Faunal Evidence from Lækjargata in Reykjavík: a preliminary report

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Introduction

The archaeological remains of Lækjargata (64.146270, -21.938554) in downtown Reykjavík were excavated by archaeologists from Fornleifastofnun Íslands (FSÍ) under the direction of Lísabet Guðmundsdóttir in 2015. Faunal evidence analyzed for this report is associated with the ruins of the site's domestic structure, which has been dated to the 10th and 11th centuries using tephra relationships and associated artifacts. The archaeofauna was sampled from floor layers and among other typically domestic features - a hearth, stone paving, and a stone box (constructed of set-stone orthostats) - possibly used for cooking, storing water or storing other materials (Figure 1). The preliminary results (Table 1) show notable parallels between the Lækjargata faunal assemblage and the assemblages from similarly aged sites in this region of Iceland: Aðalstræti 14-16 (Tinsley and McGovern, 2001; Harrisson, McGovern, and Tinsley, in press) and Tjarnargata 4 (Amorosi, 1997). However, the current number of identified specimens from Lækjargata is low and the assemblage was poorly preserved; this means faunal analysis based on statistical comparison is currently not recommended until more identifications can be made. Among the unanalyzed materials are additional animal bones from the location's 10th and 11th century phase and others from 19th century deposits. Despite the fact that the 10th and 11th century data set is currently small, it contributes significant detail to understanding the activities that took place around the Lækjargata structure while adding to inter-regional reconstructions of early icelandic subsistence, use of domesticates, long distance trade of walrus ivory, intensive animal use, and local animal extinctions.

Methods

This report focuses on identifying the species present and the skeletal elements observed following standard NABO recording methods, while leaving out metrical analyses at this stage (see McGovern et al, 2008). Published reference media, such as morphological drawings and photographs, were used to make identifications, in lieu of a physical reference collection, as well as the author's experience. As a result, specimen identifications are slightly more general than what might be possible with a physical reference collection. For example, sheep and goats are assigned to the more general category of "caprine". Results include remarks on levels of fragmentation, burning, and decomposition toward definition of the physical condition of the assemblage and in order to describe relevant past activities at the site. A multi-site statistical comparisson is recommended for the interim or final phase of analysis, after a greater number of fragments are analyzed.

Results

The preliminary "Number of Identified Specimens" (NISP) and "Total Number of Fragments" (TNF) from Lækjargata are reported below (Table 1) and faunal data from the nearby Settlement period domestic site of Aðalstræti 14-16 are included in the table for informal comparisson. Both sites were early domestic structures

excavated in what is today downtown Reykjavík and their faunal assemblages derive mostly from housefloors, making the comparisson particularly appropriate. Lækjargata's preliminary phasing (10th -11th century) places the assemblage on the early side of Iceland's Commonwealth period, AD 930-1262 - defined by the establishment of the Alþingi in AD 930 and ending with the integration of Iceland into the Norwegian political hierarchy (AD 1262). The data from Aðalstræti 14-16 (Tinsley and McGovern, 2001) is best described as pertaining to the Settlement period, AD 870 – 930, when people arrived to Iceland en masse for the first time. Based on preliminary phasing, the two households potentially overlap during the 10th century.

