archaeological evidence for kitchens or a great hall in the inner ward (Liddiard & McGuicken, 2007; Keen, 1993, p.100). This may be because Beeston was not a permanent residence, indicating no real need for a great hall or permanent kitchens, or rather there was no strong archaeological evidence that has been recovered. There was still an adequate amount of chambers and small halls for the constable and visitors (Keen, 1993, p.101).

9.2.1 The Inner Ward

A large flat rock-cut ditch separates the inner ward from the outer ward. This ditch on the south side was also where a large amount of the stone was quarried for the building on the inner ward (Keen, 1993, p.101). The gatehouse in the inner ward is believed to be the earliest and most important building of the castle. The constable who would have looked after the castle would have resided here (Liddiard & McGuicken, 2007). The gatehouse was accessible by a stone causeway, which is a replacement for what would have been a timber bridge (Keen, 1993, p.101). Two D-shaped towers stand at the entrance of the gatehouse, though less survives of the east gatehouse tower (Keen, 1993, p.101). The inner ward also contained a further three towers, the south-west tower, the east tower and the south-east tower. There is also a well within the inner ward. The well has been excavated on three occasions, in 1935 with a recorded depth of 100.1 metres and 103.2 metres in 1936 (Keen, 1993, p.104).

The well was further explored in 1976 to look for the treasure that was thought to have been placed there by Richard II (Keen, 1993, p.104).

9.2.2 The Outer Ward

As Beeston had no castle keep, the gatehouses were the key important foci. The outer gatehouse would have been similar to the gatehouse in the outer ward but would have stood twice as tall (Liddiard & McGuicken, 2007). There were ten D-shaped towers in the outer ward that stood along the outer curtain wall, all of which would have had timber floors and be at least “one storey about the level of battlements” (Keen, 1993, p.104). The towers vary in their completeness today, with some merely foundations whereas others are in a more complete state. It is also believed that ancillary buildings would have been inside the outer ward, but there is little archaeological evidence for this (Liddiard & McGuicken, 2007).

9.3 Excavation of the Castle

Excavations have taken place in the inner ward, the outer ward, the outer gateway and the lower green. All excavations are published in Ellis’s volume on Beeston Castle (1993).

1968-1973 Excavations

The excavations that took place between 1968 and 1973 were intended to reveal more of the medieval structure, including the medieval walls of the inner ward (Ellis, 1993, p.13). The excavations were carried out under the direction of Laurence Keen.

1975-1985 Excavations

These later and more comprehensive excavations took place under the direction of Peter Hough. Excavation took place in the inner and outer ward, the outer gateway, and on hillslopes to the east.

[redacted]

Figure 65: Location of excavations at Beeston Castle (Ellis, 1993, p. 15). This image has been removed by the author of this thesis for copyright reasons.

9.4 Phasing of the Castle

The castle was phased using a single period system, based on stratification and artefacts as indicators. The evidence was separated into twelve periods as follows:

Period	Date
1A	Neolithic
1B	Early/Middle Bronze Age
2A	Late Bronze Age to c 900 BC
2B	Late Bronze Age, c 900 BC to c 650 BC
3A	Early Iron Age, c 650 to c450 BC

3B	Middle/Late Iron Age, c450 BC to first century BC
4	Romano-British to thirteenth century AD
5	Thirteenth to fourteenth centuries AD
6	Later Medieval
7	English Civil War (mid-Seventeenth century)
8	Late Seventeenth century
9	Eighteenth to twentieth centuries

Table 26: Phasing of the site of Beeston Castle (Ellis, 1993).

The phases that will be observed for this study include mainly the later medieval/post-medieval faunal material including period 5, period 6 and period 7 made of material mostly from the Inner ward, outer ward and outer gateway. Material from the post-seventeenth was also included in this study to draw a comparison between early and later styles of butchery.

9.5 Animal Bone Report

The animal bone was analysed by Jacqui Mulville in 1993. For the purposes of the animal bone report, the castle's development was divided into 4 phases:

Phase	Date
Pre Medieval	Up to 1225
Medieval	1225-1640
Seventeenth century	1640-1700
Post seventeenth century	1700 onwards

Table 27: Phasing according to the animal bone report (Mulville, 1993).

The recovery method for the animal bone was that all remains were hand-picked. There were 10,125 bones recovered from the site; 97.3% of the bones were mammalian. Most of the bone recovered came from the outer gateway area, which constituted 92.4% of the total bone from excavation (Mulville, 1993).

The report contains a section on butchery of the major domestic species. It states that due to high fragmentation levels, low numbers of butchery marks were recorded. Observations include that chop marks were occurred mainly on the limbs; that limbs are detached from the distal scapula and chopped or marrow removed; and that knife cuts on the jaw are evidence of removal of the tongue and cheek. Sheep butchery was similar to cattle butchery patterns but evidence came in the form of knife marks as opposed to cleaver chops (Mulville, 1993). Butchery was also observed on red deer, horse and pig remains. The report also mentions that there is a large amount of metapodial butchery in the post seventeenth century compared to the seventeenth century.

There was also a 1976 animal bone report by A. Gebbels, which contained 718 bones. These bones were divided into the phases: medieval (1220-1350); Civil war occupation; and mixed deposits. Though this assemblage was small there were very few comments on butchery. For the seventeenth century it was noted for cattle remains that there were "…clear signs of butchery, especially the vertebrae, where the processes were cut off" (Gebbels, 1976, p. 16). For pig remains there was mentions of signs of butchery but also emphasising the difficulty in identifying sheep from pig vertebrae. The only other time when butchery is mentioned is when discussing cattle in the post-medieval, in which Gebbels (1976) states "The long bones frequently showed signs of cutting" (p.19). There were no further interpretations regarding butchery for this particular report.

In the Beeston archive, obtained from Historic England in Helmsley, there was a butchery diagram of cattle and sheep with the butchery marks from the seventeenth-century and the post-seventeenth-century animal bone. The marks were identified on outline diagrams as chopped, chopped through and knife cut. Cattle had sixteen butchery marks including five knife marks on the mandibles, six chops on the pelves, two chops to the radii, and single chops to the femur, scapula and calcaneus, whereas the post-seventeenth-century butchery for cattle had over seventeen butchery marks. Most of the hind limb had been cut off the page, so butchery evidence from the tibia downward is not present in the diagram to discuss. The diagram included eight chops to the metacarpals, six chops to the scapulae, two chops to the femora and a single chop to the humerus and mandible. There were also partial diagrams of the sheep which show less butchery evidence, consisting of marks on the tibiae, a chop to a femur and humerus. These diagrams are most likely associated with Mulville's (1993) report. It is noteworthy that a zooarchaeologist was presenting butchery marks visually at this time. The butchery data collected from Mulville's report contained only a small amount of butchery evidence, though as this study is focusing on butchery marks in particular, the quantity of data has increased. It is also important to point out that all butchery marks, including cuts and chops to ribs are included in the butchery quantification for this study, while they were not considered countable fragments in Mulville's (1993) animal bone report.

The dates for the largest portion of the animal bone that will be analysed in this case study are slightly later in date to Edlingham Castle and Portchester Castle, which might provide points of difference in the way that carcasses were being butchered and prepared. It will also be interesting to compare the status differences as Beeston was built for an earl and is known to have the occasional royal visit, though it was not necessarily as high status as the royal castle of Portchester and larger than the hall house of Edlingham. As Beeston is somewhat later in date compared with the two other case studies the likelihood of increased professional butchery is higher.

Chapter 10: Beeston Castle Butchery Evidence

The animal remains from Beeston Castle were divided into three groups for this research for comparative purposes. To reiterate, the three phases the bone were divided into were the medieval phase (1225-1640), seventeenth century phase (1640-1700) and post-seventeenth century phase (1700 onwards). These phases were three of the four phases that were included in Mulville's (1993) animal bone report. The phase for the pre-medieval material was not included for this analysis as less than ten fragments with identified butchery marks dated to this time period. The bone dating to the seventeenth century group included the bone from the civil war period of the site. As discussed in the previous chapter, Gebbels' animal bone report only briefly mentioned a presence of butchery but included no quantification, tool usage information or interpretations. The animal bone report by Mulville (1993) did include a page dedicated to butchery of the major domestic species represented. There was no clear quantification of the butchery marks in the report. It is likely though that each element only contained a small amount of butchery evidence as one would assume it would be mentioned if there was a heavy amount of butchery. The bone analysed for this study included both the animal bone studied by Gebbels and Mulville.

The animal bone came from the inner ward, outer ward and the outer gateway of the castle. The bone analysed in Gebbel's (1976) animal bone reports was excavated by Laurence Keen in 1968-73, and the bone from the later excavations discussed in Mulville's (1993) report was excavated by Peter Hough in 1975-85.

10.1 Cattle Butchery

The butchery data for cattle consisted of 510 chop marks and 562 cut marks. The below figures show the percentages of butchery marks for cattle overall for the site. Some common trends to be discussed in detail in this chapter include butchery evidence on the vertebral column, metapodia and scapulae as these are some of the most heavily butchered elements excluding ribs.

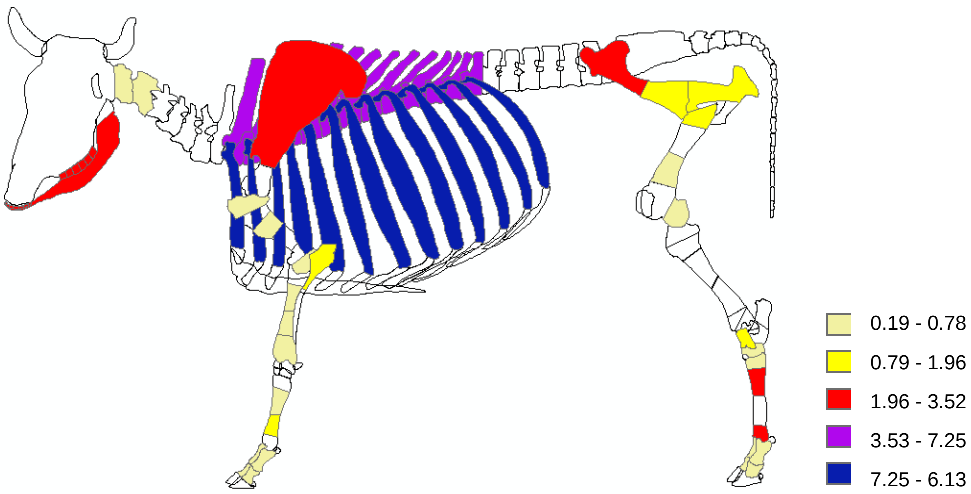

Figure 66: Cut mark frequencies overall for cattle from Beeston Castle.

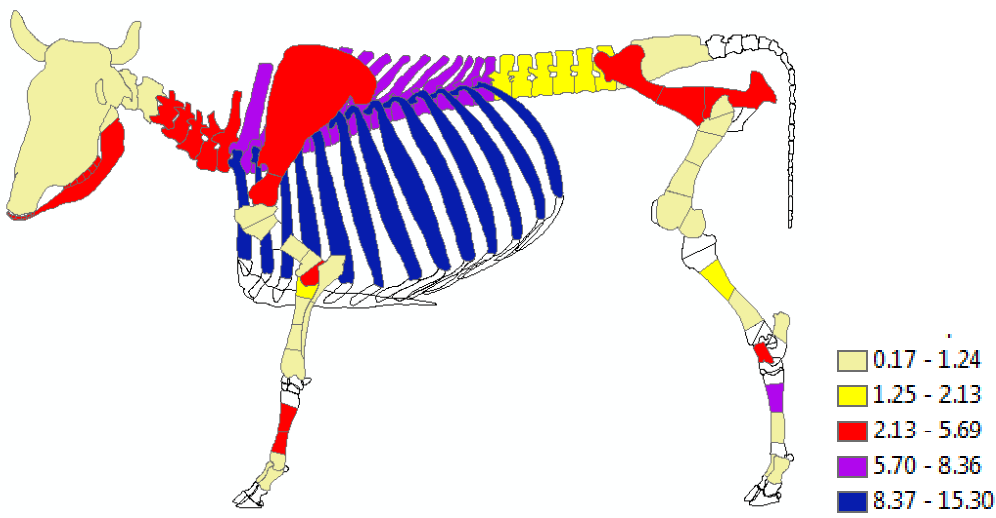

Figure 67: Chop mark frequencies overall for cattle from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
1	skull	skull		2		0.4
20	mandible	mandible	15	17	2.9	3.0
20.1	mandible	mandible hinge		3		0.5
22	horn core	horn core		1		0.2
28	cervical vertebra			22		3.9
29	thoracic vertebra		37	47	7.3	8.4
30	lumbar vertebra			12		2.1
26	atlas	atlas	2	6	0.4	1.1
27	axis	axis	4	3	0.8	0.5
31	sacrum			3		0.5
33	rib	rib	313	86	61.4	15.3
36.1	scapula	articulation		32		5.7
36.2	scapula	blade	18	25	3.5	4.4
38.11	humerus	proximal upper	4	1	0.8	0.2
38.12	humerus	proximal lower		5		0.9
38.21	humerus	upper shaft	3		0.6	
38.22	humerus	lower shaft		3		0.5
38.31	humerus	upper distal		2		0.4
38.32	humerus	lower distal	4	26	0.8	4.6
39.1	radius	proximal		12		2.1
39.21	radius	upper shaft	2	5	0.4	0.9
39.22	radius	lower shaft	2	1	0.4	0.2
39.3	radius	distal	3	4	0.6	0.7
40.1	ulna	proximal	5	2	1.0	0.4
40.2	ulna	distal		3		0.5
57.21	metacarpal	upper shaft	4	28	0.8	5.0
57.22	metacarpal	lower shaft	6	28	1.2	5.0
57.3	metacarpal	distal		1		0.2
70.1	pelvis	illium upper	17	19	3.3	3.4
70.2	pelvis	illium lower	9	26	1.8	4.6
71	pelvis	ischium	10	21	2.0	3.7
71.11	femur	head		4		0.7
74.12	femur	proximal upper		1		0.2
74.13	femur	proximal lower	5	4	1.0	0.7
74.21	femur	upper shaft		1		0.2
74.22	femur	lower shaft	3	1	0.6	0.2
74.31	femur	upper distal		2		0.4
74.32	femur	lower distal	2	6	0.4	1.1
74.32	femur	lower distal		1		0.2
76.1	tibia	proximal upper		8		1.4
76.21	tibia	upper shaft		8		1.4
76.22	tibia	lower shaft		7		1.2
76.32	tibia	distal lower		1		0.2
79	astragalus	astragalus	6	18	1.2	3.2
80.2	calcaneus	lower		4		0.7
87	navicular cuboid		2		0.4	
95.1	metarsal	proximal	2		0.4	7.3
95.21	metatarsal	upper shaft	16	41	3.1	0.5
95.22	metatarsal	lower shaft		3		
95.3	metatarsal	distal	14		2.7	0.7
109	first phalanx	first phalanx	1	4	0.2	
110	second phalanx	second phalanx	1		0.2	

Table 28: Butchery data overall for cattle from Beeston Castle.

10.1.1 Cattle Butchery Medieval Phase

There were 28 cattle fragments with 53 butchery marks from the medieval period of the castle. This phase contained the smallest amount of bone and the smallest amount of butchery evidence. Frequencies for cut and chop marks are depicted in figures 68 and 69.

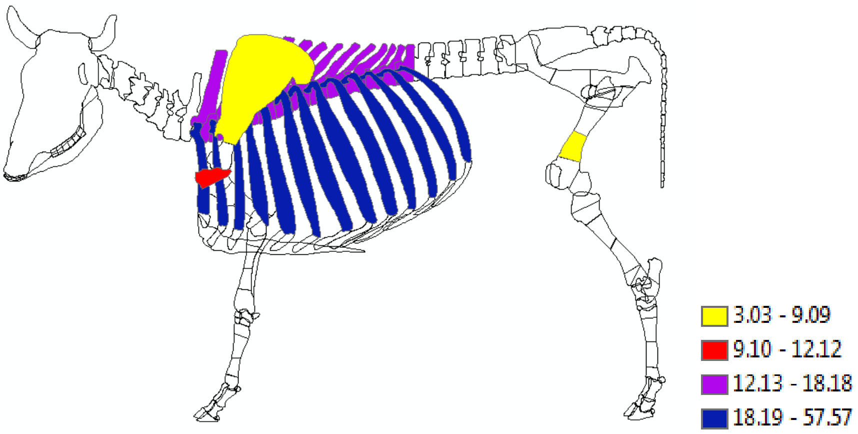

Figure 68: Cut mark frequencies for medieval phase for cattle from Beeston Castle.

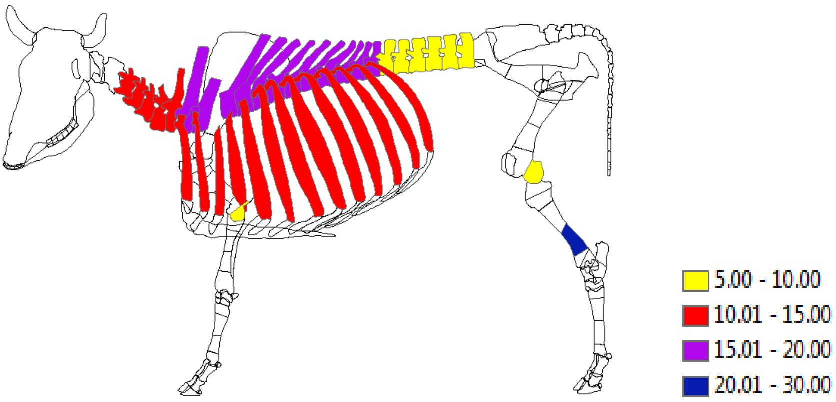

Figure 69: Chop mark frequencies for cattle for the medieval phase from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
28	cervical vertebra			3		15.0
29	thoracic vertebra		6	4	18.2	20.0
30	lumbar vertebra			2		10.0
33	rib	rib	19	3	57.6	15.0
36.2	scapula	blade	1		3.0	
38.11	humerus	proximal upper	4		12.1	
38.32	humerus	lower distal		1		5.0
74.22	femur	lower shaft	3		9.1	
74.32	femur	lower distal		1		5.0
76.22	tibia	lower shaft		6		30.0

Table 29: Butchery data for cattle for the medieval phase from Beeston Castle.

Head: There were no butchery marks on the skull or mandible for the medieval phase.

Neck and Axial: Evidence observed included longitudinal heavy chops through the bodies of cervical and lumbar vertebrae. These longitudinal chops were also observed on thoracic vertebrae, yet there were also chops to the spinous processes on three of five thoracic vertebrae with observed butchery marks. The longitudinal butchery of the vertebrae indicated that the carcasses were split down the middle on the spine and divide into two halves. Rib cuts accounted for 57.6% of the overall cut marks. Cuts were found on all parts of the rib including head, neck and body. Figure 70 shows an example of a rib with cut marks. The vast majority of cuts to the rib appeared on the body, which are indications of meat removal and filleting meat from the bone, whilst the small amount of chop marks was most likely associated with joint division.

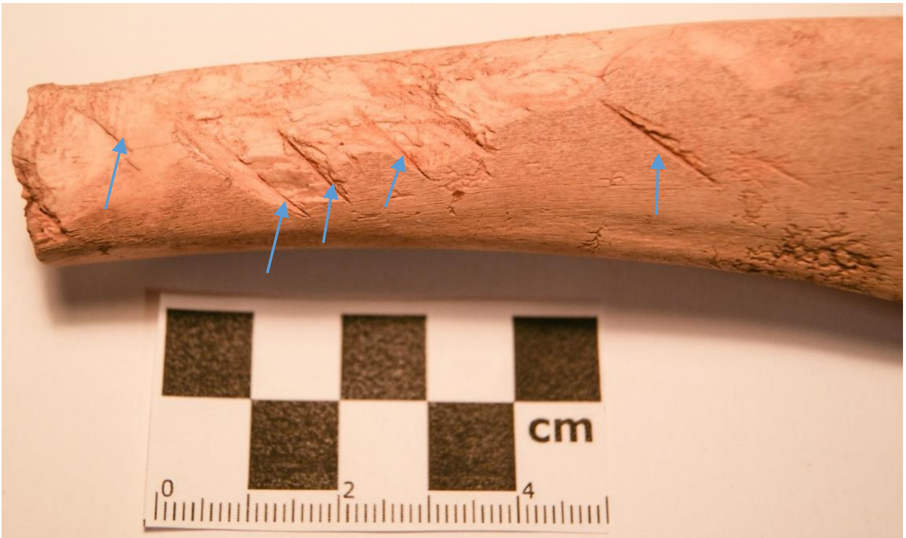

Figure 70: Cattle rib with a series of cut marks from Beeston Castle (Photo by Hayley Foster).

Pelvis: There were no butchery marks on cattle pelves from this phase.

Sacrum: There were no butchery marks on cattle sacrum from this phase.

Appendicular Skeleton:

Scapula: There were a series of cut marks on the posterior side of the blade of a scapula. These were clear indications of filleting the shoulder meat.

Humerus: The proximal humerus had 12.1% of the cuts, mainly on the head and the lower distal had cuts to the trochlea. The cuts to the head are associated with the cutting of the ligaments that join the humerus and the scapula. Likewise, the cuts on the trochlea would have been the disjointing of the ligaments around the proximal ulna and distal humerus.

Radius, ulna and metacarpal: There was no butchery evidence on radii, ulnae and metacarpals for this phase.

Femur: There were three cuts to the lower shaft of the femur and one chop to the lower distal.

Tibia: One tibia fragment had 30% of chop marks as it contained six heavy chops diagonal across the lower shaft. These marks were unmethodical and more of a hacking at the bone.

Metatarsal, astragalus and calcaneus: There was no butchery evidence on these elements for the medieval phase.

10.1.2 Cattle Butchery Seventeenth Century

There were 408 butchery marks on 237 cattle fragments from the seventeenth century phase. Figure 71 and 72 show the frequencies of cut and chop marks from the seventeenth century.

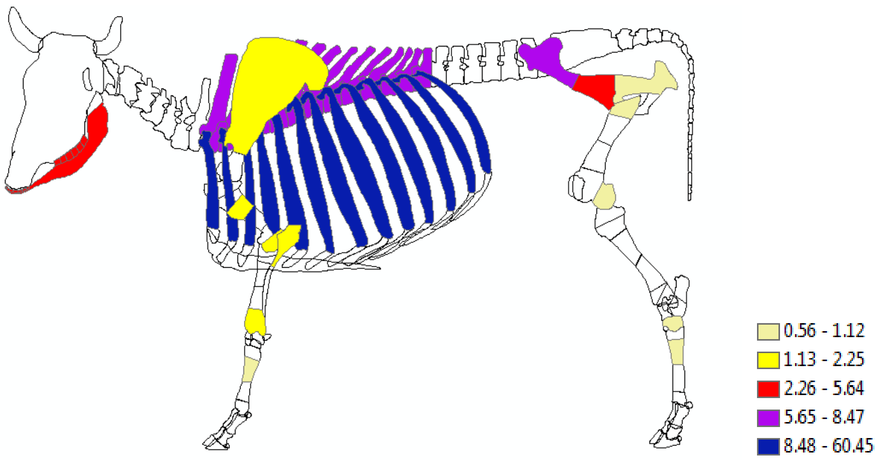

Figure 71: Cut mark frequencies for cattle from the seventeenth century phase from Beeston Castle.

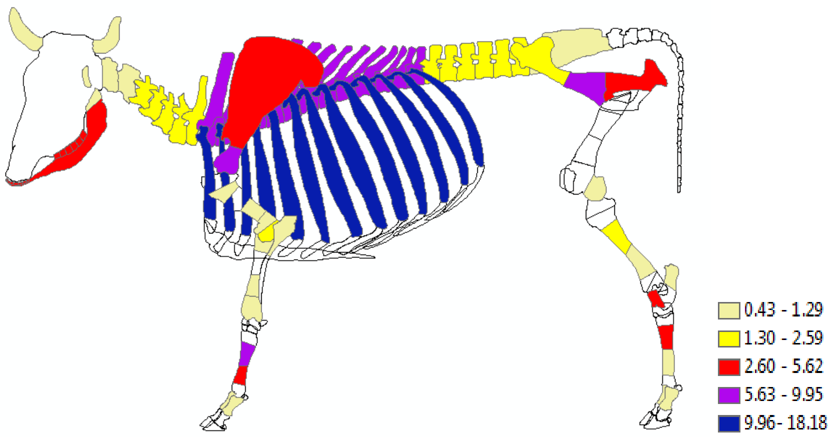

Figure 72: Chop mark frequencies for cattle from the seventeenth century phase from Beeston Castle.

ID	Element	Portion	Cuts	Chops	Sawn	%cut	%chop
20	mandible	mandible	10	10		5.6	4.3
20.1	mandible	mandible hinge		1			0.4
22	horn core	horn core		1			0.4
28	cervical vertebra			6			2.6
29	thoracic vertebra		15	17		8.5	7.4
30	lumbar vertebra			6			2.6
26	atlas	atlas		2			0.9
27	axis	axis		2			0.9
31	sacrum			1			0.4
33	rib	rib	107	42		60.5	18.2
36.1	scapula	articulation		16			6.9
36.2	scapula	blade	3	13		1.7	5.6
38.12	humerus	proximal lower		2			0.9
38.21	humerus	upper shaft	3			1.7	
38.22	humerus	lower shaft		2			0.9
38.31	humerus	upper distal		1			0.4
38.32	humerus	lower distal	4	5		2.3	2.2
39.22	radius	lower shaft		1			0.4
39.3	radius	distal	3	2		1.7	0.9
40.1	ulna	proximal	4	4		2.3	1.7
57.21	metacarpal	upper shaft	1	23		0.6	10.0
57.22	metacarpal	lower shaft		9			3.9
70.1	pelvis	illium upper	13	6		7.3	2.6
70.2	pelvis	illium lower	7	14		4.0	6.1
71	pelvis	ischium	2	9		1.1	3.9
74.13	femur	proximal lower	1			0.6	
74.32	femur	lower distal	1	1		0.6	0.4
76.1	tibia	proximal upper		2			0.9
76.21	tibia	upper shaft		5			2.2
76.22	tibia	lower shaft		1			0.4
76.32	tibia	distal Lower		1			0.4
79	astragalus	astragalus		9			3.9
80.2	calcaneus	lower		3			1.3
87	navicular cuboid		2			1.1	4.8
95.21	metatarsal	upper shaft	1	11		0.6	0.9
95.22	metatarsal	lower shaft		2			0.4
109	first phalanx	first phalanx		1			

Table 30: Butchery data for cattle for seventeenth century phase from Beeston Castle.

Head: There were no butchery marks on the skull yet butchery to the mandible accounted for 5.6% of the chops and 4.3% of the cuts overall. There was also one chop to a mandible hinge. Butchery to the mandible mainly happened on the body below the tooth row. There were two chops to the ascending ramus and one to the hinge too. Cuts to body of the mandible are generally signs of skinning activity but chops are associated with removal of the tongue and dismemberment from the maxilla, particularly if the chop mark appears on the mandibular hinge.

Neck and axial skeleton:

Butchery marks to the ribs accounted for 60.5% of the cuts and 18.2% of the chops. This data is fairly consistent with the other phases as generally 55-65% of the cuts occur on the ribs. The butchery to the vertebrae was fairly extensive. The cervical vertebrae had fragments with five chops, three of which were transverse chops and two with longitudinal chops through the bodies. There were 18 thoracic vertebrae with butchery evidence for this phase. The vast majority of the thoracic vertebrae showed longitudinal chops through the bodies or spinous processes. There were three cases where there were transverse chops through the vertebrae bodies. The lumbar vertebrae only had five fragments with butchery marks, two of which were transverse chops. The atlas and axis were also butchered with chops appearing on the anterior side and split longitudinally, as discussed. Transverse chops to the atlas and axis suggest attempts at separating the head from the rest of the vertebral column. Longitudinal chops to the atlas and axis are possible indications the head had previously been removed and was a sign of division of the carcase.

Pelvis: There was butchery evidence to all sections of the pelvis. The highest frequency occurred on the lower illium which consisted of 4% cuts and 6.1% chops overall.

Sacrum: There was one cattle sacrum with a longitudinal chop mark down the centre axis of the bone.

Appendicular Skeleton:

Scapula: The scapulae had 6.9% of the chops to the articulation and 5.6% to the blade. The chops to the articulation mostly occurred on the scapulae neck or on the articular surface. Chops to the blade mainly occurred on the spine or in close proximity to the spine. These chops are associated with the dismemberment of the scapula from the proximal humerus. The cut marks to the blade are generally associated with filleting shoulder meat from the bone.

Humerus: There was evidence of butchery marks on most areas of the humeri, including the proximal lower section, the upper and lower shaft, and the lower distal. The lower distal consisted of 2.3% of cuts overall and 2.2% of chops overall.

Radius: The radii had butchery evidence on the proximal, lower shafts and the distal. The proximal had the most butchery with 2.3% of cuts overall and 1.7% chops. As discussed in the previous phase this would be associated with the dismemberment of the radius and ulna from the distal humerus.

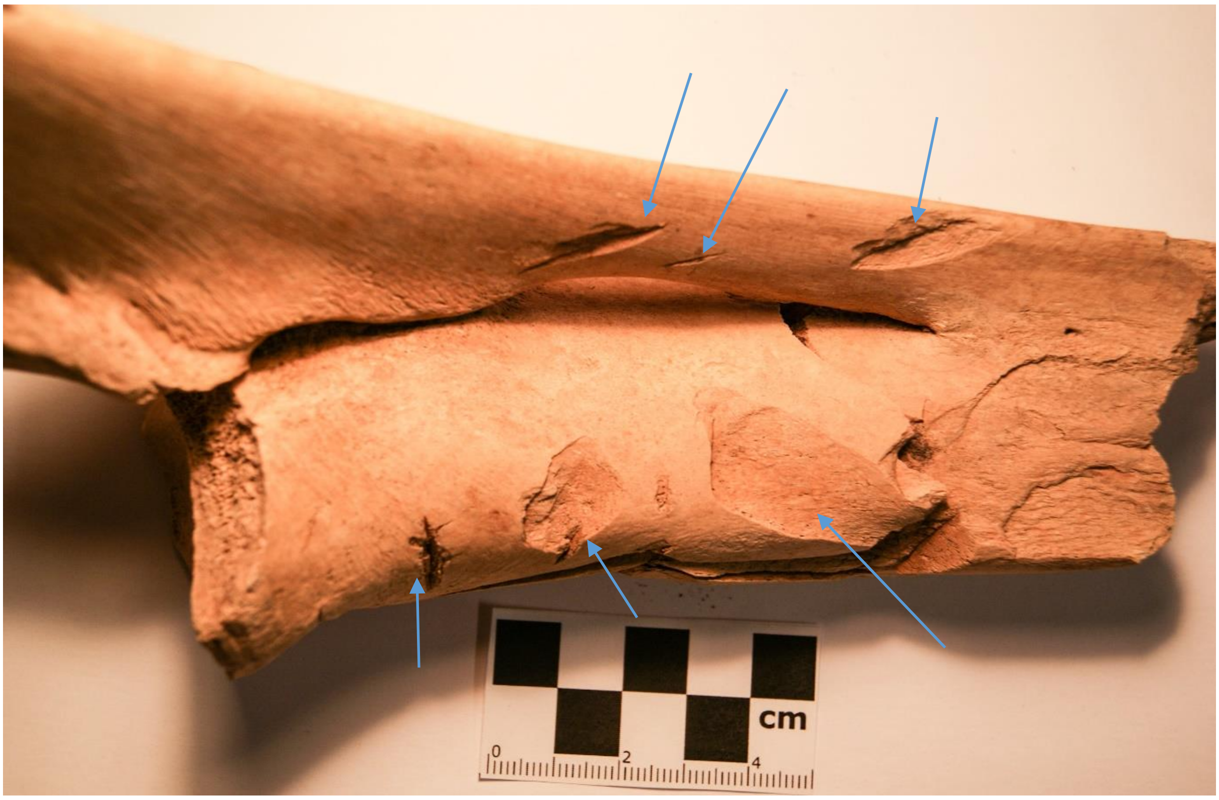

Figure 73: Posterior side of cattle radius and ulna with chop marks (Photo by Hayley Foster).

Ulna: As seen in figure 73, the ulna had a series of heavy chop marks. The series of impact blows were indications of likely attempts at dismemberment from the upper limb.

Metacarpal: The upper shafts exhibited 10% of the overall chop marks for the phase for cattle and the lower shafts 3.9%. The majority of the cuts and chops appeared on the lateral side of the bone. Figure 74 and 75 show heavy chops to the metacarpal shaft.

Figure 74: A cattle metacarpal with heavy chop marks to the anterior shaft (Photo by Hayley Foster).

Figure 75: A cattle metacarpal partially chopped through at the mid-shaft and then snapped (Photo by Hayley Foster).

