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Bones in pits and ditches
A contextual approach to animal bone distribution in Early Modern Tornio

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This paper analyses the distribution of animal bone finds in the Tornio Keskikatu 29–35 urban archaeological rescue excavation and discusses site-formation processes and waste disposal practices in the town during the 17th and 18th centuries. Animal bone finds from different types of context are studied in relation to preservation conditions, species distribution and fragment size, skeletal frequencies and butchery patterns, treatment of companion animals and ritual aspects. Despite some degree of secondary deposition and difficulties in interpreting some contexts with complex formation histories, information about waste disposal practices, site formation processes, the functions of the features at the site and people's attitudes to different animals can be inferred from the zooarchaeological material. Thus the contextual approach to animal bone distribution is a useful method for analysing bone material from an Early Modern town in Northern Finland.

Keywords: zooarchaeology, historical archaeology, waste disposal, Tornio

Introduction

Questions of livelihood and economy have traditionally been prevalent in zooarchaeology, but site formation processes, waste disposal practices and the functions or meanings of archaeological contexts have also been explored through faunal remains (e.g. Jones 1998; Thomas 1999; Stallibrass 2000). While contextual approaches have become common in prehistoric archaeology, they have rarely been used in historical archaeology to address site formation processes and bone discarding patterns, for instance. Contextual approaches to urban archaeological animal bone assemblages have not yet been adopted in Finland.

The aim of this study is to analyse the distribution of animal bone finds among the different types of archaeological context recorded in the Tornio Keskikatu 29–35 rescue excavation conducted in 2002, paying attention to factors that affected bone accumulation and survival in different types of context and exploring the potential of a context-oriented approach for understanding animal bone distribution at a Finnish urban archaeological site. The Keskikatu excavation is one of the largest and most thorough urban archaeological excavations so far conducted in Northern Finland, but the formation processes leading to the various features documented in the field seem to be complex and in some respects unclear. The goal of this paper is to shed light on the functions and formation processes of the various features and the treatment of animal remains in 17th and 18th-century Tornio.

A contextual approach to animal bone distribution

Animal bone finds are often studied from a purely economic point of view, and the faunal remains at an archaeological site are frequently analysed as a single body of material (Price 1985:40; Jones 1998:303). It is improbable, however, that faunal remains were

uniformly disposed of at archaeological sites, as animal bone waste was not treated as a single category of refuse, but rather different species and body parts may have been treated differently (Price 1985:40) and preservation conditions will have varied between archaeological contexts. Analysis of the distribution of animal bone finds in different contexts can contribute to our understanding of site formation processes, taphonomic conditions and waste disposal practices (see Price 1985; Rothchild & Balkwill 1993; Stallibrass 2000). The distribution of animal bone finds can also reflect specific areas used for certain activities such as butchering or the manufacture of artefacts (Armitage 1982) and also illuminate ritual aspects of human behaviour (Cunliffe 1992; Backe et al. 1993).

Moreover, a context-oriented approach to animal bone distribution can produce information on the meanings of animals in past societies and the meanings of the places where their bones were deposited (Jones 1998; Thomas 1999). While zooarchaeologists have traditionally been occupied mainly with matters of subsistence, the recent emphasis on social archaeology has also elicited a more culturally oriented set of research questions. It is evident that cultural factors significantly affect people's choice of food, their patterns of discarding animal remains and their relationships with different animal species, and therefore it can be argued that people's world views are reflected to some extent in how they treat and think about animals (Douglas 1994; Jones 1998; Marciniak 1999; Fiore & Zangrando 2006).

A contextual approach to animal bone distribution has rarely been applied at historic sites, however. Rothschild and Balkwill (1993) studied animal bone finds from sheet refuse, landfill and archaeological features in 17th to 19th-century Manhattan and argued that butchery and food consumption sites differed in their proportions of quality meat parts, and that exposure to weather and trampling affected the fragmentary condition of the bone material in sheet refuse. In her study of Early Modern Norrköping, Vretemark (2003) came to a similar conclusion: that animal bone waste was more fragmented in primary contexts that had a long formation period and had been subjected to weather conditions and trampling. Price (1985) combined ethnographic data with her analysis of animal bone distribution in different contexts at the Widow Harris site, a 19th-century farmstead in Missouri, arguing that ethnographic observations correlated with patterns of animal bone distribution, differential treatment of carcass parts and different species.

The Tornio Keskikatu 29–35 excavation

Tornio is a small town in Northern Finland, founded in 1621 in response to the Swedish crown's increased interests in controlling and taxing trade in the north. Trade networks had been established prior to the 17th century, and Tornio was probably founded on the site of an already established market place at the mouth of the River Tornio. Virtually all trade with Lapland passed through Tornio, the main products involved being furs, feathers, blubber and reindeer hides, for instance (Mäntylä 1971). Farming contributed significantly to the subsistence of the townsfolk in Early Modern Tornio, and virtually all the town's inhabitants owned livestock and commonly kept it within the town boundaries

