Zooarchaeology of Aðalstræti 14-16, 2001

Report of the Viking Period Animal Bones

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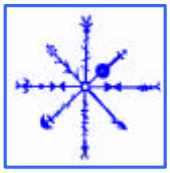

Abstract: The 2001 excavations of a Viking-Age hall at Aðalstræti 14-16 in downtown Reykjavík produced a small and highly fragmented collection of burned animal bone. The bone collection derived from the hall floor layers and was recovered through flotation and retention of 1 mm mesh sink fraction. Approximately 3 % of the collection could be identified, allowing for only the most basic quantification. Nevertheless, all the major Settlement Period domestic mammals are represented (Cattle, Caprine, Pig, Horse) as are tusks of what may be local Icelandic walrus.

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Introduction

Located in the central historic district of downtown Reykjavik, Aðalstræti 14-16 was recently excavated (January-June, 2001) because of planned construction in the area. 450 square meters of the site area (1450 square meters) was excavated by Fornleifastofnun Íslands under the direction of Árbæssafn. The excavations revealed a stratified series of remains that were primarily 18th century, under which was the remains of a Viking period domestic structure (skáli) (Roberts 2001). This paper reports the Viking age animal bones associated with the lower structure, the Early Modern collection above has been reported in Tinsley & McGovern (2002a).

Methods:
The occupational deposits within the skáli were sampled for micromorphological analysis and 100% bulk sampled for botanical, faunal, chemical, and magnetic analyses (for review of methods, see Milek 2001) . The majority of samples were from the floor contexts of the skáli and these were all excavated on a 1 meter square grid. All bulk samples were processed via flotation using an Ankara type apparatus. Heavy fraction (including animal bone) was collected in 1mm mesh (for details, see Guðmundsson 2001). The faunal remains recovered from these bulk samples (AST phase 2) are the subject of this report. All zooarchaeological data were recorded using the NABONE digital recording system (7th edition NABO 2002) with support of partial comparative collections at the FSl center in Reykjavík and at V. Stefánsson Arctic Inst. Akureyri. Note that the zooarchaeological term "caprine" refers to both sheep and goats together (which are impossible to distinguish on most bone elements) and is equivalent to other authors' "Sheep/Goat" or "Ovis/Capra" categories.

AST Settlement Period		
Cattle		1
Horse		3
Pig		118
Caprine		32
	total domesticate	154
Walrus		7
Fish Sp.		2
Mollusca Sp.		6
	total NISP	169
Large terrestrial mammal		3
Medium terrestrial mammal		16
Unidentified		4918
	total TNF	5091
% ID		**3.32**

Figure 1

The Viking period assemblage contains only 169 identifiable fragments (NISP) out of a total of 5091 (**Figure 1**). An additional three fragments could only be identified as "large terrestrial mammal (cattle/horse sized)", 16 fragments identified as "medium terrestrial mammal (sheep/goat/pig/large dog sized)", and 4918 completely unidentifiable fragments. Thus the percentage of fragments identified is only 3% and is too low for any meaningful interpretation except as a partial list of taxa present on site.

Bone Fragmentation and Taphonomy: The cause of this very low rate of identification is the highly fragmented nature of the collection. As figure 2 illustrates, the overwhelming majority of the AST Viking age remains were in the 1 cm and below size range. The cause of the extreme fragmentation may be found in the degree of combustion suffered by most (98%) of the bone elements. As figure 3 illustrates, almost all were burnt to a white calcined state.

