# Tracing Dead Meat

## Butchering Animals in the Castles of Kastelholm and Raseborg in the 14th to 16th Centuries

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### Abstract

*This paper aims to explore aspects of food economics in the light of meat butchered and consumed in the castles of Kastelholm and Raseborg during the medieval and early modern period. Bones of domestic animals are a typical group of finds from archaeological sites that have been extensively studied but detailed analyses of butchery patterns are rare. Iconography from the 14th and 15th centuries and the bailiff's accounts from the castles in question from the 16th centuries are here compared with general patterns of butchery in the zooarchaeological material in order to see how the livestock in the castles were processed into foodstuffs. Whole animals, including heads and entrails, were used as food in the castles, and there seems to be a standardized pattern of butchery in Sweden during the period in question.*


## Introduction

A variety of different parts of animals were used as food during the late medieval and early modern period. Zooarchaeologists in Sweden have commonly considered different parts of animals as "rich in meat" or "low in meat" (head and feet: metapodials and phalanges). This division is often used to separate (food) waste after cooking (rich in meat) from waste (low in meat) that was already discarded after the primary butchery (e.g. During 1986, 64; Vretemark 1997, 30ff., 65; Sten 1992, 203; Tagesson *et al*. 2016, 302ff.). The aim of this paper is to investigate in detail the meat economy of the castles of Kastelholm (Åland Islands) and Raseborg (Western Nyland in Finland, see Fig. 1) by studying butchery patterns on bones and the descriptions of cuts of meat recorded in the castle accounts. The focus is kept on domestic animals. Aspects concerning the killing and the skinning of the animals will not be discussed.

The pattern of butchery marks in bone material has previously been discussed by, among others, Binford (1981), Audoin-Rozeau (1987), Lyman (1987), Maltby (1989), and in Sweden by Lepiksaar (1966) and Larje (1992), in order to understand meat processing by looking at the cut- and

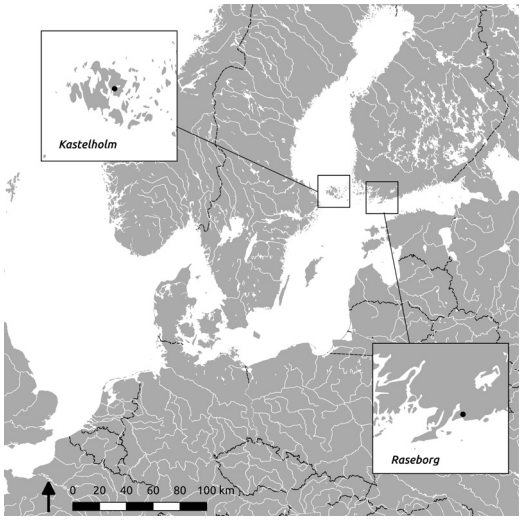


Fig. 1. The location of castles Kastelholm and Raseborg. Map by Rudolf Gustavsson.

chopmarks on the animal bones. Recent studies of archaeological bone materials have focused attention on butchery as a profession and have been useful for further understanding the zooarchaeological records (see e.g. Seetah 2002, 2007, 2008). These studies have shown that detailed analyses of butchery marks in faunal assemblages can facilitate the understanding of how cultural and economic factors have an impact on how animals were utilized as food. Studies concerning food economics are easier to comprehend at castle sites, such as Kastelholm and Raseborg, than in towns where the ownership of the town plots is more fragmented and the town structure altogether is more complex than castles functioning as administrative centres in rural areas. Further on, the historical records can be more generally applied in castle sites than in towns. The need for at least two sites to study is essential in order to understand the potential emerging patterns in both zooarchaeological and archive material. Kastelholm and Raseborg provide such opportunities.

The zooarchaeological material analysed from Kastelholm and Raseborg comes from waste deposits, which have been accumulated over long periods of time, probably mixed and transported to the surrounding landscape as filling material, building material, or even to the fields (see e.g. Armitage 1989; Kivikero 2016). The finds in the fills are thus not from one butchery event, but are depositions from several butchery, cooking, and consumption occasions. This means that the material covered in this study is a sample of the waste material which was deposited and occasionally redeposited in the castle landscapes. This may have caused some bias in the anatomical representation, i.e. over- or underrepresentation of certain bone elements, but this does not affect the general patterns observed here. Butchery marks on the bones are observed only for cuts and chops. It is difficult to distinguish between cut- and chopmarks from butchery or food preparation and processing. In both activities, the same kind of tools were used.

## The castles of Kastelholm and Raseborg

Kastelholm was founded at the end of the 14th century, between 1384 and 1387 (Hausen 1934, 4ff.), and has been described as flourishing during the 15th and 16th centuries. A fire destroyed almost the entire castle around 1619/1620. A period of slow decay started in 1634, when the administrative posts attached to the castle were moved to Turku. Fires in 1745 and 1772 left the castle more or less in ruins (Mäkinen 2004, 117ff.).

The castle of Raseborg is located on the south-west coast of Finland, on a small hill by the river Raseborgs Å. The castle was first mentioned in 1378, and the castle is thought to have been at its peak at the end of the 15th century (Drake 1991; Rask 1991, 60ff.). The castle was abandoned in the middle of the 16th century, and the administrative tasks were moved to Helsinki (Rask 1991, 71ff.).

## Source material

The zooarchaeological assemblage from Raseborg comes from research excavations at Slottsmalmen, outside the castle walls, carried out in 2008–2009. The bones are waste from the castle that was deposited partly as landfill on the castle premises, but probably also in other parts of the landscape (see Knuutinen *et al*. in press). A total of 85 kg of unburned animal bones were found, of which there were 7,177 bone fragments from domestic mammals and 300 from domestic birds. Cutmarks are present in 21% of bones from domestic animals in Raseborg (Kivikero 2014). The bones come from a layer dated to the 15th century (Haggrén *et al*. 2009).

