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BONES, ECONOMIC STRATEGIES AND SOCIOECONOMIC STATUS: AN ANALYSIS OF TWO BONE ASSEMBLAGES FROM 17TH CENTURY TORNIO

ABSTRACT

In this paper, two animal bone assemblages from 17th century Tornio are compared. The study is focused on differences in economic strategies and socioeconomic status as inferred from zooarchaeological material. Despite the overall similarity of the assemblages, subtle differences were observed especially in the proportions of game animal bones, cattle body part frequencies and cattle age profiles. The differences clearly implicate variation in economic strategies, whereas the connection of the observed differences with social or economic status proved to be more difficult to interpret.

Keywords: zooarchaeology, animal bones, historical archaeology, Tornio, socioeconomic status

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INTRODUCTION

Historical archaeology has been concerned with the relationship between material culture and socioeconomic status since the late 1970s (e.g. Spencer-Wood 1987). The study of socioeconomic status is based on the assumption that consumer choice depends on wealth on the one hand and social relations, especially position in social hierarchy, on the other (Carroll 2002: 126). Thus, there is a tendency to think that wealth and status are displayed by buying expensive commodities and luxury items, and by calculating the ratios of different types of artefacts in specific assemblages, it is possible to estimate the socioeconomic status of the household associated with those assemblages (e.g. Hållans & Andersson 1992). The most commonly used class of finds for estimating socioeconomic status is pottery (e.g. Niukkanen 2002; cf. Scott 1997: 145), but other data, such as buildings and bones, have also been used (e.g. Yentsch 1994).

The aim of this paper is to compare two 17th century animal bone assemblages from the town of Tornio, northern Finland, and to explore whether or not, or to what extent, socioeconomic differences are inferable from a relatively modest sample of bones. The assemblages derive from the excavation of two roughly contemporaneous houses in two different plots at the centre of the town, and the present study can be understood as a parallel to Nurmi's (2004) previous analysis of artefact finds associated with the two buildings. Nurmi's study shows that the artefacts assemblages are markedly similar with each other and seem to indicate a relatively low socioeconomic status; the assemblages contained few 'luxury' items of any kind and traces of repair and reuse were common. In all, significant differences in terms of socioeconomic status could not be observed, but it is not altogether clear how accurately the results reflect the situation in the past (Nurmi 2004).

Animal bones can potentially offer an alternative insight into socioeconomic variation. Rather than objects of display, bones represent food refuse and economic activities such as fur and skin treat-

