Landscapes at Landnám: Palynological and Palaeoentomological Evidence from Toftanes, Faroe Islands

Landsløg í landnámstíð: flogsáðfrøðilig og grókornfrøðilig prógv av Toftanesi

Kevin J. Edwards[1], Paul C. Buckland[1], Robert Craigie[1], Eva Panagiotakopulu[2] and Steffen Stummann Hansen[3]

1: Department of Archaeology and Prehistory, Sheffield University, Northgate House, West Street, Sheffield S1 4ET, England
Phone: +44 114 222 2901, fax: +44 114 272 2563, e-mail: k.j.edwards@sheffield.ac.uk

2: School of Geography, University of Birmingham, UK

3: Institute of Archaeology and Ethnology, University of Copenhagen, Denmark

Úrtak

Toftanes er ein bóndagarður úr víkingatíð í bygdini Leirvík í Eysturoy. Útgrevstrar í 1980-árunum vístu fýra bygningar, fleiri túsund fundir og kolevni 14-dagfestingar, sum møguliga rukku aftur í níggjundu øld e.Kr. Hetta er fyrsti garður úr landnáminum í víkingatíð, sum er útgrivin í síni heild í Føroyum. Flogsáð og skordýr í lívrunnum leivdum í gólvløgum vórðu greinað í eini roynd at endurskipa, hvussu jørðin hevur verið nýtt í sambandi við garðin og landslagið sum heild.

Tafonomi av setløgunum og steinrenningarnar í teimum hava tvørleikar við sær, tá ið úrslitini skulu tulkast. Tað er tó greitt, at eitt opið landslag yvirhøvur varð nýtt til beiti, men flogsáð av korni er eisini at síggja. Skordýrafaunan er gátuför, við tað at hon vísir sera veik antropogenisk tekn, tó at hon sýnir eyðsýnd tekn um antropokor gróðrarøki. Í framtíðini fara fornvistfrøðiligar rannsóknir at fevna um nógv fleiri royndir og greiningar av fræ.

Abstract

Toftanes is a Viking age farmstead in the coastal village of Leirvík, Eysturoy. Excavations in the 1980s revealed four buildings, thousands of finds and radiocarbon dates which extend back to perhaps the 9th century AD. This is the first complex farmstead of the Viking Age landnám settlement to have been completely excavated in the Faroe Islands. Organic remains from floor layers were subjected to pollen and insect analyses in an effort to reconstruct land use associated with the farm and the wider landscape.

The taphonomy of the deposits and their contained fossils presents difficulties for the interpretation of results. It is clear, however, that a mainly open landscape was associated with a largely pastoral economy, but cereal-type pollen is also present. The insect faunas are enigmatic in showing a very muted anthropogenic signature, yet one which displays obvious signs of anthropochorous habitats. Future palaeoecological research will include the investigation of many more samples and the analyses of seeds.

Fróðskaparrit 46. bók 1998: 229-244

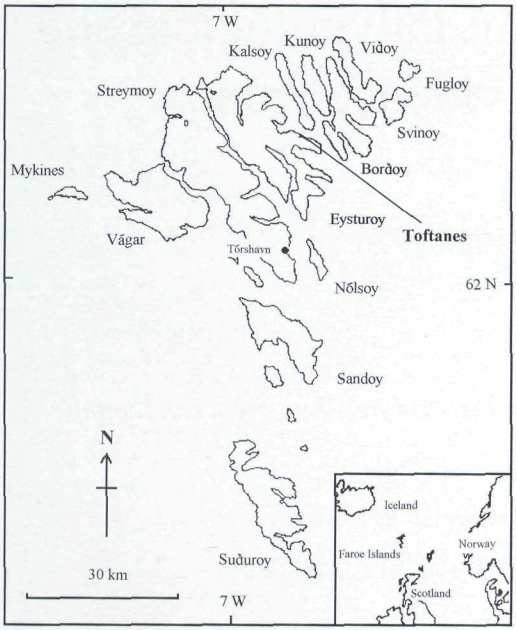

Fig. 1. The location of Toftanes
Mynd 1. Støðukort.

Introduction

The farm site at Toftanes was excavated by Steffen Stummann Hansen between 1982 and 1987 and represented the first time that a comprehensive excavation of a Viking age farmstead and its outbuildings had taken place in the Faroe Islands. The character of the site and its archaeology are outlined, and the greater part of the paper is then given over to a presentation and discussion of preliminary palaeoecological (pollen and insects) findings from the site.

Toftanes: site and excavation

Topography

Toftanes is a Viking-age site in the modern village of Leirvík on the east coast of the island of Eysturoy (Fig. 1). The excavation covered four contemporary buildings of a farmstead which was located on the south side of a small stream, Matará, which descends from the slopes of Ritufjall (640 m). The location conforms with the 'primary Norse farmstead' model for Shetland and Norway (Small, 1969; Stummann Hansen, 1996), with (1) its access to the sea, (2) fairly flat well-drained land suitable for the construction of a farmstead and the potential for some grain cultivation (infield), and (3) extensive grazing areas (outfield). In any approach through Leirvíkfjørður, this shallow embayment, backed by a great amphitheatre of potential grazing and other resources, would have probably been the most attractive location to Norse settlers.

Excavation

Work at the site became paramount in 1982 with the announcement of a programme of road building. Toftanes was one of three ancient settlements (*byling-farms:* the others are Við Garð and Uttan Á; Arge, 1997) in the village. An area of some 900 m^2 was excavated under the aegis of Føroya Fornminnissavn (The Faroese National Museum) under the direction of Steffen Stummann Hansen. Work took place annually between 1982 and 1987, and represented a total of two years excavation.