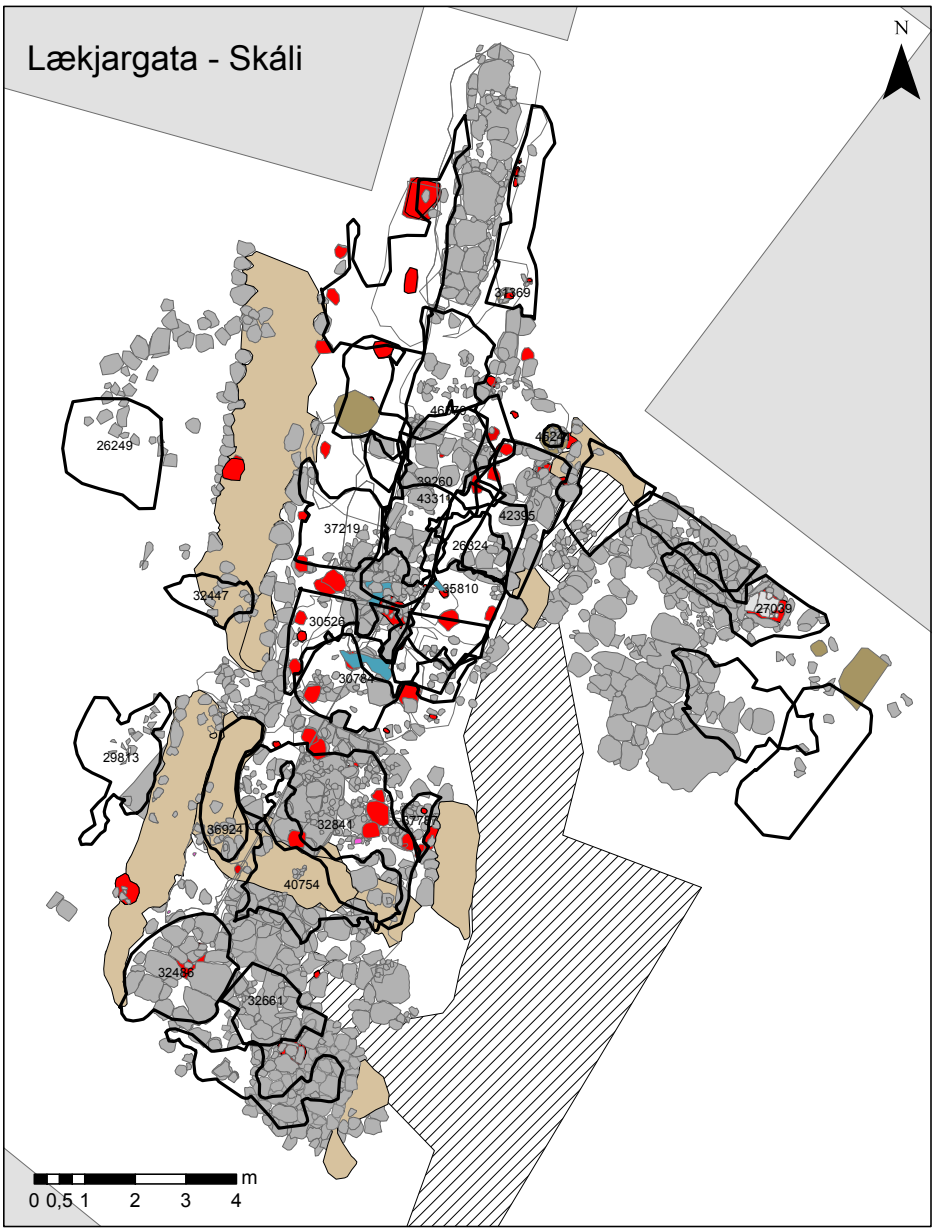

Figure 1 A plan of the domestic structure at Lækjargata. Deposits containing bone are outlined in black. Image: Lísabet Guðmundsdóttir.

Identified Specimens

Table 1 The "Number of Identified Specimens" and "Total Number of Fragments" from Lækjargata and Aðalstræti (Aðalstræti data from McGovern and Tinsley, 2001)

Taxa	Lækjargata prelim. 10th and 11th	Aðalstræti 14-16 Settlement Age assemblage
Mammals		
Caprine (sheep and goats (*Ovis aries and Capra hircus*))	20	32
Cow (*Bos taurus*)	5	1
Pig (*Sus scrofa*)	14	118
Horse (*Equus caballus*)	1	3
Marine mammal unidentified	1	0
Walrus (*Odobenus rosmarus*)	1	7
Phocid	1	0
Mollusks		
Mollusk species indeterminate	0	1
Birds		
Great auk (*Penguinus impennis*)	2	0
Avian, unidentified	19	0
Fish		
Fish, unidentified	3	2
Gadid fish	2	0
Number of Identified Specimens	**69**	**167**
Large terrestrial mammal	7	3
Medium terrestrial mammal	21	16
Small terrestrial mammal	0	0
Unidentifiable animal bone	359	4618
Total Number of Fragments	**456**	**5089**