The material from Kastelholm comes from excavations carried out in 1982–1998, with the purpose of documenting the castle area before restoration. Five excavation areas with a total of 143 kg of unburned animal bones were analysed, by the author and Rudolf Gustavsson, from varied contexts both inside and just outside the castle walls, which are dated to the 15th–17th centuries (Carlsson 1993). The deposits include only waste from the castle. The analysis includes 11,118 bone fragments from domestic mammals and 921 fragments from domestic birds. Cutmarks are present in 34% of the bone fragments from domestic animals in Kastelholm.

The quantitative comparisons are presented according to Number of Identified Specimens (NISP). Cuts are regarded as superficial marks, most often done with thin-bladed tools, such as knives. Chops are heavier marks produced by heavier tools such as axes or cleavers. The marks are made in the cortical surface of the bones. The marks were identified by eye.

The castle bailiffs were obliged to keep records of the income and expenses of the castle, and of the taxed goods from the parish. The bailiffs would then travel once a year to Stockholm to present the accounts to the king's accountants. The records contain information on the number of slaughtered animals, the meat cuts preserved from the animals, the number of seabirds stored, and the amount of food consumed in the castle (see e.g. Myrdal 1978; Ferm 1990; Vilkuna 1998; Seppälä 2009; Lahtinen 2012). For this paper, accounts from Kastelholm concerning the years 1543–1557, 1568-1569 and accounts from Raseborg from the years 1540–1551 have been studied.

An additional source for understanding the parts of meat recorded in the accounts is the Nuremberg Twelve Brother's Books "*Die Hausbücher der Nürnberger Zwölfbrüderstiftungen*" which includes portraits of people at work with tools, materials and products, mainly depicting manufacturing procedures. The people portrayed in the books are old Nuremberg craftsmen living in an old people's home, built by the wealthy merchant Konrad Mendel in 1388. The home was meant for twelve craftsmen in need. The model was followed by Matthäus Landauer in the 16th century, and produced a similar kind of memorial book. The books include 18 pictures of butchers at work. Cuts of meat can also be seen in the medieval health books *Tacuinum sanitatis in medicina*. The few known examples were copied and illustrated in Italy in the 14th and 15th centuries from the original written by Ibn Butlán in the 11th century (Gobeaux-Thonet 1969). The references are also relevant for understanding Scandinavian conditions.

## Butchers at work

Because of the odours that the slaughter of animals would produce, the slaughter house would be built outside the castle walls, probably near the water to make it easy to clean the entrails and the house itself.

Between 1541 and 1544 the same butcher,

*Simon slaktare* (Simon the butcher) was employed for the entire year (KA 2921,3; KA 2928,78; KA 2929,32,73; KA 2934,18; KA 2924,35, 43; KA 2937,5; KA 2938,34; KA 2946,4) in Raseborg. During 1549 and 1550 a butcher was employed in the castle for the entire year, but the name of the person is unknown (KA 2970,22; KA 2979,28).

The information on butchers in Kastelholm is scarcer. According to the accounts, more animals were butchered in Kastelholm than in Raseborg. This would mean that there was a larger need for at least one butcher in the castle during the autumn. The reason for the lack of details is probably that the butcher's profession is not explicitly stated in the payrolls. The one butcher that is known by name in the castle records is from 1544, a man called *Per Anderson from Västsibby* (KA 2603,35).

The autumn would have been an intense working period for the butcher (e.g. KA 2939; Svensson 1967). After December, the work load would have been easier, although some young animals would probably be killed in the spring. Animals could also be slaughtered at any time during the year for fresh meat. The butchery process seems to have been rather crude, as 97% of the marks are from chops done with a heavy tool. Cutmarks are more scarce (1%), and may be linked to the cooking process and consumption. Some bones have both chop marks and knife marks (2%), and 0.3% of bones have traces of sawing. The sawed bones were observed in horns (cornu) only and can be linked to handicrafts.

The men in the portraits of butchers in the Twelve Brothers House book are portrayed with their primary tool, an axe/cleaver (e.g. Hans Lengenfelderis, Amb. 317.2° Folio 59 verso, Fig. 2). The distinction between marks from butchery and cooking is difficult to make, because knives and cleavers were used by cooks as well as butchers in their work. The accounts of the cook's utensils in the castles include: working axe (*arbetsyxa*, KA 2954,24), kitchen axes (*köksyxor*, KA 2918,42; KA 2954,24), axes (*yxa,* KA 2938,60) and peasant knife (*bondekniv*, KA 2938,60).

Fig. 2. The butcher (*Fleischhacker; Metzger*) Hans Lengenfelderis (Stadtbibliothek Nürnberg, Amb. 317.2° Folio 59 verso) processing a pig with an axe/cleaver in the 15th century.

## Cutting and splitting carcasses

The bone assembly has all anatomical regions represented from cattle, sheep and/or goat, and pig (see Fig. 3 and 4). Almost all elements show marks of cutting and chopping (Figs. 5, 6 and 7).

Today, livestock is butchered by splitting the breastbone (sternum) in two, in order to cut the stomach open for the removal of entrails. However, the entrails might be removed by only cutting open the gut and

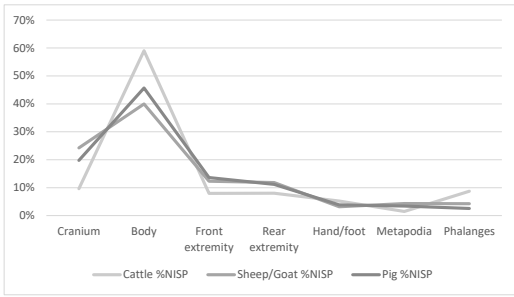



Fig. 3. The anatomical distribution of bones from domestic animals from Kastelholm.