The buildings

Salient features of the four buildings at Toftanes (Fig. 2) may be summarized as follows (Stummann Hansen, 1988; 1989; 1991):

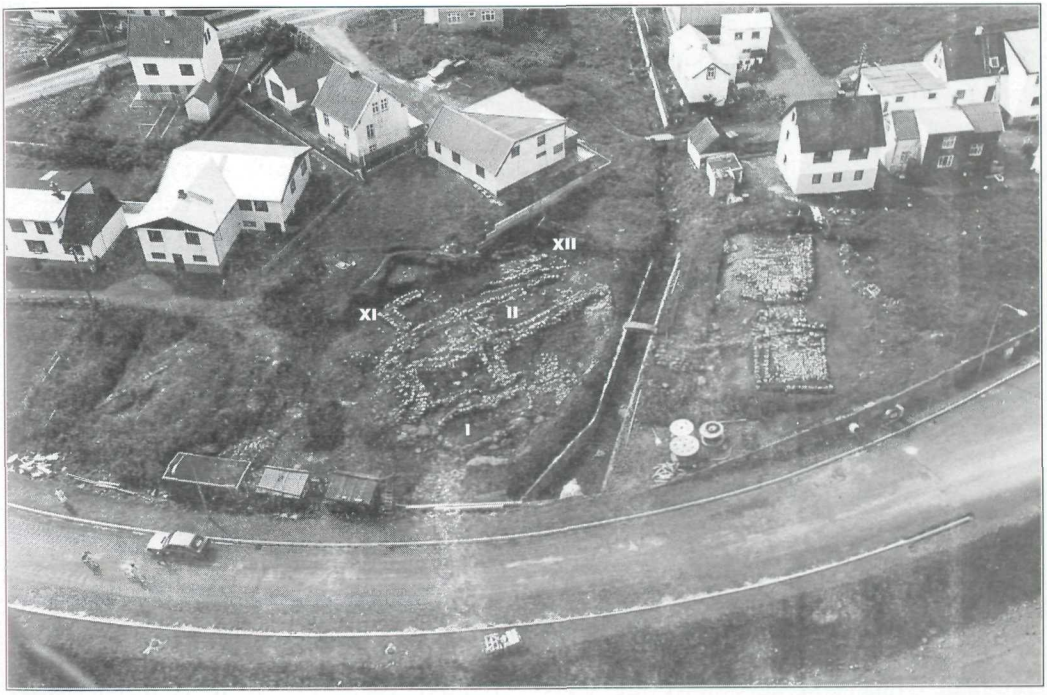

Fig. 2. Aerial photograph of the site during excavation, showing the four buildings.
Mynd 2. Loftmynd av økinum undir útgrevstrinum, sum vísir teir fýra bygningarnar.

Building I. 13x4 m internal dimensions. 5 m above the present shoreline. This building differs from the others in having single thickness stone-built walls and no apparent turf construction; wind could blow easily through the construction. The entrance was on the south and the northwestern part of the building had been eroded by the stream in earlier times. The building is interpreted as an outhouse, but this is uncertain.

House II. Approximately 20x5 m internal dimensions. It has curved walls, 1m in diameter, stone-built inner and outer walls with courses of turf which made it more windproof. There were five pairs of roof posts, and a central firetrench nearly 5 m long. The entrance was on the north and the west end of the building had been eroded by the stream. The eastern end appears to have contained a byre. There were many drains, some stone-built, under the floor layers. The building is interpreted as a dwelling house.

House XI. This is a small building, 12 m^2 in area. The west side was probably a wooden wall. Function unknown, but perhaps an additional outhouse.

House XII. A small building of dimensions 5x3 m. The west and east sides may have

been wooden. The floor was paved with flat stones covered with thick layers of ashes and charcoal. There was a small stone-built ember-pit at the east end. The building is interpreted as a fire-house (= kitchen).

A paved staircase joins buildings I and II. Building II appears also to be linked to XI and XII by an entrance to the south. The four buildings are all part of same farmstead. I and II were built first and XI and XII added later.

Finds

Thousands of finds were retrieved, especially from the floor layers of the buildings. There were more than 700 objects of steatite (soapstone), a material unknown in Faroe, but it was quarried in Norway and Shetland. Objects included bowl fragments and saucepans of west Norwegian types, spindle whorls, line and net-sinkers of Norse type. Local (Faroese) stone (tuff and basalt) was used for spindle whorls, loom weights and line or net sinkers. There were hones and querns of schist, a rock type unknown in Faroe. An arm ring/bracelet of jet probably came from England or Scotland.

Few metal objects were unearthed, but included a bronze brooch of Scandinavian type, two ringed pins (also known from Ireland, Isle of Man, mainland Scotland, Hebrides, Orkney, Iceland, Newfoundland) and from one other Faroese location (Tjørnuvík).

Wooden objects were preserved in huge numbers. Many were waste material from building construction but several artefacts were also found, e.g. a door plank with a carved wooden handle, spindle whorls, a box, counting sticks, model boats, bowls, spoons, a gaming board, and barrel staves. Preliminary identification of wooden objects shows *Quercus* (oak), *Picea abies* (spruce), *Pinus sylvestris* (Scots pine), *Corylus avellana* (hazel), *Larix* (larch), *Sambucus* (elder), *Betula* (birch) and *Alnus* (alder). Much of this wood, where not driftwood, would have been imported or reused. Driftwood unsuitable for boats or roof supports could also be used for fuel.

There was a total of more than 100 m of cords (in lengths up to 2 m) made of twined juniper (*Juniperus communis*) branches, including a rope tied to a roofing stone (Stummann Hansen, 1989; Larsen, 1990).

The acid soil conditions at Toftanes would not have been conducive to the survival of bone, and there is no surviving bone artefact industry, a contrast with assemblages from Orkney and Shetland. Burnt bones include those of sheep (dominant) and a few bones of cow and pig. The absence of skeletal material extended to fish remains. This may be as much a recovery problem as preservational, in that material would need to be sieved. It is not possible to say whether fishing played a major role in the economy of Viking-age Toftanes, although, as noted above, line or net sinkers were present at the site.

Dating

On the basis of the finds, the settlement has been dated to the Viking (= Early Norse) period and this is corroborated for house I by three radiocarbon dates which provide a calibrated date spread of AD 870-1020 (1

Lab. code	Date (un-cal. AD)	Date (cal AD; 1 σ)	Date (cal AD; 2 σ)
K-4441	865±65	890 (980) 1020	810 (980) 1040
K-4442	835±65	880 (900) 1010	780 (900) 1030)
K-4443	800±50	870 (890) 970	780 (890) 1010

Table 1. *Radiocarbon dates from House 1, Toftanes. The calibrations for these dates are expressed as one standard deviation ranges and the central date is shown in parentheses (Stuiver and Pearson, 1993; calculated using the program Calib v.3.0.3 [Stuiver and Reimer, 1993]; all dates rounded to the nearest 10 years).*

Talva 1. Kolevni 14-dagfestingar úr húsi 1 á Toftanesi. Kalibreringarnar fyri hesum dagfestingunum eru vístar sum eitt standard fráviksøki, og middagsfestingin er víst í klombrum (Stuiver og Pearson, 1993; útroknað við forritinum Calib v. 3.0.3 [Stuiver og Reimer, 1993]; allar dagfestingar rundaðar til tey næstu 10 árini).

sigma) and AD 780-1040 (2 sigma) (Table 1). The unweighted central mean date for all three samples is AD 920. The shape and construction of the buildings fits very well with the pattern of Norse building styles in the North Atlantic and the topographical situation not only fits Small's model, but is identical to that of the Viking-age sites of Niðri á Toft at Kvívík (Dahl, 1951) and nearby Við Gjógvará in Fuglafjørður (Dahl, 1958; 1970).