Domesticated mammals

Caprines (sheep and goats) are the most numerous category of identified domesticated mammals so far in the Lækjargata assemblage (20 NISP). Pigs are the second most numerous domesticated animal identified (14 NISP) and cows are third (5 NISP). Horses were represented by just one element thus far, a molar. Each of these domesticated species are non-native to and were first brought to Iceland during the Settlement period, whereafter they were bred in strategic proportions based on desired production of meat, milk, wool, fats, oils, skins, and other derived products. It is noteworthy that early Reykjavík assemblages of Lækjargata,

Aðalstræti 14-16, and Tjarnargata 4 have high relative numbers of pig remains when compared other early sites in Iceland. Some scholars have suggested that Settlement period southern Icelandic households may have more consistently modeled their farming after Norwegian norms of the time by keeping by numerous cows and pigs, and with relatively fewer caprines (Vésteinsson and McGovern, 2002; Perdikaris 1997). In northern Iceland, on the other hand, Settlement period archaeofaunas see caprines consistently as a clear and consistent majority of domesticated mammals (See also McGovern et al, 2009).

The archaeological evidence for the numbers of pigs suggest decreasing relative numbers, at least in some places, after the Settlement period in Iceland, by the 11th century (McGovern et al, 2009, P. 242). Documentary evidence from the 13th century clarifies conventions for management of pigs between common and private space, suggesting difficulties and tensions (ibid). Swine herding in Iceland leaves little trace by the late Middle Ages and pigs, it seems, disappeared from Iceland after the early 16th century, to be later introduced in some places around 1900 (Jónsson and Júliusson, 2013, Vol 4, P. 134-5). The change is perhaps due to pigs being difficult to manage in the Icelandic landscape in both a social and ecological sense. They differ from the other livestock in that they cannot subsist on grass alone. Left to their preferences, these omnivores forage for plant material, fruits, insects, birds eggs, carcasses, and when available, varied human refuse. If penned, they need to be provisioned. Further, pigs' consumption of wild bird eggs and disruption of nesting could have put them in direct conflict with people managing wild bird egg collecting grounds (Brewington et al, 2015). What is more, the *Grágás* (1) law book (relevant to the Settlement period and Middle Ages) tells that uncontrolled pigs ate things that then made them troublesome and unacceptable as food animals including dead horses and human corpses (Dennis, Foote, and Perkins, 2012, P. 48). Lækjargata's preliminary evidence contributes to the interpretation that pigs were relatively common in the early centuries of Icelandic settlement, especially in the south while other sources suggest their eradication from approximately 1500 - late 1800's. There are several potential explanations for the fluctuating use of pigs over time in Iceland, yet regional differences could be further explored.

Figure 2 Walrus tusk fragment.

Marine Mammals

One proximal end fragment of a walrus tusk has been identified in the Lækjargata collection thus far. It measures approximately 13 centimeters and has a lengthwise naturally occurring groove that resembles reference photographs of other specimens, though some degradation has changed the surface texture. Walrus hunting in Iceland is known from the zooarchaeological record and historical texts such as the *Grágás* law books and the *Konungs Skuggsjá* (see discussion in Frei et al, 2015). Walrus canine ivory became a valuable commodity that moved from Iceland and Greenland during the Settlement period and Middle Ages to continental Europe and Scandinavia. Several authors have gathered material and textual evidence of significant walrus ivory trade early in Iceland (Pierce, 2009; Keller, 2010; Einarsson, 2011; Vésteinsson et al, 2006; Frei et al, 2015). Walrus ivory and associated working debris have been found at nearly every site in Greenland (McGovern et al, 1996; Smiarowski, 2014) while walrus bone and ivory have been found several sites in southwest Iceland including Tjarnargata 4 (Amorosi 1997), Aðalstræti 14-16 (McGovern, 2001; McGovern, 2013), Alþingisreitur (Pálsdóttir, 2010) and recently both Lækjargata and Útskalar (Hicks et al, forthcoming). The icelandic evidence includes both postcranial bone and ivory suggesting hunting for meat, hides, in addition to the highly valued tusks. Archaeological locations with walrus finds from the north of Iceland include the inland farm of Hrísheimar, the trading site of Gásir, Svalbarð, and Siglunes (Edvardsson and McGovern, 2006; Harrison, Roberts and Adderly, 2008; Frei et al, 2015, P 8). The trade of this compact and highly valued