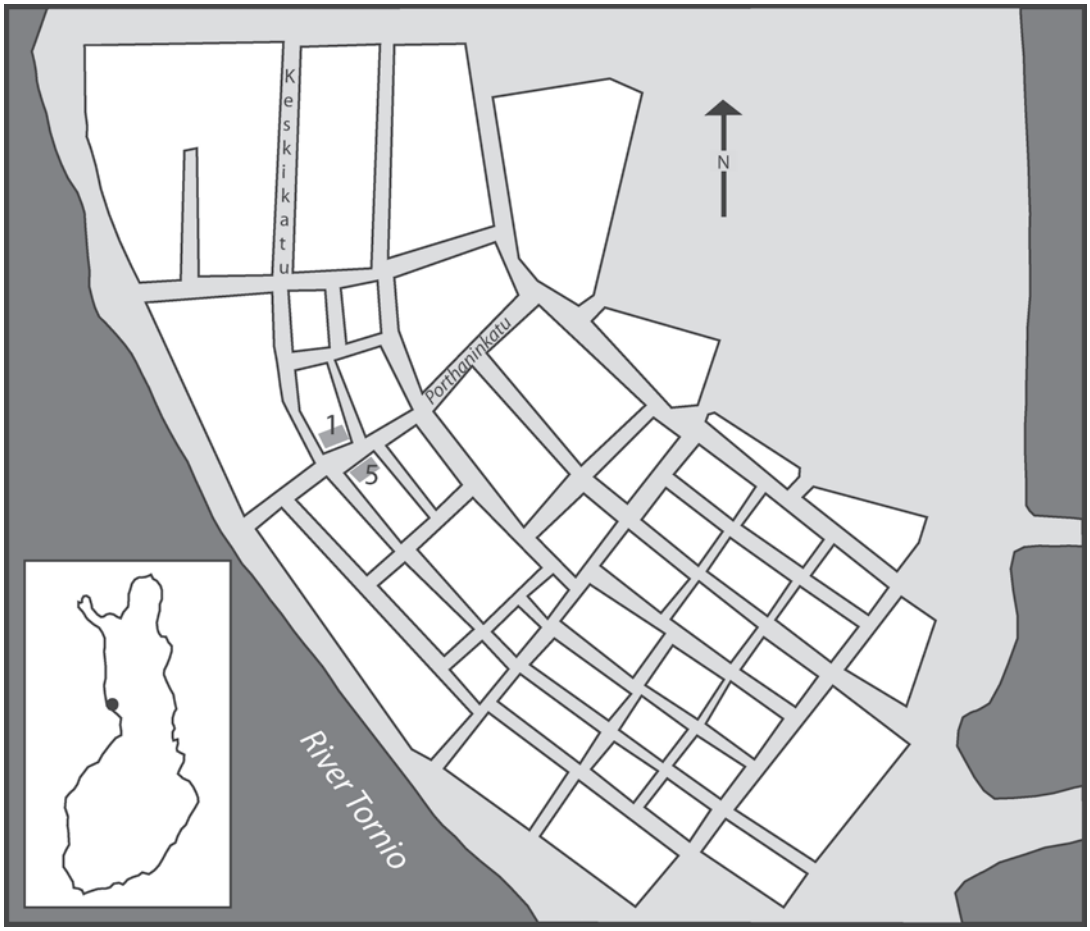

Figure 1. Map of Tornio showing excavation areas 1 and 5.

ment, wool and milk production, and bone artefact manufacture. Differences in wealth and status can therefore be reflected in the animal bone waste produced by households. Various indicators of wealth and status, such as species diversity, imported animal species, and bones representing better or more expensive meat cuts can be used for studying socioeconomic variation (e.g. Reitz 1987; Gidney 2000; Stokes 2000). For instance, the varying prices of meat cuts or fish species purchased from the slaughterer or the fishmonger have been used as the basis for studying socioeconomic status through zooarchaeological material (e.g. Branstner & Martin 1987; Singer 1987). Even a rough categorisation of the main meat producing species and skeletal elements can offer a detailed insight into economic and ethnic differences within a town (Ijzereef 1989). This study analyses and compares two animal bone assemblages from 17th century Tornio in terms of species diversity, domestic animal age profiles, and skeletal frequencies. The similarities and differences between the assemblages are discussed and their implications on economic and social variation considered.

SUBSISTENCE IN 17TH CENTURY TORNIO

Tornio is a small town in northern Finland, founded in 1621 by the Swedish crown in order to control the profitable northern trade, and it prospered during the 17th and 18th centuries. The town originally comprised of two streets (called Keskikatu and Takakatu) and two rows of blocks aligned with the River Tornio (Fig. 1). Most inhabitants of 17th century Tornio were tradesmen

who also kept livestock and cultivated land in the town (Mäntylä 1971: 52). Cattle, sheep and pigs were raised and slaughtered probably in the town premises (Mäntylä 1971: 52, 121; Puputti 2006). Cattle and sheep provided milk and wool for households' needs and were generally slaughtered for meat at a relatively high age, although there are indications of younger animals, even calves, having also been slaughtered (Puputti 2005, 2006). Historical sources suggest that the farming activities practised within the town premises produced sufficiently farm products for households' needs, but were not intensive enough to produce merchandise (Mäntylä 1971: 52, 602; Virrankoski 1973: 249). The town inhabitants seem to have been quite self-sufficient in farm products, especially as there is no evidence of large-scale meat cut trade within the town during the 17th century (Puputti 2006).

Game animals, especially hares and birds, were an important addition to the diet, and they probably also provided extra merchandise in the form of train oil, feathers and furs. The proportion of game animal bones in the two the assemblages discussed in this paper is extraordinarily high in comparison to other bone assemblages from urban contexts in Finland and Sweden: game mammal and bird bone fragments make up over 30 % of the assemblage in NISP counts. It is obvious that hunting was an important means of livelihood to the farmers and the townsfolk of northern Finland during the 17th century (Virrankoski 1973: 270–1; Puputti 2006). According to historical records, fishing has had a major role in the economy and diet of the townsfolk (Mäntylä 1971: 121, 206), but fish bones were excluded from this study due to a serious bias in fish bone representation (see below). The zooarchaeological analysis of livestock husbandry and game exploitation in Tornio is discussed in detail elsewhere (Puputti 2005, 2006).