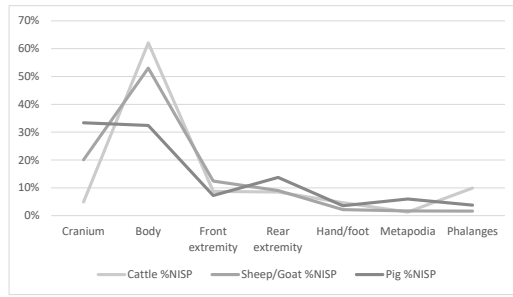
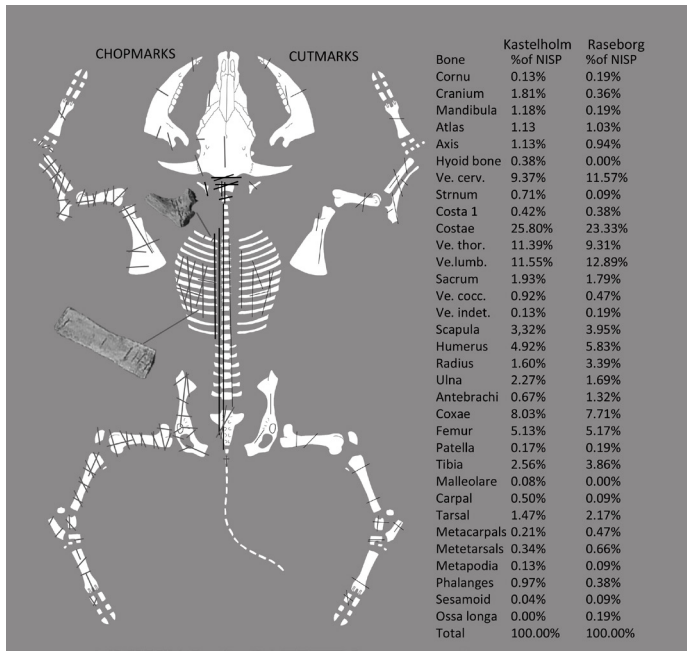



Fig. 4. The anatomical distribution of bones from domestic animals from Raseborg.

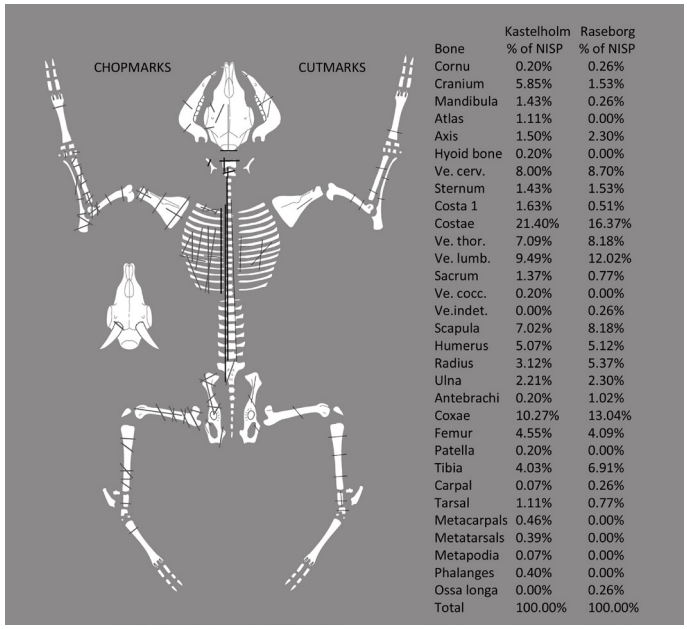



| Bone | Kastelholm %of NISP | Raseborg %of NISP |
|---|---|---|
| Cornu | 0.13% | 0.19% |
| Cranium | 1.81% | 0.36% |
| Mandibula | 1.18% | 0.19% |
| Atlas | 1.13 | 1.03% |
| Axis | 1.13% | 0.94% |
| Hyoid bone | 0.38% | 0.00% |
| Ve. cerv. | 9.37% | 11.57% |
| Strnum | 0.71% | 0.09% |
| Costa 1 | 0.42% | 0.38% |
| Costae | 25.80% | 23.33% |
| Ve. thor. | 11.39% | 9.31% |
| Ve.lumb. | 11.55% | 12.89% |
| Sacrum | 1.93% | 1.79% |
| Ve. cocc. | 0.92% | 0.47% |
| Ve. indet. | 0.13% | 0.19% |
| Scapula | 3,32% | 3.95% |
| Humerus | 4.92% | 5.83% |
| Radius | 1.60% | 3.39% |
| Ulna | 2.27% | 1.69% |
| Antebrachi | 0.67% | 1.32% |
| Coxae | 8.03% | 7.71% |
| Femur | 5.13% | 5.17% |
| Patella | 0.17% | 0.19% |
| Tibia | 2.56% | 3.86% |
| Malleolare | 0.08% | 0.00% |
| Carpal | 0.50% | 0.09% |
| Tarsal | 1.47% | 2.17% |
| Metacarpals | 0.21% | 0.47% |
| Metetarsals | 0.34% | 0.66% |
| Metapodia | 0.13% | 0.09% |
| Phalanges | 0.97% | 0.38% |
| Sesamoid | 0.04% | 0.09% |
| Ossa longa | 0.00% | 0.19% |
| Total | 100.00% | 100.00% |

Fig. 5. The location of the butchery marks on cattle bones from the recovered material. Inserted in the picture are typical fragments of cattle ribs with cut- and chopmarks. Chops associated with butchery are marked on the left side with black, and other marks and chopmarks with dark grey. Cutmarks are shown on the right side. The table shows % NISP of the total number of cut- and chopmarks on each site. Hanna Kivikero from base image by Michel Coutureau, ©ArchéoZoo.

not the sternum, although dismembering the thorax would still need cuts to the sternum. After that, the pelvis (coxae) is cut along the midline by the pubic area. The carcass is then split by cutting down the length of the backbone/spine. Pig carcasses are split from the tail up to and including the head, to expose the brain (Mettler 2003, 15ff.). The splitting of the breastbone would leave cutmarks on the bones, which can then be seen in the zooarchaeological material. Cutting off the pelvis would probably leave marks near the pubic symphysis, and splitting the spine would leave clear marks on the vertebra.