Femur: There was a small amount of butchery on the proximal and distal femora. There was evidence of an unfused metaphysis which is evidence of a cattle less than 42-48 months of age (Silver, 1969)

Tibia: There was minimal butchery seen on the tibiae, the upper shafts had 2.2% of the chops overall while the proximal, distal and shafts had less than 1% of chops. Several of the proximal epiphysis were unfused indicating the animal was not older than 42-48 months of age (Silver, 1969).

Metatarsals: 4.8% of chop marks occurred on upper shafts of metatarsals. Most of these chops occurred on the lateral side of the bone. These chop marks represent the removal of the foot.

Astragalus: Astragali consisted of 3.9% of the chop marks for this phase. The chops were a combination of longitudinal chops down the centre of the bone and transverse chops through the central axis. This evidence is consistent with dismemberment from the rest of the lower leg and rapid meat removal.

Calcaneus: There were three chops to two calcanei from this phase. The chops were heavy and applied with a substantial amount of force to the body, a clear sign of disarticulation.

Phalanges: There was only one cut to one first phalanx on the proximal end of the bone.

10.1.3 Cattle Butchery Post-Seventeenth Century

There were 591 butchery marks on 327 separate cattle fragments from the post seventeenth century phase. This phase contained the largest amount of cattle remains with butchery evidence. Figure 76 and 77 show the frequencies of cuts and chops on cattle remains from the post-seventeenth century.

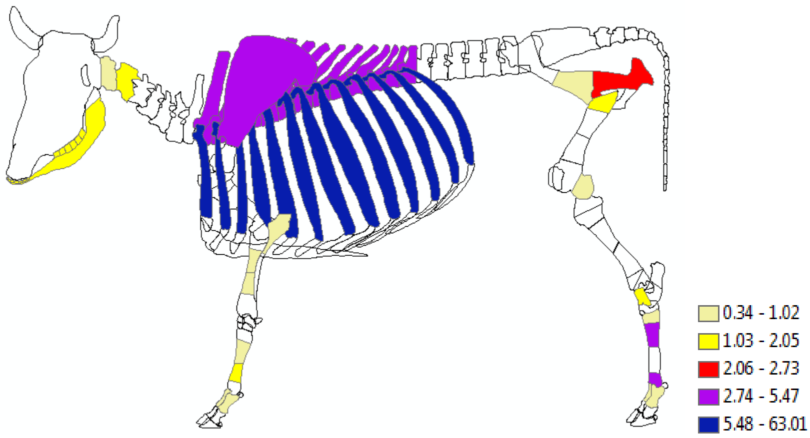

Figure 76: Cut mark frequencies for cattle from the post-Seventeenth century from Beeston Castle.

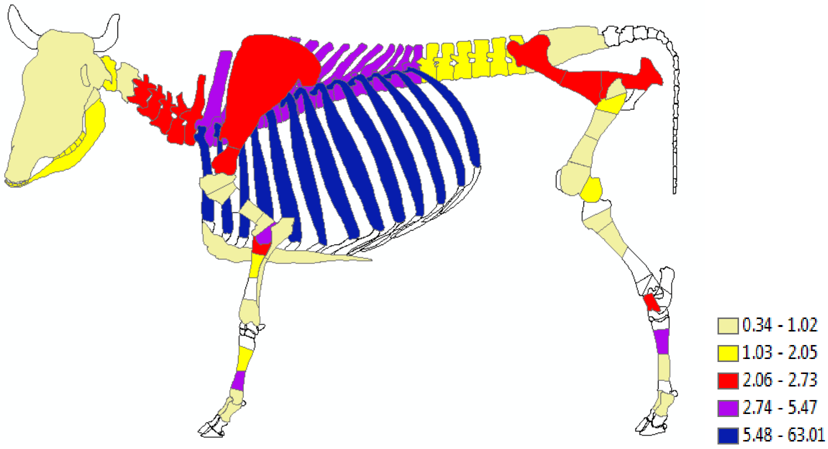

Figure 77: Chop mark frequencies for cattle from the post-Seventeenth century from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cuts	%chops
1	skull	skull		2		0.7
20	mandible	mandible	5	5	1.7	1.7
20.1	mandible	mandible hinge		2		0.7
28	cervical vertebra			11		3.7
29	thoracic vertebra		16	26	5.5	8.7
30	lumbar vertebra			4		1.3
26	atlas	atlas	2	4	0.7	1.3
27	axis	axis	4	1	1.4	0.3
31	sacrum			2		0.7
36.1	scapula	articulation		16		5.4
36.2	scapula	blade	14	12	4.8	4.0
38.11	humerus	proximal upper		1		0.3
38.12	humerus	proximal lower		3		1.0
38.22	humerus	lower shaft		1		0.3
38.31	humerus	upper distal		1		0.3
38.32	humerus	lower distal		20		6.7
39.1	radius	proximal		9		3.0
39.21	radius	upper shaft	2	5	0.7	1.7
39.22	radius	lower shaft	2		0.7	
39.3	radius	distal		2		0.7
40.1	radius	proximal	1	1	0.3	0.3
40.2	radius	distal		3		1.0
57.21	metacarpal	upper shaft	3	5	1.0	1.7
57.22	metacarpal	lower shaft	6	19	2.1	6.4
57.3	metacarpal	distal		1		0.3
70.1	pelvis	illium upper		12		4.0
70.2	pelvis	illium lower	2	9	0.7	3.0
71	pelvis	ischium	8	12	2.7	4.0
71.11	femur	head		4		1.3
74.12	femur	proximal upper		1		0.3
74.13	femur	proximal lower	4	5	1.4	1.7
74.21	femur	upper shaft		1		0.3
74.22	femur	lower shaft		1		0.3
74.31	femur	upper distal		2		0.7
74.32	femur	lower distal	1	4	0.3	1.3
76.1	tibia	proximal upper		4		1.3
76.12	tibia	proximal lower		2		0.7
76.21	tibia	upper shaft		3		1.0
79	Astragalus	astragalus	6	9	2.1	3.0
95.1	calcaneus	proximal	2		0.7	
95.21	metatarsal	upper shaft	15	28	5.1	9.4
95.22	metatarsal	lower shaft		1		0.3
95.3	metatarsal	distal	14		4.8	
109	first phalanx	first phalanx	1	3	0.3	1.0

Table 31: Butchery data for cattle for post-Seventeenth century from Beeston Castle.

Head:

There were two chops to the skull on the frontal of one skull fragment. 1.7% of the cuts and 1.7% of the chops occurred on the mandible. Chops and cuts appear on the ascending ramus and on the body of the mandible below the tooth row. The cut marks appear as small nicks which are considered signs of skinning. There were also two mandible hinges with chops, probable signs of dismemberment.

Neck and Axial Skeleton:

Ribs accounted for 63% of cuts and 13.4% of chops overall for the phase. Vertebrae followed similar patterns to the previous phase in that most cervical and thoracic vertebrae were butchered longitudinally through the body. Cuts were also common on the spinous processes of the thoracic vertebrae. The lumbar vertebrae only accounted for 1.3% of the chop marks yet transverse chops slightly outweighed longitudinal chops. The atlas and axis also had cuts and chops present, consisting mainly of central longitudinal chops.

Pelvis: The pelvis has butchery marks on all parts of the pelvis. The cut and chop marks mainly occurred on or around the acetabulum. These chop marks are consistent with the disarticulation of the femur from the pelvis.

Sacrum: There were two sacra that had chop marks, one of which was unfused.

Appendicular Skeleton:

Scapula: The scapulae had 5.4% of the chops to the articulation and 4% to the blade. As in the previous phase the marks occurred on the posterior side on the neck and on the articular surface.

Humerus: The lower distal humerus had 6.7% of the chop marks overall. These chops included chops through the trochlea and articular surface, many of the chops occurring on the posterior side of the bone, an indication of the separation from the lower limb.

Radius: The proximal radii had 3% of the chop marks, occurring both on the medial and lateral sides of the bone. These chop marks on the proximal articulation are likely evidence of the separating of the distal humerus from the proximal radius.

Ulna: There was no butchery evidence on ulnae from this phase.

Metacarpal: The metacarpals had butchery evidence on the upper and lower shafts and the distal. The lower shafts had the highest frequency of butchery marks for the metacarpals with 2.1% of cuts and 6.4% of chops overall for cattle.

Femur: All sections of the femora exhibited butchery evidence. The proximal lower section had the highest frequency of butchery marks for femora, consisting of 1.4% of cuts and 1.7% of chops overall. This section saw diagonal chops that removed the head of the femora entirely, a clean and forceful disarticulation.

Tibia: The proximal upper and lower section and the upper shaft had chop marks.

Astragalus: Astragali had 2.1% of cuts and 3% of chops overall for this phase.

Calcaneus: There was only 0.7% of cuts for the calcanei.

Phalanges: Only first phalanges had butchery marks and all marks appeared on the proximal half of the bone.

10.2 Sheep/Goat Butchery

Butchery evidence for sheep/goat was not as extensive as for cattle. Below (figure 78 and figure 79) represents the cut and chop marks overall for all three phases.

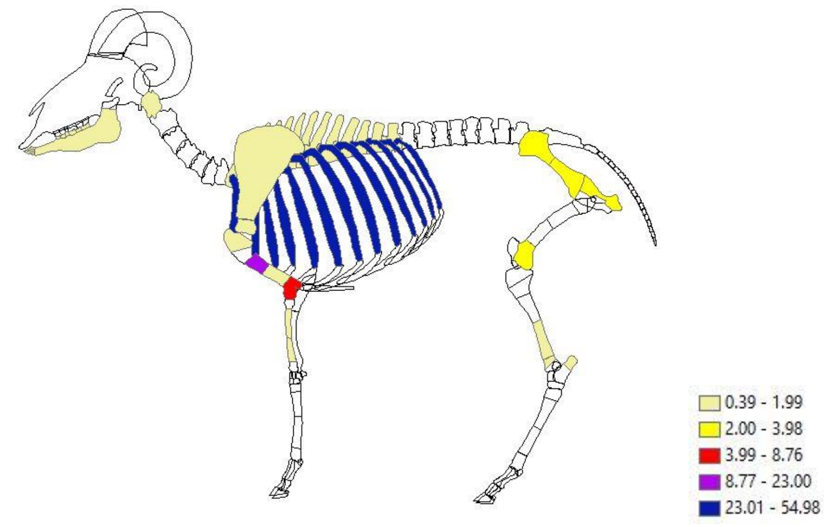

Figure 78: Cut mark frequencies overall for sheep/goat from Beeston Castle.

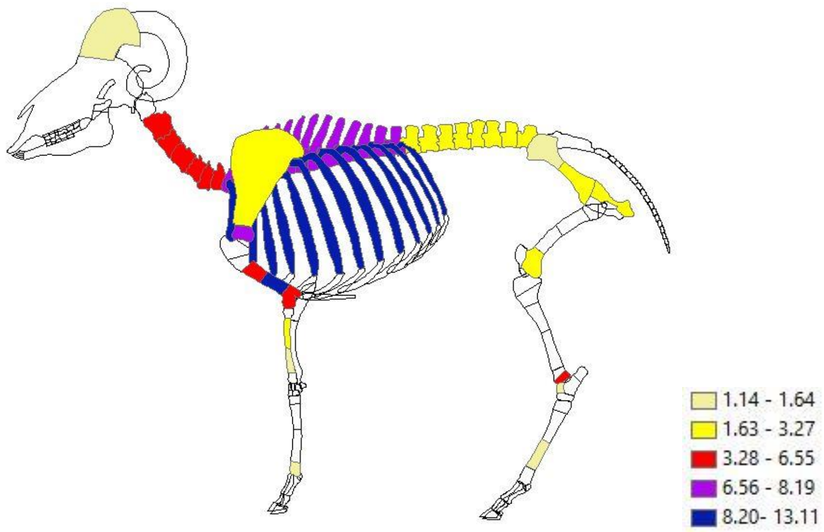

Figure 79: Chop mark frequencies overall for sheep/goat from Beeston Castle.

ID	Element	Portion	Cuts	Chops	% cut	%chop
20	mandible		2		0.8	
22	horn core	horn core		1		1.6
26	atlas		5		2.0	
27	axis			4		6.6
28	cervical vertebra			3		4.9
29	thoracic vertebra		1	5	0.4	8.2
30	lumbar vertebra			2		3.3
33	rib	rib	138	6	55.0	9.8
36.1	scapula	articulation	1	5	0.4	8.2
36.2	scapula	blade	4	2	1.6	3.3
38.11	humerus	upper proximal	4		1.6	
38.12	humerus	lower proximal	1		0.4	
38.21	humerus	upper shaft	23	3	23.0	4.9
38.22	humerus	lower shaft	3	8	1.2	13.1
38.3	humerus	distal	22	3	8.8	4.9
39.21	radius	upper shaft	2	2	0.8	3.3
39.22	radius	lower shaft	1	3	0.4	1.1
57.3	metacarpal	distal		1		1.6
70.1	pelvis	illium upper	9	1	3.6	1.6
70.2	pelvis	illium lower	9	2	3.6	3.3
71	pelvis	ischium	9	2	3.6	3.3
74.3	femur	distal	10	2	4.0	3.3
76.22	tibia	lower shaft	5		2.0	
76.31	tibia	upper distal	1		0.4	
76.32	tibia	lower distal		4		6.6
79	astragalus			1		1.6
80.2	calcaneus	lower	1		0.4	
95.22	metatarsal	lower shaft		1		1.6

Table 32: Butchery data overall for cattle from Beeston Castle.

The data indicates that the largest percentage of cuts are seen on the ribs, which would be expected as they are generally highly fragmentary hence why more fragments were recovered. After rib fragments, cuts and chops are seen most frequently on the shafts of the humeri, upper shafts for cuts and lower shafts for chops. Those elements with no butchery marks are somewhat to do with recovery methods and also butchery practices. For example, no phalanges showed evidence of butchery marks for sheep. This may very well be due to the fact that there were very few phalanges recovered, suggesting feet were removed and discarded elsewhere, though the lack of phalanges may also be related to recovery techniques during excavation. While phalanges are still a fairly dense bone, sheep phalanges are small and are less likely to be recovered during excavation.

The sheep butchery tends to follow a similar pattern to the cattle butchery. As Mulville (1993) discussed in the animal bone report for Beeston Castle, there are a far more knife marks than chop marks on the sheep remains which is consistent with the findings, yet as this was a larger sample size than discussed in Mulville's report it is not true that butchery was only confined to the limb bones.

10.2.1 Sheep Medieval Butchery

The smallest amount of butchery evidence for sheep comes from the medieval period. Ribs contained the majority of butchery marks with most occurring on the body. Two thoracic vertebrae have longitudinal chops through the vertebral bodies. This is an indicator that there was also some deliberate siding butchery seen with sheep in the medieval period. A radius, pelvis and humerus also have lone butchery marks.

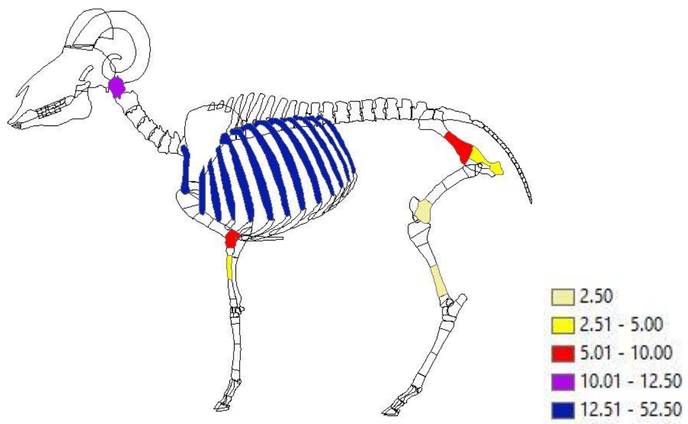

Figure 80: Cut mark frequencies for medieval phase for sheep/goat from Beeston Castle.

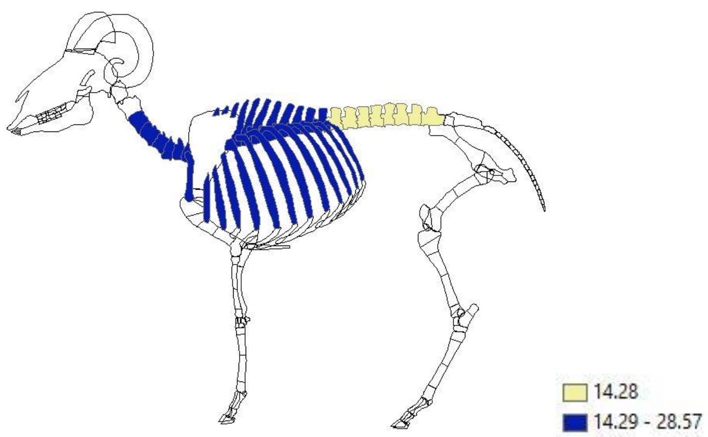

Figure 81: Chop mark frequencies for medieval phase for sheep/goat from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
26	atlas		5		12.5	
28	cervical vertebra			2		28.6
29	thoracic vertebra			2		28.6
30	lumbar vertebra			1		14.3
33	rib	rib	21	2	52.5	28.6
38.3	humerus	distal	4		10.0	
39.21	radius	upper shaft	2		5.0	
70.2	pelvis	illium lower	4		10.0	
71	pelvis	ischium	2		5.0	
74.3	femur	distal	1		2.5	
76.22	tibia	lower shaft	1		2.5	

Table 33: Butchery data for sheep/goat for medieval phase from Beeston Castle.

10.2.2 Sheep Butchery Seventeenth Century

Of the cut marks in this phase, 22.2% occur on the distal humerus, the highest percentages after butchery to the ribs. There was also evidence of chops to the lower shafts of the metatarsals and distal end of the metacarpals. There was also a single chop mark in the centre of a horncore, most likely evidence of horn removal.

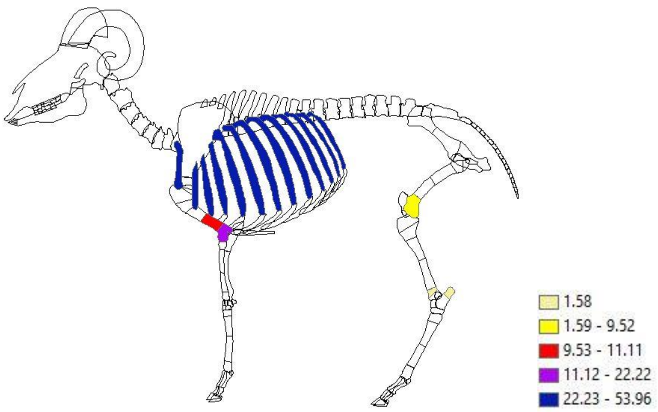

Figure 82: Cut mark frequencies for Seventeenth century phase for sheep/goat from Beeston Castle.

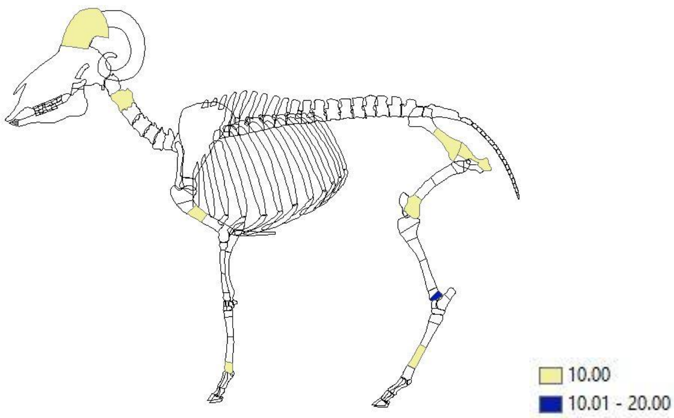

Figure 83: Chop mark frequencies for Seventeenth century phase for sheep/goat from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
22	horn core	horn core		1		10.0
27	axis			1		10.0
33	rib	rib	34		54.0	
38.21	humerus	upper shaft		1		10.0
38.22	humerus	lower shaft	7		11.1	
38.3	humerus	distal	14		22.2	
57.3	metacarpal	distal		1		10.0
70.2	pelvis	illium lower		1		10.0
71	pelvis	ischium		1		10.0
74.3	femur	distal	6	1	9.5	10.0
76.31	tibia	upper distal	1		1.6	
76.32	tibia	lower distal		2		20.0
80.2	calcaneus	lower	1		1.6	
95.22	metatarsal	lower shaft		1		10.0

Table 34: Butchery data for sheep/goat for Seventeenth century phase from Beeston Castle.

10.2.3 Sheep Butchery Post-Seventeenth Century

Rib cuts counted for 59.3% of the cut marks for the post-seventeenth century period. The humerus had 11.9% of cuts and 18.6% of chops to the lower shaft. These butchery marks primarily occurred on the anterior side of the bone on both the medial and lateral sides. Chops to the scapulae articulation area were 11.6% of the overall chop marks. These chops all occurred on the neck off the scapulae. Butchery was carried out by giving forceful chops to the posterior side of the neck of the scapulae to separate the joint.

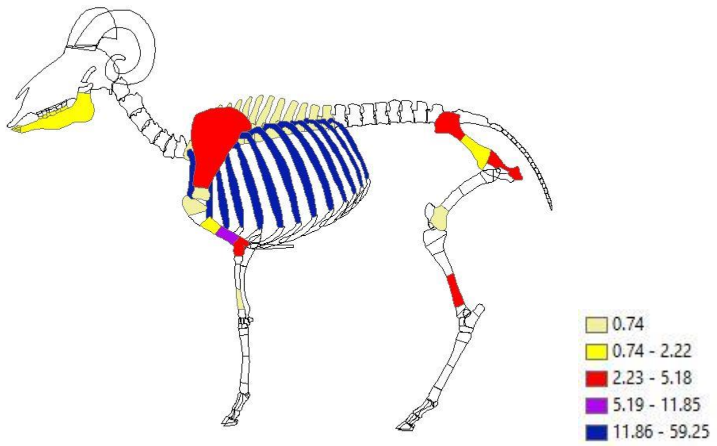

Figure 84: Cut mark frequencies for Post-Seventeenth century phase for sheep/goat from Beeston Castle.

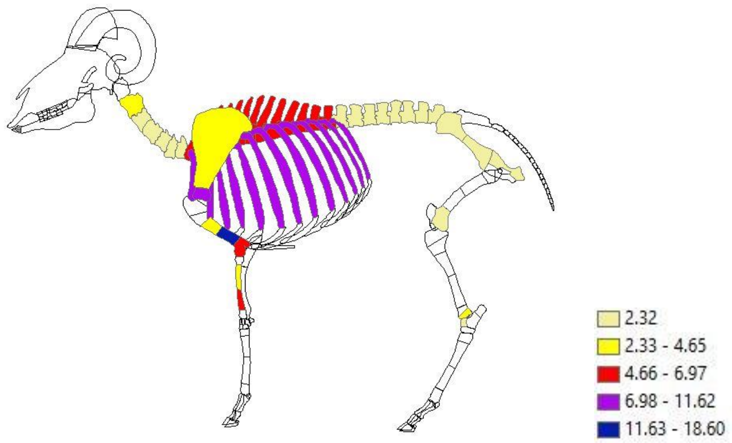

Figure 85: Chop mark frequencies for Post-Seventeenth century phase for sheep/goat from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
20	mandible		2		1.5	
27	axis			2		4.7
28	cervical vertebra			1		2.3
29	thoracic vertebra		1	3	0.7	7.0
30	lumbar vertebra			1		2.3
33	rib	rib	80	4	59.3	9.3
36.1	scapula	articulation	1	5	0.7	11.6
36.2	scapula	blade	4	2	3.0	4.7
38.11	humerus	upper proximal	4		3.0	
38.12	humerus	lower proximal	1		0.7	
38.21	humerus	upper shaft	3	2	2.2	4.7
38.22	humerus	lower shaft	16	8	11.9	18.6
38.3	humerus	distal	4	3	3.0	7.0
39.21	radius	upper shaft		2		4.7
39.22	radius	lower shaft	1	3	0.7	7.0
70.1	pelvis	illium upper	4	1	3.0	2.3
70.2	pelvis	illium lower	2	1	1.5	2.3
71	pelvis	ischium	7	1	5.2	2.3
74.3	femur	distal	1	1	0.7	2.3
76.22	tibia	lower shaft	4		3.0	
76.32	tibia	lower distal		2		4.7
79	astragalus			1		2.3

Table 35: Butchery data for sheep/goat for post-Seventeenth century phase from Beeston Castle.

The figures below show evidence of cut marks to a posterior distal humerus and cut marks to the illium portion of the pelvis.

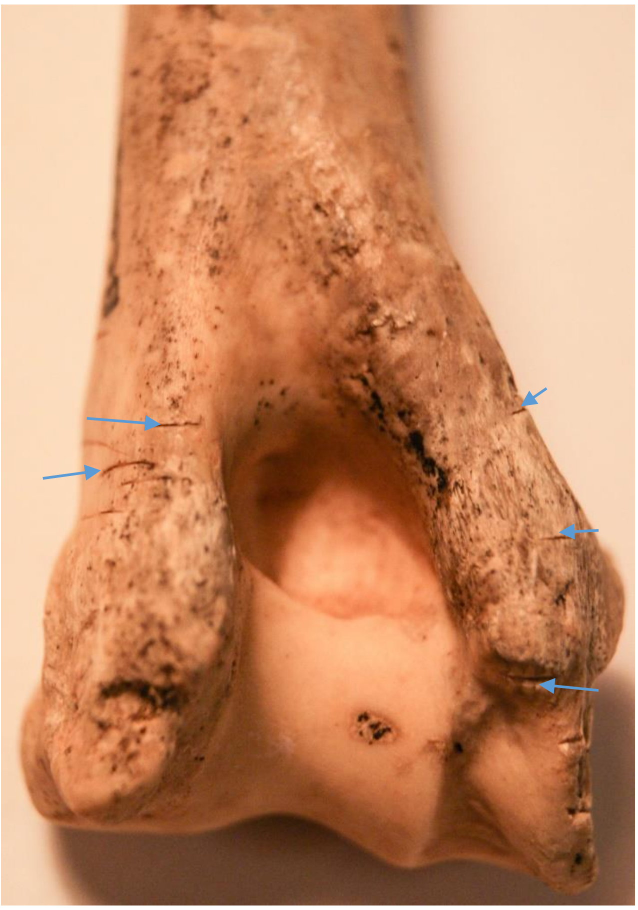

Figure 86: Sheep humerus with multiple cut marks from Beeston Castle (Photo by Hayley Foster).

Figure 87: Sheep pelvis with cut marks on lower illium from Beeston Castle (Photo by Hayley Foster).

10.3 Deer butchery

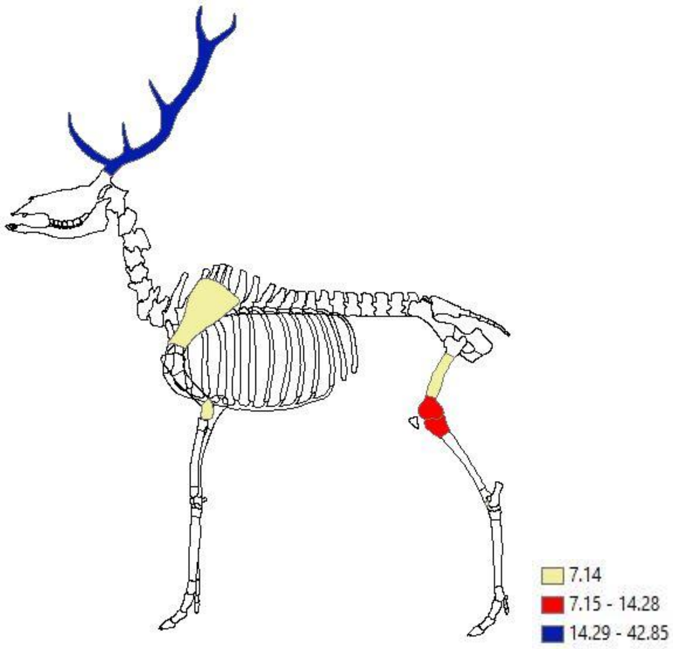

Figure 88: Chop mark frequencies overall for deer from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
0	antler			6		42.9
36.1	scapula	articulation	2		100.0	
36.2	scapula	blade		1		7.1
38.3	humerus	distal		1		7.1
74.2	femur	shaft		1		7.1
74.3	femur	distal		2		14.3
76.1	tibia	proximal		2		14.3
79	astragalus			1		7.1

Table 36: Butchery data overall for deer from Beeston Castle.

There were 16 butchery marks from 11 fragments of deer remains overall. Three of these fragments were antler. Two pieces were solely the tip of the tine that was butchered and one was a larger fragment. These fragments were cleanly chopped through, opposed to sawn which was observed at Portchester Castle. All antler with butchery marks were from the post-seventeenth century period. In the medieval period there were two chops to the proximal tibiae found just below the articulation on the posterior side. Other elements with chop marks include a distal humerus, tibia and scapula. Cut marks were exclusively confined to just the articulation of the scapulae.

10.4 Pig butchery

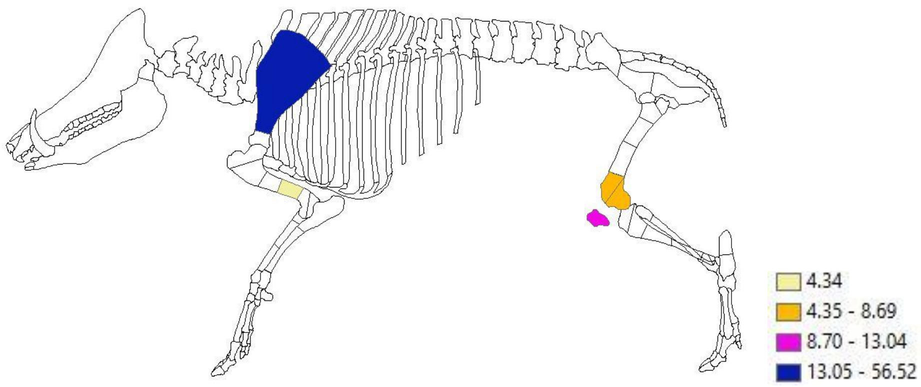

Figure 89: Cut mark frequencies overall for pig from Beeston Castle.

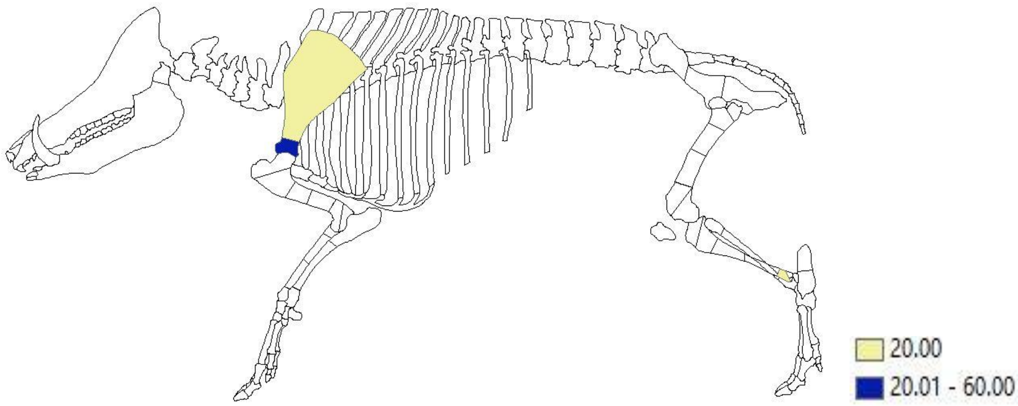

Figure 90: Chop mark frequencies overall for pig from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
36.1	scapula	articulation		3		60.0
36.2	scapula	blade	13	1	56.5	20.0
38.22	humerus	lower shaft	1		4.3	
38.3	humerus	distal	3		13.0	
74.3	femur	distal	2		8.7	
75	patella		3		13.0	
76.2	tibia	lower shaft	1		4.3	
76.31	tibia	distal		1		20.0

Table 37: Butchery data overall for pig from Beeston Castle.

There was not a great deal of butchery evidence on pig remains from Beeston Castle. Those remains that were butchered were the humerus, tibia, femur and scapula. The butchered long bones were mainly unfused, as would be expected as optimum age of slaughter for pig would be before reaching maturity. The humeri had butchery evidence on the distal articulation on the trochlea, there were also cut marks on the posterior lower shafts. The tibiae had chop marks to the lower shafts and distal too. Evidence included an unfused distal tibia with a transverse chop through the articular surface. The butchered femur was chopped on the posterior side and was unfused. The scapulae all followed a similar pattern, in that those that were chopped through at the neck in one strike, often on the posterior side a sign of dismemberment of the shoulder. The blade of the scapulae had varying cut marks to the anterior and posterior sides, these cuts were not focused on the spine area. Pig bones with butchery evidence dated to the seventeenth century and the post seventeenth century phases.

