THE BISHOP'S BEEF

IMPROVED CATTLE AT EARLY MODERN SKÁLHOLT, ICELAND

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Abstract

This article presents results of a preliminary analysis of mammal bones from one context in an early modern midden at the Episcopal farm of Skálholt, headquarters for one of two Episcopal sees of Iceland (AD 1056 to 1785). Since 2001, excavations directed by Gavin Lucas of the Archaeological Institute of Iceland (FSI) have produced large collections of early modern, early 17th to late 18th centuries, artifacts and bone from a complex of structures which included the Bishop's house, a boy's school, and the domestic infrastructure of this large, proto-urban manor and associated middens. Excavation and analysis continue, and this paper is an interim report of the growing archaeofauna of this important site. This paper reports analysis of context 454 which was dominated by cattle bones (92% of the NISP 1,616). These bones come from adult, but generally not aged animals, and include very few newborn calf bones. This pattern is a strong contrast to other Icelandic archaeofauna (9th-19th c) which contain high percentages of newborn calves and generally older adults. In contrast to such 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 represents an exceptionally high cost, and high value, beef-cattle strategy probably associated with the status and scale of the Skálholt manorial household. Furthermore these cattle were of a new breed. The majority of them are naturally polled, and the two exceptions are artificially polled. This suggests that the management of the Skálholt farm were engaged in the import of new

breeds and in animal husbandry improvement from an early date relative to the Agricultural Revolution.

Animal husbandry is as much a reflection of culture as architecture, ceramics, or jewelry. Zooarchaeology in Iceland has made significant contributions towards understanding the contexts behind decision making in Iceland from Landnám into the early modern era (Vésteinsson et al., 2002, McGovern et al, 2001, for example). Domestic animals have always been dynamic elements within culture. We can breed them to our needs and desires. In the early modern period the level of random chance in animal breeding in Europe dropped dramatically as breeding technologies advanced (Russell 1986). The assemblage discussed in this article reflect the impact of the technological innovations in animal breeding and the impulse towards improving agriculture characteristic of this period in Europe and the Americas.

After the earthquake in 1784, the Bishop's residence was moved to Reykjavik[1] and the manorial complex – which consisted of the Bishop's quarters, a school, and considerable infrastructure devoted to the household – was partially abandoned, and a prosperous farm took its place. Skálholt was a major livestock farm in its own right, based in a highly fertile region (relative to Iceland) in the southern part of the Iceland and had according to an early eighteenth-century land register one of the largest cattle herds in the country (Edvardsson, in progress). Church documents, early maps, geophysical survey, and early modern travelers' accounts all indicate the unusual size and intricacy of the

[1] The Bishop returned to Skálholt after having bought the property from the crown and lived there until his death in 1796.

complex of buildings currently being exposed by excavation. Skálholt can be regarded as a settlement of possibly the highest year-round density in Iceland until it was replaced by the expansion of Reykjavik beginning at the end of the eighteenth century (Lucas, 2005).

The zooarchaeological assemblage recovered so far is extensive, but this paper only addresses one particular midden, context 454, found in a 2X3 meter trench with a one meter square extension off of the southwest section (group 383) to the southeast of the main complex. This midden was found directly below a collapsed wall that originally followed the break of a slope running roughly east/west a short distance, about 20 meters, south of the main complex and near one of its main entrances. There is no absolute date for the midden, yet the depth of the midden, over one meter, and finds found above and within the midden, such as a 17th century Dutch pipe bowl, and fragments of tin-glazed earthenware suggest a date within the seventeenth century. Three other 2X2 meter trenches were excavated 5 (group 1440), 10 (group 2193) and 15 (group 2008) meters east along the same slope as group 383 in June and July of 2006. They were all excavated down to a similar depth to that of group 383, a little over one meter. Group 1440 contained a 17th century Dutch pipe bowl as well as other artifacts typical of the 18th and 17th centuries such as stoneware and glazed and unglazed redware. Group 1440 also contained a midden context below a collapsed wall at almost the exact same depth as that of group 383 and unit 454. While analysis is ongoing the initial impression is that this midden is at the very least superficially similar to that of unit 454 in that it is dominated by cattle. Group