In this study, the fragments of breastbones in cattle (*Bos taurus*), sheep (*Ovis aries*), and/




| Bone | Kastelholm % of NISP | Raseborg % of NISP |
|---|---|---|
| Cornu | 0.20% | 0.26% |
| Cranium | 5.85% | 1.53% |
| Mandibula | 1.43% | 0.26% |
| Atlas | 1.11% | 0.00% |
| Axis | 1.50% | 2.30% |
| Hyoid bone | 0.20% | 0.00% |
| Ve. cerv. | 8.00% | 8.70% |
| Sternum | 1.43% | 1.53% |
| Costa 1 | 1.63% | 0.51% |
| Costae | 21.40% | 16.37% |
| Ve. thor. | 7.09% | 8.18% |
| Ve. lumb. | 9.49% | 12.02% |
| Sacrum | 1.37% | 0.77% |
| Ve. cocc. | 0.20% | 0.00% |
| Ve.indet. | 0.00% | 0.26% |
| Scapula | 7.02% | 8.18% |
| Humerus | 5.07% | 5.12% |
| Radius | 3.12% | 5.37% |
| Ulna | 2.21% | 2.30% |
| Antebrachi | 0.20% | 1.02% |
| Coxae | 10.27% | 13.04% |
| Femur | 4.55% | 4.09% |
| Patella | 0.20% | 0.00% |
| Tibia | 4.03% | 6.91% |
| Carpal | 0.07% | 0.26% |
| Tarsal | 1.11% | 0.77% |
| Metacarpals | 0.46% | 0.00% |
| Metatarsals | 0.39% | 0.00% |
| Metapodia | 0.07% | 0.00% |
| Phalanges | 0.40% | 0.00% |
| Ossa longa | 0.00% | 0.26% |
| Total | 100.00% | 100.00% |

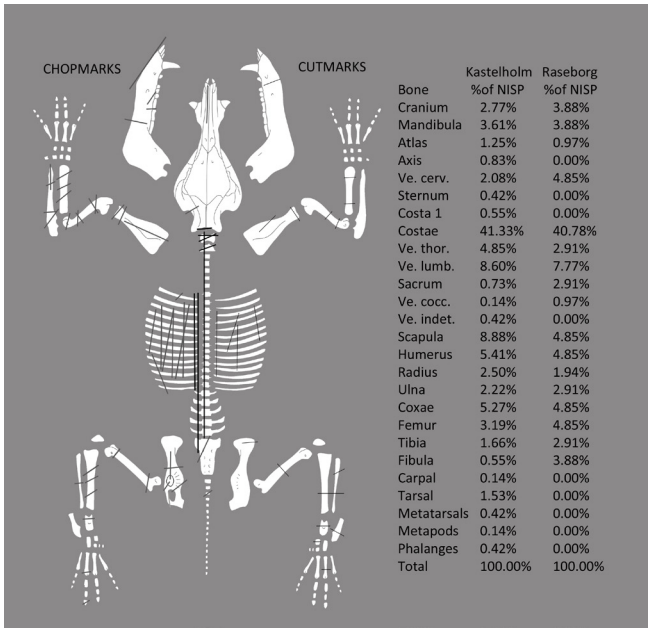
Fig. 6. The location of the butchery marks on sheep/goat bones. There are several cuts to the frontal, parietal and occipital bones in the material to divide the crania from the middle. Chops associated with butchery are marked on the left side with black, and other and chopmarks with dark grey. Cutmarks are shown on the right side. The table shows % NISP of the total number of cut- and chopmarks on each site. Hanna Kivikero from base image by Michel Coutureau, ©ArchéoZoo.

or goat (*Capra hircus*) and pig (*Sus domesticus*) include cut- and chopmarks that were made when splitting the stomach and chest area. Some cuts in the pelvis probably also originate from the butchery process (marked with black in Figs. 5, 6 and 7).

There are differences in the location of chopmarks for cattle, sheep/goat, and pig bones in the material. Common locations for chops are the spine (vertebra) and the ribs (costae). In cattle, 33% of the recorded chops are in the vertebrae and 25% on the ribs (Fig. 5). Chopmarks to sheep/goat vertebrae account for 25%, and chops to the ribs 42% of sheep/goat bones (Fig. 6). Chops to ribs (51%) are most abundant in pig bones, compared to vertebrae where only 16% of the cut- and chopmarks appear (Fig. 7).

Ribs and vertebrae exhibit several cuts. Some of these could be interpreted as having been done in the butchering of the animal. In particular, chops to the proximal end of the ribs and costal processes of the lumbar vertebrae, as well as vertical chopmarks to the spine (Figs. 5, 6 and 7), can be traced back to the splitting of the backbone. Also, the cut- and chopmarks to the cranium, especially to the middle of the occipital, parietal, and frontal bones of sheep and/or goat and pig bones, could be related to the butchery process of the carcass.