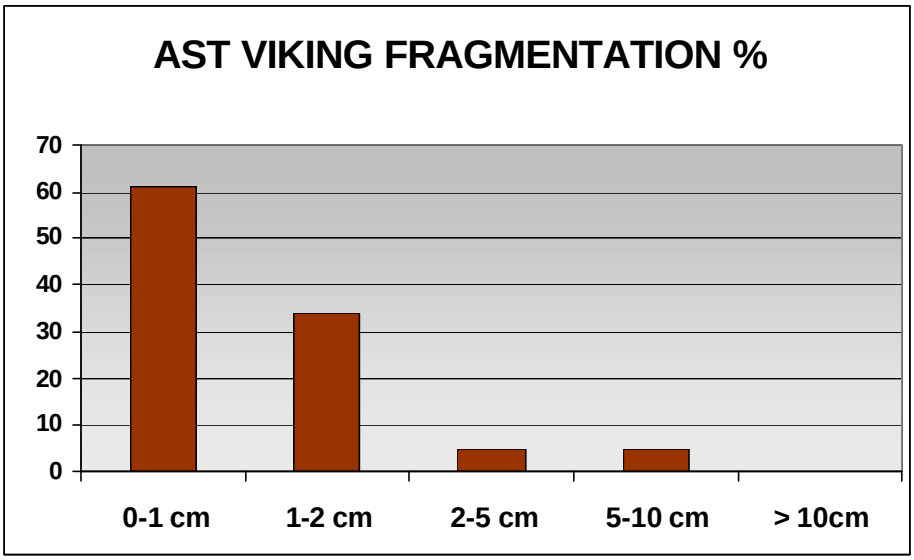


Figure 2

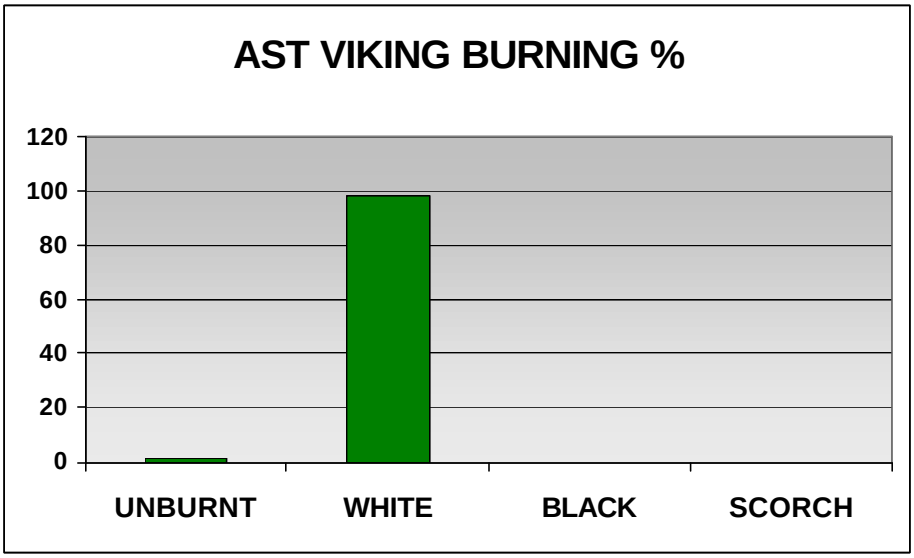


Figure 3

Vertebrate bone requires sustained heat of 450-500 degrees Celsius for a prolonged period to achieve calcination (David 1990). This type of heating would only be possible in a hearth with a sustained heat source for 5-6 hours (David 1990:69). Accidental or unintentional burning (e.g. house fire) would not provide the needed duration of heat to completely burn bone. Calcined bone is regularly recovered from other early sites in Iceland (including settlement period sites, Amorosi 1996, Tinsley 2001, McGovern & Perdikaris 2002) and is usually associated with fragments of wood charcoal and fire cracked stones. In these contexts the calcined bone appears to be a component of hearth cleaning, and suggests that early settlers regularly disposed of bone by adding it to primarily wood burning hearths. It is likely that the AST Settlement Period bone was calcined in a similar manner.