The Faroese Norse landnám is assumed on literary grounds (*Færeyinga saga [The Saga of the Faroe Islanders] ca* AD 1200 [Halldórsson, 1987]) to date to *ca* AD 800 (Debes, 1990). The radiocarbon dates from Toftanes are the earliest known for any buildings in the Faroe Islands.

The Viking-age North Atlantic seems to be largely aceramic (cf. Crawford, 1979), with local pottery appearing in the Later Norse period and the earlier phase, as at Toftanes, typified by imported steatite objects.

The name Toftanes could be interpreted as a primary one, thus indicating that deserted buildings ('toftir') were at the ness at the time of the Norse arrival (Irish hermits or early Norse raiders/settlers). It is as likely, however, to be a secondary name, suggesting that the farmstead became deserted after the Viking period, but before the 16th century, when the name appears in written sources. This conjecture is supported by the absence of excavated Late Norse objects and the survival intact of other objects (wooden bowls, metalwork, line sinkers, querns) which were simply abandoned.

The late Jóhannes Jóhansen (1971; 1979, 1987) argued on palynological grounds that the human occupation of Faroe stemmed from pre-Norse times. If this were accepted, then Toftanes would not equate to a landnám farmstead, or not as far as Faroe was concerned. There is no archaeological support for this (Arge 1997), and this is not the place to enter the debate, but readers are referred to Debes (1990), Hansom and Briggs (1990), Buckland (1992), and Buckland *et al.* (this volume).

Sampling for palaeoecology, laboratory methods and the presentation of results

Samples for pollen analysis were taken by Jóhannes Jóhansen in 1985. Ten samples came from the deposits in the area between buildings I and II (Figs 2 and 3; Table 2). The strata here are very complex and consist of a mixture of organic and minerogenic material. The organic material is assumed to possibly represent domestic and

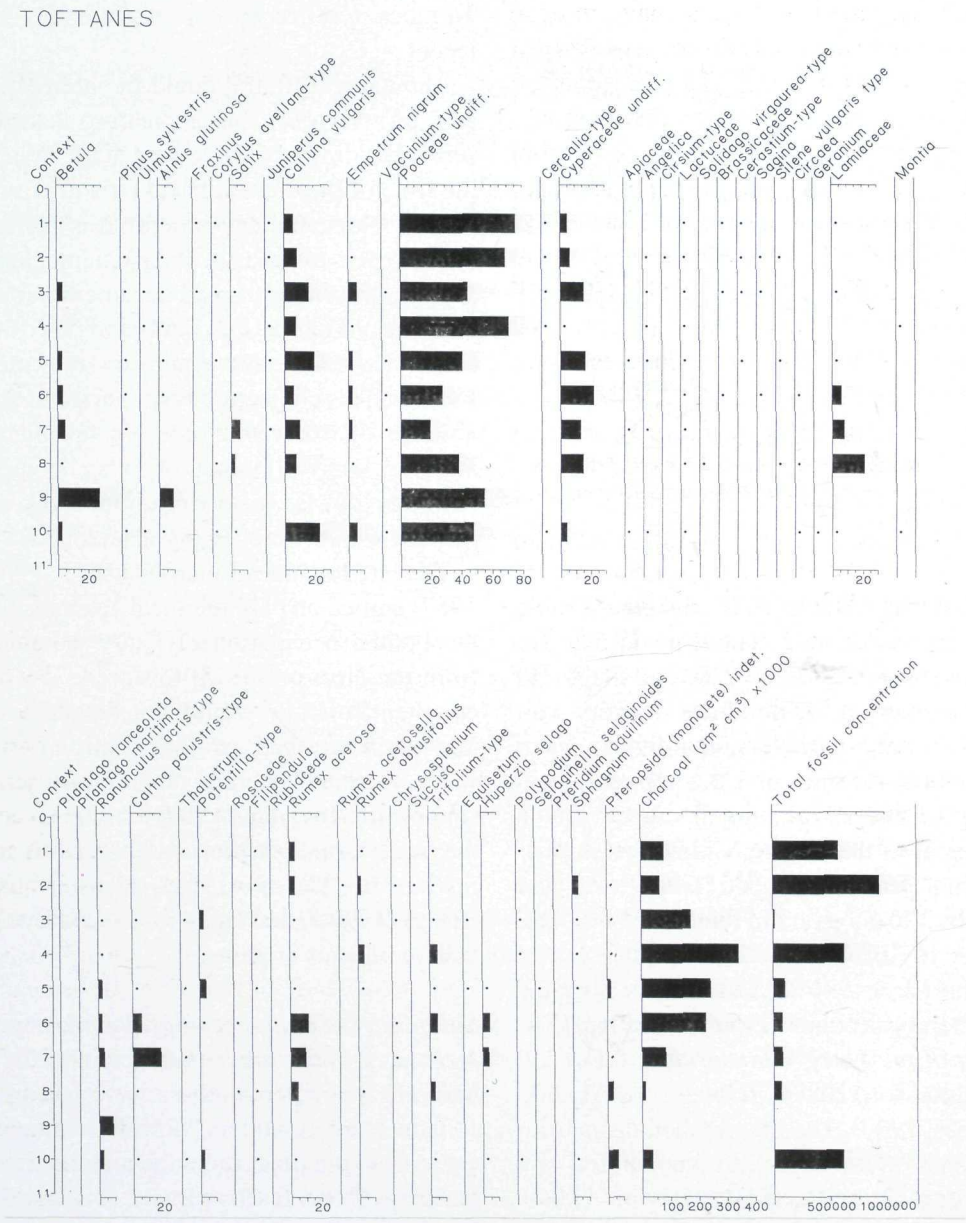

Fig. 3. Pollen diagram (% TLP) for the sample contexts between houses I and II. • = <2% TLP
Mynd 3. Strikumynd (% TLP) av samanhangi millum flogsáððroyndir í húsi I og II. • = < 2 % TLP.

byre refuse; the minerogenic may comprise stream-borne deposits laid down in times of flood. Two further samples correspond to samples S1563 and S1622 which were taken for entomological study and come from outside of house II, and the supposed floor layer of the byre at the end of house II respectively (Table 3). Pollen samples were prepared using standard NaOH, HCl, HF and acetolysis procedures (Faegri and Iversen, 1989) and concentrates were mounted in silicone oil of 12,500 cSt viscosity. Pollen data expressed as percentages of total land pollen (TLP) are presented in Figures 3 and 4. Pollen nomenclature follows Bennett (1994) and plant nomenclature is based on *Flora Europaea* as exemplified by Stace (1997) and informed by Hansen (1966) and Jóhansen (1985). Microscopic charcoal was measured by the point count method of Clark (1982).