material may have been one of the major incentives for the Norse settlement of some areas of the North Atlantic and it seems to have drawn trade ships from Europe and Scandinavia to Iceland and Greenland over the 9th through early 15th centuries though the commodity may have played a smaller economic role in Iceland when compared to Greenland (Frei et al, 2015).

Birds

Figure 2 Great auks depicted by John Gerrard Keulemans

Of the avian bones identified from Lækjargata (21 total fragments), two specimens were identified as belonging to the now extinct great auk (*Penguinus impennis)* - a whole adult femur and a proximal end fragment of an adult tibiotarsus (the two left-most fragments in Figure 3). The femoral shape is characteristic of great auk; the head of the femur and the greater trochanter (the two rounded features at the proximal end) are level with each other. The total length of the adult femur is slightly longer than 8 centimeters, matching the comparative material (Coen and Serjeantson, 1986, see Appendix 1 in the present publication).

Other elements were great auk sized, and likely were auk, including a proximal humerus fragment, a coracoid fragment, clearly large avian ribs and a fragment of a synsacrum (pelvis) (Figure 3, ribs not pictured); these were recorded in the more general avian category (AVSP) until identification can be confirmed. All of the abovementioned specimens were found in context [36924]. Great auks were large, flightless birds, 75- 85 cm tall – were fairly common in western Iceland in the past, breeding on rocky cliffs and islands. It is not surprising that they made appealing targets for past Icelanders. The last great auk colony in Iceland was on Eldey, and they were reportedly killed off in 1844 for the purpose of collecting scientific specimens for study and display in other countries. For some time, the Settlement age material from Tjarnargata 4 contained the only early evidence of human predation on great auks in Iceland. Now we can include Lækjargata, and Útskálar (Hicks et al, forthcomming) among sites with evidence of great auk hunting.

Figure 3 On the left: a femur and tibiotarsus of great auk. On the right, three fragments of likely great auk bones: humerus fragment, coracoid fragment and synsacrum fragment. Context [36924].

Fish

Three unidentifiable fish fragments were noted plus two vertebrae that were of the gadid family and were likely cod. Fish bones in this poorly preserved assemblage would have probably been some of the first to decompose and low sample numbers overall mean that it is not possible to say more. This assemblage is one more "dot on the map" to indicate early gadid fishing in Iceland. It is important to note that fishing for gadids, though a long-term mainstay in Iceland, was not universal; for example, evidence for gadid fishing by the Norse in Greenland has been essentially non-existent (Perdikaris and McGovern, 2008; Smiarowski et al, 2016 in press).

Taphonomy

Taphonomy is a catch all term used to describe a variety of agents and events that contribute to the physical characteristics of an animal bone assemblage (Lyman, 1994). For zooarchaeologists, these include the killing and butchery of animals, the exchange or discard of selected animal parts (seen as presence and absence), burning of bone for various reasons, the decomposition of discarded or buried bone, and the recovery methods used by archaeologists (e.g. sieving). Such activities ultimately need to be considered in order provide a holistic view of the assemblage and to describe what been done with animal bodies in the past. In the case of Icelandic domestic contexts, it seems that the majority of animal parts cycling through various household uses would have been thrown out with ash and other refuse on to outdoor refuse areas. However, this archaeofaunal collection was recovered mostly from house floors and domestic activity areas rather than from middens and such conditions generally produce fragmented and less well-preserved bone, and smaller volumes of bone per deposit. The Lækjargata assemblage has been sieved through four-millimeter mesh, which will contribute to the recovery a high number of small fragments. Beyond fragmentation, the material from this site is generally in poor condition in terms of preservation. Factors for preservation vary to include the acidity of the soil as well as its draining and freezing tendencies. The mammal bone from Lækjargata´s 10th and 11th c. phase is brittle, porous, and exfoliated. One indicator of poor preservation is a higher than expected percentage of teeth among other bones. Dense tooth enamel preserves well in conditions where other osseous material will degrade. A large proportion of the identifiable fragments of mammal bone in this assemblage are indeed teeth (Table 2).