2193 contained little bone and the wall collapse did not appear but a single early 17th century pipe stem (with maker's mark) did appear in one of the middle layers. Group 2008 also contained an early seventeenth century Dutch pipe bowl, fragments of tin-glaze earthenware, and a hammered sixteenth or seventeenth century coin. The deepest unit in this group contained half of a naturally polled cattle skull. No late 18th century ceramics or other artifacts were found in any of these groups. Another hint comes from Joseph Banks, an eminent British naturalist who visited Iceland and stayed at Skálholt in 1772. His traveling companions included illustrators, one of whom included some clearly polled cattle in his portraits of the settlement. Though not definitive this is another piece of evidence supporting an early modern date for unit 454. Finally many of the polled European breeds, such as the Angus and the Galloway were not developed until the seventeenth century and if the cattle represented by this midden were imports this might suggest a date within this period (Van Bath, 1963; Trow-Smith, 1954; Overton, 1996). The artifactual and stratigraphic evidence strongly point to a 17th century date for this midden deposit though the early to mid 18th century should not be completely ruled out.

Throughout the North Atlantic Scandinavian cultural sphere, the usual domestic-mammal zooarchaeological assemblage reflects economies that concentrated on dairy production. Three elements make Skálholt's unit 454 unique within this North Atlantic context. The first is the overwhelming presence of cattle in the assemblage. No other known archaeofaunal context from Iceland or the North Atlantic region is so dominated by cattle. Not only is unit 454 clearly

dominated by cattle but the total percentage of cattle in the archaeofauna so far analysed from Skálholt is high, 57%. This percentage should increase as the finds from the 2006 season are also dominated by cattle bones. The second is a zooarchaeological profile indicating dedicated beef production, relative to Iceland, the first among non-modern archaeofauna from Iceland. Finally, the cattle represented by this assemblage were a new breed either brought in from Europe or bred from Icelandic cattle. Any of these conditions alone in an Icelandic context in any period would be exceptional (McGovern, et al 2001). To find all three is remarkable and merits further consideration.

The midden containing context 454 was, judging from contemporary maps, close to and possibly associated with a meat store room. Among the butchery-related artifacts were a piece of whale bone butcher's block and a possible small cetacea (porpoise or dolphin) bone knife handle. The midden is located along the edge of a road that ran through a complex of outbuildings south of the Bishop's residence. It was formed via a series of dumps of refuse, ash and fill over the edge of the road. Context 454 was the only stratum in group 383 associated with large quantities of well-preserved, whole animal bones. It is an extremely dense deposit, with very little sediment present among the closely packed and entangled bone fragments. Because the 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.

Table 1 presents a count of the identified specimens (NISP 4,227) and the less well identified categories of "Large Terrestrial Mammal" (LTM), "Medium

Terrestrial Mammal" (MTM), and "Small Terrestrial Mammal" (STM) as well as unidentified mammal bone fragments contributing to the overall bone count (TNF) of 19,519.

Table 1

Scientific Names	***English Common Names***	***NISP Count***
Bos taurus dom.	cattle	887
Equus caballus	horse	3
Canis familiaris	dog	
Sus scrofa	pig	
Ovis aries	sheep	27
Ovis/ Capra sp. Indet.	caprine	118
Cetacea sp.	whale species	2
Alopex lagopus	arctic fox	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	19,519

Table 2 presents the count of fragments (NISP) and relative percentage of domestic mammals. Cattle dominate the domestic mammal assemblage; caprines (sheep and goat) together make up less than 15% of the deposit

Table 2

Domestic Mammals	*% NISP*
Cattle (Bos taurus)	84.70
Horse (Equus caballus)	0.30
Dog (Canis familiaris)	present
Sheep (Ovis aries)	4.00
Caprine (Sheep and Goat)	11.00
Total Caprines	15.00

Of the unidentifiable mammal bones, LTM make up a similar majority in proportion to MTM 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 are similar, it is not 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. No other currently known archaeofaunal context from Iceland has such a high percentage of cattle bone. 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 Landnám, 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 eighteenth-century site in NW Iceland, Finnbogastaðir, has cattle making up roughly 10% of its assemblage (Edvardsson et al, 2004). Both the early modern southern farm of Storaborg and the high status farm of Bessastaðir near Reykjavik had cattle making up roughly 30% of their assemblages. The higher ranking farm of Viðey just north of the Reykjavik harbor had cattle making up 17% of the total NISP of the medieval contexts and roughly 7% of the early modern contexts. Within the domestic mammals these figures are 41% for the medieval period and 35% for the early modern period at Viðey (Amorosi and McGovern, 1993).

