Preliminary Report of an Analysis of Faunal Remains from an 18th century midden at Skálholt, Iceland

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Abstract

This report presents results of a preliminary analysis of the mammal bones from one context in an 18th c midden at the Episcopal farm of Skálholt, Arnessyslá, south Iceland. This context (454) was part of Midden Test D (Group 383), and was excavated by Dr. Jim Woollett, Matthew Brown, and Kate Krivogorskaya during June and July of 2003. Further excavation of this context was conducted by George Hambrecht during June of 2004. Details of excavation and recovery methodologies employed, as well as descriptions and discussions regarding the complete stratigraphy of Midden Test D and other midden test pits undertaken at Skálholt in 2003 can be found in reports of field work by Woollett (2003) and Lucas (2004). This work was conducted as a midden sampling program, in conjunction with the FSI excavations of the 18th century phase of Skálholt. A total of 20,554 bone fragments were recovered from Context 454, representing roughly one half of the total number of bone fragments recovered from the entire site in 2003 and 2004. The remaining half of the 2003 and 2004 assemblages are derived from a great number of contexts in the house and various midden tests, many of which contributed single bag bone samples. An analysis of faunal remains from these other contexts is on-going and is not discussed in this report. All sediments were dry sieved through 4mm mesh to standardize recovery of bones following usual NABO recommendations. This assemblage does not fit the typical dairy survivorship profiles associated with North Atlantic farm economies. The majority of these cattle were slaughtered at their peak age for meat return, sometime before the second half of their third year of life. This assemblage seems to represent a high cost, and high value beef-cattle strategy rather than the more usual dairy pattern of peaks in mortality in very young and very old animals. This assemblage could also be the product of the culling of unproductive milk cows for meat. Yet the almost total absence of neonatal cow bones, as well as the few indicators of the presence of very old cows suggests that the meat strategy is a more likely explanation. A meat based strategy calls for large amounts of pasture land and winter fodder. It is a strategy that invests these assets towards a one-time meat return, as opposed to long-term dairy production. In the Icelandic context in any period such a strategy would be exceptional (McGovern, et al 2001). Archaeofauna from the 9th-11th c contexts from Sveigakot and Hofstaðir in Mývatnssveit, and the 18th century from Finnbogastaðir in NW Iceland will be used for the purposes of comparison.

The cattle represented in this context seem to have been of a breed foreign to Iceland that must have been introduced from continental Europe. All the crania recovered from this context are polled. In all but two of these cases the cattle were naturally polled. In the other two cases the cattle were artificially polled. Cattle in Iceland from the Settlement Period through the Early Modern Period were of horned varieties. Naturally polled cattle were a rare genetic mutation that appear very infrequently in the archaeological record. The appearance of this different breed suggests that these cattle might have been part of an effort towards agricultural improvement on the part of the Bishops of Skalholt. The appearance of the artificially polled cattle suggest how the urge towards

improvement went beyond pure economics and entered the realm of fashion and identity.

Site Context

Context 454 is a midden deposit broadly dated to the first half of the eighteenth century, at which time Skálholt was a large, proto-urban settlement and the diocesan headquarters for southern Iceland. The midden containing context 454 was, according to contemporary maps close to, and possibly associated with, a butcher's work shed. Butchery related artifacts such as a piece of whale bone butcher block and a possible whale bone knife handle were found in context 454. It is also located alongside the edge of a roadway that ran through a complex of outbuildings south of the Bishop's residence. The midden was formed through a series of dumps of refuse, ash and fill over the edge of the road. Context 454 was the only context in this midden associated with quantities of well-preserved, whole animal bones. It is an extremely dense midden deposit, with very little sediment present between the closely-packed and entangled bone fragments.

Because the edges of adjacent, thin peat ash deposits interdigitate with it, context 454 seems to represent an accretion of multiple dumps occurring over a fairly short time period.