Table 2 preliminary proportions of teeth as a subset of identified domesticated mammal bones, Lækjargata

Species	Total NISP	Number of teeth (subset of NISP)	Mandibles
Cow	5	3	
Caprine	20	11	1
Horse	1	1	
Pig	14	12	1

Small, thoroughly burnt pieces of bone comprise 46% of the archaeofauna and this speaks to the flow of animal parts, from butchery and dining situations, into the domestic hearth before they are eventually discarded. Iceland's early domestic structures commonly had long, central hearths at floor level that served for cooking and heating. After the Middle Ages, smaller, off-center hearths are more common, or alternatively, specialized separate cooking rooms. Some have suggested that domestic sites with central hearths produce more burnt bone as people casually throw the remains of their meals into the fire (Bigelow, 1985). One should also keep in mind that bone contains flammable components that can increase the temperature of a fire, so it is certainly possible that it was added to hearths intentionally. Most of the bone was found in an advanced state of burning (calcined) and was stark white in color and brittle from having been in prolonged contact with fire. A few fragments of bone had a smooth, grey appearance with glass-like texture (contexts [34829] and [31369]). This characteristic may indicate that Lækjargata's past inhabitants simmered the bones or limbs to release collagen, fats, and other nutritious substances.

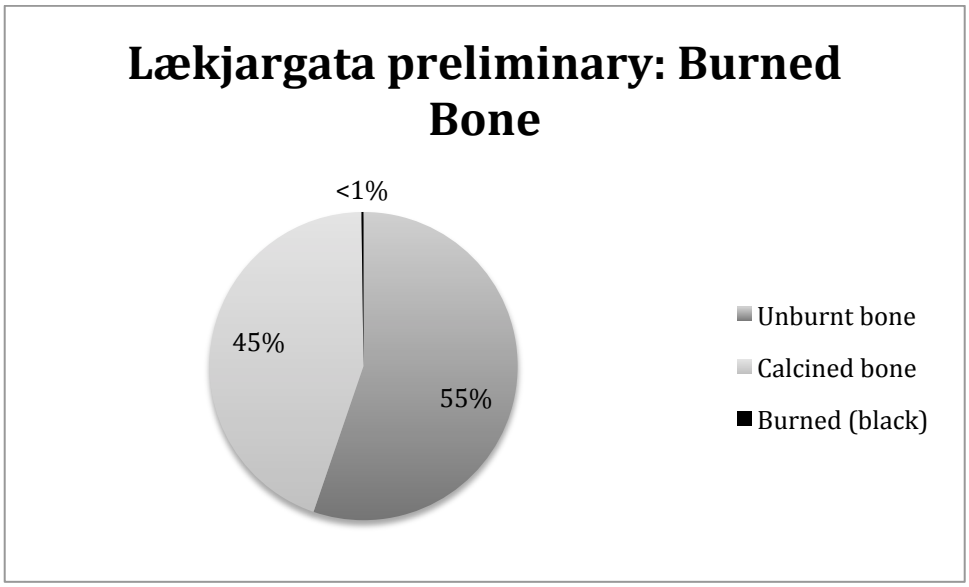

Figure 4 Preliminary percentages of burnt bone, N= 456

Discussion

Although the overall number of identified animal bone specimens in the Lækjargata assemblage is low at this stage of ongoing work, the evidence informs research into household activities, subsistence, trade economies, and human/environmental interaction in Iceland's early centuries. The archaeofaunal evidence from Lækjargata, Aðalstræti, and Tjarnargata 4 – all early sites in Reykjavik – have certain details in common that may soon be more clearly understood as regional patterns of specific practices within Iceland. The first commonality is a high proportion of pig bones among domesticates, relative to other sites, and over time.

