CHAPTER 7

Archaeological Data: 2. Butchery Analysis

> Since it cannot be generally argued that butchering destroys bones, variable frequencies of bones on different sites, must relate to the decisions made by the butcher. If archaeologists are to give meaning to observed patterns of association between different anatomical parts in variable frequencies they must seek to understand the criteria in terms of which parts are differentially transported and allocated to different uses. In addition, they must seek to recognize information relevant to different dismemberment patterns and degrees of dismemberment.
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> (Binford 1978: 64)

7·1 Introduction

The faunal remains under study only represent a sample of the fauna reflecting human behaviour once the taphonomic factors relating to the site have been investigated and the non-human effects excluded. The problem is that there is generally no way of knowing the relationship between the excavated sample and the parameters of the slaughtered population from which the sample derives. The validity of the descriptive statistics used to quantify the sample have been brought into question, but of major concern to a number of researchers, such as Turner (1984: 363) is the reliability of these statistics when they are extrapolated to the slaughtered population and when they are then used to interpret human behaviour in relation to the entire use of animals by people. For this reason an increasing number of researchers are turning their attention to the analysis of butchery practices as evidenced on the bones themselves as butchery marks.

The importance of studying butchery patterns has been realised by a number of researchers in Britain (Arid 1985 and Maltby 1985b) and in the United States (Lyman 1977). Butchery analysis is by no means utilised by all researchers, nor is it accepted or understood by many archaeologists for whom faunal analysis is rooted in species and skeletal element lists along with statistical counts of fragments, weights or MNIs. This unfortunate state of affairs has been well documented by Maltby (1985b), who surveyed published reports detailing faunal analyses for Britain. He concluded that the study of butchery practices employing the evidence of cut marks and fragmentation patterns on animal bones had been of a 'haphazard nature' and that in the majority of cases 'such evidence was ignored, or at best, given scant attention.' Maltby (1985b: 19) went on to detail this 'scant attention', stating that:

> ... in his survey of bone assemblages mainly of Romano-British date, King listed 116 site reports, of which only 26 mentioned butchery evidence at all. Only in a few instances have detailed summaries of the type of butchery marks observed been given. In still fewer cases have the detailed results of fragmentation and butchery analysis been discussed. This is surprising in view of the increased interest of archaeologists in faunal analysis in the last 20 years. In general, however, studies of butchery practices have been considered of less importance than the investigation of species abundance, ageing and metrical analysis.

In Australia as in Britain, there has been a haphazard approach to butchery analysis. Butchery data have generally been ignored in faunal studies from both prehistoric and historical sites. Maltby (1985b: 27) has pointed that the need to investigate butchery practices is as important as the effects of post-depositional taphonomic processes. The reason for this is that it is only through analysis of butchery marks and butchery patterns that a reliable understanding of the type of faunal assemblage being studied can be obtained. Butchery analysis permits the researcher to understand the utilization and processing of animals by humans, and thus sheds light on an important aspect of past human behaviour, that of the interaction between people and the animals they raised, or those they hunted.

A number of researchers have already applied butchery analysis to the faunal assemblages that they were studying which have gained inights into aspects of human behaviour. Gilbert (1980: 6) outlines the work of a number of researchers whom were able to interpret industrial usages of horn and bone as a result of examining faunal remains in terms of the butchery marks they exhibited. Wijngaaden-Bakker (1984) was able to conclude that the fauna (cattle and herrings) represented in the assemblage excavated from a seventeenth century Dutch whaling station on Amsterdam Island, Spitsbergen had been preserved via salting. This conclusion was reached after considering the faunal remains in terms of their spatial distribution, the frequency of skeletal elements, and the butchery pattern evidenced by butchery marks. Consideration of these three factors allowed diagnostic patterns relating to specific food preservation techniques to be recognised. Industrial use or processing of fauna has not only been interpretated for the historic period, but also has been determined for the prehistoric period as a result of butchery analysis. Zvelebil (1985: 164) used butchery analysis, as well as taking taphonomic processes into consideration when examining faunal assemblages from northern Russian and northeastern Baltic Iron Age sites. As a result of these analyses, it was possible to conclude that fortified and hill fort settlements specialised as centres of industrial activity where red deer and elk hides were brought for tanning, and fur bearing animals such as beavers had their pelts processed into furs.

As can be seen from the above examples, the study of butchery marks and patterns can be valuable in understanding facets of past economic strategies. But butchery analysis of faunal remains can also recognise differences in cultural and social organisation of past societies (Arid 1985: 5). Yellen (1977: 271) also recognised that butchery analysis could shed light on aspects of past cultures, arguing that the process of butchery is governed, either consciously or unconsciously, by a series of culture-specific rules. By discerning these rules Yellen believed that it would be possible to approach traditional archaeological questions concerned with variation in cultural relationships through time and space. He went on to state that:

> Just as stone-tool forms and ceramic forms, both of which reflect cultural rules and patterns, are used to define and compare archaeologically known cultures, comparision in the patterning of faunal remains may be used in the same way. Frenchmen not only call their cuts of meat by different names than do Americans, but in fact they butcher their animals in a different way. Although this study has not been done, I am fairly confident that if large and representative samples of bone scraps were collected from French and American households these differences would be readily apparent.
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> (Yellen 1977: 328-9)

Yellen (1977: 328-9) goes on to state that he is aware of a number of cases where defining archaeological cultures on the basis of the pattern of butchery exhibited by their faunal remains could be very productive. He states:

> ... there are a number of cases where the evidence from faunal analysis [butchery analysis] might throw a welcome additional light on the already existing problems. In two areas with which I am familiar, the Upper Paleolithic of France and the stone age in Eastern and Southern Africa, there are a number of instances in which it would be interesting to know if conclusions drawn on the basis of lithic analysis would be supported by possible faunal analysis.

Clearly there is a need to consider butchery analysis with far greater depth than has been the case thus far when conducting faunal analyses. The potential for this type of analysis to result in meaningful and valid conclusions is high, most probably higher than that being achieved to date. However, it will still be necessary to quantify those remains present in an assemblage in order to compare and contrast assemblages between sites. What is been suggested here is that the method of quantification be related to the manner in which a culture breaks down an animal's carcass into consumption units. For Australian historical archaeological sites, this method of quantification needs to consider the multi-ethnic diversity of its past and present population. The method should not be based on a single cultural pattern, but should be based on a pattern which reflects the cultural mix of Australia's colonial history. For this reason the analysis of the St Helena

fauna will be conducted using the models derived from the ethnoarchaeological and documentary cases recorded in Chapter 5 and Appendices 1 and 2.

Binford (1978) has demonstrated how ethnoarchaeological observations of butchery practices can aid immensely in the interpretation of variation in the patterning of faunal remains. Maltby (1985a: 49) has succinctly summarised the significance of Binford's work, stating that

> He has demonstrated that, given very detailed knowledge of a society's or group's butchery practices, it is possible to make accurate interpretations of assemblage variability by comparing the relative frequencies of different skeletal elements against various predicted models.

The predicted models that Maltby mentions are based on indices, which relate to differing assessments of the relative value of meat, marrow and bone grease associated with the skeletal elements of the animal. Binford (1978) also proposed a general utility index in which all the indices for a specific skeletal element are combined.

The utility index method would appear to have had some success in Binford's hands in formulating models predicting faunal patterning from butchery processes related to the cultural setting of his study. Maltby (1985a: 50), however, has cautioned against universal acceptance of this method, pointing out a number of potential difficulties in applying it to different cultural settings. As Maltby puts it, difficulties arise from the need to calculate many different models of carcass utilisation, since:

> ... the utility indices of each element will vary between different species and in different societies, depending on the methods of butchery and the importance placed on the procurement of different products.

There are also difficulties which arise from temporal and spatial factors, which may cause the indices to vary.

Spatial factors which can affect the reliability of the indices result from the intermixing of discarded faunal remains from a number of separate activities in a single deposit. This is a quite common occurrence, especially in historical archaeology as evidenced by the ERT midden on St Helena, where slaughter waste, primary and secondary butchery waste, cooking waste, and table waste, were all disposed of in the same midden. Further, it must be kept in mind that, in the non-market or subsistance economy, as well as the market or retail economy, individual bones may evidence one, some, or all of the various butchery procedures carried out on a carcass. Thus, a single

faunal remain from a subsistance agricultural group may evidence primary, secondary and culinary butchery procedures, a single remain from a market economy may evidence primary, wholesale and retail butchery, and a single remain from a hunting and gatherering economy may evidence primary and secondary field butchery as well as what Spiess (1979: 24) defines as culinary butchery. These spatial difficulties are further compounded by the temporal depth observed in archaeological accumulations which may in fact be evidencing changing cultural perspectives in the manner in which a group utilises its faunal resources.

Spiess (1979: 23) has stated that the 'extent of intercultural variation in the butchering process is difficult to determine.' This is because cultural factors which result in differing butchery patterns are linked to intra-cultural situational and economic factors which also result in variation in butchery patterns and thus faunal assemblages. The problem is that it is not often possible to decide where cultural variables differentiate from those arising from economic or situational factors.

7·2 St Helena butchery analysis

For the purposes of this analysis only those bones which exhibited butchery marks and intact or virtually intact bones were used to determine the pattern of butchery practised on St Helena. Intact or virtually intact bones were included because they demonstrate that butchery has not occurred and thus are just as relevant to a study of butchery patterning as those which do exhibit butchery marks.

Successful interpretation of butchery data relies on detailed recording of marks, identification of skeletal elements and species, and a grasp of the taphonomic factors which may have influenced the assemblage (Bonnichsen and Will 1980: 10-11). These factors have been discussed above. Whereas 'prehistoric butchering practices are most commonly reconstructed through analysis of the tools found in association with the faunal remains and through analysis of modifications such as cut marks found on the bones themselves' (Bonnichsen and Will 1980: 10), historical butchering practices are reconstructed from cut placement, orientation, tool type, skeletal element representation, and through ethnographic analogue, and it is these techniques which have been used to reconstruct the St Helena butchery pattern. This pattern has been reconstructed because this thesis is testing a method which requires analysis of butchery practices from an archaeological site.

In this study butchery marks are identified as resulting from three sources—cleavers, hand-saws and knives. The use of the first two tools are found on the faunal specimens as either shearfaces or marks, whilst knives are evidenced by cut marks. Both cleavers and hand-saws can produce shearfaces but there were instances when it was not possible to determine which implement had caused the shearface. Those shearfaces made by cleavers have been abbreviated to CSF, those made by saws to SSF, and those for which the implement causing the shearface was undetermined to SF. Saw marks have been abbreviated to SM and cleaver marks to CM. Cleavers can, however, also be used as a cutting implement as well as a chopping implement. The inability to distinguish between cut marks made by a knife from those made by a cleaver resulted in defining all cut marks as resulting from a sharp-edged cutting implement. Thus, although many cut marks may result from knives, no distinction was made between knives and cleavers and all such marks were defined just as cut marks.

In order to get an overall picture of butchery as practised on St Helena, the assemblage was considered as a whole. This decision was made due to the relatively low numbers of faunal items diagnostic of butchery for any one stratigraphic unit. This involves an assumption that there was no change in butchery practice through the history of the Establishment. However, as stated earlier,the faunal items chosen for this study come from an area of the midden where there is evidence from other artefact classes that the time-depth of the deposit is much shorter than that for the Establishment. The time-depth from which the assemblage results is such that the assumption can be made that variation in the pattern of butchery are not related to changes in practice through time.

Those faunal remains exhibiting evidence of the butchery practices of St Helena will now be discussed in turn for each of the three main domesticates (sheep, cattle and pigs).

7·2·1 Sheep

The faunal remains which evidence sheep butchery on St Helena are all from physically mature individuals. Each skeletal grouping will now be discussed.

7·2·1a Cranio-facial specimens

The cranio-facial remains evidence butchery in three areas:

1. Longitudinal division of the cranium into two halves.

2. Ventrally located transverse division of the horn core from the frontal bone.

3. Transverse division of the mandible.

Longitudinal division of the cranium into two halves is interpreted on the bases of the ethnoarchaeological data as relating to brain extraction for consumption and would have taken place during the initial slaughter phase of the butchery process. The presence of these specimens, therefore relate to slaughter discard. Three bones, the parietal, frontal and occipital display this process with mid-line located longitudinal shearfaces. Both saws and cleavers were used in halving the cranium. The data relating to butchery tool use is presented in Table 7·11, and is discussed at the end of this section on sheep butchery.

There were a minimum number of ten crania based on the parietal bones which demonstrated brain extraction. There is clear evidence from these bones and from their stratigraphic position that they each came from separate crania. Stratigraphic position was able to be used in this case because of the low number of specimens being present in clearly defined stratigraphic contexts, but this cannot be relied upon when larger samples are spread more evenly through the site. From the assemblage identified, only one cranial bone, a virtually intact occipital bone, indicated that mid-line division for brain extraction had not occurred. Clearly brain extraction was the norm in this butchery process.

The second area that cranio-facial bones evidenced butchery was in transverse or oblique division of the horn core from the frontal bone. The shearfaces were present on the ventral end of horn cores which had some frontal bone adhering. This pattern of butchery is indicative of the removal of sheep horns at the time of slaughter. This is because the removal of some frontal bone with the horn core would have proved fatal should such an operation have taken place while an animal was alive. This is not evidence of consumption but evidence of extraction of sheep horns for some secondary usage. Unfortunately the historical records do not inform us of any industrial use that these were put to either on or off the island. Unlike cattle horn which was a valuable raw

material in medieval times for the production of drinking vessels and utilitarian items such as buttons, sheep horn is unsuited to these purposes due to its size and morphological features. The most likely explanation is that sheep horns were used in the production of glue in much the same manner as cattle hoofs were.

The third area where the cranio-facial bones displayed butchery was the mandibles. The mandibular remains exhibited butchery in two locations. These were a transverse cut through the ramus at the base of the coronoid process and an oblique cut through the body of the mandible in the region of the internalveolar margin. The first of these cuts is made using a cleaver, while the latter is made using a saw. Based on the ethnoarchaeological data it is interpreted that these cuts have been made for tongue extraction, and would have taken place at the slaughtering stage. Therefore mandibular remains represent slaughter waste.

The data suggests that these two cuts were not used in conjunction with one another in enabling easy removal of the tongue, but that they represent separate alternatives for this process. There were two examples of cuts being made through the base of the coronoid process and five examples of cuts being made through the internalveolar margin. These two different methods may be viewed as alternatives available to butchers on the island, but in all likelihood they represent differing approaches taken by individual butchers.

Although not normally classified as a cranio-facial bone, the hyoid bone will be included in this section. There were seven hyoid bone specimens identified from the assemblage. Two of these were intact, one was virtually intact, while the other four were fragments of varying size. The two intact and the one virtually intact hyoid bones suggest that this bone was not butchered in any way. From observations made while conducting the ethnoarchaeological study, removal of the tongue by severing its muscular attachments can result in cut marks on the hyoid. The lack of such marks on the archaeological specimens supports the contention that on St Helena tongues were removed as a result of division of the mandible. As it is normal practice for this bone to be discarded with the head, the hyoid bones from St Helena can be explained as representing a pattern of slaughter discard along with the other cranio-facial bones.

7·2·1b Vertebra specimens

7·2·1bi Cervical vertebra specimens

There were eighty cervical vertebrae specimens in the assemblage which exhibited butchery marks. These specimens evidenced one pattern of slaughter butchery and two patterns of primary butchery. Slaughter butchery refers to all initial butchery procedures prior to the carcass being left to chill. Primary butchery refers to the butchery of the carcass into major units or joints, while secondary butchery is the cutting of these into units for consumption. In addition to the butchered specimens the assemblage also contained fifteen intact or virtually intact cervical vertebrae (Table 7·1).

Table 7·1: Breakdown of the numbers of intact and virtually intact cervical vertebrae and butchered cervical vertebra specimens

SKELETAL ELEMENT	NUMBER INTACT	NUMBER VIRTUALLY INTACT	NUMBER OF BUTCHERED SPECIMENS
Atlas	3	7	4
Axis	0	1	7
3rd cervical vertebra	1	0	13
4th cervical vertebra	0	2	9
5th cervical vertebra	0	0	9
6th cervical vertebra	0	1	3
7th cervical vertebra	0	0	5
Unpositioned non-atlas cervical vertebra	0	0	29
TOTAL	4	11	79

From Table 7·1 it can be seen that the intact or virtually intact and butchered atlas specimens stand out as a group when compared to the other cervical vertebrae in this assemblage. As a whole the assemblage had a minimum number of fifteen atlas elements. This number is made up of the ten intact or virtually intact, two from fragmented non-butchered specimens, and three (or 20·0%) from four specimens which

do exhibit butchery marks. The ratio of intact and virtually intact to butchered specimens is different to the other cervical vertebrae. It is concluded that the atlas specimens display a pattern of butchery which differs from the other cervical vertebrae. As a whole, the atlas vertebrae are interpreted as representing slaughter discard and indicate the point of division between the vertebral column and the cranium. The butchered atlas vertebrae all exhibit longitudinal shearfaces indicating mid-line division of the carcass into sides. This suggests that the point of division was at the atlas/occipital interface. That is division between the anterior articular cavities of the atlas and the condyles of the occipital bone. Both the ethnoarchaeological and documentary data demonstrate that this was a standard and logical location for such a division to occur. Those atlas specimens which are intact or virtually intact indicate that the point of separation is located not at the anterior end of the atlas, but at the posterior end, at the atlas/axis interface. In support of this there were 3 butchered axis specimens which exhibited transverse shearfaces located at the caudal end of the anterior articular process, the exact position that such a division would produce a shearface. Thus, the intact atlas specimens represent slaughter waste, being discarded with the head once the brains and tongue had been extracted. Overall, the atlas specimens displayed a pattern of slaughter butchery, whereby the skull was separated from the vertebral column at the atlas/occipital interface in 20·0% of cases, and at the atlas/axis interface in 80·0% of cases. Gilbert (1980: 34) has documented why the division is more likely to occur at the atlas/axis interface, stating that:

> The skull in mammals is firmly attached to the first cervical vertebra, particularly in those mammals with well-muscled necks. Separation is made difficult because the occipital condyles of the skull are set deeply into the corresponding articular sockets of the atlas, or first cervical vertebra.