Laboratory Methods

Analysis of the Skalholt collection was carried out at the Brooklyn College and Hunter College Zooarchaeology Laboratories and made use of extensive comparative skeletal collections at both laboratories and the holdings of the American Museum of Natural History. All fragments were identified as far as taxonomically possible (selected element approach not employed) but most mammal ribs, long bone shaft fragments, and vertebral fragments were assigned to "Large Terrestrial Mammal" (cattle-horse sized), "Medium terrestrial mammal" (sheep-goat-pig-large dog sized), and "small terrestrial mammal" (small dog-fox sized) categories. Only elements positively identifiable as *Ovis aries* were assigned to the "sheep" category, with all other sheep/goat elements being assigned to a general "*caprine*" category potentially including both sheep and goats. Following NABO Zooarchaeology Working Group recommendations and the established traditions of N Atlantic zooarchaeology we have made a simple identified fragment count (NISP) the basis for most quantitative presentation. Measurements (Mitoyo digimatic digital caliper) of fish bones follow Wheeler & Jones (1989), mammal metrics follow Von Den Dreisch (1976) and mammal tooth eruption and wear recording follows Grant (1982). General presentation of domestic mammal age reconstruction follows Enghoff (2003). Digital records of all data collected were made following the 8th edition NABONE recording package (Microsoft Access database supplemented with specialized Excel spreadsheets, see discussion and downloadable version at www.geo.ed.ac.uk/nabo) and all digital records (including archival element by element bone records) and the bone samples are permanently curated at the

National Museum of Iceland. CD R versions of this report and all archived data are also available on request from nabo@voicenet.com.

Butchery marks are numerous and variable on this assemblage. A large amount of measurements were also recorded. These aspects of the assemblage will not be addressed in this preliminary report, but will be addressed in later reports drawing on a larger portion of the whole archaeofauna.

Overview of Species Present

Table 1 presents a count of the identified specimens (NISP 4,227) and the less well identified categories of "Large Terrestrial Mammal" , "Medium Terrestrial Mammal" and "Small Terrestrial Mammal" and unidentified mammal bone fragments which contribute to the overall bone count (TNF) of 20,554

Table 1	
Domestic Mammals	**Count**
Cattle (Bos taurus)	887
Horse (Equus caballus)	3
Dog (Canis familiaris)	present
Sheep (Ovis aries)	27
Caprine (Sheep and Goat)	118
Total Caprines	145
total Domesticates	1035
Cetacea	2
Arctic Fox (Alopex lagopus)	2
Fish sp to be determined	2203
NISP total	4277
Large Terrestrial Mammal	888
Medium Terrestrial Mammal	94
Small Terrestrial Mammal	1
Unidentified mammal fragment	15,294
TNF total	20,554

Horses are represented by a whole metatarsus, which may represent raw material for craft work rather than meat waste, though there is also a molar and a fragment of a horse scapula. Dogs are represented by tooth marks on bones, and were certainly present on site despite the absence of their remains from this context. The tooth marks could also have been made by Arctic Fox which is present in the context. Birds are not present in the current sample. Species and

element identifications for the fish elements are currently underway and will be presented in a later report.

Domestic Mammals

Table 2 presents the count of fragments (NISP) and relative % of the domestic mammals. Cattle dominate the domestic mammal assemblage; no other currently known archaeofauna from Iceland has such a high percentage of cattle bone. Caprines together make up less than 15% of the deposit.

Table 2 Domestic Mammals	*% NISP*
Cattle (Bos taurus)	85.00
Horse (Equus caballus)	0.30
Dog (Canis familiaris)	
Sheep (Ovis aries)	4.00
Caprine (Sheep and Goat)	11.00
Total Caprines	15.00

Of the unidentifiable mammal bones, LTM (large terrestrial mammals) make up a similar majority in proportion to MTM (medium terrestrial mammals) and STM (small terrestrial mammal) as cattle to caprines in the NISP. Considering that equids are represented by only three elements, and that the proportions between bos versus other mammals and LTM versus MTM (medium terrestrial mammal and STM (small terrestrial mammal) are similar it might not be too risky to associate LTM with cattle.