In most of the ribs, the cut- and chopmarks are found on the inside of the bone and a *cut-crack* technique (e.g. Fig. 5), described by Audoin-Rozeau (1987, 35), is used. The ribcage is chopped into pieces first with a blow from an axe, and manual pressure is added to the fracture afterwards to break the bone along the line of the cut. The ribs also seem to be chopped into two or three




| Bone | Kastelholm %of NISP | Raseborg %of NISP |
|---|---|---|
| Cranium | 2.77% | 3.88% |
| Mandibula | 3.61% | 3.88% |
| Atlas | 1.25% | 0.97% |
| Axis | 0.83% | 0.00% |
| Ve. cerv. | 2.08% | 4.85% |
| Sternum | 0.42% | 0.00% |
| Costa 1 | 0.55% | 0.00% |
| Costae | 41.33% | 40.78% |
| Ve. thor. | 4.85% | 2.91% |
| Ve. lumb. | 8.60% | 7.77% |
| Sacrum | 0.73% | 2.91% |
| Ve. cocc. | 0.14% | 0.97% |
| Ve. indet. | 0.42% | 0.00% |
| Scapula | 8.88% | 4.85% |
| Humerus | 5.41% | 4.85% |
| Radius | 2.50% | 1.94% |
| Ulna | 2.22% | 2.91% |
| Coxae | 5.27% | 4.85% |
| Femur | 3.19% | 4.85% |
| Tibia | 1.66% | 2.91% |
| Fibula | 0.55% | 3.88% |
| Carpal | 0.14% | 0.00% |
| Tarsal | 1.53% | 0.00% |
| Metatarsals | 0.42% | 0.00% |
| Metapods | 0.14% | 0.00% |
| Phalanges | 0.42% | 0.00% |
| Total | 100.00% | 100.00% |

Fig. 7. The location of the butchery marks on pig bones. Chops associated with butchery are marked on the left side with black, and other marks and chopmarks with dark grey. Cutmarks are shown on the right side. The table shows % NISP of the total number of cut- and chopmarks on each site. Hanna Kivikero from base image by Michel Coutureau, ©ArchéoZoo.

pieces. Seetah (2002, 113) suggests that the cattle ribs would be easier to separate from the carcass when hung and further processed into smaller pieces on a block, which could result in the butchery marks seen in Fig. 5.

There seems to be a general over-representation of ribs (Fig. 3 and 4) in the material, but cuts to the ribs of the pigs are abundant (Fig. 7) compared with marks on cattle and sheep and/or goat ribs (Fig. 5 and 6). This may be due to the amount of meat and fat in the ribcage which meant that the pig sides would have to be cut and chopped in small parts to be able to fit a certain weight or size of a vessel or pan.

Sheep and/or goat crania contain fairly many cuts, as do those from pigs. The cuts are typically made to the back of the head, covering the occipital, parietal, and finally the frontal bones. Cutmarks are also noted in the hyoid bones of cattle and sheep and/or goat (Fig. 5 and 6).

The butchering of birds does not seem to leave cutmarks on the bones (Mettler 2003, 113ff.). Cutmarks are seen in geese (*Anser* sp.) and chicken (*Gallus domesticus*) bones; the most typical ones are marked in Figs. 9 and 10. Common cutmarks on geese bones are to the humerus, sternum, furcula and

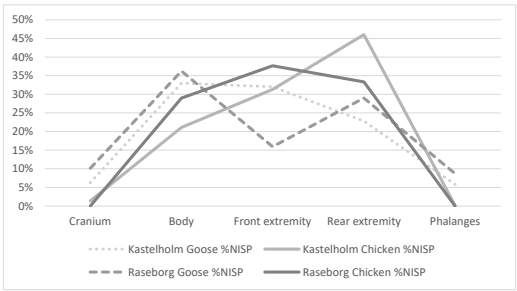



Fig. 8. The anatomical distribution of geese and chicken bones from Kastelholm and Raseborg.

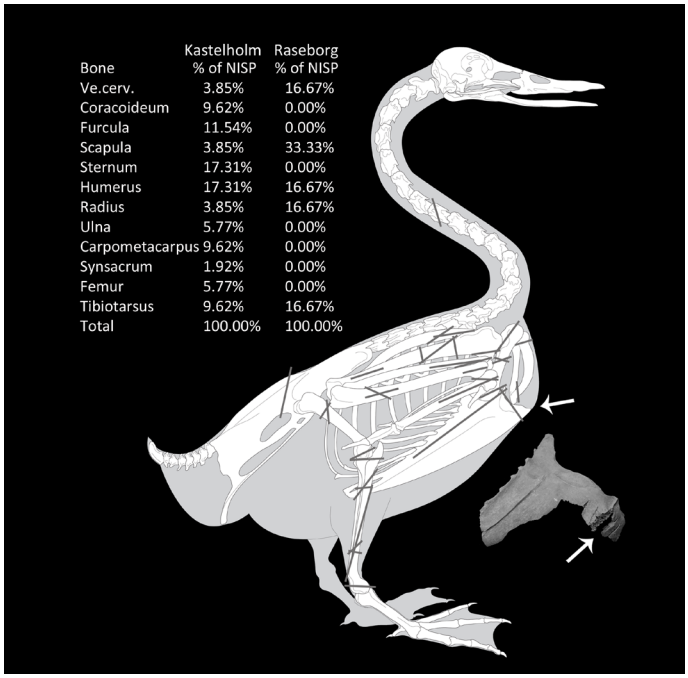



Fig. 9. Location of cuts on geese bones in the material. Several cuts are made to the sternum. Cuts to the middle of the sternum are marked with a white arrow. The picture of the cut sternum is from a common eider (*Somateria mollissima*), but can also be seen in geese. The table shows % NISP of the total number of cut- and chopmarks on each site. Hanna Kivikero from base image by Michel Coutureau and Véronique Larculandie, ©ArchéoZoo.