Forty-four of the butchered cervical specimens exhibited longitudinal shearfaces. This is interpreted as representing the primary butchery pattern of mid-line longitudinal bisection of a carcass in order to produce two sides. Although the other thirty-six specimens did not exhibit such shearfaces, only eighteen of these thirty-six could positively be said not to exhibit longitudinal shearfaces, due to fragmentation and taphonomic factors eroding surfaces. As a whole, 46·3% of the butchered and intact cervical vertebrae specimens exhibited longitudinal shearfaces, 34·7% did not, and for 19·0% it was not possible to determine whether they were or were not bisected longitudinally. The percentage of remains with longitudinal shearfaces is significantly lower than that for the thoracic vertebrae whilst those evidencing no longitudinal shearfaces is significantly higher.

Overall the above indicates two patterns of primary butchery:

1. Mid-line longitudinal bisection of the carcass.

2. Separation of the cervical vertebrae from the thoracic vertebrae, occuring either before or after the bisection of the carcass.

Those specimens which definitely did not evidence longitudinal shearfaces were interpreted as representing a whole neck unit cut from the thoracic vertebrae prior to longitudinal bisection of the carcass. Those specimens which did exhibit longitudinal shearfaces were interpreted as representing longitudinal half neck units which were separated from the thoracic vertebrae following longitudinal bisection of the carcass. Separation from the thoracic vertebrae following carcass bisection is supported by those cervical and thoracic specimens which had longitudinal shearfaces, and the difference in the percentage between these two groups of specimens which also had transverse shearfaces. The thoracic group had 69·6% with transverse shearfaces, whilst the cervical group only had 48·8%. This difference is viewed to be significant enough as to represent a thoracic/cervical interface division following longitudinal bisection of the carcass.

This separation of the cervical vertebrae from the thoracic vertebrae, either in the form of a whole neck or two half neck units is not at all unexpected. Both the ethnoarchaeological butchery data and the documentary data point to the separation of the cervical vertebrae from the thoracic vertebrae as a common practice. This chiefly relates to a perceived difference in the eye of consumers as to the relative merits of these two regions, and most likely relates to the marked difference in the meat to bone ratio for these two regions. The thoracic region is generally left as part of a roasting unit or else converted into rib chops which are generally either baked, grilled or fried. The cervical region on the other hand is generally converted into neck chops which are usually stewed or casseroled.

All the butchered specimens with two exceptions, and the five intact or virtually intact non-atlas cervical vertebrae, indicate a single pattern of secondary butchery. This is the conversion of whole and half neck units into neck chops. This is portrayed by shearfaces which bisect the mid-line at right angles. These are known as transverse shearfaces. Of the forty-four butchered specimens which exhibit longitudinal shearfaces and thus represent half neck units, nineteen displayed a single transverse shearface and three displayed a pair of transverse shearfaces, located one at their anterior end and one at their posterior end. There were also eighteen specimens interpreted as relating to half

neck units which did not display transverse shearfaces. Overall, 50·0% of the specimens representing half neck units displayed transverse shearfaces and 40·9% did not. The remaining 9·1% of specimens represent either posterior or anterior fragments for which it was not possible to state whether the vertebra from which they originated had or had not been cut transversely.

There were thirteen butchered specimens (16·3%) which did not have longitudinal shearfaces, but due to fragmentation it was not possible to state that the vertebrae they originated from had or had not been bisected longitudinally. These thirteen specimens all exibited transverse shearfaces. Twelve of them exibited a single transverse shearface, while the thirteenth displayed one at its anterior end and one at its posterior end. In addition to these specimens there were eighteen butchered specimens (27·5%) which definitely had no longitudinal shearfaces, but did have transverse shearfaces. Eleven displayed a single transverse shearface, while the other seven displyed a transverse shearface at both their anterior and posterior ends.

Those specimens which exhibited both transverse and longitudinal shearfaces clearly represent chops, in this case neck chops, because individual chops are characterised by both longitudinal and transverse shearfaces. The reason why those specimens which evidence just a transverse shearface, just a longitudinal shearface, the intact and virtually intact specimens and those exhibiting the classic dual pair of shearfaces, were all stated above to represent neck chops relates to the meat/bone ratio for cervical vertebrae and the preferred cooking method. Unlike rib chops which are generally uniform in width, relating to the divisions set out the ribs and the favoured cooking methods— grilling and frying— neck chops can and do vary in their widths. Whereas grilling and frying are relatively short cooking methods, casseroling and stewing, the preferred cooking methods for neck chops are relatively long. This longer length of time means that variation in width will not result in wider chops being under cooked. This permits less standardisation in the size of the chops being cut. Further, because of a relatively low meat/bone ratio, when compared to chops from either the thoracic or lumbar regions, neck chops tend to be cut much wider so that each chop has a target amount of meat. These are the reasons why not all cervical specimems originating from neck chops will exhibit transverse shearfaces. Hence an intact cervical vertebra can represent a neck chop, originating from a whole neck unit. The transverse shearfaces relating to it being present at the anterior end of the preceeding vertebra and the posterior end of the following vertebra.

The first of the two specimens which did not represent the neck chop pattern was difficult to explain to any pattern. It displayed two shearfaces and a saw mark. These marks were restricted solely to the dorsal surface of the specimen, and it is this which causes difficulty in explanation. For had the shearfaces continued through the ventral portion or body of the vertebra then this specimen would have fitted the neck chop pattern.

The second specimen not to fit the neck chop pattern was virtually intact but exhibited a single shearface oriented obliquely, dorso-ventrally in the anterio-posterior plane. If we picture longitudinal shearfaces as being in the dorso-ventral plane, and transverse shearfaces in the left-right plane, then this shearface was clearly different, and was intended to separate dorsal aspects from ventral aspects. There were five other cervical remains in the assemblage which exhibited shearfaces in this anterio-posterior plane. Two are such small fragments that it was not possible to state whether or not the vertebrae they originated from also displayed transverse and/or longitudinal shearfaces. Two definitely displayed the presence of transverse shearfaces but no longitudinal shearfaces and thus originated from a whole neck unit, whilst the fifth evidenced both a transverse and a longitudinal shearface.

7·2·1bii Thoracic vertebra specimens

There were 167 thoracic vertebrae specimens which exhibited butchery marks. In addition to these specimens there were two virtually intact thoracic vertebrae. The butchered specimens displayed primary butchery in terms of longitudinal bisection of carcasses into halves or sides. They also displayed secondary butchery of the thoracic vertebrae into rib chops, which was confirmed by the butchery evident on the ribs. This secondary butchery indicates a primary butchery unit, a rack cut which consisted of the thoracic vertebrae and the associated dorsal ribs. The existence of a rack cut was also represented by specimens which exhibit a longitudinal shearface but no transverse shearface. Butchery of carcasses in order to produce a rack cut would involve transverse separation of the thoracic vertebrae from the cervical vertebrae, which has been discussed above and, transverse separation of the thoracic vertebrae from the lumbar vertebrae. The sequence of butchery that the thoracic specimens indicate, taking into account evidence from both the cervical vertebrae specimens and the rib specimens was as follows:

1. Removal of the cervical vertebrae from the thoracic vertebrae in some instances.

2. Mid-line located longitudinal bisection of the carcass into two halves or sides.

3. Transverse separation of the cervical vertebrae from the thoracic at the 1st thoracic/7th cervical vertebrae interface, and transverse separation of the lumbar vertebrae from the thoracic vertebrae at the 1st lumbar/13th thoracic vertebrae interface.

4. Transverse separation of the dorsal ribs from the ventral ribs, calcified rib cartilages and sternum in one of three locations along the rib shaft in order to produce a rack unit and a breast unit.

5. Reduction, via transverse cuts to the thoracic vertebrae of the rack into rib chops.

The five steps were not always carried out. In addition to this pattern, there is evidence from the scapula and rib specimens that the five anterior thoracic vertebrae were in some instances part of a forequarter unit, which was subsequently reduced to forequarter chops.

The forequarter pattern of butchery would fit into the above sequence of butchery for the thoracic vertebrae after step 3. In this instance the forelimb would still be attached to the thorax region. The ethnoarchaeological and documentary research indicate that generally the forelimb is cut off the carcass prior to longitudinal bisection. The pattern of forequarter butchery would follow thus from step 3:

4. Transverse separation of the rack, cut usually at the interface of the fifth and sixth thoracic vertebrae according to the ethnoarchaeological and documentary data, in order to produce at the posterior end a short rack and at the anterior end a forequarter.

5a. Reduction of the short rack, via transverse cuts to the thoracic vertebrae, into chops.

5b. Reduction of the forequarter into forequarter chops, via transverse cuts to the ribs and the fore limb bones, and longitudinal cuts parallel to the anterio-posterior plane of the thoracic vertebrae.

As for the previous outlined butchery sequence, steps 5a and 5b did not necessarily have to be carried out. This reduction of a forequarter unit into chops would evidence shearfaces on the first five thoracic vertebrae which were parallel to the anterio-posterior plane. There were three specimens in this assemblage which display shearfaces in this plane. All three were fragments representing the spinous process. One of these three also has a posteriorally located transverse shearface. Due to the fragmented nature of these specimens it was not possible to state whether the vertebra they originated from contained any other transverse shearfaces or exhibited longitudinal shearfaces. Only one of these specimens could be positioned to a specific vertebra, and this was the 10th thoracic vertebra, excluding it from the forequarter region and making it a specimen at odds with the ethnoarchaeological and documentary data, and the other archaeological specimens. However, the other two specimens could relate to the forequarter region, and thus support scapulae and rib evidence that forequarters were cut from the carcass and reduced in secondary butchery to forequarter chops.

Out of the 167 specimens which had butchery marks, 164 exhibited shearfaces. One hundred and thirty-five of these specimens, or 82·3% displayed longitudinal shearfaces. Three of these specimens displayed two longitudinal shearfaces and these have been interpreted as representing situations where the bisecting cut has had to be repositioned as it was diverging from the line set in the butcher's mind that he wished to follow. These three cases do not represent the full dorso-ventral cross-section of a vertebre, so there is unfortunately no way of knowing if this explanation is correct or not. Since these shearfaces have been interpreted as representing the same intention, that of mid-line bisection of the carcass, they have been counted as one in terms of the tool usage.

There were only six specimens (3·7%) which definitely did not exhibit longitudinal shearfaces and an additional twenty-three (14·0%) specimens fragmented to such a degree that it was not possible to determine whether they had, or had not been, bisected longitudinally. The extremely high percentage (82·3%) of specimens definitely exhibiting longitudinal shearfaces clearly points to longitudinal bisection in this region being the norm. The six specimens which do not exhibit longitudinal shearfaces, and the two virtually intact specimens, do not necessarily mean that longitudinal bisection of the carcass from which they originated did not occur. There was evidence from the rib specimens that in some instances carcasses were not bisected longitudinally through the mid-line of the thoracic vertebrae but that they were bisected just lateral to one side of the thoracic vertebrae. This cut went transversely across and through the angle of the ribs close to the rib head. It would have resulted in two sides, just as when the cut went

through the mid-line of the vertebrae, the only difference being that one side would contain no thoracic vertebrae, the other would contain them all. These vertebrae would not exhibit any shearfaces which would be indicative of longitudinal bisection of the carcass, even though this had taken place. Subsequent butchery of the carcass sides resulted in either a rack, or else a short rack and forequarter.

Evidence relating to secondary butchery of the rack and short rack units is now discussed. Of the 164 thoracic vertebrae specimens exhibiting shearfaces, ninety-four (57·3%) displayed both longitudinal and transverse shearfaces. One hundred and twenty-one specimens (73·8%) displayed transverse shearfaces. Only eight specimens (4·9%) definitely did not exhibit transverse shearfaces but exhibited longitudinal shearfaces. The remaining thirty-five specimens (21·3%) did not exhibit transverse shearfaces, but the vertebrae from which they originated may or may not have. Of the 121 specimens which definitely do display transverse shearfaces, 116 exhibit a single shearface, while the other five exhibit two transverse shearfaces. Contained amongst the 116 which exhibit one shearface were four specimens which exhibited either two attempts with a cleaver to produce the shearface or else a slight change in the angle of the saw halfway through producing the shearface. Also contained with the group counted as single shearfaces were six spinous process fragments which exhibited two shearfaces. These were interpreted as representing either an ineffective first attempt at producing a shearface through the bone ventral to the process, or else a cut made so that the dorsal aspects of this process could be removed. Since it was not possible to determine which of these two possibilities truly represented the situation, and since there was no evidence from the other thoracic spinous processes in the assemblage to support the second contention, it was decided to use the first and count them as one in relation to tool use.

In interpreting what these transverse shearfaces, or lack of shearfaces may represent, it was concluded that those specimens which exhibited transverse shearfaces could represent one of two secondary butchery intentions. Firstly, and most probably these shearfaces represent the conversion of a rack unit (be it short or long) into rib chops. The second interpretation is that these shearfaces represent cuts made to rack units in order to assist in subdivision after cooking. That is, shearfaces pass through the thoracic vertebrae but a cut using a knife or cleaver through the intercostal muscles between the ribs is not performed as it would be in producing rib chops. The rack unit is therefore held together by the intercostal muscles.

Those butchered specimens which do not exhibit transverse shearfaces and the two intact specimens are interpreted as representing rack units for which cuts were not

made so that carving of the unit following cooking would be easier. An alternative to this is that the lack of transverse shearfaces may be indicating a double chop unit. That is, a chop unit which contained one thoracic vertebrae which did not evidence transverse shearfaces, connected caudally to the anterior of a thoracic vertebra exhibiting a transverse shearface and cranially to the posterior of a thoracic vertebra exhibiting a transverse shearface. In addition to these bones the unit would contain two adjacent dorsal ribs.

7·2·1biii Lumbar vertebra specimens

There were no intact or virtually intact lumbar vertebrae in this assemblage. There were however 179 specimens which had butchery marks. All but one of these specimens displayed shearfaces. There were three patterns of primary butchery and two patterns of secondary butchery. The primary butchery patterns were:

1. Mid-line longitudinal bisection of the carcass in order to produce two sides or halves.

2. Transverse bisection either through the 1st sacral vertebra or through the sacral/lumbar interface, and transverse bisection of the lumbar/thoracic interface, following a mid-line located longitudinal bisection resulting in two sides, in order to produce a loin unit.

3. The same pattern as described in 2, except occurring prior to mid-line longitudinal bisection, in order to produce a loin saddle.

The two patterns of secondary butchery relate to the subsequent butchery of both the loin and saddle units, via transverse shearfaces, in order to most probably produce loin chops and saddle chops.

The first of the primary patterns evidenced is of mid-line longitudinal bisection of the carcass. This was evident on 142 of the lumbar specimens (79·8%). Only fourteen specimens (7·9%) definitely did not exhibit longitudinal bisection, with the remaining twenty-two specimens (12·4%) being inconclusive either way due to their degree of fragmentation. The 79·8% of specimens which exhibited longitudinal bisection, in conjunction with the evidence from the sacral and thoracic regions were indicative of the second pattern of lumbar primary butchery as portrayed by the ethnoarchaeological and

documentary cases, namely that of producing loin units. The 7·9% of specimens which did not exhibit longitudinal bisection, in conjunction with the same evidence from the sacral and thoracic regions are indicative of the third pattern of primary butchery, namely that of producing saddle units. The production of loin units dominated over saddle unit production at a ratio of approximately 10:1.

The evidence for the conversion of these two primary butchery units into secondary butchery units comes from the transverse shearfaces present on these specimens. One hundred and twenty-six specimens (70·8%) exhibited transverse shearfaces. Only seventeen specimens (9·6%) definately did not exhibit transverse shearfaces, with the remaining thirty-five specimens (19·7%) being too fragmented to clearly demonstrate whether the vertebra they originated from contained transverse shearfaces or not. Most specimens did exhibit secondary butchery at a ratio of 7:1 in favour of it taking place. Those specimens which did exhibit transverse shearfaces could be subdivided into two groups. Those which relate to loin units and those which relate to saddle units.

Ninety specimens (50·6%) exhibited both transverse and longitudinal shearfaces. Seventeen specimens (9·6%) exhibited only longitudinal shearfaces. This assemblage displayed at a ratio of approximately 5:1 in favour, secondary butchery of loin units. This secondary butchery was interpreted as representing one of two possibilities. Either the production of loin chops, or the production of cuts designed to make carving of a cooked whole loin unit easier, as was the case for the rack unit. The 9·6% of specimens which did not exhibit transverse shearfaces are interpreted as representing loin units which underwent no secondary butchery.

All fourteen (7·9%) of the specimens which definitely did not exhibit longitudinal shearfaces and have been equated as representing saddle units, exhibited the secondary butchery pattern of transverse shearfaces. Like the secondary pattern exhibited for the loin unit, the transverse shearfaces in this group can be interpreted as either representing saddle chops or cuts designed to make the carving of a cooked whole saddle unit easier. The shearfaces in this assemblage of lumbar vertebral specimens portrays the cooking of whole loin units, loins cut to make carving easier and/or loin chops, and saddle units cut to make carving easier and/or saddle chops.

7·2·1biv Sacral vertebra specimens

The assemblage contained eighteen sacral vertebrae which exhibited butchery marks and one intact sacral vertebra. Three patterns were portrayed by the butchered sacral vertebrae. These patterns were well defined if we look at the envisaged sequence of butchery on the sacrum. There were four specimens out of a potential minimum number of eleven sacra which demonstrated this sequence. This sequence is as follows:

1. Mid-line longitudinal bisection as evidenced for the other butchered vertebral specimens thus far discussed.

2. Transverse bisection of the sacrum, most likely to separate the sacrum from the lumbar region.

3. Longitudinal bisection of the 1st sacral vertebra through the medial side of the wing of the sacrum, in order to separate the sacrum from the pelvis.

