VIKING UNST PROJECT

EXCAVATIONS AT HAMAR AND THE UPPER HOUSE, UNDERHOULL: FIELD SEASON 2008

INTERIM REPORT NO. 3
(DATA STRUCTURE REPORT)

SHETLAND AMENITY TRUST
UNIVERSITY OF BRADFORD

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PART ONE: EXCAVATIONS AT HAMAR &
THE UPPER HOUSE, UNDERHOULL
PART TWO: PERSONNEL & RELATED RESEARCH
PART THREE: APPENDICES

J.M. BOND, Z. OUTRAM & C.M. FREETH
Department of Archaeological Sciences, University of Bradford, BD7 1DP

With contributions by D.J. Bashford, C.E. Batey, C.M. Batt, L.D. Brown, M. Church, J.E. Cussans, S.J. Dockrill, G. Gaunt, J.G. McDonnell, J. McKenzie, A.R.R. Mustchin, J.R. Summers, G.T. Swindles, and V.E. Turner

Illustrations by D.J. Bashford
Photographs by J.M. Bond & S.J. Dockrill

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PART ONE

EXCAVATIONS AT HAMAR & THE UPPER HOUSE, UNDERHOULL

1. INTRODUCTION

J.M. Bond, Z. Outram & C. Batey

The Viking Unst Project began in August 2005 with an integrated survey of key sites in the island of Unst (Bond *et al*. 2006). Using a Penmap survey as well as simple annotated plans, this initial investigation aimed to thoroughly record the sites in terms of surviving earthworks and the surrounding area. The first excavation season was carried out in July 2006 and focused on the site of Hamar under the direction of Dr. Julie Bond, with work on the site of Belmont being carried out under the direction of Stine Larsen of Roskilde Skibsmuseet.

It has been suggested that Unst may have played an important role in the expansion of the Viking/Norse populations, acting as a staging post between Norway, Britain and the lands further west (Ritchie 1996, 71; Graham-Campbell & Batey 1998, 67). Published excavations include those undertaken at Underhoull (Small 1966), Sandwick (Bigelow 1985), Framgord (RCAHMS 1946), and Norwick (Ballin Smith 2007). Small's excavations at Underhoull took place before the routine employment of sieving and sampling on archaeological excavations and so little can be said about the economy of the site or about its chronology. A major aim of the Viking Unst Project is to excavate new sites in Unst employing up-to-date methodology to address these key issues. This research will advance our understanding not only of Unst's past, but of Shetland as a whole.

The sites investigated during the 2008 excavation season were Hamar (SMR site 3471, Nat Grid Ref. HP 6463 0933), and a longhouse located adjacent to the broch at Underhoull (SMR site HP50SE13, Nat grid Ref. HP5734 0435), located in the Westing and referred to here as the Upper House, Underhoull (figure 1.1).

1.1 THE SITE OF HAMAR

The archaeological investigations carried out at Hamar can be divided into two phases: The first phase consisted of a trial excavation and a geophysical and standard archaeological survey (Stummann Hansen 1995b; Bray *et al*. 1997). The second phase included a survey which took advantage of recent developments in GIS (Geographical Information System), and a full open plan excavation directed by Dr Julie Bond.

The First Phase of Investigation

The site of Hamar was first recorded by Stummann Hansen (Stummann Hansen 1995a; *ibid* 1995b; *ibid* 2000). He described it as a single (and possibly single-phase) longhouse almost 24m long, with no associated outhouses or offsets, aligned down slope. In 1994 Stummann Hansen undertook a standard survey of the site (Stummann Hansen 1995b) which identified several features, such as the entrances within the interior of the structure, part of a potential yard wall emerging from the upper end of the structure, and a circular feature interpreted as a hole used to collect the drain fluids from the byre (Stummann Hansen 1995b; Stummann Hansen 2000, 91).

A geophysical survey of the site was also carried out by BUFAU (Birmingham University Field Archaeology Unit) using a Geoscan Research RM15 Resistivity Meter, operated with a twin-probe array and 0.5m mobile probe spacing, and processed using the Geoplot program, version 2 (Geoscan Research). The survey encompassed the site itself, as well as a substantial area around the structure (Bray *et al.* 1997). The results of this survey clearly showed the position of the structure, as well as the entrances mentioned in the reports produced by Stummann Hansen (1995b). However, the potential yard wall identified in the field by Stummann Hansen (2000, Figure 5) was not recorded by the resistivity survey; it was suggested that excavation was needed to determine the nature of this feature (Bray *et al*. 1997, 7).

A trial excavation carried out by Stummann Hansen focused on a small trench, 60cm wide, which cut across the upper part of the structure. The excavations revealed a feature that could be interpreted as a bench setting running parallel to the outer walls. A floor surface was also identified at a depth of approximately 75cm below the level of the topsoil; the features excavated indicated that the structure had a sunken floor. A fragment of steatite was recovered from the floor surface, which "confirmed the dating of the structure to the Scandinavian period" (Stummann Hansen 2000, 90-91).

The Second Phase of Investigation

A second phase of archaeological investigation began with a survey carried out by Bond *et al.* (2006), which aimed to produce a Penmap survey of the site as well as the surrounding area in order to assess its position within the landscape. This demonstrated the unusual location of House 1 within the landscape, being positioned on a platform halfway up the hill and backed by an increasingly steep slope (Bond *et* al. 2006, Figure 1.1). The structure was aligned downslope with no obvious outbuildings or extensions. The trace of the potential yard wall seemed to follow the line of the platform on which the house sits. The back (upper and northern) wall of the structure appeared to be distinctively curved but only excavation would clarify if this was intentional or an effect of tumble from the original walls.

The survey did not highlight any areas of midden accumulation, nor could it identify the circular drain feature recorded by Stummann Hansen (Bond *et al*. 2006, 3). It was noted that the structure was suffering badly from rabbit damage, both internally and externally. It was suggested that excavation was necessary before any more of the valuable information held by the site was lost.

Using the data collected during this survey, a Geographical Information System (GIS) plot was produced by Maher which enhanced the site's visible features (Maher 2006, 13 and figure 2.4).

In 2003 an additional (possibly later) structure was identified by Bond and Turner, higher up the slope. In the 2005 survey the original structure was referred to as 'House 1', and the second structure 'House 2' (Bond *et al.* 2006).

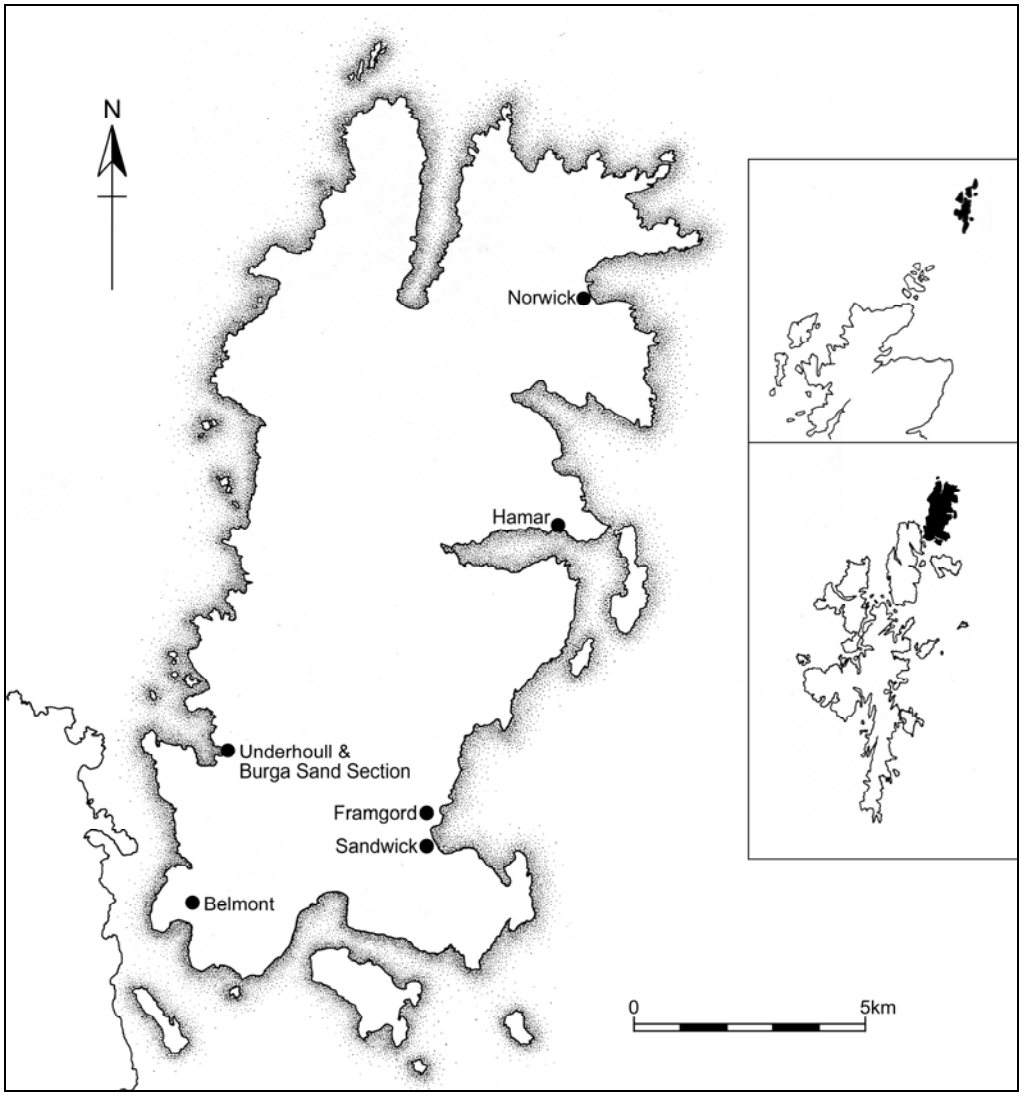

Figure 1.1: Location of the main Viking/Norse sites excavated to date in Unst

The 2006 & 2007 excavation seasons

The excavation of the structure during the summer of 2006 revealed a sub-rectangular building divided internally into an upper and lower room aligned roughly N-S downslope on a small terrace, referred to as House 1. A remnant of double faced walling excavated on the western wall was interpreted as part of a later addition to the structure. A fragment of a well carved steatite vessel was found within the core of this extension wall. A trench first excavated by Stummann Hansen (2000) that was positioned across the upper room was re-excavated in order to view the stratigraphic sequence of deposits within this area.

The 2007 excavation season focused on the excavation of the lower room and annexe of the structure, as well as the external drainage gully that appeared to run parallel to the northern wall line of the upper room. The investigation of the lower room revealed a negative feature that ran down the centre of the structure towards the southern door. A concentration of ash and steatite was recorded at the base of this feature, which may have related to a hearth deposit. A hearth was also identified in the annexe, located against the remnant of double faced walling. This feature was left at this stage to be sampled for archaeomagnetic dating in the 2008 season.

In addition to these excavations, two trenches (Areas C and D) were positioned over House 2, which occupies a small platform in the landscape to the north west of House 1. The excavation of Area C revealed the infill of the structure, which was rich in organic remains, such as cereal grains, charcoal and peat ash, as well as producing a large number of steatite artefacts. Excavation of Area C continued in the 2008 season.

1.2 THE SITE OF UNDERHOULL

The excavation of the Upper House at Underhoull in 2007 focused on a site adjacent to the road which was partially visible as raised, turf-covered foundations. Previous work in the area can be divided into two main phases. The first relates to the excavation of a structure located down slope towards the beach at Underhoull, published by Alan Small in the *Proceedings of the Society of Antiquaries of Scotland* (Small 1966), where he reported a Norse building which he assigned to the 10th century in date, overlying an earlier Iron Age settlement with a souterrain. Uphill from Small's site lies a substantial broch structure which may well have influenced both the position of the Norse building(s) in the immediate landscape as well as providing a potential quarry for building stone (Small 1966, 230-235). In more recent decades, revisions in our understanding of the dating of Small's Norse structure have been posited by Batey, Bigelow and Hansen and a Late Norse date would seem to be a better fit for both the structural form and the artefact assemblage (Graham-Campbell & Batey 1998, 181).

The structural remains investigated by Small consisted of a longhouse aligned roughly E-W, being approximately 56ft (c.18m) in internal length and with a maximum central breadth of 15ft (c.4.5m). The long walls were slightly curved so that the western end of the building was almost semicircular, giving the house an "almost boat-like shape" (Small 1966, 237). The walls were constructed of drystone walling that was faced internally, with a turf and stone backing on the exterior face (Small 1966, 237). Several internal features

were recorded within the structure, including upright stones that were interpreted as possible bench settings, two post-holes located along the central line that may have acted as supports for the roof, and a small drain (Small 1966, 238). Small also believed that the western end of the structure had been utilised as a byre due to the wide doorway (being approximately 5ft: c.1.5m), and due to the presence of rough paving; other areas of the structure were only paved in order to cover drains, with the remaining area having a beaten earth floor (Small 1966, 258).

The second phase of work at Underhoull took place in May 2007, where a team carried out a thorough survey of the Upper House site to be excavated in the summer of that year. The survey team was led by Robert Friel and produced a detailed contour survey of the feature and the surrounding area, highlighting the wall plan of the structure as well as possible field/yard boundaries.

2007 excavation season

The structure excavated during the 2007 season is from here referred to as the Upper House, Underhoull to differentiate it from Small's 1966 excavations (Small, 1966). Two trenches, Areas A and B, were opened to assess the surviving archaeology, in preparation for the full excavation planned for 2008. One trench was positioned across the top of the structure at its western end (Trench A: 12m x 6m) and a second across the middle of the structure (Trench B: 16m x 6m) encompassing what appeared to be an annexe or extension to the house.