A widely used meat utility measure (Binford 1976) attempts to evaluate the overall "modified general utility index (MGUI)", which provides a numerical score for each bone element (including marrow and sinew values as well as attached

muscle meat). While MGUI scores are not precise indicators of amount of associated meat and marrow, they can highlight major differences in the content of bone assemblages. Bone density can indicate the survivability of an assemblage through time. It can give an indication as to its representative utility, whether the bones being examined have survived well since burial or have been ravaged and are not a good representation of the original dump. Note that the 1st quartile is almost always going to be disproportionately larger due to the fact that cranial elements (which are within the 1st quartile) have a tendency to fracture and boost their proportion within the total assemblage.

The cattle bones of Unit 454 show good representation across density and MGUI quartiles (figure 1). This implies that these bones have survived well from deposition to excavation.

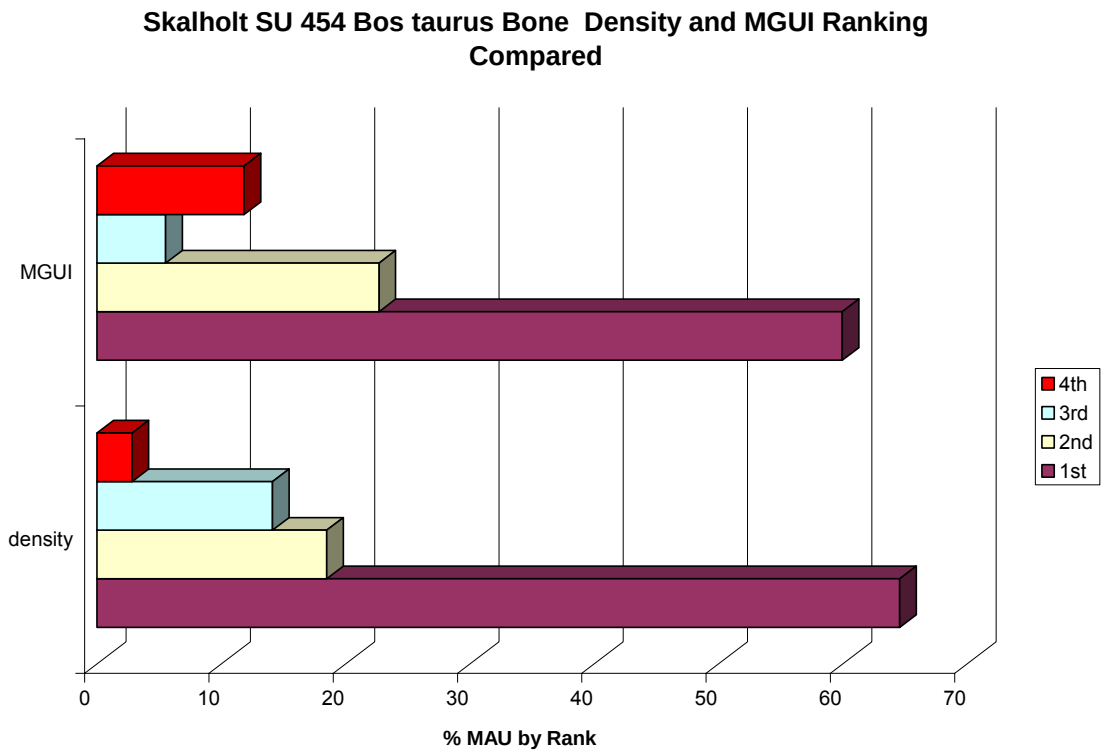

Figure 1

The element distribution for these cattle (figure 2) strongly suggests that they were slaughtered onsite. Elements from across the whole animal are present. If the beef represented by this archaeofauna was being imported from surrounding farms or regions, the element distribution would most likely contain a majority of heavy-meat bearing bones, such as the femur and humerus.