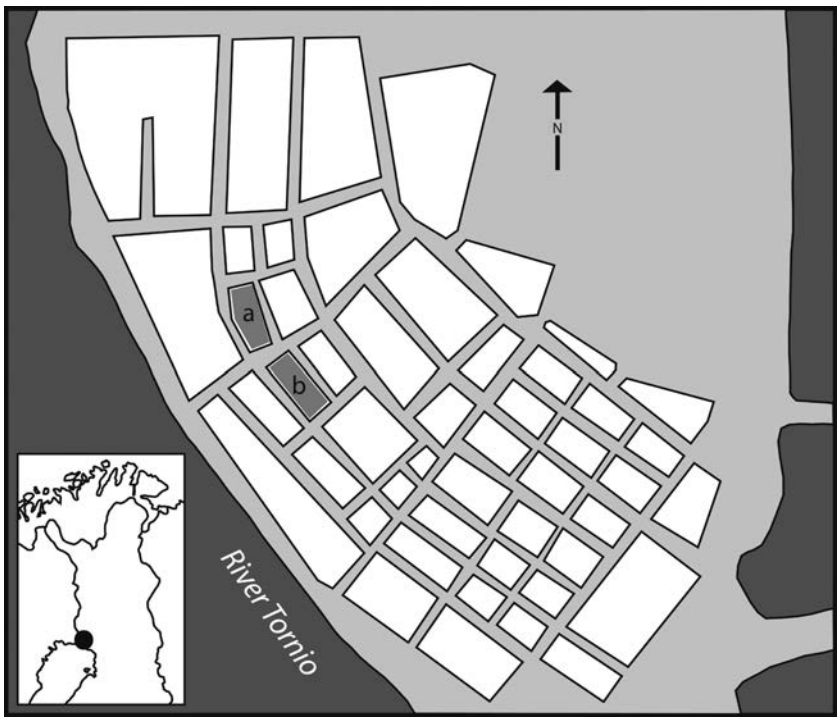

Figure 1. Map of Tornio and the Keskikatu excavations. The locations of the Ryhmäkoti plot (a) and Rakennustuote plot (b) are indicated on the map.

(Mäntylä 1971:52). Animal bone material (Table 1) and historical data (Mäntylä 1971:52) attest that cattle were the most numerous domestic animals, followed by sheep and pigs. A household's needs for wool, milk and meat were probably satisfied mostly by its own cattle, sheep and pigs. Hunting was an essential supplement to the livelihood of the farmers of Early Modern Northern Finland (Virrankoski 1973:270), and the townsfolk probably also engaged themselves, at least occasionally, in hunting wild gallinaceous birds, waterfowl, arctic hares and other small mammals and seals (Table 1; Puputti 2006a). There have been some differences in the animal bone assemblages between excavation areas (most prominently in the proportion of bones of wild animals and the diversity of domestic animal species), but it has not been possible to connected these with any known social groups within the town (Puputti 2006b, forthcoming).

The animal bone material considered in this paper was derived from the Tornio Keskikatu 29–35 excavation, all the descriptions and dates of features encountered in the excavation mentioned from this point onwards being from the reports by Herva (2003) and Nurmi (2005). The stratigraphic units were dated with the aid of coin finds and a typological analysis of ceramics and clay pipes (Nurmi 2005). The excavation was conducted using the stratigraphic method, and no sieving was done due to the restricted budget and limited time available. The excavations were conducted on two empty building lots located close to the market square of the 17th-century centre of Tornio (Fig. 1). The two large trenches opened up during the excavation cut through eight 17th-century plots, which were treated as distinct excavation areas (Fig. 2). Seven areas were ultimately excavated, but one of these was very small (area 4) and another only hastily studied (area 8). Three areas (1, 5 and 6) were fairly thoroughly excavated and the features were relatively clear in terms of both function and location, whereas in two areas (2 and 3) the nature of the features remained somewhat unclear. For this latter reason it is difficult to comment upon possible differences in function between the buildings and excavation areas.

The remains of two buildings, along with yard deposits and pit fillings, were studied in excavation area 1. The remains in the centre of the area were interpreted as representing a residential building dating back to the first half of the 17th century that had apparently been destroyed by fire.

Table 1. Species diversity of the stratigraphic units included in the study. The quantities are indicated as NISP (number of identified specimens).

Taxon	**NISP**	**% NISP**
Elk (*Alces alces*)	1	0.01
Cattle (*Bos taurus*)	1 648	13.94
Sheep/goat (*Ovis aries*/*Capra hircus*)	743	6.28
Reindeer (*Rangifer tarandus*)	57	0.48
Pig (*Sus scrofa domesticus*)	262	2.22
Horse (*Equus caballus*)	8	0.07
Dog (*Canis familiaris*)	8	0.07
Red fox (*Vulpes vulpes*)	19	0.16
Canine (Canidae)	1	0.01
Cat (*Felis catus*)	3	0.03
Grey seal (*Halichoerus grypus*)	2	0.02
Ringed seal (*Phoca hispida*)	6	0.05
Seal (Phocidae)	82	0.69
Brown bear (*Ursus arctos*)	10	0.08
Rat (*Rattus* sp)	1	0.01
Squirrel (*Sciurus vulgaris*)	4	0.03
Arctic hare (*Lepus timidus*)	216	1.83
Middle-sized ungulate	1 023	8.65
Large ungulate	1 960	16.58
Mammal (Mammalia)	3 750	31.72
Duck (*Anas* sp)	58	0.49
Greylag goose (*Anser anser*)	11	0.09
Lesser white-fronted goose (*Anser erythropus*)	4	0.03
Bean goose (*Anser fabalis*)	11	0.09
Goose (*Anser* sp)	9	0.08
Tufted duck (*Aythya fuligula*)	1	0.01
Greater scaup (*Aythya marila*)	2	0.02
Tufted duck/greater scaup (*Aythya* sp)	1	0.01
Whooper swan (*Cygnus cygnus*)	35	0.30
Goosander (*Mergus merganser*)	1	0.01
Red-breasted merganser (*Mergus serrator*)	5	0.04
Goosander/red-breasted merganser (*M. merganser*/*serrator*)	10	0.08
Duck/goose/swan (Anatidae)	9	0.08
Black grouse (*Tetrao tetrix*)	76	0.64
Capercaillie (*Tetrao urogallus*)	314	2.66
Willow grouse (*Lagopus lagopus*)	35	0.30
Willow grouse/rock ptarmigan (*Lagopus* sp)	94	0.80
Hazelhen (*Bonasa bonasia*)	8	0.07
Domestic chicken (*Gallus domesticus*)	5	0.04
Gallinaceous bird (Galliformes)	12	0.10
Bird (Aves)	386	3.27
Fish (Pisces)	780	6.60
Undetermined	151	1.28
Total	**11 822**	**100.00**