10.5 Horse Butchery

There was evidence of only 18 butchery marks on horse remains on 10 fragments. Horse fragments with butchery evidence occurred in all three periods. Chop marks were seen on the first and second phalanx, on the shaft and distal tibia, the scapula blade, the proximal and distal femur and the proximal humerus. The phalanges had fine cut marks to the borders on the anterior side. The tibia was chopped on the medial side of the proximal section and the distal femur was entirely chopped through. The scapula had tiny cut marks along the spine, which is evidence of filleting. Figure 91 and 92 depict the cut and chop mark frequencies for horse.

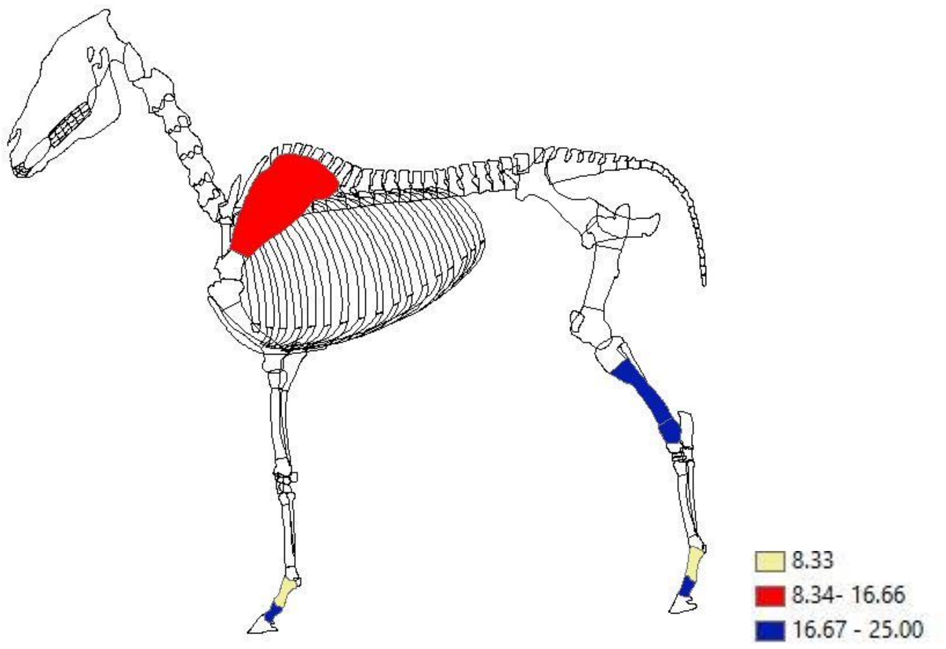

Figure 91: Cut mark frequencies overall for horse from Beeston Castle.

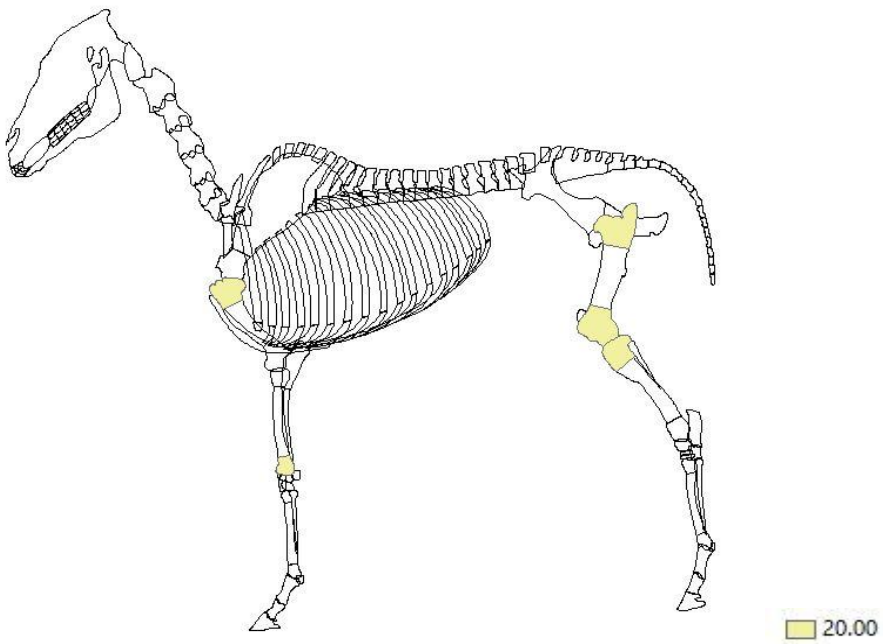

Figure 92: Chop mark frequencies overall for horse from Beeston Castle.

ID	Element	Portion	Cuts	Chops	%cut	%chop
36.2	Scapula	blade	2		16.7	
38.1	Humerus	proximal		1		20.0
39.3	Radius	distal		1		20.0
74.1	Femur	proximal		1		20.0
74.3	Femur	distal		1		20.0
76.1	Tibia	proximal		1		20.0
76.2	Tibia	shaft	3		25.0	
76.3	Tibia	distal	3		25.0	
109	Phalanx 1		1		8.3	
110	Phalanx 2		3		25.0	

Table 38: Butchery data overall for horse from Beeston Castle.

10.6 Butchery Tool Use

Tools used for butchering animals at Beeston Castle consisted of sharp knives for cutting, skinning and slicing and heavy chopping tools for disarticulation and removal of joints of meat. There was no evidence of sawing on any of the animal remains. The craftwork remnants of deer antler was chopped through with a cleaver opposed to a saw which is frequently seen on antler.

10.7 Methods of Butchery

While haphazard butchery was seen on fragments, overall the butchery was fairly methodical and followed some clear patterns, which will be discussed in the following section.

10.7.1 Clear Trends of Butchery

Unlike the animal bone from Edlingham Castle, there was quite a high amount of fragmentation in this assemblage, with lots of small unidentifiable fragments. The heavy chops on long bone shafts indicate that those involved in the butchery process were extracting marrow and also dividing the carcass into smaller more manageable joints and portions.

10.7.1.1 Vertebrae trend:

Cattle vertebrae in all phases showed evidence of butchery. One common trend was longitudinal and transverse chops to the vertebral bodies. Figure 93 shows an example of a more transverse chop in which a cleaver was used to chop through the left part of the vertebral body and neural arch.

Figure 93: Unfused thoracic vertebrae with transverse chop through body from Beeston Castle (Photo by Hayley Foster).

Figures 94 and 95 depict a longitudinal chop with a cleaver down through the body of the vertebra, indicating the butcher was dividing the carcass in half down the axis of the vertebral column.

Figure 94: Thoracic vertebrae chopped longitudinal through the body from Beeston Castle (Photo by Hayley Foster).

Figure 95: View from above, vertebra chopped longitudinally through the body from Beeston Castle (Photo by Hayley Foster).

Vertebrae chop trends by phase

The figure below (figure 96) presents the butchery data by vertebrae type and type of chop. The types of chop were divided into two categories, these were transverse chop and longitudinal chop. There were other chops to the vertebrae recorded which includes those chops that do not fall into longitudinal or transverse category, such as indeterminate chops to the spinous or transverse processes, which were not presented in this specific figure. The medieval period shows a higher proportion of longitudinal chops, though the small sample size should be highlighted as overall there were only one transverse and five longitudinal chop marks. The seventeenth century had more transverse chops than longitudinal on the thoracic and lumbar vertebrae and the cervical vertebrae had an even number of transverse and longitudinal. The post-seventeenth century phase had more longitudinal than transverse chops in the cervical and thoracic vertebrae. The trend appears to be a shift from transverse chopping of the vertebrae to an increased number of longitudinal chopping. The table below the chart shows the number of each type of chop.

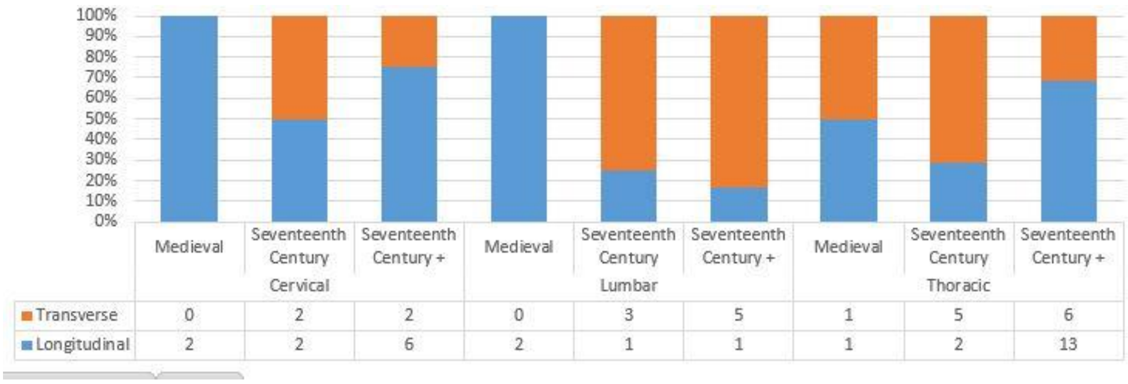

Figure 96: Proportion of transverse and longitudinal chops on vertebrae per time period, broken down by vertebrae type.

From the data we can see that both longitudinal and transverse chops are present in all phases. This may be due to the butchers' preferences, or a cross-over during the post-seventeenth century period. If we disregard the medieval period as it has a small sample size, it is clear that the ratio between longitudinal versus transverse vertebrae chops shifts dramatically.

There is less data for butchered vertebrae for sheep, but in all phases longitudinal butchery outnumbers transverse butchery. Sheep are far easier to butcher than cattle and much easier to hang up and split longitudinally in that fashion. Therefore, it is possible that they were butchering sheep longitudinally down the vertebral column earlier than they were butchering cattle in that style.

10.7.1.2 Clear Disarticulation Points

Chops to Distal Humeri: These chop marks were some of the most common chops observed. The heavy chops were points of disarticulation that were frequently seen on the posterior side of the trochlea, mainly on cattle remains. This pattern was not apparent in other species, apart from one sheep humerus.

Chops to Scapulae Articulation: Heavy chop marks to the neck of the scapulae and chops directly on the articular surface of the scapulae were common occurrences particularly for cattle. This is clearly the use of heavy chopping tools to disarticulate the shoulder from the humerus. The medieval period had no evidence of scapulae chops. The chops to the articulation in the seventeenth and post-seventeenth century all occurred on the neck or articulation surface, frequently the entire neck was chopped through and the articulation removed.

Chops to the blade were often slightly above the neck but obviously with the same intent carried out.

Chops to Tibiae Shafts: These chops to the tibiae shafts are most likely associated with marrow extraction. Though as Mulville (1993) mentions marrow extraction is not always easy to identify as it would not always be carried out by chopping the bone but often by smashing the bone. There is also a possibility that this pattern is specific to the site and that maybe the tibiae were chopped to be smaller pot sized pieces to accommodate the vessel that the meat was cooked in. The highest frequency of this type of chop occurs during the seventeenth century, though is still found in the post-seventeenth century. This decrease in frequency may indicate that during the post-seventeenth century people were becoming less reliant on marrow for soups and stews for example.

Chops to Pelvis: These chops are consistent with the separation of the femur from the pelvis. Chop marks are frequently seen on and around the acetabulum. These chops were frequently on the illium but also seen on the ischium too.

Cuts and Chops to the Mandible: These marks are consistent with removing of the cheeks and tongue and disarticulation of the mandible from the maxilla. The cuts on the buccal side are most likely skinning marks whereas those on the lingual side are consistent with tongue removal. The chops to the diastema are likely to be evidence of marrow extraction.

Chops on Metapodial Shafts: The heavy chops to the metapodials frequently appeared in the mid-shaft region of the bone. This is not a clear disarticulation point as marks are not occurring near the proximal or distal articulations. The metapodials are dense and do not yield meat like other long bones in the skeleton. Therefore, the chopping occurring on the shafts of metapodials must still be associated with removing of the limb at that point. It is also highly possible that marrow was extracted when carrying out this process, as there is a reasonable amount of marrow in cattle metapodia. The highest frequency of metapodial chops was in the post-seventeenth century.

10.8 Other Taphonomic Processes

Gnawing: Gnawing was not extensive on the animal bone overall, there was a minimal amount of carnivore and rodent gnawing on smaller bones such as phalanges. Figure 97 shows an example of carnivore gnawing on the distal anterior side of a cattle first phalanx. The striations could be mistaken for butchery marks but with closer inspection it is clear that the marks are carnivore tooth mark drags.

Figure 97: Gnawing on cattle first phalanx from Beeston Castle (Photo by Hayley Foster).

Burning: There was a minimal amount of burning present on the animal bone from Beeston Castle. While one may expect a high proportion of burning, burnt bone is far more fragile and has a higher likelihood to fragment therefore may not have been recovered from this hand-picked assemblage.

Root etching: There was a moderate amount of root etching on the bone surface for several contexts from the earlier excavations. The root etching was easily discernible from the butchery evidence as in this case, those bones that did exhibit root etching had an extensive amount and were clearly not human produced marks.

10.9 The Butcher at Beeston Castle

Beeston would not necessarily be defined as a royal castle like the residence of Portchester, but it did have royal connections and social and political importance in Cheshire and the surrounding areas.

As a kitchen was never excavated at Beeston, there are a few possible explanations, either there was somewhat of a pop-up kitchen that would be moved around or that a permanent kitchen remains in an unexcavated area. In medieval Chester a kitchen would be not only a place of cooking but also, partly, a butcher's shop (Jones, 2010). Carcasses would be hanging in these kitchens from hooks and livestock held in pens close by (Jones, 2010).

Cattle would be kept in surrounding fields and marshes and pigs brought in from the Ewloe and Delamere forests (Lewis & Thacker, 2003). Retail butchers in the city would butcher in butcher shops and on the surrounding land in the crofts and discarded of the entrails into the streets (Laughton, 2008). Butchers in the city purchased cattle from the countryside, then they were driven into the city cattle market during the medieval period (Laughton, 2008). Livestock was heavily traded and Chester was the distribution centre (Lewis & Thacker, 2003, p. 103). It is possible that as Chester was such a hub for cattle purchase that the cattle were bought there, but it's more than likely that as Beeston Castle was such high status and rural, that they were purchasing livestock from the countrymen. It is also probable due to this factor that animals were butchered onsite on the castle grounds and that most types of skeletal elements were recovered during excavation. Therefore, a hypothesis that will be discussed in chapter 12 is that not all castles follow the model of an urban meat supply resulting in longitudinal butchery, but other variables play a factor in what style of butchery is carried out.

10.10 Conclusions

The animal bone assemblage for Beeston Castle contained a significant amount of butchery evidence that allowed for trends to be identified. The time frame that the animal remains dated to for Beeston Castle stretched from the medieval period through to the post-seventeenth century.

characteristics observed included the transverse and longitudinal splitting of cattle vertebrae, shifting from a higher amount of transverse chopping in the seventeenth century to a higher amount of longitudinal during the post-seventeenth century. Sheep vertebrae observed were mostly chopped longitudinally throughout the three phases. The heavy chopping on the distal humeri were common for cattle, these marks are associated with disarticulation of the lower limb. Chops to the articulation of scapulae were also a common occurrence on cattle remains, varying to some degree in exact position of the chop, yet all attempting to disarticulate the shoulder from the forearm. Other trends discussed included chops to the tibiae shafts which was a probable disarticulation point, with the butcher choosing to separate the joint on the lower tibia, which has very little meat. Chopping the tibiae in this way is fairly common for how legs of lamb are butchered today for example, and is generally an easy point to chop through instead of dealing with the distal tibia and ankle joint. Chops to the pelvis, particularly the illium and ischium surrounding the acetabulum which were evidence of dismemberment from the femur. Cuts to the mandible were signs of skinning and chops to the body and hinge were associated with cheek and tongue removal and dismemberment from the maxilla. Chops to the metapodial shafts were common in cattle and much like the tibiae chops they are probable evidence for marrow extraction.

Tools employed by butchers at Beeston included sharp knives for skinning, filleting, meat removal and preparation and heavy chopping tools were used for disarticulating joints and jointing by removing muscles. The style observed at Beeston was mostly professional, though there was evidence of multiple attempts at disarticulating joints. Overall butchery of carcasses seemed to be more methodical than random in nature and by the post-seventeenth century was even more so professional in style.

In Mulville's (1993) animal bone report the butchery evidence was summarised with some findings being further proven correct with the addition of further data and some trends disproved and further studied. For example, the pattern of the front limb being detached from the scapulae is a common finding observed which was proven in this research, as was the chop marks on the pelvis as evidence of disarticulation from the femur. Sheep butchery did follow a similar pattern to cattle butchery, yet it was not true that sheep were solely butchered with a knife, which contradicts Mulville’s report. Though it should be reiterated that Mulville did only record the material from the later excavations which would have limited the data.

Chapter 11: Assessments of Urban Assemblages Related to Castle Case Studies

This chapter will discuss the results of the analysis of three urban assemblages, each within a relatively short distance of one of the castle case studies observed in this research. The three case studies, Edlingham, Portchester and Beeston castles, were paired with one of the nearest close urban centres in order to observe comparisons between the ways animals were butchered for the castle and the ways in which they were butchered in the town/city. Beeston Castle was paired with an assemblage from Eastgate Street in Chester, Portchester Castle was paired with two assemblages from Winchester, St. John's Street and Victoria Road, and Edlingham Castle was paired with the Orchard Street assemblage from Newcastle upon Tyne.

Sites	Date of Material Studied	Characteristics	Location
Edlingham Castle	Late 13th-16th century	Medieval hall-house, went through rise and fall in status.	Northumberland (30 miles from Newcastle)
Newcastle	16th-17th century	Orchard Street, near city wall.	
Portchester Castle	12th-16th century	Royal castle, high status, periodic residence.	Coastal Hampshire (20 miles from Winchester)
Winchester	13th-16th century	Material from 2 sites in city centre.	
Beeston Castle	13th-17th century	Hill-fort, fortification.	Cheshire (12 miles from Chester)
Chester	12th-18th century	East Street in city centre marketplace.	

Table 39: Summary of sites studied for case studies and assessments.

The assessments were also implemented to shed light on whether animals were butchered by professional butchers in the urban areas, or were butchered at the castles. Another likely possibility is that butchery was a combination of urban and onsite butchery in the castle animal bone assemblages. The status of the castle was taken into consideration as was the radius between the castle and the related urban area.

11.1 Animal Bone from Winchester Assessment

11.1.1 Winchester Background

Winchester in Hampshire has had a number of important excavations carried out there that date to the medieval period. Some of these excavations occurred during the late 1970s and early 1980s. The reports on the zooarchaeological evidence were the “most comprehensive” of an English town up till that time (Serjeantson & Rees, 2009). Winchester was selected as a case study as the animal bone assemblages were large enough for comparisons to be made. These excavations that took place in Winchester were rescue excavations, therefore bone that could be reliably dated to a phase group was analysed in the original animal bone reports. Some of the animal remains, including the Victoria Road, excavation were hand collected only. The bone overall had good preservation as the sites were mainly on chalk substrata (Serjeantson & Smith, 2009).

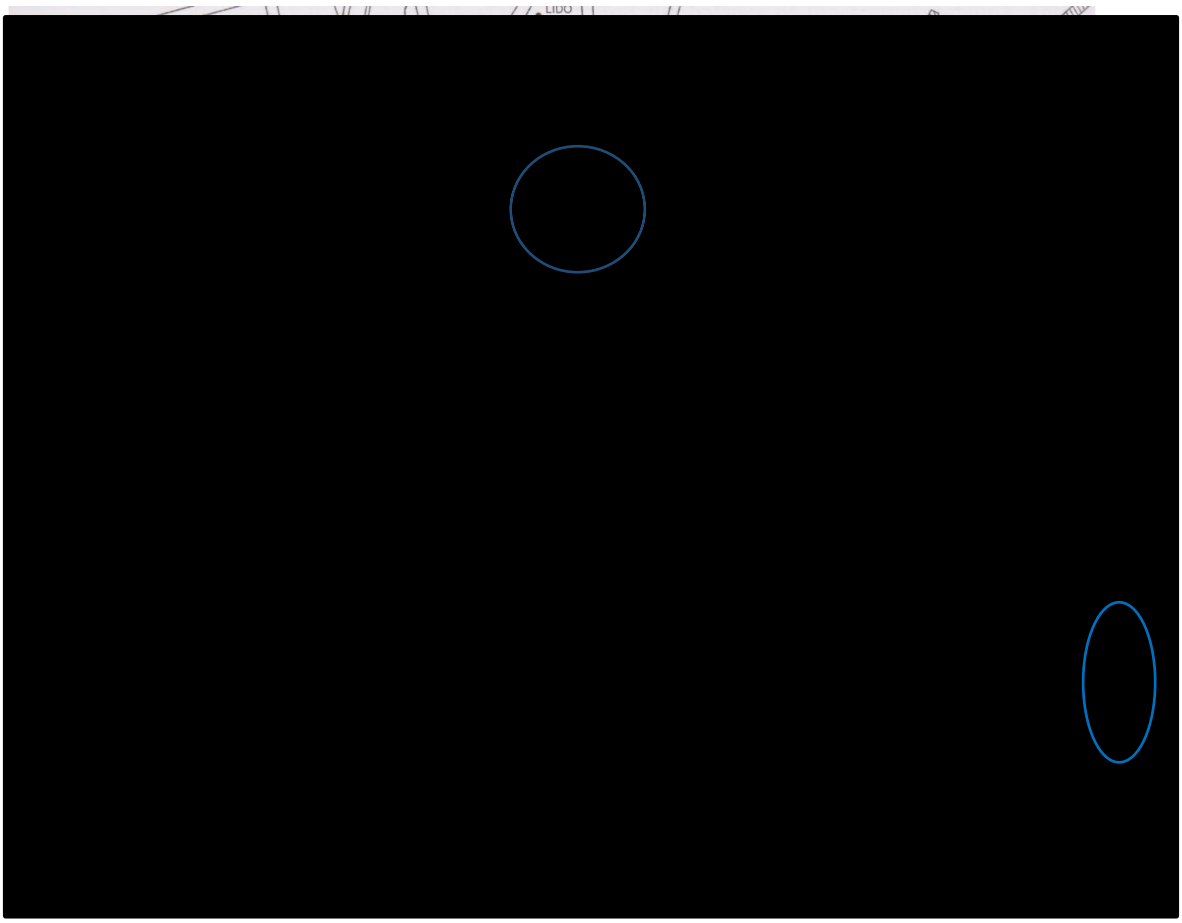

Figure 98: Map of sites from medieval Winchester, Victoria Road and St John’s Street highlighted (Serjeantson, 2009, p. 4). This image has been removed by the author of this thesis for copyright reasons.

As there is a substantial amount of animal bone from the town of Winchester from the rescue excavations, and with Winchester being approximately 20 miles from Portchester Castle, the assemblages were selected for assessment purposes to explore if similar butchery trends were occurring in an urban settlement in close proximity to the castle. While the sites in the town are not as high status as Portchester Castle, they are suitable examples to determine if animals were being exploited in similar ways when geographically close by. They also shed light on whether the style of butchery at Portchester Castle had an influence on the surrounding area. As it is probable that the livestock from Portchester Castle was purchased from an urban centre in close proximity, such as Winchester, further investigation will be carried out to see whether butchery of the animals from Portchester Castle occurred in the town, or onsite at the castle, which has been suggested in chapter 8, or possibly a combination of the two.

11.1.2 The Assessment

Due to time constraints the assemblages from Winchester were only assessed instead of conducting a full analysis, as was carried out with the three castle case studies. The assessment was designed to collect the most amount of butchery evidence possible in an accurate and efficient manner in the allotted time frame. For purposes of the assessment, the larger contexts were selected to analyse the butchery marks present, to gain a solid overview of patterns from each site and from Winchester overall.

The assessment encompasses sites from the eastern suburbs and northern suburbs. The medieval contexts that included the largest volumes of animal bones were analysed for butchery marks. The larger contexts for each excavation from the medieval phases were assessed for butchery evidence.

Eastern suburbs- The site assessed from the eastern suburb was St John's Street phase 49 which dated to the sixteenth century.

Northern suburbs- The site assessed for the northern suburb was Victoria Road. The phases that were looked at for Victoria Road were the thirteenth-fourteenth century phase (phase 975) and the fifteenth-sixteenth century phase (Phase 792).

11.1.3 Butchery Evidence from the Report

Butchery is briefly mentioned in the original report, particularly for the remains in the tenth and eleventh centuries. Butchery trends were highlighted but not specific as to exactly where marks were appearing. The report states that all periods saw cattle limb bones chopped through at the shaft, as were most pig and sheep limb bones (Serjeantson & Smith 2009). One change highlighted is that the radius was chopped mid-shaft in the middle ages and then usually recovered whole by the seventeenth century. This suggests that people were less reliant on marrow in the later periods or that the joint was kept as a whole (Serjeantson & Smith 2009, p. 155). There was also evidence of skinning on cat remains and butchery on geese, hares and rabbits. At Henly's Garage which was a site consisting of Saxo-Norman pits from the city defences there was industrial waste material evidence in the form of horncores and cattle metapodia. All of the metapodia have been chopped at the mid-shafts or distal shafts of the bone. Cuts were also seen on the condyles and epicondyles in some cases. An interesting feature is the presence of heavy chop to the proximal end, in which the ligament attachment has been removed, which the author hypothesizes is the butcher disarticulating the upper from lower leg in an unusual manner (Serjeantson & Smith, 2009, p. 157).

A butchery trend that was explored as a shift in style over time is 'paramedian' butchery to the vertebrae (Coy, 2009, p. 33). In the late Saxon period paramedian butchery was more common than in the late middle Ages. Paramedian butchery is "chopping through the transverse process at the side of the vertebrae" (p.33). These type of butchery marks are an indication of dividing the carcass, and usually cut through the centra also. The report contains statistics on median versus paramedian butchery of the vertebrae of cattle, sheep and pig. From the evidence it is clear that for cattle and pig paramedian axial butchery decreases in phase 14 and 15. The median splitting, or as I have referred to in previous chapters as transverse butchery of the vertebrae, first appeared in phase 13 (eleventh or twelfth centuries) at Winchester. The butchery style overall was described mainly as chops through the long bones on or around the joint area (Coy, 2009). This type of butchery evidence in not uncommon for the period, as seen at all three cases studied, Edlingham, Portchester and Beeston Castles. Butchery marks from sharp blades were first seen at Winchester during the late

Saxon period according to the report and there was a small amount of sawing present, but this was only visible on horncores and skulls (Coy, 2009).

11.1.4 Social Status of Winchester

From the species distribution from Winchester there are some indications of wealth from the diet. Winchester was considered a wealthier town at the time in England, but it did not have the variety of species such as wild game and hunted wild animals that would be found in a castle assemblage. There were very few deer bones recovered from any of the sites across Winchester. There were also very few wild game remains recovered, which would be expected as hunting would have been reserved for wealthy aristocracy. Hare bones were uncommon and rabbit bones were small in number yet made up 7% of identified bones (Serjeantson, 2009). Rabbits did become more common during the later periods and were sold in cities becoming, more freely available (Serjeantson, 2009). Pig is often considered a high status food yet pig remains made up 20% of the late Saxon assemblage, which was higher than that from Portchester Castle (Serjeantson 2009). Serjeantson (2009) suggests that there was a status differentiation between different cuts of meat. For example, pork was generally considered high status whereas bacon and ham are considered less high status (p.181). Winchester seems to overall have a high proportion of pig than most medieval towns. The sites overall do not exhibit high status but there were wealthier areas of the town such as the northern suburb and in the western suburb, which was near the Royal Mews, had remains that were indicative of hunting (*ibid*).

11.1.5 **Results of Butchery Assessment**

11.1.5.1 Eastern Suburbs: St John's Street

Phase 49 (sixteenth century) - The most abundant species were sheep/goat, followed closely by cattle and pig. The remains were household waste from six features. From this study the findings in this phase consisted of 106 butchery marks recorded for this phase. 75 of these butchery marks occurred on cattle remains, 18 on sheep remains, 6 on pig remains and 7 on deer remains. Key butchery practices to note on the cattle remains are: chops to the lower distal humeri, longitudinal chops to the cervical, thoracic and caudal vertebrae and chops to the navicular-cuboid. The chops to the distal humeri are clean, methodical chops and a defined disarticulation point. In regards to the vertebrae there were four chops seen on cervical vertebrae, three which were transverse and one which was longitudinal. The thoracic vertebrae had four longitudinal chops and no transverse and the caudal vertebrae had two longitudinal chops and no transverse. While this is a small sample size we can assume that longitudinal butchery of thoracic and caudal vertebrae is the predominant trend. The main trends for sheep/goat were the longitudinal butchery of the lumbar and thoracic vertebrae and the transverse chopping of the cervical vertebrae. Another pattern was the chops to the proximal femur which saw the removal of the entire femoral head and neck. In regards to pig butchery, marks were mainly seen on the scapulae articulation, consisting of chops to the neck and cuts on the articulation surface. Deer remains consisted of fallow deer and red deer. There was only a small amount of butchery on four bone fragments of deer, including a distal humerus with small cut marks on the posterior borders.

Overview

From the data collected from phase 49 of St John's Street certain butchery patterns dominated. Thoracic vertebrae were mainly chopped longitudinally in both cattle and sheep/goat remains. Caudal and lumbar vertebrae were also chopped longitudinally for sheep/goat. This would suggest that both sheep and cattle were hung up and slaughtered with a cleaver down the centre of the spine. Cervical vertebrae appear to be more frequently chopped transversely, but this is most likely due to the removal of the head from the rest of the carcass. The chops to the navicular-cuboid on the cattle remains show a definitive point of disarticulation of the lower leg from the foot.

11.1.5.2 Northern Suburbs: Victoria Road

Phase 975 (thirteenth-fourteenth century)-From this phase we know from Serjeantson and Smith (2009) that over 1000 bones were recovered and they were well preserved. The highest proportion of bones were from cattle followed by sheep/goat and pig that had slightly less fragments than those from cattle. Most of the bones recovered were meat bearing elements. Cattle butchery consisted of 17 butchery marks and sheep consisted of 15 butchery marks for this phase. The butchery characteristic for vertebrae was that the thoracic vertebrae were longitudinally chopped and there were also two chops to astragali.

Phase 792 (fifteenth-sixteenth century)-There were approximately 1100 bones from this phase (Serjeantson & Smith, 2009). There was a high proportion of sheep/goat bones and also an unusually high number of cat bones for this phase. From this research it was found that there were 23 butchery marks recorded in this phase. All but one of these marks were seen on cattle fragments. Patterns in this phase for cattle were transverse chops to the astragali and transverse chops to the proximal and distal calcaneus. There was also a single chop to a scapula articulation and a scapula blade. There was only one vertebrae chop on for cattle in this phase and the chop was neither distinctly longitudinal nor transverse in characteristics.

Overview

While there was only a small amount of butchery data from the two phases of Victoria Road analysed, there were a few key trends that were brought to light. In the early and phases there were longitudinal chops to the thoracic vertebrae, indicating that cattle were hung up and divided in half down the spine. There were also chops to the astragali suggesting this area was a disarticulation point from the lower leg and the foot. There were only signs of cattle and sheep/goat butchery from these phases.

11.1.6 Butchery for St John's Street and Victoria Road Material Analysed

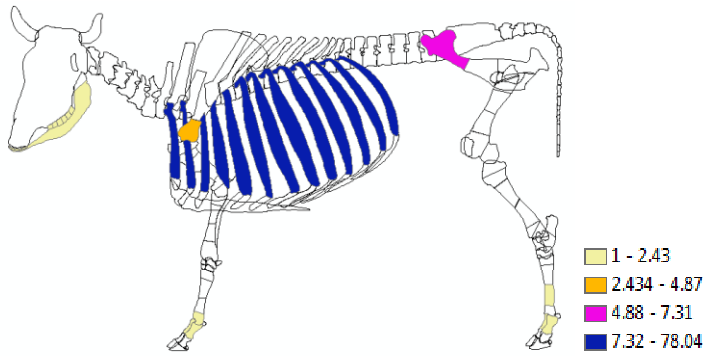

Figure 99: Cut mark frequencies for cattle from St John's Street (phase 49) and Victoria Road (phase 975 and 972).

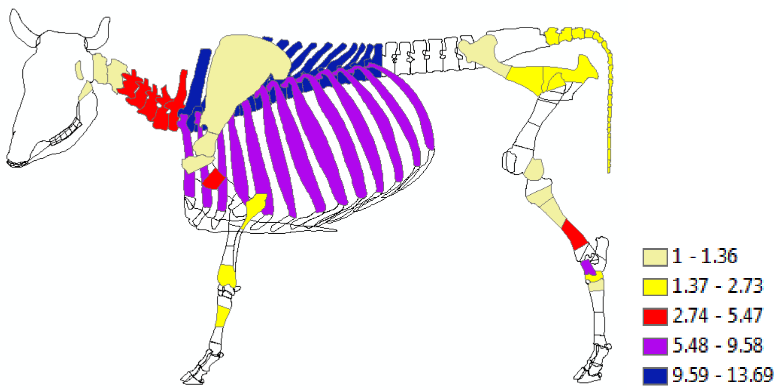

Figure 100: Chop mark frequencies for cattle from St John's Street (Phase 49) and Victoria Road (phase 975 and 972).