Finding cattle at a high status site such as Skálholt is not out of the ordinary, but to find an assemblage so totally dominated by cattle is. In comparison, archaeofaunal assemblages from the medieval farm sites of Sveigakot and Hofstaðir in the north of Iceland exhibit far higher numbers of caprines, with cattle routinely representing between 15-20% of the archaeofaunal assemblages in the early period after landnam, and then falling to 10-15% later in the early medieval period (McGovern et al 2001, Perdikaris et al 2004). The archaeofaunal assemblage from a lower ranking 18th century site in NW Iceland, Finnbogstaðir, has cattle making up roughly 10% of its assemblage (Edvarsson et al, 2004).

Element Distribution

The chart below (Figure 1) does not show skull fragments, because their high numbers and the possibility of multiple representations of the same individual tend to skew the element distribution chart (total number of cow skull elements is 182). Vertebral elements, excepting the axis and the atlas, are left out as they are not species identified, but LTM vertebral elements are present in significant numbers.

The element distribution for the cattle strongly suggests that these cattle were slaughtered onsite. Elements from across the whole cow are present. If the beef represented by this archaeofauna was being imported in from surrounding farms or regions, our element distribution would most likely contain a majority of heavy meat bearing bones, such as the femur and humerus. The long bones with heavier meat loads, such as the femur and humerus represent 29% of the identifiable cow bones, minus the skull fragments. Yet the rest of the assemblage does contain very low meat bearing elements such as phalanges and metapodials, whose presence does imply that many of these cows were slaughtered onsite.