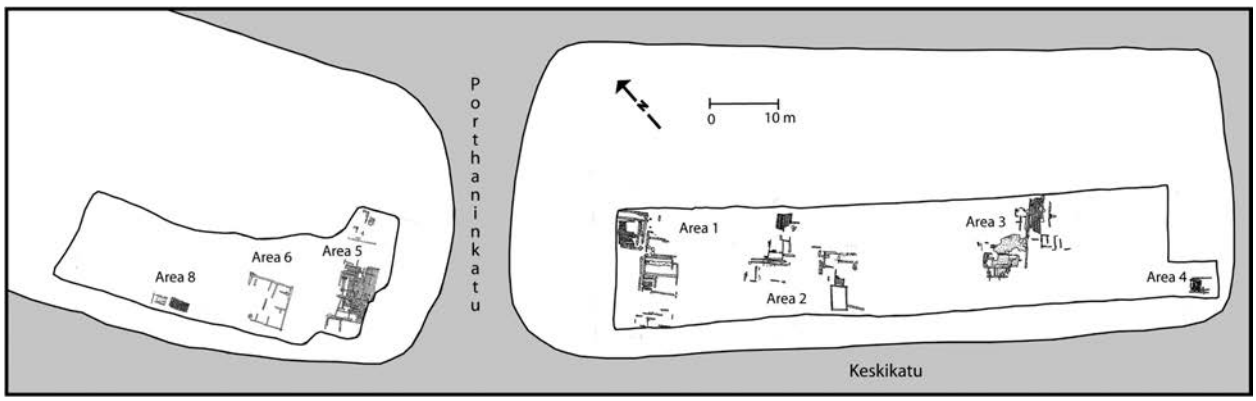

Figure 2. Map of the Tornio Keskikatu 29–35 excavations.

The function of the building in the northern part of the area is unclear. Both buildings had been erected directly on the ground. Altogether the fillings of five modest-sized pit structures were studied in this area. One pit is undated, but the others could be dated to 1640–1740 or simply to the 17th century, and some of them may thus be contemporaneous with the residential building. The yard deposits in area 1 dated from 1620–1725, a fairly long formation period that may mean that the deposits were contemporaneous with the residential building.

Area 5 contained the remains of a residential building with two rooms, a roofed pathway, two small cellar pits and a fireplace. The building had been erected directly on the ground and had probably had two phases of use, dated to 1620–1650 and 1660–1680, respectively. The earth fillings in the cellar pit are contemporaneous with the phases of use of the building. The remains of a lightly built wooden building dating to the latter half of the 17th century were discovered in the western part of the excavation area, but the function of this building is unclear. A large yard deposit was also excavated, and was similarly found to include two phases, again dated to 1620–1650 and 1660–1680. Thus the actual formation periods were quite short and contemporaneous with the use of the residential building. Unfortunately, the bone material from these chronologically distinct clusters was lumped together during the initial laboratory work and hence also has to be treated as one entity in this study.

The remains of a rather large residential building dating from the early 17th century were excavated in area 6, And other remains underneath it were also documented, but their relationship to the youngest building phase is unclear. It is probable that excavation area 6 had two or three building stages.

The building remains in area 2 were somewhat unclear in function and location. In addition to unidentifiable building remains, a timber-covered yard, three pits and the remains of a timber-constructed cellar were found in the area. The deposits from under the covered yard, which seems to have been destroyed by fire, were dated to 1620–1650 and 1650–1725, so that they may have been formed over long periods, and it is also unclear whether one part of the covered yard was actually part of a building. The cellar, dug deep into the ground, seems to have been partially demolished, and the finds in it date from a period extending the 18th century to the end of the 19th century. A dendrochronological sample from the cellar was dated to 1768/69 (Zetterberg et al. 2004). Thus the cellar is younger than the other features in the area.

The remains of a building, layers associated with a ditch and two pits were studied in excavation area 3. The structure on the southern side of the ditch was interpreted as a residential building erected directly on the ground and was dated to the beginning of the 17th century. The filling material in one of the pits represented a lengthy period extending from the early 17th century to the 1720s, but the other pit structure was younger. A timber-covered ditch ran in a NW–SE direction across the eastern corner of the excavation area. This was probably a sewer, as marked on a town map drawn in the 1690s, and is probably contemporaneous with the residential building. The filling material was dated to the 17th and early 18th-centuries.