The contexts of samples for palaeoentomological study are summarised in Table 3 together with the archaeological interpretation of the sample layers. Six five litre samples have been analysed so far, and these were processed using the standard technique of disaggregation and paraffin flotation (Coope and Osborne, 1968). The resulting insect remains were identified using modern reference material and the identified taxa are listed in Table 4.

Pollen sample	Context	Description
1	BC	Light green gravel layer with many cobbles.
2	BB	Compact yellowish-brown homogenous peat layer containing wood and wood chips.
3	AZ	Green-brown gravel layer with cobbles.
4	BA	Homogenous, moist humus containing plant remains, yellowish-brown.
5	DØ	Dark greenish-grey compact gravel layer containing cobbles.
6	FY	Gritty gravel layer, brownish-yellow in colour.
7	FX	Sandy moss layer containing some wood, dark greyish in colour.
8	GH	Compact grey gravel
9	GE	Moss layer containing wood, teeth and burnt bone, dark brown
10	GG	Moist moss/peat layer, dark brown in colour.

Table 2. *Contexts for pollen samples from between building I and house II.*
Talva 2. Sambandið millum flogsáð-royndir millum hús I og hús II.

Pollen analysis

The first thing that needs to be said about the pollen data from Toftanes is that they cannot be interpreted like a normal pollen profile from a peat or lake profile. The deposits from the site are assumed to represent a mixture of materials from the habitation site, the infield and the outfield. By the same token, the pollen will derive from these potentially spatially and chronologically varied samples. It cannot be assumed that the pollen component from normal aerial deposition, contemporaneous with the settlement and coming from on- and immediately off-site vegetational sources, will predominate. Combine this with pollen carried on feet and hoofs, and it will be apparent that archaeopalynology is fraught with taphonomic difficulties (Dimbleby, 1985). Short of radiocarbon-dating every sample (which itself would be a suspect activity given the possible mixed materials from within each context), then a strong note of caution must qualify any interpretations of the pollen. The taphonomic problems of the insect fossils are somewhat different (Buckland *et al.* 1991), with faunas living

Taxon	S 1345	S 1376	S 1563	S 1581	S 1621	S 1622
Trichoptera_indet.						
Coleoptera						
Carabidae						
Nebria rufescens (Strom.)		1				
Notiophilus biguttatus (F.)	1	1			1	
Trechus obtusus Er.	4	3	4	1	3	1
Patrobus septentrionis (Dej.)	1		2			
Pterostichus diligens (Strm.)			1			
P. adstrictus Esch.					2	2
Dytiscidae						
Hydroporus palustris (L.)			2			
H. pubescens (Gyll.)			15			
Hydroporus sp.	1			2		
Hydrophilidae						
Helophorus flavipes (F.)			9	4	1	
Cercyon littoralis (Gyll.)	1					
C. haemorrhoidalis (F.)				2		
C. analis (Payk.)					1	
Megasternum boletophagum (Marsh.)	4	5	7	6	2	
Anacaena globulus (Payk.)	1	2	4	2	1	
Ptiliidae						
Ptenidium punctatum (Gyll.)			4			
Staphylinidae						
Omalium laeviusculum Gyll.			1			
O. rivulare (Payk.)		6	7	1		1
Omalium sp.	4				1	
Xylodromus concinnus (Marsh.)	1		2			
Olophrum fuscum (Grav.)	1	1	3		1	
Lesteva heeri Fauv.			1			
L. longoelytrata Goez.	1	3	3	5	2	
Stenus spp.	2	1	8	2	4	3
Lathrobium brunnipes (F.)	1	1	1		3	
Othius punctulatus (Goez.)	1	1	1			1
O. angustus Steph.	18	15	13		5	3
Philonthus cephalotes (Grav.)	1			1		
P. fimentarius (Grav.)		1				
Philonthus sp.	1		1			
Quedius mesomelinus (Marsh.)	1		1			
Q. curtipennis Bernh.		1				
Q. umbrinus Er.	1		2		1	
Q. boops (Grav.) group				6	1	
Quedius sp.	2		1		1	
Tachinus signatus Grav.				2		
Atheta (s.l.) sp.			13			
Aleocharinae gen. indet.	1		1	2	1	2
Elateridae						
Hypnoidus riparius (F.)				2	1	
Byrrhidae						
Simplocaria semistriata (F.)	1	3	2		1	1
Cryptophagidae						
Cryptophagus cf *dentatus*	1	1	2			
Scarabaeidae						
Aphodius lapponum Gyll.					1	
Curculionidae						
Apion haematodes Kirby	1		1		1	
Otiorhynchus arcticus (F.)		2		1		
O. nodosus (Müll.)			1		1	
Tropiphorus obtusus (Bons.)						1
Notaris aethiops (F.)		1	1		2	
Micrelus ericae (Gyll.)			1			

Table 4. *Insect remains from Toftanes House II.* **Talva 4.** Skordýraleivdir úr húsi II á Toftanesi.