ID	Element	Portion	Cuts	Chops	%cut	%chop
20	mandible	mandible	1		2.44	
20.1	mandible	mandible hinge		1		1.37
26	atlas	atlas		1		1.37
27	axis	axis		1		1.37
28	cervical vertebra			4		5.48
29	thoracic vertebra			10		13.70
32	caudal vertebra			2		2.74
33	rib	rib	32	5	78.05	6.85
36.1	scapula	articulation	2	1	4.88	1.37
36.2	scapula	blade		1		1.37
38.11	humerus	proximal upper		1		1.37
38.21	humerus	lower shaft		4		5.48
39.3	radius	distal		2		2.74
40.1	ulna	proximal		2		2.74
57.2	metacarpal	Proximal		1		1.37
57.21	metacarpal	upper shaft		2		2.74
57.3	metacarpal	distal	1		2.44	
70.1	pelvis	illium upper	3	1	7.32	1.37
70.2	pelvis	illium lower		2		2.74
71	pelvis	ischium		2		2.74
71.11	femur	head		2		2.74
74.12	femur	proximal upper		2		2.74
74.32	femur	lower distal		1		1.37
76.1	tibia	proximal upper		1		1.37
76.12	tibia	proximal lower		1		1.37
76.21	tibia	upper shaft		1		1.37
76.22	tibia	lower shaft		4		5.48
76.32	tibia	distal lower		1		1.37
79	astragalus	astragalus		7		9.59
87	navicular cuboid			2		2.74
95.1	calcaneus	proximal		1		1.37
95.12	calcaneus	distal		7		9.59
95.22	metatarsal	lower shaft	1		2.44	
109	first phalanx	first phalanx	1		2.44	

Table 40: Butchery data for cattle from St John's Street (Phase 49) and Victoria Road (phase 975 and 972).

Figures 99 and 100 show the frequencies of cut and chop marks from St John's Street and Victoria Road. The evidence shows that cuts are most prominent on ribs. Ribs cut were seen on the head, neck and body of the ribs. These were followed by cuts on the upper illium of the pelvis. Chop marks were most common on the thoracic vertebrae, ribs and astragali. As discussed above, the butchery results at St John's Street and Victoria Road both show a dominance in longitudinal chops of the thoracic vertebrae for cattle. There is also a pattern of longitudinal chops on the astragali, which is a clear disarticulation point. As the sample size is small there is no other butchery trends that are definitive between St John's Street and Victoria Road.

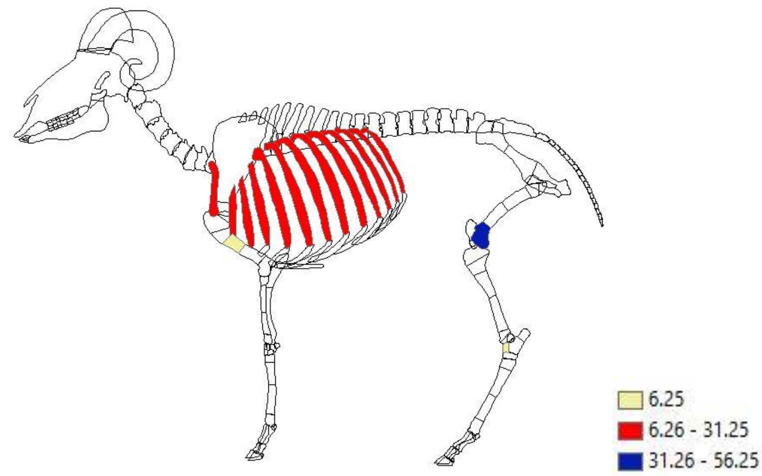

Figure 101: Cut mark frequencies for sheep/goat from St John's Street (Phase 49) and Victoria Road (phase 975 and 972).

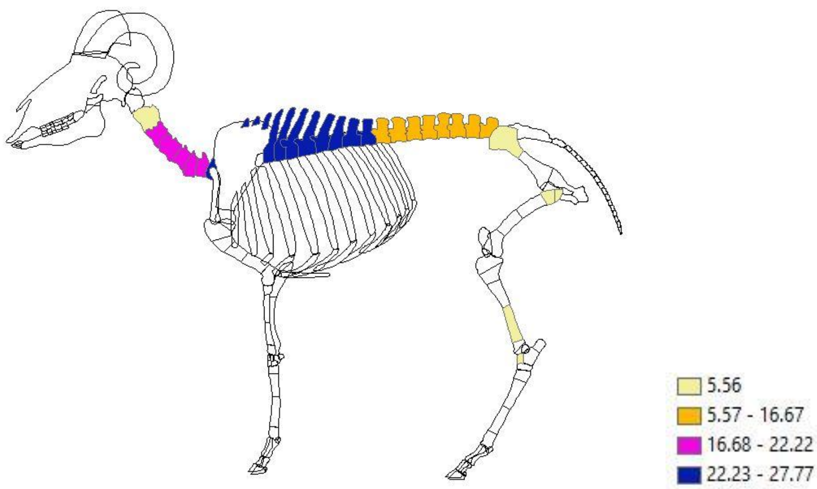

Figure 102: Chop mark frequencies for sheep/goat from St John's Street (Phase 49) and Victoria Road (phase 975 and 972).

ID	Element	Portion	Cuts	Chops	%cut	%chop
27	axis	axis		1		5.56
28	cervical vertebra			4		22.22
29	thoracic vertebra			5		27.78
30	lumbar vertebra			3		16.67
33	rib		5		31.25	
38.21	humerus	Upper shaft	1		6.25	
70.1	pelvis	illium upper		1		5.56
74.12	femur	Proximal upper		1		5.56
74.13	femur	Proximal lower		1		5.56
74.3	femur	Lower distal	9		56.25	
76.22	tibia	Lower shaft		1		5.56
79	astragalus	astragalus	1	1	6.25	5.56

Table 41: Butchery data for sheep/goat from St John's Street (Phase 49) and Victoria Road (phase 975 and 972).

Sheep/goat, like cattle, had mostly rib cuts. In regards to chop marks, the thoracic vertebrae consisted of the most butchery marks followed by the cervical vertebrae and the lumbar vertebrae. Cut marks to the distal femora had the highest frequency. Overall trends for sheep/goat from both St John's Street and Victoria Road did not have a lot of crossover due to the small sample size. St John's Street had mainly longitudinal chops to the vertebrae and chops to the proximal femora. Both sites did see chops to the distal portion of the astragali, a disarticulation point from the lower leg of the animal.

11.1.7 Trends Observed at Winchester and Comparison with Portchester Castle Butchery Evidence

11.1.7.1 Vertebrae Butchery Trends

Portchester Castle saw transverse chops to the vertebrae in the early phases (A & 3) dating to the thirteenth century, whereas in the later phases (4 and 6) dating to fourteenth to sixteenth centuries there were more longitudinal chops to vertebrae. The vertebrae butchery trend at Winchester, particularly from the results from St John's Street phase 49, dating to the sixteenth century, shows overwhelmingly a dominance of longitudinal chops to the vertebrae. Cervical vertebrae tend to be chopped transversely but this most likely is due to the removal of the head before. Most of the vertebrae butchery data is seen on cattle remains but there were sheep vertebrae butchered as well. Sheep vertebrae from both Portchester Castle and Winchester were mainly butchered longitudinally though there was not a distinct pattern in terms of time period.

11.1.7.2 Astragalus Butchery Trends

Cleaver chops to the astragali are the most common butchery marks seen on the astragalus at Winchester. The patterns vary somewhat but at Winchester there are mainly chops to the proximal half of the bone carried out longitudinally. At Portchester Castle heavy chops to the astragali were also present. As the astragalus was not divided into two sections for the purposes of data collection a numerical comparison between proximal and distal sections of the astragalus showing the highest frequencies is difficult to assess quantitatively. Though from the notes collected when recording the butchery evidence, there is a more even distribution1 between longitudinal and transverse chops and also between proximal and distal chops. This may very well be due to having a larger sample size at Portchester Castle versus a small sample from Winchester. This joint is a common place to divide a carcasses lower leg from the foot as the astragalus is dense and is not a marrow source.

11.1.7.3 Humerus Butchery Trends

Heavy chops to the distal humeri are common at both Portchester Castle and at the Winchester sites. These chops are generally methodical and consist of one blow directly through or on the trochlea of the humerus. The distal humerus is an obvious point of disarticulation, evident from the chop marks. There are also cut marks to the posterior side of the bone on the borders of the lateral and medial epicondyles, an indication of the cutting of tendons and of meat removal.

11.1.8 Professional and Unskilled Butchery

As discussed in chapter 8, the urban butcher would have been specialised and highly skilled in his trade. While it is possible that Portchester Castle had its own butchers to slaughter the meat for the castle elite, as high status homes often did, it is also a possibility that some of the meat was coming to the castle as dressed carcasses. As explained in chapter 8, there were phalanges and skull fragments present in the inner and outer bailey, an indication that at least some whole carcasses would have been brought to site. This idea will be further discussed in chapter 12.

A proportion of the meat that was prepared and served at Portchester Castle would have come from a neighbouring urban centre in Hampshire, such as Winchester or perhaps Southampton. In comparing the royal castle site of Portchester Castle with the urban medieval centre of Winchester there are key similarities in how meat was exploited and styles in which butchery was carried out.

The butchery style at Winchester is clean, methodical and clearly carried out by an experienced professional whereas the butchery at Portchester Castle appears to be somewhat of a combination of amateur and professional butchery. While there are many cases of precise and methodical butchery at Portchester there are also examples of bones that have haphazard marks, and evidence of multiple attempts at breaking or dividing a bone. This would suggest that some of the meat is butchered by professionals and a smaller amount is possibly butchered by amateur butchers.

The comments detailed in the original report (Serjeantson & Smith, 2009) detailing chops to the shaft of long bones were seen on cattle tibiae and a humerus, yet from the bone analysed for this study there was only one metapodial with butchery marks observed. However the presence of metapodia with chops to the proximal articulation was a pattern that was observed on cattle metatarsals from Portchester Castle.

It is difficult to say whether the butchery styles of Portchester Castle influenced Winchester or vice-versa. The most likely scenario is that they influenced each other. The professional butchery style of the highly skilled butchers of the town were seen on the animal remains from the castle, as most likely many of the animal remains were coming from the town, yet the variety of species and the extravagance of the high status diet would have been envied by the people living in Winchester.

11.2 Animal Bone Assessment from the City of Chester

11.2.1 Chester Background

As discussed in chapter 9, Chester was the centre for livestock trade and purchasing in the area. Cattle were driven into the city and either sold at the cattle market, which would have most likely been at Bridge Street and Lower Bridge Street, or to the butchers' shops (Laughton, 2008). Butchers not only sold meat but made money by selling hides, skins and tallow to craftsmen (Laughton, 2008). The site to be assessed, Eastgate Street, is in the centre of Chester and developed from the Roman period to a Saxon market place, medieval butter shops, and then post-medieval butter shops. These butter shops would have been part of the market that sold dairy products and would have been opposite Baker's row where the bakeries would have been situated (Matthews, 1995). Tanneries were also located just outside of the Eastgate (Laughton, 2008). Market days in medieval Chester were Wednesdays and Saturdays in which many products including livestock would be sold (Laughton, 2008).

Overview

Chester was chosen as an assemblage to compare butchery trends with Beeston Castle, as it is approximately 12 miles away and as discussed above, it was the urban livestock centre of the region. It is highly likely that the meat consumed at Beeston Castle had originated from the hinterlands of Cheshire and was taken to the livestock market trade in Chester. The assemblage that was assessed was from 3-15 Eastgate Street. The animal bone was originally recorded in a report by Lesley A. Harrison, and bone was found in all phases of excavation except one. According to the report there were 1027 bones recovered from the site (Harrison, 1995). The assessment looks at these bones and the butchery evidence present. As it is a relatively small sample, a full butchery analysis could be carried out in a manageable time period. Animal bone from the site dates from approximately 74AD until the early twentieth century. The bone from phases IV (tenth-twelfth century) to IX (eighteenth century) will be analysed in the assessment as they are more applicable to the research period.

The animal bone assemblage was mainly recovered by hand with only pits being sieved. Species included cattle, sheep/goat, pig, and a small amount of dog, cat, domestic fowl and wild goose. There was also some wild species including hare, rabbit and deer.

11.2.2 The Butchery Evidence from the Eastgate Street Report

The material from this assemblage is mainly food and butchery waste, and a small amount of craftworking (Harrison, 1995). Butchery marks were mainly made by a knife and cleaver with saw marks only seen in the post-medieval period. Butchery marks were quantified and trends were mentioned in a few of the phases as were certain elements with marks. To summarise the butchery data from the report (Harrison, 1995), what we do know about butchery in this assemblage is:

Phase IV: Cattle had 14% butchery, and pig also had 14% of remains butchered. There was no sheep/goat butchery.

Phase V: Cattle had 27% of the bones butchered and sheep/goat had 25%. There was no pig butchery.

Phase VI: 48% of cattle, 57% sheep/goat and 32.5% of pig had butchery marks. Trends for cattle were identified here with removal of cheek meat due to cuts on the mandible anterior surface and the disarticulation of the ulna due to chop marks. An interesting observation is this phase was that there were no cattle or sheep/goat metapodia but there were pig metapodia. It was also noted that there was only a small amount of non-meat bearing bones, indicating probable primary butchery.

Phase VII: 43% of cattle, 33% sheep/goat and 12% pig bones had butchery. This phase was slightly different to the previous phase in that the ratio for non-meat bearing bones to meat bearing bones was more even, suggesting food waste instead of primary butchery waste.

Phase VIII: 33% of cattle, 40% pig and no sheep/goat bones had butchery marks. It is noted here that a cattle scapula has cuts on the glenoid, indicating trimming, also the report suggests small joints may have been cooked as there were "miscellaneous medium sized ribs" (p 51). The majority of bones in this phase were meat bearing bones (Harrison, 1995).

Phase IX: 16% of cattle and 26% of sheep/goat bones had butchery evidence. It was noted in this phase that there was evidence of cheek meat removal for sheep/goat.

Phase Xa: 25% of pig and 33% of sheep/goat, and no cattle bones displayed evidence of butchery.

Phase Xb: None of the bones from this phase had evidence of butchery.

To summarise in brief the dates of each phase, according to the documentary evidence:

Phase IV: Tenth to twelfth century

Phase V: Twelfth to Thirteenth century

Phase VI: Early post-medieval period

Phase VII: Sixteenth century

Phase VIII: Early eighteenth century

Phase IX: Mid eighteenth century

These interpretations by Harrison (1995), show the difference in the types of animal remains recovered from phases and the noticeable presence of items that are food waste and those that were a result from primary butchery.

11.2.3 Status

Chester itself was an important political centre and a hub for sale and trade. Chester was considered small in population for being a regional capital (Laughton, 2008). Chester was very much a hierarchical society made up of gentry, clergy and the poor. The top consisted of wealthy merchants and the bottom were the penniless and homeless (Laughton, 2008). Many of the residents of Chester were craftspeople with 170 occupations recorded from 1275-1520 (Laughton, 2008, p.133). The range of species found at Chester Eastgate Street consist mainly of sheep, pig and cattle. There were wild species present such as rabbit and hare but the only deer fragments recovered were pieces of antler. Antler would have been used for craftwork and the upper classes would have been more likely the individuals who were hunting red deer.

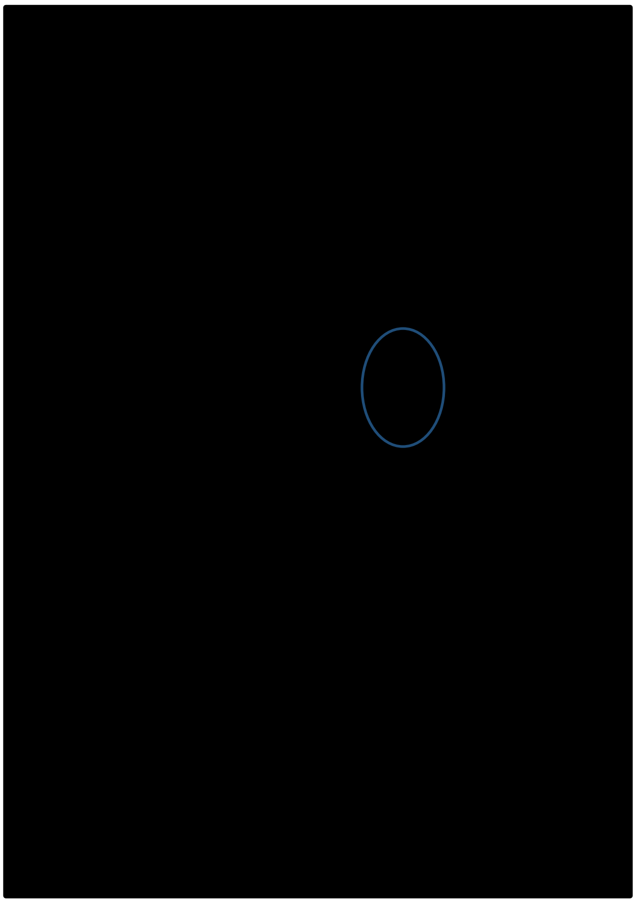

Figure 103: Map of Eastgate Street in medieval Chester (Matthews, 1995, p. 2). This image has been removed by the author of this thesis for copyright reasons.

11.2.4 Results of Butchery Assessment

The entirety of the Eastgate street animal bone assemblage was assessed for butchery marks. The assemblage was small and therefore timing allowed for an assessment of the entire assemblage. Bone from the site dated from the tenth century to the mid-eighteenth century. Most of the butchery evidence came from the later phases. Butchery evidence was seen on mainly cattle and sheep/goat remains, but also on pig, rabbit and deer remains. Deer butchery was only seen on antler fragments, as mentioned in the original report. There was a great deal of antler which made up approximately 9% of the entire assemblage. Cattle consisted of 68 butchery marks and sheep/goat had 52 butchery marks. The diagrams below (figures 104, 105, 106) show the overall butchery marks for sheep and cattle. The most butchery marks for both cattle and sheep appeared on rib fragments.

Two boxes of medieval bone were also assessed from Delamere Street (Cuttler et al., 2012) as time allowed for this. Unfortunately the collection from this site was not successful for butchery analysis. The site's roman bone was in good condition but the medieval bone was in very poor condition. The bone was heavily damaged during excavation with many modern breaks. Most of the breaks were clear signs of excavation damage from mattocks and shovels. This meant that butchery was impossible to evaluate and only a few rib cuts could be definitively identified.

11.2.4.1 Cattle Butchery

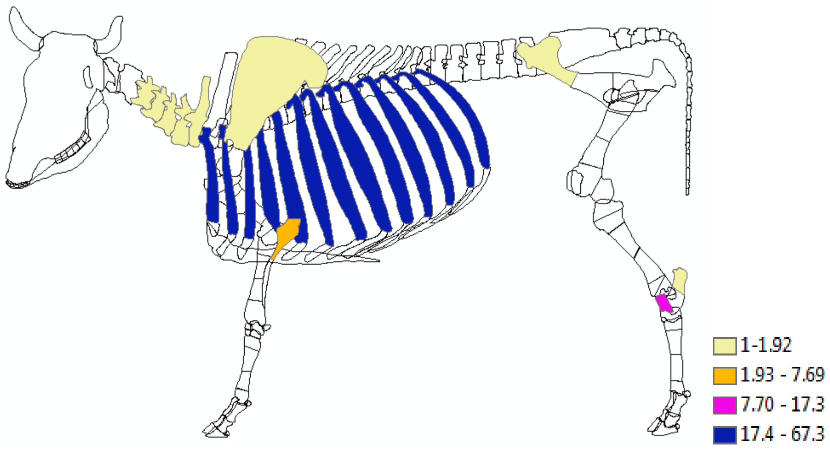

Figure 104: Cut mark frequencies for cattle from Eastgate Street, Chester.

The cattle cuts are the most frequent on the ribs from Eastgate Street, rib cuts were mostly seen on the body but there were ribs cut seen on the neck. Other cuts include one astragalus with nine cuts around the outer margins of the bone.

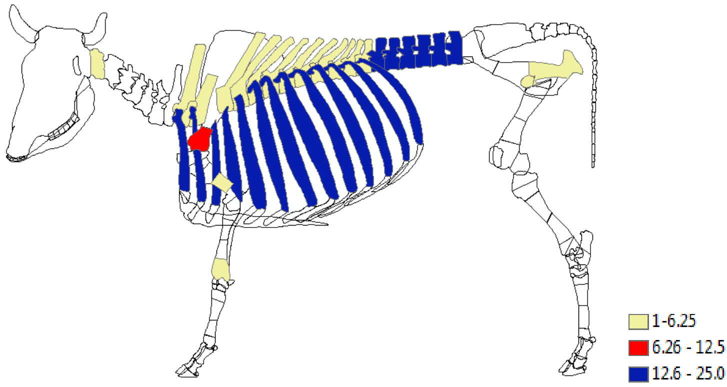

Figure 105: Chop mark frequencies for cattle from Eastgate Street, Chester.

ID	Element	Portion	Cuts	Chops	%cut	%chop
26	atlas			1		6.3
28	cervical vertebra		1		1.9	
29	thoracic vertebra			1		6.3
30	lumbar vertebra			4		25.0
33	rib		35	4	67.3	25.0
36.1	scapula	articulation		2		12.5
36.2	scapula	blade	1		1.9	
38.22	humerus	lower shaft		1		6.3
39.3	radius	distal		1		6.3
40.1	ulna	proximal	4		7.7	
70.1	pelvis	lower illium	1		1.9	
71	pelvis	ischium		1		6.3
74.11	femur	head		1		6.3
74.32	femur	lower distal				
79	astragalus		9		17.3	
80.2	calcaneus	lower	1		1.9	

Table 42: Butchery data for cattle overall from Eastgate Street, Chester.

Figure 105 shows the frequencies of chop marks on the bones of cattle from Eastgate Street. The highest percentage of chop marks occurred on the ribs and on the lumbar vertebrae. The amount of butchery evidence that could be collected was very small in comparison to the data which was collected from Beeston Castle. The assemblage was much smaller and the amount of larger fragments and long bones was much smaller.

11.2.4.2 Sheep/Goat Butchery

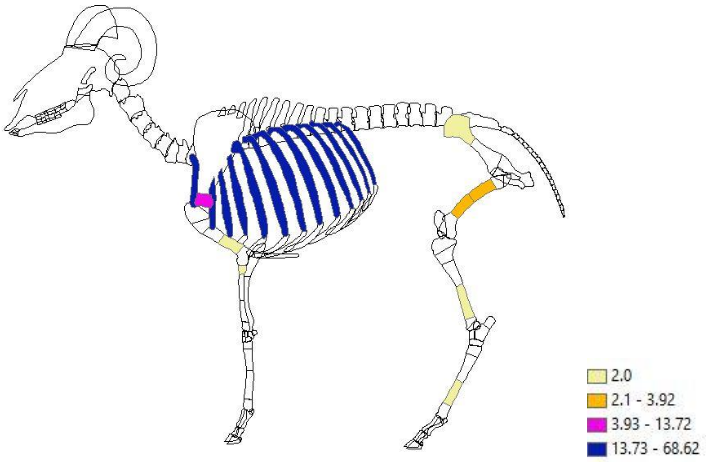

Figure 106: Cut mark frequencies for sheep/goat from Eastgate Street, Chester.

ID	Element	Portion	Cuts	Chops	%cut	%chop
36.1	scapula	articulation	7		13.7	
33	rib		35		68.6	
74.22	femur	lower shaft	2		3.9	
74.21	femur	upper shaft	2		3.9	
29	thoracic vertebra			1		100
76.22	tibia	distal shaft	1		2.0	
70.1	pelvis	upper illium	1		2.0	
39.1	radius	proximal	1		2.0	
38.22	humerus	lower shaft	1		2.0	
95.22	metatarsal	shaft	1		2.0	

Table 43: Butchery data for sheep/goat overall from Eastgate Street, Chester.

Cut marks to the ribs were the most frequent type of cut. This was followed by cut marks to the articulation and neck area of the scapulae. Much like for the cattle remains there were not as many large fragments in the Chester assemblage which resulted in the amount of butchery evidence being less and more difficult to identify. There was only one chop present which was on a sheep thoracic vertebrae, therefore a diagram was not produced.

11.2.5 Trends Observed and Butchery Comparison with Beeston Castle

Vertebrae Trend

For cattle there were only three vertebrae that exhibited evidence of butchery, one thoracic and two lumbar. The thoracic had a longitudinal chop but the lumbar vertebrae had longitudinal and transverse chops through the body and to the body. The atlas also had a longitudinal chop through the centre. Beeston Castle mainly saw longitudinal chops but did also show evidence of transverse chops to the vertebrae. For sheep/goat there was only one chop mark on a thoracic vertebrae which was a longitudinal chop. The lack of evidence from Eastgate Street is not enough to draw conclusions as to whether carcasses were dismembered longitudinally down the spine as they were in the later phases of Beeston Castle.

In terms of other butchery trends the cuts and chops to the scapulae articulation in sheep/goat and cattle were a common point for filleting and disarticulation not only at Beeston Castle but also during the medieval period in general. The heavy chops to the astragalus were also common at Beeston.

11.2.6 The Regional Diet and Dietary Preferences

The butchery evidence from Eastgate Street was not sufficient enough to determine whether the same methods of butchery seen at Beeston Castle were like those seen in the city of Chester. Therefore we cannot conclude whether the regional trends and dietary preferences were the same in the urban centre and at the castle.

11.2.7 Summary

The lack of butchery evidence from Eastgate Street is not enough to provide an in depth comparison with Beeston Castle. The high level of fragmentation and small sample size was not sufficient enough to determine if the same style of butchery was occurring in both places. The few cases of vertebrae butchery that were present in the assemblage were not evidence enough to determine if the same style of carcass dismemberment was occurring. From the data gathered it is clear cleavers were used in the dismemberment process as were sharp knifes for filleting meat. The heavy chops to the scapulae articulation, radii and vertebrae are seen in both assemblages.

Due to the inadequate sample size bone of Eastgate Street, bone from Delamere Street was also sampled. Unfortunately, the bone from this site was in poor condition, mainly due to damage during excavation. A larger assemblage from the city would need to be assessed in order to gain a clearer picture of whether butchery practices in Chester closely mirrored those from Beeston Castle. As Beeston Castle bone dates from approximately 1225 through to 1700 the dates do correlate to the date of Eastgate Street, yet the differentiation between earlier and later phases at Eastgate Street allow for no solid distinctions in butchery patterns to be identified.

11.3 Animal Bone from Newcastle

11.3.1 Background and Overview

Newcastle expanded rapidly during the medieval period. It was an important urban centre of lead, coal and wool production (McCord & Thompson, 1998). Durham was an administrative centre for the bishop and would not have been a main urban centre of the northeast (*ibid*). Newcastle is 30 miles away, and would have been the closest major urban centre to Edlingham Castle. It is therefore possible that livestock was being purchased from the city.

Newcastle was the only town north of York with a large number of guilds (Graves & Heslop, 2013). These guilds included butchers, tanners, and skinners to name a few. The market streets where goods and livestock were sold to people were named accordingly, such as “horsemarket” and “neat” and “nolt” markets which refer to cattle (Graves & Heslop, 2013, p.129). These markets were located near the entrance of the town for convenience of transportation (Graves & Heslop, 2013).

A number of excavations were part of a 2013 volume that looked at the archaeology of Newcastle during the medieval and post-medieval period. The volume indicated that the general trends in the medieval and post-medieval period were that people were consuming more veal (6 months of age or less) as meat instead of beef. Sheep were also consumed before reaching full maturity, as it is evident that sheep were slaughtered at 2-3 years of age, which corresponds with meat consumption instead of wool production (Graves & Heslop, 2013). There were several sites in the volume that included medium to large zooarchaeological assemblages. Sites such as Westgate and Bastion ditch provided an interesting comparison in that Westgate was clearly a poorer population as head and feet made up more than half of the assemblage, whereas

Bastion had 65% high quality cuts and more lamb (Graves & Heslop, 2013). Other sites such as, Cannon cinema, had sieving implemented which resulted in a large number of fish bones, mainly belonging to haddock, being recovered. Other sites such as Orchard Street showed the high frequency of sheep bones, as previously mentioned, and Oakwellgate showed a very low number of pig remains recovered (Graves & Heslop, 2013). The original faunal bone reports were reviewed to see whether butchery was a part of the recording of the bone and the discussion.

Oakwellgate: The animal bone report from Oakwellgate, Newcastle (Cartledge, 2007) provided relevant information of the assemblage but no specific details regarding butchery. What the report does mention about butchery is that it was visible on cattle, sheep, pig, and fallow deer remains. There was also some butchery evidence on horse remains and dog remains. The dog remains were possibly skinned. There were also three contexts that had a large amount of metapodia, used for possible tool making. That was the only mentioning of butchery in the report.

Westgate Road: The animal bone from Wesgate Road, Newcastle (Gidney 1991), once again provided very little insight into butchery data and practices. The key sentence that is applicable to this research is “Sagittally split vertebrae of cattle and sheep/goat indicate that carcases were commonly suspended and split into two sides” (Gidney 1991, p177). While no numerical data is made available this is a clear indicator that this style of butchery did occur in Newcastle. Other points that are relevant to butchery and links to dietary trends are that most parts of the animal carcass are present in the seventeenth century, indicating butchery occurred close by. There was a presence of suckling pig remains, possibly the remains of a feast, but there was only one fallow deer bone fragment and one fragment of red deer antler. These points indicate that deer did not make up much of their diet, though that would be expected of the lower class town populations. Also, suckling pig, a dish that is considered a delicacy of the high status medieval diet may have caught on as an enviable food choice of the town people.

As Edlingham Castle was the case study that was furthest from an urban centre the results shouldn't be expected to be the same as those found at Newcastle. As mentioned above, Newcastle is over 30 miles from Edlingham Castle in Northumberland, which would not have been a convenient location to transport dressed carcasses. Thus a valid hypothesis would be that meat is being butchered on site due to the distance from the urban centre. From the butchery study of Edlingham Castle it is also clear that the butchery style is different from the other castle case studies. The butchery at Edlingham is not clean and methodical like the butchery style seen at Portchester for example. The butchery appears to be much more haphazard with multiple attempts needed in order to disarticulate major joints. Edlingham Castle also had a dominance of transverse chopping of the vertebrae, which is not the case for the other two castles studied.

The assessment looked at the animal bone from Orchard Street, near the town wall in Newcastle. The excavation of this area took place across two seasons in 1987 and 1988 along a curtain wall that was supposed to be entirely medieval in date (Nolan, 1993).

Butchery marks were analysed to determine whether similar patterns in butchery were occurring at Edlingham Castle. Two of the potential outcomes of the analysis were that the butchery patterns closely match those observed on the faunal remains from Edlingham Castle, in that butchery was less methodical and that vertebrae were chopped transversely. Alternatively the other option is that vertebrae are chopped longitudinally indicating the same techniques seen by professional butchers in urban centres, much like at Winchester. This would be able to tell us whether the butchery trends are regional, in that transverse butchery of the vertebrae is how the butchers were choosing to slaughter their animals in the northeast or whether in Newcastle butchers are slaughtering their animals longitudinally down the spine, as they were in Winchester.

The assemblages was chosen as there was a lack of large medieval assemblages from the city, and this particular assemblage had a publication. All of the animal bone from Orchard Street that was available from the Tyne and Wear museum's stores was used for the assessment. The bird bone was not analysed in this assessment as it was not with the original animal bone recovered from the site. The excavation of this area took place across two seasons in 1987 and 1988 along a curtain wall that was supposed to be entirely medieval in date (Nolan, 1993).

[redacted]

Figure 107: Site location of excavation of Orchard Street (Nolan, 1993, p. 94). This image has been removed by the author of this thesis for copyright reasons.

Dobney and Jacques (1993) did provide butchery information and interpretations in the brief animal bone report. The assemblage was made up 2409 fragments. Once again no quantitative butchery data was provided, yet a section was dedicated to butchery and bone use in the report. Butchery evidence was found in all phases of excavation, and it was mentioned that cattle and sheep were dismembered using knives and cleavers. Chop marks were mainly on cattle remains and knife marks more commonly seen on sheep/goat remains. The report mentions butchery on cat remains, most likely for the removal of pelts. The material was all hand-picked indicating that there was a bias of the larger species and larger elements (Dobney & Jacques, 1993, p.126). The report does mention the presence of dog gnawing but there was also a substantial amount of root etching present on the bone surface. The report states that there were 45 bird fragments recovered, yet when assessing the bird bones were no longer with the remaining assemblage. The table below shows the phases for the excavation.

