



LUND UNIVERSITY

Veitstu Hvé Blóta Skal

The Old Norse Blót in the Light of Osteological Remains from Frösö Church, Jämtland, Sweden

Magnell, Ola; Iregren, Elisabeth

Published in:
Current Swedish Archaeology

2010

[Link to publication](#)

Citation for published version (APA):

Magnell, O., & Iregren, E. (2010). Veitstu Hvé Blóta Skal: The Old Norse Blót in the Light of Osteological Remains from Frösö Church, Jämtland, Sweden. *Current Swedish Archaeology*, 18, 223-250.
http://www.arkeologiskasangfundet.se/csa/Dokument/Volumes/csa_vol_18_2010/csa_vol_18_2010_s223-250_magnell_iregren.pdf

Total number of authors:
2

General rights

Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

VEITSTU HVÉ BLÓTA SKAL?

The Old Norse *Blót* in the Light of Osteological Remains from Frösö Church, Jämtland, Sweden

Ola Magnell & Elisabeth Iregren

The osteological remains from Frösö Church, Jämtland, have been re-analysed in order to understand the Viking Age rituals at the site and to study the *blót*, the Old Norse sacrifice and feast. Radiocarbon analyses of animal and human bones date the rituals to the late Viking Age. A taphonomic study shows that especially brown bear and pig were of importance in the rituals. Butchering marks reveal the processing of the carcasses as well as feasting. Further, bones and not whole carcasses seem to have been deposited on the ground. Human remains have been treated differently from the animal bones and may represent disturbed burials rather than sacrifices. Seasonal analysis indicates that the rituals took place in late autumn, early spring, and possibly around the summer solstice. The results of the osteological analyses are also discussed in relation to the written sources about the Old Norse *blót*.

Key words: Old Norse, Frösö, animal sacrifice, blót, taphonomy, seasonality

INTRODUCTION

Excavations in the choir of Frösö Church in 1984 revealed bones scattered around the mouldering remains of a birch tree. The abundance of bones from wild animals, the body part frequency, and the unique find context of bones and tree remains here on the island of Freyr (Frösö) showed that the find most likely represents the remains of the *blót*, the Old Norse sacrifice and feasting (Iregren 1989).

The Old Norse word *blót* means sacrifice (Palm 2004:483). In this study *blót* refers to the public sacrifices of animals and the ceremonial feasts at sacred places, which are described in the written sources

Current Swedish Archaeology, Vol 18, 2010 223

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

(Näsström 2001). The archaeological evidence of the *blót* and animal sacrifice is rather scanty. This can be explained by taphonomic factors and the problem of distinguishing between bones from ritual feasts and those from ordinary

meals.

The bones from Frösö Church are one of the most important archaeological sources of information on Old Norse animal sacrifices, and have also been used as an example of this ritual practice (Näsström 1996:80; 2001:112ff; Jennbert 2002:111). Animal bones in graves are another important and relatively common source material, but they represent specific mortuary rituals (Iregren 1997). Another relatively common ritual practice during the Iron Age is depositions of animal bones in house structures (Paulsson-Holmberg 1997; Carlie 2004). However, these rituals are closely related to the construction or abandonment of houses, and in some cases the interpretations of the bone finds in postholes as ritual depositions can be questioned. Bones of animals and humans in bogs are further evidence of pre-Christian ritual sacrifices, but this type of deposition is part of an older tradition which diminishes during the 5th century and which in many aspects such as environmental setting differs from the religious ceremonies and sacrifices that took place at settlements during the Late Iron Age (Fabech 1991:97; Nilsson 2009:95ff).

There are few other finds of Old Norse cult places with animal bones in Sweden. Borg in Östergötland and Uppåkra in Scania are examples of other cult places with probable remains of sacrificed animals (Lindeblad & Nielsen 1997; Magnell, in press). These sites are also more problematic to interpret, with less clear evidence of animal sacrifices and ritual depositions than the bones from Frösö Church. Other examples of Viking Age bone finds, from Tibble in Uppland and Järrestad in Scania, are interpreted as ritual depositions, but the interpretations of these bone depositions as sacrificed animals can be questioned (Andersson 1998:252; Nilsson 2003).

The osteological remains from the site have earlier been analysed and published by Elisabeth Iregren (1989). The development of osteological methods as well as new detailed analyses has made it possible to obtain new information from the material. An additional purpose of the study has been to sort out misconceptions of the find in connection with its presentation in other publications.

The descriptions of the *blót* in the written sources can also be questioned since they are usually not eyewitness accounts of the rituals but instead were

written down several generations after the pre-Christian

224 Current Swedish Archaeology, Vol 18, 2010

religious practice had been abandoned. The descriptions were also written down by Christians for specific purposes and it is likely that the descriptions have been exaggerated and distorted (Clunies Ross 2002; Sundqvist 2007:11). The most cited and important written source is the account of the *blót* in Gamla (Old) Uppsala by Adam of Bremen. Its validity and the extent to which it actually describes Old Norse rituals have been debated (Hultgård 1997; Janson 1998:17ff). There are many aspects of the *blót* that at present are uncertain and questionable. Which animals were sacrificed? Were humans sacrificed? During what time of year did the *blót* take place? These are examples of questions that will be discussed in this study.

This paper deals with three main issues. Firstly, radiocarbon dating has been done in order to establish the chronology. Secondly, a detailed analysis has been performed in order to reconstruct the taphonomic history of the bones – from the selection of animals for sacrifice, to the slaughter, to the deposition of bones at the site. Thirdly, a detailed age assessment of the animal remains has been done in order to try to estimate during which part of the year the rituals took place.

The aim of the study has been to better understand the rituals that took place at Frösö in the Viking Age, but also to compare the archaeological and osteological evidence with the written sources and generally accepted view of the Old Norse ritual practice at the *blót*. In short, we will try to answer the question posed by Odin himself in Havamál: *veitstu hvé blóta skal?* “Do you know how to sacrifice?”

LANDSCAPE AND SITE DESCRIPTION

During the Viking Age Frösö was most likely the social, political and religious centre in the Lake Storsjö region in the province of Jämtland, Sweden. That the site where Frösö Church now stands was important in the Late Iron Age society is indicated by burial mounds in the churchyard and by the name of the village near the church – *Hov* (Hemmendorff 2010). The exact meaning of the Old Norse word *hov* (*hof*) is unclear, but it usually refers to a building with a sacred function (Vikstrand 2001:253ff; Sundqvist

2007:159; Jakobsson 1997).

The area around Frösö can be described as a sacred landscape with several place names linked to the Old Norse religion (Fig. 1). The gods Freyr, Odin, Njord and Ull can be associated to the places Frösö, Oden-sala, Norderön and Ullvi, while Vi and Hov in five different places refer to cult sites (Brink 1990; Vikstrand 1993).

Current Swedish Archaeology, Vol 18, 2010 225

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

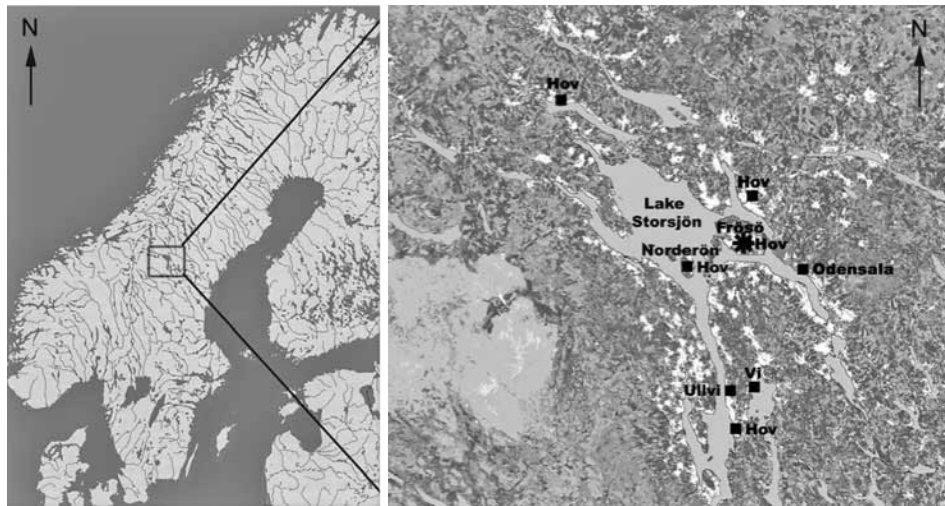


Fig. 1. Scandinavia and the Lake Storsjö area (left), Frösö Church (*) and Old Norse place names in the Lake Storsjö area (right).

The setting of the site in the landscape, with a wonderful view on one of the highest summits of the island Frösö 130 m above Lake Storsjön, was most likely chosen carefully. The site may have had a cosmological meaning, even though strategic and social factors could explain why this place became the centre of the cult. When standing on the site gazing westward one gets the impression that one is in the middle of the cultural landscape by the lake; further away lie the forests, and in the distance are the mountains that surround the landscape. It is difficult not to avoid parallels with the Old Norse spatial cosmology where *Midgård* (Middle World), the settled and ordered world of the humans, was surrounded by *Utgård*, the home of the giants and chaos. Frösö and the area by Lake Storsjön may have represented *Midgård*, while the mountains in the distance represented *Utgård*. That people during

the Viking Age actually had this simple dualistic worldview of the spatial mythology has been criticized (Brink 2004:292ff). However, that the concept of Midgård was important is not doubted (Clunies Ross 1996:60). It has also been suggested that other cult sites, such as Gamla Uppsala, reflected a mythical landscape (Sundqvist 2007:114ff).