MATERIAL AND METHODS

Two modern-day plots by Keskikatu (i.e. 17th century Takakatu) located near the 17th century town hall and the market square were excavated in Tornio in 2002. The excavated plots were divided into eight separate areas, which roughly corresponded to the 17th century plots by Keskikatu (Herva 2002: 6; Nurmi 2004: 11). Little is known about the inhabitants of specific plots prior to the very end of the 17th century. From 1720 on, plots in the town were taxed and it is hence known that the plots by Rantakatu were relatively more expensive than those located by Keskikatu, and this probably indicates that they were also more highly esteemed socially (Mäntylä 1971: 243–4). Also, the Rantakatu plots were mostly owned by burghers, tradesmen and officials whereas the Keskikatu plot-owners included also mariners and craftsmen (Kostet 1982: 163–4). Moreover, according to historical sources, wealth tended to accumulate in the hands of a few burghers over the 18th century (Mäntylä 1971: 403–5).

The bone assemblages analysed here derive from excavation areas 1 and 5 (Fig. 1). Excavation area 1 included the remains of at least two buildings, and the remains of one building were investigated in excavation area 5 (Herva 2002). One building in the excavation area 1 dates to the first half on the 17th century whereas the other building dates approximately to 1650–1680 (Nurmi, unpublished). The building in area 5 has probably consisted of three rooms unified by a covered pathway, and two small cellars. It had probably two phases of use, the first dating to 1621–1630 and the second to 1630–1650 (Nurmi, unpublished). Although all the stratigraphic units pre-dating 1721 are included in this study, most of the units date to 1620–1650 (Nurmi 2005), as does the majority of the animal bone material.

Most stratigraphic units in the study were associated with the buildings: underfloor deposits, foundation deposits and layers formed in the destruction of the houses constitute a majority of units. Earth fill deposits, refuse deposits and yard deposits are also included. Unfortunately, the soil was not sieved due to restricted budget and time (Herva 2002), and this has most certainly caused a loss of smaller bones, especially fish bones and small bird and mammal bones. The bone material was fairly well preserved. Burned bones constituted 1.8 % of the assemblage and nearly 30 % of the bone fragments were identifiable to species or genus. Gnawing damage, chop and cut marks were recorded in roughly 7 % of domestic animal bone fragments and breakage was observed in about 3 % of domestic animal bone fragments in both areas.

Species diversity, domestic animal age profiles, and domestic animal skeletal frequencies on

Table 1. Species diversities in excavation areas 1 and 5 (% NISP).

		Area 1 (% NISP)	Area 5 (% NISP)
Mammals			
	Cattle (*Bos taurus*)	37	42
	Sheep/goat (*Ovis aries/Capra hircus*)	18	21
	Pig (*Sus scrofa domesticus*)	5	7
	Reindeer (*Rangifer tarandus*)	1	--
	Seal (*Phocidae*)	5	2
	Other game mammals	9	6
	Other domestic mammals	1	1
Birds			
	Wild gallinaceous birds (*Galliformes*)	19	15
	Waterfowl (*Anatidae*)	5	6
	Total	100% n=1056	100% n=1428

excavation areas 1 and 5 animal bones pre-dating to 1721 were compared. The statistical significance of the observed differences was tested with chi-square (χ^2) tests performed by SPSS. Domestic animal age profiles were constructed using epiphysial fusion data. Epiphysial fusion dates were taken from Habermehl (1961), Silver (1969) and Barone (1999).

The relative species abundances were evaluated by using number of identified specimens (NISP). Minimum numbers of individuals (MNI) were counted from the assemblages, but were not used in this study, since the numbers were too small for statistically significant comparisons. Skeletal frequencies were compared using minimum number of elements (MNE). MNE indicates the least possible number of anatomical elements needed to produce the observed number of bone fragments (e.g. Reitz & Wing 2004: 215). MNE values rather than NISP-based counts are used, because they avoid the problems associated with differential fragmentation of elements. The ratio of meaty and less meaty body parts is used in quantifying skeletal frequencies. According to During (1986: 46), the cranium, carpals, tarsals, metapodials, phalanges and caudal vertebrae are less meaty body parts, whereas the upper limbs, pelvis, scapula, ribs and cervical, thoracic and lumbar vertebrae are meaty body parts. Meaty body parts can be considered as food waste and less meaty regions as offal. Also the less meaty body parts were also used in food preparation, but these parts were rarely used as merchandise (Vilkuna 1929: 27; Tourunen 2003: 371).