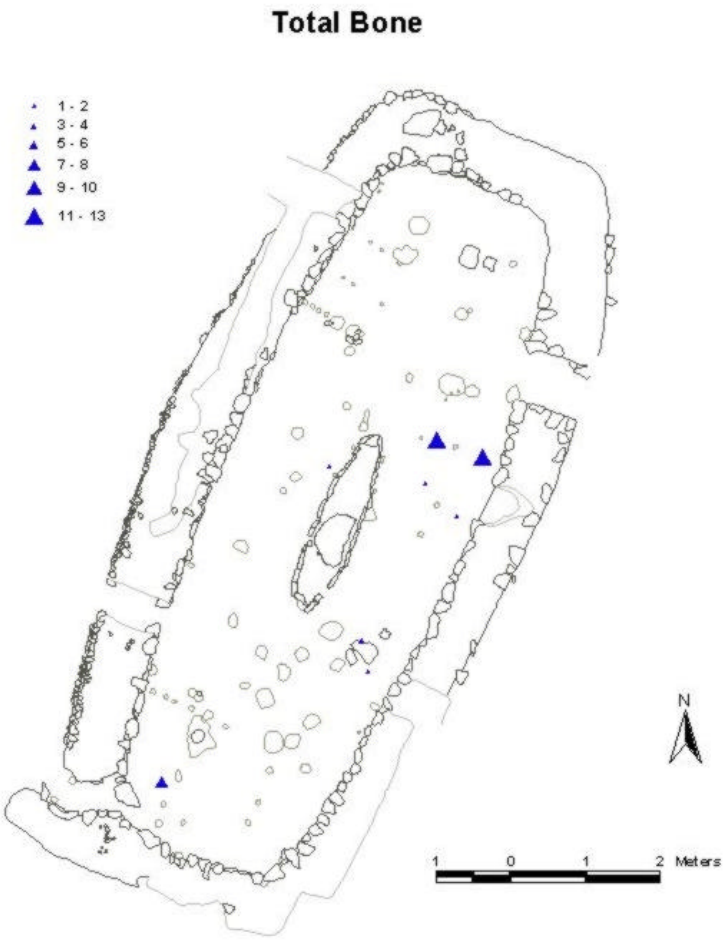
Calcined bone has usually been subjected to such extreme heat that it has lost most of its organic content and (as the name suggests) has been largely reduced to its mineral components (mainly calcium and hydroxyapetite). This leaves the bone without much tensile strength, and calcined bones often shatter like glass when touched (Shipman et al. 1984). Average shrinkage of 5 to 30% (often associated with lateral distortion) is also likely for vertebrate remains that have been calcined (Gilchrist & Mytum 1986). While calcined bone tends to shatter easily and is thus extremely vulnerable to mechanical damage, its mineralized make up may render it less subject to some types of chemical weathering than unburnt bone (Knight 1985, Lyman & O´ Brien 1987). Commonly, calcined bone and teeth are the last fragments to succumb to strongly acid soil conditions or to leaching resulting from highly permeable substrate, such as the beach gravels underlying the early Settlement Period deposits at AST. It is likely that the original bone deposit contained a mixture of burnt and unburnt fragments similar to those documented elsewhere and that these fragmented calcined elements are the much -winnowed remainder of an archaeofauna much affected by chemical attrition. The only unburnt remains included in the archaeo fauna are three badly preserved walrus tusks described more fully elsewhere (McGovern in Roberts 2002).

Species Present

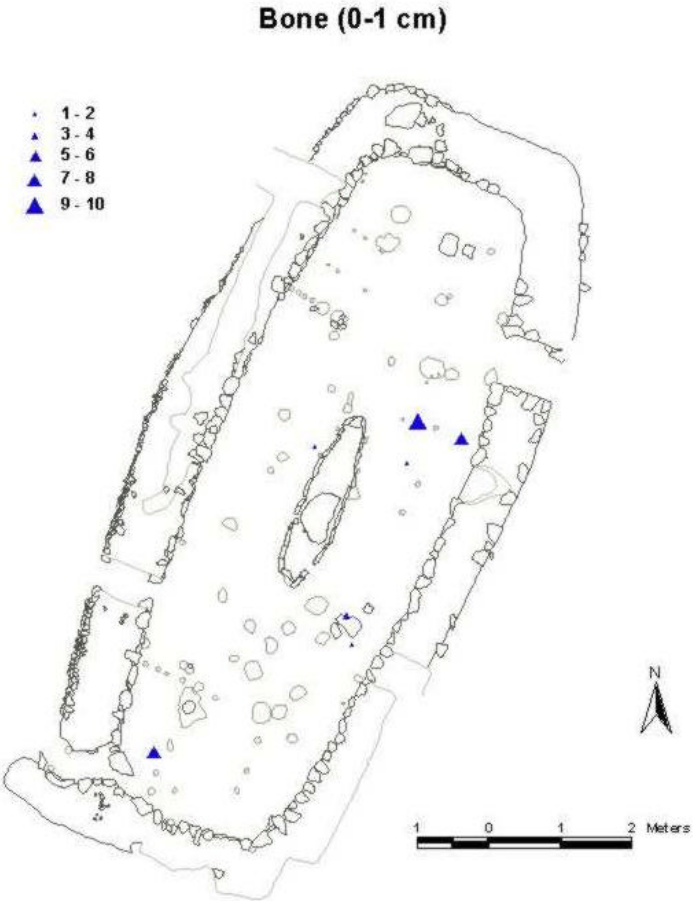
Due to the very fragmented nature of the early AST faunal sample, very few identifications were possible and meaningful discussion of species relative abundance is not possible. Figure 1 should probably be regarded merely as an incomplete species list. The species found (interestingly including pig remains) are in fact similar to other Viking period assemblages studied thus far in Iceland and are wholly consistent with an early date for the structure and floor contexts (McGovern et al 2001, Tinsley 2002a, 2002b).