The excavation of Trenches A and B defined the limits of the structure, revealing a southern double-faced wall line of the structure, although only a small fragment of this survived. The northern half of the structure was defined through the presence of a turf bank containing small gravel, although it was not clear at this stage if the stones of the wall had been robbed. A rubble-filled annexe was identified in Trench B, from which a small steatite figurine was recovered (SF No. 098; Bond et al. 2007, 51). The excavation of the external area around the structure revealed that part of the site was sealed by a substantial peat deposit, which was sampled for palaeoenvironmental analysis and dating. Further work was carried out in this area during the 2008 season.

1.3 THE RESEARCH AGENDA

The excavation of Viking/Late Norse settlements on the most northerly of the British Isles forms the centre of the much larger multi-faceted 'Viking Unst' programme, which includes historical research, place name interpretation, landscape survey, environmental history, heritage interpretation and community involvement and regeneration. Utilising recent developments in archaeological method and theory the maximum amount of information will be gathered from these excavations in order to address the research issues outlined below.

Little is understood about rural Scandinavian settlement in Britain and much of what we do know is from sites in Orkney, such as Pool (Hunter *et al.* 2007), Skaill (Buteux 1997), Birsay (Hunter 1986), Buckquoy (Ritchie 1977) and Westness (Kaland 1995). All of these

sites are multiperiod settlements situated on good land and often part of a long subsequent settlement history. They are very different to many of the Unst sites, which appear to be short lived single phase settlements, often on poorer land.

One of the major questions addressed by these excavations is the reason for the apparent difference in settlement pattern in Unst, and for the subsequent abandonment of these sites in the Late Norse or medieval period. It is likely that the apparent distribution of sites has been influenced by subsequent settlement; the very best locations are probably occupied by modern farms, burying or obliterating the earlier settlement. However this does not explain the distribution of apparently abandoned farms on land not subsequently used for settlement or arable. Do these sites perhaps signal the next generation's move away from the primary Scandinavian settlements? If so, their short lifespan still needs to be explained. Norse farms in these locations may have been environmentally vulnerable; the solifluction stripes and mountain-tundra soils which can be seen on the Keen of Hamar, just 20m above the longhouse site, testify to its marginal location. It may be that several factors were involved; for example, the poorer climate of the later Norse and Medieval periods and the rise in the importance of fishing in the late Norse economy, as proposed by James Barrett and others (Barrett 2003), which may have led to the abandonment of more marginal agricultural settlements. It may be that some of the sites in upland locations are not abandoned farms, but shielings contemporary with settlements on better land which have subsequently disappeared.

Thus the main aim of the project is to understand this unusual settlement pattern by investigating its chronology, form, economic basis and landscape context, and to understand how this affected later settlement. The project also seeks to understand the date and nature of the initial Viking settlement of Unst, and how this fits into the models of Viking expansion across the North Atlantic.

1.3.1 Site development and chronology

The production of detailed chronologies for the sites investigated is essential to the interpretation of Viking settlement in Unst. The provision of an absolute chronology will facilitate the dating of the structural and depositional sequence of the sites and will provide a chronological framework for the interpretation and understanding of questions surrounding the sites' past inhabitants, economic development and cultural identity.

The dating programme devised for the Viking Unst project is based upon the integration of several techniques, focussing on the generation of research questions in the field as excavation is carried out and requiring specific sampling during the excavation process. Three scientific dating methods have been selected for use; archaeomagnetic dating of *in situ* fired structures such as hearths, accelerator radiocarbon dating of carbonised plant remains (cereal grains) from secure depositional events and tephrochronology. It is necessary to utilise a range of dating methods as the radiocarbon calibration curve is insufficiently sensitive at crucial points to be used as the sole dating technique. The application of these methods to targeted chronological problems has shown great potential in not only the reinforcement of dates produced by a single method but perhaps more importantly by the use of Bayesian statistics on the integrated data (Buck *et al.* 1994). The

establishment of an integrated absolute chronology for the Unst sites is essential in order to provide a framework for the other findings from the excavations and interpretations of the sites' economic development and cultural identity.

The analysis of the artefacts recovered will be of enormous importance to the interpretation of the sites excavated over the course of the Viking Unst Project. The expertise of Dr. Colleen Batey will be utilised.

1.3.2 The paleoeconomy of Viking and Norse Unst

Understanding the past economic exploitation of the surrounding landscape, shore and sea (e.g. for arable agriculture, animal husbandry, fishing and other resources such as fuel) is vital to our understanding of the sustainability of these sites. Analysis of the economic data will provide information regarding the subsistence base of the sites and the reasons for their success or failure. It was anticipated that most of the known sites in Unst (with the exception of those with a high windblown sand component) are unlikely to have good bone preservation, though some is possible and this has proved to be the case with Hamar and Underhoull. A few fragments of bone have been recovered, providing limited information on food resources and technology (butchery, bone working). Sampling for plant remains will allow the study of the nature of the arable contribution to the economy and what fuel resources were utilised, as well as providing material for AMS dating.

1.3.3 Formation of the archaeological deposits

An integrated research programme examining magnetic signatures, carbonised and fossilised organic components, phosphate and soil micromorphology will enable an understanding of fuel exploitation, the identification of surfaces within structures, the formation and management of arable soils and provide evidence for deposits associated with ironworking. It was hoped to investigate the nature and extent of any yards or infield surrounding the settlement which is important in settling the 'farm or sheiling' question for the sites in the higher areas. Work on this is ongoing in this area through the PhDs of Robert Legg, University of Bradford (Muck, farmsteads and landscapes: Geochemical and geophysical investigations of farmstead and landscape interaction on the isle of Unst, Shetland), and Val Turner, University of Stirling (Inherited landscape: the pre-historic field systems of Shetland).

1.3.4 Manufacture, trade and contact

Evidence for manufacture, such as copper alloy casting and ironworking, together with imported cultural material, will provide evidence for both production and trade, which in turn provides further insight into the status of the sites and how this might have changed over time.

1.3.5 Status and social hierarchies in Viking/Late Norse period Unst.

Issues relating to the Viking/late Norse society in Unst will be addressed, and to this end investigation of the social status of the settlements will be important.

The results of the 'Penmap' survey in August 2005 seemed to show that some of the assumed single-structure and single-phase sites, such as Hamar and Lund, may be much

more complex; geophysics would be an obvious means of exploring this (Bond *et al.* 2006). It is hoped that the nature and extent of the yards or infields surrounding the settlements could be looked at in order to settle the 'farm or shieling' question for the sites in the higher areas.

2. THE RESEARCH EXCAVATIONS AT HAMAR AND THE UPPER HOUSE, UNDERHOULL IN 2008

J.M. Bond, S.J. Dockrill, J.E. Cussans, D.J. Bashford & A.R.R. Mustchin

2.1 INTRODUCTION

The excavations carried out in June and July in 2008 continued the excavation of Houses 1 and 2 at Hamar. Excavations also continued at the Upper House, Underhoull, investigating the structure located adjacent to the broch, and upslope from the structure excavated by Small (1966). A summary of the excavation season is provided here.

2.2 EXCAVATIONS AT HAMAR

2.2.1 House 1, Area A (Figure 2.1)

Work on Hamar House 1 this year focussed on finishing the investigation of the upper room, the western annexe, and a small amount of investigation around the lower doorway where fill of the ash pit had been left in situ. Further sections of the gulley which surrounded the upper part of the house were also excavated, sampled and recorded.

Excavations at House 1 showed that there were many more phases to the structure than surveys and studies prior to full excavation had suggested (see e.g. Stummann Hansen 2000, Bond *et al*. 2006). The latest (as yet undated) occupation seems to have utilised only part of the upper room, with a dividing wall and post setting forming a smaller space at the northern end.

Upper room

The double faced wall [243]/[244] was removed, which had formed part of the latest small inner room along with post setting [284]. A stone setting and burning part way up the wall on the western side together with a small area of burning, [350], indicate a possible corner hearth or oven in this phase. A patch of surface in the north west corner, [365], is also likely to be contemporary.

Unfortunately the rabbit damage observed in previous seasons proved to be far more extensive than at first thought, with channels running through the remaining early occupation surfaces, along walls such as [243]/[244] and actually running into the broken bedrock in places. This meant that such earlier occupation surfaces as were identifiable survived only in patches, making interpretation more difficult. These patches of occupation deposits included early features such as an area of burning [422], a primary surface consisting of burnt bedrock and ash, which was sealed by brown ash [421] itself sealed by a later ash surface [399] and a tertiary surface [389]/[356].

Despite the rabbit damage it can be demonstrated that there were several occupation surfaces in the upper room before the small inner room was constructed and that in the earliest of these phases an ashy floor lay directly over bedrock. Early indications are that this phase relates to the building of the secondary cross wall which created the upper room ([017]/[073]/[064]/[250]) and that it dates to the Late Norse period. The finds from this

floor surface included fragments of a pot with a gritty texture, a schist hone stone and fragments of steatite bake plate.

Excavation this season showed that, surprisingly, this bedrock floor surface was not dug into the slope of the hill to form benches and a sunken floor, as earlier investigations based on a small exploratory trench had suggested (Stummann Hansen 2000) but was mostly level with base of the walls. The subsequent occupation surfaces, specifically [402], [403], sealed the deposits encountered in those earlier excavations. Excavation this season proved that the cuts assumed by Stummann Hansen to be the bench lines of a Norse building ([091], [443]) were in fact the west and east sides of a sunken floored structure which lay under the cross wall of the extant building and on the same alignment as its long walls. The southern part of the cut, to the south of cross wall [017]/[073]/[064]/[250], was numbered [405].

The sunken floored structure is c.3x4m with settings for post pads at the centre of the north and south pit edges and possible evidence for smaller corner posts (figure 2.2). To the south the pit is c.20cm deep whilst to the north it is dug into the bedrock to a depth of c.30cm. The finds from the deposits included a steatite line sinker and fragments of copper alloy. The later cross wall seals this feature and the infill of the pit, as do the floor surfaces of the upper room. The fill of the pit was a series of ashy layers; north of the cross wall, the sequence of layers starts with a black and orange surface [453] at the base of the pit, sealed by [449], [448], [431], [447] and finally [369], whilst south of the cross wall, surface [452] was sealed by a second surface [404], [242] and [444]. The cross wall itself was not removed as it was required for later consolidation and display of the site, so a baulk was left to the north to protect the stability of this wall.

No closely comparable sunken featured building has been found in Shetland, although there are traces of a sunken structure at The Biggins, Papa Stour and the Hamar structure bears a close resemblance to pit houses found in Norway from the ninth century and later (Crawford & Ballin Smith 1999, 208-213, Mårtensen 1997)

Annexe

Investigation of the remaining fragments of the western annexe continued and revealed a hearth ([307], [313]) set against inner wall face [079] and sealed by later flagging [254]. Samples for archaeomagnetic dating were taken from this feature, which had scorched the face of the wall and in burning the bedrock beneath had inadvertently formed a bowl-shaped feature as the rock fractured and broke away. Very little else was found in this annexe area although some shallow and rather faint negative linear features were found ([437]/[440] running N-S and [438]/[441] running E-W) which may be traces of walls, though they are just as likely to be linear rabbit burrows. In their favour, a small alignment of flat stones [439] seal [438] and are on the same alignment.

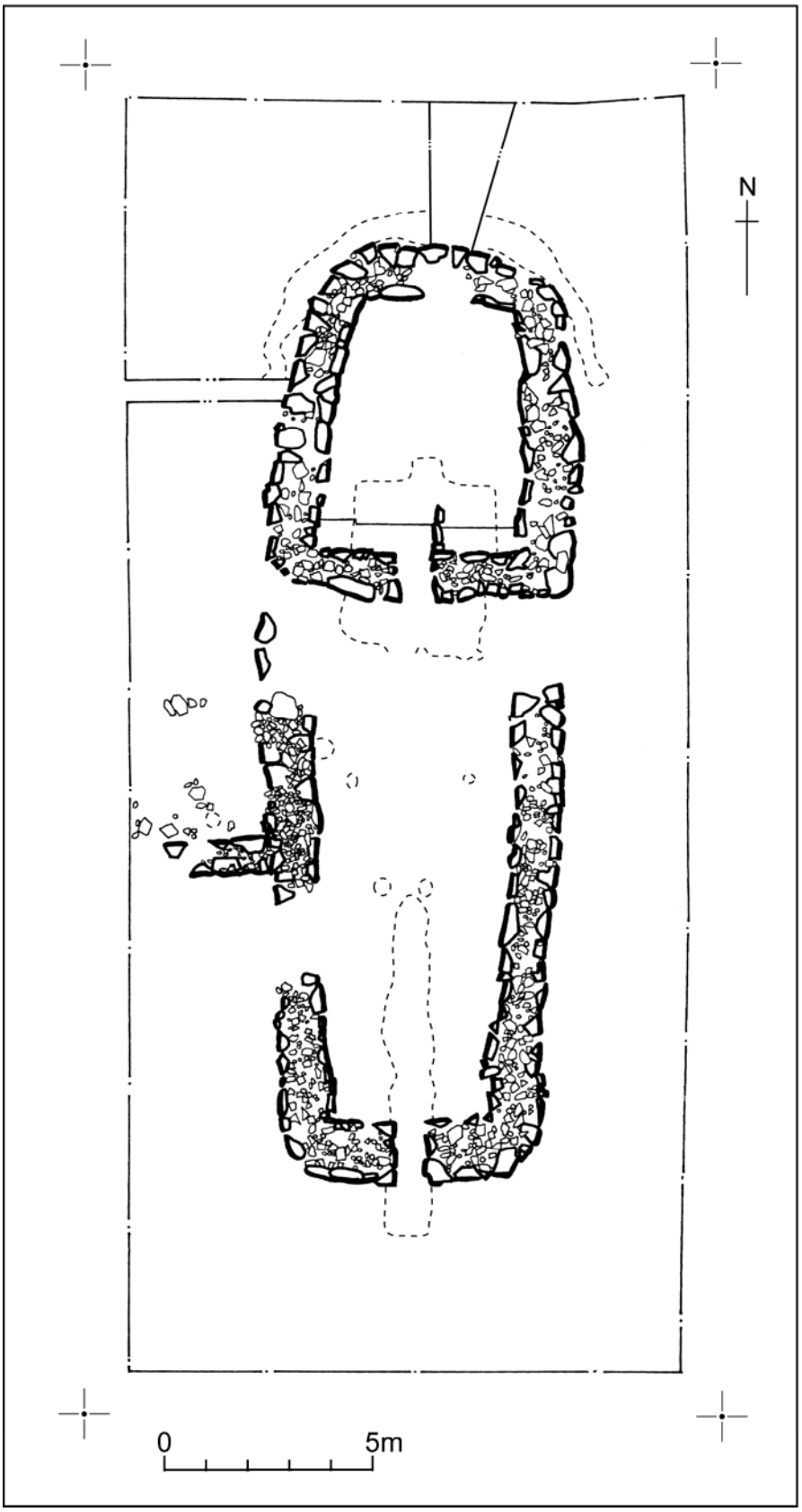

Figure 2.1: Plan of the excavated structure, House 1, at Hamar

Lower room & ash pit

Work also concluded on investigations of the substantial ash pit running lengthwise down the lower room and out under the end wall of the house ([040]/[039]/[374] to the west and [037]/[038]/[375] to the east). It is now confirmed that the pit is older than the end walls and that the house must have been substantially shortened (or the position of the house as a whole shifted down slope) when the later end wall was rebuilt over the ash pit. The fill of the ash pit [378] was sealed by flags [291] and [338] which in turn were sealed by the end wall, suggesting a further phase when the pit went out of use but before the end wall was rebuilt. Whether this ash pit formed part of a structure of the same or an earlier or later phase as the sunken structure is not yet apparent.