There were fourteen sacral specimens which had mid-line longitudinal shearfaces. There were no sacral specimens which definitely indicated that a longitudinal shearface was not evident for any individual sacrum, with the exception of an intact fourth sacral vertebra. It is quite possible that the longitudinal bisection, which from the ethnoarchaeological and documentary data generally commences at the caudal end of a carcass began anterior to this vertebra, and thus it did not display a longitudinal shearface. Four of these fourteen specimens also exhibited a transverse shearface, and one specimen exhibited bisection of the sacrum from the pelvis as a result of an oblique shearface passing through the wing of the sacrum.

There were six specimens which exhibited transverse shearfaces. Two were located at the anterior end of the 1st sacral vertebra, three at the posterior end of the first sacral vertebra, and the sixth at the posterior end of the second sacral vertebra. These shearfaces were interpreted as being the location of the separation of the sacrum from the loin. The posteriorally located ones could relate to the cutting of a chump with the loin as portrayed by the ethnoarchaeological and documentary data.

Four specimens evidenced the separation of the sacrum from the pelvis via longitudinal bisection of the wing of the sacrum. These specimens all exhibited shearfaces designed to bisect the medial side of the wing of the sacrum in such a manner

as to separate the sacrum from its skeletal attachment to the pelvis at the sacral auricular surface/pelvic tuber sacrale interface. This cut is not portrayed by any of the ethnoarchaeological or documentary cases and thus represents an unusal pattern of butchery variation.

7·2·1bv Coccygeal vertebra specimens

The assemblage contained one intact and ten virtually intact anterior coccygeal vertebrae which through association in the midden appear to result from three individuals. The intactness of these vertebrae is not at all unexpected based on how these bones where treated in the cases recorded in Appendices 1 and 2. Athough they are usually part of a hind leg cut attached to the sacrum, mid-line longitudinal bisection of a carcass commences anterior to these bones in the sacral region.

7·2·1bvi Unpositioned vertebra specimens

There were seventeen butchered vertebral specimens which were so fragmented it was not possible to position them, even in gross terms to regions of the vertebral column. It was not even possible in three cases to determine the location, orientation and angle of the shearfaces present. All seventeen exhibited shearfaces which have been counted in Table 7·11 for the discussion on tool usage. Since these specimens could not be positioned no further discussion of them will be made.

7·2·1bvii Summary of vertebra specimens

Overall the vertebrae displayed a primary butchery pattern whereby the vertebral column was bisected longitudinally in the mid-line to cut the carcass into two halves or sides. The vertebral column was then subdivided transversely at four locations. A neck unit was removed at the cervical/thoracic interface, although this could occur prior to longitudinal bisection. The cranium was removed during the slaughter butchery at the atlas/axis interface in 20% of instances and 80% of instances at the atlas/occipital interface. A rack unit was cut by bisecting the thoracic/ lumbar interface, and a loin unit by bisecting the anterior sacrum. The loin unit in some instances was cut prior to mid-line longitudinal bisection producing a unit called a saddle. There was another functional variation in the pattern of primary butchery. This was the making of an additional

transverse cut through the interface of the 5th and 6th thoracic vertebrae in order to produce a forequarter unit. In this section the forelimb was still attached to the carcass.

The pattern of secondary butchery evidenced by transverse shearfaces present on the bones was that of conversion: the neck unit into neck chops; the forequarter units to forequarter chops; the rack units to chops and possibly double chops and/or rack units which had been cut so as to make carving of a cooked unit easier; the saddle unit to saddle chops; and the sacrum in some instances bisected by a longitudinal shearface through the the wing of the sacrum in order to separate it from the pelvis.

7·2·1c Rib specimens

One hundred and fifty-one rib specimens in the assemblage displayed butchery marks. Analysis of the location of the shearfaces exhibited by these specimens and the rib portions which contained these marks indicated that there were four primary butchery methods used to reduce the rib cage into units which may or may not have undergone secondary butchery. Three of these methods were relatively similiar in that they all divided the rib cage through the antertio-posterior plane into two units. The dorsal unit of this division is commonly referred to as a rib roast or rack cut, while the ventral unit is usually referred to as a breast or brisket cut. However, the exact positioning of this bisecting cut varied along the length of the rib shaft between individual specimens to such a degree that non-functional, individual variation could not be used as an explanation. Non-functional or individual variation is a term coined by Lyman (1977). It refers to the fact that individual butchers will place cuts for the same function in slightly different positions, and that an individual butcher may not always place a cut in the exact same place each and every time. As long as the intention is the same in all instances the variation in exact location is non-funtional.

Close inspection of the position along the rib shaft where cuts fell revealed that they occurred in one of three locations. This, taken together with the portion of rib displaying the shearface permitted the determination of three patterns of single anterio-posterior division. These patterns would have resulted in the following three sets of primary butchery cuts:

1. A rack cut consisting of the dorsal half of the rib cage and a breast cut consisting of the ventral half of the rib cage.

2. A rack cut consisting of the dorsal third of the rib cage and a breast cut consisting of the ventral two thirds of the rib cage.

3. A rack cut consisting of the dorsal two thirds of the rib cage and a breast cut consisting of the ventral third of the rib cage.

The fourth pattern of primary rib butchery was that of two anterio-posterior cuts being made through the rib cage producing a dorsal, mid and ventral rib cut. Each of the three portions produced were of equivalent width, representing approximately a third of the rib cage width. That is, this butchery pattern subdivided the rib cage in the dorso-ventral plane into thirds.

In addition to these four patterns of primary butchery, the specimens displayed 2 patterns of secondary butchery:

1. Convertion of the forequarter joint (which commonly consists of the proximal humerus and shaft, scapula, cranial thoracic vertebrae, and the cranial ribs) into chops via a series of parallel anterio-posterior oriented shearfaces.

2. Convertion of at least some of the dorsal or rack units produced by the 4 primary butchery methods into chops. That is individual dorsal rib portions with associated portions of thoracic vertebrae.

As well as displaying four primary patterns of butchery relating to the rib cage, fifteen rib specimens exhibited a pattern of butchery which indicated a variation on the mid-line longitudinal division of a carcass into two halves. Instead of the vertebral column being divided the carcass was split into halves by either using a saw or a cleaver to separate the ribs from the vertebral column by transversely cutting through the angle of the ribs close to the tubercle.

There were twenty-nine rib specimens which had a single transverse or oblique shearface which was indicative of a pattern of primary butchery whereby the rib cage was divided evenly in half perpendicular to the dorso-ventral axis. Twenty-two of the specimens represented the dorsal half or rack portion of this division, while seven represented the ventral half or breast portion.

The second pattern of primary butchery was defined by shearfaces which divided the rib shaft in such a manner as to produce a rack unit containing the dorsal third of the rib shaft and a breast unit containing the ventral two thirds of the rib shaft. Twenty-three specimens exhibited this pattern of butchery. Twenty specimens represented the rack end, while three represented the breast end. One of these specimens exhibited a saw mark. The location and orientation of this mark, suggests that it results from an oblique saw cut made through a thoracic vertebra associated with this specimen in a rack unit. This is possibly related to the secondary butchery of a rack unit in order to produce rib chops.

The third pattern of primary butchery displayed by the rib specimens was a reverse of the pattern just discussed. That is, it was distinguished by a rack unit containing the dorsal two thirds of the rib shafts, and a breast unit containing the ventral third of the rib shaft. There were fifteen specimens which exhibited this pattern of butchery. Eight specimens represented the rack end and seven specimens represented the breast end.

There were two dorsal specimens with shearfaces for which it was not possible to determine whether they fitted the first pattern of rib primary butchery or the second. There was also present a single dorsal specimen displaying a shearface for which it was not possible to determine whether it fitted the first or the third discussed pattern of primary butchery. This was because within each of the groups thus far discussed there was a degree of non-functional variation in the exact placement of the shearfaces across the rib slab. This coupled with the fact that rib length varies across the rib cage, results in a degree of uncertainty in classifying some butchered ribs to specific butchery pattern categories.

The fourth pattern of primary butchery was distinguished from the preceeding three, in that the rib cage was divided into not two but three longitudinal sections of equivalent width. That is, this pattern had the rib cage being divided into a dorsal, mid and ventral section, as opposed to just a dorsal and ventral section. There was only a single rib specimen which demonstrated this pattern, which suggests that the division of the rib cage into three rather than two sub-units was relatively uncommon. This single specimen came from the mid-section and displayed a transverse shearface at both its dorsal and ventral ends. The reason why this single specimen has been classified as a separate pattern is that it is possible that some of the dorsal shaft portions attributed to the second primary butchery pattern, and some of the ventral shaft portions attributed to the

third primary butchery pattern could relate to this fourth pattern. However, the lack of any other mid shaft portions exhibiting a pattern of dual transverse shearfaces indicated that this was not likely.

The butchered rib specimens displayed two patterns of secondary butchery. The first of these had the intention of producing forequarter chops. Forequarter chops are produced when a side of a carcass is bisected transversely, usually at the interface of the 5th and 6th thoracic vertebrae, prior to the removal of the forelimb but after the removal of the cervical vertebrae. This forequarter unit was then bisected by parallel cuts along the anterio-posterior axis. This had the effect of producing chops. This form of secondary butchery results in the anterior ribs being reduced to short lengths (2-3 centimetres) which display shearfaces at both ends. There were four anterior rib specimens in the assemblage which displayed this pattern. All four were between 2-3 centimetres in length and evidence transverse shearfaces at both ends. This evidence, in conjunction with that from the scapula specimens indicated that some sheep on St Helena were butchered into forequarters, which were subsequently converted into forequarter chops. The forequarter was a primary butchery unit.

The second pattern of secondary butchery to be displayed by rib specimens was that of the conversion of dorsal rib portions into rib chops by transverse cuts through the thoracic vertebrae followed by separation of the ribs from one another using a knife to sever the intercostal musculature. This was evidenced on seventeen ribs by transverse cuts made through the thoracic vertebrae removing either the anterior or posterior aspects of the rib head region. Thus the rib heads evidence longitudinally oriented shearfaces. This pattern can, however, equally be attributed to cuts designed to allow the easy carving of cooked rib roast units.

In addition to the specimens already discussed, the assemblage contained another fifty-three rib specimens displaying butchery marks. Due to the degree of fragmentation exhibited by these specimens, it was not possible to reliably determine their exact postion along the rib shaft. Indeed, the small size of many of these specimens did not even permit reliable orientation in the dorso-ventral axis. Of these fifty-three specimens, forty-nine exhibited a single transverse or oblique shearface.

7·2·1d Sternum specimens

There were six sternal specimens which exhibited butchery marks. All six had mid-line located, longitudinally oriented shearfaces. Based on the ethnoarchaeological and documentary cases this was interpreted as representing halving of the carcass into two sides as a result of mid-line longitudinal bisection. As such, the shearfaces evident on the sternum specimens represented primary butchery.

7·2·1e Limb bones

In determining the pattern of butchery exhibited by the archaeological limb bones it was possible to test the location of shearfaces present on the archaeological sample against the data collected for both the ethnoarchaeological and documentary cases. This procedure was conducted in order to investigate if the archaeological limb bones varied in their pattern of butchery from the generalised skeletal portion models produced from the ethnoarchaeological and documentary data. It was felt that this approach would best determine if there were significant variation in the butchery on St Helena to that which the models predicted. This was seen as the best way to group the archaeological data in order to pin point areas of significant divergence from the models. Each limb skeletal element was looked at in turn in a detailed manner as for those skeletal elements already discussed, and the data gained from this approach, although not presented here, has been incorporated in determining the overall pattern of butchery variation as practiced on St Helena and is presented in Figure 7·1.

The position of shearfaces on the archaeological sample will now be tested for each limb bone against the ethnoarchaeological and documentary cases, using Chi-square tests which incorporate Yates' correction for continuity. This means that Chi-square values were calculated using the formula:

$$X^2 = \frac{N \left(\left| AD-BC \right| - \frac{N}{2} \right)^2}{(A+B)\,(C+D)\,(A+C)\,(B+D)}$$

It should be noted that in all tests there were sixteen ethnoarchaeological cases and twenty documentary cases. The number of archaeological cases was determined using the MNE for the particular skeletal element being tested.

The femur is discussed first in detail as an example of the procedure used to arrive at the Chi-square results. The results of the Chi-square tests and the data that they are based upon for the other limb bones have been tabulated collectively (Tables 7·2 and 7·3). The implications of these results will however be discussed for each skeletal element following the next sub-section on femora.

Table 7·2: Incidence and location of shearfaces on limb bones (excluding femora)

SKELETAL ELEMENT	LOCATION OF SHEARFACE	NO. OF ETHNOARCHAEOLOGICAL CASES	NO. OF DOCUMENTARY CASES	NO. OF ARCHAEOLOGICAL CASES
Scapula	posterior 1/3 blade-mid 1/3 blade	0	0	6
	mid 1/3 blade-anterior 1/3 blade	0	0	8
	anterior 1/3 blade-neck	0	0	5
	neck- glenoid cavity	1	0	3
Humerus	proximal end-proximal 1/2 shaft	1	1	8
	proximal 1/2 shaft-distal 1/2 shaft	1	1	5
	distal 1/2 shaft-distal end	4	3	11
Radius/Ulna	proximal end-proximal 1/2 shaft	4	3	4
	proximal 1/2 shaft-distal 1/2 shaft	6	6	9
	distal 1/2 shaft-distal end	0	1	1
Pelvis	anterior ilium crest-posterior ilium crest	0	0	3
	posterior ilium crest- anterior ilium shaft	3	1	10
	anterior ilium shaft-posterior ilium shaft	1	2	12

Table 7·2: Continued

SKELETAL ELEMENT	LOCATION OF SHEARFACE	NO. OF ETHNOARCHAEOLOGICAL CASES	NO. OF DOCUMENTARY CASES	NO. OF ARCHAEOLOGICAL CASES
Pelvis	posterior ilium shaft- posterior acetabulum	3	14	14
	posterior acetabulum-anterior ischium/pubis	0	0	0
	anterior ischium/pubis-posterior ischium/pubis	1	0	8
Tibia	proximal end-proximal 1/2 shaft	1	0	17
	proximal 1/2 shaft-distal 1/2 shaft	3	2	3
	distal 1/2 shaft-distal end	2	2	0
	distal end - tarsals	1	1	0

Table 7·3: Chi-square test results for shearfaces located on limb bones (excluding femora)

SKELETAL ELEMENT	LOCATION OF SHEARFACE	ETHNOARCHAEOLOGY V DOCUMENTARY	ETHNOARCHAEOLOGY V ARCHAEOLOGY	DOCUMENTARY V ARCHAEOLOGY
Scapula	posterior 1/3 blade-mid 1/3 blade	O O	**4.733** S	**6.028** S
	mid 1/3 blade-anterior 1/3 blade	O O	**7.542** **HS**	**9.392** **HS**
	anterior 1/3 blade-neck	O O	3.494 NS	**4.518** S
	neck- glenoid cavity	0.013 NS	0.220 NS	1.838 NS

Table 7·3: Continued

SKELETAL ELEMENT	LOCATION OF SHEARFACE	ETHNOARCHAEOLOGY V DOCUMENTARY	ETHNOARCHAEOLOGY V ARCHAEOLOGY	DOCUMENTARY V ARCHAEOLOGY
Humerus	proximal end-proximal 1/2 shaft	0.324 NS	**4.119** S	**5.611** S
	proximal 1/2 shaft-distal 1/2 shaft	0.324 NS	1.252 NS	1.961 NS
	distal 1/2 shaft-distal end	0.109 NS	2.612 NS	**6.038** S
Radius/Ulna	proximal end-proximal 1/2 shaft	0.109 NS	0.031 NS	0.041 NS
	proximal 1/2 shaft-distal 1/2 shaft	0.014 NS	0.054 NS	0.094 NS
	distal 1/2 shaft-distal end	0.013 NS	0.034 NS	0.390 NS
Pelvis	anterior ilium crest-posterior ilium crest	O O	0.276 NS	0.472 NS
	posterior ilium crest- anterior ilium shaft	0.087 NS	0.594 NS	2.754 NS
	anterior ilium shaft-posterior ilium shaft	0.041 NS	2.843 NS	2.419 NS
	posterior ilium shaft- posterior acetabulum	**7.424** **HS**	1.095 NS	**4.164** S
	posterior acetabulum-anterior ischium/pubis	O O	O O	O O
	anterior ischium/pubis-posterior ischium/pubis	0.013 NS	0.941 NS	3.398 NS
Tibia	proximal end-proximal 1/2 shaft	0.013 NS	**6.178** S	**10.991** **VHS**

Table 7·3: Continued

SKELETAL ELEMENT	LOCATION OF SHEARFACE	ETHNOARCHAEOLOGY V DOCUMENTARY	ETHNOARCHAEOLOGY V ARCHAEOLOGY	DOCUMENTARY V ARCHAEOLOGY
	proximal 1/2 shaft-distal 1/2 shaft	0.073 NS	0.423 NS	0.062 NS
	distal 1/2 shaft-distal end	0.088 NS	1.980 NS	1.450 NS
	distal end - tarsals	0.324 NS	0.190 NS	0.099 NS

7·2·1f Femur specimens

The incidence of transverse or oblique division of the femur for the ethnoarchaeological, documentary and archaeological cases is recorded in Table 7·4.