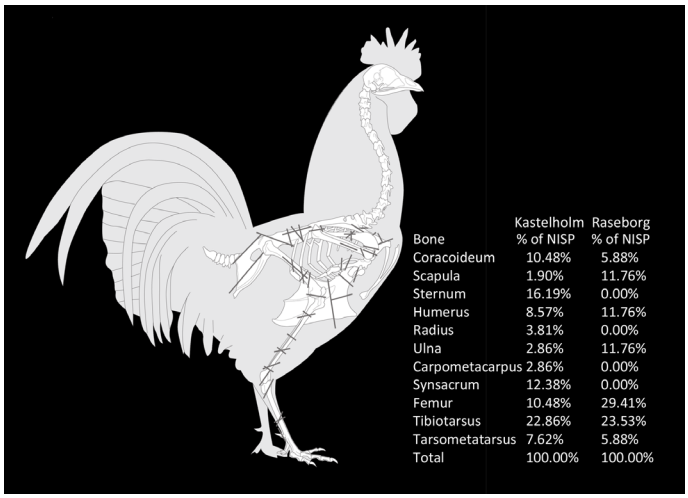



Fig. 10. General cuts on chicken bones in the material. The table shows % NISP of the total number of cut- and chopmarks on each site. Hanna Kivikero from base image by Michel Coutureau and Véronique Larculandie, ©ArchéoZoo.

tibiotarsus. The sternum is often cut along the middle, on either side of the internal spina and the craniolateral process. The cuts on the chicken bones are more abundant than those seen in geese, as shown in Figs. 9 and 10. The sternum is more frequently cut open in geese than in chicken. Most of the cuts on chicken bones are to the sternum, femur and tibiotarsus. Few geese and chicken crania could be identified (Fig. 8) and none of them included cuts (Figs. 9 and 10). The crania could have been separated from the body before the birds were processed for preservation. This would mean that the heads would end up in some other deposit.

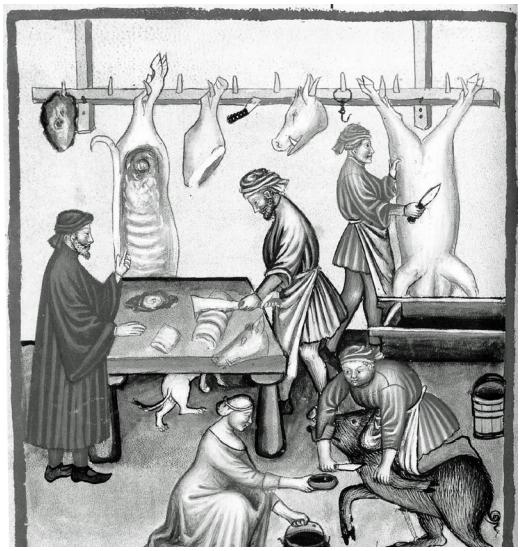


Fig. 11. Butchering of pig in *tacuinum sanitates in medicina* (ANL/Vienna, Cod. Ser. n. 2644, fol. 74 verso). In the background is a half carcass of a pig.

## Meat in the castle accounts

The account books show only the foodstuffs that were preserved in the castle as food for the inhabitants, exported to the castle in Stockholm, or sent to other parts of the realm in need. The foodstuffs would also have had some sort of market value, but not all would have been recorded in the accounts. Cabbages and foods from the garden are absent, even if they were certainly preserved in some form. The animals seen in the account books are cattle, sheep, goat, pig, geese, chicken, seabirds, fish, and seals. Rams and goats are not represented in the accounts of Raseborg

Table I shows the parts of meat that were stored in the castles after butchery. The parts are more or less standardized items, but there are differences in the way the animals were divided. In Raseborg, the sheep were only recorded as carcasses (*fårkroppar*), whereas in Kastelholm sheep backs (*fårryggar*) appear in 1547, together with pork backs (*svinryggar*) and cattle backs (*nötryggar*). In Raseborg, separating the spines from the carcasses seems to be have been a short-lived trend which ends in 1549, but continues in Kastelholm with a short two-year pause. This difference could be attributed to a specific butcher that worked in castles, or it could have been directed from Stockholm.

It seems that animals generally were preserved as whole carcasses, although some terms for the meat products can be challenging to interpret. Seppälä (2009, 132) has described *nötsfallskött* as a smoked half of a cattle carcass without the spine. The Swedish Academy's dictionary (SAOB), on the other hand, explains the word as meaning the sum of all the meat from butchered cattle, even in the sense of a cattle carcass. Looking at the accounts, it is most probable that in this case *nötsfallskött* means one cattle carcass. The number of cattle that were butchered corresponds to the number of *nötsfallskött* after each event. Cattle backs appear in the accounts in 1546/1547, and also correspond to the number of butchered cattle. *Nötsfallskött* still appears side by side with backs, which would mean that the backs were separated from the carcasses, but that the rest of carcass would then be counted as *nötsfallskött*.

Table I. Meat and meat products that were produced in the castles in different years according to the Bailiffs' account books. Kastelholm is marked in the table with K, and Raseborg with R.

| | sid-fläsk | Pork backs | Sheep carcass | Sheep backs | Ram carcass | Ram backs | Goat carcass | Cattle head | Cattle tongues | Cattle carcass | Cattle backs | Entrails | svart micklar | Sausages | Blood-sausage | Geese halves |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1540 | | | R | | | | | | | R | | R | | | | R |
| 1541 | R | | R | | | | | | | R | | R | R | | | |
| 1542 | R | | R | | | | | | R | R | | R | R | R | | |
| 1543 | RK | | RK | | K | | | | RK | RK | | R | R | R | | |
| 1544 | RK | | RK | | K | | K | | RK | R | | R | R | R | | RK |
| 1545 | R | | R | | | | | | R | R | | R | R | R | | R |
| 1546 | RK | | RK | | K | | K | | RK | RK | R | R | | R | | RK |
| 1547 | RK | RK | RK | K | K | | | | RK | RK | RK | RK | RK | K | | K |
| 1548 | RK | RK | RK | K | K | | K | R | RK | RK | RK | RK | RK | K | | K |
| 1549 | RK | RK | RK | K | K | | K | R | RK | RK | RK | RK | K | RK | K | K |
| 1550 | RK | | RK | | K | | K | | RK | RK | K | K | | K | | K |
| 1551 | RK | | RK | | K | | K | | RK | RK | | R | | K | | K |
| 1552 | K | K | K | K | | | | | K | K | K | K | | K | | K |
| 1553 | K | K | K | K | | | | | K | K | K | K | | K | | |
| 1554 | K | K | K | K | | | | | K | K | K | | | | | K |
| 1555 | K | K | K | K | K | | | | K | K | K | | | K | | K |
| 1569 | K | K | K | K | K | K | | | K | K | K | | | K | | |