Discussion

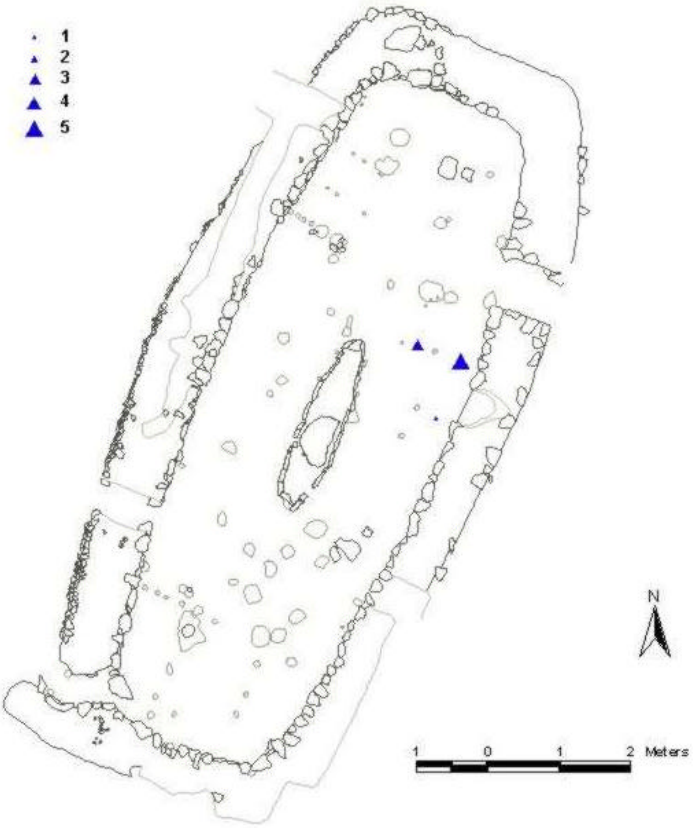
The highly fragmented Viking period faunal assemblage from AST appears to represent the intentional burning of bone, probably in the central hearth of the hall structure. While a conventional zooarchaeologial analysis can only provide limited insight into early economy at the site, the careful recovery of these small bone fragments may yield information on the arrangement and use of the hall. The spatial distribution of the fragments (figures 5-7) suggest that they probably derive from hearth cleaning debris trampled into floors or kicked towards walls or under benches. The study of this distribution in combination with soil micromorphology and artifact distribution may prove fruitful.