Phase	Date	Description
3.1	16th century	Post wall construction land use east side. Scattering of kitchen waste.
3.2	16th century	Post wall construction land use west side
4	17th century	Post friary land use: The midden
5	Final use 1644	Midden. Civil war.
6	Post-Civil war to present	Midden.

Table 44: Description of phases of Orchard Street excavation.

Bone was found in all phases but the bone was condensed to three phases for data analysis purposes. The diagrams below are the bone from phases 3.1, 3.2 and 4 which date to the medieval and late medieval period.

11.3.2 Results of Assessment

11.3.2.1 Cattle Butchery

There were 21 cut marks and 38 chop marks on cattle remains from Orchard Street. From figure 108 below we can see that cut marks were mainly seen on rib fragments, followed by the upper shafts of the femora, scapulae blade and the distal humeri. Cut marks on the ribs were found on six rib fragments with mostly multiple cuts per fragment. The cuts to the upper shaft of the femur were only found on one fragment and the three cuts were found both on the medial and lateral sides of the bone. The cuts to the scapulae were solely on the blade and on the posterior side. The cuts to the distal humerus were located on the trochlea or slightly above on the anterior side.

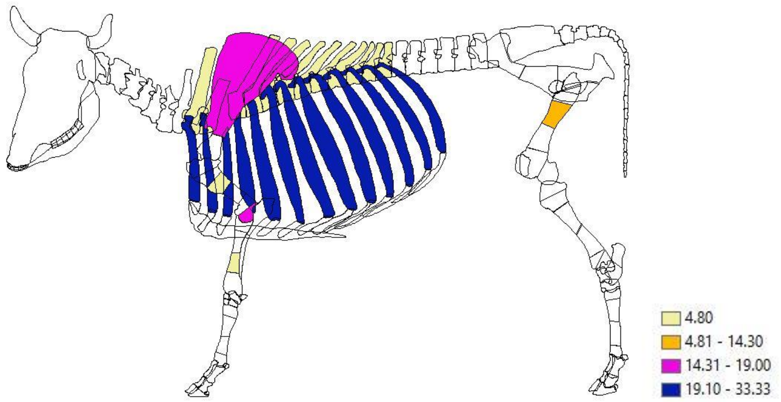

Figure 108: Cut mark frequencies for cattle from Orchard Street.

The cut marks found on the ribs are consistent with removal of flesh, those to the scapulae are filleting of meat from the bone. Other cut marks include cuts to the lower shafts of the radii, upper shafts of the humeri and the thoracic. Cuts to the shafts of the radii were not seen in the Edlingham Castle remains, yet cuts to the humeri are consistent with those found at Edlingham Castle. These marks are signs of removing flesh from the bone.

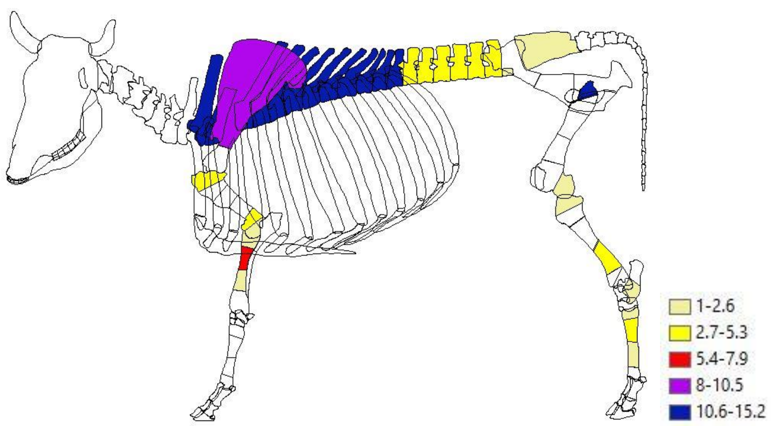

Figure 109: Chop mark frequencies on cattle remains from Orchard Street.

ID	Element	Portion	Cuts	Chops	%cuts	%chop
29	thoracic vertebra		1	5		2.6
30	lumbar vertebra			2		7.9
31	sacrum			1	4.8	2.6
33	rib		7			5.3
36.2	scapula	blade	4	4		2.6
38.11	humerus	proximal upper		2	4.8	13.2
38.21	humerus	upper shaft	1		33.3	
38.31	humerus	upper distal		2	19.0	10.5
38.32	humerus	lower distal	4	1		2.6
39.1	radius	proximal		1		5.3
39.21	radius	upper shaft		3		2.6
39.22	radius	lower shaft	1	1		2.6
74.12	femur	proximal upper		5		5.3
74.21	femur	upper shaft	3			2.6
74.32	femur	distal lower		1		5.3
76.11	tibia	proximal upper		1	4.8	
76.22	tibia	lower shaft		3		5.3
76.32	tibia	distal lower		1	19.0	2.6
80.1	calcaneus	proximal		1		13.2
95.1	metatarsal	proximal		1	14.3	
95.21	metatarsal	upper shaft		2		2.6
95.22	metatarsal	lower shaft		1		2.6

Table 45: Butchery data for cattle overall from Orchard Street, Newcastle.

The most chop marks for cattle appear on the thoracic vertebrae. Chops were found on the body and spinous process. All chops were longitudinal straight through the body of the vertebrae. Chops were also seen on the upper femur, with the entire neck of the bone chopped through removing the head. Chops to the scapulae were the third most common chop marks, which were found on one fragment. The four chops occurred on the scapula blade and spine. Other chop marks were seen on the distal femora and proximal tibiae which are signs of the disarticulation of the upper leg from the lower leg. The same pattern is seen on the front limb in that there was chop marks to the lower femur and upper radius. Further evidence of disarticulation occurred on the calcaneus and the proximal metatarsal.

As mentioned about all chops to the vertebrae were longitudinal as were the chops to the lumbar vertebrae. This is distinct evidence that cattle carcasses were chopped by being hung up and divided in half down the centre of the spine. The chop to the sacrum is also consistent with those seen on the thoracic and lumbar vertebrae.

Not depicted in the above figures, as was seen in the civil war period of phase 5, several long bone fragments did have evidence of sawing straight through the bone shaft. These marks were only seen on cattle remains. Saw marks are not common in medieval butchery, though a small number of saw marks were seen on long bones at Portchester Castle, though the sawing marks are evidence that it is a technique that was implemented by butchers in Newcastle during the later post-medieval period.

11.3.2.2 Sheep/Goat Butchery

Cut marks were more common on sheep/goat remains than on cattle remains. There were 36 cuts and 15 chops present on sheep/goat remains. Cut marks were most common on the upper shafts of the femora followed by the upper illium of the pelves, the lower shafts of the humeri and the lower shafts of the metatarsals.

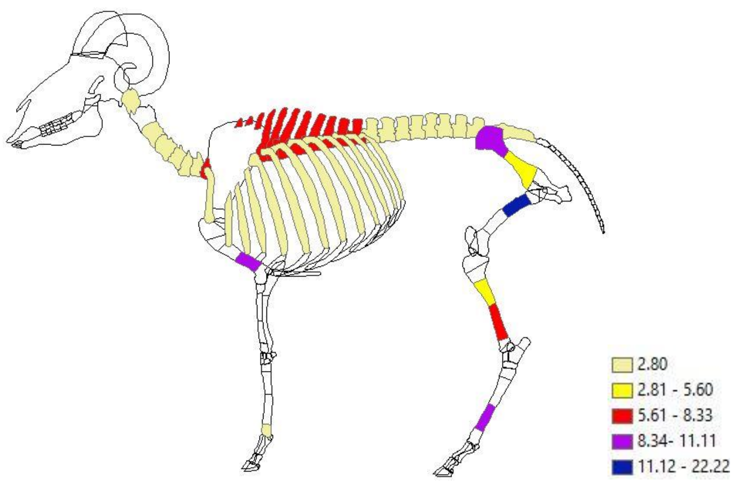

Figure 110: Cut mark frequencies for sheep/goat from Orchard Street.

Chops marks were not common on sheep/goat remains at Orchard Street. The most chop marks were seen on cervical vertebrae. The chops to the cervical vertebrae were all longitudinal chops.

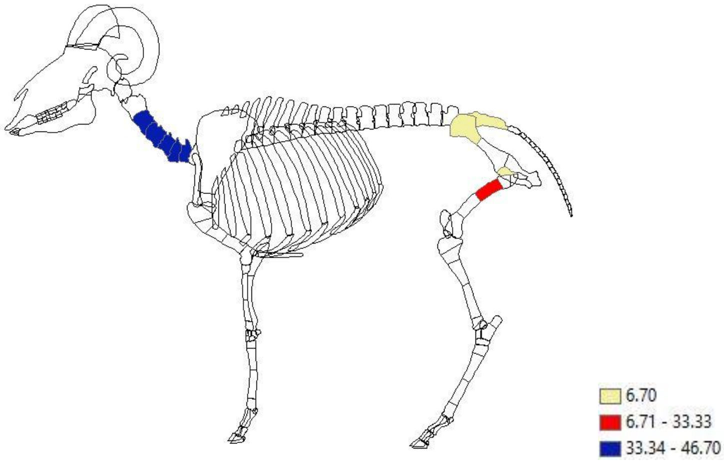

Figure 111: Chop mark frequencies for sheep/goat from Orchard Street.

ID	Element	Portion	Cuts	Chops	%cut	%chop
95.22	metatarsal	lower shaft	4		11.1	
57.3	metacarpal	lower shaft	1		2.8	
33	rib		1		2.8	
70.1	illium	upper	4	1	11.1	6.7
70.2	illium	lower	2		5.6	
74.11	femur	head		1		6.7
74.21	femur	upper shaft	8	5	22.2	33.3
38.22	humerus	lower shaft	4		11.1	
76.21	tibia	upper shaft	2		5.6	
76.22	tibia	lower shaft	3		8.3	
26	atlas		1		2.8	
28	cervical		1	7	2.8	46.7
29	thoracic		3		8.3	
30	lumbar		1		2.8	
31	sacrum		1	1	2.8	6.7

Table 46: Butchery data for sheep/goat overall from Orchard Street.

The other chops recorded include chops to the upper shafts of the femur, head of the femur, upper illium, and the sacrum. The single chop to the sacrum occurred on the anterior side.

11.3.2.3 Butchery on Other Species

Butchery did occur on other species from the Orchard Street assemblage. Butchery occurred on the remains of horse, fallow deer, pig and cat. The horse butchery consisted of only two cuts to a single metatarsal shaft. The fallow deer butchery occurred on several elements. Chops were seen on an atlas, an ischium and a distal tibia. The deer axis was butchered longitudinally like the sheep and cattle vertebrae from this assemblage. Cut marks were seen on the lower shaft of the humerus. Butchery marks on pig remains consisted solely of cuts marks to one tibia shaft on the medial and lateral sides. Cat butchery was originally discussed in the Orchard Street report, and the same evidence can be confirmed as small cut marks were observed on several long bones, indicating probable use for their pelts.

11.3.2.4 Trends Observed and Butchery Comparison

The butchery of cattle was carried out in a methodical and precise way. Chop marks were heavy and frequently were characterised by chopping clean entirely through the bone articulation. Sheep/goat bones saw more cut marks versus chop marks and as sheep carcasses are smaller than cattle they would have been easier to dismember thus more time may have been spent using a knife rather than a cleaver.

While this is a small sample size the vertebrae trend for cattle and sheep/goat was the same with all divisions on the vertebrae, this was seen through longitudinal chops. Thoracic, lumbar and the sacral vertebrae all showed the longitudinal division in cattle and cervical vertebrae were divided longitudinally for sheep/goat. Even a fallow deer axis was chopped longitudinally.

Other patterns that consisted of the largest frequencies of cut or chop marks are some of the practices that are also seen at Edlingham Castle too. For cattle, cuts to the scapulae blade were seen, which are indications of filleting of meat, which is the same pattern seen at Edlingham Castle. Heavy chops to the distal humeri in cattle and sheep were present at Edlingham but this pattern was only observed in cattle at Orchard Street. The small sample size of the assessment assemblage does make the comparison of trends limiting, yet stylistically the methods are varying.

11.3.3 Professional and Amateur Butchery

The butchery seen on the vertebrae is key evidence of professional butchery as it is the main carcass division of cattle and sheep, as they were all divided longitudinally down the spine. The precise and rapid dismemberment of the limbs was also a sign of an expert butcher with experience of knowing how to separate joints cleanly and efficiently. This is the case in most of the examples from Orchard Street, yet there was an example of less methodical butchery on a cattle tibia in which three heavy chops are seen all along the upper shaft. These chops were all in the same direction and if the butcher was attempting to dismember that bone they were not successful with these chops. The proximal section of the bone was missing, therefore we cannot tell if the bone was dismembered through the proximal articulation.

These butchery methods are characteristically different from those seen at Edlingham Castle. The butchery techniques at Edlingham, as described before, were more haphazard with evidence of multiple attempts to dismember limbs with heavy chops.

11.3.4 Regional Dietary Trends and Preferences

Edlingham Castle's butchery trends are unique as they are unlike the techniques carried out in the Portchester and Beeston Castle assemblages. The amateur nature of the butchery indicates that there is a possibility that animals were butchered by kitchen staff on site. By looking at the animal remains from Newcastle we can tell that butchery was carried out in a different style than those remains from Edlingham. As the style of butchery at Edlingham Castle is vastly different from that seen at Newcastle, it is fair to say that the butchery style is not regionally specific to the Northeast of England. Edlingham Castle stands out from all of the other castle assemblages and urban assessments as the butchery is distinctly different. The importance of region, status and distance from an urban centre will be further examined in chapter 12.

11.3.5 Summary

The Orchard Street animal bone assemblage offered some interesting insight into butchery practices in Newcastle. Carcasses were clearly split in half longitudinally in the Orchard street assemblage as is seen from the butchery evidence on the vertebrae. The butchery trends at Edlingham Castle were noticeably different to the patterns seen in the Newcastle assemblage. As previously discussed the vertebrae at Edlingham Castle were chopped transversely opposed to longitudinally. Besides the vertebrae butchery, overall butchery at Newcastle was more methodical and carried out with more precision than was seen at Edlingham Castle.

11.4 Overview of Assessments

The three animal bone assessments from Winchester, Chester and Newcastle provide an alternate view of how butchery was carried out in urban centres that are in relatively close proximity to the castle. The assessments were carried out in order to see whether the same trends in butchery were occurring in both the urban centre and the castle. Edlingham Castle was the most rural of the castles in that it was the furthest from an urban area. Edlingham Castle was the case study that stood out the most from its urban assemblage assessment comparison. The other case studies all had some cross over trends that allowed for comparison to be made between the case studies and an urban centre that is close in proximity. Edlingham is different in various ways, for example, geographically it is more rural and further away from any urban centre than the other two castle sites. This subject will be discussed in further detail in chapter 12, as differences can be related to social status variation, geographic proximity and regional/cultural factors.

Chapter 12: Discussion

This chapter will discuss the key trends that have been illuminated by the butchery data collected. The analysis of these three castle animal bone assemblages from varying landscapes and social statuses across the medieval period in England have highlighted many significant variations in how butchery processes were carried out. The butchery marks observed provided insight into how animals were being exploited and how the butcher was undertaking the processes of butchering a carcass. We can delve deeper into the ideas of whether butchery trends are related to the geographical location of the site, the status of a site, and investigate how the proximity to an urban centre versus a rural landscape bares relevance on meat supply and availability.

This chapter will discuss the correlation between butchery carried out by a professional butcher, and the systematic style of dividing a carcass longitudinally down the spine. This chapter also spotlights how the proximity to an urban centre affects the style of butchery seen onsite and how this relates to meat been traded and how the status of a site affects the butchery style.

This chapter will also discuss topics including medieval cooking and the effect of cooking on bone, the social status of the castles and how this is reflected in the faunal remains. Important butchery patterns and the significance of the changes in butchery patterns will also be discussed. The chapter will conclude with the outcomes of the methodological aims and points to consider when undertaking this kind of data collection and analysis.

12.1 Medieval Cooking

“Medieval food has often been criticized for being over prepared, over-seasoned, and over-coloured. All these charges may well be true, for it was roasted, boiled, mixed, mashed, baked, fried and spiced; sometimes the same piece of food endured most of the foregoing process” (Warner 2001, p.107).

Historical and documentary evidence have provided examples of what people were eating in a high status environment. As many foodstuffs are not preserved in archaeological contexts besides archaeobotanical evidence and residual evidence on food utensils, faunal remains are the main source of evidence for consumption.

While this research has shown the various aspects that zooarchaeological analysis can provide, the bones themselves cannot necessarily provide evidence of the exact particulars of a dish. They cannot be reinterpreted easily as each foodstuff could be prepared in various ways in a variety of different recipes Schweitzer, 2010).

Roasting whole carcasses and large joints of meat was frequently seen in the medieval period but so were dishes such as pottages and stews. Larger joints of meat would be roasted more frequently (Schweitzer, 2010). This would be because dismembering a carcass into small joints would be time consuming and much more challenging without the use of saws. Joints from larger species would be roasted on a spit whereas smaller animals such as suckling pig, lambs and hares would be roasted whole (Wilson, 1973). Kids and suckling pigs were a delicacy and would be stuffed with ingredients such as figs, raisin, sugar and bread crumbs (Wilson, 1973).

12.2 The Cooking Process and the Effect on Bone

Understanding the cooking processes from analysing just the bone remains can be difficult. Burnt bone whether burnt in situ or disposed of in pits is "direct evidence of utilization of the animal by humans" (Nicholson, 1993, p.41). There was very little evidence of burning on the bones from any of the assemblages analysed. This is not necessarily an uncommon occurrence. The colour of burnt bone indicates the variation in temperature that the bone was exposed to heat. This should only be used as a guide as what temperature the bone achieved as there is wide variation and can be confused with post-depositional staining (Nicholson, 1993). As a large portion of meat would have been roasted on the bone, the bone wouldn't have necessarily changed in colour as the meat is what would have been exposed to the flame and insulated by flesh. Roasting would have been common, as discussed above at Southampton, and stews and pottage were also a frequent occurrence on medieval tables. Feasts or large meals would have included roasting on a grander scale, and would often take place outside as there would be more space than in the kitchen and less fire risk (Wilson, 1973).

Meat would have been boiled for stews therefore not leaving behind any evidence of burning. Boiling bone causes loss of collagen and makes the bone more porous, however bone needs to be boiled extensively for these type of alterations to be noticed (Robert, et al., 2002). The main issue is that with the loss of collagen and minerals bone becomes more fragile. Severely boiled bone wouldn't survive, as they have reduced strength and increased mineral alteration (Robert, et al., 2002). Mildly heated bone will show no noticeable changes to the naked eye. However, bone boiled at low temperatures can be detected using a transmission electron microscopy (TEM) approach. In this approach bone was viewed using TEM and found that cooked bone appeared as short fibrils with frayed edges while the uncooked had intact fibrils with beaded edges (Koon, et al., 2010).

As bone becomes weaker when undergoing these cooking processes, it is fair to say that bone that did undergo higher temperature cooking or boiling for an extended period of time, would not have survived in the archaeological record. Also the changes of exposing bone to heat can be similar to the effects of weathering such as cracking, colour changes and cortical exfoliation (Koon, et al., 2010).

12.3 Preservation of Meat

We know that it would have been necessary to preserve large quantities of meat in a castle. The domestic species would have been expensive to continue to feed through winter therefore many would be culled in winter (Wilson, 1973). Preserving meat via dry salting was common. All of the main domestic species as well as deer could be preserved in this fashion. Deer for example, would be soaked in water, dried, salted, then boiled and soaked in a brine then barrelled (Wilson, 1973, p.92). Other parts would be pickled for preservation. Pig ears, trotters and cheeks would often be pickled for later consumption (Wilson, 1973).

12.4 Investigating Social Status

The Black Death had an effect on the social status of food. With a decrease in population and power of the aristocrats, peasants had greater access to meat. It also deflated food prices. Yet the castle elite still had the greatest access to a wide variety of species for consumption.

Castles have higher proportion of pig and a lower proportion of sheep in comparison to urban sites (Thomas, 2007). This was the case in the analysis of the faunal remains from Newcastle and Chester, there was a higher proportion of sheep and a lower proportion of pig. At Eastgate Street there was 34% cattle, 44% sheep and 22% pig (Harrison, 1995). Orchard Street had an even amount of cattle and sheep, followed by pig (Dobney & Jacques, 1993). It is important to now look at how the data collected from the case studies and urban assessments compares in regards to social status and how their differing elements, species presence and butchery trends provide insight into the level of social status.

12.4.1 The Social Status of Edlingham Castle

Edlingham Castle animal bone assemblage had many of the common components of what makes up the high status medieval diet. There was evidence of consumption of red deer, with butchery marks appearing on meaty bones/joints. There was also evidence of large hunting hounds and rabbit remains. The remains themselves provided insight into the diet of those residing in the castle.

Edlingham Castle, as discussed in chapter 6, appears to have a more amateur style of butchery in comparison with Portchester and Beeston Castles. This medieval hall house was geographically the furthest away from an urban centre compared with the other two castles studied. The less methodical approach to butchery at Edlingham is apparent in the haphazard chops and multiple blows that are apparent on joints, suggesting that the butchers producing those marks were not skilled professionals in the craft, and more effort was required to disarticulate joints. A small hall house such as Edlingham most likely would not have had a designated butcher, and kitchen staff would have been responsible for the butchering and preparing of animals for consumption. Edlingham Castle, even in its peak of social standing, would not have been as highly ranked as Beeston Castle or Portchester Castle. The castle underwent a great deal of change during its span of occupation and saw some interesting changes in the meat that was consumed. In the early phases, phase 5 and 6, there was a wider variety of species and also a high percentage of pig remains discovered. These characteristics correlate with the peak of high status of the castle.

The zooarchaeological evidence clearly depicts the rise and fall of status of the castle. The amount of pig consumed also decreases in the later periods as pig is often considered a high status food, this would correspond with the castle falling on hard times during phase 9. The percentage of sheep remains increased in the later periods, suggesting people were more reliant on mutton instead of pork.

The assessment of the animal bone from Orchard Street in Newcastle upon Tyne revealed distinctively different styles of butchery to those found at Edlingham Castle as detailed in chapter 11. The animal bone from Newcastle mainly dated to the seventeenth century which corresponded with one on the later phases of occupation (phase 9). While Newcastle was still quite a distance from Edlingham Castle it was realistically the only urban centre that meat could be coming from, if meat was going to the castle as partially butchered carcasses, as Northumberland is such a rural location. While the assessment assemblage was a small sample size the clearest trend was the butchery evidence found on vertebrae from all species. All of the cervical and thoracic vertebrae for cattle, sheep/goat and deer were chopped longitudinally through the body of the vertebrae, as discussed in chapter 6. This is solid evidence longitudinal butchery of the vertebrae is directly associated with professional butchery. The methodical dismemberment of a carcass could only be carried out by an individual who was skilled in their craft. This type of butchery is associated with both the urban assemblage of Orchard Street and the urban assemblages from Winchester that were studied. The Edlingham animal bone assemblage did not have the professional butchery associated with the urban assemblages.

The distance from an urban centre to the castle is a key difference in the style of butchery produced. It is highly likely that butchery would have been carried out by people that worked at the castle, probably the kitchen staff. From the butchery evidence we know that carcasses were not hung up and divided longitudinally down the spine at Edlingham Castle, like those carcasses butchered in the city. While the diversity in species was apparent at Edlingham indicating the residents were consuming the high class diet of the elite, yet the styles of butchery in urban areas and the other medieval castles were considerably different.

Sykes (2007) proposed the idea that following the post-Norman conquest the elite began obtaining more of their meat from urban centres, thus increasing the demand for professional butchers, with carcasses appearing to be divided into halves along the spine (p. 47).

While this idea is very much supported from the evidence collected from Portchester Castle and Beeston Castle it is not what was seen at Edlingham Castle. Why was the butchery style so different at Edlingham compared to the other two castles studied?

As mentioned above, location would have played a factor in the style of butchery as the closest urban centre was much further away from Edlingham in comparison with the other castles, therefore obtaining professionally butchered cuts of meat would have been difficult. The level of social status would also have been significant. In historical and archaeological literature, the term 'elite diet' has been used somewhat as a blanket term. The 'elite' in the medieval period can refer to royalty, lords, knights, and wealthy landowner to name a few groups. Edlingham Castle cannot be considered as high status as Portchester Castle and Beeston Castle. Edlingham had no royal connections and was a medieval hall house owned by a string of military families followed by the Swinburnes' who had no military connections (Fairclough, 1982). There would also be less need for vast quantities of meat at Edlingham. From household records of other elite households we know feasts did take place, particularly with the arrival of special guests. Accounts from a number of different households provide insight into the amounts of animals that would be brought in. For example at the household of the Bishop of Winchester in 1393 the butcher spent 13 days getting animals and preparing them for the Bishop's arrival (Woolgar, 1999). The butchery was carried out by butchers within the household (*ibid*). Another example is the household of Anne Stafford at Whittle in 1465, where the accounts accounted for 10 oxen. When Stafford moved to London a pasture and a slaughter house had to be hired, much more like a professional butcher would carry out (*ibid*). In the early 1400s at Acton manor, household records reveal that meals can vary to feasts of 300 people to only 3 people dining with the lady of the house, Alice de Bryene, and others of her household (Swabey, 1998).

A royal household would differ as the King would only spend a limited amount of time at the castle. King John used Portchester Castle in the thirteenth century as a residence for hunting expeditions in the Forest of Bere (Cunliffe & Munby, 1985). In the fifteenth century Henry V used the castle as a departure point en route to France (Cunliffe & Munby, 1985). The castle would not have been a permanent residence for the King, throughout the Middle Ages the castle was the home to a resident constable, with royalty paying occasional visits (Cunliffe & Munby, 1985). As mentioned in chapter 4, the Swinburnes' owned Edlingham from the sixteenth century in which time the castle was much more of a domestic family home and the living quarters only accommodated the immediate family (Fairclough, 1982). This would have meant less food would have been needed to feed the household, and there would have been no need for meat to be brought from the outside. A small household with a small amount of staff could obtain and butcher their meat themselves. The number of people residing in a castle would also affect whether dressed meat would need to be brought in. For example, in the royal household of Henry I it has been documented that there were 150 servants, whereas by the time of Henry VI there were up to 800 servants (Woolgar, 1999).

12.4.2 The Social Status of Portchester Castle

Portchester was much closer to an urban centre than Edlingham Castle, which saw a direct relationship with the styles of butchery that were observed. While Edlingham was only 30 miles from Newcastle, the landscape of rugged Northumberland was far more rural. The butchery style at medieval Portchester was considerably different from the butchery patterns seen in the Roman and Saxon periods at Portchester. Carcasses were cut into smaller pieces in the medieval period which made it more difficult to identify fragments (Grant, 1985). As discussed in chapter 8 Portchester had a variety of species, evidence of high status were the presence of birds, hare, rabbit, neonate pig and deer.

Grant's report (1977) details the amounts of venison remains recovered from the site. There was evidence of roe deer, red deer and fallow deer. Fallow deer saw an increase during the medieval period compared with the Saxon period (Grant, 1977), accounting for approximately 6% of the overall assemblage. The butchery study of Portchester, chapter 8, showed only a small amount of butchery evidence on deer remains with evidence of cuts, chops and saw marks on metatarsals, tibiae and antler. As explained in chapter 2 deer would have been a high status food as deer hunting was an activity of the elite. Residents and visitors of Portchester would have hunted deer from the New Forest.

A quarter of land area in England in the thirteenth century was considered royal forest (Young, 1978). William the Conqueror introduced the forest laws to protect deer for his own hunting purposes (Young, 1978). These laws were enforced in the New Forest. Forest laws were not only to protect the deer from poachers but also for protecting the trees of the forest which would also have been a key component of the hunting experience and the habitat for the deer. Penalties for hunting deer and cutting down trees in the royal forests were hefty. The fine for cutting down a tree in a royal forest was three times as high as elsewhere (Young, 1978). Red, roe and fallow deer were abundant in many royal forests though taking a deer would have been prohibited by non-royals (Birrell, 1980).

Deer made up only 1-2% of the deposit in the Winchester assemblages. Deer were present in most of the late medieval and post-medieval groups though. Red deer and roe deer were sparse in number but fallow deer were slightly more common. There was some evidence of butchery on fallow deer remains from the sixteenth century (Serjeantson & Smith, 2009). Besides the small amount of deer long bones found there was also a small amount of antler recovered with evidence of butchery, indicating craftworking activity. It would be expected that antler would be recovered from Winchester as it was a centre for craftworking on materials such as horns, hides, skins, pelts, furs and feathers. Though the presence of deer remains is a bit more unexpected. Due to the Forest laws in the early and mid-medieval period it would have been difficult to obtain deer. The deer may have been obtained through illegal poaching in the New forest. Poaching was occasionally an activity carried out by the lower classes and as mentioned in chapter 2, poaching was not tightly enforced until around 1650 when tighter laws came into effect (Drummond, 1958). The presence of deer remains in the Winchester assemblages shows that the high status diet did have an influence over the lower classes. Winchester was in no way a low status community but there is always a need to keep up with the upper classes, which is the most likely reason deer remains appear in the assemblages.

Habitation at Portchester would have been somewhat sporadic as royalty would come and go at various times and was a base before setting off on the waters.

While feasting would have occurred at Portchester a small staff may have only been present during times royalty were away.

12.4.3 The Social Status of Beeston Castle

The assessment from Chester did not provide the insight needed to form any definitive conclusions regarding the comparison of the butchery methods carried out at Beeston Castle and Chester. From the small amount of butchery evidence seen at Eastgate Street there were no specific marks that were noticeably different from those found at Beeston Castle. The close proximity of Beeston Castle to the city of Chester is still an important variable. The majority of butchery marks found on the animal remains from Beeston Castle are clearly those from a professional butcher. The carcass dismemberment was carried out methodically with clean chops. It is quite possible that a castle the size of Beeston would have had its own skilled butcher. It is also possible that a skilled butcher from the city that was part of the butcher's guild was carrying out the butchery. Either way Beeston was not rural in the sense of isolation. Farmers from the surrounding countryside would sell their livestock in the city. Beeston would have most likely purchased its livestock/meat in this manner or directly from the farmers.

The animal bone assemblage from Eastgate Street in Chester did not reveal enough butchery evidence to be able to form a solid comparison with the butchery evidence discovered from Beeston Castle. As discussed in chapter 11, the close proximity of the city and the castle would share a close trade relationship.

Beeston Castle had a wide variety of species, not just domestic livestock. Wild species that were recovered include red deer, fallow deer, roe deer, fox, rabbit, hare and rat. There was also evidence of amphibians and birds such as frog, toad, chicken, goose, thrush, crow, woodcock and pigeon.

Beeston Castle predominately had carcasses split in half down the length of the spine. This specific butchery practice is discussed below in further detail. It is a clearly a methodical approach to slaughtering an animal and one that has been seen not only in castle assemblages but also urban assemblages, suggesting a certain level of skill would be necessary to carry out the process.

12.5 Urban Assemblage Examples and Their Butchery Trends

In this research it has been hypothesized that not all castles see professional butchery during the medieval period, and that professional butchery is associated with longitudinal siding of animals; whereas more local processing seen at Edlingham Castle, for example, corresponds with amateur butchery which is characterised through transverse splitting of the vertebrae. However, this pattern was not the case at medieval Exeter. In Maltby's (1979) study of Exeter, the pattern in butchery was that vertebrae were divided transversely thus indicting that there was no evidence of siding of the carcass. This wasn't the case for another medieval site from Exeter. The butchery evidence from the medieval site of Exe Bridge (Levitan, 1987) showed the opposite in fact, and revealed siding as longitudinal butchery was seen on vertebrae from this site. The Exe Bridge site is only a few miles from the centre of the city where the sites from Maltby's (1979) studies. This may be a case of personal preference or that the material was not butchered by those professional butchers associated with the butcher's guild. This is an unlikely scenario as the sites are close by to one another. Sheep are far easier to butcher than cattle and much easier to hang up and split longitudinally in that fashion. Sheep are smaller and lighter therefore it is possible that they were butchering sheep longitudinally down the vertebral column earlier than they were butchering cattle in that style.