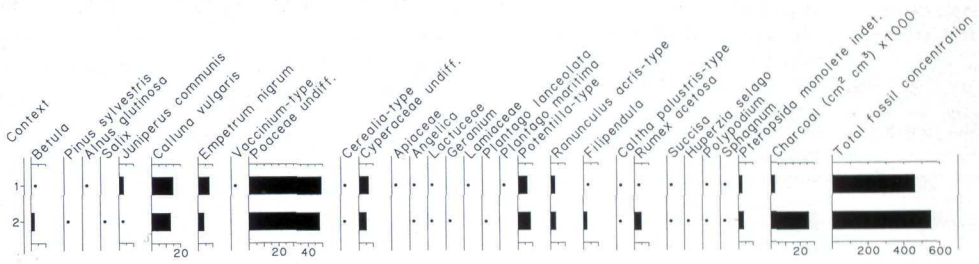

Fig. 4. Pollen diagram (% total land pollen) for beetle sample contexts S1563 (=1) and S1622 (=2). • = <2% TLP
Mynd 4. Flogsáðstrikumynd (% av øllum landflogsáð) av samanhangi millum klukkuroyndirnar S1563 (= 1) og S1622 (= 2). • = < 2 % TLP.

within and and around the buildings being mixed with taxa imported in peat to the site.

A vital procedure is to attempt to discern 'order' within the fossil record. In the case of both the pollen and the insects this is arguably present. Figure 3 shows that the pollen spectra from the inter-building samples are dominated by Poaceae (grass family), *Calluna vulgaris* (heather) and Cyperaceae (sedge family). These are characteristically dominant taxa of peatlands. The presence of Lamiaceae (cf. *Thymus polytrichus,* wild thyme), *Potentilla*-type (tormentil), *Trifolium*-type (clover), *Rumex acetosa* (common sorrel), *Ranunculus acris*-type (cf. meadow buttercup), *Plantago lanceolata* (ribwort plantain), *Cerastium*-type (chickweed/stitchwort) and, of course, Poaceae and Cyperaceae, is to be expected in both dry and damp grasslands. Wetter areas are reflected by the pollen of *Caltha palustris* (marsh marigold), Cyperaceae and the spores of *Equisetum* (horsetail) and *Sphagnum* (bog moss).

Agricultural activity, and especially grazing, may be denoted by many of the grassland taxa. Cultivation is suggested by the pollen of Cerealia-type (where classifiable, this was referable to *Hordeum*-type [cf. barley]). There is no distinctive presence of the pollen of arable weed taxa and it seems likely that arable crops were of minor importance.

There is little in the way of wood or shrub pollen. *Betula* (birch) and *Salix* (willow) are best represented. The birch would seem to derive from tree (cf. *B. pubescens*) rather than dwarf (*B. nana*) species on the basis of pollen size measurements; tree birch macrofossils have been found in peat at Eiðisvatn (Mahler, 1991; Malmros, 1990, 1994). If locally present, birch was probably located beyond the outfield of Toftanes. The same would apply to any juniper (*Juniperus communis*) which, like willow, does not produce great quantities of pollen. This may mean that any local woodland present at the time of landnám was

Sample	Context	Description
S1345	Layer FK	Outside House II, phase 1. 9th-10th century.
S1376	Layer GK	Outside House II, phase 1. 9th-10th century.
S1563	Layer EP	On old surface outside House II, a peaty layer with wooden items and wood waste, beneath buildings XI and XII, phase 1, 9th-10th century.
S1581	Layer AN	Supposed layer from demolition of House II - material from walls or roof ? Phase I/II, 9th-11th century.
S1621	Layer FV	From byre end of House II, floor or soil from walls, phase 1, 9th-10th century.
S1622	Layer EU	From byre end of House II, supposed floor layer, phase 1, 9th-10th century.

Table 3. *Archaeological contexts of insect samples.*
Talva 3. Fornfrøðilig tíðarfesting av skordýraroyndunum.

quickly removed and surviving arboreal elements (e.g. the *Juniperus* necessary for the production of juniper ropes) must have been protected from grazing animals or must have been otherwise inaccessible to them (e.g. on talus or cliff faces slopes). The other arboreal taxa are probably a wind-blown long distance component. An exception could be *Corylus avellana*-type (hazel); hazel nut shells were found at Toftanes and both hazel nuts and wood were found at the shieling site of Argisbrekka beside Eiðisvatn (Malmros, 1994).

Can the patterning interpreted from the pollen data be taken further? This would represent an additional level of abstraction given the caveats already entered regarding sample taphonomy. What cannot be ignored in Figure 3 is that the pollen spectra are behaving in an apparently structured fashion, with high Poaceae (contexts 9, 10) giving way to expansions in Cyperaceae, Lamiaceae, *Caltha* and *Rumex acetosa* (contexts 6-8), charcoal (contexts 4-7), and a resurgence of Poaceae (contexts 1-5). Speculatively it might be advanced that there was an initial episode, perhaps coeval with early occupation at Toftanes, of grazing and small-scale cereal cultivation. This could have resulted in over-grazing (decreased flowering of grasses) or even some abandonment as other plants (e.g. sedges, thyme, sorrel) invaded formerly grazed areas. A successful effort may then have been made to re-intensify use of the land and more charcoal was produced (either from burning of the land surface to encourage the renewed spread of grass, and/or as a product of more domestic activity); this latest phase might also have seen further barley cultivation.

Nothing has so far been said about the pollen samples corresponding to those taken for insect analyses. The pollen spectra (Fig. 4) are dominated by Poaceae, *Calluna vulgaris,* Cyperaceae and *Potentilla*-type and they contain small amounts of Cerealia-type pollen. They are so similar to the assemblages evident in Figure 4, that there is no obvious justification for interpreting them separately.

The insect faunas

Preliminary analysis of samples associated with building II, the Norse longhouse, has been directed towards elucidating the nature of the landscape in the 9th to 10th centuries and any evidence for use of the building. The house (Fig. 2) is orientated south-east-northwest, with a central fire trench in

the westernmost part, a doorway in the centre of the northerly side, and a putative byre at the downslope (easterly) end (Stummann Hansen, 1991).

Despite recovery from within and around an identified building, adjacent to others, the faunas display surprisingly little evidence of the anthropogenic nature of the context, whilst still including several taxa which are typically anthropochorous on the North Atlantic islands and one, *Aphodius lapponum*, which could not exist on the Faroes without the herbivore dung provided by domestic animals. Although the Faroese synanthropic insect faunas have been little examined (cf. Bengtson, 1981; Dinnin *et al.*, unpubl.), absences in the fossil faunas from Structure II, when considered in relation to the amount of work upon similar faunas across the region, must be taken as significant. Farming on the North Atlantic islands relied heavily upon secondary products from cattle, sheep, and goats to provide the basis of subsistence, and this required the acquisition of sufficient fodder to overwinter successfully at least the core stock (Amorosi *et al.*, 1998). In addition, these animals, particularly the sheep, like the humans, have a characteristic ectoparasite fauna (Sveinbjarnardóttir and Buckland, 1983; Buckland and Perry, 1989; Buckland and Sadler, 1989). Although preservation has some influence upon the survival of the invertebrate remains, the absence of this group, particularly the heavily sclerotized ked, *Melophagus ovinus* (L.), an ectoparasite still found on the hill sheep of the Faroes, suggest that neither sheep nor wool processing (*idem.*) was associated with the building, or that none of the samples effectively encapsulated the use phase of the structure. Archaeologically there can be no doubt that the building reflects the typical form of an early Norse farm, but, given the excellent preservation, the absence of this element in the fossil faunas is curious.