A lone post hole hard by the inner face of the western long wall of the house [031] consists of cut [384], fill [385] and chocking stones or rubble [383], sealed by [324]. There is a fragment of steatite bake plate at the base of its fill, which cannot have acted as a post pad being too fragile, and so may be a later deposition when the post hole went out of use and was infilled. The position of the feature, hard by the western wall, also suggests it belongs to an earlier phase or structure before this section of wall was built. There are no other postholes in the building which would correspond to this one, the holes found last year being on different alignments and of less substantial size.

Excavation of further sections of the gully were unable to follow its course south of the upper room; it may be that the feature continued only in more shallow soil deposits which have subsequently been lost, perhaps with scalping. What further excavation of this feature has demonstrated is how close the back wall [048] comes to the gully, suggesting the possibility that the gully is older than the surviving wall face. In places the wall has started to collapse into the ditch, showing that in its present form it stands too close to it.

These features suggest that rebuilding may have been more substantial than is obvious from the remaining deposits on this partially denuded and rabbit disturbed site, and that the site itself was substantially longer lived than it might at first appear. Work continues on the post excavation analysis, but the poor quality of survival of deposits and the amount of rabbit disturbance means that we may never be able to fully phase these more isolated features. However it is hoped that radiocarbon and archaeomagnetic dating will at least give us broad phasing which can be refined by the archaeological results.

2.2.2 House 2, Area C (Figure 2.3)

The continued excavation of Area C began with the removal of the 2007 backfill. Once cleaned and recorded the trench across House 2 was extended by one metre to the NW and SW. The principle aim of this year's work was to investigate, record, and sample any occupation deposits sealed by the post-occupation ash midden infill of this structure, shown by radiocarbon dating of barley from the fill to be 15th to 17th century in date (see Outram *et al*., Chapter 5, this volume). In addition the extended excavation area, measuring some 10m x 2.5m, allowed a more detailed examination of exterior deposits on the building's hillward side.

Removal of turf [1000] from the extended area exposed an uninterrupted blanket of silty clay topsoil [1001]. Beneath this layer, the previously identified wall lines of House 2 were found to continue along their anticipated course (approximately SW-NE). The building style observed in 2007 was evident once more, with each wall comprised of internal and external faces of large stones ([1006] and [1007] form part of the northern wall, and [1008 and [1009] form part of the southern wall) around cores of earth and small irregular rubble ([1018] & [1019] from the north and south walls respectively).

Excavation of the internal deposits revealed a clear-cut sequence of ashy carbon-rich middens ([1005], [1020], and [1021]). These contexts correspond to and are equal to contexts [214] and [261] recorded in 2007. Collapsed stone and/or core material from both walls was found throughout this sequence ([1010], [1011], [1012], [1028], and [1034]). Below the uppermost contexts and associated collapse material within the structure (including previously unexcavated deposits against the NE baulk, [1022] and [1029]) a single ash- and carbon-rich clay context, [1035] was identified extending across the whole internal area and butting inner wall faces [173/1007] and [175/1008]. This was equal to the stratigraphically earliest context recorded in 2007 ([305]), which has been dated to AD1440-1640 at 95% confidence levels (Lab. Code GU-16695, table 5.1 this volume).

Due to time constraints, excavation of the interior of the structure was limited to a 1m-wide sondage running between the inner wall faces against the SW baulk. Sampling and removal of [1035] revealed a moderately carbon-flecked silty clay [1043] that was similarly sampled and excavated. This layer comprised the primary abandonment or post-abandonment fill of House 2, the removal of which exposed an intact floor surface containing flagstones [1049] and a small sub-circular 'hearth' [1044]. A 'hearth' [1044], comprising burnt red and yellow ashy clay within a loose arrangement of possible kerbstones, was found approximately 50cm from the internal SE wall face. After detailed recording this feature was sampled for archaeomagnetic dating, any residual material being bulk sampled.

The presumed floor surface chiefly comprised clay layers [1046], [1047], [1048], [1051] and [1052] but also contained a spread of ash and carbon flecks, [1045]. Clays [1048] and [1051] were both heavily burnt and also carbon-rich. A linear arrangement of possible flagstones [1049] ran NE-SW in the NW floor area. One of these was lifted in order to investigate the possibility that they formed capping for a flue, drain, or similar. However, only a homogenous yellow clay [1050] was found to underlie this feature and was tentatively interpreted as natural subsoil. If this were the case it might suggest a single occupation phase for House 2 associated with the overlying floor.

The external area down-slope of House 2 was not fully excavated this season. The rubble collapse [246] identified in 2007 was found to continue into the extended trench area, and was accordingly renumbered [1003]. Although successive layers of this material were recorded and removed, the base of this 'collapse' was not reached and its primary relationship to the SE wall of House 2 remains unclear.

Externally to the NW of the structure excavation revealed mixed colluvium and topsoil ([1004], [1013] and [1017]) overlaying various 'tips' ([1014], [1016], [1025] and [1027])

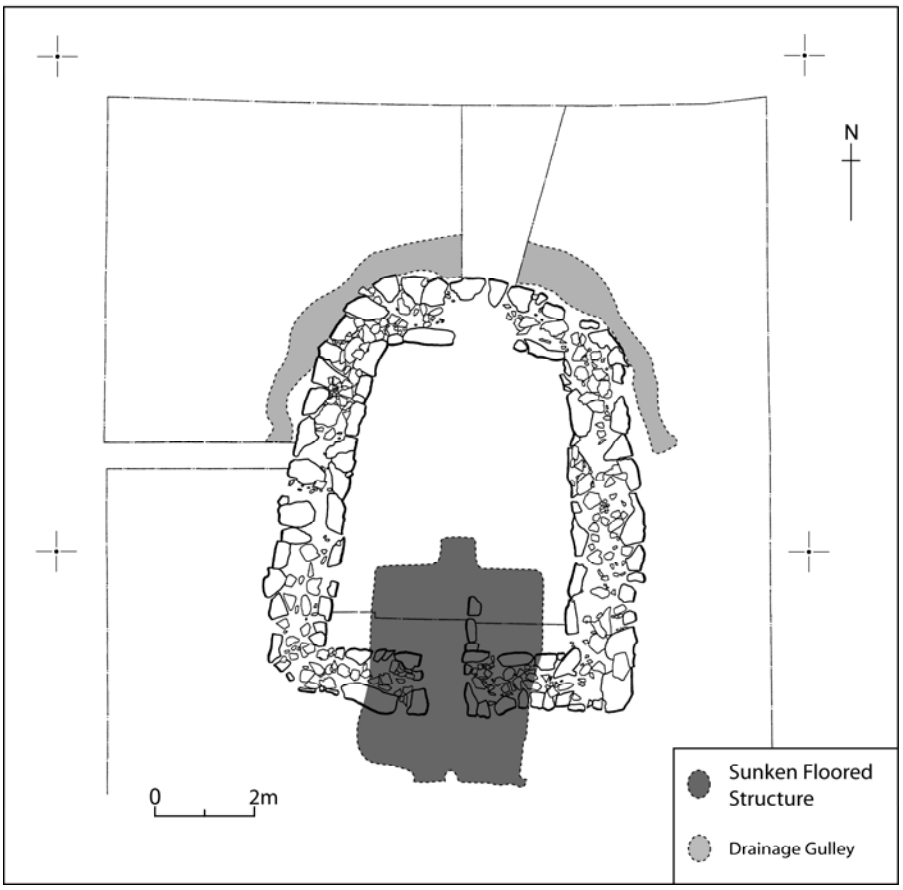

Figure 2.2: Plan of the sunken floored structure, Hamar

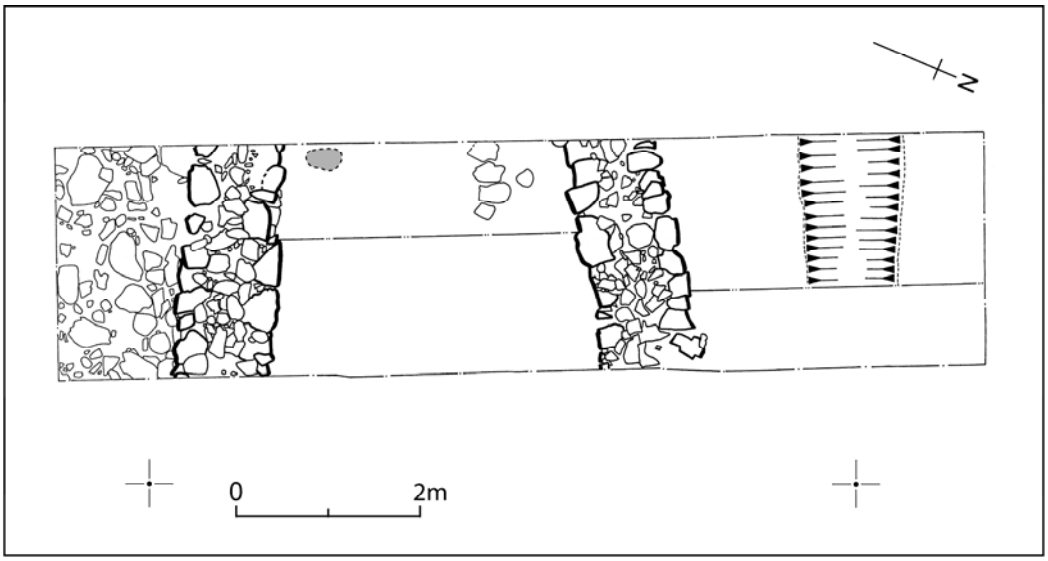

Figure 2.3: Plan of the excavated structure within Area C, Hamar

and possible wall collapse material ([1015] and [1024]). Removal of these overlying deposits revealed two gravely, clay-rich layers ([1030] and [1032]), containing fine ashy lenses. These deposits were interpreted as being equal to one another, separated by a 'ditch' cut [1040] that ran NE-SW between the baulks. This cut truncated a further two underlying deposits ([1041] and [1042]), and contained three fairly sterile fills ([1031], [1037] and [1039]), corresponding to material recorded from a sondage the previous year (see Bond *et al.* 2007). Cut [1040] most likely represents a past attempt at diverting hillwash material away from the NW wall of House 2.

Artefacts recovered in 2008 were broadly representative of a Nordic cultural package of the Late Norse/Medieval period. The post-abandonment fills within the structure contained numerous steatite artefacts, including a possible bakeplate fragment (SF1140) from layer [1035]. Ferrous objects (SF1111, SF1117, SF1118, & SF1119) and one piece of glass (SF1152) were also recovered from fills [1020], [1021] and [1035]. The primary abandonment/post-abandonment fill of House 2 ([1043]) produced several finds including a possible bakestone fragment (SF1173), and a whetstone (SF1168).

The walls and 'collapse' material produced several finds including a steatite fragment (SF1099) and ferrous object (SF1100) from core [1018], and steatite (SF1129 & SF1130) from rubble [1003].

2.3 EXCAVATIONS AT THE UPPER HOUSE, UNDERHOULL (FIGURE 2.4)

At the end of the 2007 excavation season two main trenches had been opened over the west end (Area A) and central part (Area B) of the main structure plus three small exploratory trenches examining field boundaries and peat depth. It was revealed that the main structure had both stone and turf elements to the walls which were seemingly very poorly preserved in some areas. There was also a stone built annexe to the south east, a drainage gully to the north and a paved area to the south west which was covered by a considerable layer of peat growth. A variety of steatite finds were recovered, the majority of which came from the west (upslope) end of the structure. Outside of the structure to the north-west, a large area of red ash and fuel ash slag was uncovered.

The aim of this year's excavation was to discover the full extent of the main structure and its annexes, to understand the construction of the walls, to fully excavate the internal occupation deposits and to gain a better understanding of the peat formation to the south of the structure.

Trench Extensions

In Area A, a small extension was made in the north-west corner in order to more fully investigate the extent of the area of burning and fuel ash slag outside of the building. Area B was greatly extended to the east, west and north to show the full extent of the main structure and its annexes. A further trench (Area F) was opened across a field boundary to the south of the main excavation area to examine the relationship between the peat formation and the boundary.