COMPARISON OF THE ASSEMBLAGES

Results of species diversity analysis are presented in Table 1. In area 1, game animal bones were more abundant than in the area 5; they constituted 37.9 % of the bone fragments in NISP counts in the area 1 and 29.8 % in the area 5. The difference was statistically significant (χ^2=19.6 p=.000). Especially seal (*Phocidae*) bones were more abundant (χ^2=13.8 p=.000). Cattle (*Bos taurus*), sheep/goat (*Ovis aries/Capra hircus*) and pig (*Sus scrofa domesticus*) bones were relatively more common in area 5 (χ^2=35.2 p=.000; χ^2=26.4 p=.000; χ^2=19.8 p=.000).

Sheep/goat age profile did not show any significant differences between the two areas (Fig. 2) whereas the number of pig bones suitable for age estimation was too small for comparisons. Cattle age profile, on the contrary, shows a small but statistically significant (χ^2=11.2 p=.001) difference in calf and young cattle bones (deceased before the age of 7–10 months) in area 1 (Fig. 3). Sheep and pig skeletal frequencies were similar in both areas, whereas cattle meaty body parts were better represented in the excavation area 5 (Table 2; χ^2=25.1 p=.000).

DISCUSSION

The similarities between the two assemblages were far greater than the differences; the basic economic strategy has apparently been livestock husbandry accompanied by food and merchandise acquisition by hunting. Some subtle differences were, however, observable especially in species diversity, cattle age profiles, and cattle

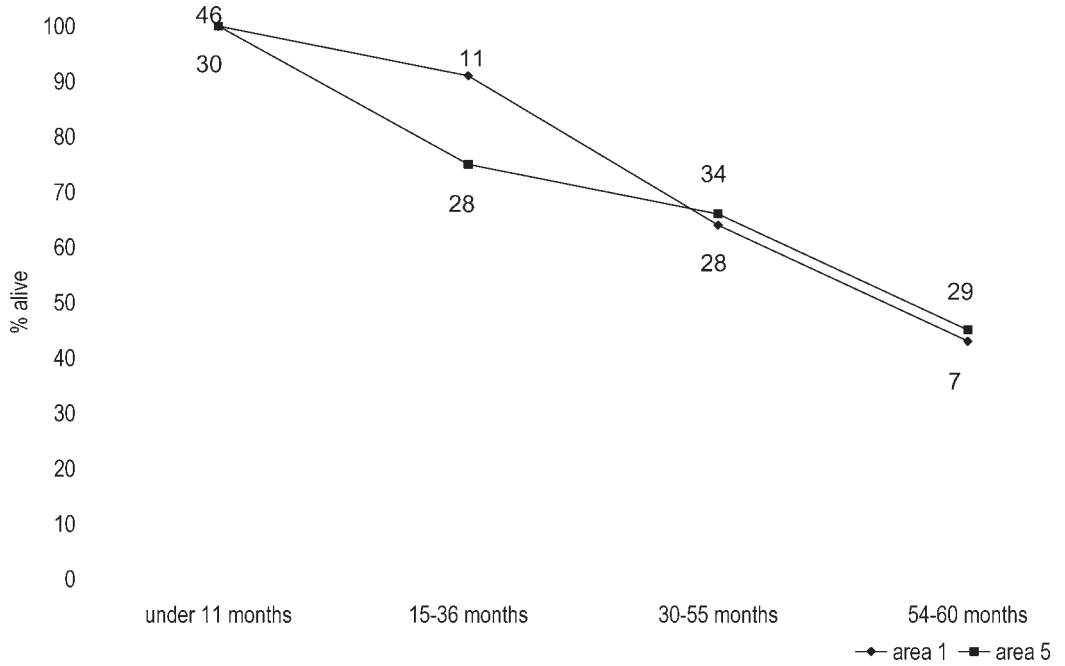

Figure 2. Sheep/goat (Ovis aries/Capra hircus) age profiles based on epiphysial fusion. Absolute numbers of elements in each age category are indicated under or above the line.

skeletal frequencies. It is evident that hunting has been an important means of livelihood for the inhabitants of both areas. In area 1, the proportion of game animal bones is somewhat more elevated, and it therefore seems that the household in area 1 may have invested more energy in hunting. It is unfortunate that artefact finds do not shed much additional light on this issue, but the only hunting-related objects, three leaden fowling piece bullets, were found in area 1 (Nurmi 2004). The fact that the difference is observable especially in the numbers of seal bones can indicate that the objective was to obtain additional merchandise. Arctic hare (*Lepus timidus*) and wild gallinaceous bird (*Galliformes*) bones were found in quantities from both excavation areas. These animals were probably hunted mostly in order to supply extra meat to the diet, as hare fur was relatively low-valued and gallinaceous birds may have been caught in small numbers around the year.