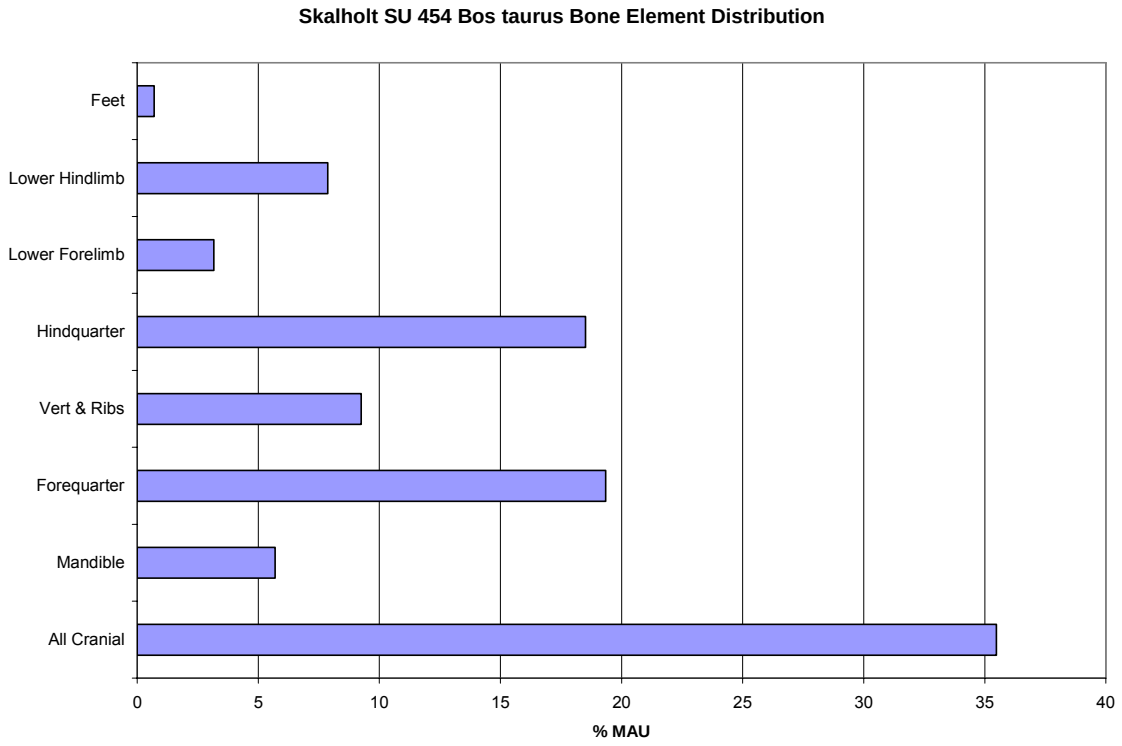

Figure 2

The cattle in the context 454 collection are almost all adults or older juveniles (table 3). This, too, is atypical. Neonatal bones, barely represented in this assemblage, normally make up 20-40% of most Icelandic farm collections from all periods. The total percentage of cattle neonatal bones from the archaeofauna of all analyzed contexts at Skálholt so far is only 7%, and within context 454 only 0.34%.

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, (figures 3 and 4), indicate that the majority came from young adult animals.