In area 4 the remains of a lightly built building of unidentified function were excavated along with one pit. The remains of a building were also excavated in area 8, but again their function is unclear.

Zooarchaeological methods

The animal bone material (Table 1), i.e. the material from features that could in some way be identified, consisted of c. 12 000 bone fragments weighing 165.2 kg in total, which were identified with the aid of the skeleton collection in the Zoological Museum of the University of Oulu and with reference to bone atlases (Barone 1999). Instances of charred and fractured bones were recorded (using the fracture identification criteria of Villa & Mahieu 1990 and Outram 2001). The bone finds from each stratigraphic unit were weighed.

Only NISP (number of identified specimens) counts are presented here, as the MNI (minimum number of individuals) figures produced similar patterns but with considerably smaller sample sizes. The use of NISP figures to compare assemblages requires an assumption of uniform preservation conditions for the assemblages (Hambleton & Rowley-Conwy 1997:57), which this seems overall to be the case with the present material (see next section). The skeletal frequencies are presented as percentages of slaughter waste and food waste, although the former may also have been used in food preparation to some extent. The parts of the skeleton regarded as slaughter waste include the cranium, caudal vertebrae, carpals, tarsals, metapodials and phalanges (During 1986).

The distribution of animal bone finds is most often analysed in relation to feature type, location inside/outside buildings or on a central/peripheral axis (Wilson 1996). The archaeological deposits documented in the Tornio Keskikatu 29–35 excavation were divided into 1) deposits associated with buildings (including under-floor deposits, foundation deposits, layers above the floors and layers formed in the destruction of the buildings), 2) yard deposits, 3) cellar fillings, 4) pit fillings, and 5) ditch fillings. A list of the stratigraphic units is presented in Appendix 1. The animal bone finds from under-floor deposits are analysed separately from those in other contexts associated with buildings, and those associated with residential buildings are also analysed separately from those in buildings of unidentified function.

The factors affecting bone distribution at archaeological sites can roughly be grouped into the effects of scavenging, rubbish clearance and slaughter (Wilson 1996). The consideration of sampling error and taphonomic factors other than scavenging can also be of major importance for a reliable analysis of animal bone distribution (Wilson 1994). The types of deposit considered here are analysed with regard to five aspects: 1) preservation conditions, 2) species distribution and fragment size, 3) skeletal frequencies and butchering patterns, and 4) differential treatment of faunal remains. A consideration of preservation conditions is essential for understanding differences in animal bone accumulation processes and in the representativeness of samples. Species distribution and fragment size, skeletal frequencies and butchering patters, and the treatment of companion animal bones, are analysed in order to study waste disposal practices and butchery patterns in relation to different taxa. Finally, an attempt is made to consider the treatment of remains of different categories of animals, such as companion animals and wild animals.

Preservation conditions

The bones were generally in fairly good condition, with little or no surface erosion. No complete long bones of cattle were found, probably due to breakage during slaughter and food preparation, but whole bones of smaller mammals and birds were often found. The proportion of complete bones varied between around six and ten percent depending on the context type, the differences not being statistically very significant (Table 2). Some contexts with otherwise excellently preserved bones included a few eroded specimens, which may indicate secondary deposition. Such evidence was scarce, however, and confined only to a few contexts: a layer above and below the floor of the residential building in area 1 (SU 39), an early yard deposit under the building in the northern part of area 1 (SU 77), a layer below the covered yard in area 2 (SU 1008), a yard deposit in area 5 (SU 4023) and an under-floor layer from the roofed passage in area 5 (SU 4043).

The proportion of burned bones is fairly similar in all context types (between around two and four percent), except for the cellar and pit fillings (Table 2), where the larger percentages of burned bones may be attributed to the cellar filling SU 1009 and the pit filling SU 2055, which also stand out as being younger than the other features in their areas. Bone fragments with rodent or carnivore teeth marks were recorded only in a yard deposit in area 1 (SU 54), a deposit under the covered yard in area 2 (SU 1029), finds from under the foundation timbers of the residential building in area 3 (SU 2050), a deposit associated with the residential building in area 5 (SU 4025) and a layer associated with the buildings in area 6 (SU 5004). Thus gnawing damage was minimal, which implies either

Table 2. Mean fragment sizes and proportions of charred bone, bones of wild animals (NISP), complete animal bones and bones of companion animals in different context types.

	Building		Under-floor		Residential		Yard		Cellar fill		Pit		Ditch		χ^2	p
	%	N	%	N	%	N	%	N	%	N	%	N	%	N		
Mean fragment size g	7.6	7044	8.3	1807	7.4	5476	11.6	3166	11.7	599	9.6	715	11.4	355		
Charred bones	2.4	7044	1.8	1807	1.7	5476	1.7	3166	8.7	599	7.9	715	3.7	355	158	.000
Complete bones	7.6	7044	8.4	1807	7.8	5476	6.6	3166	8.9	599	10.4	715	5.9	355	16.7	0.05–0.01
Game animal bones	35.1	2120	36.0	591	33.6	1629	23.4	1044	31.6	231	8.6	257	3.4	119	146.2	.000
Companion animals	0.1	7044	0.1	1807	0.1	5476	0.0	3166	0.0	599	0.0	715	0.6	355	12.6	.049

a lack of scavengers in the town or prompt burial of waste in all types of context.