In medieval Sweden, a large proportion of cattle and game animal bones has been interpreted as an indication of wealth (Vretemark 2003: 90). The proportion of cattle bones may be a valid indicator of economic status also in the context of 17th century Tornio; slaughtering cattle and sheep/goat for meat instead of keeping them for milk and wool production could be interpreted as an indication of wealth. Hunting, however, was commonly practised in the 17th century and a relatively cost-free way of obtaining extra food and merchandise. Therefore, and given the overall 'agrarian' character of 17th century Tornio, a large proportion of game animal bones can hardly be interpreted as a sign of wealth.

A high proportion of calf bones can indicate several things. Veal meat is appreciated and a large number of calf bones might indicate wealth in the sense that a household could afford to slaughter calves instead of raising them to adulthood, when they would produce milk or greater quantities of meat. The proportion of calf bones could also reflect an investment in butter and/or cheese production (Vretemark 1997: 83–4). Milking cows around the year requires that the cows calve also late in the autumn. The mortality rate of calves born late in the autumn has been higher than that of the calves born during spring and summer (Vretemark 1997: 83–4). Hence, the greater proportion of calf bones could indicate that cows were milked also during the winter and the calf

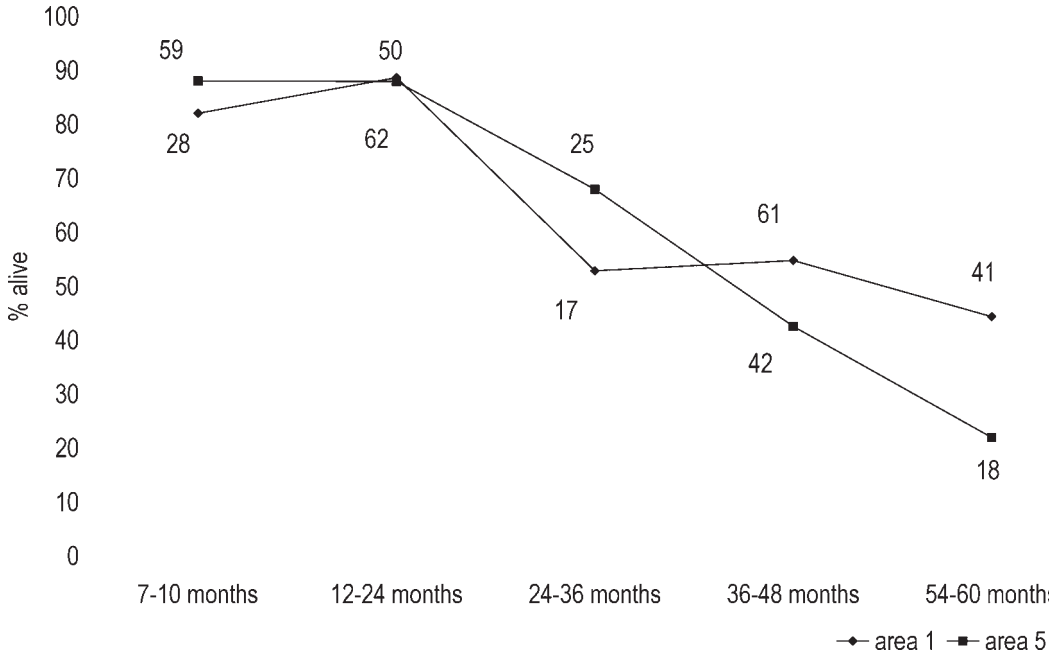

Figure 3. Cattle (Bos taurus) age profiles based on epiphysial fusion. Absolute numbers of elements in each age category are indicated under or above the line.

mortality rate was therefore higher. Virrankoski (1973: 242–3) speculates that the custom of milking cows during the winter may have been practised in the countryside of northern Finland during the 17th century. In principle, this may also have been the case in Tornio, and more so in the excavation area 1. Cheese rennet was obtained from the stomach of a calf, lamb, young goat or young pig. In Finland, the stomach of 3–4 days old calf has been traditionally used (Grotenfelt 1916: 131). Whether or not the calf bones indicate butter and cheese production remains an open question. Red earthenware storage jars and serving dishes distribution did not show evidence of enhanced milk production in either area, but then again, the milk production-related jars could also have been wooden (Pääkkönen 2006: 46).