Another challenging term to interpret is *sidfläsk*, which according to SAOB is the meat and fat that comes from the sides of the pig, meaning the bacon and the belly of the pig. Seppälä has interpreted the word in the accounts to mean pork belly/bacon (Seppälä 2009, 134). However, when looking at the account books, it may be argued that *sidfläsk* in this context meant the half carcass of a pig, and thus the word would actually mean a half (*sida*) of pork meat (*fläsk*) instead of bacon and pork bellies seen in the portrait of Hans Lengenfelderis in the Twelve Brothers House book (Fig. 2). These pig halves can be seen hanging in the background in one of the pictures from the *tacuinum sanitatis* books, depicting a pig and pig butchery (Fig. 11). As the number of *sidfläsk* is always double the number of butchered pigs, the interpretation is reliable.

The separation in the accounts between carcass and halves indicates that the carcasses were stored whole after the removal of the entrails, and probably also the head and tail. The same words continue to be in use even after backs occur among the cuts.

Meat was apparently classified also by specific weight terms, such as pound of meat (*pund kött*) and pound of pork meat/fat (*pund fläsk*). These are seen in the accounts after tax deliveries from peasants (e.g. KA 2610, KA 2614, KA 2624). These cuts could be of any type weighing one pound. This type of meat cuts can be seen in the portrait of Hans Lengenfelderis (Fig. 2). These parts would be salted and preserved in barrels. It was much more affordable for the peasants to deliver a certain amount of salted meat to the castle as taxed goods instead of whole animals. The rest of the animal could then be used in the peasant's home.

Cattle heads (*nöthuvud*) are present in the accounts of Raseborg between 1547 and 1549 (KA 2954,12; KA 2962,14; KA 2971,12; Table I). This means that at least for three years heads were preserved (salted) in Raseborg. Cattle tongues (*nöttungor*) appear in the accounts for 1542.

*Kaldun* appears in the accounts for Raseborg almost every year (Table I). In this paper, I have translated the word as entrails. According to SAOB the word was probably originally used for the still warm entrails of a newly butchered animal. It could also mean the edible entrails of a butchered animal, Fig. 12. A 17th century cookbook uses the term to mean cow stomach (Höök 1695, 23).

Sausages (*korvar*) occur in the accounts of Raseborg almost every year, but turn up in Kastelholm at the same time as backs (Table I). One of the types of sausages that is seen in both of the castles is *svart micklar*. The Swedish Academy's dictionary defines the word as a black, probably preserved, sausage.

Chickens appear in the accounts, but they seem to have mostly been consumed fresh, except for the year 1541 in Raseborg, where salted chicken appears (KA 2603,13). No special parts of the chicken can be seen in the accounts – they seem to have been preserved and used whole. Geese appear mostly as halves in the accounts (Table I).

## Discussion

How the butcher works was affected by "cultural fact, guided and determined by the pressures of economic necessity, social destination, taste, market rules of supply and demand, customs and prejudices, religious concepts, local tradition", which determines the cuts that are made (Audoin-Rozeau 1987, 32).

The parts of meat seen in the bailiffs' accounts are actually fairly standardized items, and seem to have been more or less the same in both of the castles. It is probable that these parts were recorded after the basic butchery process, when the carcasses were still whole

or cut into halves. The carcasses could be preserved as such, but for easier preservation they could be cut into smaller parts to be salted and processed, for example smoked. It needs to be mentioned, however, that whole smoked carcasses do appear in the accounts. It is therefore possible that the carcasses were not cut into smaller pieces for preservation, but were instead preserved whole and cuts were taken when needed. The butchered animals were mostly used in the castles, so the carcasses could be left hanging in the storehouses.

The over-representation of certain animal parts, especially ribs, in the zooarchaeological record may relate to the meat that was salted in barrels and delivered to the castle as tax by the peasants. Barrels of salted meat were the most typical form of transported meat. In these barrels, there could have been any kind of meat cuts with specific weights, as could be seen in the picture of the butcher in the Twelve Brothers book (Fig. 2). Bone material from barrels of meat can be observed from some shipwrecks (e.g. Boëthius 2011; Söderlind 2006). The pattern of cuts, specifically parts of the ribcage, can be seen in the osteological material from the castle. The same technique for cutting meat was used for several purposes and most probably it was similar throughout the medieval and early modern Swedish kingdom. On the other hand, the accounts show only preserved meats with a market value. The carcasses would also be used as food over the course of the entire year, which means that bones would be deposited in various parts of the castle and its landfills on several occasions and then probably be spread out.

Cutmarks to the hyoid bones are, according to Weinstock (2002, 12), made during extraction of the tongue. This means that the cutmarks to the hyoid bones could relate to the salted and preserved cattle tongues noted in the castle accounts. Cutmarks to the sheep/goat hyoids would also indicate the removal of tongues, although they are not seen in the accounts. This could mean that at least some of the sheep/goat tongues were used somewhere else, or that they did not have enough value to be reported to the central government. This would probably also be the case with the animal heads. The cuts to the crania of the sheep, goat, and pig (and cattle) indicate that the heads were processed in some way, maybe in order to get access to the brains, as seen in Fig. 12.