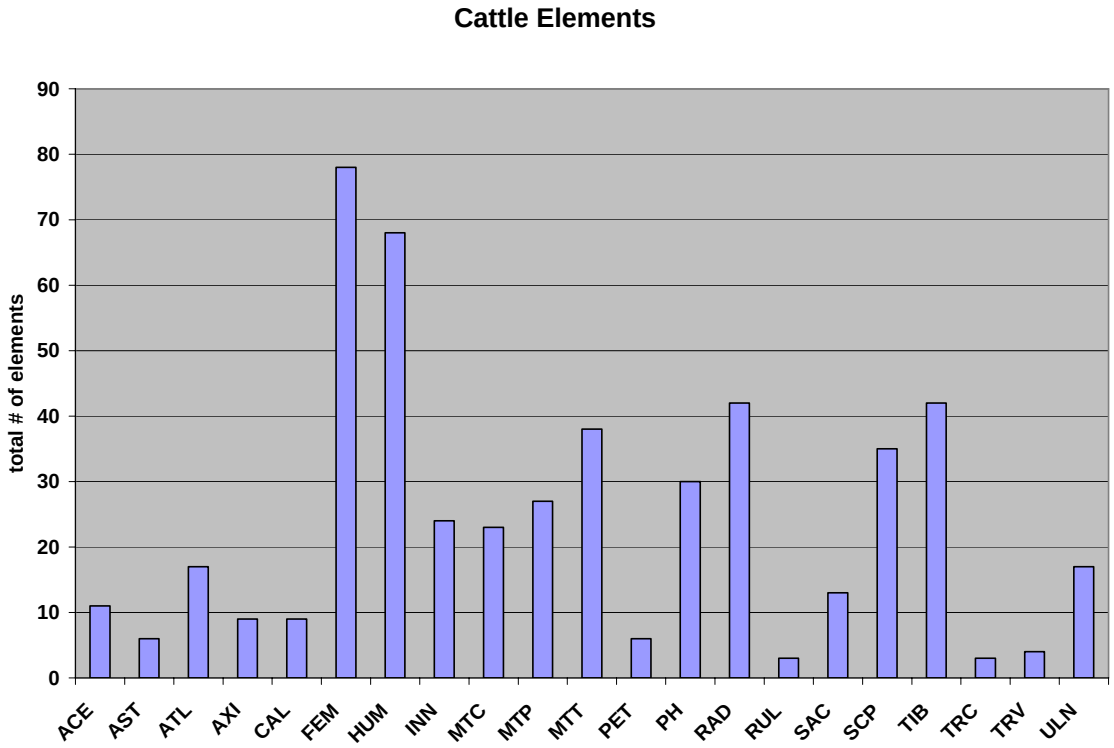

Figure 1

Mortality/Age Structure of Cattle

A number of approaches have been applied to archaeofaunal assemblages to determine the age at which animals were killed in an effort to reconstruct herding strategy (Payne 1974). The presence of newborn (neonatal) bones, tooth eruption and wear, and fusion state of long bones are all usually combined in an attempt to reconstruct the mortality profile (Enghoff 2003).

The cattle in the context 454 collection are almost all adults or older juveniles (table 3). Neonatal bones are barely represented in this assemblage but normally make up 20-40% of most Icelandic farm collections from all periods.

Table 3 – Adult/Juvenile and Neonatal Cow bones

Cattle Bones	# of bones	%
Adult & juv	887.00	99.66
Neonatal	3.00	0.34

Tooth eruption patterns observed on both maxillary and mandibular cattle tooth rows, Figure 1, indicate that the majority came from young adult animals.

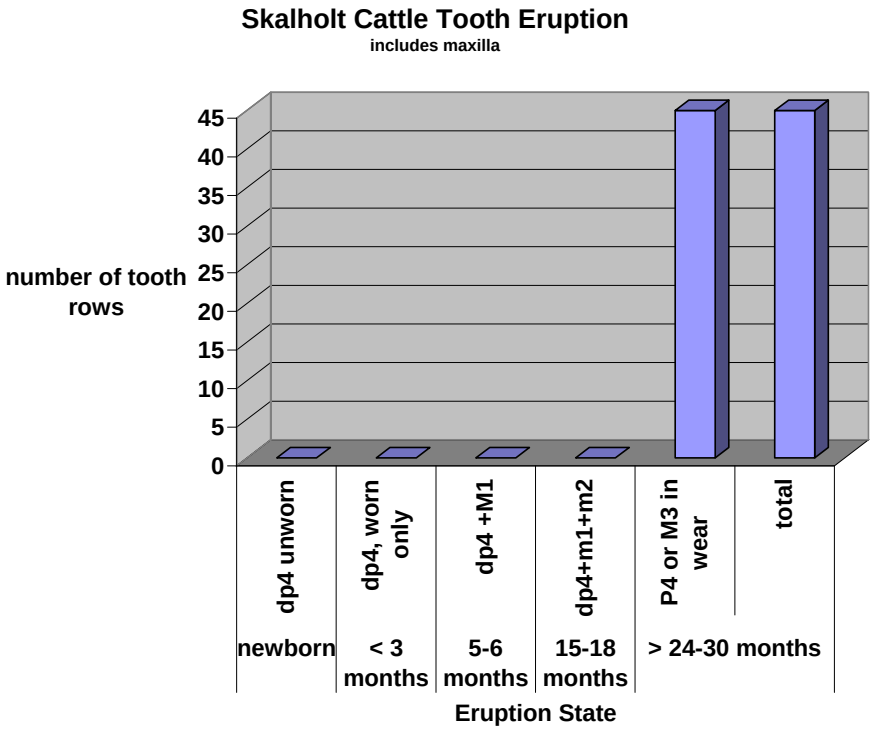

Figure 2

Figure 3 presents the wear state of the cattle maxillary third molar, erupting when the animal has become fully adult. The majority of these erupted third molars (M3) show very light to medium wear, suggesting that the majority of these animals were young adults rather than very old dairy cattle reaching the end of their useful lifespan.