Assemblages from Winchester were assessed for butchery patterns as a comparison to the animal bone assemblage from Portchester Castle in chapter 11. It is a possibility that meat could have been supplied from the urban centre of Southampton. Southampton was also in close proximity to Portchester Castle and is the site of important medieval archaeological excavations. The animal bone report for Southampton, while concise for today's standards, was an important report due to the size of the assemblage and was a detailed report for the 1970s (Gerrard, 2003). Most reports up until that point had been only included as appendices to reports and less relied upon in terms of husbandry and diet as historical sources were still primarily the evidence consulted for these subjects (Gerrard, 2003). The bone from the Southampton excavations was analysed and reported on by Noddle (1975). The bone was very well preserved and most fragments were identifiable. The bone was divided into three periods, period A (1100-1225), period B (1250-1350) and period C (1550-1650) and came from multiple sites on the High Street, and others include Cuckoo Lane and Winkle Street. From the report an interesting trend to note is that in period A cattle vertebrae were not split and there were more large fragments recovered. Noddle (1975) suggests that this indicates that butchery occurred locally and whole carcasses acquired. This would also indicate that during this early period in Southampton that carcasses were not divided longitudinally down the spine. For period B fragment sizes were smaller and beef carcasses were divided into sides. This is an important piece of evidence, proving that this style of butchery was taking place as early as the thirteenth century in Hampshire. Period B also saw an increase for veal and suckling pig (Noddle 1975). This would have been a high status choice of food. Period C saw a decline in the amount of pig consumed but veal was still preferred over mature beef. The assemblages studied from Southampton were not from poor neighbourhoods, but more affluent areas. There were a few insights into butchery patterns and cooking techniques that were noted. The report states that the bone appears to be roasted as opposed to stewed, as there are crisp bone fits, which are related to higher status (Noddle, 1975; Steane, 1985). Young animals were also selected for roasting as they would have more tender (Steane, 1985). This again is another indicator of influences of tasting preferences.

While as mentioned above, the assemblages analysed for Southampton were not from a poor area, they did have refined culinary preferences. This could be a strong indication that the castle diet, or the high status household diet in general, was influencing the tastes and preferences of the city dwellers. The butchery marks were not reported on specifically in the animal bone report from Southampton, yet the trends described are not necessarily the same as what is seen at Portchester. Unusually at Southampton there was evidence of fine sawing and more precise dismembering techniques (Steane, 1985). This is not very common during the medieval period; sawing is mainly seen on antler and horncores for craftworking. The more sophisticated way of dividing meat into joints is something that is present in castle diets, yet there was only very limited evidence of sawing on long bones at Portchester Castle.

The assessment carried out for the assemblages in medieval Winchester provided insight into the urban versus castle diet. One of the key finds was that longitudinal splitting of the vertebrae occurred at the same time in the towns as at Portchester Castle. This is evidence that professional butchery was occurring in both locations and that this method of carcass division was favoured. The most likely scenarios are that meat was being partially butchered in the town and subsequently transported to Portchester. Another possible scenario is that professional butchery was being carried out in the castle and this style of butchery influenced the butchery styles of the town.

12.6 The Butcher

“The way the butcher works is inescapably a cultural fact, guided and determined by the pressures of economic necessity, social destination, taste, market rules or supply and demand, customs, prejudices, religious precepts and local tradition” (Audoin-Rouzeau, 1987, p.32).

As butchers were highly skilled artisans, the methods and techniques of the town butchers would have affected the type of cuts and livestock brought to the castles for consumption.

At Portchester Castle and Beeston Castle the butchery evidence revealed that the butcher was methodical and precise in their dismemberment and processing of carcasses. Long bones tended to have clean chops around the articulations and clean chops were frequently seen on the ischium and illium of the pelvis. The butchery practices carried out at Edlingham could not be characterised this way. As explained in chapter 6, there were several cases of multiple attempts to separate joints and haphazard chop marks.

Outside of towns there wouldn’t have been many professional butchers, before the Black Death it is believed that individuals were butchering animals themselves onsite (Woolgar, 2016, p.67).

During the medieval period, saws were not a common tool used in the butchery process of animal remains. Before the use of the saw by butchers, cuts of meat would have been much larger (Schweitzer, 2010). This is a key difference between medieval butchery and butchery seen in later periods. Cuts of meat that are popular today, such as the pork chop for example, would not have been common, as dividing to a joint this small would have been very time consuming and tricky to carry out without the use of the electric saw.

The use of larger joint division would also have been due to the popularity of roasting in the medieval period. As meat tended to be roasted on spits in the kitchens, using larger portions of meat would have been a logical method in order to serve a household. In the fourteenth century, there is little written evidence of named joints of meat (Woolgar 2016, p.69).

"There would also have been butchery carried out by the peasant farmer when he slaughtered one of his own animals; this could have been a somewhat crude form of butchery" (Rixon p.56).

The evidence of the change to longitudinal division of a carcass is an essential factor in the rise of the professional butcher. O'Connor (1992) believes this rise occurred around the eleventh century at Flaxengate in Lincoln as butchering a suspended carcass is easier that butchering a carcass on the floor. Sykes (2006) also suggests the shift from butchering carcasses on the floor to suspending them and dividing them into two halves occurred in the late eleventh to twelfth century.

The three tools that were implemented in butchering carcasses in this study were cleavers/choppers, knives and saws. As discussed in chapter 2, saws were mainly seen in cases of antler craftworking, yet did appear on several long bone remains from Portchester Castle and Edlingham Castle. As explained previously, saw marks are characterised by a distinct striated pattern. Chop marks can be characterised by clean disarticulations, or jointing of meat or even attempts to carry out these processes. Cut marks are slice marks, filleting marks, blade insertions, or skinning.

12.7 Important Butchery Trends

"While cultural implications provide the furthest-reaching uses of butchery analysis, information concerning specific techniques and practices for carcass dismemberment are vital for comparisons between sites and periods for gaining an appreciation of implement used as well as possible levels of actual activity" (Seetah, 2004, p.20-21).

The butchery techniques of the medieval period are more careful and methodical than those seen in the Roman period. For example, chopping through the femoral head would be an indication of rapid dismemberment because butchers could have alternatively dismembered by cutting the tendons around the pelvis. While chops to the femoral head are seen in this research of butchery, cuts to the femoral head are much more common than chop marks in this area. The medieval butcher was less haphazard and more thorough in dismembering joints carefully. Another difference in Roman butchery is that the butchers would cut the entire scapula spine with the meat then remove the spine from the meat (Seetah, 2004, p. 31). Again, the removal of the entire scapula spine is rarely seen in the medieval data, instead the spine would be partially removed or more commonly evidence of cut marks on the spine showing meat had been filleted from the bone. The differences in these butchery techniques is down to tool use and also the skill level of the butchers. During the Roman period chopping tools such as cleavers were predominantly used whilst during the medieval period knives and cleavers were the preferred tools for butchering carcasses. There were a few cases of sawing on long bones from Portchester Castle, but most of the sawing evidence was seen on antler fragments. Sawn antler fragments were also seen at Orchard Street in Newcastle. Saws would have become blunt easily and it would take much more effort to saw through a long bone than chop through it with a cleaver. Hand saws would not be used for reasons of aesthetics either as butchers wouldn't want bone to fracture (Seetah, 2004).

In all of the castle sites the meat bearing elements are seen in abundance. The extremities, phalanges, were generally found in far lower numbers. The feet generally were of little importance, particularly in a high status diet as they yield minuscule amounts of meat and marrow. At Beeston and Portchester the feet and head were likely to have been removed in the urban centre and the rest of the carcass brought to the castle on most occasions. Therefore these elements were considered food waste. One exception would be boars' skulls, as these were a known delicacy seen on the table at feasts during the medieval period. While all of the castle sites did see phalanges and skull fragments, Edlingham, had a particularly large number of phalanges present.

Cattle were overwhelmingly the primary food choice of the castle inhabitants, generally followed by sheep, pig and deer. Cattle were consumed more during the medieval period, whereas sheep and pig were generally more common in the Saxon period, as seen at Portchester Castle (Grant, 1977). Pig neonate remains were found at Portchester Castle and Edlingham Castle, a probable delicacy.

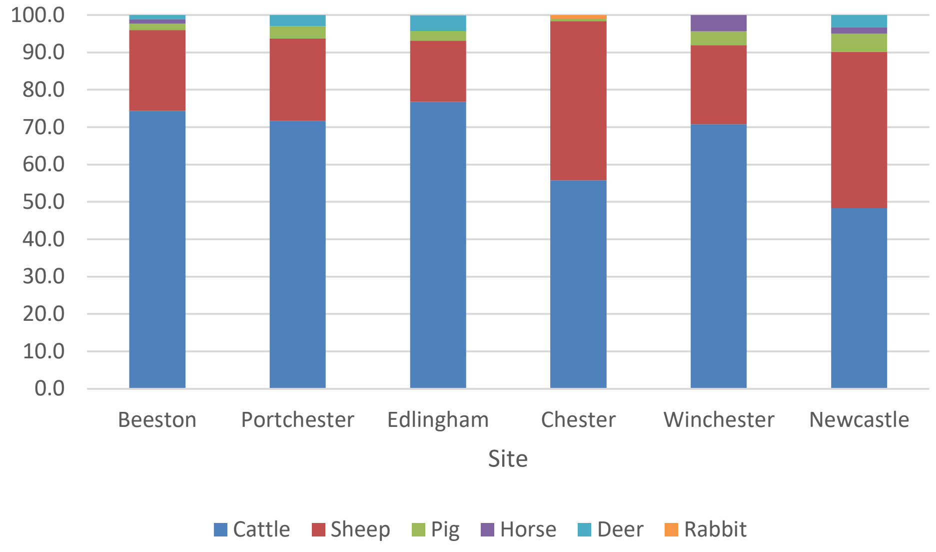

Figure 112: Percentage of butchery marks by species per site.

Figure 112 shows that cattle always accounted for over 45% of the species showing butchery evidence for all of the medieval assemblages studied, followed by sheep. Chester and Newcastle had a more even distribution of sheep to cattle which may be due to the lower status of the diet versus the castle diets and the higher status of Winchester as a town. Chester and Newcastle had over 40% of the butchery evidence belonging to sheep, this highlights their greater reliance on mutton as a food source. Pig is also interesting because the percentage of pig remains with butchery marks is largest at Newcastle and Winchester. While pig throughout this research has been referred to as a high status food, it was also a species that could be easily kept in towns as pigs do not require a lot of space or land for grazing. The fact that cattle are larger in size and would take much more processing to divide into portions should also be considered, as this would increase chop marks. Cattle have a much higher NISP than the other species.

The data from the urban assemblages were small sample sizes, which should be taken into consideration when interpreting the results. The figure above represents the percentage of fragments with butchery marks, not the percentage of fragments as a whole. For example, rabbit remains were documented at all of the castle sites, though Portchester Castle and Edlingham Castle showed no evidence of butchery marks on rabbit remains. Cattle butchery marks are easier to locate and cattle remains are more likely to survive in the archaeological record, opposed to smaller and more delicate fragments. It is also important to mention meat values of a species. Cattle yield a far greater meat value than sheep and pig. Pig yield a higher meat value than sheep for example, yet the percentages of sheep with butchery marks exceeds pig remains with butchery marks hence would have no significant effect on the conclusions drawn from the data.

When selecting specific trends to highlight and delve deeper into, one clear criterion was the sheer frequency in how often butchery marks were appearing in specific sections of the skeleton. While the frequencies show us the raw percentages, the patterns selected show noteworthy factors such as tool use, manner in which the butchery was carried out and direction of the butchery mark were considered. While butchery practices that are the same across sites are significant in showing the consistency in the methods of butchering an animal in castles during the medieval period, those butchery trends that differ regionally and over the occupation of the site, present the more intriguing social questions of discussion.

12.8 Significance of Changes in Butchery Patterns

A change to the way in which an animal is butchered and what species people were consuming can be due to a social change whether practical, financial or perhaps even fashionable. The practicality of butchering an animal would have been an integral key in how butchering was carried out. Likewise, even skilled professional butchers would want to minimise the effort and time it took to slaughter a carcass. Practicality can also be based on supply and demand. If there is less availability of a certain species, then it will appear less in the archaeological record for that time. This is the case at Edlingham in that pig appear less in the later periods of occupation of the site, when the castle was undergoing an economic and social decline. The example could relate to social, financial and supply and demand factors as the cause of change in diet. Pig was considered a high status species during this time period, thus a noticeable decline in pork can suggests a social decline of the resident along with other factors such as a reduction of access to woodland.

As mentioned in chapter 2, Launceston Castle was an example that is documented as undergoing a decline in status, but showing no visible change in the zooarchaeological evidence (Albarella & Davis, 1994). This was clearly not the case at Edlingham Castle as the zooarchaeological evidence very much supports the historical evidence of a rise and fall in status.

Changes in butchery styles may also be due to a fashionable change. Fashionable change in that one regions' manner of slaughtering an animal in a specific way is adopted by another as it is considered a more exclusive way of carrying out the process. A cut of meat may be popular in a certain region in the upper classes of society and have a trickle on effect in which demand increases in other locations. As discussed in chapter 2, the cuisine of the nobility was revered by all echelons of society, and the upper class were very much trend setters in terms of what was considered high status food and surely influenced other high status (and lower status) communities near and far.

Edlingham Castle is a unique case as it is a medieval hall house as opposed to a large defensive fortification. Aside from the size of the castle, why would Edlingham's butchery style differ from the other two castles? The likely reasoning behind this is social and geographical. Edlingham is the castle that is furthest away from an urban centre. Being geographically further away from an urban centre would affect the accessibility of receiving meat that is dressed. Transporting cuts of meat to rural Northumberland would have been very difficult. What is a more likely scenario is that live animals were brought to the castle and butchered onsite. From the animal bone data there was evidence of phalanges and skull fragments which would suggest onsite butchery was carried out at Edlingham in some capacity. Edlingham was a high status household amongst the Northumberland elite and from the species that were present we know the wide variety of species consumed. The slightly lower social status of Edlingham, as it can be classified as more of a medieval hall house as opposed to a large military capable castle with royal affiliation, most likely contributes to the different butchery style also. Edlingham didn't follow the trends of the other castles due to the proximity from the urban area. While at Beeston Castle and Portchester Castle some of the meat was likely brought in as dressed carcasses, yet onsite butchery was most likely was also a component.

Trends discussed below will show the key similarities and differences observed between the three castle case studies in regards to cattle butchery.

Head

Mandible: The mandibles from Beeston Castle had a significant amount of butchery on them in the seventeenth and post-seventeenth centuries. Chops were seen mainly on the ascending ramus and the hinge. At Edlingham Castle, chops were mainly to the body of the mandible. Portchester Castle saw skinning cut marks on the mandible body and chops to the hinge and the vertical ramus. These type of chop to the hinge and the ascending ramus, seen at Beeston and Portchester, were associated with the disarticulation of the mandible from the rest of the crania. Whereas chops to the body of the mandible, may be an untrained way of attempting to separate the mandible from the skull.

Skull: There were very minimal amounts of butchery on the skull. At Portchester Castle there were a few cuts which were indications of skinning. Edlingham Castle had cut marks to the horncores and the frontal of the skull.

Neck and Axial:

Vertebrae butchery

The most significant butchery trend that emphasises a complete shift in the way butchery was executed during the medieval period would be the change from transverse division of the vertebrae to longitudinal division. This butchery practice is the key shift that led to carcasses been hung up and divided in half down the centre of the spine. This is important stylistically and influenced the way butchers would have carried out their trade. In order to complete this type of butchery it would require large and sturdy equipment. To butcher a whole cow it is necessary to hang it by the hind hocks from a beam and divide the carcass down the spine, requiring the beam to withstand the weight of the cattle and the force of the chop, approximately 180 kg (O'Connor, 1982).

To reiterate, Rixon (1989) stated that dividing a carcass into two sides would have begun around the sixteenth century as butchers favoured chopping carcasses into separate joints of meat. This type of butchery is more similar to how modern butchery would be carried out. In Roman Cirencester there was evidence of cattle and sheep being butchered with an axe longitudinally through the centra of the vertebrae (Thawley, 1982). This form of butchery seems to be a very crude form as the carcass would have been divided with an axe and the carcass may have been hung up by the hind limbs but also could have been laid down and butchered (Thawley, 1982). Therefore it would be a stretch to call that form of butchery professional by any means. The dorso-ventral vertebrae butchery also occurred around the sixteenth century in Exeter (Maltby, 1979), as discussed in chapter 2.

O'Connor (1982) believes that the change to the longitudinal style of butchery is related to the improvement of building construction in relation to the necessary strength of the equipment that would be required to carry out this style of butchery. At Flaxengate, Lincoln, longitudinal dividing of the vertebrae was seen on the majority of the late medieval vertebrae. This is not unexpected, yet the evidence from the eleventh and even tenth centuries are surprising. From the late eleventh and twelfth centuries, approximately 50% of the vertebrae were longitudinally chopped and in the tenth century 15-30% were chopped transversely. Sykes (2007) also has supported this idea that this form of butchery started in the late eleventh to twelfth century, showing the rise in professional, specialised butchery techniques.

This method of butchery is not the case at Edlingham Castle whatsoever. This is unusual as longitudinal chopping of the vertebrae was common at medieval Portchester Castle and Beeston Castle. Saxon vertebrae butchery at Portchester Castle was dominated by transverse cuts to the spine (Grant, 1976).

The timings of the presence of longitudinal butchery does vary by castle/urban area/geographic location. At Winchester transverse chops to the vertebrae were more common in the eleventh-twelfth centuries and longitudinal chops to the vertebrae were more common in the late middle ages. These longitudinal divisions were evident in cattle with longitudinal chops to the thoracic and caudal vertebrae and on lumbar and thoracic vertebrae for sheep/goat. Likewise, Portchester saw a dominance of longitudinal chops in thirteenth and fourteenth century on thoracic and lumbar vertebrae. Cervical vertebrae were still mainly chopped transversely during this period. Beeston Castle had more longitudinal chops versus transverse chops to the vertebrae in the medieval phase (fifteenth to sixteenth century), seventeenth century and post-seventeenth centuries. The Orchard Street assemblage from Newcastle only had longitudinal chops to the vertebrae which dated to the sixteenth century. Edlingham Castle faunal remains mainly dated to the thirteenth to sixteenth centuries and had no evidence of longitudinal chopping of the vertebrae.

What this evidence shows is that longitudinal butchery of the vertebrae was occurring in Winchester and Portchester Castle in Hampshire in and around the thirteenth-fifteenth centuries. This type of butchery crosses over nicely in Hampshire, in southern England, whereas the evidence from Beeston Castle is also seen in the fifteenth century, and the evidence from Newcastle was a century later.

While the majority of the animal bone from Newcastle is coming from the fifteenth century and later, it is possible that the longitudinal butchery of the vertebrae was a trend that spread to the northeast of England slightly later than it appeared in the south of England. The northeast of England has far less urban centres during the medieval period, which of course would mean fewer butcher's guilds and trading routes. As a result, the spread of butchery trends from other urban centres and castles in the south would have likely been delayed. Other faunal remains from the north of England, preferably those that are both castle and urban assemblages would need to be assessed to understand if there was a delay in the spread of butchery styles.

As the assessment assemblage at Eastgate Street in Chester did not present any conclusive findings on vertebrae butchery all we can conclude is that longitudinal butchery was occurring in Cheshire from at least the fifteenth century from the evidence at Beeston Castle.

All of the vertebrae butchery evidence collected disproves Rixon's (1989) statement that longitudinal butchery began around the sixteenth century. As all of the sites in this study that showed evidence of longitudinal vertebral butchery dated to centuries earlier. The evidence of transverse butchery to the vertebrae was seen throughout the Edlingham Castle animal bone assemblage that dated to the thirteenth to mid-sixteenth centuries. Whereas in Winchester transverse butchery, as previously noted, was seen in the eleventh-twelfth century.

Butchery to the Atlas/Axis:

There is clearly a social significance of longitudinal versus transverse splitting of the vertebrae. As mentioned above, the butchery dating to the thirteenth-fifteenth centuries at Portchester Castle and Winchester was longitudinal division of the vertebrae. The butchery data seen on the atlas and axis was limited across all the assemblages studied. Beeston Castle mainly saw central longitudinal chops to the atlas and axis for cattle. There was also a longitudinal chop to a fallow deer axis at Newcastle. Butchery to the atlas and axis on sheep remains was also limited, but transverse chops were seen at Beeston Castle. Butchery to the other cervical vertebrae was more common than to the atlas and axis.

Appendicular skeleton

Scapula: Cut and chop marks were found on scapulae at all three castle assemblages. The most common patterns were chops to the neck and cuts to the spine on the blade. The neck is an area which was a clear disarticulation point in the division of the scapula from the proximal humerus. This disarticulation point is consistent evidence in all castle case studies.

Humerus: The most common butchery marks to the humerus were heavy chops to the distal articulation, frequently on the trochlea. This is a clear sign of dismemberment of the upper front limb and the lower front limb, at the distal humerus from the proximal radius and ulna.

Radius and Ulna: At Beeston Castle and Portchester Castle chops were seen on the proximal radius and ulna as a clear disarticulation point of the upper leg from the lower leg. Chops to the mid-shaft were seen at Edlingham Castle as a likely indication of marrow being extracted from the bone, when the chop divides through the entire bone. Other chops that were noted mid-shaft that did not divide the bone could have been the result of a failed attempts at dividing the joint.

Metapodials: The metapodials at Beeston and Portchester Castles were mainly chopped at the upper or lower shaft area which is a likely sign of marrow extraction and detaching the foot. The metatarsal would be chopped through at the upper shaft to detach this foot while leaving the tarsals intact. Edlingham Castle had only a small amount of butchery evidence on the metapodials, though there were chop marks to the lower shaft of the metatarsal and the distal metacarpal.

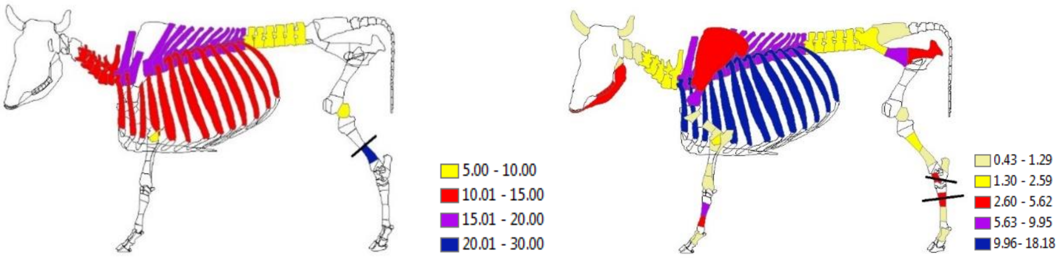

Figure 113: Joint division of the leg of cattle in the medieval (left) and Seventeenth century (right) at Beeston Castle.

Figure 113 shows the variation in how the leg of cattle was dismembered into joints in the medieval versus the seventeenth century at Beeston Castle. In the medieval period it would appear that the leg was divided at the tibia whereas the division was lower, around the astragalus and upper shaft of the metatarsal in the seventeenth century.

Femur: Femur fragments in all phases of Beeston Castle and Portchester has chops to the distal articulation. A clear disarticulation point of the upper and lower leg. At Edlingham Castle femora were chopped mid-shaft, a probable indication of marrow extraction.

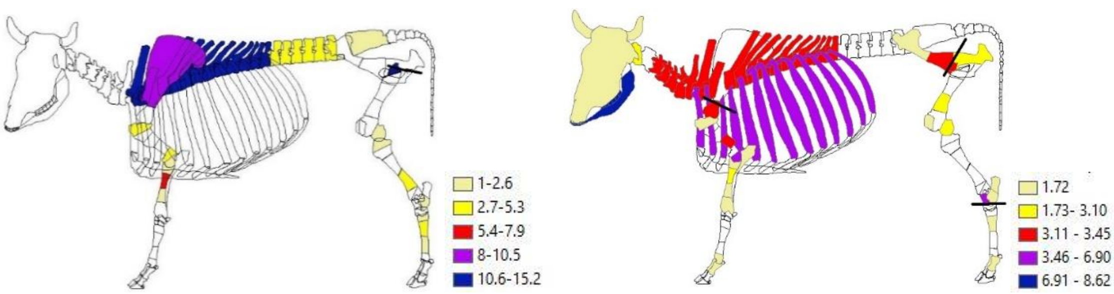

Figure 114: Cattle dismemberment of the upper leg at Orchard Street, Newcastle (left) and at Edlingham Castle (right).

The figure above shows that that cattle from Orchard Street had evidence of chop marks through the upper trochanter of the femora as a place of dismemberment, whereas cattle from Edlingham Castle had evidence of dismemberment through the femoral head.

Tibia: Butchery on tibiae fragments was similar at Beeston and Portchester Castles in that tibiae fragments were often chopped on the upper and lower shafts. Chops through the tibiae shafts are for the removal of the hock and to get to the shin meat. These chops are not always complete chops through the shaft, therefore all cases are not for extracting marrow either. As with the radius this may be a failed attempt of disarticulation or perhaps a slightly crude way of meat removal.

Astragalus: The astragalus at all castle sites showed cut and chop mark evidence. Cut marks were mainly found on the borders and edges, distinct signs of skinning whereas chops were frequently transverse in nature around the articulation with the naviculo-cuboid, to divide the foot.

Calcaneus: There were chops to the proximal and distal parts of the calcaneus for most of the castle studies. These were mostly heavy chops to divide the foot.

Phalanges: There was very little evidence from phalanges, as discussed previously, they are small and less likely to be retrieved, but also because if carcasses were brought to side partially butchered then phalanges wouldn't be expected.

12.9 Butchery practices: Analysis

Figure 115 shows the percentages of the different butchery marks by species. It is clear that cattle dominated all types of butchery marks. Deer show a strong percentage of saw marks as butchery was seen on antler and metapodia.

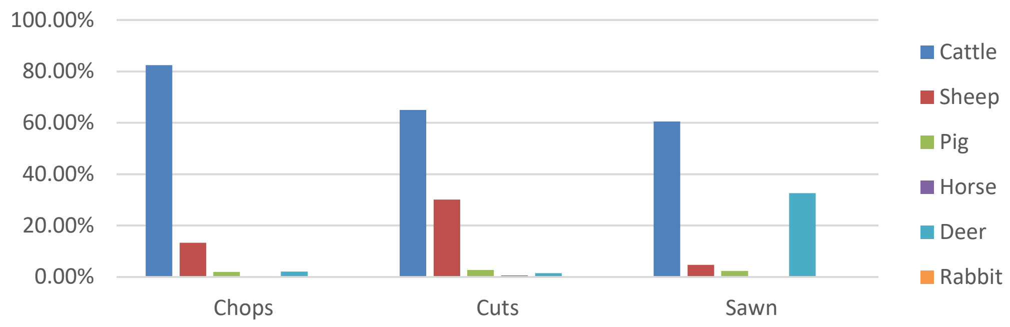

Figure 115: Percentage of butchery types for species from sites overall.

To further explore butchery marks between sites, correspondence analysis was carried out using PAST software. Correspondence analysis was implemented as a technique to show trends and relationships between sites, species and butchery type could be further explored. The figures below further cement theories presented in this research but also highlight other relationships. The figure below depicts the relationship between sites and the way in which the domestic animals were butchered, whether they were favouring chop marks over cut marks and the variance between species.

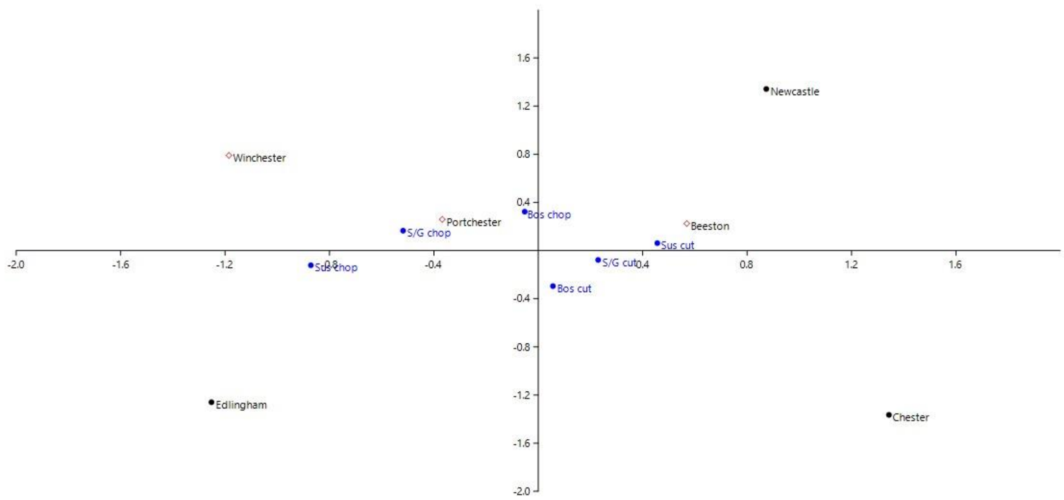

Figure 116: Correspondence analysis of cattle (Bos), sheep/goat (S/G) and pig (Sus) butchery percentages (cut and chop) by site.

Figure 116 depicts correspondence analysis to compare the butchery practices of the domestic species at each site. The percentages used for the correspondence analysis are the percentage of cut and chop marks for each individual species. Saw marks were not included as the percentages were minimal for the domestic species. From this data we can see that Portchester and Winchester are closely related and both show a greater proportion of chop marks versus cut marks on cattle, sheep/goat and pig. Edlingham was somewhat of an outlier in the bottom left quadrant, while still heavier on chop marks, it does not show the same relationship as Portchester and Winchester. The figure corroborates that there is a direct correlation in the way people were butchering the domestic species at both Winchester and Portchester, and that there is less of a relationship between the other castle case studies and their urban centre counterparts. If we add in deer butchery percentages, there is a slight shift.

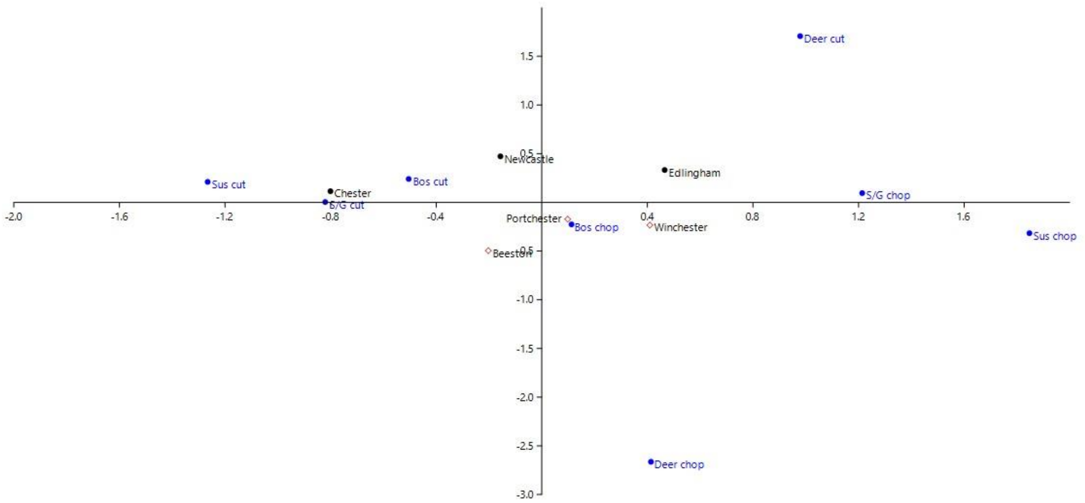

Figure 117: Correspondence analysis of cattle (Bos), sheep/goat (S/G) pig (Sus), and deer butchery percentages (cut and chop) by site.

	Bos chop	Bos cut	S/G chop	S/G cut	Sus chop	Sus cut	Deer chop	Deer Cut
Edlingham	52	48	20	80	18	82	92	8
Portchester	76	24	2	98	0	100	60	30
Beeston	52	48	48	52	75	25	88	12
Newcastle	64	36	29	71	0	100	75	25
Winchester	56	43	32	67	47	52	57	43
Chester	36	64	53	46	67	33	0	0

Table 47: Butchery percentage (chop and cut) per species by site.

Deer butchery is not seen at Chester and deer cuts and chops appear on the outer borders of the quadrants when added to the butchery percentages of the domestic species. There is no clear correlation between deer butchery and butchery of the other domestic species. This is what would be expected as it is probable that deer were butchered on site. Saw marks were also seen at Portchester castle on deer but were not included in the correspondence analysis, as there was no data to compare it to. Deer would have been hunted and therefore brought to the castles as a whole carcass. Beeston and Portchester Castles were likely receiving meat from the domestic species partially butchered. Deer would have been slaughtered and dismembered by a butcher on site, therefore would not have followed the same methods as those butchers from the urban centres.

In the faunal report from Flaxengate (O'Connor, 1982), O'Connor suggests that the longitudinal butchery is related to shaft chops to the metatarsals and tibiae as that is how limbs would be divided when carcasses were hung up.

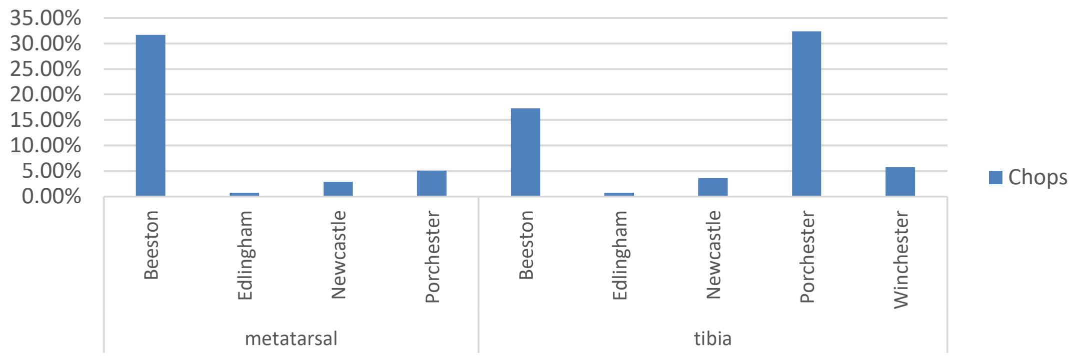

Figure 118: Percentage of chops to the shafts of metatarsals and tibiae by site for cattle.