The argument that the site of Frösö Church really was a cult centre from a cosmological perspective is further confirmed by remains of the birch tree below the choir. The tree is interpreted to represent the world tree, *Yggdrasil* (Iregren 1989:130f; Näsström 1996:79f). Accord-

226 Current Swedish Archaeology, Vol 18, 2010

ing to the Old Norse mythology *Yggdrasil* was standing in the middle of the cosmos, connecting the different worlds (Andrén 2004:390f; Näsström 2006:27ff).

Due to renovation an excavation by Jämtlands läns museum took place in Frösö Church in 1984. Below the floor in the choir was a thin layer of pulverized wood, which most likely represents the remains of an earlier floor in the church, and beneath the latter was found a black cultural layer with bones, fire-cracked stones and charcoal covering an area of 3 x 3 m. The remains of a stump and roots of a birch tree were found in the middle of the choir. Bones were found on top of the roots and not beneath or on the tree stump. No other finds apart from bones, an iron pin from a buckle, and an iron crook were recovered. The cultural layer was missing in the western part due to the construction of graves during the 18th century and a sepulchral chamber. The eastern and southern walls of the choir also cut the cultural layer. It is not known whether the layer with bones continues outside the church. Consequently the original extension of the layer with bones is most uncertain (Hildebrandt 1989:162f).

MATERIAL

The osteological material of 5 kg has earlier been analysed and published by Elisabeth Iregren (1989). A new quantification of the frequency of different animals has been done (Table 1). The reason for this is a misprinting in the publication from 1989, and in the earlier analysis ribs and bones of the vertebral column were not determined as to species (Iregren 1989). The

identification of loose teeth and assessments of age have also resulted in new estimates of the minimal number of individuals.

The new quantification of NISP (number of identified specimens) has resulted in a slightly higher frequency (4 %) of wild game in relation to domestic animals. The frequency of brown bear (*Ursus arctos*) has increased by 5 %, while sheep and goat (*Ovis/Capra*) have decreased by 6 %. Other species have about 1 % or less difference between the earlier and the new quantification. The new estimation of MNI has resulted in a higher number of individuals, but the relationship between the species is more or less the same.

In this study, bones of bat (*Chiroptera*), rodents (*Rodentia*), jackdaw (*Corvus monedula*), passerines (*Passeriformes*) and whitefish (*Coregonus*) have been excluded, since these bones either are from a younger

Current Swedish Archaeology, Vol 18, 2010 227

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

Cranium 9 7 Teeth 713 10 Mandible 12 16Teeth (mandible) 35 60 11

3337272936 11 4

1

Teeth 1 AtlasAxis 1 Cervical vert. 4 Thoracic vert. 12 Ribs 6 Sternum 4 Lumbar vert. 2 Sacrum

Caudal vert. 2 ScapulaHumerus 3 Radius 5

Ulna Carpals121 Metacarpals 11PelvisFemur 2Tibia 4Fibula 2Tarsals14

1

Metatarsals Metapodia Sesamoideum Phalanx 1 Phalanx 2 Phalanx 3

11 16 22 34 22

4

2

6

1 1

3 36

NISP 256

MNI 7

77 14

3

12 1

9 1

1 1

1

1

211 1

5

2

4 7

1 2

3 1 1

1

31 12 1

6

1 5 33 121 1 1 1 29

1 4 1 14 1 1 1 4

21

1

7 2 1 1 4

Table 1. Osteological remains of mammals and birds from Frösö Church (layer RL 6). Additionally two bones of pike and one of salmon have not been included in the table. NISP= Number of Identified Specimens. MNI= Minimal Number of Individuals.

228 Current Swedish Archaeology, Vol 18, 2010

Brown bear Elk

Red deerRed squirrel

Capercaillie Cattle

Goat Sheep

Sheep/goat Pig

Horse Dog

Domestic fowl Human

layer in the nave or most likely are later intrusions in the Viking Age cultural layer (Iregren 1989:120). Nine bones from cattle, sheep and pigs differ significantly from the other bones by being white-grey and showing no signs of weathering in contrast to the otherwise brown-red and weathered bones. These bones are from a limited area in the northern part of the choir and are assumed to be of a younger date, probably from the time of the construction of the church. Because of this, these bones have also been excluded from the quantification.

METHODS

The development of methods for age estimation of pigs, sheep and European elk has occurred since the earlier analysis was made. This has made it worthwhile to re-access mandibles and teeth with the aim of finding further evidence of the seasonality.

The age estimation is based on development and wear of teeth of pig, cattle, sheep and elk (Brown *et al.* 1960; Jones 2006; Carter & Magnell 2007; Magnell, manuscript). Additional radiographs of mandibles of recent newborn calves and lambs of known age at death have been taken and used by the authors to verify the age assessments.

It has been assumed that tooth development in Viking Age animals is generally similar to that of animals of today. However, since the modern

improved pig breeds develop faster than primitive breeds of the past, tooth development in wild boar and in crossbreeds between wild and domestic pigs has been used as reference material for the Viking Age pigs (Carter & Magnell 2007).

In order to assess the seasonality one has to combine the age estimation with an assumed breeding period. The breeding of wild animals like brown bear and elk is today restricted to short periods in January/ February and late May/early June, respectively (Ekman *et al.* 1992:68; Sandegren & Swenson 1997:21). There is no reason to assume that the situation was different during the Viking Age. Sheep in Sweden today usually lamb in the spring, in April/May (Insulander 1956:88f). Since the onset of the rut and lambing in sheep is affected by decreasing day-light in the autumn, there is no reason to assume different conditions in the past (Sjödin 1980:124).

It is more problematic to evaluate the animals that do not have limited breeding seasons, like pigs, cattle and goats. However, in areas with great seasonal differences in climate and food supply, like Jämtland, the breeding of livestock is often more restricted to the spring in order

Current Swedish Archaeology, Vol 18, 2010 229

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

to increase the chance of offspring surviving their first winter, and this was also the case with their wild ancestors.

As an example, wild boar can and does breed in different seasons, but in Sweden about 90 % of the farrows are in the spring (Lemel 1999:33). In this study it has been assumed that reproduction in pigs during the Viking Age was similar to that of wild boar, with most piglets born in early spring. However, it cannot be excluded that the pigs had two farrows a year, one main breeding period in spring and occasionally one in late summer, just as wild boar has in years of good food supply and according to historical sources on pig breeding (Lauwerier 1983). The results of the analysis and clustering of the piglets in two limited age groups, 2–4 months and 7–9 months respectively (see results), thus indicate seasonality in the breeding of pigs. If reproduction in pigs had not been tied to specific periods it is unlikely that the

age of the slaughtered piglets would be found in restricted age groups, but instead randomly spread out over the year.

Sources on reproduction in goat from the 19th and early 20th centuries reveal that the kids were born in spring (Dahlander 1916:72; Fägerborg 1986:126). The natural reproduction in horse is a rut in late spring/early summer, resulting in the foal being born in spring (Rossdale 1996:66). Since calving in spring is natural for cattle and was preferred by farmers in the past, this has been assumed in our study as well (Richter 1982:258; Berg 1986:112). Historical sources on reproduction in cattle in Sweden also show that calving in northern Sweden and Småland was concentrated to spring (Nathorst 1877:161; Larsson 2009:125).

Identification of sheep and goat has been based on criteria for mandible according to Boessneck *et al.* (1964) and dentition after Payne (1985). In a recent publication by Zeder and Pilaar (2010) several of the criteria described by Payne (1985) have been criticized. Since the analysis of the osteological material from Frösö Church was performed before the publication by Zeder and Pilaar (2010), the identification of goat can be questioned. However, this does not have any influence on the seasonal analysis.

The presence of butchering marks on bones was noticed in the earlier analysis, but no systematic and detailed study of bone modifications was performed. Since the taphonomic history of the bones is of interest in this study, bones have been examined with a stereo-microscope in order to identify bone modifications. Weathering has been recorded according

230 Current Swedish Archaeology, Vol 18, 2010

Fig. 2. Radiocarbon dating of charcoal: wood from birch tree and bones from the choir in Frösö Church.

to Behrensmeyer (1978), identification of trampling follows Olsen and Shipman (1988), and gnawing and butchering marks have been identified based on characteristics described in Blumenschine *et al.* (1996).