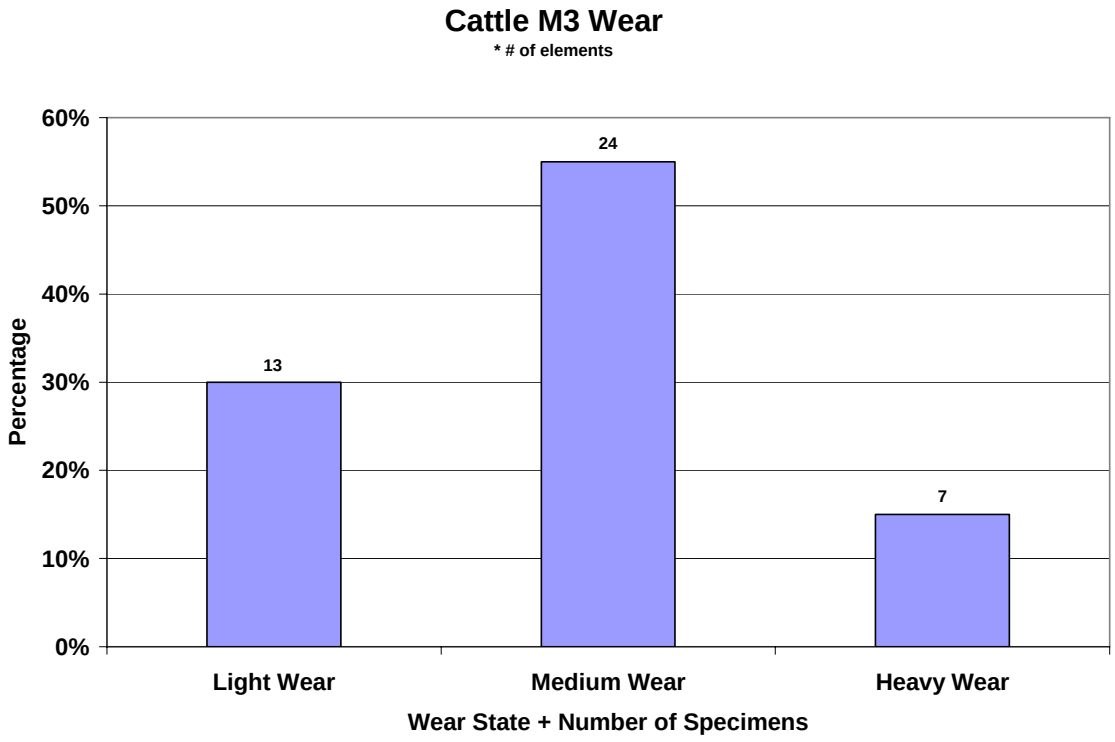

Figure 3

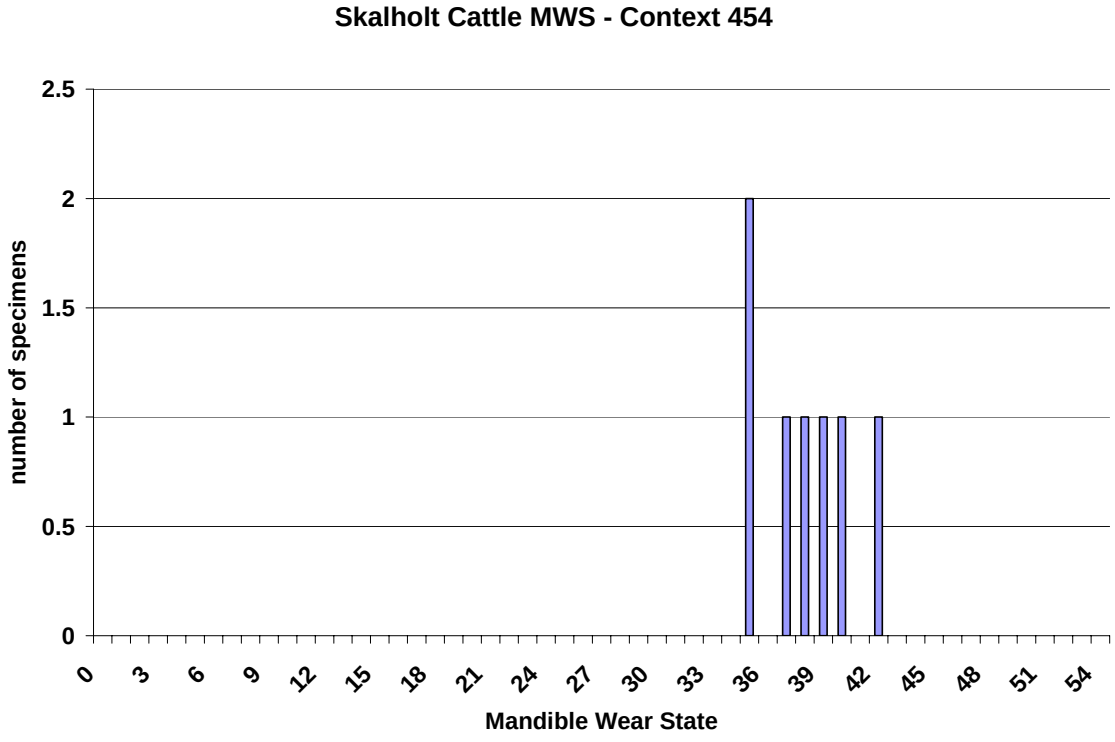

Figure 4

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Figure 4 presents the mandibular wear state for the available cattle jaws, making use of the Grant (1982) method, age estimates relative to tooth eruption and wear from Grigson (1982).

Light and medium wear account for roughly 84% of the sample of maxillary tooth rows (out of 44 samples). This strongly suggests that these cattle were slaughtered when they were three years old or older (Grigson, 1982). The significantly smaller number of M3 showing heavy wear suggests that there were few older animals, meaning older than 4-5 years, represented in this dump. The mandibles tell a similar story, suggesting that the majority of the cattle represented by unit 454 lived until sometime after their third year. Yet due to the much larger sample size of maxillary tooth rows, the M3 maxillary tooth wear data should be emphasized over the mandibular tooth wear data, with its much smaller sample size (7 mandibular tooth rows). Also, dental wear is a relative indicator of age. Different levels of erosion and pasture fertility can, for example, either inhibit or increase the levels of tooth wear in a cow. In order to lessen the "noise" from such possible variables the fusion state of selected long bones must be examined as well.

The fusion states of the cattle long bones reinforce the idea that these cattle lived beyond their third year, but not much longer than their fourth year (figure 4).