Table 7·4: Incidence and location of shearfaces on femora

LOCATION OF SHEARFACE	NO. OF ETHNOARCHAEOLOGICAL CASES	NO. OF DOCUMENTARY CASES	NO. OF ARCHAEOLOGICAL CASES
femur neck-proximal end	2	14	6
proximal end - proximal 1/2 shaft	0	0	4
proximal 1/2 shaft-distal 1/2 shaft	0	1	2
distal 1/2 shaft-distal end	1	0	10
distal end- proximal tibia	7	3	2

Using the data in Table 7·4 and a MNE for femora of thirty-six, Chi-square was used to test the null hypothesis that there was no significant difference between the patterns of butchery as evident by the incidence of shearfaces between the three data sets

taken in pairs at each of the five locations set out. If the null hypothesis proved to be incorrect this would mean that there was a significant difference in the incidence of shearfaces and possibly a variation in the pattern of butchery between those two data classes being tested. Because the data presented for the ethnoarchaeological and documentary categories did not take secondary or retail butchery into consideration, differences between these classes and the archaeological data does not necessarily mean a difference in primary butchery. Where the null hypothesis is shown to be incorrect then this gives an indication of those points in the archaeological sample where it is necessary to look more closely in order to see if this variation from either the ethnoarchaeological or documentary data cases is a result of primary or secondary butchery practices. If it is shown to be secondary butchery practices then it will be necessary to determine what this pattern is, based upon the data contained in Appendices 1 and 2.

The Chi-square value plus the level of significance of this value for each of the five locations of shearfaces on the femora are set out in Tables 7·6 to 7·10. These tables were calculated from 2x2 tables and an example is set out in Table 7·5 to show how the data was extracted

Table 7·5: Two by two table for the calculation of Chi-square for shearfaces located between the femoral neck and the proximal end of the femur for the ethnoarchaeological and documentary data sets.

	NO. OF ETHNOARCHAEOLOGICAL CASES	NO. OF DOCUMENTARY CASES	TOTAL
NO. OF CASES OF WITH SHEARFACES	2	14	16
NO. OF CASES WITHOUT SHEARFACES	14	6	20
TOTAL	16	20	36

In Tables 7·6 to 7·10 the Chi-square values are given above the diagonal and the level of significance is given below this line. In these tables, and those that follow, abbreviations have been used for the degree of significance. These are defined as follows:

O	=	not testable
NS	=	not significant
S	=	significant
HS	=	highly significant
VHS	=	very highly significant

Table 7·6: Chi-square test result for shearfaces located between the femoral neck and the proximal end of the femur

	ETHNOARCHAEOLOGY	DOCUMENTARY	ARCHAEOLOGY
ETHNOARCHAEOLOGY	-	9.688	0.001
DOCUMENTARY	HS	-	13.631
ARCHAEOLOGY	NS	VHS	-

Table 7·7: Chi-square test results for shearfaces located between the proximal end of the femur and the proximal half of the femoral shaft

	ETHNOARCHAEOLOGY	DOCUMENTARY	ARCHAEOLOGY
ETHNOARCHAEOLOGY	-	O	0.679
DOCUMENTARY	O	-	1.011
ARCHAEOLOGY	NS	NS	-

Table 7·8: Chi-square test results for shearfaces located between the proximal half of the femoral shaft and the distal half of the femoral shaft

	ETHNOARCHAEOLOGY	DOCUMENTARY	ARCHAEOLOGY
ETHNOARCHAEOLOGY	-	0.013	0.033
DOCUMENTARY	NS	-	0.282
ARCHAEOLOGY	NS	NS	-

Table 7·9: Chi-square test results for shearfaces located between the distal half of the femoral shaft and the distal end of the femur

	ETHNOARCHAEOLOGY	DOCUMENTARY	ARCHAEOLOGY
ETHNOARCHAEOLOGY	-	0.013	1.923
DOCUMENTARY	NS	-	5.002
ARCHAEOLOGY	NS	S	-

Table 7·10: Chi-square test results for shearfaces located between the distal end of the femur and the proximal end of the tibia

	ETHNOARCHAEOLOGY	DOCUMENTARY	ARCHAEOLOGY
ETHNOARCHAEOLOGY	-	2.369	8.780
DOCUMENTARY	NS	-	0.488
ARCHAEOLOGY	HS	NS	-

The null hypothesis has to be rejected between specific data sets at specific points along the femur. These are:

1. Between the ethnoarchaeological and documentary data for shearfaces located between the femoral neck and the proximal end of the femur.

2. Between the documentary and archaeological data for shearfaces located between the femoral neck and the proximal end of the femur.

3. Between the documentary and archaeological data for shearfaces located between the distal half of the femoral shaft and the distal end of the femur

4. Between the ethnoarchaeological and the archaeological data for shearfaces located between the distal end of the femur and the proximal end of the tibia.

This section of the thesis is not concerned with variation between the ethnoarchaeological and documentary models, as these are only two models by which to test the archaeological data. This section is concerned solely with differences between the

archaeological data and the models and the explanations of any variation. Analysis of the butchered archaeological femur specimens suggests that the difference in the butchery pattern evident between these specimens and the ethnoarchaeological and documentary cases results not from primary butchery practices to the hind leg but from secondary butchery practices. The archaeological butchered femora exhibited a pattern of shearface distribution which was interpreted as resulting from secondary butchery to a hind leg cut. The pattern that these shearfaces indicate, based on both the ethnoarchaeological and documentary cases, is that the femur is being cut at one of four locations in order to reduce the size of the hind leg cut, into smaller portions. The four points where division of the femur takes place are:

1. At or close to the neck of the femur, in order to divide the femur from the pelvis.

2. At the proximal end of the femur, in order to divide the proximal end of the femur and the pelvis from the femoral shaft and those elements distal to the femur.

3. At the mid-shaft region of the femur, in order to divide those elements proximal to this point from those distal to it.

4. At the distal end of the femur, in order to divide the femur from the tibia.

Neither the ethnoarchaeological or documentary models, nor a combination of models is able to adequately explain the variation in butchery exhibited by the archaeological femur specimens. That is, the archaeological specimens do not fit specifically one or the other of the models, or a combination of both models. This indicates that butchery practiced on St Helena in the femoral region exhibited a degree of variation which differed from that upon which the models were based. It can be also said that this region exhibited in the archaeological sample a marked degree of variation in secondary butchery cuts.

The archaeological sample contained a single specimen which was not included in the Chi-square analysis because it did not fit any orientation of the shearface locations used. Table 7·3 was examining only shearfaces which were transverse or oblique in orientation. This specimen exhibited a longitudinally oriented shearface through the femoral head and neck. Although this shearface achieves the same result as transverse or oblique shearfaces through the femoral neck, it is functionally different. The documentary model is able to explain the presence of this shearface. The shearface is seen as not resulting from a cut designed to separate the femur from the pelvis but from a

transverse cut designed to bisect the acetabulum separating what are referred to in the documentary model as a leg from a chump. The femoral specimen merely displayed the continuation of this cut, which because of the orientation of the of the femur to the pelvis resulted in a longitudinal shearface on the femur.

The femur specimens also demonstrated the primary pattern of butchery displayed by almost all the ethnoarchaeological and documentary cases, of whole legs. These were represented in the ethnoarchaeological and documentary cases by intact femora. The archaeological assemblage contained seven intact and one virtually intact femora. These specimens represent an intact femoral region of the hind leg and are suggestive of a whole or shortened leg joint. That is, they may represent an entire leg unit consisting of intact pelvis, femur and tibia, or else they may represent such a unit which has been shortened through removal of the anterior aspects of the pelvis and/or the distal aspects of the tibia. There was present amongst both the archaeological pelves and tibiae evidence that such anterior and distal reduction did take place.

At least two of the femur specimens displayed a spiral fracture related to a shearface. These spiral fractures were interpreted as resulting from a situation where only partial severance of the bone was achieved using a tool, with complete severance resulting from the application of manual pressure causing the bone to snap and resulting in a spiral fracture. There were also a number of other specimens which exhibited spiral fractures. These were not related to shearfaces, and therefore were not the result of a cut-and-snap approach to bone division. As spiral fractures usually occur when bones are still green (Haynes 1981), these spiral fractures are interpreted as resulting from deliberate breaks prior to discard. The interpretation is that following meat consumption femora may have been deliberately broken, resulting in spiral fractures, in order that their marrow may have been extracted for consumption.

7·2·1g Scapula specimens

The results of the chi-square tests on scapulae (Table 7·3) informs us that the null hypothesis has to be rejected between specific data sets at specific points along the scapula. These are:

1. Between both the ethnoarchaeological and documentary data and the archaeological data for shearfaces located between the posterior third and the anterior third of the scapula blade.

2. Between the ethnoarchaeological data and the archaeological data between the anterior third of the scapula blade and the neck of the scapula.

Analysis of the butchered archaeological scapula specimens strongly suggests that the differences in the butchery pattern evident between these specimens and the ethnoarchaeological and documentary cases results not from primary butchery practices to the forelimb but from secondary butchery practices. The archaeological butchered scapulae displayed a wide and varied distribution of shearfaces, which were interpreted as relating not to primary but to secondary butchery. These secondary butchery shearfaces were seen to represent two patterns of secondary butchery which were able to adequately explain the distribution of shearfaces across the scapula. These patterns were:

1. The conversion of the scapula when part of a forequarter into forequarter chops.

2. The conversion of a forelimb or shoulder cut into chunks.

The data base of Appendices 1 and 2 which is used throughout this discussion on detailing the St Helena butchery pattern, contains within it cases which document the cutting of a forequarter into forequarter chops. It is from these cases that the archaeological specimens of narrow width, displaying shearfaces at both their anterior and posterior ends were able to be interpreted as representing forequarter chops. However, the second pattern of secondary butchery is not represented in any of the ethnoarchaeological or documentary cases, and represents a variation upon secondary butchery practices detailed in Appendices 1 and 2. This pattern was interpreted from the archaeological data itself, in that it was the best and simpliest explanation for the presence of those shearfaces which did not fit the pattern of producing forequarter chops.

In addition, the scapula specimens also demonstrated the primary pattern of butchery displayed by almost all the ethnoarchaeological and documentary cases, that of whole shoulders. These were represented in the ethnoarchaeological and documentary cases by intact scapulae. The archaeological assemblage contained five near complete non-butchered scapulae. These are viewed as representing the remains of shoulder roasts or boiling cuts.

7·2·1h Humerus specimens

The results of the Chi-square tests on humeri (Table 7·3) inform that the null hypothesis has to be rejected in the following instances:

1. Between both the ethnoarchaeological and documentary data and the archaeological data for shearfaces located between the proximal end of the humerus and the proximal half of the humerus shaft.

2. Between the documentary data and the archaeological data for shearfaces located between the distal half of the humerus shaft and the distal end of the humerus.

Analysis of the butchered archaeological humeri suggest that the difference in butchery pattern evident between these specimens and the ethnoarchaeological butchery cases results from secondary butchery practices to the forelimb. The shearfaces present on the archaeological humeri are located in three different positions. These positions are:

1. The proximal end.

2. Various points along the shaft.

3. The distal end.

There is relative similarity in the location of shearfaces for the first and third position but considerable variation in the second. Most humerus specimens (78·3%) exhibited shearfaces at the first or third locations. The ethnoarchaeological and documentary cases do have cases which can be used to suggest the presence of some shearfaces present on the archaeological specimens. However, these cases do not explain all of the shearfaces present. The pattern of secondary butchery being practiced on the humerus specimens was concluded not only from the case studies but also from shearfaces present on the other archaeological forelimb bones. Although the skeletal elements are being discussed individually, it must be remembered that they represent only part of a whole carcass. When the shearfaces present on the humerus specimens are examined along with those present on the radius/ulna specimens, two patterns of secondary butchery emerge:

1. Separation of the scapula from the humerus as a result of a cut through the proximal humerus.

2. Separation of the humerus from the radius and ulna as a result of a cut through the distal radius and proximal radius/ulna.

These two patterns of secondary butchery of the forelimb are not both displayed by any single archaeological specimen and therefore it has been concluded that they represent two alternative approaches to the subdivision of a forelimb. The first pattern, separation of the scapula from the humerus is not exhibited by the ethnoarchaeological or documentary cases. The sum of the evidence from the shearfaces present on the upper forelimb bones resulted in the interpretation that proximally located shearfaces were the result of a butcher dividing a forelimb into portions which were to be treated quite differently by further butchery and subsequent cooking methods. The interpretation is that the proximal portion of this cut was being either butchered into chops or chunks (wide transverse portions) for cooking by grilling, frying or stewing, and that the distal portion was being used as a whole roasting or boiling cut.

Both the ethnoarchaeological and documentary data contain cases which exhibited the second pattern of secondary butchery, that of separation of the humerus from the radius/ulna. From these cases it can be concluded that shearfaces located at the distal end of the humerus relate to division of a forelimb into a shoulder cut and a foreshank cut.

The archaeological humeri exhibited five specimens which displayed shearfaces along the shaft which differed from the pattern of butchery portrayed by the ethnoarchaeological and documentary models. These shearfaces have been interpreted as representing cuts made in order to reduce the overall size of the forelimb into smaller cooking or culinary units. These cuts are viewed as possibly a third pattern of secondary butchery whereby the forelimb was reduced into two roasting or boiling forelimb units of approximately equal length. Although these units may have been of equal length they would not have had equal consumable meat weight figures, therefore it is unlikely that these cuts were being made in such a way as to relate secondary butchery to meat ration levels.

An alternative explanation for the presence of these shearfaces along the shaft is that they represent division between the humerus and the radius/ulna but at a slightly more proximal position than those shearfaces which clearly evidence the third pattern of secondary butchery. A reason for cutting at a more proximal position is that this would

lessen the amount of work required in bisecting all three bones at the joint. This interpretation is partially supported by the fact that all but one of the shearfaces present on the shafts of the archaeological specimens occur in the distal third of the shaft.

7·2·1i Radius/Ulna specimens

The Chi-square tests conducted on the radius/ulna demonstrate that there is no significant difference in the pattern of butchery exhibited by the archaeological specimens to that presented in both the ethnoarchaeological and documentary models. The shearfaces present on the archaeological specimens do vary in exact placement and orientation. However, this variation is viewed as non-functional individual variation, and as such the shearfaces can be grouped into three categories, based upon their location. These locations are:

1. Proximal end.

2. Proximal to mid shaft.

3. Mid to distal shaft.

The ethnoarchaeological and documentary cases are able to explain why the shearfaces group in such a manner. The first two groupings are non-functional variation of the same butchery cut. This is the division of the radius/ulna from the humerus in order to produce a foreshank. The third grouping represents non-functional variation in positioning where the lower forelimb was cut off during slaughter.

The archaeological specimens exhibit two features which should be noted. Firstly, the assemblage contained two intact non-butchered radii. These specimens however do not represent another pattern of butchery. These specimens represent shank cuts. This is because both specimens have ulna portions fused to them which exhibit shearfaces which represent the division between the humerus and the radius/ulna. The point to note is that division between the humerus and the radius/ulna does not necessarily mean that there will be any evidence of this procedure present on the radius.

The second feature that the butchered archaeological specimens exhibit, is an association between butchery marks and spiral fractures. Five out of the fourteen specimens (35·7%) exhibited a spiral fracture associated with a butchery mark. These

spiral fractures are seen as resulting from a cut-and-snap approach to butchery as described in section 7·2·1f. This cut-and-snap method is interpreted to have been carried out for a specific reason. This reason is that this approach permits an entire forelimb consisting of intact scapula, humerus, and radius/ulna to be cooked as a whole unit. This unit is divided into a shoulder and fore shank as a result of a cut made at the humerus/radius/ulna interface, but the cut is not carried through all the musculature at this point. This leaves the fore shank attached to the shoulder by these muscular connections. The reason for this partial division is documented in the ethnoarchaeological and documentary data base. The reason is that, partial division enables any difficuly arising from the size of a whole forelimb in cooking to be solved by bending the foreshank back or removing it at the cooking stage. The cut-and-snap approach increases the amount of muscular connection between the shoulder and fore shank than if the bones were completely divided using a tool.

7·2·1j Carpal specimens

There were twenty-two intact or virtually intact carpal specimens in the assemblage. None of these specimens exhibited butchery marks, as did none of the metacarpals. Having observed the relatively high degree of butchery marks present in those bones lying proximal to the carpals, a clear hiatus in butchery marks is evident. Based on the ethnoarchaeological and documentary data this can be explained as evidenced of slaughter butchery where the carpals, metacarpals and phalanges are cut using a knife from the carcass at the radius/ulna/carpal interface. Subsequently these bones are discarded as slaughter waste.

7·2·1k Metacarpal specimens

The assemblage contained two intact and four virtually intact metacarpals. These metacarpals and the other metacarpal fragments identified in the assemblage exhibited no butchery marks. The lack of butchery marks supports the contention that the metacarpals do not represent consumption but rather represent discard of slaughter waste.

7·2·1l Sesamoid specimens

There was one virtually intact sesamoid bone which did not exhibit any butchery marks. This bone is interpreted as representing a component of a discarded lower foreleg and as such is evidence of slaughter waste.

7·2·1m Pelvis specimens

The results of Chi-square tests on pelves (Table 7·3) inform us that the null hypothesis is rejected for the following:

1. Between the ethnoarchaeological data and the documentary data for shearfaces located between the posterior ilium shaft and the posterior acetabulum.

2. Between the documentary data and the archaeological data for shearfaces located between the posterior ilium shaft and the posterior acetabulum.

The shearfaces which are located between the posterior ilium shaft and the posterior acetabulum are transverse, and pass through the acetabulum. Both the ethnoarchaeological and the documentary cases where this occurs define it as resulting from the intention to cut a chump either with the loin or as a separate unit from a hind leg. The reason the null hypothesis was rejected for the comparison between the ethnoarchaeological and documentary cases was that the incidence of this cut in the ethnoarchaeological cases was minimal and this is why this cut is not part of the generalised skeletal portion model based on the ethnoarchaeological cases. The frequency of this cut in the documentary cases was, however, such that it was included as part of the model based on the documentary cases. Although this cutting of a chump is evidenced by the archaeological specimens, the frequency of its occurrance is still less than that represented by the documentary cases, hence the significant result to the Chi-square test. What the result is indicating in this case is that the incidence of the cut is significantly less in the archaeological data set than in the documentary data set.

Overall the butchered pelvic specimens evidenced a high level of non-functional and functional secondary butchery variation. The butchery patterns concluded from the analysis of the shearfaces exhibited by the pelvic specimens are present in the summary of sheep butchery practices on St Helena and are depicted in Figure 7·1.