RESULTS

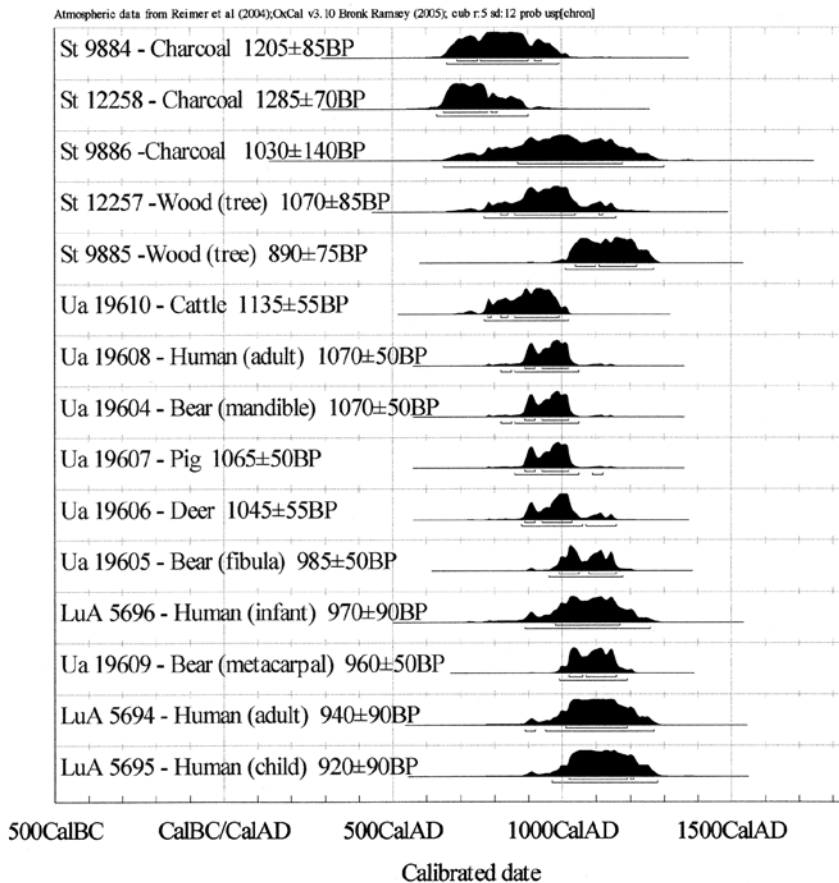
The chronology

Radiocarbon dating of the animal bones indicates that the sacrifices and

depositions took place during the late Viking Age (end of 10th to early 11th century) (Fig. 2). Based on the radiocarbon dating it cannot be excluded that depositions of animals started already in the early 9th century and continued until the 12th century, but this is not likely.

Current Swedish Archaeology, Vol 18, 2010 231

Veitstu hvé blóta skal?



Ola Magnell & Elisabeth Iregren

Rather, the overlap and distribution of dates, together with the homogeneity of the finds in regard to body part distribution, colour and texture of bones, and anatomic refitting of bones, indicate a shorter period. An analysis of the radiocarbon dates of the bones, done by combining all the dates obtained and assuming that they represent a short event using Oxcal 3.1 (Bronk Ramsey 2005), gives the result that the bones were deposited between AD 980 and 1025 with a 95.4 % probability.

Further, the dating of the tree remains shows that the birch tree was still standing when the rituals took place. Two samples of charcoal dated to the 8th and the 9th century indicate earlier activities at the site. Radiocarbon analyses of four bones show that human remains are contemporaneous with the animal bones and not intrusions from later burials in the church. However, three of the radiocarbon dates from human bones have large errors and might be later, from the 12th century (Fig. 2). It is also possible that the dates from the human bones are too old due to reservoir effects caused by consumption of freshwater fish from lakes with hard water. This problem has earlier been suggested to be associated with radiocarbon dating of human remains from Västerhus, Frösö (Holm 2006:114f).

Animal remains

Studies of the taphonomic history are a useful approach in analysing and understanding ritual bone depositions. The aim is to try to reconstruct the chain of events – from the selection of animals for sacrifice, to how the carcasses were processed, to the deposition of the bones including the type of setting and circumstances (Magnell in press).

What is most striking about the find from Frösö Church is the high proportion of bones of wild animals, especially brown bear, as noted earlier (Iregren 1989). At other sites on the island of Frösö that date from the Late Iron Age to the Early Middle Ages, wild animals make up 3 % or less of all bone fragments (Wallin & Martinsson-Wallin 1990; Thilderqvist 2005; Magnell 2004). However, at the settlement of Kyrklägdan, situated on the mainland around Lake Storsjön, 25 % of all bones are from wild animals, mainly elk (Holmgren 1985). This shows that hunting was fairly important for the settlements around Lake Storsjön, in contrast to settlements in southern Scandinavia where bones of wild game make up only a small percentage of the NISP.

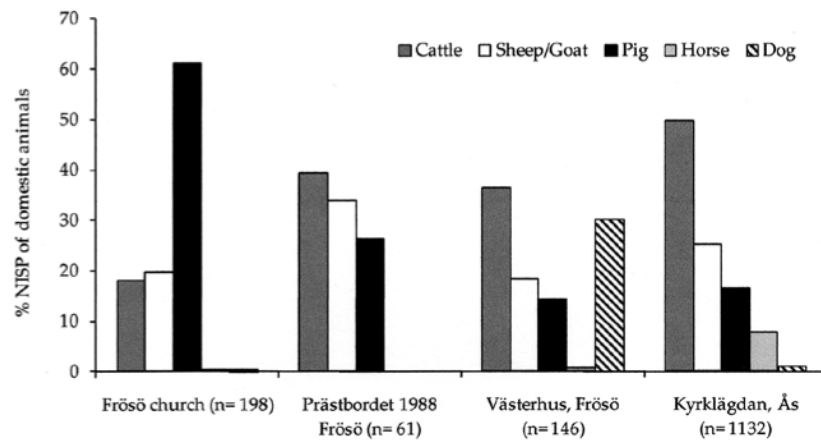
Since brown bear is a predator with low population density, the species is never frequently found in bone assemblages from settlements of

any period (Ekman & Iregren 1984). Thus, there is no doubt that the bear bones from Frösö Church are the result of a selection and that they were brought to the site for a specific purpose.

The relatively high frequency of elk does not reflect the local conditions on Frösö, where the species does not seem to have been hunted frequently, but in a larger regional perspective the abundance of elk bones is not unexpected. The finds of red deer, however, are remarkable. This species is not found at other sites in the region and is not found today in the area around Lake Storsjön. The nearest find of red deer is from Krankmårtenhögen in Härjedalen, but this is dated to the pre-Roman and Roman Iron Age (Ambrosiani *et al.* 1984:69).

The osteological remains of brown bear and elk include juveniles, but are mainly from adults. Thus, the bones indicate no intentional selection of a specific age group and instead reflect the age composition of the hunted animals. The occurrence and frequency of the domestic animals are also of interest. It is striking that horse and dog are almost absent, represented only by a single tooth each (Fig. 3). It is clear that the sacrificed domestic animals were the livestock commonly held and slaughtered for meat.

The expected relationship between livestock in a typical Iron Age settlement in middle Sweden would be cattle as the most common livestock followed by sheep/goats and then pigs. An excavation at the site known as Prästbordet 1988 revealed a Viking Age cultural layer only



Ola Magnell & Elisabeth Iregren

100 m north-east of the choir of Frösö Church, and even though the osteological sample is small it represents the expected frequency of domestic animals in ordinary refuse from the local settlement by the church (Magnell 2004).

The high frequency of pig indicates a clear selection of and preference for pigs as sacrificial animals (Fig. 3). The quantification of the number of individuals accentuates even more the importance of pigs in the rituals at the site (Table 1). Pigs had a special importance on Frösö, which is further indicated by finds from the Viking Age cultural layer just outside the churchyard, excavated in 1988. A tooth pendant, made from a lower incisor, shows that pigs probably had a symbolic meaning.

Another interesting aspect of the pigs from Frösö is the large tooth size. Two lower third molars from Prästbordet 1988 measured 36.5 and 38.2 mm, which is larger than any pig teeth from Birka or early medieval Lund (Ekman 1973; Wigh 2001). In southern Scandinavia, finds of pig teeth of this size from the Viking Age would usually be ascribed to wild boar or rather crossbreeds between wild and domestic pigs. The large teeth cannot be explained as wild boar, since the distribution of that animal in the past has not reached as far north as Jämtland (Ekman & Iregren 1984). Either the Iron Age pig breeds of middle Sweden were unusually large or the teeth represent imports of crossbreeds used as breeders. Another interesting feature of the molars is lesions of caries, indicating that the pigs had been given an unnatural diet. Interestingly, isotope data of pigs from early medieval Västerhus confirm a diet unusually rich in protein ($\delta^{13}\text{C}$ 22.9; $\delta^{15}\text{N}$ 10.9).

(Iregren *et al.* 2009: table 5).

All pig bones from Frösö Church, except for a single tooth, come from piglets. Piglets are not uncommon in bone material from Iron Age settlements, but the most frequent age group is almost without exception animals of about 1.5–3 years of age. This indicates that piglets (i.e. pigs less than 12 months) were typically selected to be sacrificed at the *blót* on Frösö.

The second most common domestic animal is the category sheep/ goat. The bones with morphological characteristics enabling separation of the two species show that sheep were more frequently represented, just as in most Iron Age settlements in Sweden (Table 1). The bones of sheep are mainly from lambs, but also adults. Goat is only represented by teeth from a newborn kid. The teeth of dog and horse derive from juvenile animals. Cattle, on the other hand, are represented by osteological remains of newborn calves, subadults, adults, as well

234 Current Swedish Archaeology, Vol 18, 2010

as old animals. Unfortunately, no bones permitting sexing have been found, and for this reason it is impossible to know whether males or females were preferred as sacrificial animals.

The body part frequency of brown bear, with relatively more postcranial bones than other species, shows that this animal was treated differently (Table 1). However, quantification based on MNI (minimum number of individuals) shows that mandibles represent at least seven individuals, bones from the paws four individuals, and bones from the trunk and long bones only two individuals. Anatomical refitting of bones, spatial distribution and ageing further indicate that most of the postcranial bones may originate from two bears, one adult and one subadult (18–24 months). Not only body part frequency but also butchering marks prove that single bones or body parts, not complete carcasses of animals, were deposited at the site (Tables 1, 2). No animals have been hung in the tree, in contrast to Adam of Bremen's description of the *blót* at Gamla Uppsala (Adam av Bremen, in Swedish translation 1984).

Skinning marks on mandibles, metapodials and phalanges of bear together with missing distal phalanges (the claws) demonstrate that the bear skin has

been taken care of (Table 1). Butchering marks on mandibles from brown bear, elk and pig show that the lower jaw has been cut from the head. Blackening and cracks on the enamel of teeth from mandibles of pig, sheep and elk indicate exposure to fire, probably from the roasting of the mandible and tongue over fire.