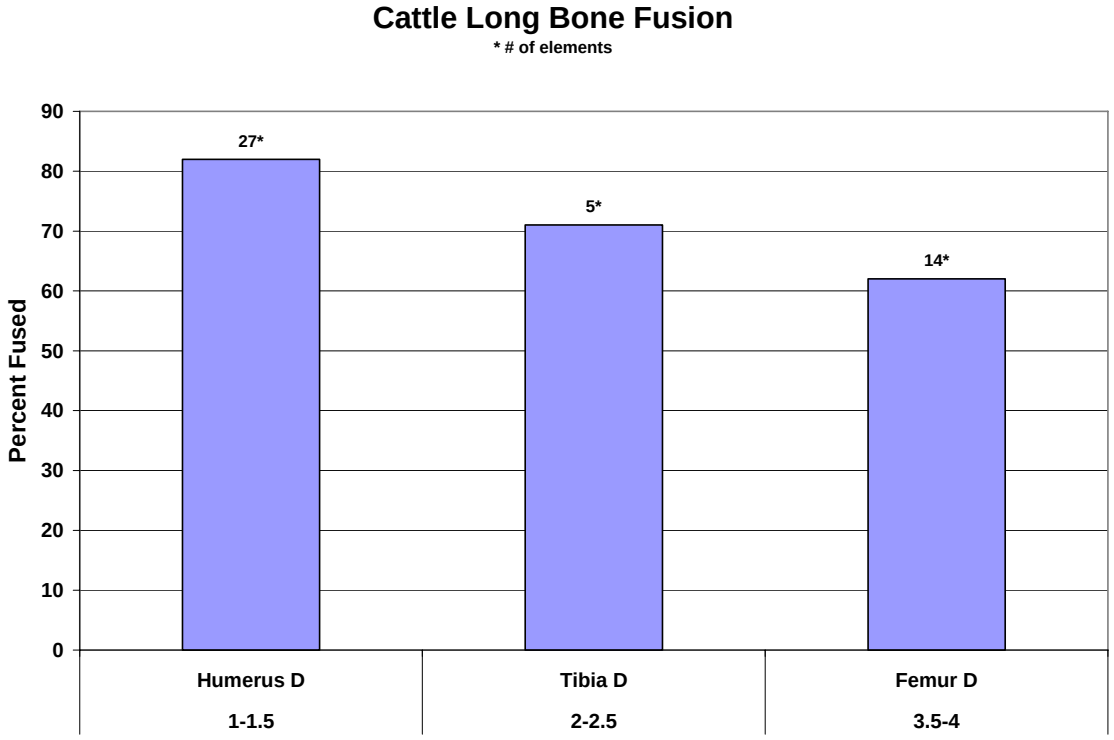
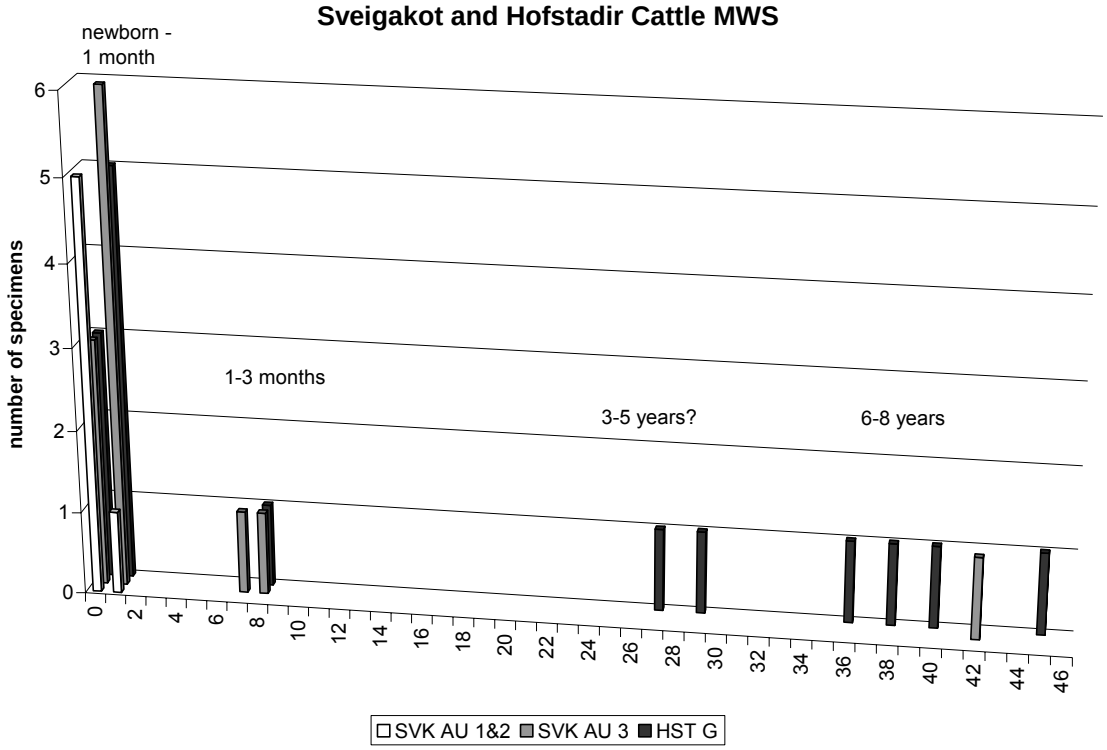