The problem extends beyond the ectoparasites. The initial transport of domestic animals, with hay and perhaps other plant material as dunnage and food in the boats provided a travelling habitat and means of dispersal for a range of insects and other invertebrates across the Atlantic (e.g. Enckell *et al.*, 1987; Sadler, 1991). These faunas included not only soil dwelling animals and a dung fauna, but also a wide range of species associated with the fungi associated with the decay of hay and the resultant foul residues, both Coleoptera and Diptera, as well as their predators. These species are as much the 'Norsemen's footsteps' as the range of accidental plant introductions. Kenward and Hall (1997) note that hay is also likely to include some elements in the field fauna accidently incorporated in storage. The material may also have a wide range of other incidental uses other than as fodder, and employment as animal litter can lead to partial sterilisation of the fauna because of the amount of urine and dung incorporated (cf. Smith, 1991). Even at the most remote farms in the Western Settlement of Greenland, however, at sites like the recently excavated GUS, above the level of direct marine access, insect faunas are characterized by elements of the hay fauna, such as *Enicmus minutus*

(L.) (grp.), and their associated staphylinid predators (Buckland *et al.,* 1998), which appear at the base of the succession and continue until the Greenland sites are abandoned in the fourteenth century (Buckland *et al.,* 1996). In southern Iceland, at Holt in Eyjafjallasveit, the tephra stratigraphy constrains the date of settlement, and a similar more extensive hay fauna is present shortly after landnám (Buckland *et al.,* 1991). Toftanes is similarly a landnám period farm, yet only part of the fauna is evident in the assemblages examined, which include samples from floors and immediately outside the building, associated with construction debris. The predatory anthropochorous synanthropic staphylinids, *Omalium rivulare, Xylodromus concinnus, Philonthus cephalotes, P. fimentarius* and *Quedius mesomelinus*, are present, but only *Cryptophagus* cf. *dentatus* hints at a fungal feeding component.

Taxa associated with the continuum from foul, wet plant residues to herbivore dung are well represented in the faunas, and include two species not currently recorded in the Faroes. The small ptiliid *Ptenidium punctatum* may have been overlooked, particularly in view of the limited amount of research which has been carried out on synanthropic faunas in the islands. It is recorded from deep wrack beds, as well as wet stable manure of horse and cattle (Koch, 1989). The hydrophilid *Cercyon analis* is recorded from a wide range of decaying organic matter, and is widespread in northern Europe (Hansen 1987), being also recorded from western Iceland (Larsson and Gígja, 1958), where it has been present since at least the early medieval period (Amorosi *et al.,* 1992); it has also been introduced to North America (Smith, 1994). Despite extensive pitfall trapping of infield and outfield localities in Faroe (Bengtson, 1981; Dinnin *et al.,* unpubl.), it does not seem to be part of the modern Faroese fauna. Kenward (1997) has recently applied island biogeographic theory to the establishment and demise of synanthropic insect faunas in the archaeological record, and some extinctions might be expected on purely stochastic grounds, yet the loss of an essentially eurytopic, eurythermal fully winged species may hint at a break in habitat continuity. This might reinforce the suggestion that the landnám farm at Toftanes, despite its wealth of archaeological finds (cf. Stummann Hansen, 1989, 1991), may not have been occupied for very long. In this context, the paucity of synanthropic elements in the two samples from within the building (S1621 and S1622) may be significant

However, despite the careful sampling during the excavation, and notwithstanding the small number of samples analysed thus far, it remains possible that sample selection has been accidentally biased towards units which were sufficiently thick to provide a reasonable sample, or that sample resolution may be insufficient to resolve a short period of occupation. At Engihlíð in Berufjörður, eastern Iceland, Buckland and Sadler (1991) have argued that the absence of a hay fauna and the presence of significant numbers of the dung beetle, *Aphodius lapponum*, could be used to indicate a shieling rather than a farm, although the com-

plexity of shieling use in the more restricted landscape of Faroe (Mahler, 1991) may make this simple model more difficult to apply. Toftanes neither looks like a shieling nor is positioned like one (cf. Mahler, 1993), and its insect fauna does include elements, like *Xylodromus concinnus*, which would be expected as part of the indoor and immediately peripheral house, byre and barn fauna. Its proximity to the shore is indicated by occasional members of the seaweed fauna, *Cercyon littoralis* and *Omalium laeviusculum*, but, unlike Langenes on Langøya in Arctic Norway (Simpson *et al.*, 1998), the archaeology makes it difficult to argue for a fishing station, rather than a farm, although soil acidity at Toftanes means that the only bone preserved is that which has been burnt (Stummann Hansen, 1991). The essentially natural faunas from the site include elements which are likely to have been brought in with peat, rather than structural turves, and this is particularly the case with S1563, with its large number of water beetles. Dinnin (in Dinnin *et al.*, unpubl.) found the dytiscid *Hydroporus pubescens* to be common in peaty pools on high ground in the Faroes, and West (1937) notes it as the most common water beetle. The sample is best interpreted as the remains of peat incorporating some occupation debris. The weevils, including the feeder on grasses *Notaris aethiops*, previously recorded only once on Sandoy (West, 1937), and the heather feeder *Micrelus ericae*, usually found on *Calluna vulgaris* (Bengtson, 1981), may also reflect the incorporation of old material from peat, a problem not restricted to the insects (cf. Simpson *et al.*, 1998).

An absent fauna may indicate an absent habitat. Was the region around Leirvík at landnám sufficiently productive, and protected from the weather, to preclude the need to collect hay, and is the move towards a hay-dependent economy a reflection of habitat destruction (cf. Jóhansen, 1985), and a worsening climate into the late and post-medieval period? A pattern of increased grazing pressure and soil loss has emerged from the tephra-constrained sequences of southern Iceland (Thorarinsson, 1961; Dugmore and Buckland, 1991), but more work is necessary on the Faroese situation.