Human(Homo sapiens)

Cattle(Bos taurus)

Sheep/goat (Ovis/Capra)

2 2

Pig 23 (Sus domesticus)

Elk 11 (Alces alces)

Brown bear 5 2 61 (Ursus arctos)

Veitstu hvé blóta skal?

Gnawing

3

2

Trampling

5

Cut/chop

3

Burning

Weathering score

0.4 1.6 1.9 2.2 1.9 1.5

Table 2. Number of bones from Frösö Church with evidence of burning and marks from cutting, chopping, trampling, and gnawing by carnivores. Evidence of burning is limited to cracks and blackening of teeth and no bones are calcinated. Weathering score mean of weathering category according to Behrensmeyer (1978).

The high occurrence of cut and chop marks on bear bones shows that the animals were dismembered in most major joints and that meat was filleted from the bones. Chop marks and breakage patterns on mandibles of bear indicate marrow fracturing (Fig. 4). It is interesting to notice that several of the long bones of bear are unbroken unlike the few postcranial bones of the domestic animals, which all are fragmented.

Three skull bones and two mandibles have chop marks by the alveoli of the canines showing that the fangs have been extracted, probably to be used as tooth pendants or ritual objects. Only bones from the nose part of the skull (*premaxilla*, *maxilla*, *os palatinum*) have been identified and none of the robust bones of the neurocranium. An explanation to this pattern could be that after the extraction of the canines, the bear skulls were removed from the area beneath the birch tree. Interestingly, also no scapula of bear has been found. In the Saami bear graves the skull, mandible and scapula are usually the only bones that are not marrow fractured and damaged. Further, the canines are also in many cases missing in the bear burials (Zachrisson & Iregren 1974:50ff). Maybe the bear skulls and scapulae have been used as ceremonial trophies.

Gnawing marks from carnivores occur on a few bones and show that the bones to a small extent have been exposed to scavengers (Table 2). The low frequency of bones with gnawing marks could be interpreted as an indication of some kind of prevention, such as an enclosure to make the bones less accessible to scavengers.

Weathering on the animal bones indicates that the bones had been exposed for a time before they became covered with soil. Bones embedded in the soil are also affected by weathering, but in this case many bones have one more exposed side with longitudinal cracks, which is typical of bones exposed to weathering while lying on the ground. The higher degree of weathering on bones from pig in comparison with bear can most likely be explained by the fact that the pig bones come from juvenile animals with a more porous bone surface, which is more sensitive to weathering (Table 2). Since weathering is dependent on different factors like exposure to sunlight, moisture and temperature, as well as the morphology of the bones, it is difficult to

determine how long a time the bones had been exposed. It usually takes a few years before any traces of weathering appear, and bones do not start to fall apart from weathering before at least a decade of exposure (Lyman

236 Current Swedish Archaeology, Vol 18, 2010

Fig. 4. Chop and cut marks on bones of brown bear from dismembering. Left: chop mark on *corpus mandibulae*. Middle: chop marks on ventral axis. Right: cut mark by *processus articu- laris* on mandibula.

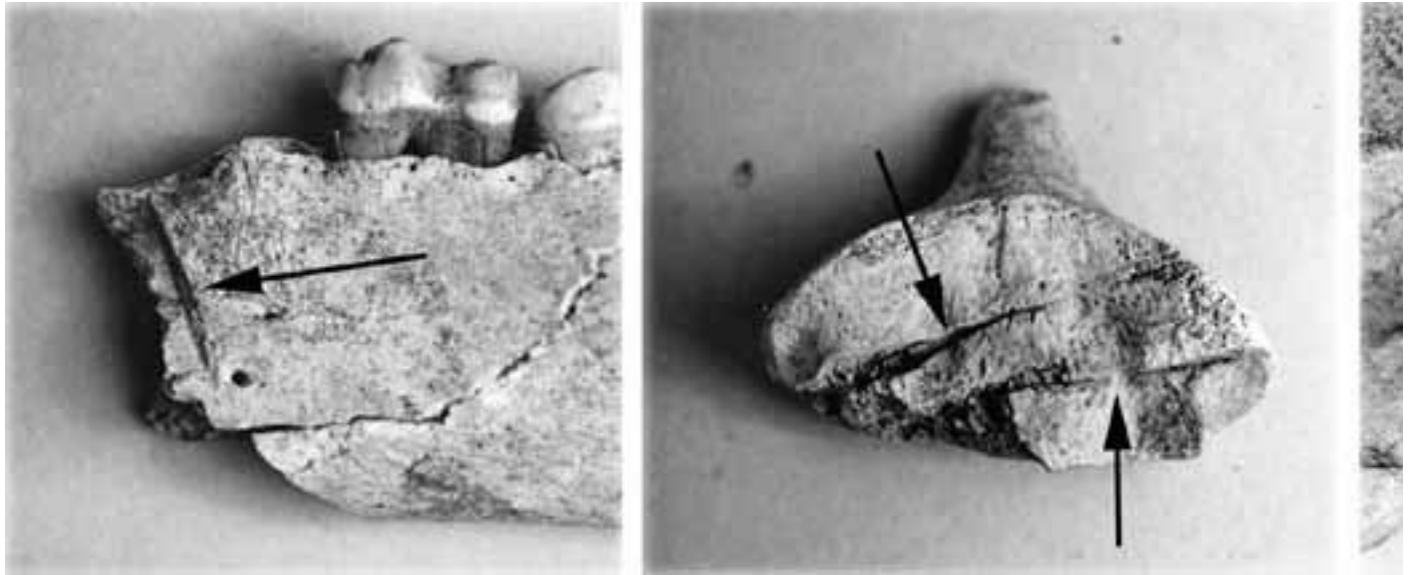
1994:365). This means that the bones most likely had been lying be- neath the birch tree for several years before being covered by humus from decomposing leaves and organic refuse.

The construction of a church over the layers with bones most likely protected the remains and resulted in the preservation of the tree and bones. If this had not happened the tree would not be preserved at all and the bones would be more fragmented and less well preserved, mak- ing the material more difficult to interpret.

Human sacrifice?

The radiocarbon dating shows that the human bones are more or less contemporaneous with the animal bones (Fig. 2). The 29 human bones originate from at least two adults, one child aged about 3–5 years, and one infant aged 0–6 months. The adults are represented by four ribs and 13 bones from the hands and feet, while only nine bones from the trunk of the child have been found (thoracic vertebrates, ribs, pelvis and scapula). The infant is represented by parts of the skull (*os occipi- tale*), scapula and tibia (Table 1, Fig. 5).

On the human remains there are no traces of burning, cut marks or gnawing marks to indicate how the corpses had been treated and whether the individuals had been killed or mutilated. The human bones show distinctly less weathering in comparison with the animal bones, indicating different treatment of the human bones (Table 2). Most likely the human bones had been deposited in the ground relatively quickly. Further, the human bones were found in a limited area in the north-eastern part of the choir, an area with only a few animal bones. These animal bones are also less weathered and have a different yellow- white colour. They have been interpreted as later than the other animal



Current Swedish Archaeology, Vol 18, 2010 237

Ola Magnell & Elisabeth Iregren

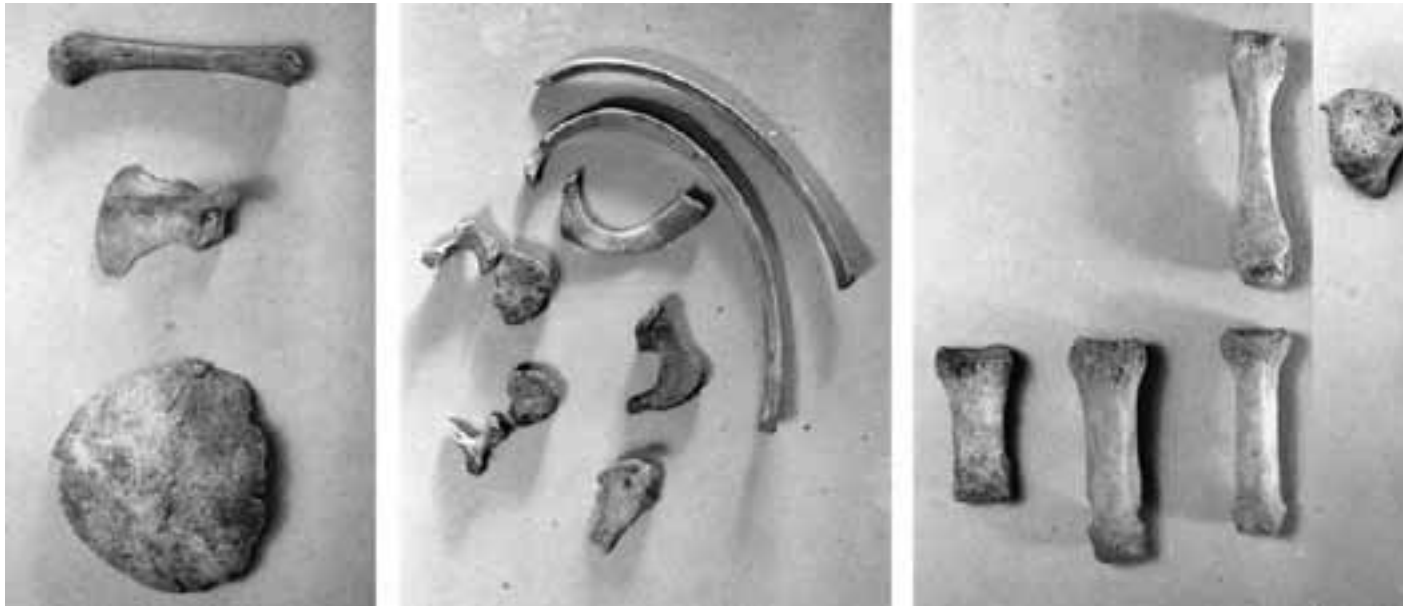


Fig. 5. Human remains in the choir of Frösö Church. Left: infant. Middle: child 3–5 years. Right: adults.