The figure above represent the percentage of chops to the upper and lower shafts of both the metatarsals and tibiae for cattle. From the data, we can see that Beeston and Portchester have the most chops to shafts of both the metatarsals and tibiae. Winchester had the third highest percentage of chops to the tibiae. The data is what would be expect as the two largest assemblages that also exhibited longitudinal division of the vertebrae has the highest percentages of chops to metatarsal and tibiae shafts. Chester is not included in the figure as it did not have any evidence of chops to metatarsal or tibia shafts.

The longitudinal chop marks on the vertebrae are seen in all sites studied, at some stage in the occupation on the site, except at Edlingham Castle.

12.10 Meat supply

From the three castle case studies the differences in the methods of carcass butchery has provided insight into where people were likely purchasing meat. It is probable that the meat that was consumed at Portchester Castle and Beeston Castle was mainly supplied from a close urban centre, from a market/butcher and coming to the castle partially butchered. Whereas the meat at Edlingham Castle was most likely not purchased from an urban centre and butchery was carried out solely at the castle. With onsite butchery we would expect to see all skeletal elements present and with dressed carcasses being brought to a site we would expect to see mainly meaty joints/bones. These are loosely the trends that were seen at the castles, yet recovery biases would play a factor. The meaty bones are the largest of the long bones therefore are more likely to be recovered during excavation. Deer were obviously wild animals that were hunted by the elite in deer parks close by to the castles. The evidence does heavily lean towards cattle been purchased in an urban centre. For example, Dudley Castle was surrounded by woodland and pastures which were thought to be where pig and sheep were raised and obtained for food (Thomas, 2005). All three castle case study sites were in fairly rural locations either surrounded by forest, woodland or pastureland. Therefore, it is possible that sheep and pigs were obtained from more local sources for consumption as the professional butchery pattern is not consistent on sheep and pig remains.

It is documented that there was a shortage of beef in the counties in southern and eastern England. This resulted in a system in which cattle were driven to the midlands or East Anglia where they were fattened up and sold on to other towns in the south (Wilson, 1973). Purchasing meat ‘on the hoof’ was the way in which towns would be supplied with meat as this was before the days of refrigeration (Davis, 1987b). This is most likely what happened with the cattle sold on to Winchester or Southampton that eventually ended up as meat at Portchester Castle.

Reiterating the exclusivity of the high status diet, people dining in the castles would require quality cuts of meat. The professional style of butchery observed in Newcastle and Winchester which consisted heavily of methodical, clean chops on the articulations and vertebrae split longitudinally down the centre of the spine were trends that were seen in the later medieval period at Portchester Castle and Beeston Castle. As these two castle are within 20 miles of their closest urban centre, partially butchered carcasses would likely have been transported to the castles. They would have been easier to transport versus livestock being drove. At Portchester Castle and Beeston Castle there was a small presence of phalanges and skull fragments for cattle and sheep/goat indicating there was some amount of onsite butchery of carcasses. The dominance of meaty bones and joints also is a strong indicator that some dressed carcasses were transported to the site.

Many other items would have been supplied to the castle besides meat. Castles that were in a close proximity to towns, including Portchester and Beeston, would have had good access to other professional crafts and trade good. The medieval urban centre was made up of many professional artisans such as tanners, cobblers, blacksmiths, armourers, saddlers, masons, cloth makers and candle makers to name a few. Artefacts found at medieval castles range from pottery, iron and pewter domestic objects, bone tools and glass. Many of these objects, along with others, would have had to be supplied to a castle as they would not have had all of the facilities or the expertise to produce such an array of items at the castle.

12.11 Points to Consider When Carrying out Data Collection

12.11.1 Recovery and Fragmentation of Elements

There are of course biases in any archaeological faunal remains assemblage. There are a number of factors that should be considered when forming interpretations. Recovery techniques are key, to what degree a site is sieved, whether bone was solely hand-collected or whether sieving was carried out and what percentage of the site was sampled. Lack of sieving can create a bias as smaller species and smaller bones go unrecovered. Smaller bones are also more fragile and unlikely to make up part of an archaeological assemblage unless sieving is a part of the excavation recovery techniques. The higher fragmentation of smaller bones not only bias the lack of smaller species in an archaeological assemblage but also means that the butchery marks on those fragments will be lost from the archaeological record. Other biases in recovery of animal bone suggested by Payne (1992) include an excavators' eyesight and motivation, the speed the excavation is conducted, and environmental factors such as the lighting in the trench and the colour of the deposit. All of these factors could result in less bone being retrieved from a site.

Another important factor is fracturing of the bone. Zooarchaeologist are actually at an advantage in excavating animal bone from the Iron Age and the Roman periods as bone from these periods are generally less fragmented than food waste from the medieval period (Grant, 1988, p.162). The more fragmentation of an assemblage obviously results in less fragments being recovered and less fragments identified. Taphonomic considerations need to also be taken into account as the level of preservation of bone can also hamper the amount of bones that are possible to identify to species and element.

12.11.2 The Importance of Collecting Quantitative and Qualitative Data

An important aspect that this research has highlighted is the need for quantitative and qualitative butchery data to be collected in zooarchaeological analysis. The raw numbers are important to see how much butchery evidence was found, including how many chops and cuts are present. Comparing marks across phases is also key in showing how butchery evolved over the occupation of the site. In terms of qualitative data, the tool used to create a certain butchery mark should be recorded, and notes taken regarding the side and orientation of such mark as that cannot be displayed on the diagrams. In many zooarchaeological reports when butchery is included, qualitative data is all that is collected and either no or very little qualitative data is collated or presented. Recording the numbers of marks found and the location of where the butchery evidence is found on the bone has proved to be a vital piece of evidence to gain a better understanding of how animals were butchered during this time period. By collating the data from these case studies it has proven possible to determine overall dominance of how carcasses were dismembered. Spatial analysis is also important to document when excavating the animal remains. Determining whether remains are a result of primary butchery, food/kitchen waste, or craftwork are important to understand how the remains were used. The majority of the remains from the castles were clearly food waste, yet there were instance of antler and metapodial craftworking at Portchester Castle. The presence of phalanges for example are butchery waste as they hold no culinary value.

12.11.3 Age of Animals Slaughtered

The age at which animals were slaughtered should be taken into consideration as this provides a good indication about the preferences of diners.

The age animals were slaughtered very much reflects the needs of a population, whether for dietary preferences such as the high status delicacy of suckling pig or tender kid, or for industries like wool or dairying, and the need for working animals for traction. The castle populations had the luxury of slaughtering younger animals if they wished particularly to impress at a feast. Alternatively slaughtering a cattle around two to three years of age would be long enough for a species to reach an optimum weight, which is logical in a meat based economy (Payne, 1973).

Sheep in the sixteenth century in the city of Exeter were older in age when they were slaughtered, indicating less reliance on sheep as meat and more reliance on a dairying economy (Maltby, 1979). This trend was seen also in the post-medieval period at Edlingham Castle from the data collected in chapter 8 and from Grant's (1976 and 1977) data from Portchester.

Cattle follow a different pattern than sheep as they follow similar slaughter patterns throughout the phases of occupation studied. Cattle are consistently the species with the highest NISP and the highest number of butchery marks. Pig are solely used for secondary products therefore would not be kept beyond optimum age of slaughter. At Edlingham Castle pig had more unfused elements in the early periods, which is an indication of earlier consumption.

12.12 Professional Butchery and the Link to Vertebrae Longitudinal Splitting and Urban Supply of Meat.

As discussed above, the vertebrae butchery pattern seen at Edlingham Castle is dominated by transverse butchery whereas at Beeston Castle and Portchester Castle the trend shows more cases of longitudinal butchery of the vertebrae. The castles with longitudinal butchery to the vertebrae are those that are closest to an urban centre. The proximity to an urban centre would suggest a professional style of butchery that is carried out by a highly skilled butcher, who is part of an official butcher's guild. A butcher who was part of the guild would have been taught a systematic method of slaughtering an animal. Slaughtering a cattle carcass longitudinally down the spine would require equipment to hoist a cattle and a frame to secure the carcass in place. The correlation between longitudinal division of a carcass and professional butchery seems to be a strong relationship from the faunal remains that have been studied in this research.

12.13 The Outcome of the Methodological Aims

Rixon concluded in his paper (1989) that butchery should be presented in a way that is uncomplicated, capable of recording the required data, and easy to read and comprehend (p.60). The methodological aims of this research were to implement a tool that could present butchery information that was clear, efficient and could display large amounts of data visually. These aims were carried out successfully. The ArcGis templates were adapted so that bones were subdivided into smaller portions to give a better idea of where exactly the butchery marks were occurring. Collating the data in Excel and transferring that data to be presented visually was accomplished. This method of presenting butchery is user friendly, in that it is not complicated or overly technical. The system enabled large amounts of butchery data to be presented through a visual medium that is easy to read and interpret.

The methodology aided in facilitating changes in the way species were exploited over time and in different locations. The key change was the method of secondary butchery in how carcasses, cattle particularly, were divided.

The fluctuation in wealth from high status to a lower status of a castle saw the change in the amount of high status species people were consuming. The variety of species dropped and the amount of pig that was consumed also dipped. The age of sheep actually decreased in the later period at Edlingham Castle, yet this may be because mutton was considered more of a food source as the amount of pig decreased.

The inter-site comparisons have shown that butchery trends are not the same at all sites studied. The urban sites of Eastgate Street in Chester and Orchard Street in Newcastle had a more even percentage of cattle and sheep butchery evidence. The castle sites had butchery marks on deer remains, whilst this was not seen at Winchester or Chester. The most obvious butchery difference was the butchery style of Edlingham Castle versus the other two castle case studies, in that butchery was not carried out in the same systematic way. As discussed above, Edlingham Castle lacks the professional skill see at the other sites. The most butchery evidence came from Portchester Castle animal bone assemblage, and Winchester provided an insightful comparison within the urban/rural dynamic. The similar butchery styles crossing over in the late medieval period shows the regional influence and the high status influence over the urban population.

Chapter 13: Conclusions

This thesis sought to investigate and explore changes in butchery practices in medieval castles in England and how meat was supplied to those castles. The social ranks of the people residing in the castles and the geographic locations of the castles were a primary factor in the way their meat was butchered.

The research methods were applied in order to illuminate the often overlooked value of butchery evidence in zooarchaeological reports. The significance of the evidence from this study has shown that analysing butchery practices of an animal bone assemblage has the potential to reveal previously unestablished information about past butchery and consumption patterns.

13.1 The Importance of Detailed Butchery Analysis

Quantitative butchery has not been widely applied to zooarchaeological analysis of faunal assemblages. As mentioned throughout this research, butchery is a vital aspect of zooarchaeological research that is frequently brushed over and rarely described or investigated in substantial detail in archaeological reporting. This research highlights the importance of butchery evidence in medieval animal bone assemblages and the need to record butchery data thoroughly and implement the data for more detailed interpretations. In this research, butchery analysis has proven that it provides cultural insight into how animals were being butchered in medieval castles in various geographical locations in England. The variation in butchery techniques has shown professional versus amateur butchery styles and how they directly correlate with urban versus rural environments.

The need for a straightforward recording methodology that visually presents large amounts of butchery data was a necessary tool. These techniques were implemented to investigate the significance of butchery evidence and changes in style. The research focused on the butchery analysis from the three castle case studies and three urban assemblages.

13.2 Completion of Research Aims

The butchery evidence allowed for interpretations to be made on how animals were exploited in the medieval and sometimes post-medieval periods in the case studies examined. There were notable changes seen in the ways that animals were butchered. This research has confirmed the dates suggested by O'Connor (1982) and Sykes (2006) when longitudinal butchery of the spine first began and disproved Rixon's (1989) dates that this type of butchery occurred three centuries later. Longitudinal butchery was occurring as early as the thirteenth century at Winchester and Portchester Castle.

The fluctuation of wealth and status was spotlighted in the Edlingham Castle case study. In the later medieval period where the castle saw a decline in status, the variety of species diminished. The study proved that the butchery practices were not the same at every site and that there was a definitive relationship between the style of butchery carried out, the location of a castle and their proximity to an urban area. A castle in close proximity to an urban area would predominately display a professional style of butchery in the animal bone assemblage and there would likely be a mixture of onsite butchery and dressed carcasses brought to the castle. Edlingham Castle was the case study that was furthest away geographically from an urban centre and displayed a more amateur style of butchery that would likely have been carried out onsite. The presence of the professional style of butchery is linked to the urban meat supply as the data has strongly indicated that the longitudinal division of a carcass is a task undertaken by a skilled butcher.

13.3 Future Research

Future work should focus on exploring and expanding upon this research. Methodologically, dividing bones into further sections and providing 360 degree diagrams would provide an extra aspect of detail. These diagrams could provide even further precision in understanding the exact locations of carcass exploitation and division. By having diagrams that provide 360 degree views of the skeleton, they would act as a 3D model and result in more detailed viewpoints. A more advanced approach in collecting butchery evidence would be nothing but helpful in collating the most accurate butchery data from an animal bone assemblage.

If time permitted, using a microscope to identify butchery marks would also be helpful in locating small nicks and cuts that maybe could not be seen with the naked eye or a 10x magnification hand lens. This could also increase the amounts of cut marks that were obtained from an assemblage, as more marks would likely be identified using this technique.

While rib cuts and chops were recorded and displayed on butchery diagrams, species was assigned purely on an educated guess based on comparative collections and the context. In reality, depending on the size of the fragments it can be difficult to assign to a distinct species category. Grouping ribs into large artiodactyl and medium artiodactyl for example is a more general but more scientifically accurate way of grouping rib fragments. Therefore, for future research, obvious fragments should be assigned but those in the grey area should not be assigned to a specific species.

Another useful tool would be to be able to go one step further by being able to identify further the exact type of cut mark (as per Seetah 2006) and represent that on a visual diagram too.

13.4 Assessing More Assemblages and Implementing Isotope Analysis

The issue with the assemblages looked at for Chester Eastgate Street and Delamere Street for a direct comparison with Beeston Castle, was that they were too small a sample to provide any strong distinctive similarities in butchery trends. If there is not enough evidence to base worthy interpretations for comparison then only limited remarks can be made. Therefore, assessing larger assemblages from medieval Chester would likely result in more detailed interpretations.

Analysing further sites in Northumberland to see whether butchery patterns are the same as those seen at rural Edlingham Castle would give a more detailed view of butchery practices of the region. If the elite of Northumberland followed the same trends in the ways animals were butchered or if the closer to an urban centre, the more likely the trends were similar to those seen at Newcastle. As mentioned in the discussion chapter of this thesis, understanding whether the spread of longitudinal butchery of the vertebrae was a trend that was delayed in reaching the north of England, could only be investigated with studying further faunal assemblages from that area.

Investigating further medieval assemblages from Southampton would also be an interesting research proposition as comparing the styles between Winchester, Southampton and Portchester Castle could narrow down whether it is possible to determine if livestock was coming from Southampton or Winchester.

Going one step further would be to isotopically identify where the supply of livestock was coming from at Portchester Castle. One way to carry this out would be to look at strontium isotopes by analysing teeth of cattle from Southampton and Winchester. This could be carried out by taking samples from all three places to determine if it is possible to pinpoint where the supply of livestock is coming from. A study such as this could track the movement of trade and animals. This could be further explored by looking at a double supply chain. In tracing where the animals were coming from and grazing, to follow on to the urban centre where they are sold, followed by the journey from the urban centre to the castle. Ideally, locating which hinterlands the livestock are coming from as a commercial source of meat.

13.5 Further Analysis of the Urban Diet

A strong subject of further research would be to analyse urban medieval castles. By looking at urban castles and their surrounding locations, it would provide further insight about professional butchery and the castle diet. By looking at castle faunal assemblages such as Norwich Castle, and comparing it with assemblages from the cities would give an important comparison of the urban versus urban high status diet. An urban castle would be an excellent addition to the research as it would combine both the urban diet and the high social status diet.

13.6 Conclusions

This research has aimed to spotlight the potential of conducting detailed butchery analysis on zooarchaeological material. The techniques carried out have allowed for a large amount of data to be collected and analysed. The butchery data has provided a great deal of insight into how animals were butchered and how castles were obtaining their meat during the medieval period.

The ideas for future research discussed above would be an excellent starting point to expand upon and further investigate regional and fashionable changes in the way animals were butchered and consumed in the past.

Notable contributions in the understanding of professional butchery in relation to medieval castle settings have been made. This research has demonstrated the potential of this kind of work, while only grazing the surface on the value of butchery investigation. The methods applied are applicable far beyond this current project and hopefully will encourage future use in this type of archaeological investigation.

Appendix

NISP table calculations

Loose teeth include loose maxillary teeth and teeth that could not be classified as either mandibular or maxillary. Cranium includes zygomatic arch or tooth row where 3 or more teeth of the dP4/P4-M3 tooth row were present. For calculation of MNI; loose teeth or unfused epiphyses were not counted. Incisors for cattle were divided by 8, for pig they were divided by 6. Pig canines were divided by 2. Premolars were divided by 6, M1/2 were divided by 4, M3 were divided by 2 and phalanges were divided by 8. With the exception of teeth and phalanges, left and right were taken into account for all elements. Proximal and distal ends were taken into account for all elements where applicable. In the case of cattle or sheep/goat metapodials MC2/MT2/MP2 were counted as 05 units. In the case of pig MC/MT/MP were counted as 0.5 units.

Appendix abbreviations

hi= mandibular hinge

tr = mandibular tooth row (dP4/P4-M3)

p = proximal

d = distal

ole = olecranon process

il = illium

is = ischium

su = sustentaculum

Element	Cattle	Sheep/Goat	Pig	Horse	Dog	Deer	Rat	Rabbit	Bird	Total
Horncore	2	1								3
Cranium	6	9	3		1	1		1		21
Loose teeth	57	43	8	4						112
Loose lower incisor	1	4	9							14
Loose lower canine			3							3
Loose lower premolar	7	1			1					9
Loose lower M1/2		13		2						15
Loose lower M3		8								8
Mandible	15	31	13				1			60
Atlas	5	1	2							8
Axis	3	9								12
Scapula	7	8	4	2		2			3	26
Humerus	8	17	6			1		1	5	38
Radius	7	21	6			5				39
Ulna	6	5	4		1				2	18
Metacarpal	31	7	4		2	1			1	46
Pelvis	12	11	5			1		1		30
Femur	15	9	7	1	4				3	39
Patella	1	1	2							4
Tibia	15	34	5		1	4			4	63
Astragalus	15	7	3			1				26
Calcaneum	11	10	3					2		26
Metatarsal	19	14	4	2	2	4			1	46
Metapodial	5	2	2	1						10
Scafocuboid	4	4	3							11
Phalanx 1	24	10	9		1					44
Phalanx 2	20	4	4							28
Phalanx 3	15		2							17
NISP	311	284	111	12	13	20	1	5	19	776
%NISP	40.08	36.60	14.30	1.55	1.68	2.58	0.13	0.64	2.45	
MNI	11	18	9	2	2	3	1	2	3	51
%MNI	21.6	35.3	17.6	3.9	3.9	5.9	2.0	3.9	5.9	

Table 48: Phase 5&6 Edlingham Castle Number of Identifiable specimens (NISP) by element and species.

Element	Cattle	Sheep/Goat	Pig	Deer	Total
Horncore/Antler	1	2		1	4
Loose teeth	5	8	4		17
Loose lower incisor					
Loose lower canine			2		2
Loose lower premolar		3			3
Loose lower M1/2		5			5
Loose lower M3					
Mandible					
Atlas		1			1
Axis	1				1
Scapula		5	1	1	7
Humerus	1	1		1	3
Radius		4		1	5
Ulna	1				1
Metacarpal	7	1			8
Pelvis		1			1
Femur		1			1
Patella	2				2
Tibia		2		2	4
Astragalus					
Calcaneum	1				1
Metatarsal	7	1			8
Metapodial					
Scafocuboid					
Phalanx 1	2				2
Phalanx 2	1				1
Phalanx 3	6				6
NISP	35	35	7	6	83
%NISP	42.2	42.2	8.43	7.23	
MNI	4	3	1	2	10
%MNI	40.0	30.0	10.0	20.0	

Table 49: Phase 7&8 Edlingham Castle Number of Identifiable specimens (NISP) by element and species.

Element	Cattle	Sheep/Goat	Pig	Horse	Dog	Cat	Fox	Rabbit	Bird	Deer	Total
Antler										4	4
Horncore	8	1									9
Cranium	3	1	2		2						8
Loose teeth	30	23	5	6	6			1			71
Loose lower incisor			6								6
Loose lower canine			1		1						2
Loose lower premolar	1			1	1						3
Loose lower M1/2	1	11	1	3	1						17
Loose lower M3		1									1
Mandible	13	19	6		6						44
Atlas	2	1								1	4
Axis	3	2		1							6
Scapula	7	9	2	2						1	21
Humerus	12	14	3		11	1				1	42
Radius	11	17	4	3	5	1					41
Ulna	5	3	1		7						16
Metacarpal	21	4	1	2	8					1	37
Pelvis	14	12		1	4						31
Femur	10	3		2	7		1			2	25
Patella											
Tibia	8	17		1	11		1	1		4	43
Astragalus	11										11
Calcaneum	8	3		1							12
Metatarsal	17	12	3	1	8				1	1	43
Metapodial	2	3	1								6
Scafocuboid	1										1
Phalanx 1	11	2	1	2						1	17
Phalanx 2	5										5
Phalanx 3	4										4
NISP	208	158	37	26	78	2	2	2	1	16	530
%NISP	39.2	29.8	7.0	4.9	14.7	0.4	0.4	0.4	0.2	3.0	
MNI	10	12	4	2	5	1	1	1	1	2	39
%MNI	25.6	30.8	10.3	5.1	12.8	2.6	2.6	2.6	2.6	5.1	

Table 50: Phase 9 Edlingham Castle Number of Identifiable specimens (NISP) by element and species.

	Cattle	Sheep/Goat	Pig	Horse	Dog	Cat	Mouse	Rabbit	Deer	Bird	Total
Horncore	3	4									7
Cranium	5	11		2	6	1	1		2		28
Loose teeth	24	25	4	24	7			2			86
Loose lower incisor	1		1	3				1			6
Loose lower canine			3		1						4
Loose lower premolar					1						1
Loose lower M1/2	3	3						2			8
Loose lower M3	2	4									6
Mandible	10	21	2	2	9			6			50
Atlas	1	2		1							4
Axis	2	1									3
Scapula	3	15		2	1	1		3	1		26
Humerus	3	23	2	2	7	1		6	1		45
Radius	8	18	2	5	4			6			43
Ulna	5	6	3	1				3	1		19
Metacarpal	28	17	1	4	3						53
Pelvis	8	13		3	5			7			36
Femur	8	9		1	8			11	1	1	39
Patella	1										1
Tibia	7	15		4	6			15	4		51
Astragalus	2	2		2							6
Calcaneum	2	6		1				1			10
Metatarsal	16	18		3	4			4			45
Metapodial	5	2	1	6				2			16
Scafocuboid	1	1		1							3
Phalanx 1	9	16	2	5	1						33
Phalanx 2	4	2		2					1		9
Phalanx 3	4	1		5							10
NISP	165	235	21	79	63	3	1	69	11	1	648
%NISP	25.46	36.27	3.24	12.19	9.72	0.46	0.15	10.65	1.70	0.15	
MNI	11	13	2	3	5	1	1	7	3	1	47
%MNI	23.4	27.7	4.3	6.4	10.6	2.1	2.1	14.9	6.4	2.1	

Table 51: Phase 10 Edlingham Castle Number of Identifiable specimens (NISP) by element and species.

Element	Grant TWS	Higham MWS
M1/2	c	N/A
M1/2	c	N/A
M1/2	g	N/A
M1/2	h	N/A
M1/2	k	N/A

Table 52: Edlingham Castle phase 5 & 6 tooth wear stage for loose mandibular cattle tooth following Grant (1982, p. 92).

Cattle Mandible	Grant TWS					Higham MWS
	dP4	P4	M1	M2	M3	
		C	g	X		21
	k		h	X		7+
		X	g	X		7+
		X	k	X		11+
		X	m	m	X	11+
	k		g	b	V	12
		X	h	f	H	13
	K		h	E	H	13
				X	g	21
		c	k	X		21
		g	m	X		22
		X	k	k	j	23
		X	k	k	k	23

Table 53: Edlingham Castle phase 5 & 6 tooth wear stages for cattle teeth in mandibles following Grant (1982, p. 92) and mandible wear stages assigned following Higham (1967, p. 104).

Element	Grant TWS	Higham MWS
M1/2	k	N/A

Table 54: Edlingham Castle phase 8 tooth wear stage for loose mandibular cattle tooth following Grant (1982, p. 92).

Cattle Mandible	Grant TWS					Higham MWS
	dP4	P4	M1	M2	M3	
	j		b	X		7
	f		c	X		7
			X	g	b	16
			X	h	e	19
		h	X			19
	f		g	g	X	21+
		E	h	h	X	21+

Table 55: Edlingham Castle phase 8 tooth wear stages for cattle teeth in mandibles following Grant (1982, p. 92) and mandible wear stages assigned following Higham (1967, 104).

Element	Grant TWS	Higham MWS
M12	f	N/A
M12	k	N/A
M12	k	N/A
M3	g	21

Table 56: Edlingham Castle phase 9 tooth wear stage for loose mandibular cattle tooth following Grant (1982, p. 92).

Cattle Mandible	Grant TWS					Higham MWS
	dP4	P4	M1	M2	M3	
			E	X		5
			U	X		6
			m	i	X	11+
			X	b	X	16
		g	l	X		22
				X	h	22
		g	m	l	i	23
			X	m	m	23

Table 57: Edlingham Castle phase 9 tooth wear stages for cattle teeth in mandibles following Grant (1982, p. 92) and mandible wear stages assigned following Higham (1967, p. 104).

Element	Payne TWS	Higham MWS
M1/2	11A	N/A
M1/2	2A	N/A
M1/2	8A	N/A
M1/2	9A	N/A
M1/2	9A	N/A
M1/2	5A	N/A
M1/2	2A	N/A
M1/2	9A	N/A
M1/2	5A	N/A
M1/2	5A	N/A
M1/2	8A	N/A
M1/2	2A	N/A
M1/2	2A	N/A
M1/2	5A	N/A
M1/2	8A	N/A
M3	11G	17
M3	2A	14
M3	5A	14
M3	10G	16
M3	11G	17
M3	11G	17
M3	12G	17

Table 58: Edlingham Castle phase 5 & 6 tooth wear stages for loose mandibular sheep/goat teeth after Payne (1973 and 1987) and mandible wear stages assigned following Higham (1967, 106).

Sheep/Goat Mandible	Payne TWS					Higham MWS
	dP4	P4	M1	M2	M3	
				X	12G	17
			X	9A	4A	14
		12S	12A	9A	11G	17
		X	10A	9A	11G	17
		5A	9A	10A	X	14+
	7M		H			5
	7M					4+
	7M					4+
		4A	9A	X		14+
			9A	6A	V	12
		12S	12A	9A	11G	17
		12S		10A		13+
	14L					3+
		12S	11A	9A	11G	17
	7M		E			5
	5A		E			5
		15A		9A	11G	17
			X	10A	11G	17
		9A	10A	9A	8G	15
	7M		H			4
		X	10A	9A	11G	17
			X	9A	2A	14
	23L		10A	5A		12
		12S	10A	9A	10G	16
		12S	9A	2A		12+
	13L		X			3+
			9A	8A	X	12+
		12S	12A	9A	11G	17

Table 59: Edlingham Castle phase 5&6 tooth wear stage for sheep/goat teeth in mandibles after Payne (1973 and 1987) and mandible wear stages assigned following Higham (1967, 106).

Element	Payne TWS	Higham MWS
M1/2	4A	N/A
M1/2	4A	N/A
M1/2	8A	N/A
M1/2	8A	N/A
M1/2	9A	N/A

Table 60: Edlingham Castle phase 7 & 8 tooth wear stages for loose mandibular sheep/goat teeth after Payne (1973 and 1987) and mandible wear stages assigned following Higham (1967, 106).

Element	Payne TWS	Higham MWS
M1/2	9A	N/A
M1/2	9A	N/A
M1/2	8A	N/A
M1/2	8A	N/A
M1/2	9A	N/A
M1/2	9A	N/A
M1/2	9A	N/A
M3	11G	17
M3	4A	14

Table 61: Edlingham Castle phase 9 tooth wear stages for loose mandibular sheep/goat teeth after Payne (1973 and 1987) and mandible wear stages assigned following Higham (1967, 106).

Sheep/Goat Mandible	Payne TWS					Higham MWS
	dP4	P4	M1	M2	M3	
					2A	14
			10A	8A	X	12+
					11G	17
		4A	9A	8A		14
		12S	15A	9A	11G	16
		j	j			14+
				14A	12G	17
		8A	9A	10A	2A	14
	13L		U			6
		9A	10A	10A	10G	16
		7A	9A	8A	X	14+
						14+
		7A	11A	9A	4A	14
		5A	9A	9A	7G	15
			X	8A	H	13

Table 62: Edlingham Castle phase 9 tooth wear stage for sheep/goat teeth in mandibles after Payne (1973 and 1987) and mandible wear stages assigned following Higham (1967, 106).

Element	Payne TWS	Higham MWS
M1/2	7A	N/A
M1/2	5A	N/A
M1/2	2A	N/A
M3	10G	16
M3	9G	16
M3	4A	14
M3	11G	17

Table 63: Edlingham Castle phase 10 tooth wear stages for loose mandibular sheep/goat teeth after Payne (1973 and 1987) and mandible wear stages assigned following Higham (1967, 106).

Sheep/Goat Mandible	Payne TWS					Higham MWS
	dP4	P4	M1	M2	M3	
		15A	15A	X		14+
			9A	9A	H	13
		9A	10A	9A	10G	16
		12S	11A	9A	11G	17
	16L		10A	E		9
		8A	10A	9A	9G	16
		12S	11A	X		14+
		X	8A	4A		12
			X	9A	10G	16
		12S	15A	9A	10G	17
	7M		H			5
		2A	9A	9A	2A	14
		15A		9A	11G	17
	13L		U			6
			X	8A	H	13
			10A	9A	11G	17
			9A	X		14+
		12S	14A	12A	11G	17
	16L		8A	H		11
	17G		8A	H		11

Table 64: Edlingham Castle phase 10 tooth wear stage for sheep/goat teeth in mandibles after Payne (1973 and 1987) and mandible wear stages assigned following Higham (1967, 106).

Pig Mandible	Grant TWS					Higham MWS
	dP4	P4	M1	M2	M3	
	a		a	c		10
			d	a		14
			X	d		14+
		a	f	d	X	14+
	e		b	X		17+
	e		b	X		17+
		b	X			17+
			X	b	C	18
		b			b	20
		d	k	f	b	22

Table 65: Edlingham Castle phase 5&6 tooth wear stage for pig teeth in mandibles following Grant (1982, 94) and mandible wear stages assigned following Higham (1967, 105).

Element	Grant TWS	Higham MWS
M12	E	N/A

Table 66: Edlingham Castle phase 9 tooth wear stage for pig teeth in mandibles following Grant (1982, 94) and mandible wear stages assigned following Higham (1967, 105).

Pig Mandible	Grant TWS					Higham MWS
	dP4	P4	M1	M2	M3	
	B		X			5
			d	a		14+
			f	b	C	18
		b	k	e	h	19
		b	j		h	19
			h	e	b	21

Table 67: Edlingham Castle phase 9 tooth wear stage for pig teeth in mandibles following Grant (1982, 94) and mandible wear stages assigned following Higham (1967, 105).

Pig Mandible	Grant TWS					Higham MWS
	dP4	P4	M1	M2	M3	
	d		X			5+

Table 68: Edlingham Castle phase 10 tooth wear stage for pig teeth in mandibles following Grant (1982, 94) and mandible wear stages assigned following Higham (1967, 105).