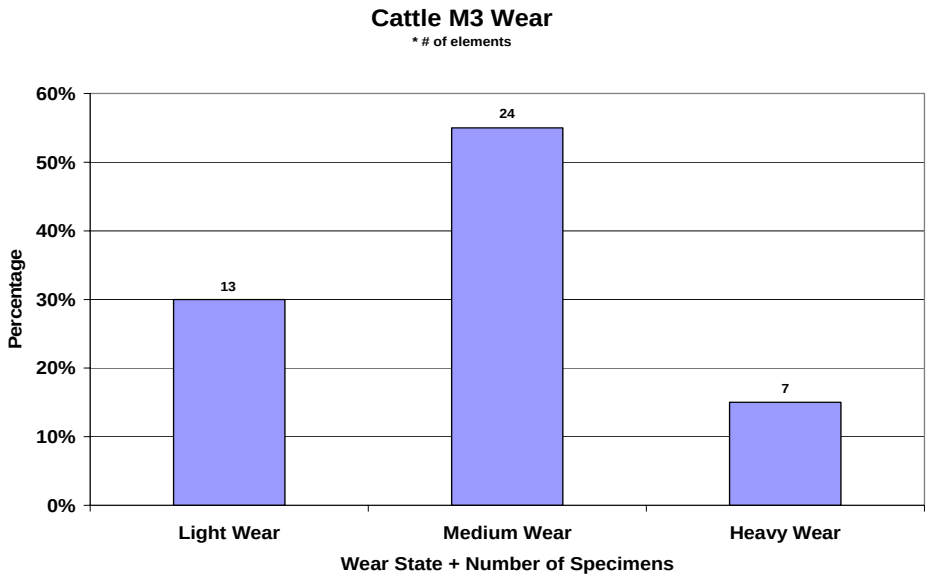

Figure 3

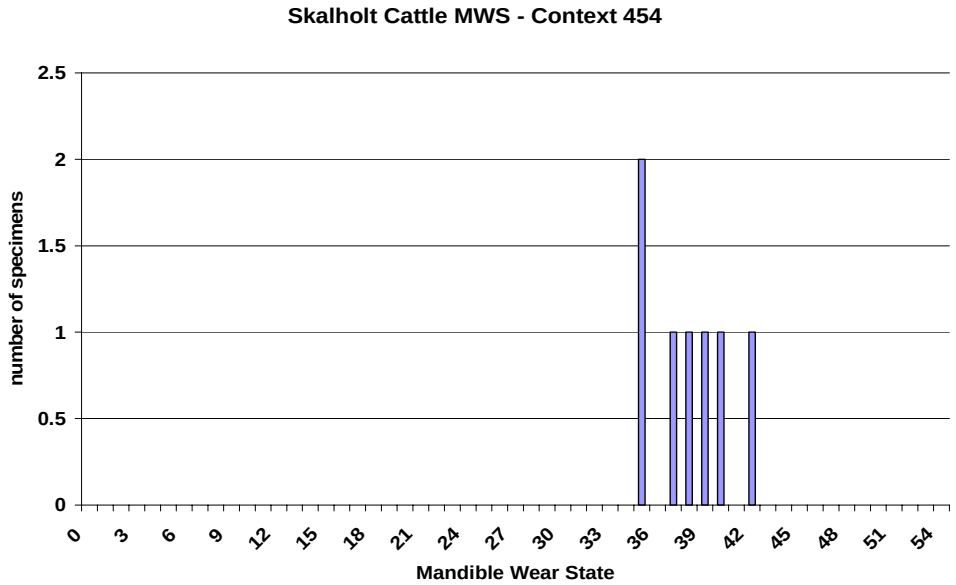

Figure 4

Figure 4 presents the maxillary tooth wear state while figure 3 presents the mandibular wear state for the available cattle jaws, making use of the Grant (1982) method, with 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 molars showing heavy wear implies that there were few older animals, meaning older than four to eight 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 not into old age, eight years or more. 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 of seven tooth rows. It's important to note that dental wear is only a relative indicator of age. Different levels of erosion and plant composition, for example, can either inhibit or increase the levels of tooth wear in a grazing animal. In order to lessen the "noise" from such possible variables the fusion state of selected long bones must be examined as well. These long bones reinforce the idea that these cattle lived beyond their third year, but not much longer than their fifth year (figure 4).