bones, perhaps from the time of the construction of the stone church. It cannot be excluded that the human bones originate from sacrificed humans, but there is nothing to indicate this apart from their occurrence in the same layer as the animal bones. The low degree of weathering makes it unlikely that the remains represent bones falling from decomposing bodies hung in the tree;

rather, the bones had been deposited in the ground. The exceptionally well-preserved bones of the infant and

child also indicate that the human remains had been deposited. An alternative interpretation is that the bones represent graves, perhaps from the time just after the sacrifices ended. Later, possibly during the construction of the church, the graves were found and exhumed so that the individuals could be buried elsewhere. Phalanges, carpal and tarsal bones are often missing among human remains, even in archaeological excavations. Bones of infants and children may have been mistaken for animal bones, which often happens when people are not

trained in human anatomy. To summarize, the human bones could be the remains of human

sacrifice, but it cannot be excluded that the bones originate from graves disturbed during the construction of the church.

The seasons of sacrifice

In the earlier study, the seasonality of the find was found to be from October to December (Iregren 1989:121). The new analysis, aided by the development of ageing methodology in recent years, indicates a more complicated picture. Seasonal analysis is in most cases also a matter of interpretation. It is possible from figure 6 to argue that animals were killed throughout the entire year, but the grouping of the seasonal indicators rather suggests that the slaughter was restricted to

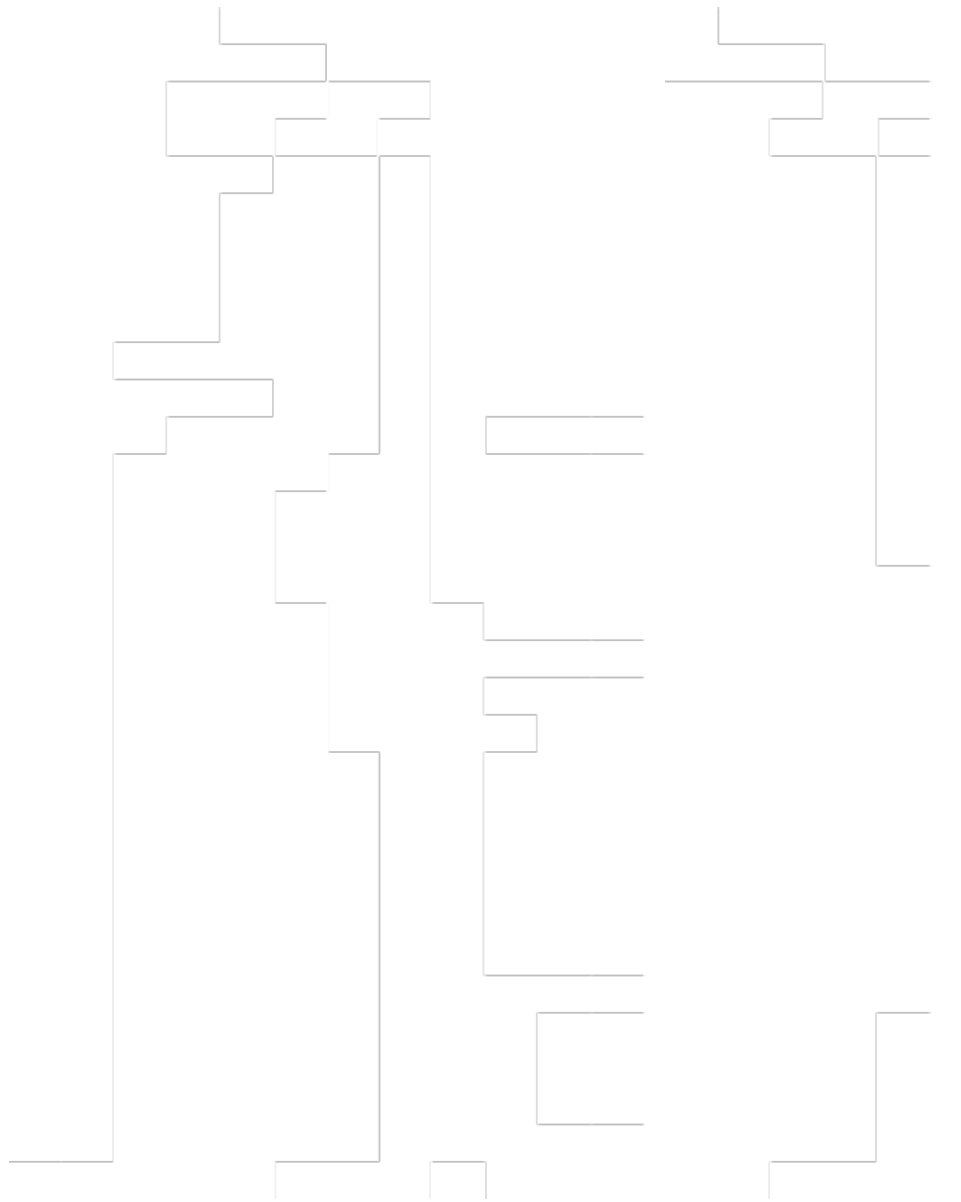




Oct

Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep





Pig 7–9 monthsPig 7–9 monthsPig 7–9 monthsPig 7–9 monthsPig 7–11 months Sheep (6–9 months)
Sheep (6–9 months) Sheep (6–9 months) Sheep (6–9 months) Elk (4–5 months)Elk (4–8 months) Bear
(18–24 months) Pig (1 month)

Cattle (0–1 months) Goat (0–1 months) Sheep (11–13 months) Elk (10–12 months) Horse (0–6 months)
Pig (1–3 months)

Pig (1–4 months) Pig (2–3 months) Pig (2–3 months) Pig (2–3 months) Pig (2–3 months) Pig (2–3
months) Pig (2–3 months) Pig (2–6 months) Pig (3–4 months) Pig (3–4 months) Pig (3–4 months) Pig (3–
6 months) Pig (4–6 months)

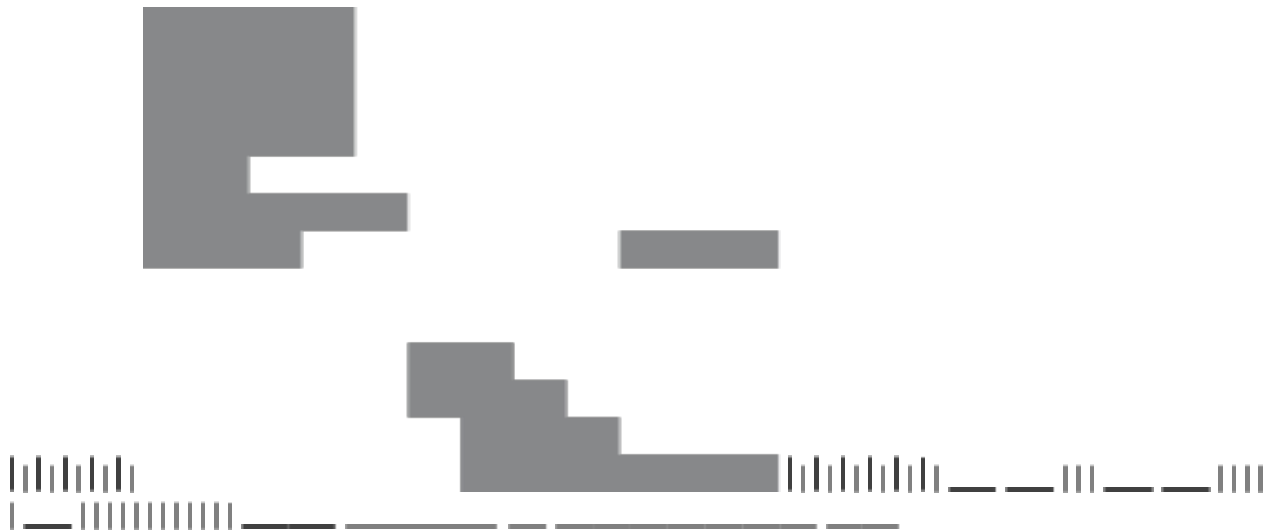


Fig. 6. Seasonality of killing of animals deposited in Frösö Church. Black rectangles indicate the three shortest possible periods of killing. Dark grey shows certain seasonal indicators of animals with limited breeding periods, while light grey shows less certain indicators of animals with unrestricted breeding, but most plausibly with births in spring.

Current Swedish Archaeology, Vol 18, 2010 239

Ola Magnell & Elisabeth Iregren

shorter periods. In seasonal analysis of settlements, the usual procedure is to determine the shortest possible season that the data indicate. The occurrence of juvenile pigs and sheep indicates slaughtering in the autumn and early winter, while elk have been killed in autumn and bear in summer/autumn (Fig. 6). The clustering of the seasonal indicators suggests that the slaughter of the different species overlapped during a limited period. The shortest possible period would be October or November. Further, newborn cattle, pig and goat together with indicators of juvenile horse and sheep indicate that killing was done

in spring, around April (Fig. 6). Several of the piglets were killed at the age of about three months,

which with a presumed birth in early spring would indicate sacrifices during summer, in June or July around the summer solstice (Fig. 6). However, killing in summer is only indicated by pigs, which as mentioned earlier is an uncertain seasonal indicator. If one assumes that pigs during the Viking Age had two litters each year, the first most likely took place in early spring and the next in late summer. If the piglets aged about three months were from the second litter in late summer, the animals would have been killed around

November, which is in accordance with the other seasonal indicators of a sacrifice at the beginning of the winter nights.