7·2·1n Patella specimens

The assemblage contained one intact patella and six virtually intact patellae. One of the virtually intact patellae displayed an oblique shearface at its ventral end. It was the only patella in the assemblage to do so. This shearface was interpreted as resulting from a cut designed to pass through the distal femur in such a way as to produce a hind shank portion from a hind leg unit. The other six patellae which did not display butchery marks are indicative of the femur having not been bisected in the distal region, or if it was then the shearface resulting would have been positioned very distally and posteriorly.

7·2·1o Tibia specimens

The results of the Chi-square tests on tibiae (Table 7·3) inform that the null hypothesis has to be rejected between both the ethnoarchaeological and documentary data sets and the archaeological data set for shearfaces located between the proximal end of the the tibia and the proximal half of the tibia shaft. Analysis of the butchered archaeological tibia specimens strongly suggests that this difference between the archaeological data and the models is not a functional difference but a non-functional difference relating to the cutting of a hind shank from a hind leg.

Both the ethnoarchaeological and documentary data contain cases where a hind shank was cut from a hind leg. Amongst these cases, the most common location for this cut was at the distal femur/proximal tibia interface. A cut at this interface is carried out using a knife and would not result in any shearfaces but may result in cut marks. The lack of cut marks on the archaeological specimens at the distal end of the femur or the proximal end of the tibia suggest that the hind shank was not cut from the hind leg in the manner portrayed by the ethnoarchaeological and documentary cases. Instead this cut was made in the archaeological sample immediately distal to the proximal end of the tibia. Infact seventeen (85·0%) of the shearfaces exhibited by the tibia specimens represent this butchery practice. Since the archaeological specimens are displaying the same intention as the ethnoarchaeological and documentary cases, the cutting of a hind shank, the difference between the archaeological data and both the ethnoarchaeological and documentary data that the Chi-square results show, represents not a different pattern of butchery but a variatiion on the same pattern.

Amongst the tibia specimens there was considerable non-functional variation in the exact location of shearfaces determining the proximal limitations of the cut made for

the hind shank. This variation is viewed as spilling over onto the distal end of the femur, and it was for this reason that shearfaces located in the distal area of the archaeological femora were interpreted as representing the division between the hind leg and the hind shank.

7·2·1p Tarsal specimens

The assemblage contained fifty-two intact or virtually intact tarsal bones as well as two tarsal bones which exhibited butchery marks in the form of shearfaces. These were one calcaneus and one talus. Clearly there was a low probability (0.037) for tarsal bones to exhibit butchery marks. The ethnoarchaeological and documentary models indicate that tarsal bones represent part of a consumption unit, rather than slaughter waste. That this was the case on St Helena was supported by the fact that some of the tarsal bones during the identification phase of the analysis were able to be shown to be articulated with one another, and in articulation with tibia specimens. There were four articulation sets clearly observed during the identification stage. Two were associated with tibiae consisting of distal ends plus shaft, which had no butchery marks, while the other two were associated with tibiae consisting of distal end plus shaft, which exhibited shearfaces at the proximal end of the shaft. This indicates that the hind shank cut contained not only the tibia shaft plus distal end, but also the associated tarsal bones.

Both the tarsal bones demonstrating butchery marks evidence obliquely oriented shearfaces. The reason for the presence of these marks has not been determined. However, these marks do not represent a cut designed to separate the upper portion of the leg from the lower, or the consumption components of the leg from slaughter waste components. Whatever these marks may represent, this is not a likely possibility. This is because the butchered calcaneus specimen was part of a tibia/tarsals set. What this means is that the presence of butchery marks on tarsal bones do not automatically preclude them from representing consumption units.

7·2·1q Metatarsal specimens

The assemblage contained one virtually intact and four intact metatarsals. These metatarsals and the other metatarsal fragments identified in the assemblage displayed no butchery marks. The lack of butchery marks on these bones is interpreted using the models produced from the ethnoarchaeological and documentary data as evidence that

these bones do not represent consumption, but that they represent discarded slaughter waste.

7·2·1r Phalanx specimens

The assemblage contained fourteen intact and two virtually intact phalanges. These phalanges and the other phalanx fragments identified in the assemblage exhibit no butchery marks. This lack of butchery marks was interpreted using the ethnoarchaeological and documentary models that these phalanges do not represent consumption but discard of slaughter waste.

7·2·1s Tool usage

Only shearfaces were used to define the pattern of butchery practised on St Helena. This was because examination of the cleaver, saw and cut marks where shown not to add any additional information to the pattern of butchery exhibited by the archaeological specimens.

Generally cleaver and saw marks were associated with cleaver and saw shearfaces respectively. Because of this cleaver marks were interpreted as representing blows made by a cleaver which failed to effect a division of the bone. The cleaver shearface present with a cleaver mark represented the subsequent successful blow in effecting the cut. Saw marks were interpreted as representing instances where the saw skipped out of the cut being made resulting in saw marks being present adjacent to the shearface evident on the specimens.

Some specimens exhibited multiple cleaver or saw marks. These multiple marks do not represent neat butchery and have been interpreted as resulting either from a hurried butcher or an inexperienced one.

As a whole the assemblage exhibited very few specimens which displayed cut marks. Cut marks did occur, however, with virtually all being present on humeral, femoral and pelvic specimens. Where cut marks occur on these bones the spacing between then indicates that they were caused as a result of meat being sliced off the bone following cooking. Thus, these marks should more correctly be called consumption marks, as they more likely relate to consumption rather than to butchery.

Table 7·11 details the tools used to produce each of the shearfaces exhibited by the butchered specimens. Those specimens which exhibited two blows by a cleaver to effect a cut have been counted as exhibiting a single CSF in Table 7·11 because both blows have been made using the same tool with the same intention in mind. Those specimens which exhibited a change in the orientation of a SSF have had this shearface counted as representing a single shearface, as although the orientation of the cut had altered it was still a continuation of the same act of butchery. Table 7·11 shows that the butchered sheep specimens in this assemblage exhibited 1111 shearfaces. Five hundred and seventy-six (51·9%) were made by saws and 487 (43·8%) were made by cleavers. What these figures suggest is that either individual butchers had no preferred preference in tool use, or, there was individual preference and this assemblage evidences butchery by different butchers who had differing tool preferences. Overall, what the butchered specimens which exhibited shearfaces demonstrate about tool usage is that there was no marked tool preference in the butchery of sheep. Further, there does not appear to be any specialisation in tool usage, with most cuts to any specific skeletal element displaying use of both saws and cleavers. Saws would appear to have been no more popular in making a cut than cleavers, and the frequency of saw to cleaver shearfaces supports this.

Table 7·11: Incidence of tools used to produce shearfaces on sheep skeletal elements

	SHEARFACE TYPE						
SKELETAL ELEMENT	NO. OF SSF	%	NO. OF CSF	%	NO. OF SF	%	TOTAL
Parietal	4	40.0	5	50.0	1	10.0	10
Frontal	3	42.9	2	28.6	2	28.6	7
Occipital	3	30.0	6	60.0	1	10.0	10
Horn core	7	39.0	11	61.0	0	0	18
Mandible	5	71.4	2	28.6	0	0	7
Cervical vertebra	53	45.0	59	49.9	6	5.1	118
Thoracic vertebra	145	54.1	115	42.9	8	3.0	268
Lumbar vertebra	137	49.0	136	48.6	7	2.5	280
Sacral vertebra	13	50.0	12	46.2	1	3.8	26
Unpositioned vertebra	12	52.2	10	43.5	1	4.4	23

Table 7·11: Continued

	SHEARFACE TYPE						
SKELETAL ELEMENT	NO. OF SSF	%	NO. OF CSF	%	NO. OF SF	%	TOTAL
Rib	72	44.2	75	46.0	16	9.8	163
Sternum	6	100.0	0	0	0	0	6
Scapula	24	80.0	4	13.3	2	6.7	30
Humerus	16	66.7	8	33.3	0	0	24
Radius	10	76.9	3	13.1	0	0	13
Ulna	4	50.0	4	50.0	0	0	8
Pelvis	27	50.9	23	43.4	3	5.7	53
Femur	17	68.0	8	32.0	0	0	25
Tibia	17	85.0	3	15.0	0	0	20
Tarsals	1	50.0	1	50.0	0	0	2
TOTAL	576	51.9	487	43.8	48	4.3	1111

7·2·2 Cattle

The cattle faunal remains which displayed butchery on St Helena are all from physically mature individuals. Each skeletal grouping will now be discussed.

7·2·2a Vertebra specimens

7·2·2ai Cervical vertebra specimens

There was a total absence of any atlas vertebra specimens, or any cranio-facial bones. This supports the contention that beef was imported to the island following slaughter, the skull being discarded following its division from the cervical vertebrae. The lack of any atlas specimens in the assemblage indicates that this separation took place at the atlas/axis interface. There were five axis specimens which exhibited transverse shearfaces located at their anterior ends. Four of these shearfaces had the effect of removing the anterior

articular process, and these are viewed as representing the division of the atlas from the axis.

There were twenty-nine butchered cervical vertebrae specimens in the assemblage. The pattern of butchery that these specimens indicate is as follows:

1. Mid-line longitudinal bisection of the carcass.

2. Defleshing of the cervical vertebrae or neck.

3. Random transverse and oblique bisection of the defleshed neck.

There were no intact cervical vertebrae in the assemblage, and none of the butchered specimens indicated that longitudinal bisection of the neck had not taken place. Twenty-five of the twenty-nine butchered specimens displayed mid-line longitudinal shearfaces. The four butchered specimens which did not exhibit longitudinal shearfaces were lateral fragments which did not represent the medial portion of the vertebra where longitudinal shearfaces are present.

That the neck was defleshed was concluded from three sources:

1. Cut marks on the cervical vertebrae.

2. Random located transverse and oblique shearfaces.

3. The ethnoarchaeological and documentary data base.

One of the butchered specimens exhibited two parallel cut marks which were interpreted as possibly representing the boning out of the neck. This was supported by the transverse and oblique shearfaces present on seventeen specimens. The ethnoarchaeological and documentary data bases both contain many cases where the neck was defleshed. Often, if the bones where to be subsequently used for purposes such as soup bones then the neck was randomly cut into portions of size suitable for cooking. Random reduction of the neck would produce portions of uneven width and with variation in the orientation of shearfaces. If vertebrae are being butchered into chops, then there is marked standardisation in the width of the portions cut and in the orientation of shearfaces. If they are being cut into soup bones then the archaeological specimens would display marked variation in width and in orientation of shearfaces. The cervical

vertebra specimens in the St Helena assemblage display both marked variation in the width of the portions and also marked variation in the orientation of transverse and oblique shearfaces. It is therefore concluded that the neck region of cattle carcasses were defleshed and the cervical column subsequently reduced into portions to be used for making soup bones or for similar purposes.

7·2·2aii Thoracic vertebra specimens

There were twenty-nine thoracic vertebral specimens which exhibited butchery marks in the form of shearfaces. All but one specimen exhibited mid-line longitudinal bisection of the carcass in order to produce two halves or sides. This single specimen was a relatively small fragment and it is quite possible that the vertebra it originated from was bisected longitudinally. This specimen did, however, exhibit a single transverse shearface as did twelve of the twenty-eight specimens which exhibited longitudinal shearfaces. Based upon the ethnoarchaeological and documentary cases these transverse shearfaces are interpreted as representing rib roasts. The transverse bisection exhibited by these cuts is viewed as only going as far as bisecting the vertebrae, with the intercostal muscles between the ribs not being severed. These transverse cuts are seen to have been made in order to make the division or carving of the cooked unit easier.

While twelve of the twenty-eight specimens exhibiting longitudinal shearfaces also exhibit transverse shearfaces, four definitely did not exhibit transverse shearfaces. The remaining twelve were so fragmented as not to permit conclusions to be made whether the vertebrae were or were not bisected transversely. The four specimens which definitely did not exhibit transverse shearfaces are, based on the ethnoarchaeological and documentary data, are indicative of the thorax having been defleshed and this musculature been rolled into a boneless cut, commonly called a rolled roast of beef.

7·2·2aiii Lumbar vertebra specimens

There were sixteen lumbar vertebra specimens in the assemblage which exhibited butchery marks in the form of shearfaces. Using the data base of the ethnoarchaeological and documentary cases it is possible to reconstruct the butchery practised on St Helena in the lumbar region. The shearfaces on the archaeological specimens have been interpreted as representing:

1. Mid-line longitudinal bisection of the carcass.

2. Conversion of the lumbar region into T-bone steaks.

3. Defleshing.

All but two of the butchered specimens exhibited mid-line longitudinal shearfaces. Neither of these two definitely did not exhibit a longitudinal shearface. Both were lateral fragments and the possibility that a mid-line longitudinal shearface had existed medial to them on the vertebra cannot be disregarded.

The transverse shearfaces present on the specimens are indicative of the lumbar region undergoing secondary butchery in order to produce T-bone steaks. These are units which contain a portion of the lumbar vertebra, which includes the transverse process (which forms the T) but generally does not include the spinous process. There were present in the assemblage specimens which in addition to exhibiting longitudinal and transverse shearfaces also exhibited an additional obliquely oriented shearface which would have resulted in the removal of the spinous process. This evidence for the removal of the spinous process is seen as supporting the interpretation that transverse shearfaces represent the secondary butchery pattern of cutting of the lumbar or loin region into T-bone steaks.

Those archaeological specimens which definitely did not exhibit transverse shearfaces are interpreted as representing defleshing of the loin. According to the ethnoarchaeological and documentary data the loin region is and was often defleshed by both amateur and professional butchers as it is from this region of the carcass that boneless units such as fillet, sirloin and porterhouse are cut. It is these cuts which are envisaged to have been cut off the archaeological specimens which do not exhibit transverse shearfaces.

7·2·2aiv Sacral vertebra specimens

There were three sacral specimens in the assemblage, all of which originated from the first vertebra of the sacrum. All three specimens exhibited mid-line longitudinal shearfaces which were interpreted as representing bisection of carcasses into sides of beef. In addition to these longitudinal shearfaces these specimens exhibited additional shearfaces which have been interpreted on the bases of the ethnoarchaeological and

documentary data as representing transverse division of the hind leg from the lumbar region. In addition to these transverse shearfaces, one specimen also exhibited a longitudinal shearface passing through the wing of the sacrum. This pattern of butchery is not present in the ethnoarchaeological or documentary cases. This shearface has been interpreted as representing a cut designed to separate the sacrum from the pelvis, and possibly relates to defleshing activities taking place in this area.

7·2·2av Unpositioned vertebra specimens

There were twelve fragmented vertebral specimens which exhibited shearfaces but which could not be reliably positioned to any of the four major sections of the vertebral column discussed above. All twelve displayed mid-line longitudinal bisection of the carcass sides as a result of a single longitudinal shearface.

7·2·2avi Summary of vertebra specimens

1. The cervical vertebrae evidenced division between the vertebral column and the skull taking place at the atlas/axis interface. The pattern of butchery evident on these bones suggested defleshing with the bone being sawn randomly, either transversely or obliquely into portions to be used as soup bones.

2. The thoracic vertebrae displayed both defleshing and transverse cuts designed to make subdivision of a cooked rib roast unit easier.

3. The lumbar vertebrae suggested defleshing in some instances, and in others, the transverse cutting of T-bone steaks.

4. The sacrum exhibited two patterns of butchery in addition to mid-line longitudinal bisection. They evidenced separation from the lumbar region, as well as, separation from the pelvis through division of the wing of the sacrum.

7·2·2b Rib specimens

There were forty rib specimens in the assemblage which exhibited shearfaces. The analysis of the patterning of these marks based on the ethnoarchaeological and documentary data revealed four patterns of primary butchery and one pattern of secondary butchery. The four patterns of primary butchery can be defined as follows:

1. Mid-line longitudinal bisection of the carcass into sides via transverse bisection to the rib necks on one or possibly both sides of the carcass, as an alternative to mid-line longitudinal bisection of the thoracic vertebrae.

2. Removal of the brisket unit via transverse bisection of the ventral end of the rib shaft.

3. Reduction via a transverse bisection of the the rib cage along the line of the mid point of the ribs to produce a dorsal half and a ventral half.

4. Reduction via two transverse bisections of the thorax region into three units of equal length in order to produce a dorsal, mid and ventral portion.

The single pattern of secondary butchery evident was that of reducing what are interpreted as being ribs which had been defleshed into short lengthed units (approximately 5 centimetres in length) for use as soup bones or possibly for grilling as spare ribs.

7·2·2c Calcified rib cartilage specimens

There were two calcified rib cartilage specimens, both of which exhibited single oblique shearfaces. One had its shearface located close to its interface with the sternum and this has been interpreted as representing division between the rib cartilages and the sternum. This is seen as possibly the area where mid-line longitudinal bisection of the carcass took place ventrally, as the only sternal remain to evidence shearfaces did not exhibit this taking place through the dorso-ventral axis of the sternum. The second butchered specimen was a small fragment and it was not possible to locate from which position it originated from along the dorso-ventral axis of the rib cartilage. It was not even possible to tell if the shearface was located dorsally or ventrally. Hence this specimen could tell us little about the pattern of butchery in this region.

7·2·2d Sternum specimens

The assemblage contained a single sternal specimen which exhibited two shearfaces. One of these evidenced transverse bisection of the sternum while the other is much more difficult to interpret. The second shearface was oriented longitudinally through the dorsal aspect of the sternum parallel to the anterio-posterior plane. An explanation for this shearface could not be found as none of the ethnoarchaeological or documentary cases evidenced it.

7·2·2e Scapula specimens

There were four scapula specimens which exhibited transverse shearfaces. The sample size is too small to make definite conclusions as to the pattern of butchery practised in the scapula region. This is further complicated by the fact that the location of the shearfaces present on the butchered specimens does not fit any of the patterns present in either the ethnoarchaeological or documentary cases. Possibly these specimens represent scapulae which had been defleshed and then randomly cut into portions to be used as soup or broth bones.