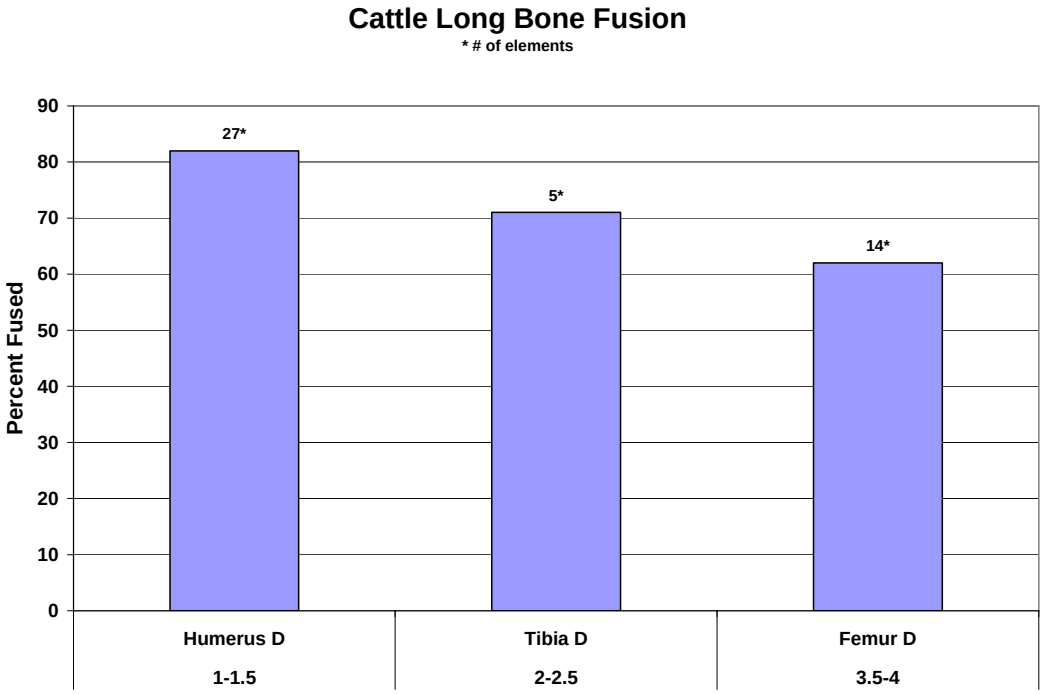

Figure 4

As can be seen from figure 4, 62% of the cattle femurs in this assemblage had fused distal ends by the time they were slaughtered. 38% were unfused, the largest proportion of long bone fusion in this assemblage. As this end of the femur does not fuse until the second half of the animals' third year of life, this pattern of long bone fusion suggests that the majority were killed off somewhere around that age.

Both the bone fusion and tooth wear data strongly point to cattle that were slaughtered within their third and fifth years of life. This mortality pattern is more indicative of a beef cattle economy than of a dairy economy. A lifespan between three and five years would usually take them to or near the peak of their growth curve, before they could become effective milk producers but close to the point where further feeding produced little or no increase in carcass size (Trow-Smith, 1951). In contrast, in zooarchaeological assemblages 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). This is a typical zooarchaeological representation of a dairy economy, in which a population of milk cows is maintained at a level determined by the amount of pasture and fodder available and neonates are slaughtered for herd population control and in order to save their mother's milk for human consumption. This is not to suggest that there was no dairy economy at Skálholt, only that a dedicated beef economy was present for at least some part of the 17th and/or 18th centuries.

That these Skálholt cattle were being raised for dedicated mature beef production is exceptional in the Scandinavian North Atlantic during any period. A dairy economy is in pure economic terms the most cost effective way to raise cattle. A beef economy costs far more in terms of time and fodder. For each animal, a farmer achieves only a one-time return for all their effort as opposed to the steady return of a dairy cow once it has reached a productive age.

The presence of beef on the Bishop's table is not in itself surprising. Skálholt was one of the highest status sites in Iceland. European upper classes (by modern standards) ate large amounts of meat, with beef a significant portion of this consumption, throughout the medieval period and into the early modern period (Elias, 1994, 96).

There are other examples of prime beef cattle appearing in Icelandic zooarchaeological assemblages, but on a much smaller scale such as at the early medieval farm of Hofstaðir (McGovern, 1999) and at the high medieval

trading site of Gásir (Harrison, 2005). There is also at least one 18th century documentary mention of steers in Iceland, so Skálholt is likely not be the only place engaging in a prime beef economy (Vésteinsson, personal communication). Yet relative to current zooarchaeological knowledge in Iceland this beef economy looks to have worked on a much larger scale than anything seen previously.

What makes these cattle more exceptional is that all of the cattle crania (ten skull elements in which the horn core area was intact) recovered from context 454 are polled (without horns). Eight of these crania were naturally polled (figure 5), and two were artificially polled. In one of the artificially polled examples, infection set in after the removal of the horn (figure 6).

Figure 5

Figure 6

There was a very low frequency of naturally polled cattle occurring in the Icelandic cattle population from the Settlement Period to the introduction of new breeds in the nineteenth century, so it is statistically unlikely that these polled cattle were the product of this rare mutation. It follows that this particular breed of cattle of unit 454 were either introduced from continental Europe by the Bishop's household or bred by them from Icelandic cattle.

It is impossible to say with any great certainty at this point in the research where exactly these cattle came from, but it is the case that during the seventeenth and eighteenth century Europeans were developing some of their first polled breeds of cattle, including the Scottish Galloway and the Aberdeen-Angus breeds that were created and raised solely for beef production (Van Bath, 1963). It is also accepted by livestock and agrarian historians that the first dedicated beef economies in Europe were formed at this time. Scotland supplied Galloway, Angus, and Highland beef cattle in large numbers for the Edinburgh and London markets (Trow-Smith, 1951, 151-153), while the Danish nobility