As a conclusion of the seasonal analysis, it can be said that animals were killed during at least two periods but possibly even three – in autumn, in spring, and possibly around midsummer.

DISCUSSION

There are reasons to assume that the place of the *blót* at Frösö was not randomly chosen and that the area of Frösö Church was a sacred site in a mythical landscape. Finds of a deposition of burned bones of mainly juvenile sheep or goat in a pit about 100 m north of Frösö Church indicate that the place may have been used for ritual activities at least since the 7th century (Hemmendorff 2010). The occurrence of fire-cracked stones in the layer beneath the animal bones and the radiocarbon dating of charcoal to the 7th–9th centuries show early activities at the site.

The radiocarbon dating of the bones suggests that the longest possible period of deposition of animal bones was between c. AD 900 and 1050. However, an analysis of the radiocarbon results indicates that the *blót* probably took place in a relatively short period of 50 years between c. AD 980 and 1030. The end of the sacrifices around this pe-

240 Current Swedish Archaeology, Vol 18, 2010

riod is in good accordance with other evidence of the Christianization of Jämtland. The end of depositions of bones at the site corresponds with the last pre-Christian graves in the area from 1020–1030 and with the erection of the rune stone at Frösö in 1060–90 on which it can be read that Jämtland was Christianized by Östman, the son of Gudfast (Gräslund 1996:22; Welinder 2003:513). The church was most likely built during the second half of the 12th century (Holm 2006:132). This indicates that at least a century passed between the end of the depositions of animal bones and the construction of the stone church.

It is not possible to tell whether the *blót* took place every year or every ninth year in an eight-year cycle as in the description of the *blót* in Lejre and Gamla Uppsala (Nordberg 2006:82ff). That the sacrifices only took place at specific

times such as during years of crop failure or unusually successful hunting seasons or good harvests is also possible, but most likely the bones originate from recurrent rituals.

If animals were sacrificed three times a year in a period of fifty years, should not the amount of bones from the site have been more extensive? Not necessarily. First, only a limited area has been excavated and the taphonomic loss of bones must have been great. The recovered bones most likely represent only a small sample of all animals sacrificed and deposited at the site.

According to the written sources a *blót* and sacrifice of animals took place in autumn around the 20th of October (chronology according to Gregorian calendar) at the beginning of “the winter nights”. This was one of the four periods into which the year was divided according to the pre-Christian calendar, and it possibly also marked the beginning of a new year. The *blót* in “the winter nights” is the pre-Christian ceremonial feast that is best known from the written sources. This *blót* was also called *disablót* and was dedicated to *diser*, female fertility deities. There are also sources that tell of *blót* dedicated to Freyr in “the winter nights” (Nordberg 2006:77).

The seasonal indicators of autumn are piglets, lambs and elk, and these animals possibly were killed at the *disablót* at the beginning of the winter nights. The *blót* was probably a celebration of a past prosperous year or alternatively a way to ensure that the coming year would be good, and was dedicated to Freyr and other fertility deities. The fact that the feast coincided with what was considered, at least since the Middle Ages, as the month of slaughter is probably not a coincidence but instead a fusion of cult and farming practice.

Current Swedish Archaeology, Vol 18, 2010 241

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

The deposition of bones of elk and possibly also bear killed in late autumn could be the result of rituals using the remains of the first-killed animals of the hunting season, in order to ensure good hunting. Whether the hunting during the Viking Age was controlled by rules and traditions is not certain,

but it is likely. In the later medieval provincial laws, such as *Dalalagen*, it is mentioned that the hunting season starts with the winter nights and ends with the summer nights (Nordberg 2006:39). According to the Old Norse calendar the summer nights start at the end of April, and interestingly a seasonal indicator of elk points toward killing in late spring/early summer. Possibly this deposition is the result of offerings at the end of the hunting season.

The seasonal analysis indicates no evidence of killing of animals in January and around midwinter night, which according to the Old Norse calendar occurred one month after the winter solstice. The mid- winter *blót* is the pre-Christian sacrifice that is most well known among the general public, and the Uppsala *blót* has earlier been described as being held at midwinter, but this is most likely incorrect. It rather took place at the vernal equinox at the end of March (Nordberg 2006:156).

The seasonal indicators of animals killed in spring, from March to April, possibly represent a *disablót* like the famous sacrifices in Uppsala, performed in order to ensure good crops and good reproduction in livestock. The newborn animals in spring were possibly specifically selected animals, such as the first-born animals of the season, sacrificed in order to ensure that the coming season would be good.

Pigs killed in summer indicate sacrifices around the summer solstice. A *blót* at midsummer is described in the written sources, but less frequently and less specifically than the sacrifices in the winter nights or the *disablót* in early spring (Nordberg 2006).

A large variety of both typical farm animals and wild game seem to have been involved in the rituals, but pig and brown bear clearly have had special importance. Pigs may have been specifically selected on account of the fertility symbolism as well as the association between pigs and fertility deities like Freyr, as mentioned in the written sources (Näsström 2001:161).

There is no evidence to show how the animals were killed. It is reasonable to assume that domestic animals were slaughtered near the birch tree, while wild animals most likely were killed at a distance from the site. Frösö is too small an area to have a local population of brown bear, and bones of this species must have been transported to the site

from hunting grounds around Lake Storsjön. Elk, on the other hand, may originate from animals hunted on the island as well as in areas farther away from Frösö. The high frequency of mandibles of bear and especially elk might be explained by the circumstance that often only parts of the animals were transported to the site for deposition (Table 1). But since domestic animals are also foremost represented by mandibles and a few postcranial bones, the selection of jawbones must depend on other factors as well. The mandible with its characteristic morphology may have served as a suitable symbol for the sacrificed animal. Depositions of mandibles are a well-known phenomenon from the Mesolithic, Neolithic and Iron Age in Scandinavia (Ekman 1974:214f; Noe-Nygaard & Richter 1988; Rudebeck 2010:158; Magnell in press).

The *blót* was not only a religious and sacred act, but also an important social event. Butchering marks show that the carcasses of the animals have been utilized and consumed in a feast. The intense utilization of the carcasses indicates that large groups of people participated in the feast and all should have their share of the sacred meals.

The cult leaders and custodians of the *blót* were probably closely connected to the local elite on Frösö, and the *blót* served as an occasion to invite allies and to host a ceremonial feast for the public. To offer meat of bear and piglet to the guests could be a way for the cult leaders of the *blót* to show generosity. Due to ecological factors, pig breeding was less extensive in the northern parts of Scandinavia than in the southern parts and pork was probably a coveted delicacy.

The bones of wild game and especially bear together with the birch tree have been interpreted as a Saami influence or a creolization, a fusion of Old Norse and Saami ritual practices (Näsström 1996:77; Wexlinder 2008: 90ff). Bear was considered sacred by the Saami, and rituals such as bear burials are examples of this (Zachrisson & Iregren 1974). In Saami cosmology the world tree that connected the different worlds was also a birch tree (Hultcrantz 1996).

It is clear that the bear has been treated differently from the other animals as there are body parts from all body regions, while other species are almost

only represented by mandibles. However, the treatment of the bear bones from Frösö differs in many ways from the Saami bear burials, since the bones were mixed with other species and also were not arranged in a pile with the skull and scapula in anatomic positions.

Further, the mandibles are marrow fractured (Iregren 1989:130). Large parts of the skulls and the scapulae are missing from the Frösö find,

Current Swedish Archaeology, Vol 18, 2010 243

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

which could be the result of some kind of special treatment of these body parts, which are important in the Saami bear rituals.

Bear may also have had a prominent position due to the fact that bear skin most likely was an important status commodity for the elite in Jämtland in the trade and contact with other regions where the supply of bear skins was limited. Cut marks and missing distal phalanges show that the bear skins were taken care of and not deposited by the tree.

Further, ritual consumption of bear meat in order to acquire the power of the animal is also a possibility in regard to the Viking Age warrior culture. In Saxo Grammaticus' chronicle *Gesta Danorum*, stories about heroes killing bears occur and also a custom of drinking bear blood in order to transmit the power of the animal (Nordenram 2001). The consumption of blood and other body parts of the felled prey can be considered to be an almost universal behavior among hunters in various cultures (Magnell 2006:83).

The birch tree has probably played an important role in the rituals. Mandibles were used in the rituals and probably represented the sacrificed animals and were deposited on the ground by the tree as the gods' share. It is only possible to speculate whether blood and cooked food were used in the rituals. The tree probably functioned as a mediator or threshold between the world of humans and the divine worlds. The occurrence of bones of animals from the mythology of the world tree *Yggdrasil*, like deer and squirrel, could have been used in ritual staging of the mythology in a symbolic transformation of the tree into the world tree (Iregren 1989:130).

Human remains are more or less contemporaneous with the sacrificed animals, but they are still not clear evidence of human sacrifices. The taphonomic analysis indicates different treatment of the human remains in relation to the animal bones. After the *blót* had ceased at the site it is possible that the area was used for burials in a transition phase between its use as a pre-Christian cult place and the erection of the church. The human bones could represent missed remains of exhumed graves found during the construction of the stone church.