Waste disposal practices and site formation processes

Waste disposal practices and site formation processes are considered on the basis on data on mean fragment size (Table 2), the distribution of species of different sizes (Fig. 3) and the skeletal frequencies of domestic animals (Fig. 4). Comparisons are made between the proportions of bones of large animals (cattle, reindeer, elk and undetermined large ungulates), medium-sized animals (sheep/goats, pigs, seals and undetermined medium-sized ungulates), small animals (rats, squirrels, arctic hares, red foxes and birds) and fish.

The pit fillings and ditch fillings were characterised by a larger fragment size and a substantial proportion of slaughter waste, especially of cattle (Table 2, Fig. 4), while the proportion of bones of wild animals was small (Table 2). The distribution of the bone fragments of differing sizes may have resulted from a waste disposal pattern that included discarding larger fragments of animal-derived waste and offal into pit structures and into the ditch. This practice has also been described in other zooarchaeological studies (e.g. Stallibrass 2000:160; Vretemark 2003:94).

The contexts associated with the building remains were characterised by small bone fragments, a large proportion of wild animal bones (Table 2) and a large proportion of cattle-based food waste (Fig. 4). Substantial numbers of large fragments and slaughter waste were also found in deposits associated with buildings, however. The distribution of animal bones in residential buildings and under-floor deposits did not differ from the overall patterns in all contexts associated with buildings, as this material contained c. 30% bones of small animals and fish (Fig. 3), c. 35% bones of wild animals (Table 2) and a little less than 60% slaughter waste from cattle (Fig. 4).

The yard deposits fall between the household deposits and the pits and ditch in terms of fragment size and the proportion of slaughter waste (Table 2, Fig. 4). This "intermediary" nature may result from their complex formation history, as the yard deposits in excavation areas 1 and 2 in particular may have formed over quite a long period during which waste may have been tossed or dropped directly into the yard, or else the yard may have originally contained a number of refuse heaps that were later dispersed.

The yard deposits contrasted with the other context types in that they often included large skull fragments. SU 1029, a deposit under the covered yard in area 2, for instance, contained five large parts of cattle crania derived from at least four individuals and also a large fragment of a sheep's cranium, and yard deposits SU 1069, 1071 and 4023 similarly contained large parts of cattle crania. Large sheep cranial fragments were found in a yard deposit (SU 54) in area 1 and a context associated with a building (SU 7001) in area 6. In principle, large cranium fragments are unexpected in a yard, as one might assume that the skulls would break rapidly under the influence of weather conditions and trampling. One possible explanation for the occurrence of large cranium fragments in these yard deposits is that the crania may originally have been deposited in refuse heaps in the yard and thus remained unaffected by trampling. In any case, it seems that crania may have undergone different treatment from the post-cranial bones.

There seems to be nothing exceptional about the cellar earth fillings, as they represent in many respects "average" contexts. It is unclear whether the cellar in area 2 had been intentionally filled with earth, but it had probably not functioned as a waste pit in the same sense as the ditches and pits. The cellar pits in area 5 had probably not been intentionally filled but had filled up when the building was destroyed.

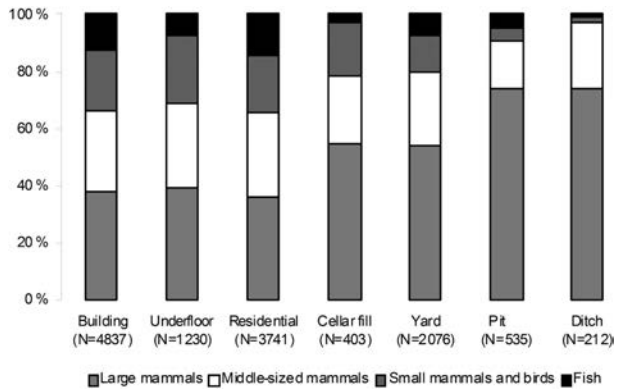

Figure 3. Proportions of bones (NISP) of large, medium-sized and small animals and fish. Sample sizes are indicated in the figure. The differences in species composition were statistically significant (χ^2=476.7 p=.000).

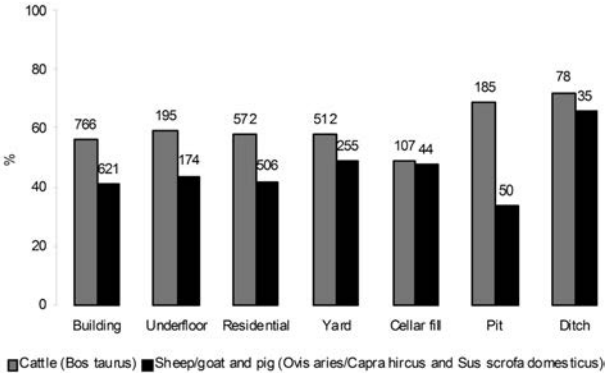

Figure 4. Proportions of slaughter waste from cattle and sheep/goats and pigs. Sample sizes (NISP) are indicated in the figure. The differences in the proportions of kitchen waste and slaughter waste were statistically significant (χ^2=19.9 p=.001, χ^2=14.3 p=.006).