supplied the Netherlands with large numbers of beef cattle in the eighteenth century(van Bath, 1963, 286). The latter may have been the source of the bishop's polled cattle as there was already a precedent for a beef cattle economy coming from Denmark. It is also likely that Denmark imported new varieties of beef cattle after the cattle plague of the 1740's destroyed as much as half of the Danish cattle population (Kjærgaard, 1994, 27-28). It is entirely possible, though not yet investigated, that the Bishop of Skálholt or one of his household might have encountered this beef enterprise and new breed imports through the Danish nobility. Though the Scottish polled beef breeds would also seem to be good candidates for the cattle of unit 454, this would be pure speculation at this point. The cattle of unit 454 are more likely from the 17th century and the development of new breeds was not only an 18th century phenomenon. The Netherlands were importing new breeds of cattle for breeding purposes throughout Europe by the 16th century (Thomas, 2005). It is just as plausible to suggest that these cattle might have been of originally Dutch origin. Regardless of the individual country of origin, it is overwhelmingly likely that these cattle or the breeding technology that created them were an import from continental Europe.

Early modern Icelandic culture and elements of early modern continental European culture came together in the Bishop's residence. The cows indicate that Skálholt was differentiated from the rest of early modern Iceland by more than just wealth. It was also culturally differentiated through its intellectual connections to early modern Europe.

The writings of improving farming theorists and the experience of practical farming experiments associated with the early Agricultural Revolution is one probable inspiration for the decisions that resulted in the appearance of these cattle at Skálholt. Most agricultural historians agree that the essence of the Agricultural Revolution was the major increase in cultivated land, and in new agrarian technologies, crops, and commercial animal breeds that appeared during the early modern period in Europe, especially in the Netherlands and in England. There is also a consensus that these new technologies and breeds led to increased agricultural production (Overton, 1996, pp 1-9). Less agreed-upon is when this revolution began though it is generally agreed that it was in development throughout much of north-western Europe by the 17th century, and that it reached its height in the second half of the 18th century. A recent article on the zooarchaeology of animal husbandry improvement in England, suggests there was a gradual but consistent increase in the size of domestic animals starting in the mid-14th century (Thomas, 2005). Though the author does not claim this as the beginning of the Agricultural Revolution he does suggest that these findings might show that improving animal husbandry can be traced back earlier than previously thought. Denmark experienced the expansion of agricultural lands and new agricultural techniques in the 17th century, though it is argued that this expansion lead to a grave ecological crisis in the 18th century (Kjærgaard, 1994).

Behind the Agricultural Revolution there was an overall concentration on the harnessing and controlling of nature. This went well beyond the biblical

precedent of the creation story in Genesis by emphasizing the ability to engineer nature and cull the unproductive elements from it (Worster, 1994, chp 2). In the context of agriculture this engineering was most often termed “improvement” (Dalglish, 2003, chp 5). Though the nature of improvement changed according to the point of view of the agents involved, generally speaking land, crops and animals were manipulated in order to increase their value and productivity through an application of literate, orderly “enlightenment” principles of formalized planning, systematic record keeping, and the application of simple numerical statistics. Early Modern Icelanders were not strangers to this improving impulse. Alongside the 1780 Icelandic manual of agricultural improvement, *Atli,* by Bjorn Halldorsson, there are eighteenth-century private “improving” journals of farmers from throughout Iceland (Ogilvie, McGovern, personal communication). There is also a significant spike in barley pollen seen in soil samples dated to the 17th century taken from Skálholt (Einarsson, 1962). These data might indicate an attempt at growing barley in the Skálholt area, another potential indication of an improving impulse, in this case from the same community that raised and slaughtered these exceptional cattle.

The idea of improvement is often associated with the rise of capitalism and the profit motive, but the Bishop’s beef cattle are a difficult fit for this model. It would be hard to understand the introduction of these polled beef cattle and the artificial polling of native cattle as motivated by profit and the accumulation of capital. It is possible that the Bishops intended to stimulate a market for beef in Iceland, but this is very unlikely. It is more likely that these cattle management

decisions were inspired by the desire to reinforce the high status of Skálholt through conspicuous beef consumption and to signal participation in the new set of European standards for appropriate behaviors of landed elite farm managers, re-emphasizing elite intellectual and social connections with the outside world. The bishop's cattle thus appear to have been intended to enhance social rather than financial capital. Their presence at Skalholt looks backwards to longstanding patterns of chiefly display and consumption as much as ahead to the oncoming world of commerce and modernity. The bishop's cattle, like the early modern manor and school of Skalholt itself stand between two worlds, and their bones tell a story more rooted in social change and changing world view than in biology or subsistence economy.

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