External Deposits
A section was excavated through the fuel ash slag deposit in Area A, ([003], [093], [216]) to examine its depth and horizontal extent and to collect further dating samples. The material appeared to have been burnt *in situ*, [216] and [093] being the main burning episodes. The area of burning was contained by a low stone boundary [119], which both [216] and [093] butted against. North of this boundary were peat layers [118] and [128] which were sterile of anthropogenic material.

Immediately north of the structure, further investigation of the gully was made including the removal of the small north-south baulk that remained from last season's excavations. Removal of this baulk revealed a number of peaty layers ([113], [115], [116]) sealing the remnant of the wall of the structure [007], the top of the fuel ash slag deposit [003] and the rubble in the top of the gully fill [062]. The east end of this gully had been partially excavated in the 2007 season; this involved the removal of rubble [061] (equal to [062]) and fill [063] revealing cut [064]. As found in Area B in 2007 excavations this season revealed this cut to be a later re-cut through earlier fill [184] which was removed and sampled. [184] proved to seal the primary fill, a greenish deposit [188] which sealed the bedrock.

On the south side of the structure further investigations were made into the peat growth which had been found to be sealing flagging [029] in the 2007 season. A series of samples were taken from the peat sections in Area A, further details of which are given in section 5.4, this volume. In addition a small (1x3m) trench was opened up over the field boundary to the south of the main excavation area. This showed that the boundary predated the peat growth found on top of paving [029] and also most likely predated the longhouse structure. It is thought that the peat growth was triggered by the building of the longhouse, creating a wet basin microclimate between the structure and surrounding field boundaries thus encouraging peat growth (M. Church & G. Swindles, pers. comm.).

Annexes
Three structures, physically attached but external to the main structure, were identified. The first of these, the south east annexe (figure 2.5), was partly excavated in the 2007 season; see Bond *et al*. (2007) for a description of the walls. At the end of the 2007 season this structure was left with its internal occupation deposits intact. [053], a greasy black occupation type deposit was excavated this season to reveal a hearth and other occupation deposits. Removal of [053] revealed a light brown ashy deposit [172], which in turn sealed [174], a charcoal rich deposit with orange mottles. Removal of this revealed the full extent of a rectangular feature [166], probably a hearth, which sealed [177], another occupation deposit. [166] was bounded by flags [176] which covered most of the interior of the annexe room. This deposit contained the charred remains of complete ears of cereal, which were removed as a block sample SF894 for processing in the laboratory. External to this annexe and sealing the south wall [039], deposit [131], a dark peaty deposit with small stones was removed revealing that the annexe wall was built directly on top of the bedrock, indicating that it was likely associated with the main structure from its earliest occupation. Access into the annexe appears to have been from the south along paving [038] which turns 90° to run

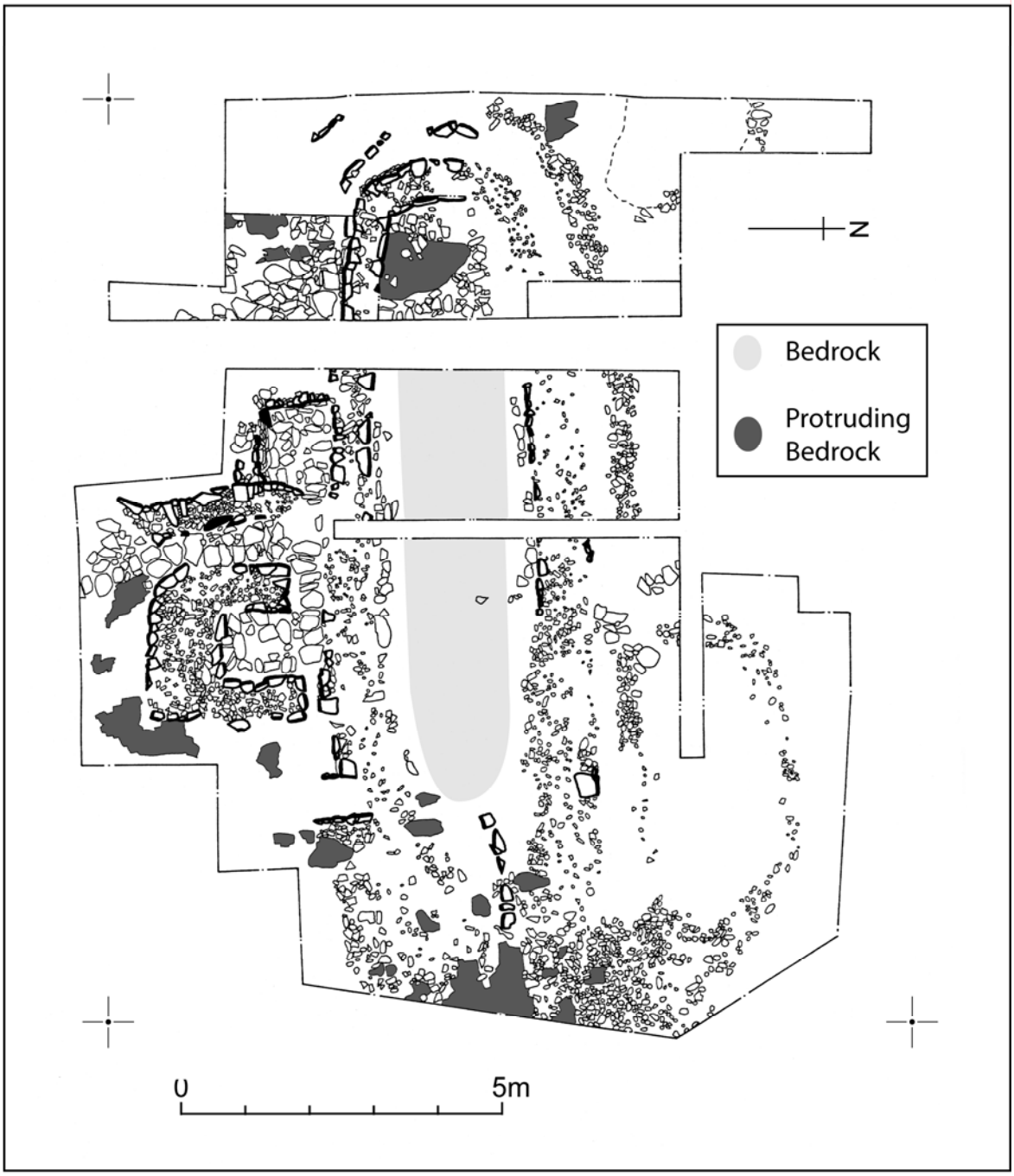

Figure 2.4: Plan of the excavated structure of the Upper House, Underhoull

along the north edge (open side) of the annexe; there does not appear to be any way of accessing this annexe from within the main structure.

The second annexe, uncovered for the first time this year, was also on the south side of the main structure but to the west (figure 2.6). This south west annexe had two, thin, single faced stone walls [109] & [110] surviving two to three courses high and butted onto the external wall of the main structure [144], again without any direct access between the two. The stone walls were backed with turf banks [134] and [129] respectively, which would presumably have provided both support and insulation for the annexe. A third walling element, forming the east wall to the annexe, [139] was one face of what appeared to be the remnants of an earlier wall with two faces [139] & [108] and a rubble core [132]. Access into this annexe appeared to be between the north end of this wall and the wall of the main structure [144] and possibly came again from the south over paving [038] although no direct link was observed. After going out of use the annexe was filled with a rubble and soil matrix ([105], [136] & [147]). Removal of this infill revealed a black and brown mottled peaty material [187], thought to be the possible remains of a roof collapse. This in turn sealed [189], a black silty occupation deposit. [189] sealed flagging [198] and a rectangular stone setting [203]. [203] was originally thought to be a hearth setting; although this rectangular feature was filled with a black/brown ashy material [202], when this was removed no evidence of *in situ* burning was found underneath, just more paving, [198]. However to the north-east of [203], a further black ashy layer [204] was also found to be sealed by [189]; removal of this revealed a hard baked orange/red ash layer interpreted as a hearth [214]. There was no formal surround for this hearth, but as with the hearth found in the south-east annexe the material butted up against the surrounding flagging [198]. In places the hearth material was situated over a void. Flagging [198] was taken to be the primary floor of this annexe as some flag stones were sealed by walls [109] and [110].

To the north east of the main structure a further enclosure was investigated. This enclosure was visible as a low earthwork curving north and then east from the north wall of the main structure. Excavation showed the boundary to be very similar in nature to the field boundaries excavated in the previous season (Bond *et al*. 2007); this comprised of a peat or turf bank and medium, un-coursed stones [126]. This wall construction led to the interpretation that this was an enclosed, external space such as a yard or small pen. To the exterior of the area an interesting deposit containing slag and some steatite [140] was excavated and sampled. Inside the 'yard' area, after removal of the turf-like, sterile material [101] ubiquitous to the site, a layer containing many small fragments of steatite and carbon flecking [170] was found. Very little else was found in this area except a possible piece of steatite oil lamp SF1753. Further excavation also revealed a possible post hole, indicating that this area may indeed have been roofed or covered in some manner. Access into this area appears to have been from the east where there is a gap in the boundary near to the north east corner of the main structure. A second possible entrance may be indicated by flagging [097] overlying the rubble filled gully [017] at the western end of the enclosure. The boundary is completed by rubble and turf bank [124] which butts onto this corner.

Main Structure

The walls of the main longhouse structure are extremely enigmatic, the only substantial piece of stone walling being at the west end [020]/ [044], identified in the 2007 season. Elsewhere the walls are seemingly much less substantial and appear to be composite walls made of turf and stone. In addition it seems that the composition of the walls varies down the length of the structure. Both the northern and southern walls within the middle section of the building had clear, but less substantial structural elements than the western end of the structure. The north wall has three main elements, a stone inner face [158], a peat or turf outer face [125] and a gritty infill or wall core [122], that was probably a mix of stones and turf. The south wall also has three elements, a stone inner face [211], a stone outer face [144] (possibly the same as [020]) and a gravel wall core [224]. The stone elements used in the southern wall were larger than those used to form the northern wall. Also associated with the walls and peculiar to this mid section of the structure were lines of flags butting up against the interior of both the north and south walls, forming a ledge; these flags, [208]/[151] and [210]/[227] respectively, do not extend further into the interior but just along the sides of the structure.

At the east (lower) end of the building there was no clear structure to the walls and no flags lining the edges of the interior. Here the wall lines were marked by banks of rubble and a gravel soil matrix ([091], [149]). On the exterior of the north wall a band of dark peaty material [127] was identified; this was almost identical in nature to context [125], thought to be a peat or turf outer face to the mid-section of wall. It seems likely then that [127] forms the outer face of this section of walling. On the southern wall, there are hints of stone work along the outer face although these do not run the full length; linear stone arrangements [078] and [165] appear to be faced structural elements and approximately correspond in alignment to [144]. At the east end of [165] there is some evidence for a possible side entrance into the structure. At this point there is a short length of walling [156] running perpendicular to the south wall and faced on the west side. This was sealed by rubble wall collapse material [229] which, when removed, revealed a small patch of ashy occupation material between the east end of wall [165] and the west face of wall [156], however sampling and removal of this did not reveal any obvious threshold. The other potential entrance into the house was located at the very east end of the structure. This had seemed very clear when examining the unexcavated earthworks and here there appears to be some evidence of a more substantial structure. At the east end of the north wall roughly central to the structure there is a single coursed alignment of stones ([150] and [230]) that appear to mark one side of a possible drain.

Internal Deposits

Last season the majority of work carried out on the internal deposits was in Area A. This involved the removal of turf-like or peaty layers that were found to seal a black deposit containing large amounts of steatite [070]. This deposit was found to continue in depth and was renumbered [185] this season but essentially stayed the same in nature. [185] contained an enormous quantity of steatite, including large vessel fragments and some almost complete artefacts at least one of which is an unfinished item SF1931 (see Batey this volume). Removal of this deposit revealed a floor layer made up partly of flags [197] and partly of bedrock. In the centre of the very west end of the structure was a small patch of

Figure 2.5: The south east annexe, the Upper House, Underhoull

Figure 2.6: The south west annexe, the Upper House, Underhoull

orange-brown ashy material overlaying paving [197] and sealed by [185], showing some evidence for a build up of occupation layers. This upper section of the building had by far the highest concentration of artefacts anywhere on the site.

In Area B in the middle and lower sections of the structure very little excavation had been carried out on the internal deposits in the previous season, since it was intended to extend the excavation area in 2008. After removal of the turf and topsoil a grey turf-like layer with flecks of iron pan was uncovered [123]/[142]. At first this layer appeared to be completely sterile of anthropogenic material; there was no evidence of carbon flecking or ash and it did not have the appearance of either a midden infill or an occupation deposit. Further excavation however showed it to have a very few finds which were quite specific in their nature. Other than a few small fragments of steatite four artefacts were found in this layer; one line sinker SF739, two loom weights SF762 & SF1174 and a spindle whorl SF1090. Further similar finds from the upper layers were a line sinker SF760 from [148] and a loom weight found in Area B in the 2007 season, SF480 from context [074] (Batey 2007, 63). One of the main points of interest regarding this group of artefacts was their positioning within the structure; they all seemed to be found down the mid line or along the very edges next to the wall lines: further analysis of the three-dimensional finds plots is needed to confirm this. The presence of these artefacts and to some extent their positions led to the tentative interpretation of this layer as being the remains of post abandonment collapse of a turf roof and that the various weights may have been hanging (stored) in the roof at the time.