The distribution of slaughter waste versus kitchen waste from domestic animals was analysed (Fig. 4). All the body parts were found in all the context types, but the frequencies were slightly different. Cattle slaughter waste had mostly been disposed of in the pits and the ditch, where about 70% of the cattle bones were the result of slaughtering, as opposed to building contexts, with about 55–60% cattle slaughter waste (Fig. 4). By contrast, the bones of middle-sized ungulates were more evenly distributed between the context types (c. 40–50% in all context types except for the ditch, where the sample size was very small) (Fig. 4). This pattern is perhaps related to the size of the waste, the smaller bone fragments of pigs and sheep/goats being less noxious than the larger animal waste, so that did not bother people if it was left in the domestic area. In all, the proportions of slaughter waste were somewhat lower in the case of middle-sized ungulates than for cattle, possibly due to a lack of sieving and the consequent loss of small carpal and tarsal bones of sheep, goats and pigs.

Treatment of animal categories

In principle, distinct treatment would be expected for the remains of different categories of animals such as wild animals and companion animals, because people have different relationships with them and they may be associated with distinct domains, such as "wild" or "domestic" (Thomas 1999). It is possible, for instance, that wild animals were perceived as a distinct category from domestic animals because they were associated with different spheres of life. However, as Holm (2002) argues in on the case of Iron Age and Early Medieval Norway, the dichotomy between wild and domestic may equally well have been a matter of indifference in a society that relied heavily on exploitation of the wilderness for its subsistence. Such may also have been the case in Early Modern Northern Finland. Companion animals were perhaps considered a distinct category from other domestic, edible animals because of their closer relationship with the people (see Ingold 1980:95–96), and this may have affected the disposal of their remains.

The distribution of wild animal bones versus domestic animal bones at the Tornio site (Table 2) differed between the context types, the largest proportions of wild animal bones being found in contexts associated with buildings (c. 35%) whereas the smallest proportions were in pits and in the ditch (from three to nine percent). The differences between the context types were statistically highly significant (p=0.000). It is significant, however, that the proportion of wild animal bones is largest in contexts associated with buildings, which are also characterised by a small fragment size. It is difficult to determine whether the observed disposal pattern of wild animal bones is only due to the smaller size of their fragments or to the different treatment afforded to wild animal remains relative to domestic animals.

To address this problem, the proportions of bones of small species (wild gallinaceous birds, waterfowl, domestic chickens and small wild mammals) and of bones of middle-sized animals (ovicaprids, pigs and seals) were analysed in the different context types (Fig. 5–6), and it does seem that wild and domestic species

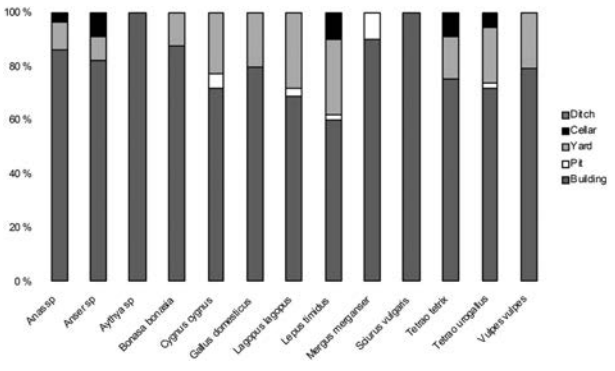

Figure 5. Proportions of bones of small domestic and wild animals in different context types.

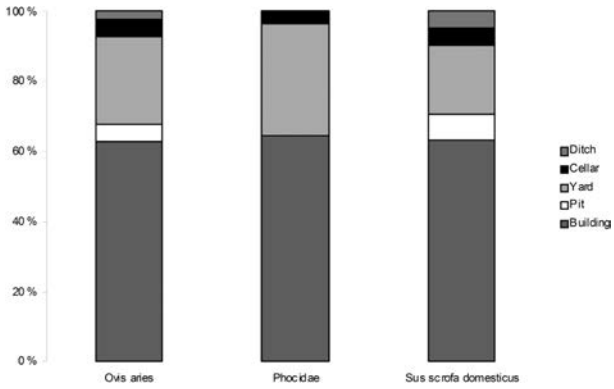

Figure 6. Proportions of bones of middle-sized wild and domestic animals in different context types.

of the same size category were treated in more or less the same way. Approximately 70–100% of the bones of small species were deposited in building-related contexts, whereas only up to six percent were found in pits and the ditch, while c. 60% of the bones of middle-sized animals were discovered in contexts associated with buildings, and c. 20–30% in yard deposits, with minor proportions in other context types. No seal bones were found in the pits or the ditch, however, unlike the bones of other middle-sized animals, some two to seven percent of which were found in these context types.

The sole exception in the treatment of bones of wild animals is the bear, which is perceived as a magical and powerful animal in Finnish folklore (Sarmela 1991). In general, signs of ritual practices were difficult to detect in the animal bone material, and the only clearer indication of ritual treatment of faunal remains was a set of nine bear claws found in a foundation deposit belonging to the house in excavation area 1, together with one claw a little further away in the yard. These may have been deposited either as a set of claws or as a fur with claws attached. According to ethnographic and archaeological evidence from Finland and Scandinavia, it was common to place offerings such as the skulls or limb bones of animals in the foundations of houses, under the stairs, or under the cornerstone (Hukantaival 2006). It is clear, however, that not all ritual actions associated with faunal remains have left traces in the animal bone record, and it is also possible that ritual acts of this kind took place primarily outside the towns.