Figure 5

As can be seen from the above chart 38% of the cattle in this assemblage had unfused distal femurs by the time they were slaughtered. This fusion does not happen until sometime in the second half of their third year of life. 62% of the distal femoral ends are fused. This is the largest proportion of unfused long bones in this sample. Coupled with the tooth wear data this reinforces the idea that this assemblage is the product of a meat producing sector of Skálholt's economy. Slaughtering cattle in the second half of their third year would probably take them at or near the peak of their growth curve, before they could become effective milk producers but near the point where further feeding produced little or no increase in carcass size (Payne 1974). Dedicating valuable fodder towards the raising of full sized cattle is a high status investment. In a zooarchaeological assemblage from dairy economies of less wealthy, though by no means poor farms in Iceland, one finds a large amount of bones from neonates and then again from older animals, past their prime (McGovern, 2003). The older cows represented in the assemblage, such as the 62% fused distal femoral ends, and possibly the heavier wear on the maxillary M3's, could be the culling of less productive dairy cattle. Yet the long bone fusion and tooth wear data together point towards a meat producing husbandry strategy. For the purposes of contrast, the following examples from the site of early medieval sites of Hofstaðir and Sveigakot illustrate the dairy pattern well.



Data from McGovern 2003

In both these cases we see large scale culling of young cattle soon after birth, reserving available grazing for the adult dairy cattle (and their mother's milk for human consumption). At Hofstaðir, a relatively high status site, it seems that a small number of cattle were allowed some time to grow for greater meat productivity. In both cases we also see evidence of very old cattle, which were presumably females slaughtered after they had exceeded their prime milking years.

A detailed presentation of the caprine mortality profiles will follow in later reports.

A Continental European Breed of Cattle?

All of the cattle crania (10 skull elements in which the horn core area was intact) recovered from context 454 are polled. 8 of these crania were naturally polled (figure 6), 2 were artificially polled. In one of the artificially polled examples infection set in after the removal of the horn (figure 7).

figure 6

figure 7

Settlement period and Medieval Icelandic cattle breeds were horned (reference?). Medieval Icelandic law defined a legal tradable cow as having horns (reference?).The appearance of polled cattle strongly suggest an early modern introduction of a European continental variety.

Discussion

Context 454 seems to represent the product of a meat producing sector of Skálholt's economy. The majority of the cattle represented were slaughtered at a prime age for meat procurement versus fodder investment, as we can see in the tooth wear data and the long bone fusion percentages. Those older cattle represented could have been unproductive milkers, or the product of herd population management culling. As context 454 is a relatively small sample, in comparison to the size of the site of Skálholt, it should be assumed that this midden only represents one small part of one sector of the Skálholt economy. As the context is indicative of a beef cattle producing profile, this assemblage might then be the product of the nearby butcher, or of some specialized beef processing or consuming sector of the Skálholt population. Coupled with this exceptional zooarchaeological profile is the presence of what looks like an introduced continental European breed of cattle. The Bishops of Skalholt were

not only showing their wealth and power through their meat based cattle economy, but also through their desire to possess a different cattle breed than the rest of the Icelanders. Considering the absence of these cattle in the contexts above 454 what we might be looking at is a failed experiment on the part of the Bishops of Skalholt. These cattle might have been an attempt at both starting a dedicated beef economy as well as an attempt to make the landscape of Skalholt look more "improved" in the 17th-18th century European sense of the word (McRae, 96). The presence of both the continental European cattle breed as well as what might be native Icelandic cattle physically altered to look more like this new polled breed bring up questions regarding Skalholt's place in Iceland's cultural landscape and its sense of its own identity. This issue as well as the rest of the zooarchaeological assemblage of Skalholt will be investigated in later publications.

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