In light of what had been found in the upper part of the house in Area A it was originally expected that excavation of these turf-like upper deposits would begin to reveal occupation deposits similar to those found in the annexes or in the upper part of the house. However in some places patches of bedrock and natural subsoil (e.g. [143]) began to appear without any sign of occupation deposits in between. This caused concern that the occupation deposits may have been so badly degraded that they were beyond recognition. In the mid section of the building excavation of deposit [123] revealed a further fairly sterile deposit [173]. During excavation it became increasingly clear that particularly in this mid section of the building the internal deposits sloped quite steeply down from the flagged sides into the centre of the structure. Removal of [173] revealed a very interesting deposit in the centre of the building. Context [207] was described having patches of charcoal and red ash and some burnt bedrock; it was also found in an ideal position for a central long-hearth yet due to its dispersed, patchy nature had clearly not been burnt *in situ*. Excavation of this context, which rested directly on the bedrock, also supported the idea that although some very hot material had been present in small amounts no hearth had been set immediately onto or above the bedrock. Excavation of the upper deposits slightly further east in the structure, on the eastern side of the narrow baulk and still within the area of flagging down the sides of the walls, revealed a further deposit [199] that appeared to contain a small ash component, but again did not appear to be a coherent occupation surface. This deposit was sealed by [168] which elsewhere had lain directly on the bedrock without any sign of an occupation deposit.

At the lower (easternmost) end of the structure, turf material [142] sealed [169], a turf layer containing a loom weight, SF1784. [169] sealed [220], another almost sterile layer with no ash or carbon inclusions, which sealed the bedrock. Along the northern side of the building, [169] sealed a thin strip of reddish ashy material [201], again with evidence of occupation material but not a coherent occupation surface.

In the centre of the building, approximately one quarter of the way up from the eastern end, the remains of a post [222] were found, during the 2007 season (see Bond *et al*. 2007) and left in place until the end of this season. Excavation this year showed the post to be part of a north-south alignment with two large flags, [163] to the south and [164] to the north. It was thought possible that these three elements were related and offered some kind of structural support. On excavation the post was found to be in a poor state of preservation with no identifiable wood remaining; what remained had a hard crust-like texture on the exterior and was quite distinct from the surrounding deposit. The post sat on a series of small flattish stones [233], which may have acted as a post pad although it is difficult to imagine them supporting any great weight; however given their close proximity to the bedrock perhaps this was all that was necessary.

Summary

Given the evidence discussed above it would seem that there were three distinct areas to the main part of the longhouse structure. The westernmost end of the building was the only part of the main structure that had a coherent paved area and may have made some use of the natural bedrock. This area was covered with a deposit that was full of large pieces of steatite vessel, including at least one unfinished piece and was clearly not an occupation surface but more likely the remains of a roof collapse where such items had been stored on a shelf or mezzanine level. It would seem that the boundary for this steatite rich deposit was at or near the eastern trench edge for the former Area A; no steatite vessel fragments were observed in or removed from the trench section edge and given the concentration of such artefacts in the trench, had this deposit continued eastwards they surely would have shown in the section.

The mid section of the house appears to be characterised by three main factors; a turf layer over the top of the internal deposits containing very little anthropogenic material other than a series of weights, flagging down the sides of the interior and very little in the way of occupation deposits other than dispersed patches of ashy material. It is suggested that this segment of the house would have had a raised wooden floor supported at the sides by the flags lining the walls with an airspace below to prevent the wood from rotting. This central area of the house is the most likely place for a central long hearth to be found and this may have been placed on the wooden platform on an area covered by a clay bed. The area covered by context [207] may be evidence for such a hearth. Here small patches of red ash were found near to but not on the central line of the building, suggesting they may have resulted from ash rake-out from a hearth placed on a central clay bed falling between wooden flooring slats at the sides. If this was indeed the case no remains of a wooden floor or clay hearth bed have been recovered although it is possible that these may have been removed around the time of abandonment, given the scarcity of wood in Shetland. If this interpretation is correct and a wooden floor was present it is difficult to tell how far

eastwards this may have extended. It is likely that in this part of the building it extended only as far as the eastern extent of the flags at the side of the walls but it is also possible that it extended as far as post [222] and flags [163] & [164] which may have formed support for the east end of the wooden platform.

It is also possible that these features formed support for a second wooden platform at the far east end of the house on a different (probably lower) level to that in the middle section of the building. If this was so no other structural evidence for a raised floor was recovered; however there is the matter of the lack of occupation deposits. There appears to be three possible explanations for this phenomenon. Firstly that there was a raised floor, similar to that in the centre of the house but without a hearth and hence the lack of any type of ashy deposits. Secondly that there was no raised floor and that this end of the house was not part of the living space but performed some other function, possibly as a barn or byre. However this seems unlikely as the only two putative entrance ways identified were both at this end of the house; that is not to say that there were not any other entrances as yet unidentified. If this area was used as a byre it is hoped that the soil sample transects taken may help to resolve this matter. Finally this may have been part of the main living space and had no raised floor and for some taphonomic reason occupation surfaces were unidentifiable. Again this seems implausible as the deposits excavated came straight down on to rather uneven bedrock which would make for an uncomfortable living space.

In conclusion it is likely that the main structure had three distinct areas, at least one of which had a raised floor. The walls of the structure were made of a composite of stone and turf, with a greater stone element being present on the southern side and the turf possibly being used as a means for insulating the building. Drainage in the area was clearly an important issue as the drain along the north side of the house appears to have been cut at least twice in its history; the need for drainage was also eminently clear during excavation as the trenches had to be bailed out on many occasions due to inclement weather conditions. External to the building there were several additional structures including two externally accessed annexes to the south, an enclosed area to the north and a paved yard to the south.

3. SUMMARY OF FINDS FROM THE 2008 SEASON

J.M. Bond, C. Batey, L.D. Brown, D.J. Bashford, G. Gaunt, J.G. McDonnell & Z. Outram

3.1 INTRODUCTION & OVERVIEW

J.M. Bond & Z. Outram

In total, 134 small finds were recorded from the site of Hamar, and 957 small finds from the Upper House, Underhoull. Here, the term 'small find' refers to the single unique identifier attributed to an individual artefact, or in some cases groups of an artefact type found together, for example a group of pottery sherds. The exact location of each 'small find' is tagged and then three-dimensionally recorded using a total station linked to the 'Penmap' survey package. This provides the potential for the analysis of the spatial distribution of the assemblage. A programme of dry sieving of the deposits was also implemented at the site of Hamar in order to maximise the information available from the site. The reports presented here represent the preliminary assessment of the material recovered from the two sites.

The artefacts recovered from the site of Hamar demonstrated a similar range of items as recorded within the 2007 excavation season, with examples of steatite vessels and weights, schist bake plates, hones, and a number of objects of iron and copper alloy.

The assemblage of artefacts recovered from the 2008 excavation season at the Upper House at Underhoull was dominated by the presence of steatite and worked stone, with a susbstantial number of fragments of pottery. This large assemblage will allow the material collected from both Hamar and the Upper House at Underhoull to be compared, as well as allowing the material to be compared to the assemblage recovered during the excavations carried out by Small on the lower site (1966).

3.2 WORKED STONE

C. Batey & D. Bashford

The largest component of the worked stone assemblage related to the steatite recovered from Underhoull, chiefly due to the many chips of unworked steatite which may perhaps represent finishing-off activities once partially worked steatite has been brought to the site from nearby quarries. This material has been tabulated below (table 3.3) in an effort to detect concentrations within specific contexts, but little can be said beyond this.

The overall stone assemblage is very varied and relatively substantial in numbers for the areas excavated in 2008. The range of steatite vessels is certainly significant, as is the clear evidence for the finishing off of items on site, seen in the partially complete vessels as well as perhaps in some of the distribution of the chips and possibly worked fragments recovered from the Upper House, Underhoull. The presence of bake plates in both schist and steatite is noteworthy, although the finely made schist imports are not seen in the 2008

material. Items which have been brought from Norway, either as primary "tool kit" or as imports post-settlement include steatite vessels (which were precious even though local material was available too, and this is seen in the reworking into smaller items from broken sherds) and whetstones. The increasing reliance on locally available stone types may be seen in the whetstone group but also in the inclusion of a siltstone vessel in this assemblage.

3.2.1 Coarse Stone

This category of material can be generally subdivided into schist and other stone. Artefacts classified as 'stone' relate to a catch-all section which includes finds which are not steatite or schist. It is likely that there is a large component of material which is locally derived, for example the quartz stone, but detailed identification and indeed confirmation is required through geological examination in due course. The use of locally available material is a good indication of exploitation and familiarity with the immediate environment and the ability to replace imported goods which are less available due to distance from source with these newly available materials.

THE ASSEMBLAGE FROM THE UPPER HOUSE, UNDERHOULL

Whetstones/hones

Several schist whetstones were recovered from the excavations at Underhoull. These include two of distinctive square section (SF1828 of context [199]; SF1969 of context [220]) and a further two which are haunched through extensive use (SF1504 of context [190]; SF1954 of context [154]). SF1504 has in addition signs of a perforation. Specific geological examination of these is required to distinguish Scandinavian sources, but visual study indicates that they may have been imported to Shetland.

A further two whetstones can be identified as Norwegian imports from the Eidsborg quarries: SF843 of context [148], and SF1223 of context [088] (pers comm. H Alsvik, Bergen). Of the remaining whetstones, two are very heavily worn: SF710 of context [133], and SF820 of context [074], and may also have an origin in Scandinavia. However, SF1112 (context [105]) is a simple pebble which has been used for sharpening and is likely to be a local product.

Weights

Two roughly shaped and perforated schist weights have been noted; SF762 (context 123) and SF1215 (context [141]). Local production is indicated and a use as fishing weight or indeed loomweight is likely. SF1664 (context [196]) is a much larger fragment of schist with part of a notch remaining on one fractured side. This notch may have formed part of a perforation for a larger artefact, possibly for use as a roof/thatch weight. One large beach cobble fragment (SF1649 context [189]) with a small drilled hole is also included in the assemblage.

In addition to the four coarse stone weights a fifth artefact should be noted here. SF858 (context [152]) is a broken, coarse schist cobble (Length 108mm x Width 62.5mm x Depth

46mm) with working marks on three sides. On one side a simple cross has been heavily scored into one corner, a feature less well implemented but also seen on one example of the steatite weights (SF1923). A small hole (1.5mm) has been placed to one side of the cross with a second much larger (10.5mm) squared hole set above this. On one side a third hole has been placed. This consists of a 10.5mm hole that undercuts itself widening to 12mm at a depth of 5.5mm. Within this a smaller squared hole has been placed 6.5mm deep. The third side has a further two holes; an area of pecking with a small hole (3mm) and set above this a larger squared hole (7mm). All of the perforations are incomplete and several more may be present but this may be natural pitting to the stone which is in a highly weathered condition.

Spindle Whorl

There is a single find in this category, SF1597 from context [189]. It is conical in form and has an expanded central perforation. It is obviously indicative of some scale of textile making activity, and if some of the simple stone weights can be also assigned to textile production rather than fishing, indicate domestic activities. Little further can be added at this stage and its geological origin would be helpful to know, as it could represent part of an original "tool kit" brought from Scandinavia.

Vessel

SF763 from context [041] is a simple small stone vessel with tapering rim, possibly of siltstone, and is considered to be a local product and the expedient use of locally available material. It is conceivable that it was originally from the nearby broch. This source may also have provided the stone tools and indeed tuyère noted below, but this is simply a suggestion at this stage.

Quartz and flint

There are four finds of quartz; two tabular pieces which are unworked (SF784 context [101], and SF816 context [011]) and two pieces which may form a snapped blade (SF819 context [119]) and a modified blade (SF1742 context [179] both of which need further detailed study. A single find of flint, SF824 from context [114] may possibly be a struck fragment. These are not chronologically sensitive items.

Worked Discs

There are two examples of a worked stone disc (SF1117 from context [016] and SF1876 from context [077]), possibly pot lids which are a ubiquitous find in the Northern Isles from many periods.

Miscellaneous stone

There are 31 finds within the general category of 'stone', although this number includes the two pieces of unworked quartz mentioned above, and three finds which are possibly worked but indeterminate. Amongst the rest of the group, there are individual examples of a possible simple incised gaming board (SF 777 context [011], figure 3.1b, figure 3.1b) that would need more careful examination before it can be accurately assigned this designation, since there are clearly natural fault lines visible on each face. A single slate pencil, SF724 (context [101]) must be considered a relatively recent loss.

There is also a small group of simple stone tools which are hard to date specifically, since they can be found at many periods. These include hammerstone SF1940 (context [185]), a small number of rubbers or burnishers, such as SF1650 (context [187]) and SF1677 (context [141]). These may be related to industrial activity as indicated by the potential tuyère SF789 (context [105]) and fire reddened stone SF703 (context [093]) or agricultural (as also suggested by the rotary quernstone SF2002 (context [197])).

THE ASSEMBLAGE FROM HAMAR

The worked coarse stone from Hamar is a relatively small assemblage of only 19 artefacts. The artefacts are discussed in terms of the different classes of items. The schist bakeplates have been discussed within the steatite report due to their close links with this material.

Whetstones/hones

There are five schist whetstone finds groups from the site; from Area A, SF 1162 (3 non-conjoining), SF 1167 and SF1330 and from Area C SF 1112 and SF 1168. They are scattered across as many contexts. All but SF1168 are noted as being haunched, implying considerable usage prior to deposition and SF1168 is considered to be in an exceptionally friable condition. Specialist identification is ongoing, but an Eidsborg origin in Norway would seem likely (see discussion by Alsvik and Batey forthcoming) and is a common origin point for many of the whetstones from the Viking-age in the British Isles.

Pebbles

This group encompasses pebbles which have signs of being used as rubbers or burnishers, such as SF1110, SF1116 and SF1148 all from the single context [1021]. SF1151 from context [1035] appears to have been used both as a polisher and as a hammer stone at some stage. This category of find was discussed by Bashford and Marshall in relation to the 2007 assemblage from Hamar (2007, 54) in conjunction with pebbles which also displayed zones of scratching.

Miscellaneous Stone

Within this category are a number of items which suggest expedient use of locally available materials, selected for their suitability as polishers/burnishers/hammerstones, possible whetstones or gaming counters. Further work is required for the specifics of the geological identification, but it is presumed they are locally collected pieces. For example, the two finds suggested for use as gaming counters (SF1073 and SF1074 from context [1001]) have been totally unmodified and the identification as potential gaming pieces is not substantiated. Likewise, pebbles SF1139 from context [409] and SF1158 from context [369] are beach pebbles which may have score marks on them, and again the function is obscure. It is unclear whether the identification of graffiti on SF1158 is correct. Two potential sharpening stones or whetstones need further detailed examination to locate any trace analysis of use in sharpening metal tools (SF1063 from context [267] and SF1067 from context [353]), but the use of locally available ad hoc materials is not unusual in Northern Isles archaeology.