The present data suggest that there may have been no distinction between wild and domestic animals, or at least no clear differences in the treatment of their remains. It is also possible that hunting was such an elementary and conventional part of their people's subsistence that wild animals were not regarded as anything different from domestic species. There is some indication that the wilderness was seen as something radically different from the domestic environment in the Finnish folklore of the late 19th and early 20th centuries (e.g. Anttonen 1994; Pentikäinen 1994), but it is highly questionable to suggest that these ideas were reflected in the life of Early Modern Tornio, where a completely different economic system prevailed and people were much more dependent on wild resources. It is suggested that the Sami had no such concept of wilderness as a sphere separate from the domestic (Schanche 2002), and we must consider the possibility that people in Early Modern Northern Finland shared this alternative view of the world.

Bones of companion animals (horses, cats and dogs) were found in small quantities in contexts associated with buildings, yard deposits and the ditch (Table 2). All the horse bones were parts of lower limbs, and they were subjected to more surface erosion than the other bones found in those contexts. Two horse bones were found in a yard deposit in area 5 (SU4023) and six in an under-floor deposit in the residential building in area 5. The dog bones were parts of upper and lower limbs. A deposit located under the timber-covered yard in excavation area 2 (SU 1029) contained a right radius and ulna and a left scapula and humerus which may all have been derived from the same individual, while other dog bone finds were an unfused distal humerus in a layer associated with the ditch (SU 2034) and two fragments of extremities in the yard deposit in area 5 (SU 4023). The cat bone finds were isolated ones, an unfused femur in a deposit under the floor of the residential building in area 1, a fused distal humerus in a layer associated with the ditch (SU 2034)

and an axis in the yard deposit in area 5 (SU 4023).

Companion animals seem to have received a different treatment from meat-producing species, since their bones were extremely rare in the Tornio assemblage and no butchery or skinning marks were observed on them. Companion animals were probably buried as whole carcasses. The disarticulated state of companion animal skeletons in the Keskikatu excavation implies that the bones in question were deposited secondarily or that the deposits were disturbed (cf. Stallibrass 2000). It is also possible that cat and dog remains were intentionally buried in association with buildings, or that a cat had died under a building, for example. Another possibility is that their remains were discarded along with other refuse. It is improbable, however, that horse carcasses would have been discarded in the yard or buried under houses, and the most probable explanation for the horse bones is therefore that they were deposited secondarily. Another possibility is that the horse bones had been used in the preparation of soap or glue. Inferior parts of the carcasses of other animals could also have been used for this purpose, although only reindeer antlers are mentioned in such a connexion in Northern Finland (Talve 1990:101). The fact that all the horse bones were lower limb bones and their surfaces were highly eroded may point to their use as a raw material in soap or glue making.

Although cats and dogs were people's companions, they were also useful animals for hunting or for catching mice, and they were not necessarily regarded as pets in the modern sense of the word. They lived freely in the town, sometimes causing irritation and complaints (Halila 1953:78), and they are often spoken of as undemanding, modest animals in Finnish folklore (Haltsonen 1929). In view of this it is perhaps not surprising that these animals were sometimes not buried but their bodies were thrown away with the other waste. The horse was the most expensive domestic animal in Early Modern Northern Finland (Virrankoski 1973:240), and the esteem in which horses were held is also interestingly reflected in court cases concerning bestiality, in that horses and cattle were the most common animal companions in this act (Keskisarja 2006:159). This may indicate that horses were such a valued domestic animals that it was more tempting, or at least less shameful, to conduct bestiality with them than with "lower" domestic animals such as pigs or dogs, for instance (Keskisarja 2006:160–162). Horses were also working animals, however, for only horses were used for working in the fields in Northern Finland (Virrankoski 1973:240). Although a horse may have been a valued companion and co-worker in Early Modern Tornio and its meat was probably not eaten, its carcass may very well have been utilised after its death.

Conclusions

All in all, the Tornio Keskikatu animal bone material was quite homogeneous. No appreciable differences in preservation conditions were observed and the remains of all species and all body parts were present in the different types of context. The pit and ditch fillings nevertheless differed from the contexts associated with buildings with respect to the waste disposal practices that they represented. The finds from yard deposits and cellar fillings were more difficult to interpret, and complex formation processes including some degree of secondary deposition and long formation periods seem to have been prevalent. Differences in the treatment of faunal remains were observed, especially between companion animals and domestic animals of different sizes. Thus, the context-oriented approach to animal bone distribution proved to be a useful way of analysing the data and producing information on waste disposal practices, site formation processes and the differential treatment of animal remains in 17th and 18th-century Tornio.

On the other hand, the analysing of features of different ages together may have obscured the results, especially as waste-disposal practices could have altered over such a long period. Some of the contexts may have been erroneously grouped because the functions and stratigraphic relationships of the features in the excavation were sometimes rather complex and poorly understood. Also, some of the contexts may not have been suitable for grouping at all because of their complex histories, long formation periods, multiple functions, etc. Furthermore, some large, unidentifiable contexts that could not be grouped in the light of our present understanding of the site had to be left out of this study, and some of the contexts were difficult to delimit, which may have caused mixing of materials from different context types. The timber-covered yard in area 2, for example, may have included some remains of a building. Finally, the analysing of other find categories in relation to bones may either shed light on the distribution of the bones or further complicate the picture. Such an endeavour remains a matter for future research, however.