The second shared characteristic is the presence of walrus bones and tusk indicating early walrus hunting and ivory production in Iceland – a significant commodity trade ending with local extinction. Finally, great auk bones were found in Lækjargata and Tjarnargata 4 early assemblages, a species now globally extinct due to centuries of human exploitation. The Lækjargata archaeofauna is by no means among the largest excavated assemblages in Iceland, but as work continues and data is contextualized it will contribute additional substance to understandings of Iceland's animal economies both on a household level and on a regional, collective scale.

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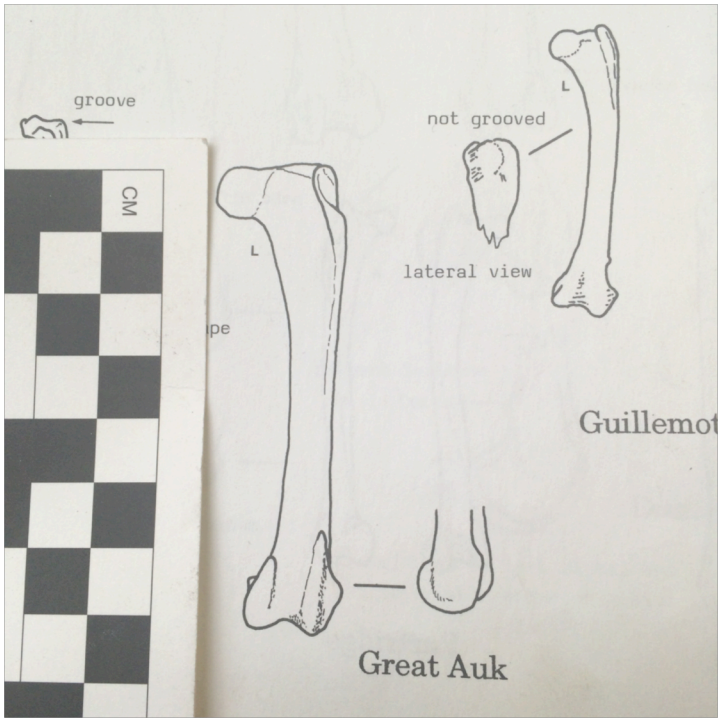
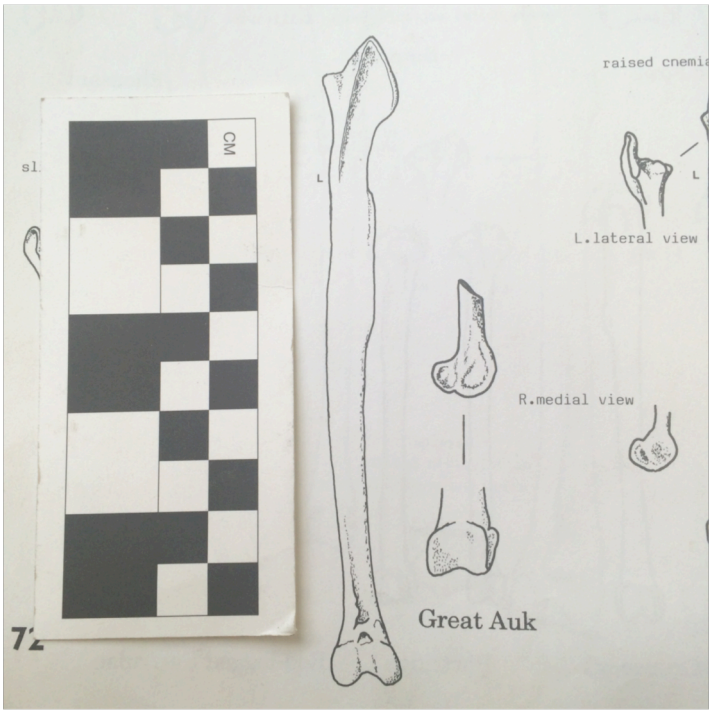
Appendices

1. Auk comparative images: a) femur b) tibiotarsus from Coen and Serjeantson 1986



a)



b)

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