3.2.2 A geological assessment of the whetstones recovered from Hamar and the Upper House, Underhoull: the 2006 to 2008 assemblages
G. Gaunt

Introduction

This report includes the whetstones from both Hamar and Underhoull, recovered over the last three seasons of excavation. Nine hones from Hamar and eleven from Underhoull were examined, principally to see how many (if any) were made from Eidsborg Schist and from Purple Phyllite, the two lithologies that are believed to indicate "Viking" contact in the British Isles. Seven of the Hamar hones and nine of those from Underhoull proved to be of Eidsborg Schist, but neither site yielded any of Purple Phyllite. The main features of both of these hone types are well known, so require no repetition here, but some additional geological aspects that may be of interest are included elsewhere (Gaunt 2000, 2484-2485, wherein the Eidsborg Schist hones are referred to as by their former name of Norwegian Ragstone). To avoid needless repetition in the catalogues, the Eidsborg Schist hones are abbreviated to ES. Two hones from each site are made of other metamorphic rock types. Their lithologies are summarised in the catalogues, with suggestions on their possible sources within the Shetland Islands. In the Catalogues each hone is identified by its small-find number.

Catalogue (Hamar)

SF number	Context	Area	Comments
173	139	A	(Numerous pieces) ES
261	214	C	ES
421	002	A	Phyllite, medium grey, 'slaty' (i.e. on grain size boundary between slate and phyllite), with moderate slaty cleavage. Not Purple Phyllite (too fine grained). There are several phyllitic sequences in the Shetlands, notably in the Clift Hills Phyllitic Group and the Dunrossness Phyllite on the mainland, but possibly a more likely source for this hone is the Muness Phyllite, which has a local occurrence on Unst and also a superficial 'woody texture' (Mykura 1976, 37).
928	261	C	Metaquartzite, pale grey, highly compacted, with moderately developed lineation texture. The nearest outcrop of 'quartzite' to Hamar appears to be a 'lenticular' mass which forms the highest ground on Yell (Mykura 1976, 33). Other quartzites are present in Shetland however, most notably in the Scatsta Quartzitic Group (Mykura 1976, 24-25; for outcrop location see plate IV).
1112	1019	C	ES
1162	369	A	(Three fragments) ES
1167	432	A	(Three fragments) ES
1168	1043	C	ES
1330	449	A	(Three fragments) ES

Table 3.1: Catalogue of whetstones recovered from Hamar

Catalogue (Underhoull)

SF Number	Context	Area	Comments
129	016	B	ES
169	053	B	ES
415	050	B	ES
710	133	B	ES
820	074	B	ES
1112	105	B	Schist, pale to medium grey, quartzitic, consisting mainly of parallel lengths of fine to medium-grained quartz crystals with only sparse minute micaceous minerals, producing a strongly lineated texture (similar to some rocks in the Grampians formerly known as 'schistose grits'). The most likely source in Shetland would appear to be in the Scatsta Quartzitic Group (Mykura 1976, 24-25, plate IV)
1504	196	B	ES
1533	190	A	ES
1831	199	B	Schist, pale brownish grey, quartz-mica, with moderate schistosity, consisting mainly of medium to coarse-grained lenticular, mutually parallel, quartz in a very fine-grained matrix of sub-parallel micaceous minerals, quartz and sparse indeterminate minerals. The lenticular texture suggests a mylonitic source, i.e. due to shearing in one of the many fault or thrust zones in the Shetland Islands
1969	154	B	(Two fragments) ES
1973	220	B	ES

Table 3.2: Catalogue of the whetstones recovered from the Upper House, Underhoull

Comments

Some of the Eidsborg Schist hones, particularly those from Hamar, have undergone post-usage discolouration, in effect bleaching, and small scale erosion. In certain hones the erosion has weakened the muscovite (white mica)-rich schistose laminae, causing splitting along the hones, whereas in others it has produced minute hollows, presumably where quartz grains have become loosened within the lithological matrix and 'popped' out. In geological environments bleaching (e.g. of red feldspars in granites) is normally due to acidic groundwater from overlying peat or other natural organic-rich deposits. This reaction can apply also in archaeological environments but in these situations localised acidic groundwater from cesspits and similar humanly induced accumulations can have the same bleaching effect. It is understood, however, that neither at the Hamar site nor the Underhoull site are any natural organic deposits, cesspits or animal-waste deposits. The nature of the bleaching agency, therefore, remains uncertain.

The small-scale erosion affecting the hones, as referred to above, is even more inexplicable. Quartz, and to a lesser extent muscovite, are the main components of Eidsborg Schist. Both

minerals are chemically stable in natural earth surface conditions, and both are common constituents of sedimentary rocks, having survived cycles of large scale denudation, transport and redeposition spanning many tens of millions of years. Three other minerals are commonly present in the schist, but only in minute quantities. Biotite and chlorite are chemically stable in most natural conditions, although they do not normally survive the physical rigours of the denudation-to-redeposition cycles. Calcite will dissolve in acidic groundwater but it seems unlikely that there is sufficient calcite in Eidsborg Schist even partly to desegregate (i.e. loosen) the quartz and/or muscovite and so produce the small-scale erosion observed.

3.2.3 Steatite and related schist artefacts

THE ASSEMBLAGE FROM THE UPPER HOUSE, UNDERHOULL

Bake plates

There are three finds within this category made of schist, SF647 (context [185]), SF1799 (context [189]) and SF1212 (context [053]). Of these, only SF1799 is definitely a bake plate fragment, and it is large, measuring over 150mm across and just 9mm thick with tool marks around the edge. Each of these finds does however lack the detailed grooving seen on one or both faces of the finds from Hamar 2008. The type has been discussed in relation to the examples from Hamar 2008 (below) and commonly the stones identified as schist are usually considered to be Scandinavian imports, whereas the ones identified as steatite are considered to be from Shetland and of a slightly earlier date. In this case certainly the thickness would seem to support an origin within Shetland rather than it being an import.

Vessels

There are 102 finds which have been identified as parts of vessels; around 20 of these are clearly worked pieces which are likely to be vessel sherds, but which survive in a form which is either too fragmentary or undiagnostic to be certain. Amongst the sherds which can be clearly distinguished, there is a variety of vessel forms to be seen. The more commonly identified hemispherical form is represented for example in SF1529 (context [190]) and there is a variety of wall thicknesses to be seen throughout the assemblage in this form (eg SF1415, (context [168]) has a thick wall measuring some 23mm whereas SF1092 (context [149]) mm is thin walled (only 8mm). Flat bottomed vessel forms are indicated by SF1063 and SF1064 (context [138]), and in some examples these are clearly from squared vessels (such as SF831, context [074]) and the corner sherds SF1487 (context [169]) and SF1094 (context [123]). Other forms include more unusual examples of troughs, for example, SF1062 (context [074]), and SF867 (context [142]) is clearly oval in form and may have been trimmed down slightly.

There is a great variety in the thickness and indeed finishing treatment of the vessel walls. SF1965 (context [050]) is a large vessel of thick walling some 17mm across, and SF1957 (context [185]) is slightly thinner at 12mm. This latter sherd has also very smooth inner and outer wall surfaces in contrast to SF1983 (context [213]) which is from a thick walled large vessel whose surfaces are deeply gouged. Very fine walled vessels are indicated by a number of sherds, such as SF702 (context [074]) and SF803 (context [070]) and

particularly SF1855 from context [185] which is well made. Some sherds show knife paring, such as SF1179 (context [167]) and SF712 (context [135]), whilst others are very smooth in the finish on either one or both faces (eg SF772 (context [179]), often with burning on both faces, such as SF772 (context [179])).

There are relatively few rims noted in the assemblage here, with SF163 (context [041]) and SF1929 (context [185]) being good examples. There is a single perforated sherd, SF756 (context [140]), which indicates suspension, presumed to be just below the rim line (as opposed to being a repair site lower down the vessel walling).

There are two clear examples of vessels which were brought to the site to be finished from quarries presumed to be on Unst. SF723 from context [132] shows a smooth exterior face with an incompletely removed inner side and SF744 (context [011]) shows the opposite, with a smooth inner and very rough and incompletely worked exterior side.

All these features and vessel types have been discussed previously in relation to the assemblages from Viking Unst project, and little further can be added at this point. It is however noteworthy that so many different vessel forms and finishes have been recognised here and this indicates a variety of functions for this versatile range of vessels (Batey 2007).

Lamp

Three fragments SF1997, SF1858, SF1997 form a complete handled steatite lamp (161x100x22.5mm). The bowl is shallow (20mm) and finely carved with circular tooling marks on its inner surface and a narrow 5mm rim. There are two handles on opposing sides of the bowl; both are squared with a rounded base. A perforation has been added to both the handles, set centrally and favouring the edge closest to the bowl. Both perforations have an oval outline on their upper surfaces; one tapers to a circular opening at its base whilst the other tapers to an irregular kidney-shaped opening.

SF1986 from context [209] has been suggested as a lamp which has been refashioned from a very thick vessel sherd. This is a common reworking and can be seen in the assemblage from the Brough of Birsay in Orkney , where the full thickness of a curving vessel wall has been utilised and hollowed out for use as a lamp (C D Morris pers. com.). SF1956, also from context [209], conjoins to SF1986 and forms one side of a shallow bowl and the base of a handle. From the same context SF1771 comprises of two fragments forming a perforated triangular lamp handle. The handle tapers inwards towards the bowl and has a centrally placed oval perforation. Although this does not conjoin to the other lamp fragments the shape of the bowl and the type of steatite used are the same, suggesting they are two sides to the same artefact.

Weights

There are 17 weights made from steatite in this part of the assemblage, including the use of raw steatite lumps (eg SF757 context [141]), steatite pebbles (eg SF1174 context [123]), and reused vessel sherds (eg SF1465 context [169]). All are perforated through the use of both drilling and knife cutting and in a few examples both techniques have been used on

the same stone. SF721 (context [117]) is a good example of a drilled perforation and SF1174 (context [123]) includes a perforation formed by knife cuts. In some cases, a single perforation is located at one end of the weight, as in SF1921 (context [185]) and in others the perforation is centrally placed (e.g. SF721). Several of the weights (e.g. SF1058 context [160]) display a partially worked example coinciding with a still-usable perforation. Although often seen in schist and steatite examples, only one of the weights possibly displays a completed secondary perforation in replacement of a broken original. This example, SF1998 from context [185], has a single perforation placed favouring one edge, the opposing end has been heavily worked and rounded and contains a centrally placed notch. The heavy working of this end suggests the notch may be an original feature that would have worked in conjunction with the perforation. It is also possible that this notch may have been one of the original attempts at a perforation that failed and has been heavily reworked after breaking. However none of the other weights that show signs of reworking display this amount of effort. Another attempt at perforating the stone is visible on one surface of the weight. Six simple stone weights are to be found in this part of the assemblage. Of these, Large examples which are likely to be fishing weights include SF1915 (context [218]) and SF1934 (context [185]).

Two of the steatite weights have a slightly different form to the others within the assemblage. SF1078 from context [035] is a narrow (10x38x28mm) heavily worked perforated object slightly S-shaped in outline. The perforation, an irregular crudely worked oval, is set to one side and favours one end of the artefact. SF1607 from context [185] is an equally narrow fragment (61x46x18mm) displaying a central perforation.

The reuse of vessel sherds which have been crudely trimmed is common in this group, e.g. SF1923 from context [185], which includes an incised cross on one face. This is a feature which was identified in the assemblage from this site in 2007 (Batey 2007: 63). Although there are complete tear-form weights in the group, such as SF1507 (context [196]), there are also examples of possible preforms for weights on this shape, such as SF1207 (context [088]), indicating an active production process as required. The finds of this category are scattered over several contexts and only layers [185] (with 5 examples), [149] (with three), and [123] (with two) have multiple examples.

In addition to the 17 steatite weights there are two further examples that should be included in this part of the assemblage. SF1599 from context [149] is a simple, unfinished tear drop shaped weight broken along the line of a failed knife-scored perforation. SF2003 is in outline very similar to the oval and tear shaped weights although on a much larger scale (298x207x35mm). A considerable amount of effort has been put into shaping its edges and surfaces where a lot of tooling marks are still in evidence. Unfortunately a fragment is missing from the top of the artefact where a perforation would be expected if this were a large possible roof weight.

Line Sinkers

Three weights fall into the category of line sinkers. SF1084 from context [070] is a small (90x52x34mm) broken example that displays heavy working in shaping the artefact. A perforation has been centrally drilled in combination with lateral grooving running from the

perforation on both opposing surfaces. On one surface the groove runs through the perforation but damage has obscured whether this was repeated on the alternate side. SF739 (figure 3.1a) from context [123] is a finely shaped complete example and is the largest of the three line sinkers (157.5x78x54mm). In outline the sinker is pear shaped tapering towards one end. In profile the base of the weight is curved with a flat upper surface. The perforation has been drilled slightly off centre and has been placed favouring the wider heavier end. The apical groove is a scored channel predominantly U-shaped although V-shaped in places. On the flat upper surface the channel is approximately 4mm deep but only 2mm deep on the curved base. The groove at the wider end is irregular and appears to have incorporated a basal plug hole. The worn nature of this area makes it difficult to discern if this was broken during use or the original working of the artefact. The first two line sinkers were both carved from a very soft slightly coarse example of steatite, the third example, SF760 (figure 3.1a) from context [148], is made from a harder, finer grained material and may possibly be imported. Although similar in outline to SF739, this example is smaller and narrower (138.5x54.5x39mm) and displays a greater refinement in its manufacture. The central perforation has been partially knife cut and is situated slightly towards the narrower end of the artefact. The channel has again been scored and knife cut, changing from U-shaped to V-shaped and 11.5mm to 4mm in depth on the flat upper surface. This channel runs into a basal hole set at a slight angle at the wider heavier end of the sinker. On the curved lower surface the channel is V-shaped, 5.5mm deep and only runs from the narrow end to the central perforation. Unlike the other examples the channel on its upper surface is surrounded by a crude but decorative incised groove.