7·2·2f Humerus specimens

There was only one specimen from a humerus which exhibited a shearface. This shearface was longitudinally oriented in the dorso-ventral plane and located on the lateral side of the lateral tuberosity passing through the inter-tuberal groove. This mark is difficult to explain, and with the assemblage evidencing only four humerus specimens, statements regarding the pattern of butchery exhibited by cattle humeri can not be made.

7·2·2g Radius/Ulna specimens

The butchered radius and ulna specimens are discussed together because they represent a single skeletal unit, and some of the butchered ulna specimens were fused to their respective radius. Furthermore, many of the shearfaces exhibited on the butchered specimens cut through both radius and ulna and thus represented the same act of butchery. Overall, the assemblage evidenced three butchered fused radius/ulna units, ten butchered radii and one virtually intact radius, and eleven butchered ulnae.

The butchered radius and ulna specimens displayed three patterns of butchery. All three of these patterns exhibited a degree of non-functional variation as to the exact position of the bisecting cuts which demonstrate these patterns. The three patterns of butchery were:

1. Conversion of the radius/ulna unit into a fore shank and a fore knuckle.

2. A functional variation on the first pattern.

3. Transverse bisection of the radius/ulna unit into three portions: a dorsal, mid, and ventral portion.

The first pattern was achieved as a result of separating the humerus from the radius/ulna, and then bisecting the radius/ulna transversely in the mid-shaft region. The separation of the humerus from the radius/ulna was achieved three ways:

1. Transverse cuts through the humeral articular surface of the ulna and through the semilunar notch of the ulna.

2. Oblique cuts through the proximal end of the ulna, following a line from the dorso-lateral end of the olecranon to the semilunar notch. This cut may or may not be evident on the radius.

3. Either longitudinal or oblique cuts through the process anconæus in order to remove this process and the semilunar notch from the ulna.

In conjunction with the use of saws and cleavers used to produce the cuts there was evidence that a sharp-edged implement most likely a knife was used to cut tendons not severed by saws or cleavers. These three methods of humerus-radius/ulna separation are viewed as non-functional or individual variations as their intention was the same in all cases.

The second pattern was viewed as representing a functional variation on the first pattern. The variation is that instead of the separation between the humerus and the radius/ulna being made through the proximal ulna, it was made either transversely or slightly obliquely through the proximal end of the radius. This cut is then inferred to continue transversely through the ulna. Although the intention is the same as the first

pattern, the difference in location and size of the fore shank unit produced are regarded as significant enough to describe this as a separate functional pattern.

There was one butchered radius specimen which did not fit any of the above patterns outlined. This specimen exhibited a very distally located shearface. This shearface has been interpreted as possibly representing trimming at the distal end of a fore limb during butchery.

The assemblage contained one virtually intact radius. This bone is inferred to represent either the cooking of a whole radius/ulna unit which had undergone no butchery, or else it represents a bone discarded following the removal of its associated musculature. That is, this bone may represent defleshing of the lower fore limb region.

7·2·2h Carpal specimens

There were thirteen intact or virtually intact carpal bones present in the assemblage. Only one of these bones displayed any butchery marks. This was an intact carpal 2+3 which exhibited a small transverse shearface. The high degree of intactness of the carpal bones and the tarsal bones, the low incidence of butchery marks, the complete absence of metacarpals, and the near complete absence of phalanges, indicate that these bones represent the fore limb extremity of the carcasses or sides of beef supplied to St Helena. The single shearface is indicative of division of the fore limb at the interface of the carpal bones with the metacarpal. The metacarpals and phalanges being discarded as slaughter waste at the off island point of slaughter. The historical documentation strongly points to beef being imported to the island as slaughtered sides. The absence of metacarpals and phalanges supports this. The pattern of butchery evidenced on the radius/ulna bones suggests that the metacarpal bones present in this assemblage would have been part of a fore knuckle unit.

7·2·2i Pelvis specimens

It was not possible to make any conclusions as to the pattern of butchery which was carried out in the pelvic region of the carcass. This was because there were only two pelvic fragments which exhibited butchery marks. One displayed a shearface at the anterior end of the iliac shaft and the other a transverse shearface on the pubic articular

surface of the acetabulum and a transverse cleaver mark on the acetabular branch of the ischium.

7·2·2j Femur specimens

As for the pelvis specimens, a single butchered femur specimen was insufficient to allow any conclusions to be made regarding the pattern of upper leg butchery as practised on cattle carcasses on St Helena. Not only are there few femur specimens exhibiting butchery marks but all skeletal elements from the upper leg region are scarce in this assemblage. The sole butchered femur specimen present exhibits a single transverse shearface perpendicular to the lateral supra-condyloid crest. This is indicative of a cut made to bisect the femur approximately a third of the way from the distal end. Based on the documentary cases, this shearface may represent the proximal border of a hind shank or shin bone unit for use in soups. This would mean that the shearface was made once boneless meat units had been cut from this region. There is limited support for this from the tibia specimens discussed below.

7·2·2k Patella specimens

There was a single patella which exhibited butchery marks. This patella, which was virtually intact evidenced a longitudinally oriented shearface on its lateral side. This is an unusual butchery mark, the most probable location for a shearface on the patella, based on the ethnoarchaeological and documentary cases, being at the distal end, and one oriented transversely rather than longitudinally. This would evidence bisection of the distal femur with the proximal tibia. Exactly what this specimen is portraying is unclear as there are no ethnoarchaeological or documentary cases which would display such a shearface.

7·2·2l Tibia specimens

As with the upper leg region the lower also suffers from a small sample which makes interpretation of butchery patterns virtually impossible. There were three tibia specimens which exhibited butchery marks. One of these specimens exhibited a transverse mid shaft shearface. It is possible that this specimen represents the distal end of a hind shank or shin unit, with that portion of the tibia distal to this cut representing a hind knuckle.

The other two butchered specimens exhibited a pattern of butchery which indicates possible random bisection of the lower leg following defleshing, with bone portions being indicative of soup bones. The low sample size however neither supports or disclaims this possibility. One of these two specimens exhibited an oblique shearface located at the proximal end of the shaft. This is too high on the bone to be indicative of a cut made to produce a hind shank or shin and hind knuckle units. The presence of a longitudinally oriented cleaver mark on the internal surface of this specimen's cortex indicates that this specimen most probably originated from a tibia which was randomly reduced into smaller portions for their eventual use as soup bones. The second of the specimens in this group also exhibited this pattern with a transverse shearface located close to the distal end of the shaft and a cleaver mark located close to the proximal end of the shaft. This cleaver mark has been interpreted as representing an unsuccessful attempt at creating a shearface with the successful attempt being located proximal to the end of this fragment. This inferred pattern would have produced a shaft portion, most likely for use as a soup bone, if it had been defleshed first. Alternatively, it could represent a meat bearing unit for use in stews, or the butchery marks may be indicative of marrow extraction. However, the sample size is just too small to decide between these possibilities. Overall, there is just too few hind leg specimens to make conclusions about butchery patterns for this portion of a beef carcass which is so important in terms of usable meat.

7·2·2m Tarsal specimens

The assemblage contained an intact talus and an intact centroquartal, a virtually intact calcaneus, as well as one virtually intact tarsal 2+3 . The intact centroquartal displayed a number of short lengthed transverse cut marks at its base. This evidence of butchery, taken into consideration with the intactness of the other two tarsal bones, the complete absence of metatarsal bones in the assemblage, and the almost complete absence of phalanges, support the historical documentation that beef was imported to the island in the form of carcasses, in all likelihood as sides of beef. These bones, and the lack of those bones distal to them, indicate that the carcasses or sides of beef imported to St Helena had had their lower hind legs removed at the tarsal/metatarsal interface, most probably with a knife. Therefore, the metatarsals and phalanges represent slaughter waste, and their virtual absence from this assemblage supports the contention that cattle were not slaughtered on St Helena.

7·2·2n Phalanx specimens

There was one intact right second phalanx present in the assemblage. It is very difficult to explain its presence since there were no other phalanx specimens nor any metatarsal specimens. Its presence does not negate the contention that beef was imported to St Helena as slaughtered carcasses or sides. It does however suggest the possibility that at least one cattle beast was slaughtered on the island, or else, at least one carcass or side of beef was sent to the island with its lower leg still attached.

7·2·2o Tool usage

The butchered cattle skeletal elements displayed 231 shearfaces (Table 7·12). One hundred and fifty-four (66·7%) of these shearfaces were produced by a saw, 71 (30·3%) were produced by a cleaver, and the remaining six shearfaces (2·6%) did not clearly demonstrate whether a saw or a cleaver had been resposible for them. What these shearfaces tell use is that use of saws in the butchering of cattle dominated at a ratio of 3:1 over the use of cleavers. This pattern in which saws dominate over the use of cleavers is true for all cattle skeletal elements which had a sample size of more two butchered specimens.

The dominance of saws over cleavers has been interpreted as relating to the thickness of the bones, not only their overall thickness but also the thickness of their cortex. This is seen as meaning that more work would be required in producing clean cuts, than would be the case for sheep bones. The greater thickness of cattle bones compared to sheep bones is seen to increase the likelihood of unsuccessful cleaver blows being administered, resulting in repeated blows being needed to effect a cut through a bone. These multiple cleaver blows would produce jagged edges which would require trimming and thus produce waste. Saws are explained as dominating in the butchery of cattle because they produce a cleaner cut than do cleavers which do not require the degree of trimming and thus meat loss that cleavers do. The dominance of saws over cleavers is therefore seen as resulting out of economic efficiency, with saws being more efficient than cleavers.

The vertebra specimens evidenced a pattern of tool usage which differed from the overall ratio of 3:1 in favour of saws over cleavers to one of 3:2 for longitudinal shearfaces. A possible reason for this variation is seen to relate to the exporting of carcass sides to St Helena at a time when refrigeration was not available. Interviews with

elderly New Zealand butchers informed that cleavers were generally the preferred tool in bisecting a beef carcass because because use of a saw produced a bone dust which turned to a paste when mixed with the spinal cord. This paste tended to increase the likelihood of meat spoiling. The slightly higher frequency in use of cleavers in the longitudinal bisection of the carcass is seen as resulting from a possible attempt at minimising the likelihood of the carcass sides spoiling during their transportation to St Helena.

Table 7·12: Incidence of tools used to produce shearfaces on cattle skeletal elements

	SHEARFACE TYPE			
SKELETAL ELEMENT	NUMBER OF SSF	NUMBER OF CSF	NUMBER OF SF	TOTAL
Cervical vertebra	29	14	2	45
Thoracic vertebra	23	20	1	44
Lumbar vertebra	16	12	0	28
Sacral vertebra	4	2	0	6
Unpositioned vertebra	7	5	0	12
Rib	37	5	0	45
Calcified rib cartilage	2	0	3	2
Sternum	0	2	0	2
Scapula	4	1	0	5
Humerus	0	1	0	1
Radius/Ulna	27	6	0	33
Carpals	0	1	0	1
Pelvis	1	1	0	2
Femur	1	0	0	1
Patella	1	0	0	1
Tibia	2	1	0	3
TOTAL	154	71	6	231
PERCENTAGE	66·7	30·7	2·6	

7·2·3 Pig

The assemblage contained virtually no pig bone. There were only fifteen specimens identified as originating from a pig carcass. Of these only three exhibited any butchery marks. Coupled with this, there was limited fusion data but there was evidence based on size and the texture of the outer cortex of specimens which suggested that these could be placed into three separate age categories. These were:

1. Mature (> 6 months).

2. Immature (< 6 months but > 3 months).

3. Feotal or newborn (< 3 months).

The ethnoarchaeological and documentary cases point to there being different butchery strategies for different pig age classes and also different strategies of butchery depending upon the type of final product desired, within the first two age categories. The ethnoarchaeological and documentary data on pig butchery indicated that this animal had the potential to have the greatest degree of functional variation in butchery. In order to have determined the pattern of pig butchery on St Helena, a far larger sample of specimens would have been required. The few specimens which are evident give no indication as to this pattern.

7·3 Summary

7·3·1 Sheep butchery pattern

The sheep faunal remains in the assemblage indicated that sheep were slaughtered and butchered on St Helena. This was demonstrated by the fact that all skeletal elements were represented in the assemblage. However, the proportions of the skeletal elements present did not equate to their proportional representation in the skeleton. This was particularly the case for the cranio-facial bones and the bones of the limb extremities, especially the phalanx bones. This is seen as resulting from differential deposition and not non-human taphonomic factors. Those skeletal elements which have a lower representation in the assemblage than what would be expected if every bone from the same animal was deposited in the exact same locality are those, which based upon the ethnoarchaeological

and documentary cases would be expected to be discarded as slaughter waste. It is therefore concluded that low incidence of these bones reflects deposition of slaughter waste in most instances in a different locality of the midden than that which was excavated.

The sheep faunal specimens exhibit an extremely complex pattern of butchery resulting from functional and non-functional variation in both primary and secondary or culinary butchery practices. The degree of variation in primary and secondary strategies or patterns of butchery which this assemblage evidenced, and the potential to mix different patterns made it extremely difficult to determine the pattern of sheep butchery on St Helena. However, detailed recording of the location and orientation of butchery marks on the archaeological specimens and use of the data on butchery practices recorded in the ethnoarchaeological and documentary cases enabled primary and secondary butchery to be determined for the assemblage. Through comparison with the ethnoarchaeological and documentary models it was possible to determine locations on the limb bones where the pattern of butchery on St Helena differed from that portrayed by these models. By comparison with the models and use of the data they were based upon it was possible to define a generalised outline of slaughter and primary butchery for St Helena.

Slaughter butchery practices commence once an animal has been killed, bled, skinned and the viscera removed. On St Helena these practices involved:

1. The removal of the carpals, metacarpals and fore phalanges.

2. The removal of the metatarsals and hind phalanges.

3. The removal of the head (containing the cranio-facial and hyoid bones) at either the occipital/atlas interface or else at the atlas/axis interface.

Once the head had been severed from the rest of the carcass the horns were transversely cut from the frontal bone. An explanation as to why this took place could not be found but it would appear that sheep horns were being taken for some purpose, the horn core being discarded with the rest of the slaughter waste. Following removal of the horns, the cranial vault was bisected longitudinally along its mid-line in order to permit the brain to be saved for consumption. Finally, the mandibles were transversely bisected in one of two locations in order to allow the tongue to be taken for consumption.

Primary butchery practices commence once a carcass has chilled. This usually means that the animal is slaughtered late in the afternoon and left to chill overnight, with both primary and secondary butchery taking place the following morning. Primary butchery relates to the major units that a carcass is cut into before being reduced into units for consumption. This latter butchery being known as secondary or culinary butchery. The generalised pattern of primary butchery evidenced by the St Helena assemblage for sheep is as follows:

1. Longitudinal bisection along the mid-line of the carcass into sides.

2. Transverse bisection of the cervical vertebrae (neck) from the rest of the carcass at the cervical/thoracic interface. This could occur either before or after longitudinal bisection of the carcass into sides.

3. Removal of the forelimb or shoulder (scapula, humerus and radius/ulna) by cutting through its muscular connections to the thorax region using a knife.

4. Transverse bisection of the thorax (thoracic vertebrae, ribs, rib cartilages and sternum) from the posterior half of the carcass at the thoracic/lumbar interface.

5. Transverse bisection of the lumbar vertebrae (loin) from the hind leg at either the lumbar/sacral interface or through a transverse cut located in the anterior half of the sacrum, which passes through the acetabulum. This would have produced a loin cut which may or may not have also contained what the ethnoarchaeological and documentary cases refer to as the chump (anterior sacrum and anterior pelvis).

6. Transverse bisection of the thorax through the dorso-ventral plane of the ribs producing a thoracic vertebrae/dorsal rib portion (rack) and a ventral rib/rib cartilage/sternum portion (breast).

There was no single pattern of primary butchery. The above is viewed as the dominant pattern of primary butchery. There were however two variations on this pattern which should be noted. Firstly, the shoulder was not always cut from the thorax. When it was left attached to the thorax, a transverse division (based on the ethnoarchaeological and documentary cases) was made between the 5th and 6th thoracic vertebrae and ribs. The end result of this was a shortened rack and a forequarter containing the first five thoracic vertebrae and ribs, and the forelimb.

The second significant variation on the generalised primary butchery pattern was that of transversely cutting the lumbar region from the carcass at the thoracic/lumbar and lumbar/sacral interfaces prior to mid-line bisection. The intention here was to produce a whole lumbar unit known as a saddle.

As stated above there was no one pattern of butchery and this is equally applicable to secondary butchery practices as it is to primary practices. The assemblage evidenced a series of different options available to the butcher at different stages of the butchery process. Figure 7·1 is an attempt to simplify these series of options and to demonstrate the various patterns of functional and non-functional variation practiced in the reduction of an animal to culinary units of consumption. The terms applied to the various units used in Figure 7·1 are skeletally defined in Table 7·13. The important thing to note in Table 7·13 is that quite often the same bone or even the set of bones can represent several different culinary units. This has ramifications in the area of meat weight calculations and will be discussed in the following chapter.

In terms of secondary butchery the assemblage exhibits two generalised patterns:

1. Butchery into large boiling or roasting units

2. Reduction of the carcass into small consumption units.

The second of these would appear to be the dominant pattern as evidenced by the relatively few intact non-butchered specimens present in the assemblage. Non-butchered intact specimens were interpreted as representing large units such as a whole forelimb or shoulder unit which would have contained the scapula, humerus and radius/ulna. In this particular case it has been interpreted that the forelimb would have been butchered such that a division was made at the humerus-radius/ulna interface but a division that did not necessarily completely separate these portions. That is, the musculature was not completely severed, leaving the fore shank attached to the forelimb cut. This seen as enabling any difficulty arising from the size of cut in cooking to be solved by bending the fore shank back or removing it at the cooking stage.