Conclusions and future palaeoecological research

The excavations at Toftanes have provided the opportunity for a palaeoecological investigation into land-use history at or soon after the generally accepted date of landnám in the Faroes. It is impossible to know if this is the first Viking building at Toftanes, and although an even older building may occupy better-drained land currently beneath more recent houses immediately above the site, there is no evidence for this.

The pollen data, if indicative of land-use contemporaneous with habitation and in its reasonably close vicinity, reveal a largely unwooded landscape in which grazing was the dominant agricultural activity and in which arable cultivation was not of major significance. It is conjectured that a phase of over-grazing or some abandonment took place and that this could have been followed by re-intensification of activity. If

woodland had been present at the time of landnám, it was quickly removed and any surviving arboreal elements, such as birch and juniper, must have been protected from grazing animals or were inaccessible to them.

The insect faunas are enigmatic in showing a muted anthropogenic signature, yet one which displays obvious signs of anthropochorous habitats. This is curious given the obvious existence of a farmstead and any incongruity may be a result of sampling bias. Three new species have been added to the Faroese list.

Future palaeoecological work at Toftanes will involve extensive additions to the number of pollen and insect samples analysed, their statistical analysis, and the identification and interpretation of seed samples. A major priority must be efforts to reduce the taphonomic uncertainties associated with the samples.

Acknowledgements

Thanks are extended to Føroya Fornminnissavn under whose aegis excavation took place, and to Jóhannes Jóhansen who collected the samples for pollen analysis. Processing and identification of insect remains was funded by a grant from NSF (USA) to NABO, the North Atlantic Biocultural Organisation. Robert Buckland assisted with sample processing.

References

Amorosi, T., Buckland, P. C., Edwards, K.J., McGovern, T.H., Sadler, J.P. and Skidmore, P. 1998. They did not live by grass alone: the politics and palaeoecology of fodder on the North Atlantic islands. *Environmental Archaeology,* 1: 41-54.

Amorosi, T., Buckland, P.C., Ólafsson, G., Sadler, J.P., and Skidmore, P. 1992. Site Status and the Palaeoecological Record: A Discussion of the Results from Bessastaðir, Iceland. *In* Morris, C.D. and Rackham, D.J. (eds.) *Norse and Later Settlement and Subsistence in the North Atlantic.* Dept. of Archaeology, University of Glasgow, pp.169-192.

Arge, S.V. 1997. Í Uppistovubeitinum. Site and settlement. *Fróðskaparrit* 45: 27-44.

Bengtson, S.-A. 1981. Terrestrial invertebrates of the Faroe Islands: III. Beetles (Coleoptera): Checklist, distribution, and habitats. *Fauna Norvegica*, B28, 52-82.

Bennett, K.D. 1994. *Annotated catalogue of pollen and pteridophyte spore types of the British Isles.* Department of Plant Sciences, University of Cambridge. (http://www-palecol.plantsci.cam.ac.uk/) 1-37.

Buckland, P.C. 1992. Insects, Man and the earliest settlement of the Faroe Islands: a case not proven. *Fróðskaparrit* 38-39 (1989-90): 107-113.

Buckland, P.C., Amorosi, T., Barlow, L.K., Dugmore, A.J., Mayewski, P.A., McGovern, T.H., Ogilvie, A.E.J., Sadler, J.P. and Skidmore, P. (1996) Bioarchaeological and climatological evidence for the fate of Norse farmers in medieval Greenland. *Antiquity*, 70: 88-96.

Buckland, P.C., Buckland, P.I. and Skidmore, P. 1998. Insect remains from GUS: an interim report. *In* Arneborg, J. and Gulløv, H.C. (eds.) *Man, Culture and Environment in Ancient Greenland.* Danish National Museum and Danish Polar Centre, Copenhagen, pp. 74-79.

Buckland, P.C., Dugmore, A. J., Perry, D.W., Savory, D. and Sveinbjarnardóttir, G. 1991. Holt in Eyjafjallasveit, Iceland. A Paleoecological Study of the Impact of Landnám. *Acta Archaeologica*, 61: 252-271.

Buckland, P.C., Edwards, K.J., Sadler, J.P. and Dinnin, M.H., this volume. Late Holocene insect faunas from Mykines, Faroe Islands, with observations on associated pollen and early settlement records.

Buckland, P.C. and Perry, D.W. 1989. Ectoparasites of Sheep from Stóraborg, Iceland and Rein interpretation. Piss, parasites and people; a palaeoecological perspective. *Likuin,* 15: 37-46.

Buckland, P.C. and Sadler, J. 1989. A biogeography of the human flea, *Pulex irritans* L. (Siphonaptera: Pulicidae). *Journal of Biogeography,* 16: 115-120.

Buckland, P.C. and Sadler, J. 1991. Farm or shieling: an entomological approach. *In* Sveinbjarnardóttir, G. Shielings in Iceland – an archaeological and historical survey. *Acta Archaeologia*, 61: 93-96.

Clark, R.L. 1982. Point count estimation of charcoal in pollen preparations and thin sections of sediments. *Pollen et Spores* 24: 523-535.

Coope, G.R. and Osborne, P.J. 1968. Report on the Coleopterous Fauna of the Roman Well at Barnsley Park, Gloucestershire. *Transactions of the Bristol and Gloucestershire Archaeological Society*, 86: 84-87.

Crawford, B. 1979. A progress report on excavations at 'Da Biggins', Papa Stour, Shetland, 1978. *Northern Studies* 13: 37-41.

Dahl, S. 1951. Fornar toftir í Kvívík. *Varðin* 29: 65-96.

Dahl, S. 1958. Toftarannsóknir í Fuglafirði. *Fróðskaparrit* 7: 118-146.

Dahl, S. 1970. The Norse settlement of the Faroe Islands. *Medieval Archaeology* 14: 60-73.

Debes, H.J. 1990. Problems concerning the earliest settlement in the Faroe Islands. *Fróðskaparrit* 38-39 (1989-90): 23-34.

Dimbleby, G.W. 1985. *The palynology of archaeological sites.* Academic Press, London.

Dinnin, M.H., Sadler, J.P. and Buckland, P.C. (in prep.) Pifalling trapping and the Coleopterous fauna of Faroe.