The higher proportion of cattle meaty body parts in area 5 could perhaps indicate that some cattle meat cuts were purchased, but the difference between the assemblages is not very pronounced, and the overall impression is that both households slaughtered and consumed cattle within the household. Wealthier households could have been in the position of buying better meat cuts from the butcher, but, on the other hand, a greater proportion of meaty body parts could also indicate lesser wealth. That is, according to Hållans & Anderson (1992: 211–12), poorer households owned less pasture needed to support sufficient livestock and were therefore forced to buy their meat from the butcher. In 17th century Tornio, however, the pasture was reserved mainly for horses and the town meadows were divided in areas of equal size (Mäntylä 1971: 52, 118). During the summer, livestock were kept in a common pen outside the town (Mäntylä 1971: 120). Although the townsfolk sometimes illegally sold,

	Cattle	Sheep/goat	Pig
Area 1	44/56	68/32	49/51
Area 5	53/47	65/35	48/52

Table 2. The ratios (% MNE) of meaty and less meaty body parts of cattle (Bos taurus), sheep/goat (Ovis aries/Capra hircus) and pig (Sus scrofa domesticus).

mortgaged or inherited the town meadows (Mäntylä 1971: 118), the conditions for keeping livestock were probably quite equal. Against this background, a high proportion of meaty body parts is likely to indicate wealth in the context of 17th century Tornio.

The absence of notable differences between the areas may also be, at least partly, due to factors relating to the formation of the assemblages. First, the soil was not sieved, and the loss of the smallest bones may have contributed to the apparent similarity between the assemblages. It must also be noticed that fish bones were excluded from this study precisely due to the bias caused by sample recovery. The differences might have been more substantial, if the smaller bones had been included in the analysis. Secondly, the assemblages may also be 'contaminated' with material originating from other households and plots. That is, pottery analysis shows that the deposits were somewhat mixed: pieces of the same vessel could be found from different excavation areas (Pääkkönen 2006: 14). The risk of contamination is especially great in earth fill, refuse, and yard deposits, as their formation processes are often quite unclear. In brief, the association of the studied bones assemblages with specific households is not certain, and there is an obvious need, at least in Tornio but probably in other contexts as well, to consider formation processes in more detail before trying to build up elaborate scales of socioeconomic variation on the basis of archaeological finds.

Finally, it must be noticed that the theoretical framework for studying socioeconomic status through archaeological finds is not unproblematic in itself. This theoretical framework, based on the idea of consumer choice, may not apply very well to early modern northern Europe; it seems possible that a need to the explicit manifestation of socioeconomic status did not even rise in small urban communities (Rosen 1999: 16–17; Nurmi, unpublished). Moreover, Nurmi (2004, unpublished) argues that wealth and social status were not expressed by purchasing expensive commodities. Rather, there are indications that instead of having been consumed, wealth was invested perhaps in land and silver (Mäntylä 1971: 207–8; Nurmi, unpublished).

CONCLUSION

The analysis of animal bone material from Tornio Keskikatu excavation areas 1 and 5 showed that there were some differences in economic strategies between households in 17th century Tornio. The association of the observed differences with socioeconomic status, however, remains unclear. The slightly more intensive investment on hunting in area 1 could indicate lesser wealth, but since the hunted species also produce valuable merchandise, it is troublesome to regard that as an indication of a lower socioeconomic status. The proportion of calf bones in excavation area 1 could indicate wealth, but it could also be interpreted as a sign of investment on butter and cheese production. The only more explicit indication of higher (economic) status is the larger proportion on meaty cattle body parts in area 5, and even this difference, although statistically significant, is not very marked. In general, the analysed assemblages give an impression of frugality and/or relatively low status: hunting has provided extra food, mainly older domestic animals have been eaten, pigs used only for meat production have not been common, and a considerable amount of breakage of bones probably for marrow extraction is observable in both assemblages.

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