Similar in outline but on a much smaller scale to the line sinkers is SF1053 from context [074]. The artefact is a small (48x21x12mm) slightly tapered rectangle of steatite with a centrally drilled perforation. Leading away from the perforation towards the narrower end is a faint groove forming a shallow notch at that end of the artefact and returning to the central perforation on the opposing side. At its wider end a second larger notch or the remains of another larger perforation is visible.

Spindle whorl

SF1090 from context [123] is a small steatite disc with a central perforation. Compared to the example from the coarse stone assemblage this whorl is relatively crude. The perforation is slightly off centre and as mentioned is oval rather than circular.

Worked/Possibly Worked but of Indeterminate Function

There are 114 finds in this category. Most are in fact pieces which seem to have been trimmed but which due to their incomplete nature do not allow fuller comment. It is possible that some of this may be debris from the on-site trimming of vessel blanks, but this cannot be confirmed.

Finds in this general category include pieces which show grooving (e.g. SF1501 from context [097]), perforations (eg SF1407 context [123]), smoothed faces (e.g. SF1999 and SF1822, both from context [185]) and tooling. There is a variety of tool marks on a number of pieces, such as SF1981 (context [201]) and SF1584 (context [185]) but SF1675 from

context [185] is a fine example of a thin piece which has good clear tool marks on one side, but its function is not clear.

Steatite Chips (see table 3.3)

There are 184 Small Finds in total comprising chips or otherwise unworked small pieces of steatite, spread across 36 contexts. There is a very limited number of contexts which have over 10 finds (Area A: context [170] has 11, and context [185] has 65; Area B: context [035] has 14, context [168] has 11, and context [196] has 10). The obvious major concentration here is therefore context [185] in Area A and further study of these pieces will be required, particularly to see if there are any specific dumps within the layer itself to check whether this was actually an area of working, trimming of larger pieces into finished objects, or an area where the steatite close by is actually rotted.

Area	Context	Finds units	Total
A	070	3	
	088	9	
	128	1	
	185	67	
	170	11	**91**
B	011	5	
	35	14	
	74	5	
	76	1	
	101	2	
	111	1	
	120	1	
	121	1	
	122	1	
	123	6	
	140	1	
	141	2	
	144	1	
	145	1	
	149	5	
	166	1	
	168	11	
	169	1	
	171	2	
	173	3	
	179	1	
	196	10	
	201	1	
	206	3	
	207	2	
	209	6	
	220	1	
	222	1	**90**

F	182	2	
	183	1	**3**

Table 3.3: Summary of the unworked steatite from the Upper House, Underhoull

THE ASSEMBLAGE FROM HAMAR

Bake Plates

Two schist finds are identified as bake plate fragments. From Area C, SF1140 (context [1035]), SF1173(context [1043]) are both pieces which have signs of parallel tool marks, or in the case of SF1173, herringbone groove marks.

There are in addition a further 14 finds of bake plates which have been provisionally identified in the record as being made of steatite; they maybe a schistose form of steatite which has perhaps seen less heating but they are clearly the same type of object. Of these, some have clear tooling on one face (e.g. SF1130 from context [1003] and SF1185 from context [453]) while another group has clear tooling on both flat sides, commonly in a parallel form (e.g. SF1190, context [453] and SF1421 context [432]). In the case of SF1599 from context [449], the tooling of both sides is of different densities. Where it is possible to distinguish an overall form in this group, SF1106 has an arc-shaped edge and SF1426 from context [453] appears to have been sub-rectangular, in common with SF1174 also from context [453]. Two large examples from Area A (SF1177 and SF1178 from context [369]) have tooling on both flat faces. SF1177 is over 150mm in diameter whilst SF1178 is closer to 400mm in diameter. Two of the bake plates show signs of perforations. SF1177 has a single perforation along one broken edge whilst SF1147 has been reworked with two incomplete perforations placed centrally and next to one edge.

This category of object has already been noted from the 2007 season at Hamar, where five examples were discussed (see Batey 2007) and it was noted that grooved schist plates have been identified within Norway and Shetland as griddle stones for the baking of thin, unleavened type breads or perhaps oatcakes. They are a common feature in Late Norse contexts throughout parts of the Northern Isles (e.g. Quoygrew on Westray, Orkney (Batey forthcoming); Da Biggins, Papa Stour, Shetland (Weber 1999)). In each case at Hamar the bake stones are coarsely chiselled. In terms of shape they seem to be more squared in finished form, whereas the Norwegian examples which have been studied are circular and made of stronger schist which is carefully tooled on both faces (eg Weber *op cit*). Weber has identified a Shetlandic origin for types of bake stones (Weber *op cit*, 134). The examples which have been noted as Scandinavian imports (eg Weber *op cit*) are thinner than the Shetlandic ones; presumably this is a function of the nature of the raw material, which in Shetland is commonly steatite unlike the fine-grained schist of Norway. Weber notes that the finds from Shetlandic materials can be up to 25mm in thickness and of rectangular or sub-rectangular shape (*op cit*, 134). The Norwegian imports are between 5 and 25mm in thickness, have a high schistosity, are grooved on both faces and of round form between 300 and 600mm across. The examples recovered during the 2007 excavation season at Hamar were between 8 and 11 mm in thickness and in the few cases where overall shape can be suggested, they are apparently rectangular. It is most likely that the

close proximity of steatite outcrops in Unst, for example at Clibberswick would have facilitated access to a more convenient local resource (Batey 2007).

Steatite Vessels

There are 18 individual finds which have been identified as parts of steatite vessels. Three finds (SF1101, SF1102 and SF1107 from context [1020]) are all from a single vessel which is of a small square form with both interior and exterior smoothing. Examples of square vessels of various sizes have been identified from Hamar House 2 in the 2007 assemblage (Batey 2007, 59) and a number of parallels were noted from Shetland site, such as Jarlshof and Kebister (Sharman 1999, 173). In the 2008 assemblage, SF1093 from context [1022] is also from a squared vessel, forming the basal/wall junction. At least six sherds are from heavy vessels, being thick and often with substantial internal and external tooling visible (eg SF1142 from context [404], SF1154 from context [387], SF1428 from context [449] and SF1129 from context [1003]). It is considered most likely that these are locally produced and seem to be generally of hemispherical vessel form. A single sherd might indicate the presence of the tray-like form noted in 2007 from the site, SF1065 from context [287] has a shallow curve, although there are traces of both internal and external sooting. A limited number of sherds suggest the presence of smaller vessels, often with smoothed surfaces, such as SF1089 from context [1021] and SF1135 from context [1036], but the vessel forms are not clear. A further two finds are classified as vessels, although without certainty (SF1108 and SF1109 from context [214]).

Weights

There were six possible weights in the Hamar assemblage. SF1091 from context [1035] is similar to several of the examples from the Underhoull assemblage (e.g. SF1058). Alongside the weights perforation are two incomplete examples visible along one broken edge. SF1156 from context [404] is a tear-shaped example similar to those seen in the assemblage from Jarlshof (Hamilton 1956, Figure 54 & 55). Two pieces of steatite vessel (SF1042, context [342] and SF1065, context [287]) have been reworked and perforated for use as a weight. Two simple pebble weights, SF1104 from context [396] and SF1172 from context [369], may have served either in a fishing context or for weighting a warp-weighted loom. The isolated nature of the finds does not really assist in resolving the identification. This object type is commonly noted from sites in the Northern Isles, and has been discussed by Clarke and Sharman in relation to Scalloway (1998, 147-149) and more widely by Batey (1987, 179).

Line sinker

SF1427 (figure 3.1c) from context [453] is an intact, carefully worked grooved line sinker. It has close parallels from material excavated at Jarlshof in South Shetland (Hamilton 1956, plate XXXIV)

Miscellaneous Worked and Unworked Fragments

There are 13 finds which are scattered across 10 separate contexts which appear to show signs of tooling. Context [1022] and context [246] have three and two finds respectively. All other contexts have single finds only. The tooling is simple and limited in all cases to possible flattening or smoothing and may be a simple result of extraction at the quarry.

Eight indeterminate steatite fragments are identified as unworked steatite; six from Area A and two from Area C. They are scattered across several different contexts.

3.3 POTTERY & FIRED CLAY

L.D. Brown

3.3.1 Underhoull

The pottery assemblage from the 2008 excavations at Underhoull stands in the region of 400 individual sherds. The majority of the assemblage (85%) was recovered from the deposits in Area A (north of the baulk), the remaining 15% from Area B (south of the baulk). The pottery can be characterised as being made from a sandy, often dark grey clay with a high mica content and quartz grit inclusions. Occasional steatite, and unidentified dark grits are present in some of the sherds. Although for the most part dark grey, the sherds range in colour and include buff, brown and dull orange (mostly on the exterior surface of the sherd). In terms of form, the vessel walls appear fairly straight and plain with the tops of the rim being either rounded or squared. A small number of bases were noted within the assemblage, both round-angled and square-angled being recorded. Where sherds retain the exterior surface, it is generally not well finished and has a bumpy, finger-moulded appearance.

Of the assemblage from Area A, the pottery from context [185], an occupation-type deposit in the centre of the structure (top room), accounts for 90% of the assemblage. This context is sealed by [070] which in turn is sealed by [021], a deposit which yielded the majority of the pottery from Underhoull during the 2007 excavations. If the pottery recovered from [070] and [185] in 2008 is added together, it then accounts from 95% of the pottery assemblage from Area A. It is likely that many of the sherds from this context will fit together; conjoining sherds will be investigated and an estimate of the number of vessels represented will be produced. Of particular interest within context [185] are the following. Six sherds (two body and four fragments) from this context have an incised line on the exterior surface. In each case, the line is fairly crudely incised. It is possible that these sherds are from the same vessel. A further body sherd (SF1573), again from [185], is decorated on the exterior surface. Only a small amount of the design survives on the sherd, but it is clear that it is an incised zig-zag.

Several fragments of white glazed pottery with a stamped blue/purple pattern were found within the silty peat deposit in the gully to the north of the north wall of the structure in Area B. These sherds appear to be from the same vessel. A single rim sherd from a pipkin was also found within Area B, from the same deposit (described above). This sherd is fine red/orange clay with a brown glazed interior surface and a ridge decoration on the exterior (running around the circumference of the vessel rim).

3.3.2 Hamar

A small assemblage of pottery was recovered from the excavations at Hamar; three body sherds and several fragments from Area A, and 23 sherds from Area C. The pottery from Area A (House 1) comes from a deposit overlying the bedrock in the west side of the upper

room. The three body sherds are fairly heavily abraded, have a wall thickness of c.13mm and have quartz grit inclusions within the gritty-textured clay matrix. In addition to the pottery, four amorphous pieces of fired clay were recovered from within several contexts in Area A; two from the upper room and two from the gully in the lower room.

The material from Area C (House 2) comes from two deposits outside of the structure, one to the north (consisting of one body sherd) and one to the south (consisting of three rim sherds and 19 fragments). The rim sherds, two of which conjoin, all have a squared top and are straight-walled. The wall of the rim sherds has an average thickness of 7.5mm. Both steatite and quartz grits are present within the sandy, dark grey clay. An amorphous piece of clay was recovered from the north of the structure.

A small amount of later pottery was recovered from the excavations at Hamar, most notably a clay pipe bowl fragment, SF1075, from the area to the north of the structure (House 2) in Area C. The bowl is a slender, tall type. The bowl is devoid of markings, however the base of the heel is marked, in relief, with 'IP'. Above the letters is a crown. The letters 'IP' refers to a maker in London or Bristol in the 17th century; further investigation is needed to narrow down the maker. A small round angled base fragment (SF1164) was found within the gravel deposit (context [369]) on the upper room of House 1 in Area A. The sherd is a fine orange clay (redware) with a linear brown and yellow slip decoration on the interior of the sherd. There is also a small perforation through the base at the point of breakage.

3.4 METAL FROM HAMAR & UNDERHOULL

J.G. McDonnell & Z. Outram

Following the 2008 excavation season, a preliminary assessment of the ferrous and non-ferrous metal assemblage was carried out. The aims of the assessment were to identify the main types of evidence recovered from both Hamar and Underhoull, as well as assessing the analytical techniques that could be applied. The assemblage has been summarised in tables 3.4 and 3.5.

Area	SF number	Context	Metal	Description
B	709	123	Fe	Wire/nail shaft
-	711	Unstrat.	Fe	Nail shaft
B	769	141	Cu-alloy/Fe	Copper alloy and Iron bimetallic object
B	817	101	Fe	Fe fragment
B	1061	074	Fe	Nail shaft
B	1088	167	Fe	Nail
B	1187	140	Fe	Fe object
B	1676	189	Fe	Fe fragment
A	1811	185	Fe	4 Fe fragments – one may be a nail head
A	1868	185	Fe?	Natural?

B	1871	130	Silver	Ring
B	1875	077	Fe	Nail shaft & 3 Fe fragments
A	1925	185	Fe	Nail
A	2015	185	Fe	Hammerscale
A	2029	185	Fe	Hammerscale
B	TRAY	011	Fe	Fe fragment?
B	TRAY	101	Fe	Fe fragments?
B	TRAY	123	Fe	Fe object

Table 3.4: Summary of the preliminary assessment of the ferrous (Fe) and non-ferrous (Cu-alloy) material recovered from the Upper House at Underhoull.