The second pattern of secondary butchery is evidenced in the assemblage by the reduction of the vertebral column and ribs into chops, and the limbs into smaller portions. There was considerable variation in the manner in which the hind leg was reduced into smaller portions as portrayed in Figure 7·1. The fore leg also displayed a variety of ways

to reduce it into smaller portions. The portions that the fore leg was reduced into were smaller than those for the hind leg. The fore leg was reduced in two ways:

1. The upper leg into chops when part of a forequarter.

2. Reduction into portions approximately 5 centimetres in width.

Overall, the St Helena sheep faunal remains evidence a marked variation in primary and secondary butchery.

Table 7·13: Skeletal definitions to butchery unit terms used in Figure 7·1

TERM	SKELETAL DEFINITION
Neck	Cervical vertebrae.
Half neck	Longitudinal half cervical vertebrae.
Long forequarter	Longitudinal half thoracic vertebrae, ribs, rib cartilages, longitudinal half sternum, scapula, humerus, radius/ulna, and carpals.
Forequarter	Longitudinal half 1st to 5th thoracic vertebrae, dorsal half 1st to 5th ribs, scapula, humerus, radius/ulna, and carpals.
Thorax	Longitudinal half thoracic vertebrae, ribs, rib cartilages, longitudinal half sternum.
Rack	Longitudinal half thoracic vertebrae, dorsal third, half or two thirds ribs.
Short rack	Longitudinal half 6th to 13th thoracic vertebrae, dorsal third, half or two thirds ribs.
Mid ribs	ribs (mid third of shaft).
Breast	Ventral third, half or possibly two thirds ribs, rib cartilages, longitudinal half sternum.
Fore limb	Scapula, humerus, radius/ulna, and carpals.
Shoulder	Scapula, proximal humerus and shaft, possibly distal humerus, possibly proximal radius/ulna.
Fore shank	Possibly distal humerus, possibly proximal radius/ulna, distal radius/ulna and shaft, and carpals.
Saddle	Lumbar vertebrae, possibly anterior sacrum, possibly ilium wing.
Loin	Longitudinal half lumbar vertebrae, possibly anterior longitudinal half sacrum, possibly ilium wing.

Table 7·13: Continued

TERM	SKELETAL DEFINITION
Hind leg	Pelvis (ischium, pubis, acetabulum, ilium shaft and possibly ilium wing), lateral half posterior sacrum, possibly lateral half anterior sacrum, anterior coccygeal vertebrae, femur, patella, tibia, and tarsals.
Leg	Pelvis (ischium, pubis, acetabulum, ilium shaft and possibly ilium wing), lateral half posterior sacrum, possibly lateral half anterior sacrum, anterior coccygeal vertebrae, proximal femur and shaft, possibly distal femur, patella, possibly proximal tibia.
Short hind leg	Pelvis (ischium, pubis, posterior acetabulum), anterior coccygeal vertebrae, proximal femur and shaft, possibly distal femur, patella, possibly proximal tibia.
Long upper leg	Pelvis (ischium, pubis, posterior acetabulum), anterior coccygeal vertebrae, femur, patella, tibia, and tarsals.
Upper leg	Pelvis (ischium, pubis, acetabulum, ilium shaft and possibly ilium wing), lateral half posterior sacrum, possibly lateral half anterior sacrum, anterior coccygeal vertebrae, proximal half femur.
Short upper leg	Pelvis (ischium, pubis, posterior acetabulum), anterior coccygeal vertebrae, proximal half femur.
Long chump	Pelvis (ischium, pubis, acetabulum, ilium shaft and possibly ilium wing), lateral half posterior sacrum, possibly lateral half anterior sacrum, anterior coccygeal vertebrae.
Fore chump	Pelvis (anterior acetabulum, ilium shaft and possibly ilium wing), lateral half posterior sacrum, possibly lateral half anterior sacrum.
Hind chump	Pelvis (ischium, pubis, posterior acetabulum), anterior coccygeal vertebrae.
Short leg	Femur, patella, tibia, and tarsals.
Lower leg	Distal half femur, patella, tibia, and tarsals.
Short mid leg	Distal half femur shaft, possibly distal femur, patella possibly proximal tibia.
Mid leg	Proximal femur and shaft, possibly distal femur, patella, possibly proximal tibia.
Hind shank	Possibly distal femur, possibly proximal tibia, distal tibia and shaft, and tarsals.

Figure 7.1: Generalised flow chart of the interpreted butchery pattern for sheep on St Helena Island

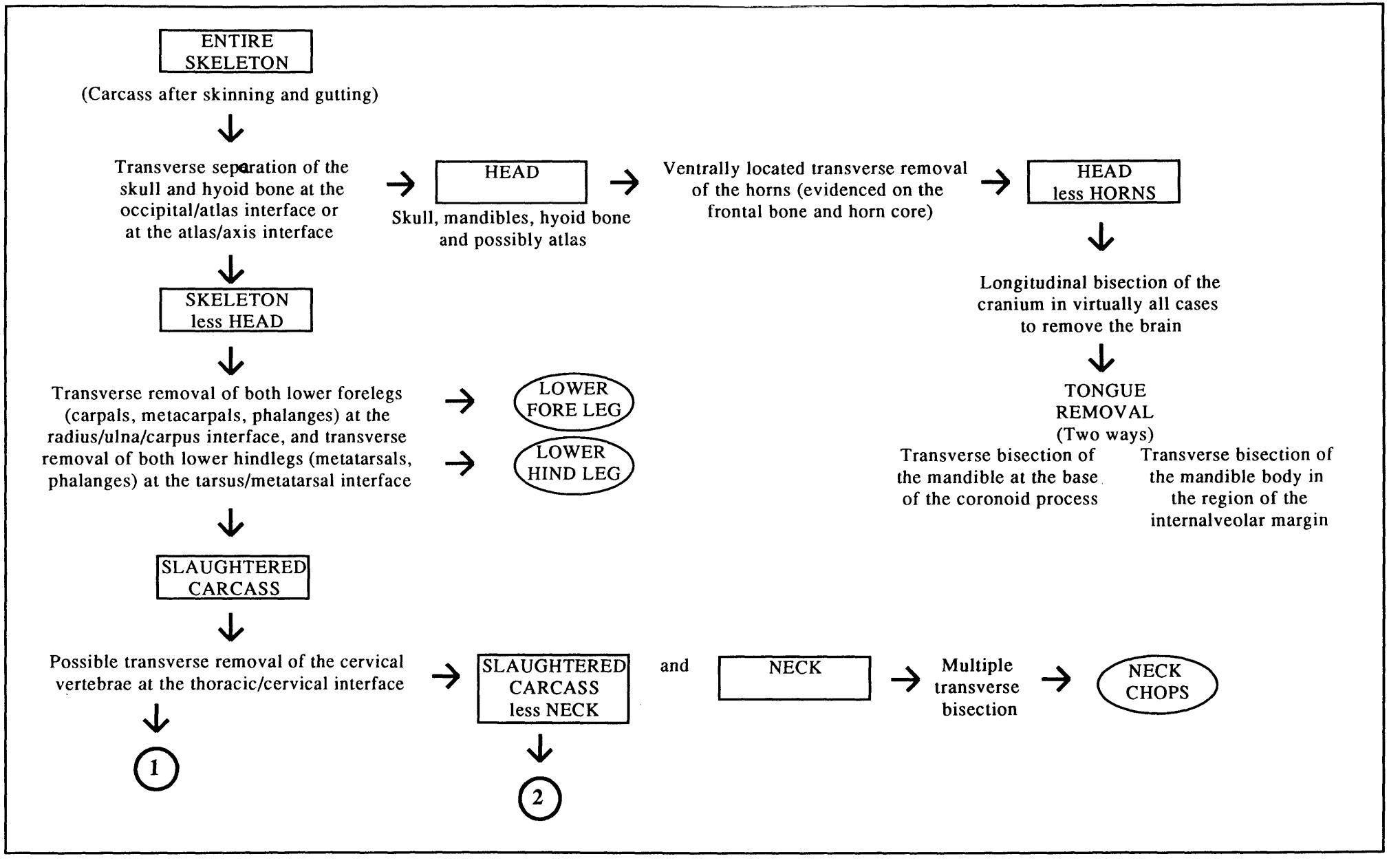
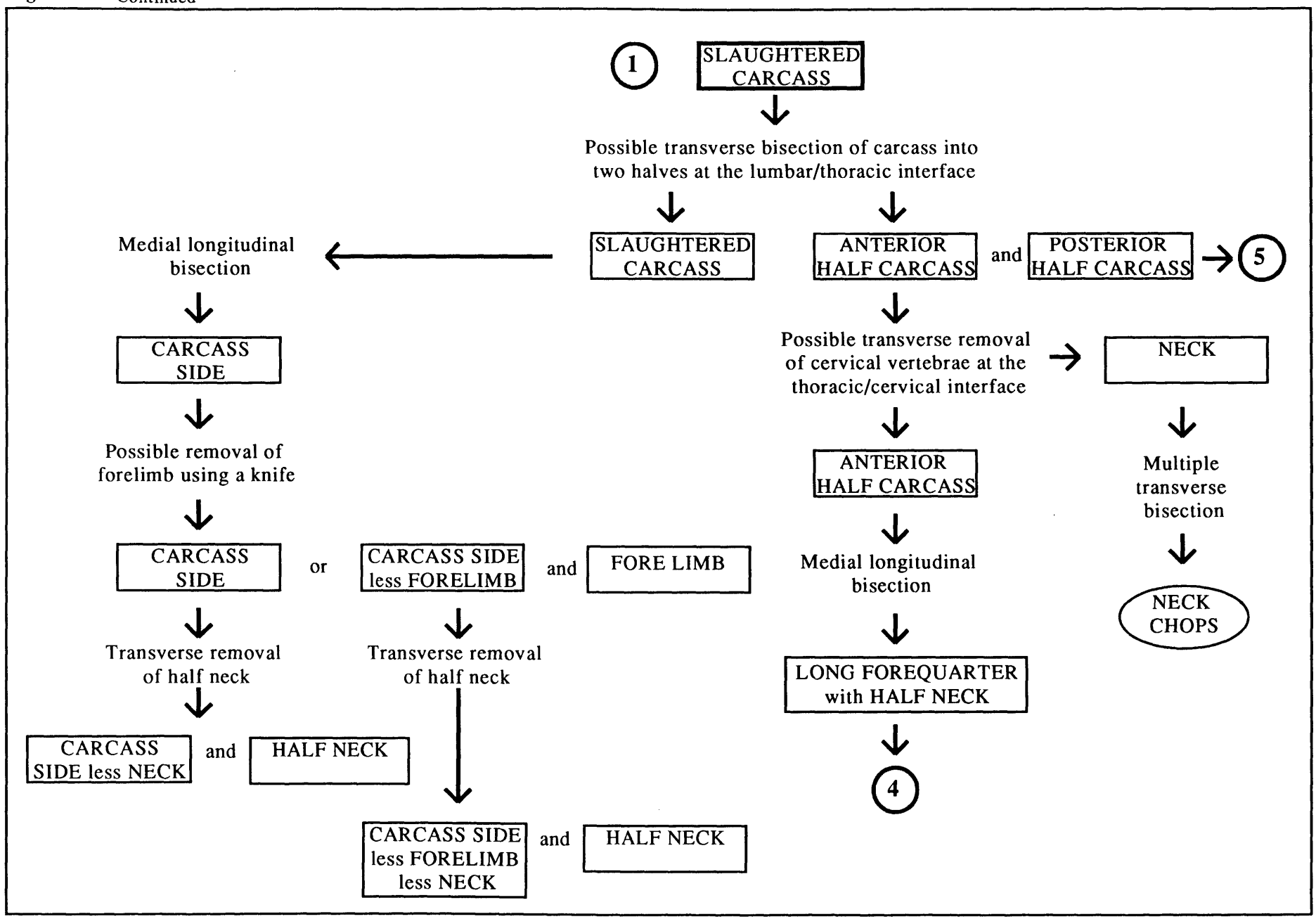


Figure 7.1: Continued



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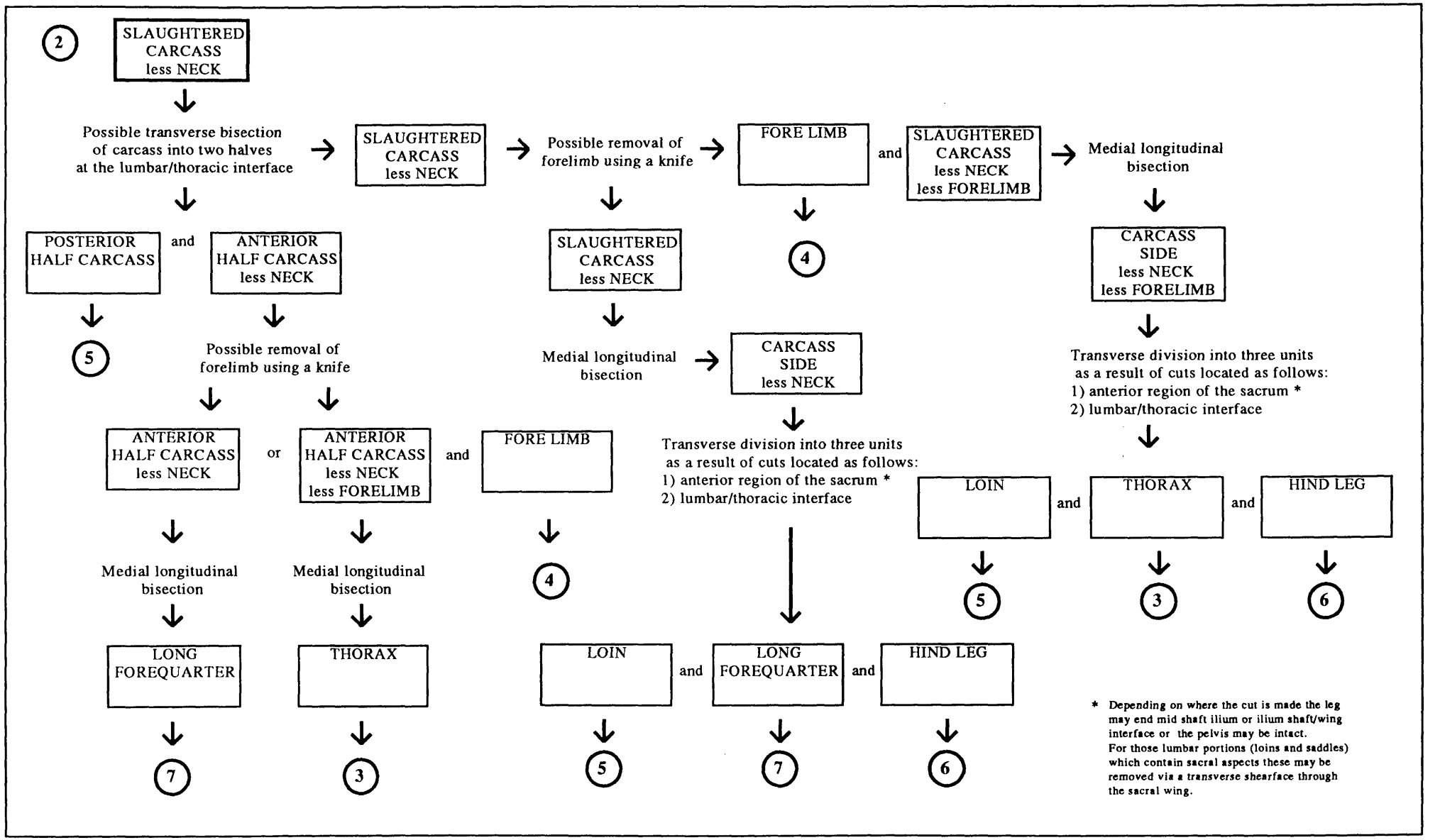

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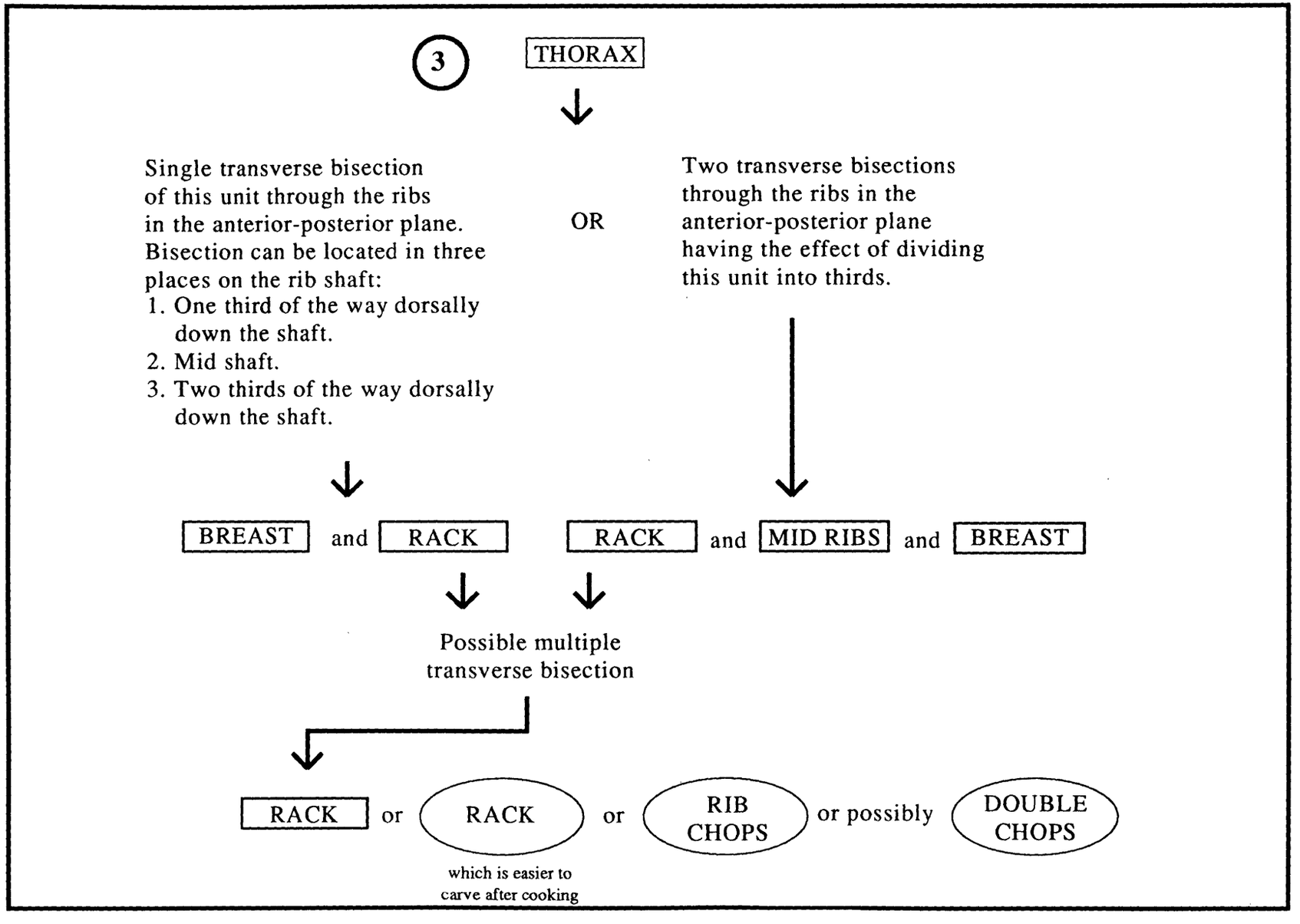