CONCLUSION The find from Frösö Church is a unique source for the understanding of the Old Norse *blót*, not only because of the preservation of osteological material and tree remains. The find is also special in the sense that

244 Current Swedish Archaeology, Vol 18, 2010

it reflects specific environmental conditions and rituals in Viking Age Jämtland that cannot be directly transferred to other regions in Scandinavia. It is important to consider that the Old Norse ritual practices most likely varied among places and regions due to local conditions and traditions, but also over time.

The bones from Frösö Church both verify and refute written sources about the *blót*. The seasonal analysis seems to confirm different aspects of the annual festival cycle with *blót* at the start of the winter nights in the autumn and a *disablót* in spring.

According to the written sources horse had a prominent role as a sacrificial animal, but horses did not seem to be important in the *blót* on Frösö. Further, the analysis also shows no evidence of carcasses hung in the tree as in the description of the *blót* in Gamla Uppsala. This does not mean that horse in other rituals, at other places, was not important and that sacrificed animals were not hung in trees in Gamla Uppsala, but rather it shows that one should be careful about using the written sources as a model of how *blót* was performed. *Blót* was probably a highly diversified and complex event.

The animal bones from Frösö Church give us unique knowledge of how the Old Norse *blót* was practiced and also exemplify how useful osteological remains can be in studies of ritual practice. This study also emphasizes the

importance of detailed taphonomic analysis in order to understand and interpret ritual depositions of bones.

Ola Magnell, University of Lund, Department of Archaeology and Ancient History, Box 117, 221 00 LUND

Elisabeth Iregren, University of Lund, Department of Archaeology and Ancient History, Box 117, 221 00 LUND

Current Swedish Archaeology, Vol 18, 2010 245

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

246

Current Swedish Archaeology, Vol 18, 2010

ACKNOWLEDGEMENTS

We would like to thank Ove Hemmendorff, Jamtli, for practical issues and discussions, and Olof Holm for comments on the manuscript. Financial support from Landsprosten Erik Anderssons minnesfond and the Swedish Research Council have made the study possible.

REFERENCES

Adam av Bremen. *Historien om Hamburgstiftet och dess biskopar*. Translation to Swedish by Svenberg, E. 1984. Stockholm: Samfundet Pro fide et christianismo.

Ambrosiani, B., Iregren, E. & Lahtiperä, P. 1984. *Gravfält i fångstmarken. Undersökningar av gravfälten på Smalnäset och Krankmårtenhögen, Härjedalen*. Stockholm: Riksantikvarieämbetet och Statens Historiska Museer.

Andersson, K. 1998. Sakralt eller profant – ett tolkningsförslag till det osteologiska materialet från Tibble, Litslena sn. In: Andersson, K. (Ed.). *Suionum Hinc Civitates. Nya undersökningar kring norra Mälardalens äldre järnålder*. Pp. 239–262. Uppsala: Department of Archaeology and Ancient History, Uppsala University.

Andrén, A. 2004. I skuggan av yggdrasil. Trädet mellan idé och realitet i nordisk tradition. In: Andrén, A., Jennbert, K. & Raudvere, C. (Eds). *Ordning mot kaos. Studier av nordisk förkristen kosmologi*. Pp. 389–430. Lund: Nordic Academic Press.

Behrensmeyer, A.K. 1978. Taphonomic and ecological information from bone weathering. *Paleobiology*. Vol. 146. Pp. 473–578.

Berg, J. 1986. Kohållning i bondemiljö. Ur några tidiga mjölkningsjournaler. In: Biörnstad, A. (Ed). *Husdjuren och vi*. Fataburen 1986. Pp. 111–118. Stockholm: Nordiska museet.

Blumenschine, R. J., Marean, C. W. & Capaldo, D. C. 1996. Blind Tests of Interanal- yst Correspondence Accuracy in the Identification of Cut Marks, Percussion Marks and Carnivore Tooth Marks on Bone Surfaces. *Journal of Archaeologi- cal Science*. Vol. 23. Pp. 493–507.

Boessneck, J., Muller, H-H. & Teichert, M. 1964. Osteologische Unterscheidungs- merkmale zwischen Schaf (*Ovis aries* Linné) und Ziege (*Capra hircus* Linné). *Kühn-Archiv*. Vol. 78. Pp. 1–129.

Brink, S. 1990. Cult sites in Northern Sweden. In: Ahlbäck, T. (Ed.). *Old Norse and Finnish Religions and Cultic Place-Names*. Pp. 458–489. Åbo: The Donner In- stitute for Research in Religious and Cultural History.

Brink, S. 2004. Mytologiska rum och eskatologiska föreställningar i det vikingatida Norden. In: Andrén, A., Jennbert, K. & Raudvere, C. (Eds). *Ordning mot kaos. Studier av nordisk förkristen kosmologi*. Pp. 291–316. Lund: Nordic Academic Press.

Bronk Ramsey, C. 2005. OxCal Program v.3.1. Oxford: Oxford Radiocarbon Ac- celerator Unit.

Brown, W. A. B., Christofferson, P. V., Massler, M. & Weiss, M. B. 1960. Postna- tal tooth development in cattle. *American Journal of Veterinary Research*. Vol 21. Pp. 7–34.

Carlie, A. 2004. *Forntida byggnadskult. Traditioner och regionalitet i södra Skan- dinavien*. Stockholm: Riksantikvarieämbetet.

Carter, R. & Magnell, O. 2007. Age estimation of wild boar (*Sus scrofa*) based on molariform mandibular tooth development and its application to seasonality at the Mesolithic site of Ringkloster. In: Albarella, U., Dobney, K., Ervynck, A. & Rowley-Conwy, P. (Eds). *Pigs and Humans. 10,000 Years of Interaction*. Pp. 197–217. Oxford: Oxford University Press.

Clunies Ross, M. 1996. *Hedniska ekon. Myt och samhälle i fornnordisk litteratur*. Gråbo: Anthropos.

Clunies Ross, M. 2002. Närvaron och frånvaron av ritual i norröna medeltida tex- ter. In: Jennbert, K., Andrén, A. & Raudvere, C. (Eds). *Plats och praxis –stud- ier av nordisk förkristen ritual*. Vägar till Midgård 2. Pp. 13–30. Lund: Nordic Academic Press.

Dahlander, G. 1916. *Handbok i smådjursskötsel. D. 2, Getskötsel*. Stockholm: Nor- stedts.

Ekman, J. 1973. *Early Mediaeval Lund – the fauna and the landscape*. Archaeologica Lundensia V. Lund: Kulturen.

Ekman, J. 1974. Djurbensmaterialet från stenålderslokalen Ire, Hangvar sn, Got- land. In: Janzon, G. O. *Gotlands mellanneolitiska gravar*. Pp. 212–246. Stock- holm: Stockholm University.

Ekman, H., Hermansson, N., Pettersson J O., Rulcker, J., Stéen, M. & Stålfeldt, F. 1992. *Älgen. Djuret, skötseln och jakten*. Spånga: Svenska jägareförbundet.

Ekman, J. & Iregren, E. 1984. *Archaeo-zoological Investigations in Northern Swe- den. Early Norrland 8*. Stockholm: Kungl. vitterhets historie och antikvitets akademien.

Fabech, C. 1991. Booty sacrifices in southern Scandinavia: A reassessment. In: Gar- wood, P., Jennings, D., Skeates, R. & Toms, J. (Eds). *Sacred and Profane. Pro- ceedings of a Conference on Archaeology, Ritual and Religion*. Pp. 88–99. Ox- ford: Oxbow Books.

Fägerborg, E. 1986. Husdjurens Bellman. Om getter och getskötsel. In: Biörnstad, A. (Ed). *Husdjuren och vi*. Fataburen 1986. Pp. 123–132. Stockholm: Nordiska museet.

Gräslund, A.-S. 1996. Kristna inslag i Jämtlands vikingatid. In: Brink, S. (Ed). *Jämtlands kristnande*. Pp. 21–44. Uppsala: Lunne böcker.

Hemmendorff, O. 2010. Långsiktigt hållbara lokaliseringar. Platser för kult och makt på Frösön. *Arkeologi i Norr*. Vol. 12.

Hildebrandt, M. 1989. Frösö kyrka på hednisk grund. In: Hemmendorff, O. (Ed). *Arkeologi i fjäll, skog och bygd 2. Järnålder – medeltid*. Pp. 153–166. Östersund: Jämtlands läns museum.

Holm, O. 2006. The dating of Västerhus cemetery. A contribution to the study of Christianization of Jämtland. *Current Swedish Archaeology*. Vol. 14. Pp. 109–142.

Holmgren, Å. 1985. Analys av benmaterialet från fornlämning 45 Ås sn, Jämtland. Appendix C. In: Olausson, M. (Ed.). *Kyrklägdan i Ås. Arkeologisk undersökning av en boplats från folkvandringstid till medeltid*. Appendix C. Östersund: Jämtlands läns museum.

Hultgård, A. 1997. Från ögonvittnesskildring till retorik. Adam av Bremens notiser om Uppsalakulten i religionshistorisk belysning. In: Hultgård, A. (Ed.). *Uppsala och Adam av Bremen*. Pp. 9–50. Nora: Nya Doxa.

Hultcrantz, Å. 1996. A new look at the world pillar in Arctic and sub-Arctic religions. In: Pentikäinen, J. y. (Ed). *Shamanism and Northern Ecology*. Pp. 31–49. Berlin: Mouton de Gruyter.

Insulander, N. 1956. *Svensk fårskötsel*. Stockholm: LTs förlag.