English language revision by Malcolm Hicks.

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Appendix 1. Descriptions of the stratigraphic units included in the study.

Area	Stratigraphic unit (SU)	Context type	Description	Date
1	1	building	covers the remains of the residential building	1620–1650
1	2	pit	filling in a pit in the W part of the area	1640–1740
1	7, 26, 56	building	covers the remains of the building in the W part of the area	1660–1680
1	8, 22, 24, 35, 54, 67	yard	layer of wood chippings in the yard	1620–1725
1	9	building	clay foundation of the residential building	1620–1640
1	12	building	covers the remains of the residential building	17th century
1	14, 18	building	covers the building in the N part of area	1670–1700
1	21	building	in the wooden construction by the NW wall of the residential building	1620–1630
1	25	building	layer of mortar on the floor of the residential building	1640–1660
1	30	pit	filling in a pit NE from the residential building	
1	39	building	on and under the floor of the residential building	1620–1650
1	42	building	under the floor of the residential building	1635–1650
1	52	building	fireplace founding in the residential building	1640–1650
1	53	building	under the floor of the building in the N part of the area	1660–1680
1	55	barrel	around the earth-sunken barrel	1625–1650
1	57	building	under the building in the W part of the area	1620–1650
1	60	pit	pit filling SE from the residential building	1620–1670
1	62	building	under the foundation timbers of the residential building	1620–1650
1	68	pit	pit filling in the NW part of the area	17th century
1	71	pit	pit filling in the NW part of the area	17th century
1	77	yard	a yard deposit under the building in the N part of the area	1620–1650
1	78	building	covers the remains of the building in the NE part of the area	early 17th century
2	1008	yard	under the covered yard	1650–1725
2	1009	cellar fill	earth fill in the cellar	1740–1900
2	1026	building	under the foundation of a building	
2	1029	yard	layer under the covered yard	1620–1650
2	1043	building	clay foundation of the building by the yard	
2	1057	pit	pit filling in the S border of the covered yard	early 17th century
2	1059	pit	pit filling	17th century
2	1069, 1071	yard	layer under the covered yard	1620–1650
2	1082	yard	under the foundation of the covered yard	early 17th century
2	1083	pit	pit filling in the NW border of the covered yard	1620–1650
2	1090	cellar fill	under the cellar staircase	1770–1800
2	1091	cellar fill	finds from under the cellar floor	1770–1800
3	2001	building	covers the remains of the residential building	1620–1680
3	2002	building	clay foundation of the residential building	early 17th century
3	2005	building	covers partially the floor of the residential building	1620–1650
3	2012	building	under the floor of the residential building	1620–1650
3	2015	building	sand layer from the fireplace in the residential building	1640–1670
3	2018	pit	pit filling	1620–1728
3	2025	building	layer of wood chipping under the residential building	1620–1650
3	2026	building	associated with the destruction of the residential building	1750–1800
3	2031, 2049	ditch	under the timber layer in the ditch	1620–1720
3	2034	ditch	on the timber layer descending to the ditch	1690–1710
3	2037	pit	layer of wood chippings enveloping the pit SU 2018	

Appendix 1. Cont.

Area	Stratigraphic unit (SU)	Context type	Description	Date
3	2042, 2044, 2045	building	unclear building remains	18th century
3	2050	building	under the foundation timbers of the residential building	1620–1650
3	2052	ditch	on the bottom of the ditch	1640–1660
3	2055	pit	pit filling	1740–1760
3	2058	ditch	layer of wood chippings in the ditch	17th century
4	3001	pit	pit filling	1680–1700
4	3004	building	under the boards of the building	early 17th century
5	4001, 4002	building	covers the remains of the residential building	1620–1725
5	4003, 4016	building	associated with the fireplace	1620–1650
5	4009	building	covers the remains of the residential building	1620–1640
5	4017	building	under the floor of the residential building	1640–1660
5	4023	yard	yard deposit	1620–1680
5	4025	building	associated with the residential building	1630–1660
5	4027	building	covers the remains of the residential building	1630–1660
5	4029	building	under the floor of the residential building	1630–1660
5	4034, 4040, 4053	cellar fill	timber-cased cellar	1630–1700
5	4035	building	SE clay foundation of the building in the NE part of the area	17th century
5	4036	building	under the building in the NE part of the area	late 17th century
5	4037, 4042	building	under the floor of the residential building	early 17th century
5	4043	building	under the covered pathway of the residential building	1620–1640
5	4044	cellar fill	earth fill in the cellar	1620–1640
5	4049	building	under the foundation timbers of the residential building	1620–1650
6	5002	building	covers the floor of the residential building	1620–1650
6	5004	building	sand layer under the residential building	1620–1670
6	5006	building	layer in the W corner of the residential building	mid 17th century
6	5011	building	covers the floor of the residential building	1650–1700
6	5013	building	sand layer under the residential building	1620–1650
6	5015	building	covers the building on top of the residential building	late 17th century
6	5022	building	underfloor deposit	1620–1640
8	7001	building	covers the brick floor	1630–1680
8	7003	building	covers the building remains	1620–1720