Total Bone
1 - 2
3 - 4
5 - 6
7 - 8
9 - 10
11 - 13
N
1 0 1 2 Meters

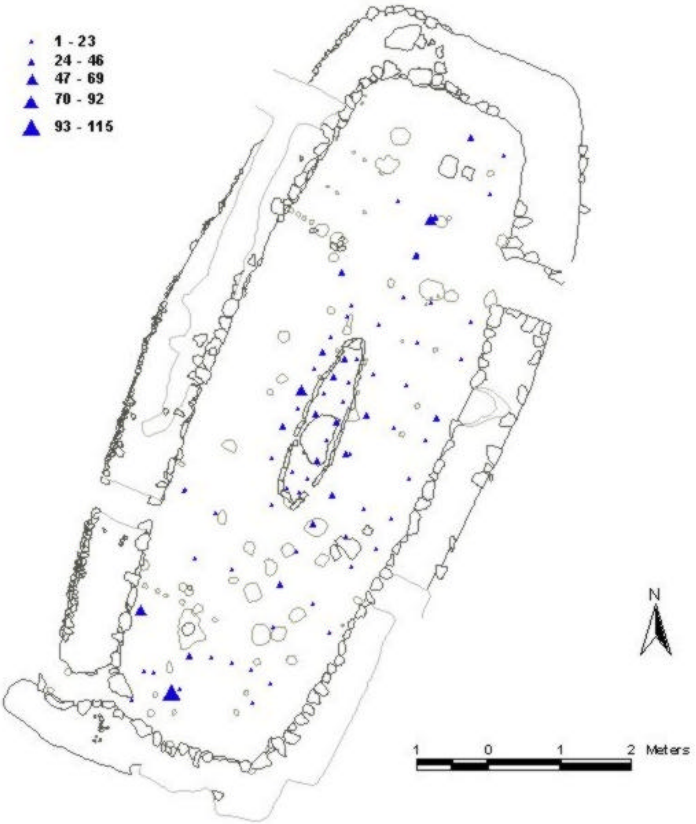

Total Burnt Bone
1 - 38
38 - 77
78 - 115
116 - 154
155 - 193
N
1 0 1 2 Meters


Bone (0-1 cm)
1 - 2
3 - 4
5 - 6
7 - 8
9 - 10
N
1 0 1 2 Meters

Bone (1-5 cm)



Burnt Bone (0-1 cm)



References

Amorosi, T. 1997. *Zooarchaeology and Global Change in Iceland.* PhD dissertation, CUNY

David, B. 1990. How was this bone burnt? In Solomon, S., Davidson, I,, and Watson, D., (eds.) *Problem solving in taphonomy.* Pp. 65-79. Tempus, Vol II.

Gilchrist, R. & Mytum, H. 1986. Experimental archaeology and burnt animal bone from archaeological sites. *Circaea* 4: 29-38.

Guðmundsson, G. 2001. The environmental evidence, In Roberts, H.M. (ed.) *Archaeological Excavations at Aðalstræti 14-18, 2001*. Fornleifastofnun Íslands: Reykjavik

Knight, J. 1985. *Differential preservation of calcined bone at the Hirundo Site, Alton, Maine.* Unpublished M.S. thesis, Quaternary Science. University of Maine.

Lyman, R.L., & O´Brian 1987. Plow-zone zooarchaeology: fragmentation and identifiability. *Journal of Field Archeology* 14: 493-498.

Milek, K. 2001. Methodology, In Roberts, H.M. (ed.) *Archaeological Excavations at Aðalstræti 14-18, 2001*. Fornleifastofnun Íslands: Reykjavik

Mc Govern, T.H. 2001. The Walrus tusks. In Roberts, H.M. (ed.) *Archaeological Excavations at Aðalstræti 14-18, 2001*. Fornleifastofnun Íslands: Reykjavik

McGovern,T.H. Sophia Perdikaris, Clayton Tinsley 2001. Economy of Landnam: the Evidence of Zooarchaeology, in U. Bragason et al. (ed) *Westward to Vinland* , Nordahl Inst. Reykjavik.

Roberts, H.M. (ed.) 2001. *Archaeological Excavations at Aðalstræti 14-18, 2001*. Fornleifastofnun Íslands: Reykjavik

Payne, S. 1972. On the interpretation of bone samples from archaeological sites. In E.S. Higgs (ed), *Papers in Economic Prehistory.* Cambridge University Press, Cambridge

Shipman, P., Foster, G., and Scheninger, M. 1984. Burnt bones and teeth: an experimental study of color, morphology, crystal structure and shrinkage. *Journal of Archaeological Science* 11: 307-325.

Tinsley, C.M. 1999. Preliminary report of 1997-1998 archaeofauna from Hofstadir, *Archaeological Islandica* 2.

Tinsley, C. M. 2002a. The Viking Settlement of Northern Iceland: A Zoological Perspective. *Environmental Archaeology 6*. Oxbow Press.

Tinsley, C. M. 2002b. The Zooarchaeology of Settlement: Some Quantitative Questions. *Proceedings of the 21st Nordic Archaeology Conference*, Akureyri, Iceland

Tinsley, C.M. & T.H. McGovern 2002 a Zooarchaeology of Aðalstræti 14-16, 2001 Assessment Report of the Post-Medieval Contexts, report to FSl May 2002.