Fig. 12. Intestines and heads in *tacuinum sanitates in medicina* (ANL/Vienna, Cod. Ser. n. 2644, fol. 77 recto).

There are also recipes describing the preparation of sheep, pig and calf heads. In a Dutch recipe from the 15th/16th century, the head is cooked until it is quite soft. Thereafter, the tongue should be removed and cleaned, as well as the brain. The meat should then be cut finely and boiled in wine and vinegar (KANTL Gent 15, volume 2, 2.131a). Another recipe also begins with the cooking of the head until it is soft. Thereafter the bones should be removed and the meat crushed in a

mortar with bread and herbs (*Koge-Bog* 1616, E5 verso, recipe XC). There are also recipes for preserving heads in salt, and that method could also be used for feet and entrails (*Koge-Bog* 1616, B4 verso-B5 recto, recipe XII).

Mettler (2003) encourages the reader of his modern butchery book to preserve pig brains for further use in cooking. He also writes that the meat from the head can be further used, as can the heart, tongue, liver, kidneys, and hooves (ibid, 49, 83).

Entrails are a valuable source of foodstuffs, and the processing of heads, brains, and entrails can be seen in Fig. 8. The entrails seem to be a type of foodstuff that was consumed in the castles. It is unclear whether the entrails in the accounts mean all kinds of entrails or just intestines. If it means intestines only, they would be emptied, cleaned, and stored to be used for sausage making (Mettler 2003, 49). These can be seen hanging on hooks in the background of the picture, together with livers.

The meat in the sausages would not need to be of the highest quality, and could be from heads or tails, or the parts of animals that are not seen in the accounts. The black coloured sausage *svart micklar* could mean a blood sausage (*blodkorv*), although blood sausages appear side by side with *svart micklar* in the accounts of Kastelholm in 1549 (KA 2619, 13, 15). Other ingredients for *svart micklar* in the accounts are rye flour, which appears in Raseborg during years 1541 and 1542 (KA 2923,32; KA 2929,37), and tallow, which is specifically added to *svart micklar* and sausages in Kastelholm in 1547 and 1548 (KA 2613,40; KA 2618, 62).

Instead of blood sausage, *svart micklar* could be liver sausage, as described in *Koge-Bog* (1616, B8 recto, recipe XX). The use of liver could produce the black colour. In the recipe, the liver and the neck piece of a pig are seethed, and after that the liver is chopped finely. The fat and meat from the neck piece are also cut into small pieces and mixed with the chopped liver, salt, cooking broth and herbs. Some soaked barley could also be added (ibid.).

Other recipes for the odd parts that would not be seen in the accounts, nor the osteological material, are sheep's stomach (*Koge-Bog* 1616, E3 recto-E3 verso, recipe LXXXII), sheep's penis (*Wel ende edelike spijse*, chapter 2: 2.23), and cow's lung (Salzburg M I 128, Fol. 319 recto – 319 verso, fol. 320 verso).

The feet of the animals could be used to make aspic and jellies, which appear in several recipes from the 15th–17th centuries. The process of making aspic involves separating the feet into two pieces and cooking them, and then cleaning the meat off the bones and knuckles (e.g. *Koge-Bog* 1616, E5 verso, recipe XCI; E3 verso-E4 recto, recipe LXXXIII; Salzburg M I 128, Fol. 323 recto – 323 verso). According to Meister Eberhard the feet, mouth, ears, and the tail are the best parts of the pig for consumption (Feyl 1963, 107, recipe 79).

It is probable that most of the marks on the bird bones are from later processing than the butchery itself. Cutmarks to the breastbone could be an indication of cutting geese, and seabirds in some cases, into halves, as encountered in the account books. The rest of the cutmarks could be from processing the birds for cooking. There does not seem to be a specific way to cut the birds. Not only the meat, but also bird brains could be consumed. Meister Eberhard tells us that eating the brains of young hens sharpens one's senses and increases the size of the brain. It can also prevent nose bleeds (Feyl 1963, 105, recipe 70).

Studying butchery patterns from zooarchaeological material gives a concrete insight to meat processing, whereas the accounts show another angle to the meat economy of the castles. Both of the sources

provide unique dimensions and aspects of the same process, which can be further developed by combining the information available.

## Conclusions

The parts of meat that were cut and chopped during the period in question seem to have been quite standardized, probably reflecting the needs and requirements of a centralized economy in Stockholm. Food stuffs were moved around the realm and used in boats, and the taxed goods needed to be standardized.

The pieces of meat and carcasses recorded in the account books seem to have been divided after the initial butchering of the animal. The meat could be preserved in the storehouse in as large pieces as possible, and then cut into smaller pieces when needed, or it could have been cut into parts that could be more easily preserved directly after the inventory. Most of the cuts seen in the bone material would in this case be from meat processing and cooking. An exception would be the cutting of carcasses to the pounds of meat and pork meat/fat the peasants would have delivered to the castle, which cannot be identified in the osteological material.

The material shows clearly that animals were processed and consumed "from nose to tail", regardless of the amount of meat attached to the bones. The cutmarks to the cranium of the sheep and/or goat and pig in the zooarchaeological material imply that the heads would have been processed. The cutmarks to the hyoid bones would be evidence of removal of tongues. Cattle tongues are present in the account books almost every year. Also, the presence of entrails and sausages strengthens the interpretation that the whole animal carcass was used as food.

Geese seem to have a pattern of the bird being cut into halves, which can be seen in the accounts and osteological material. Other cuts to the geese are probably from food preparation. Chickens have a more varied pattern of cutmarks, which mainly originates from cookery.

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