Current Swedish Archaeology, Vol 18, 2010 247

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

248

Current Swedish Archaeology, Vol 18, 2010

Iregren, E. 1989. Under Frösö kyrka – ben från en vikingatida offerlund. In: Larsson, L. & Wyszomirska, B. (Eds). *Arkeologi och religion*. Pp. 119–133. Lund: Arkeologiska institutionen, Lunds universitet.

Iregren, E. 1997. Why animal bones in human graves. An attempt to interpret animals present in Iron Age cremations in Sweden. In: Smits, E., Iregren, E. & Drusini, A. D. (Eds). *Cremation Studies in Archaeology*. Pp. 9–32. Padova: Logos Edizioni.

Iregren, E., Alexandersen, V. & Redin, L. 2009. *Västerhus. Kapell, kyrkogård och befolkning*. Stockholm: Kungl. Vitterhets Historie och Antikvitets Akademien.

Jakobsson, M. 1997. Burial layout, society and sacred geography. A Viking Age example from Jämtland. *Current Swedish Archaeology*. Vol. 5. Pp. 79–98.

Janson, H. 1998. *Templum nobilissimum. Adam av Bremen, Uppsalatemplet och konfliktlinjerna i Europa kring år 1075*. Göteborg: Historiska institutionen, Göteborgs universitet.

Jennbert, K. 2002. Djuren i nordisk förkristen ritual och myt. In: Jennbert, K., Andrén, A. &

Raudvere, C. (Eds). *Plats och praxis – studier av nordisk förkristen ritual*. Vägar till Midgård 2. Pp. 105–133. Lund: Nordic Academic Press.

Jones, G. G. 2006. Tooth eruption and wear observed in live sheep from Butser Hill, the Cotswold Farm Park and Five Farms in the Pentland Hills, UK. In: Ruscillo, D. (Ed). *Recent Advances in Ageing and Sexing Animal Bones. Proceedings of the 9th ICAZ Conference, Durham 2002*. Pp. 188–202. Oxford: Oxbow Books.

Lauwerier, R. C. G. M. 1983. Pigs, piglets and determining the season of slaughter- ing. *Journal of Archaeological Science*. Vol. 10. Pp. 483–488.

Larsson, J. 2009. *Fäbodväsendet 1550–1920. Ett centralt element i Nordsveriges jordbrukssystem*. Östersund: Jamtli förlag.

Lemel, J. 1999. *Populationstillväxt, dynamik och spridning hos vildsvinet, Sus scrofa, i mellersta Sverige. Slutrapport*. Uppsala: Forskningsavdelningen, Svenska jä- gareförbundet.

Lindeblad, K. & Nielsen, A-L. 1997. *Kungens gods i Borg. Om utgrävningarna vid Borgs säteri: arkeologisk slutundersökning, Borgs säteri 6702, RAÄ 276, Borgs socken, Norrköpings kommun, Östergötland*. Lindköping: Riksantik- varieämbetet.

Lyman, R. L. 1994. *Vertebrate Taphonomy*. Cambridge: Cambridge University Press. Magnell, O. 2004. Djurben från vikingatida lager nordväst om Frösö kyrka. Un-
published osteological report.

Magnell, O. 2006. Tracking wild boar and hunters. Osteology of wild boar in Mes- olithic South Scandinavia. Lund: Department of Archaeology and Ancient His- tory, Lund University.

Magnell, O. Submitted. “Age assessment of moose based on mandibular molariform tooth development. *Alces*.

Magnell, O. In press. Sacred Cows or Old Beasts? A taphonomic approach to study- ing ritual killing with an example from Iron Age Uppåkra, Sweden. Pluskowski, A. (Ed.). *Animal Ritual Killing: European Perspectives*. Oxford: Oxbow Books.

Nathorst, H. 1877. *Nötboskapsskötsel, efter dess nuvarande ståndpunkt*. Stock- holm: F & G Beijers förlag.

Nilsson, L. 2003. Blóta, Sóa, Senda. Analys av djurben. In: Söderberg, B. (Ed.). *Jär- restad. Huvudgård i centralbygd*. Pp. 287–308. Stockholm: Riksantikvarieäm- betet.

Nilsson, L. 2009. Häst och hund i fruktbarhetskult och blot. Carlie, A. (Ed.). *Järnålderns rituella platser*. Pp. 81–99. Halmstad: Kulturmiljö Halland.

Noe-Nygaard, N. & Richter, J. 1990. Seventeen wild boar mandibles from Slude- gårds Sömosse – Offal or sacrifice? In: Robinson, D. E. (Ed.). *Experimentation and Reconstruction in Environmental*

Archaeology. Symposia of the Association for Environmental Archaeology No. 9. Pp. 175–187. Oxford: Oxbow Books.

Nordberg, A. 2006. *Jul, disting och förkyrklig tideräkning. Kalendrar och kalen- driska riter i det förkristna Norden.* Uppsala: Kungl. Gustav Adolfs Akademien för svensk folkkultur.

Nordenram, Å. 2001. *Svenska jaktens historia från forntid till nutid.* Örkelljunga: Bokförlaget Settern.

Näsström, B-M. 1996. Offerlunden under Frösö kyrka. In: Brink, S. (Ed). *Jämtlands kristnande.* Projekten Sveriges kristnande. Pp. 65–85. Uppsala: Lunne böcker.

Näsström, B-M. 2001. *Blot. Tro och offer i det förkristna Norden.* Stockholm: Norstedts.

Näsström, B-M. 2006. *Fornskandinavisk religion.* Lund: Studentlitteratur. Olsen, S. L. & Shipman, P. 1988. Surface Modification on Bone; Trampling Versus

Butchery. *Journal of Archaeological Science.* Vol. 15. Pp. 535–553.

Palm, R. 2004. *Vikingarnas språk 750–1100.* Stockholm: Norstedts.

Paulsson-Holmberg, T. 1997. Iron Age building offerings. A contribution to the analysis of a die-hard phenomenon in Swedish preindustrial agrarian society. *Fornvännen.* Vol. 92. Pp. 163–175.

Payne, S. 1985. Morphological distinctions between the mandibular teeth of young sheep, *Ovis*, and goat, *Capra*. *Journal of Archaeological Science.* Vol. 12. Pp. 139–147.

Richter, J. 1982. Adult and juvenile aurochs, *Bos primigenius* Boj. From the Magle- mosian site of Ulkestrup Lyng Øst, Denmark. *Journal of Archaeological Sci- ence.* Vol. 9. Pp. 247–259.

Rossdale, P. 1996. *Hästavel. Dräktighet, fölning, unga föl.* Halmstad: Bokförlaget Spektra AB.

Rudebeck, E. 2010. I trästodernas skugga. Monumentala möten i neolitiseringsens tid. In: Nilsson, B. & Rudebeck, E. (Eds). *Arkeologiska och förhistoriska världar. Fält, erfarenheter och stenåldersplatser i sydvästra Skåne.* Pp. 83–251. Malmö: Malmö Museer.

Sandegren, F. & Swenson, J. 1997. *Björnen. Viltet, ekologin och människan.* Spånga: Svenska jägareförbundet.

Sjödin, E. 1980. *Får.* Stockholm: LTs förlag. Sundqvist, O. 2007. *Kultledare i fornskandinavisk religion.* Uppsala: Department

of Archaeology and Ancient History, Uppsala University.

Thilderqvist, J. 2005. Analys av det osteologiska materialet från den arkeologiska undersökningen vid Västerhus på Frösön 2005. In: Oskarsson, B. *Arkeologisk undersökning RAÄ 33 mfl, Västerhus kapell, Frösö sn, Östersunds kn, Jämt- lands län.* Pp 1–23. Östersund: Jämtlands läns museum.

Vikstrand, P. 1993. Förkristna sakrala ortnamn i Jämtland. *Namn och bygd.* Vol. 81. Pp. 49–84.

Vikstrand, P. 2001. *Gudarnas platser. Förkristna sakrala ortnamn i Mälardalen.* Uppsala: Institutionen för nordiska språk, Uppsala universitet.

Wallin, P. & Martinsson-Wallin, H. 1990. Osteologisk analys av brända och obrända ben från Frösö

kyrkogård, Frösö sn. Östersunds kn. i Jämtland. In: Pagoldh, M. *Rapport över arkeologisk undersökning inom Prästbordet 1:1, Frösö socken, Östersunds kommun, Jämtlands län. Arkeologiska undersökningar utförda av Jämtlands läns museum* 436. Östersund: Jämtlands läns museum.

Current Swedish Archaeology, Vol 18, 2010 249

Veitstu hvé blóta skal?

Ola Magnell & Elisabeth Iregren

250

Current Swedish Archaeology, Vol 18, 2010

Welinder, S. 2003. Christianity, Politics and Ethnicity in Early Medieval Jämtland, MidSweden. In: Carver, M. (Ed.). *The Cross Goes North. Process of Conversion in Northern Europe AD 300–1300*. Pp. 509–530. York: York Medieval Press.

Welinder, S. 2008. *Jämtarna och samerna kom först*. Östersund: Jamtli.

Wigh, B. 2001. *Animal Husbandry in the Viking Age Town of Birka and its Hinterland*. Stockholm: Department of Archaeology and Ancient History, Stockholm University.

Zachrisson, I. & Iregren, E. 1974. *Lappish bear graves in Northern Sweden*. Early Norrland 5. Stockholm: Kungl. vitterhets historie och antikvitets akademien.

Zeder, M.A. & Pilaar, S.E. 2010. Assessing the reliability of criteria used to identify mandibles and mandibular teeth in sheep, *Ovis*, and goats, *Capra*. *Journal of Archaeological Science*. Vol. 37. Pp. 225–242.