Dugmore, A.J. and Buckland, P.C. 1991. Tephrochronology and Late Holocene Soil Erosion in South Iceland. *In* Maizels, J.K. and Caseldine, C. (eds.) *Environmental Change in Iceland: Past and Present*, 147-160. Kluwer Academic Press, Dordtrecht.

Enckell, P.H., Bengtson, S.-A. and Wiman, B. 1987. Serf and waif colonization: distribution and dispersal of invertebrate species in the Faroe Island settlement areas. *Journal of Biogeography*, 14: 89-104.

Faegri, K. and Iversen, J. 1989. *Textbook of pollen analysis,* 4th edition by K.Faegri, P.E. Kaland and K. Krzywinski, Wiley, Chichester.

Halldórsson, Ó. (ed.) 1987. *Færeyinga saga*. Reykjavik.

Hansen, K. 1966. Vascular plants in the Faeroes. *Dansk Botanisk Arkiv* 24 (3): 1-140.

Hansen, M. 1987. The Hydrophiloidea (Coleoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica*, 18. Scandinavian Science Press, Leiden.

Hansom, J.D. and Briggs, D.J. 1990. Pre-Landnam *Plantago lanceolata* in North-west Iceland. *Fróðskaparrit* 38-39 (1989-90): 69-75.

Johansen, J. 1971. A palaeobotanical study indicating a Previking settlement in Tjørnuvík, Faroe Islands. *Fróðskaparrit* 19: 147-157.

Jóhansen, J. 1979. Cereal cultivation in Mykines, Faroe Islands AD 600. *Danmarks Geologiske Årbog 1978:* 93-103.

Jóhansen, J. 1985. *Studies in the vegetational history of the Faroe and Shetland Islands*. Tórshavn: Annales Societatis Scientiarum Faeroensis Supplementum XI.

Jóhansen, J. 1987. Jóansøkugras (*Plantago lanceolata*) og forsøgulig búseting í Føroyum. *Fróðskaparrit* 34-35 (1986-87): 68-75.

Kenward, H.K. 1997. Synanthropic decomposer insects and the size, remoteness and longevity of archaeological occupation sites: applying concepts from biogeography to past 'islands' of human occupation. In A.C. Ashworth, P.C. Buckland and J.P. Sadler (eds.) *Studies in Quaternary Entomology – An Inordinate Fondness for Insects. Quaternary Proceedings* 5: 135-152.

Kenward, H.K. and Hall, A.R. 1997. Enhancing bioarchaeological interpretation using indicator groups: stable manure as a paradigm. *Journal of Archaeological Science*, 24: 663-673.

Koch, K. 1989. Ökologie 1. *Die Käfer Mitteleuropas.* Goecke and Evers, Krefeld.

Larsen, A-C. 1990. Norsemen's use of juniper in Viking Age Faroe Islands. *Acta Archaeologica* 61: 54-59.

Larsson, S.G. and Gígja, G. 1958. Coleoptera. *Zoology of Iceland* 43a. Munksgaard, Copenhagen.

Mahler, D.L. D. 1991. Argisbrekka : new evidence of shielings in the Faroe Islands. *Acta Archaeologica*, 61: 54-59.

Mahler, D.L.D. 1993. Shielings and their role in the Viking-Age economy. *In* Batey, C.E., Jesch, J. and Morris, C.D. (eds.) *The Viking Age in Caithness, Orkney and the North Atlantic*. Edinburgh University Press, pp. 487-505.

Malmros, C. 1990. Viking Age wood resources at Argisbrekka, Faroe Islands. *Norwegian Archaeological Review* 23: 86-92.

Malmros, C. 1994. Exploitation of local, drifted and imported wood by the Vikings on the Faroe Islands. *Botanical Journal of Scotland* 46: 552-558.

Sadler, J.P. 1991. Beetles, boats and biogeography: insect invaders of the North Atlantic Islands. *Acta Archaeologica* 61: 199-212.

Simpson, I., Buckland, P.C., Perdakaris, S., Panagiotakopulu, E., Cook, G., Bertelsen, R., Keller, C. and McGovern, T.H. 1998. Radiocarbon dating of archaeological deposits: single entity or bulk sample? A cautionary tale from Vesterålen, Arctic Norway. ms.

Small, A. 1969. The distribution of settlement in Shetland and Faroe in viking times. *Saga-book of the Viking Society* 17: 145-155.

Smith, D.N. 1991. *An investigation of the potential of*

modern analogue faunas to act as comparisons to Palaeoentomological samples from archaeological deposits. Unpubl. Ph.D. thesis, University of Sheffield.

Smith, R. 1994. Effects of alien insects and microorganisms on the biodiversity of British Columbia's insect fauna. *In* Harding, L.E. and McCullum, E. (eds.) *Biodiversity in British Columbia. Our changing environment*, 190-219. Canadian Wildlife Service.

Stace, C. 1997. *New flora of the British Isles*. 2nd edition. Cambridge: Cambridge University Press

Stuiver, M. and Pearson, G.W. 1993. High-precision calibration of the radiocarbon time scale, AD 1950-500 BC and 2500-6000 BC. *Radiocarbon* 35: 1-23.

Stuiver, M. and Reimer, P.J. 1993. Extended ^{14}C data base and revised CALIB 3.0 ^{14}C age calibration program. *Radiocarbon* 35: 215-230.

Stummann Hansen, S. 1989. Toftanes – en færosk landnamsgård fra 9-10. århundrede. *hikuin*, 15: 129-146.

Stummann Hansen, S. 1988. The Norse landnam in the Faroe Islands in the light of recent excavations at Toftanes, Leirvík. *Northern Studies* 25 (1988): 58-84.

Stummann Hansen, S. 1991. Toftanes: a Faroese Viking age farmstead from the 9-10th centuries A.D. *Acta Archaeologica*, 61: 44-53.

Stummann Hansen, S. 1996. Aspects of Viking society in Shetland and the Faroe Islands. In Waugh, D.J. (ed.) *Shetland's northern links: language and history*. Edinburgh: Scottish Society for Northern Studies: 117-135.

Sveinbjarnardóttir, G. and Buckland, P.C. 1983. Nordbolus. *Skalk*, (1982), 4: 16-17.

Thorarinsson, S. 1961. Uppblastur á Íslandi í ljósi öskulagarannsóknar. *Ársrit Skógræktafelags Íslands* (1961): 17-54.

West, A. 1937. Coleoptera. *Zoology of Faroes*, 2(1), 40. Andr. Fred. Høst and son, Copenhagen.