CATTLE		Age in months	PHASE 5&6 N=140		PHASE 7&8 N=6		PHASE 9 N=85		PHASE 10 N=75	
			No. fused	No. unfused	No. fused	No. unfused	No. fused	No. unfused	No. fused	No. unfused
Early Fusing	humerus d.	12-18	4	0	0	1	8	0	2	1
	radius p.		4	0	0	0	9	0	5	0
	scapula p.	7-10	7	0	0	0	6	0	3	0
	phalanx 1&2 p.	18-24	44	1	3	0	13	2	12	1
	Total early Fusing		**59**	**1**	**3**	**1**	**36**	**2**	**22**	**2**
	%		98.3	1.7	75	25.0	94.7	5.3	91.7	8.3
Middle Fusing	tibia d.	24-36	10	1	0	0	4	2	6	0
	metapodium d.		21	5	0	0	11	7	19	4
	calcaneum p.	36-42	9	2	1	0	6	1	1	1
	Total mid Fusing		**40**	**8**	**1**	**0**	**21**	**10**	**26**	**5**
	%		83.3	16.7	100.0	0.0	67.7	32.3	83.9	16.1
Late Fusing	humerus p. radius d., ulna p femur p. & d. tibia p.	42-48	17	15	1	0	12	4	17	3
	Total late Fusing		**17**	**15**	**1**	**0**	**12**	**4**	**17**	**3**
	%		53.1	46.9	100.0	0.0	75.0	25.0	85.0	15.0

Table 69: Edlingham Castle number of fused (fused and fusing) and unfused cattle specimens classified under early, middle, or late-fusing stages following Reitz and Wing (1999, p.76) based on Silver (1969) and Schmid (1972).

SHEEP	Age in months	PHASE 5&6 N=120		PHASE 7&8 N=14		PHASE 9 N=66		PHASE 10 N=137	
		No. fused	No. unfused	No. fused	No. unfused	No. fused	No. unfused	No. fused	No. unfused
humerus d.	3-10	12	2	1	0	12	1	14	8
scapula p.	6-8	3	3	5	0	2	1	9	5
phalanx 1&2 p.	6-16	11	3	0	0	2	0	14	4
Total early Fusing		**26**	**8**	**6**	**0**	**16**	**2**	**37**	**17**
%		76.5	23.5	100	0	88.9	11.1	68.5	31.5
tibia d.	15-24	27	7	1	1	12	2	10	3
metapodium d.	18-28	13	4	1	0	3	9	11	11
calcaneum p.	30-36	8	1	0	0	1	1	3	3
Total mid Fusing		**48**	**12**	**2**	**1**	**16**	**12**	**24**	**17**
%		80.0	20.0	66.7	33.3	57.1	42.9	58.5	41.5
femur p & d	30-42	5	5	0	1	0	5	2	11
humerus p. ulna p. radius d. tibia p.	36-42	7	9	1	3	8	7	11	18
Total late Fusing		**12**	**14**	**1**	**4**	**8**	**12**	**13**	**29**
%		46.2	53.8	20.0	80.0	40.0	60.0	31.0	69.0

Table 70: Edlingham Castle number of fused (fused and fusing) and unfused sheep specimens classified under early, middle, or late-fusing stages following Reitz and Wing (1999, p. 76) based on Silver (1969) and Schmid (1972).

PIG		Age in months	PHASE 5&6 N=65		PHASE 7&8 N=1		PHASE 9 N=11		PHASE 10 N=10	
			No. fused	No. unfused	No. fused	No. unfused	No. fused	No. unfused	No. fused	No. unfused
Early	humerus d.	12-18	3	2	0	0	2	1	1	1
Fusing	radius p.	12	2	3	0	0	4	0	2	0
	scapula p.	12	1	3	1	0	2	0	0	0
	phalanx 2 p.	12	0	4	0	0	0	0	0	0
	Total early									
	Fusing		**6**	**12**	**1**	**0**	**8**	**1**	**3**	**1**
	%		33.3	66.7	100.0	0.0	88.9	11.1	75.0	25.0
Middle	tibia d.	24	0	4	0	0	0	0	0	0
Fusing	metapodium d.	24-27	0	8	0	0	0	1	1	0
	calcaneum p.	24-30	1	2	0	0	0	0	0	0
	phalanx 1 p.	24	1	8	0	0	0	0	0	2
	Total mid									
	Fusing		**2**	**22**	**0**	**0**	**0**	**1**	**1**	**2**
	%		8.3	91.7	0.0	0.0	0.0	100.0	33.3	66.7
Late	ulna p.	36-42	0	3	0	0	0	1	2	0
Fusing	humerus p. radius d. femur p. & d. tibia p.	42	2	18	0	0	0	0	0	1
	Total late		**2**	**21**	**0**	**0**	**0**	**1**	**2**	**1**
	Fusing %		8.7	91.3	0	0	0.0	100.0	66.7	33.3

Table 71: Edlingham Castle number of fused (fused and fusing) and unfused pig specimens classified under early, middle, or late-fusing stages following Reitz and Wing (1999, p. 76) based on Silver (1969) and Schmid (1972).

Bone	Ossification Centre	Age of Fusion	Fused	Unfused
Scapula			2	1
Radius	Proximal epiphysis	15-18 mts	2	0
	Distal epiphysis	3.5 yrs	1	0
1st phalanx	Proximal epiphysis	13-15 mts	1	0
	Distal epiphysis	Before birth	1	0
Pelvis	Fusion of main bones	1.5-2 yrs	0	1
Femur	Proximal epiphysis	3-3.5 yrs	1	1
	Distal epiphysis		0	1
Tibia	Distal epiphysis	20-24 mts	0	1
Metatarsal	Proximal epiphysis	Before birth	1	0
	Distal epiphysis	16-20 mts	1	0
		Total:	**10**	**5**

Table 72: Edlingham Castle phase 9 fused horse specimens present with age of fusion after Silver (1970, p. 285-286).

Bone	Ossification Centre	Age of Fusion	Fused	Unfused
Scapula			1	0
Humerus	Proximal epiphysis	15 mts	7	0
	Distal epiphysis	8-9 mts	4	0
Radius	Proximal epiphysis	11-12 mts	1	0
	Distal epiphysis	11-12 mts	2	1
Ulna	Olecranon	9-10 mts		
Metacarpus	Proximal epiphysis	Before birth	3	0
	Distal epiphysis	8 mts	2	0
1st phalanx	Proximal epiphysis	7 mts	1	0
	Distal epiphysis	Before birth	1	0
Pelvis	Fusion of main bones	6 mts	5	0
Femur	Proximal epiphysis	1.5 yrs	4	1
	Distal epiphysis	1.5 yrs	2	3
Tibia	Proximal epiphysis	1.5 yrs	4	1
	Distal epiphysis	13-16 mts	4	1
Metatarsal	Proximal epiphysis	Before birth	3	0
	Distal epiphysis	10 mts	4	0
Total			48	7

Table 73: Edlingham Castle phase 10 fused dog specimen present with age of fusion after Silver (1970, p. 285-286).

Deer		Age in months	PHASE 5&6 N=13		PHASE 7&8 N=6		PHASE 9 N=11		PHASE 10 N=8	
			No. fused	No. unfused	No. fused	No. unfused	No. fused	No. unfused	No. fused	No. unfused
Early fusing	scapula p.	12-20	2	0	1	0	1	0	1	0
	humerus d.		1	0	1	0	0	0	1	0
	radius p.	5-8	4	0	1	0	0	0	0	0
	phalanx 1 p.	17-20	0	0	0	0	1	0	0	0
	phalanx 2 p.	11-17	0	0	0	0	0	0	1	0
	Total early Fusing		**7**	**0**	**3**	**0**	**2**	**0**	**3**	**0**
	%		100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Middle fusing	tibia d.	20-23	4	0	2	0	3	0	3	1
	metapodial d.	26-29	0	0	0	0	1	1	0	0
	Total mid Fusing		**4**	**0**	**2**	**0**	**4**	**1**	**3**	**1**
	%		100.0	0.0	100.0	0.0	80.0	20.0	75.0	25.0
Late fusing	radius d.	>42	1	1	1	0	0	0	0	0
	tibia p.	26-42	0	0	0	0	1	0	0	0
	femur d.		0	0	0	0	0	0	0	1
	femur p.	32-42	0	0	0	0	2	0	0	0
	Total late Fusing		**1**	**1**	**1**	**0**	**3**	**0**	**0**	**1**
	%		50.0	50.0	100.0	0.0	100.0	0.0	0.0	100.0

Table 74: Edlingham Castle number of fused (fused and fusing) and unfused deer specimens classified under early, middle, or late-fusing stages following Reitz and Wing (1999, p. 76) based on Purdue (1983).

Phase	Species	Element	GL	Sex	ESH (cm)
6	B	MC1	199	M	121.9
6	B	RA	286	N/A	123
7	B	MT1	209	N/A	113.9
9	B	MT1	204	N/A	111.2
9	B	MC1	182	M	111.5
10	B	MC1	180	M	110.6
10	B	TI	305	N/A	105.4
10	B	MC1	175	F	107.2
10	B	MT1	199	N/A	108.5
10	B	MC1	178	N/A	109
10	B	MC1	186	M	113.9

Table 75: Edlingham Castle estimated shoulder heights for cattle after Fock (1966) as detailed in von den Driesch and Boessneck (1974, p. 336).

Phase	Species	Element	GLI	ESH (cm)
6	EQ	MT1	275	146.6
6	EQ	MC1	229	146.8
9	EQ	MC1	210	134.6
10	EQ	MC1	208	133.3
10	EQ	MC1	206	132.2
10	EQ	MC1	198	126.9
10	EQ	RA	357	154.9
10	EQ	RA	390	169.3
10	EQ	TI	349	152.2

Table 76: Edlingham Castle estimated shoulder height for horse after Kiesewalter (1888) as detailed in von den Driesch and Boessneck (1974, p.333).

Phase	Species	Element	GL or GLI	ESH (cm)
5&6	OVA	MT1	136.6	62
5&6	OVA	MT1	122.8	55.8
5&6	OVA	MT1	116.2	52.8
5&6	OVA	MC1	114.2	55.8
5&6	OVA	RA	135.7	54.6
5&6	O	CA	59.7	64.4
5&6	O	CA	52.2	56.3
5&6	O	CA	52.3	56.4
5&6	OVA	MC1	121.2	59.3
5&6	O	MC1	115.9	56.7
5&6	O	CA	51.8	55.8
5&6	O	MC1	127.3	62.2
5&6	OVA	MT1	108.4	49.2
5&6	O	CA	52.1	56.2
9	OVA	RA	145.2	58.4
9	OVA	MT1	109.8	49.8
9	O	RA	140	56.3
9	O	CA	52.7	56.8
9	OVA	MT1	121.3	55.1
9	OVA	MC1	128.8	63
10	OVA	MC1	120	58.7
10	OVA	MT1	115.7	52.5
10	OVA	MT1	113.6	51.6
10	O	CA	51.5	55.5
10	O	CA	50.2	54.1
10	O	RA	139.4	56
10	O	RA	143.3	57.6
10	O	MC1	116.7	57.1
10	OVA	MC1	114.8	56.1
10	O	CA	52.3	56.4

Table 77: Edlingham Castle estimated shoulder height for sheep and sheep/goat based on after Teichert as detailed in Von den Driesch and Boessneck (1974, p. 339).

Phase	Species	Element	GL	ESH (cm)
9	CAF	TI	135	40.4
9	CAF	TI	148	44.1
9	CAF	TI	155	46.2
9	CAF	TI	267	78.9
9	CAF	TI	267	78.9
9	CAF	HU	155	50.5
9	CAF	HU	129	41.5
9	CAF	HU	232	79.6
9	CAF	HU	232	79.6
9	CAF	HU	138	44.7
9	CAF	HU	145	47.1
9	CAF	RA	234	76.4
9	CAF	RA	129	29.6
9	CAF	UL	271	76
9	CAF	FE	255	78.7
9	CAF	FE	146	44.5
9	CAF	FE	140	42.6
10	CAF	TI	110	33.1
10	CAF	TI	151	45
10	CAF	HU	117	37.5
10	CAF	HU	137	44.3
10	CAF	HU	150	48.8
10	CAF	FE	170	52.1

Table 78: Edlingham Castle estimated shoulder height for dog based on greatest length (Harcourt 1974, p. 154).

Phase	Species	Element	GL	ESH (cm)
6	S	AS	32.6	58.4
6	S	AS	32.3	57.8

Table 79: Edlingham Castle estimated shoulder height for pig based on Teichert as detailed in Von den Driesch and Boessneck (1974, p. 341).

Phase	GL (mm)
5&6	39.5
5&6	69.4
5&6	71.1
5&6	68
5&6	87.1
5&6	83.3
7&8	64.4
7&8	57.8
7&8	67.2
7&8	68.2
7&8	56.9
7&8	72.2
9	69.7
9	69.7
10	60.25
10	56.1

Table 80: Greatest length of cattle third phalanges at Edlingham Castle.

Phase 5&6 carcass weight total	3006 Kg
Phase 7&8 carcass weight total	968.5 Kg
Phase 9 carcass weight total	2524 Kg
Phase 10 carcass weight total	2678.5 Kg

Table 81: Edlingham Castle estimated carcass weight totals.

Species	Estimated Live Weight	% Carcass Weight
Cattle	450 Kg	82.3%
Sheep/Goat	19 Kg	5.7%
Pig	80 Kg	12.0%

Table 82: Edlingham Castle meat values for cattle, sheep/goat and pig for phase 5 & 6.

Species	Estimated Live Weight	% Carcass Weight
Cattle	450 Kg	93.0%
Sheep/Goat	19 Kg	2.9%
Pig	80 Kg	4.1%

Table 83: Edlingham Castle meat values for cattle, sheep/goat and pig for phase 7 & 8.

Species	Estimated Live Weight	% Carcass Weight
Cattle	450 Kg	89.1%
Sheep/Goat	19 Kg	4.5%
Pig	80 Kg	6.4%

Table 84: Edlingham Castle meat values for cattle, sheep/goat and pig for phase 9.

Species	Estimated Live Weight	% Carcass Weight
Cattle	450 Kg	92.4%
Sheep/Goat	19 Kg	4.6%
Pig	80 Kg	3.0%

Table 85: Edlingham Castle meat values for cattle, sheep/goat and pig for phase 10.

Element	Bd	Sex
Metacarpal	56.6	U
Metacarpal	67.6	M
Metacarpal	58.7	M
Metacarpal	46.6	F
Metacarpal	58.8	M
Metacarpal	46.7	F
Metacarpal	59.3	M
Metacarpal	62.3	M
Metacarpal	56.5	U
Metacarpal	49.4	F
Metacarpal	51.9	F
Metacarpal	63.9	M
Metacarpal	52.9	F
Metacarpal	65.2	M
Metacarpal	62.9	M
Metacarpal	52.2	F
Metacarpal	51.5	F

Table 86: Edlingham Castle phase 5&6 sex determination for cattle metacarpals based in Bd measurements (McCormick 1997, p. 822).

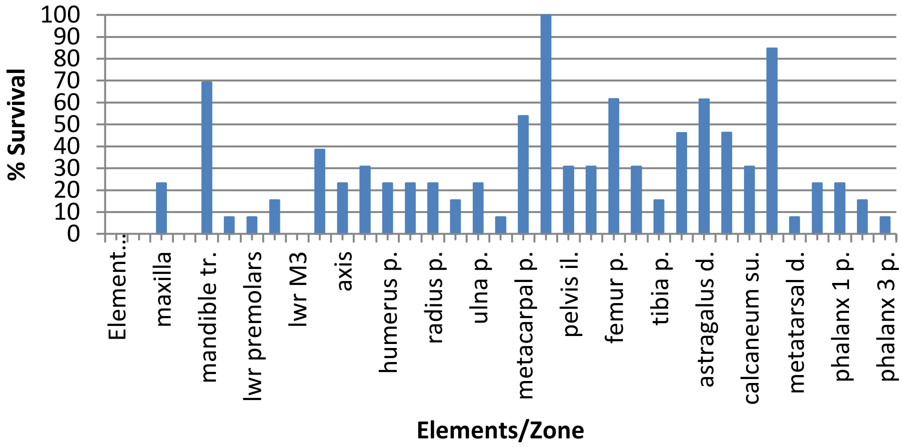

Figure 119: Edlingham Castle cattle percent survival phase 5 & 6.

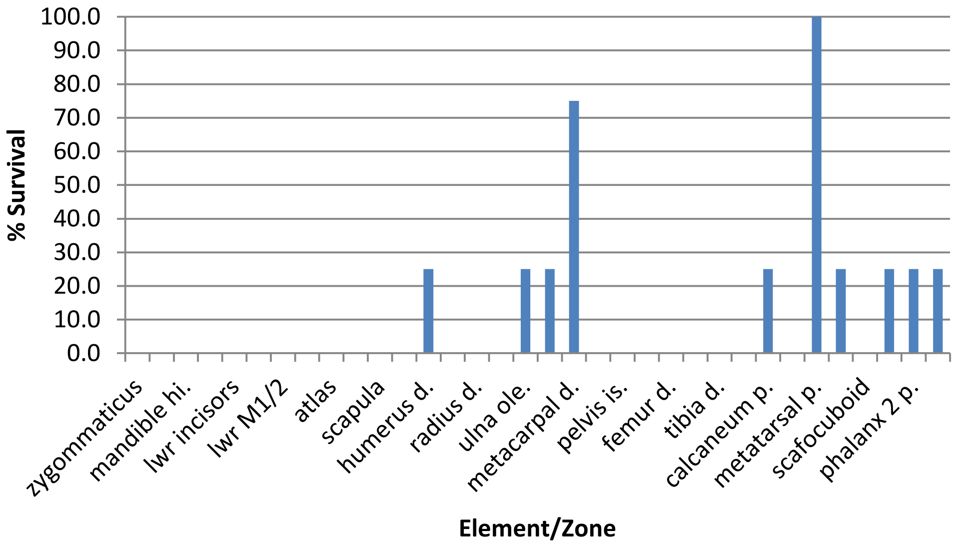

Figure 120: Edlingham Castle cattle percent survival phase 7 & 8.

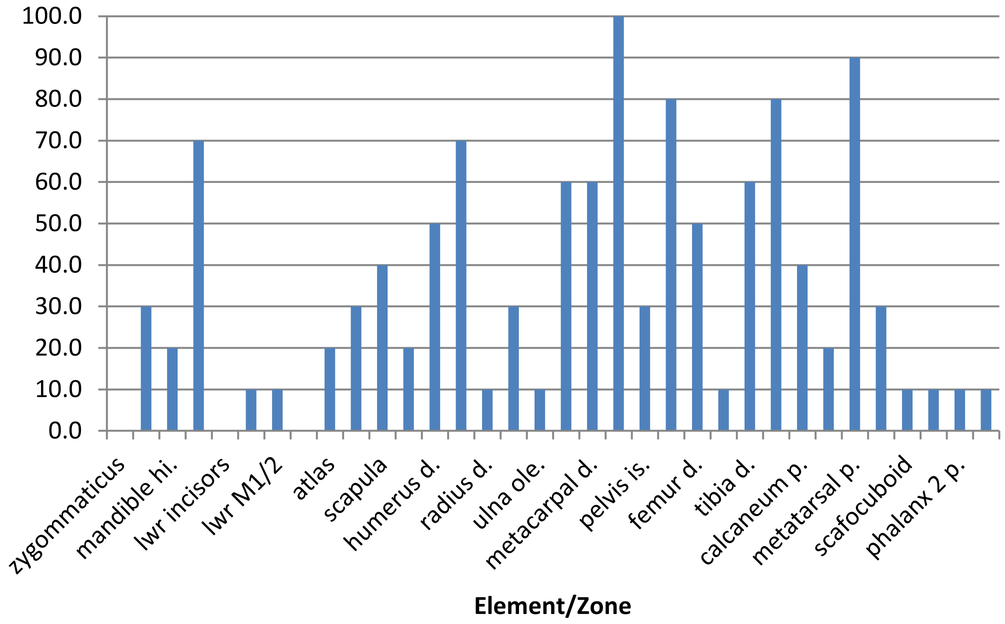

Figure 121: Edlingham Castle cattle percent survival phase 9.

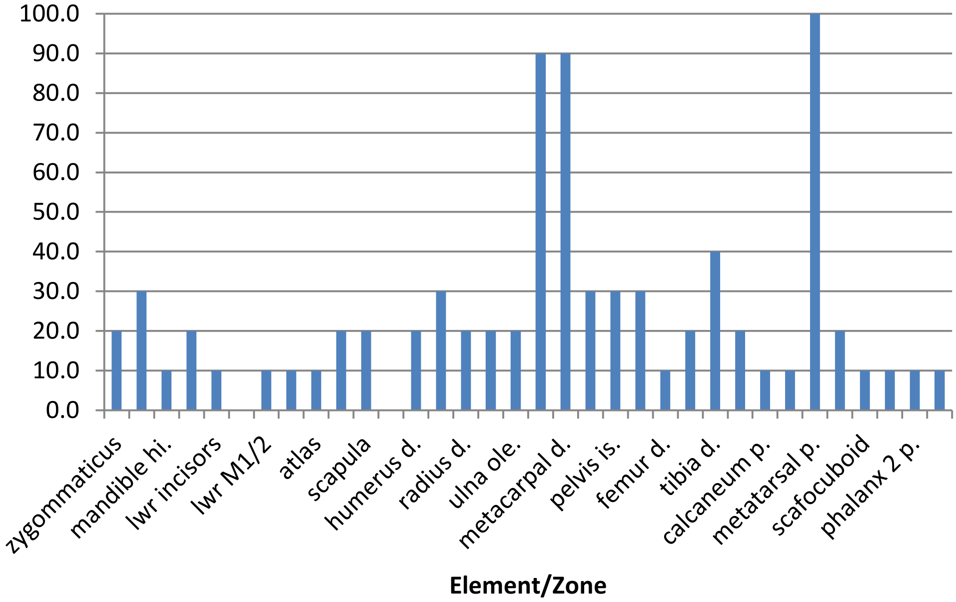

Figure 122: Edlingham Castle cattle percent survival phase 9.

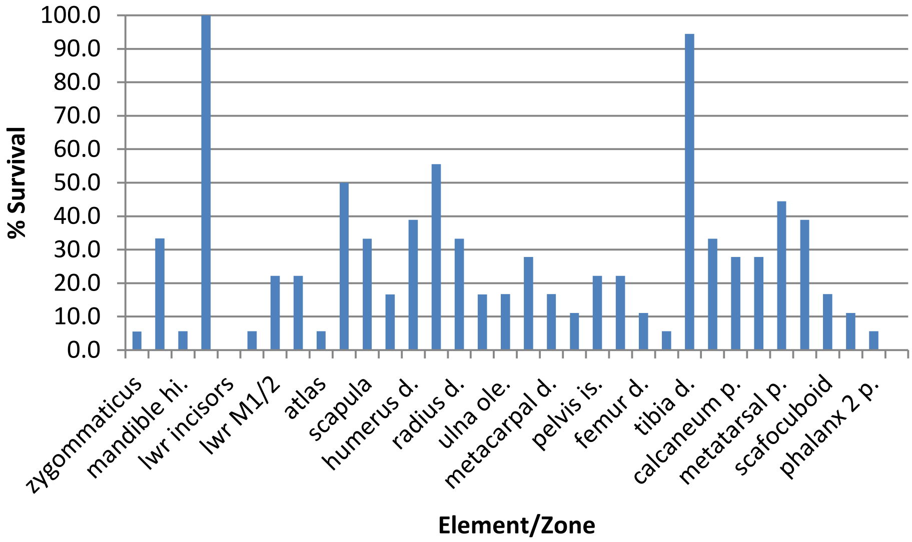

Figure 123: Edlingham Castle percent survival sheep/goat phase 5 & 6.

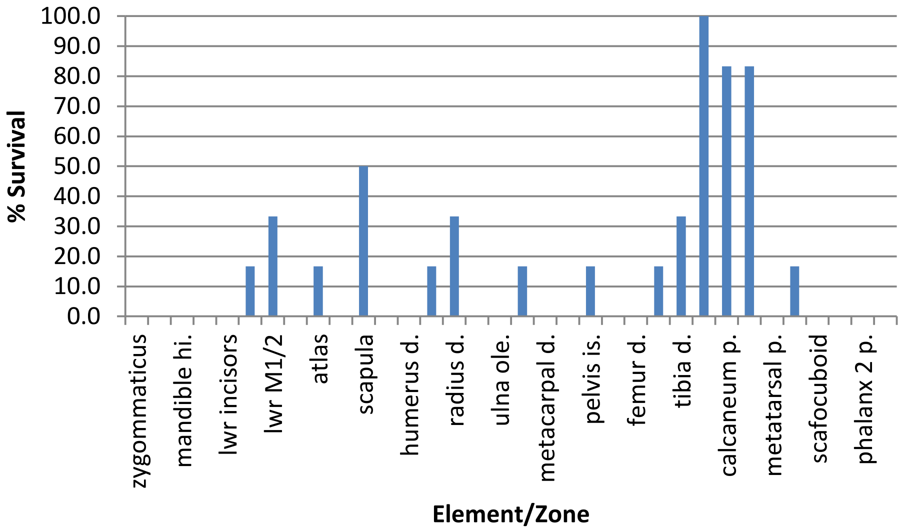

Figure 124: Edlingham Castle sheep/goat percent survival phase 7 & 8.

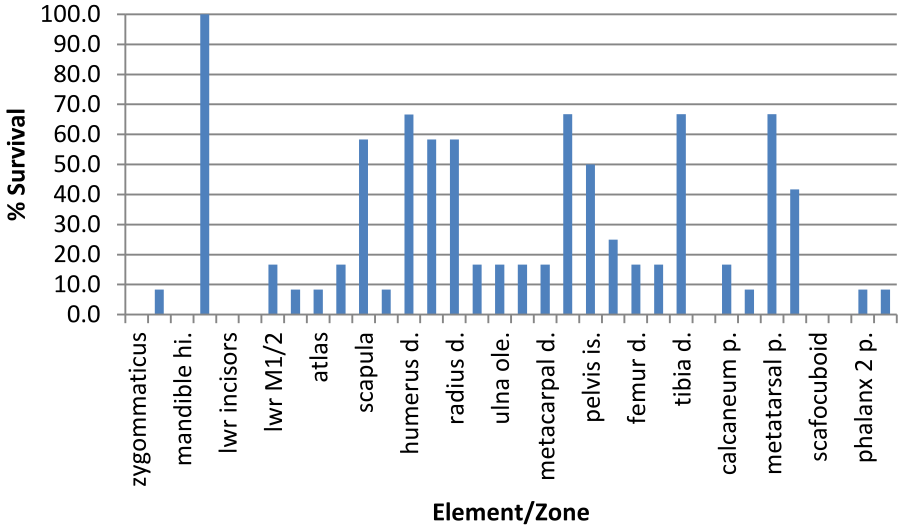

Figure 125: Edlingham Castle percent survival sheep/goat phase 9.

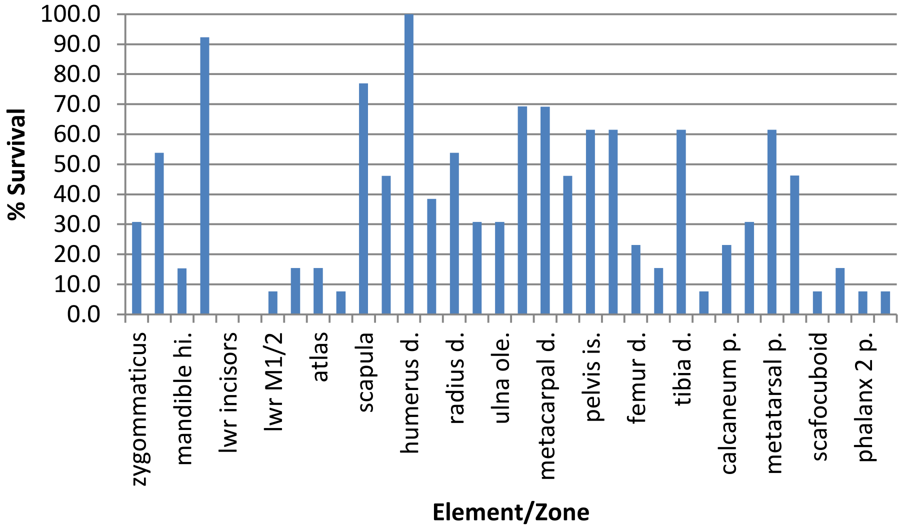

Figure 126: Edlingham Castle percent survival sheep/goat phase 10.

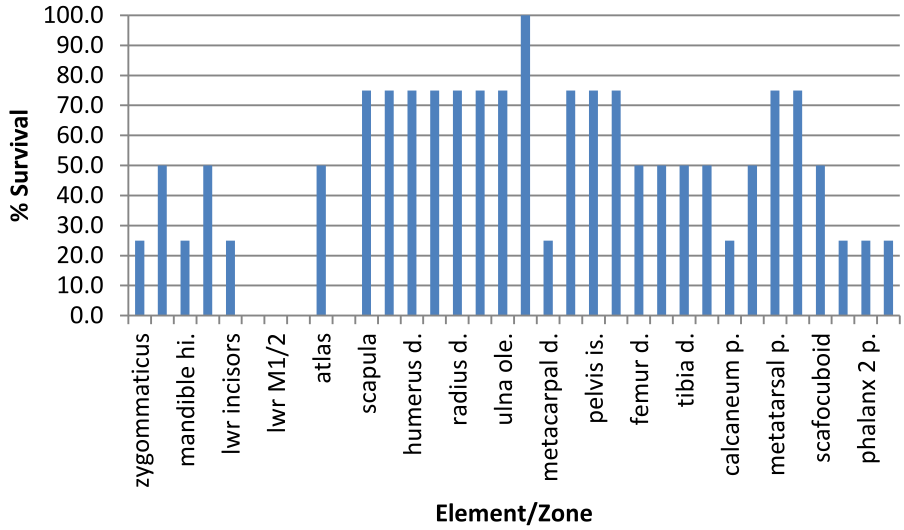

Figure 127: Edlingham Castle percent survival pig phase 5 & 6.

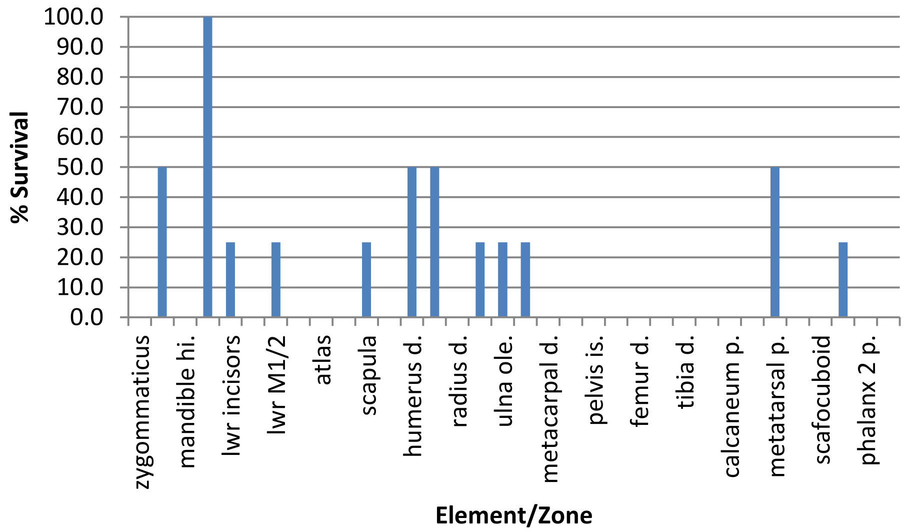

Figure 128: Edlingham Castle percent survival pig phase 9.

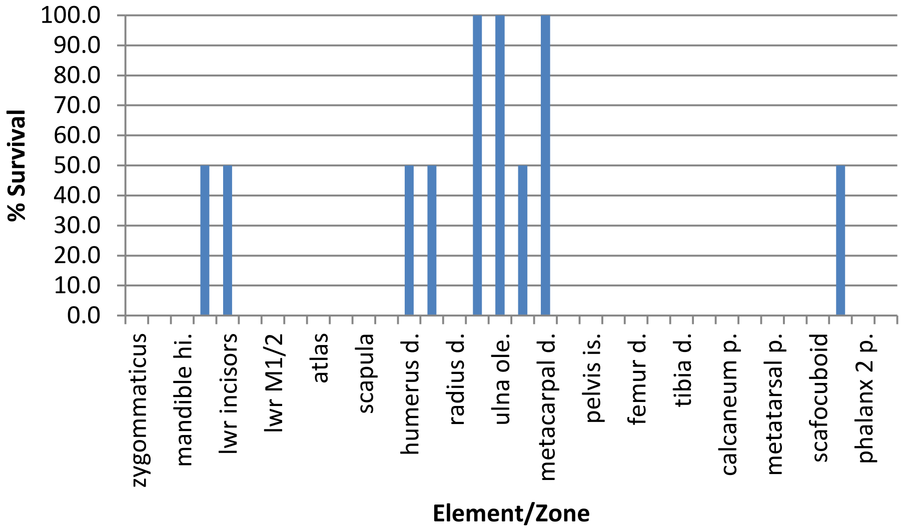

Figure 129: Edlingham Castle percent survival pig phase 10.

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