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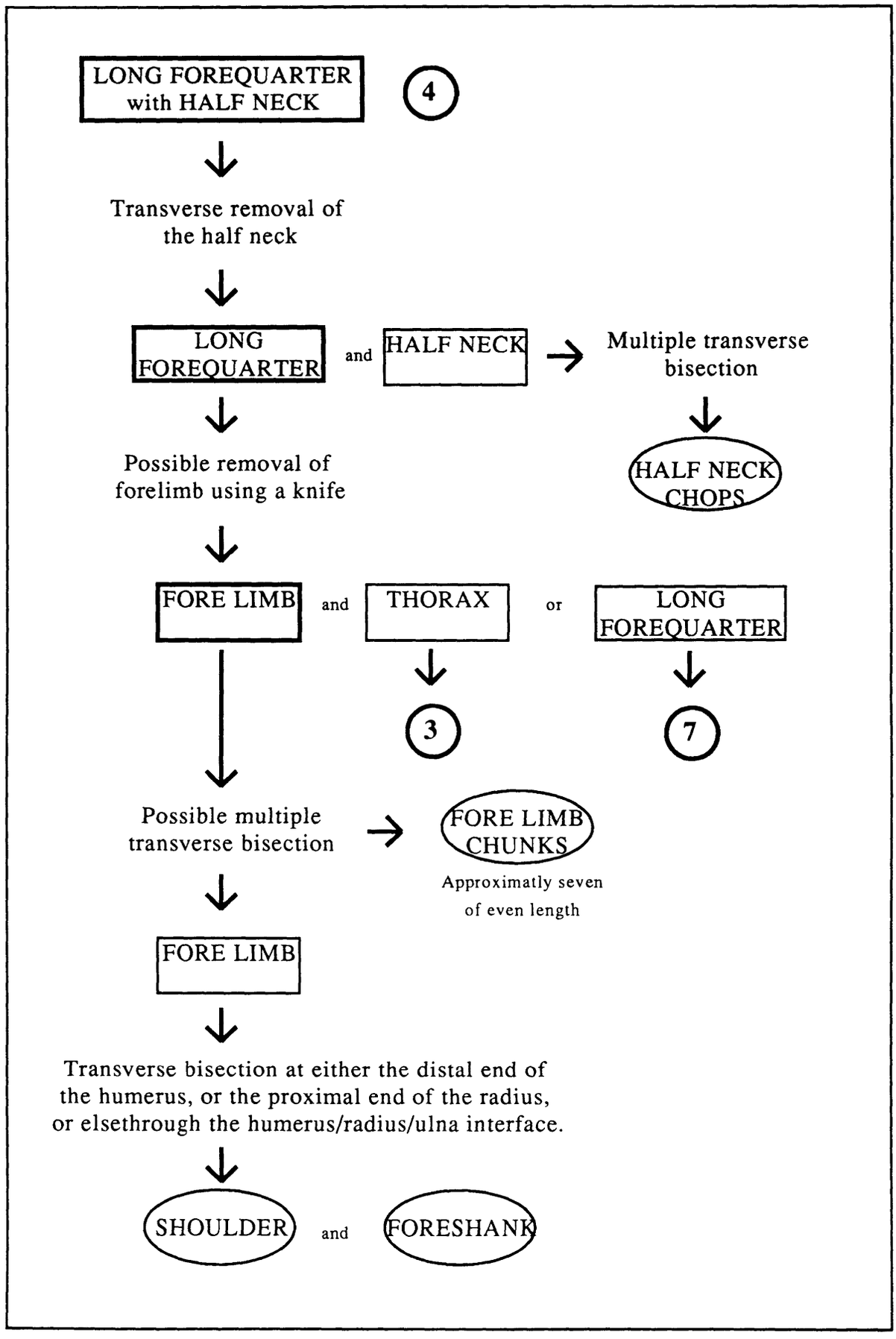

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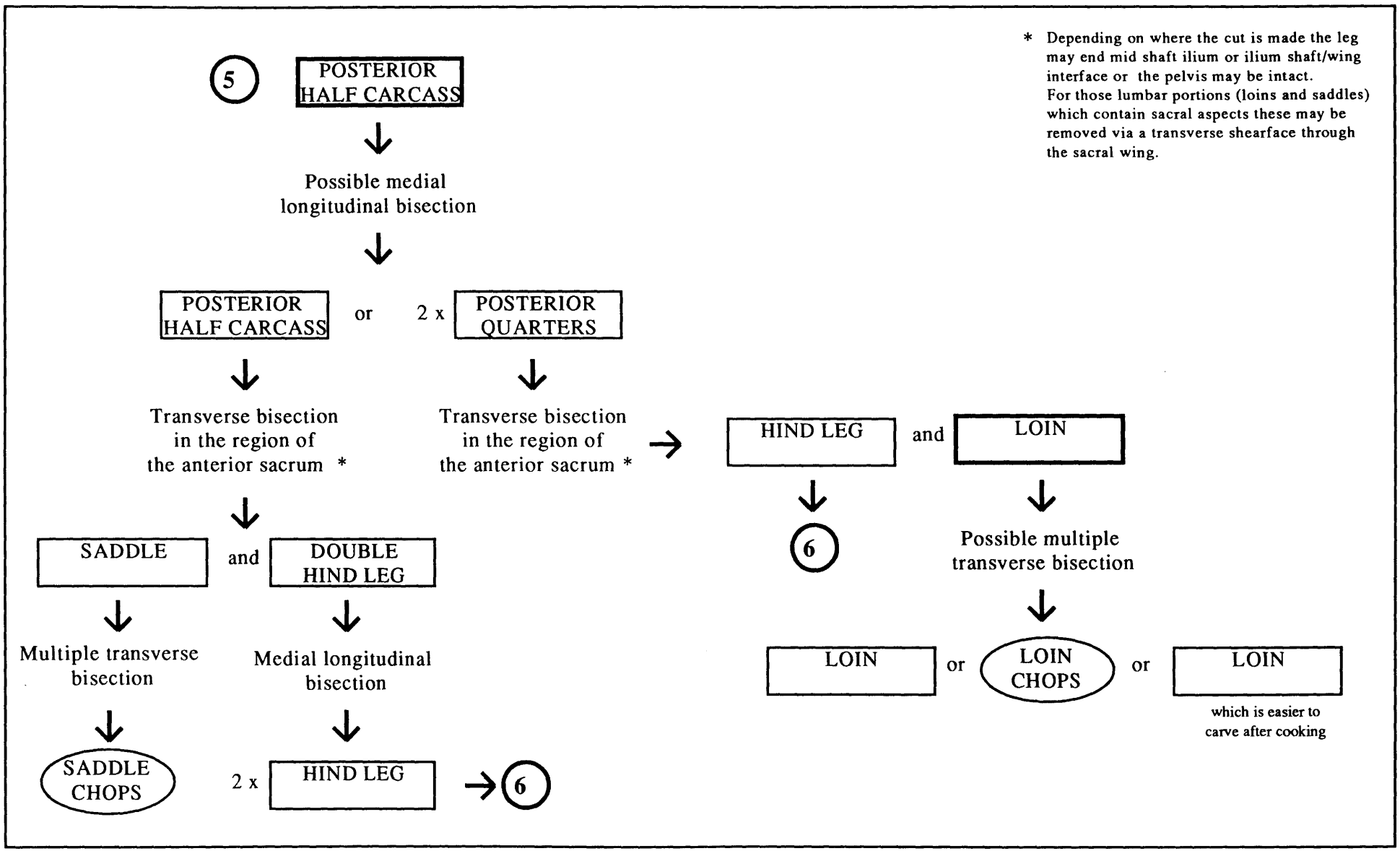

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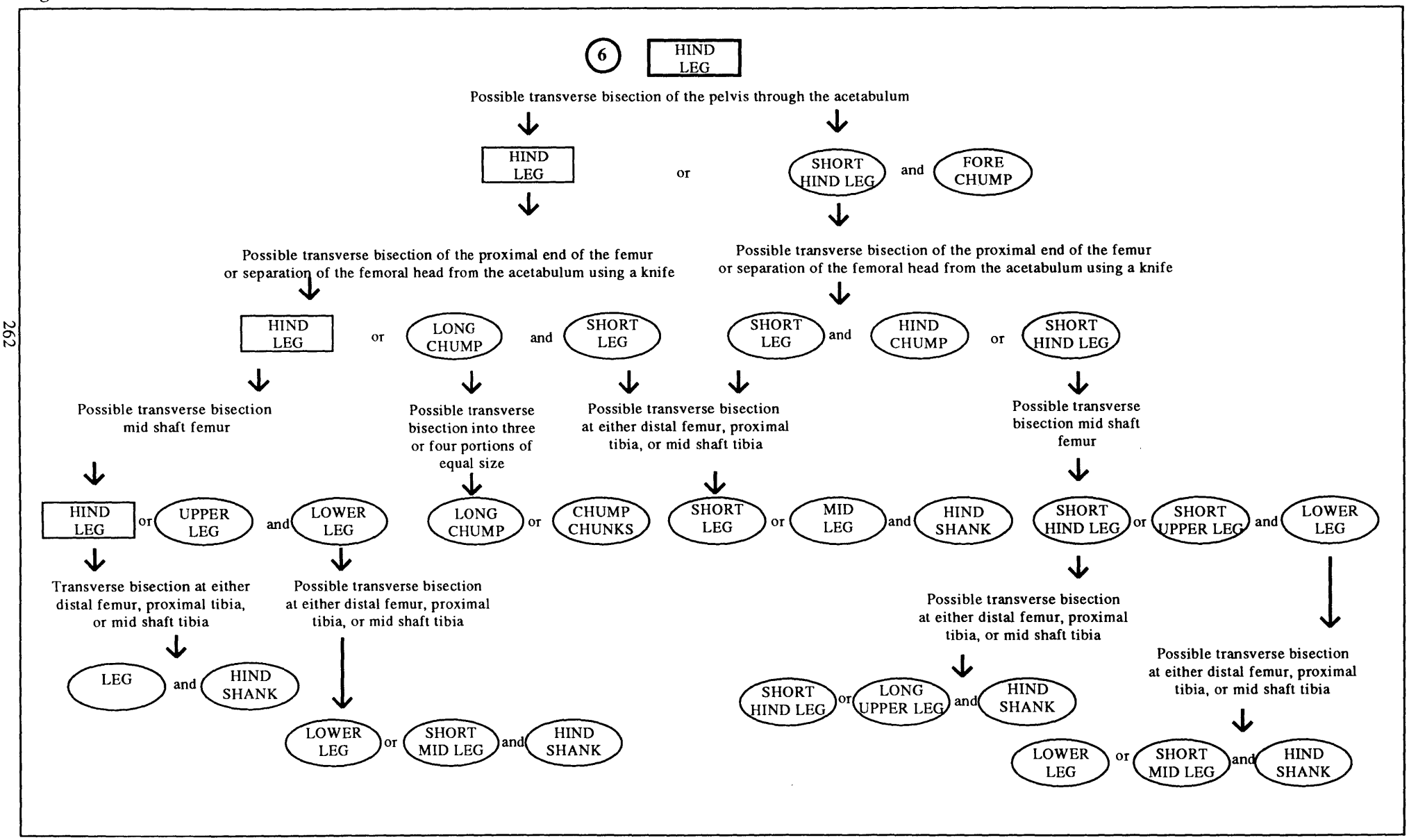

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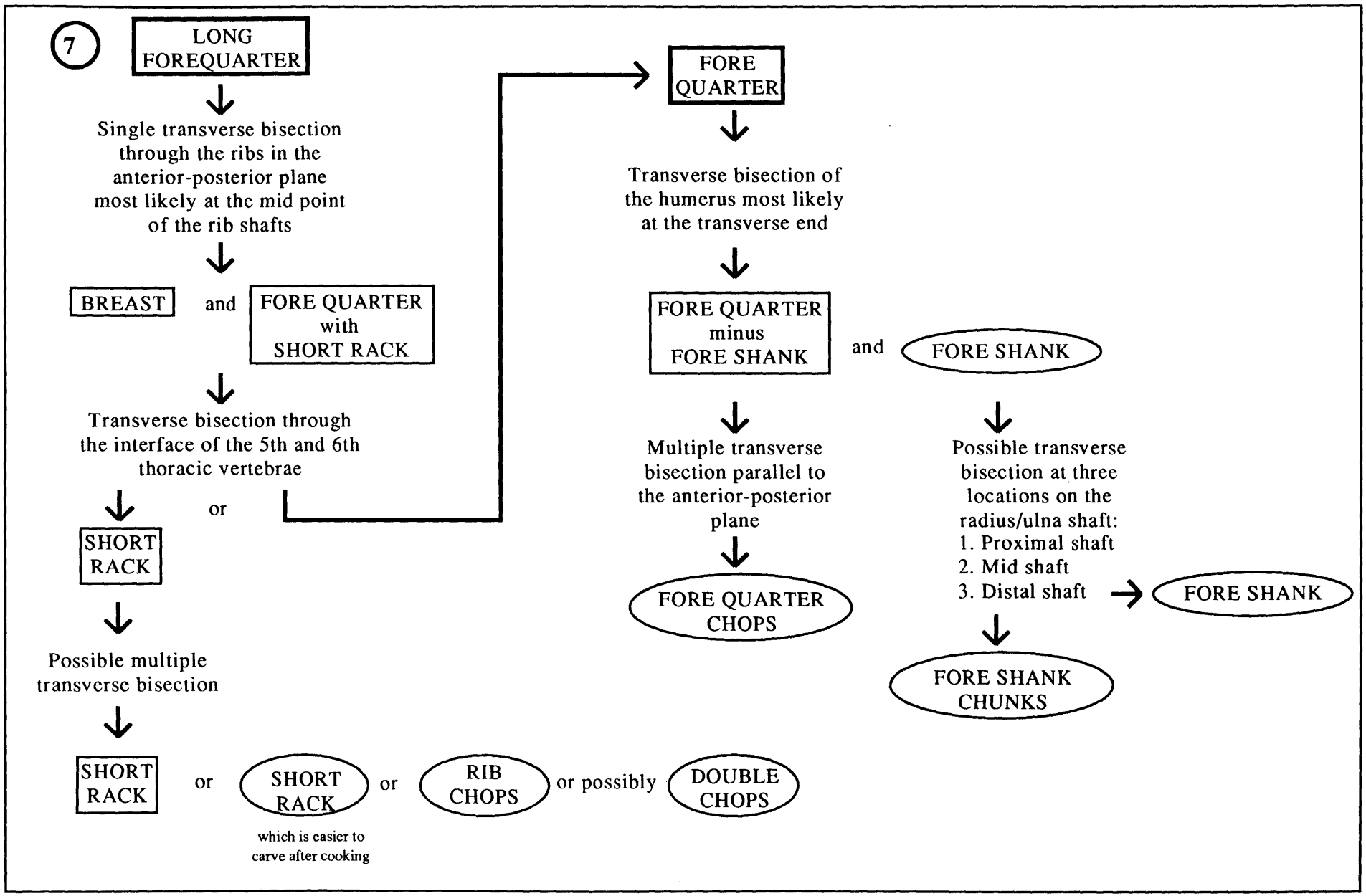

7·3·2 Cattle butchery pattern

Due to the relatively small sample of cattle bones in this assemblage and the even smaller number of skeletally identifiable bones exhibiting butchery marks, it is not possible to produce a flow chart, as was done for the sheep remains. However, a number of points can be made:

1. The absence of certain bones and the evidence of mid-line longitudinal bisection of the vertebral column, supports the historical evidence that beef was supplied to the island as slaughtered carcasses, almost certainly as sides of beef. These sides would have arrived with their metapodium, phalanges and skulls already discarded at the point of slaughter or at a dump site close to this point of slaughter.

2. The specimens (especially the vertebral column) indicate that meat was stripped off the bone producing boneless units of meat, and that the bones were subsequently converted to soup bones. Although this does not have much relevance to the calculation of consumed meat weights in a situation like St Helena where whole sides of beef are being imported, it does have significant ramifications to the calculation of consumed meat weights in those situations where this is not the case, such as the commercial urban situation.

3. Some areas of the carcass, such as the thorax and the lower forelimb exhibit multiple functional variation in the pattern of butchery practiced on them. This again has ramifications to the calculation of consumed meat weight figures.

7·3·3 Pig butchery pattern

There were insufficient pig remains to make any valid comments regarding the butchery of these animals.