Area	**SF number**	**Context**	**Metal**	**Description**
A	1043	306	Fe	Fe object and mineral preserved organic material
A	1064	362	Fe	Fe fragments
C	1100	1018	Fe	Bar or nail
C	1111	1020	Fe	Large nail, shaft approximately 8mm^2
C	1117	1020	Fe	Bar/blade?
C	1118	1020	Fe	Nail shaft
C	1119	1021	Fe	Nail?
A	1120	408	Fe	Possible nail head
A	1121	404	Fe	Nail
A	1123	404	Fe	Nail shaft
A	1124	399	Fe	Rove
A	1141	242	Cu-alloy	Fragments of copper alloy sheet
A	1161	401	Fe	Nail head
A	1163	369	Fe	Nail head
	1176		Fe	Fe fragments

Table 3.5: Summary of the preliminary assessment of the ferrous (Fe) and non-ferrous (Cu-alloy) material recovered from Hamar

The preliminary assessment of the ferrous and non-ferrous objects recovered from Hamar and Underhoull highlighted that the assemblage was dominated by nails or rods. Some of these items could be more confidently identified as nails, bolts and rivets but others will require characterisation by X-radiography. An assessment of the microstructure of these items may provide information as to the function of some of these items.

The presence of hammerscale from Underhoull suggests that metal working may have been carried out on site. However, only two fragments have been recovered to date, both from the residue of bulk sample SF919. The sorting of the residues from the bulk samples is on-going, and so it is possible that additional material will be recovered as the processing of these samples continues. Evidence of metal working on the site is important as it is in accordance with the classic view of Viking farmsteads. For example, it has been noted in

Greenland and Iceland that a number of the sites contain smithies (Vésteinsson 2000: 169). However, further work on the samples collected from the Upper House at Underhoull is required to investigate this further.

It can be concluded following the initial assessment of the ferrous and non-ferrous objects that the assemblages are almost identical in the variety and type of objects recorded, with nothing to distinguish between the items from Hamar and Underhoull. The two fragments of hammerscale from Underhoull may provide information of metal working being carried out on or near the site, but further work is needed to clarify this.

In addition to metal objects, a significant quantity of 'slag-like' material was recovered from the Upper House, Underhoull. The majority of the material has been identified as fuel ash slag, a silica-rich non-diagnostic slag (McDonnell 2000; McDonnell *et al*. 2007); the largest quantities being recovered from context [093] from the Upper House, Underhoull, located outside of the structure. A preliminary assessment demonstrated that the material was a light, silica-rich cinder fuel ash slag, similar to material found on sites such as Wasperton, Warwickshire (McDonnell *pers.comm*) as well as the slag recovered from Pool (McDonnell & Berg 2007: 455). The similarity in the material from the site and the context in which it was recovered suggests that it was formed through a single one-off event prior to deposition. However, the precise materials that were burnt to form this material, or the processes that were carried out to produce this quantity of the material are unclear. Further research on this material is essential. Firstly, all other major deposits of this material derive from the English Iron Age. Secondly, these examples are deposited in secondary/tertiary deposits, such as pits and ditches, hence the primary and secondary context at Underhoull is significant.

It has been suggested that the reason that the material is found at all relates to the context of deposition: the slag is relatively friable and would break easily if trampled. The significant quantity recovered from Underhoull indicates that it was either deposited towards the periphery of the site, away from the general movement areas around the settlement, it was deposited immediately prior to the abandonment of the site, or that it was deposited as a single event and subsequently undisturbed. The excavation of context [093] during the 2008 season suggested that the material had been burnt *in situ*, contained by a low stone boundary (context [119]). Further investigation of the slag will hopefully determine the processes that created these distinctive deposits at Underhoull.

The Hamar and Underhoull metal and slag-like material assemblage provides an excellent opportunity to investigate aspects of Viking period pyrotechnology. Archaeometallurgical analysis of the iron artefacts would provide comparative data for the analysis of the Pool artefacts (McDonnell & Berg 2007) and Viking iron from Iceland and Scandinavia. Analysis of the slag-like material from Underhoull is essential to determine possible causes of the formation of this material.

Silver ring

A silver ring SF1871 was recovered from Area B at Underhoull, context [130]. It is plain in design with a plano-convex cross section and approximately 4mm broad. The ring is rather

distorted but originally had a diameter of approximately 20mm in diameter. The ring has assay marks on its interior face indicating it was made in Birmingham in 1863 by G.Loveridge & Co. Silver pieces dating between 1784-1890 should also have a sovereign's head mark to show that duty has been paid on them but curiously this piece has no such mark.

3.5 GLASS
J.M. Bond & Z. Outram

Three small fragments of glass were recovered from the 2008 excavation season, summarised in table 3.6, bringing the total assemblage of glass fragments recovered to 14 sherds (11 sherds from Hamar, and 3 sherds from the Upper House, Underhoull). All three fragments were collected from relatively secure deposits and so they do not appear to represent contamination. There were no distinguishing features visible on the fragments of glass, but further analysis will provide more information, such as the chemical composition of the glass. The sherds will also be compared to the other fragments of glass recovered from previous two seasons of excavation at Hamar and Underhoull.

Site	Area	SF number	Context	Dimensions	Description
UND	B	1440	169	16.8 X10 X 1.1mm	Pale green fragment with a pronounced curve - probably a vessel fragment
HMR	C	1146	1038	9.7 X 6.9 X 1.6mm	Pale green fragment. The glass is opaque/cloudy. There is a slight curve to the fragment suggesting that it may be a vessel fragment
HMR	C	1152	1035	9 X 7 X 1.6mm	Pale green fragment. There is a slight curve to the fragment suggesting that it may be a vessel fragment

Table 3.6: Summary of the glass artefacts recovered from the excavations at Hamar (HMR) and the Upper House, Underhoull (UND) during the 2008 excavation season

3.6 SMALL FIND CATALOGUE AND ILLUSTRATIONS

UND08

SF739 [123] Area B Figure 3.1(a)
A large steatite line sinker heavily shaped with a central perforation favouring the wider heavier end. A carved predominantly U-shaped channel runs through the perforation around the weight's longer alignment (157.5x78x54mm).

SF760 [148] Area B Figure 3.1(a)
A finely carved line sinker made from a high quality steatite, possibly imported. The weight tapers significantly with the central perforation set closer to its narrower end. The

channel changes from U-shaped to V-shaped and 11.5mm to 4mm in depth. This channel runs into a basal hole set at the wider, heavier end of the sinker. On the curved lower surface the channel is V-shaped, 5.5mm deep and only runs from the narrow end to the central perforation. The channel on its upper surface is surrounded by a crude but decorative incised groove (138.5x54.5x39mm).

SF777 [011] Area B Figure 3.1(b)
A small fragment of carved steatite, possibly representing part of a gaming board. One surface has been deeply scored with a roughly chequer board pattern but is otherwise unmarked. The other surface contains similar although smaller designs as well as a number of random incised and worn lines (80.5x32x11.5mm).

HMR08

SF1427 [453] Area A House 1 Figure 3.1(c)
A large steatite line sinker finely carved but missing a large fragment from what would have been the wider heavier end. The remaining fragment tapers down its length with a centrally set slightly biconical perforation. A U-shaped channel leads away from this perforation on both sides of the artefact running down its length. Within the fractured end the remains of a possible basal hole is still visible (114x69x37mm).

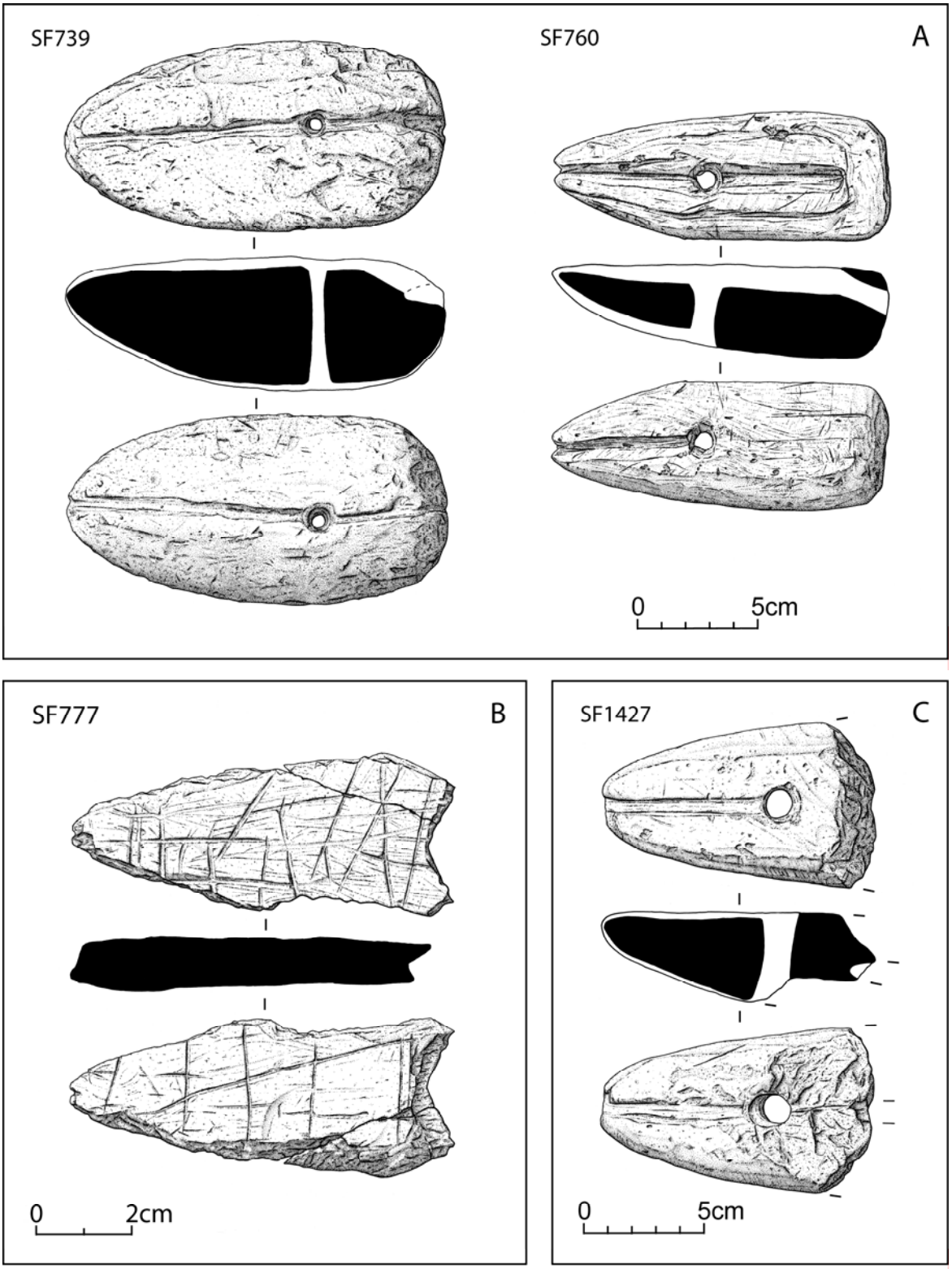

Figure 3.1: Illustrated artefacts from the 2008 excavation season (a) SF739 and SF760, line sinkers from the Upper House, Underhoull, (b) SF777, possible fragment of a gaming board from the Upper House, Underhoull, (c) SF1427, line sinker from House 1, Hamar.

4. ENVIRONMENTAL EVIDENCE

J.M. Bond, Z. Outram, M. Church (Durham University), J.E. Cussans, J.T. McKenzie & J.R. Summers

4.1 BIOARCHAEOLOGICAL SAMPLING

J.M. Bond and Z. Outram

The environmental sampling programmes used at the two sites assessed during the 2008 excavation season were vital in addressing the research aims proposed at the start of the project. In order to maximise the information available from some of the more delicate deposits reached during the 2008 season, micromorphological samples were collected from key sections at Hamar and the Upper House, Underhoull. This work was carried out by Dr. M. Church of Durham University.

Deposits from within the upper room of House 1 at Hamar and the deposits within House 2 were extensively sampled for a range of standard environmental techniques. In addition to this, deposits located within internal and external areas of Houses 1 and 2 were assessed. It was noted during the 2006 and 2007 seasons that the archaeology in many areas of the site at Hamar was quite shallow, and so a strict sampling strategy was implemented to ensure that the maximum amount of information was collected.

The excavation of the Upper House, Underhoull began in 2007 and continued in the 2008 season, focusing on the internal and external deposits associated with the structure, as well as investigating the boundaries to the site. Previous work at the Upper House, Underhoull, demonstrated the potential for the survival of uncarbonised plant macro- and micro-fossils, including pollen, due to a significant layer of peat sealing parts of the site. It was important to focus the environmental programme on providing information relating to the conditions of the archaeological deposits and the evidence that has survived. The sampling strategy therefore included the use of monolith tins to collect block samples, as well as samples to recover insect and plant remains.

Bulk samples were taken from all significant contexts at both Hamar and from the Upper House, Underhoull, such as from middens and floor surfaces. The samples were processed in a flotation tank in Shetland and Bradford: the light fraction was collected in a 500µm mesh and the residue in a 1mm mesh. Bulk sample sizes ranged from 1-70 litres, the majority being between 20-40 litres. In total, 67 bulk samples were taken from Hamar, sampling material from 60 different contexts. The excavations of the Upper House, Underhoull produced 43 bulk samples from 34 different contexts.

In addition to bulk samples, GBA (general biological analysis) samples were collected from both sites to assess the presence of insects and uncarbonised plant remains. A total of three GBA samples from three contexts were collected from Hamar, while five GBA samples from five contexts were collected from the Upper House at Underhoull. The samples will be analysed in the laboratories in Bradford. Spot samples were also collected from discrete, significant deposits from both sites; 15 from Hamar and 10 from the Upper House, Underhoull.

An extensive sampling programme for pH, phosphate, and magnetic susceptibility analysis was implemented from key deposits at both Hamar and the Upper House, Underhoull, resulting in over 250 individual samples being collected. A number of these were collected as part of doctoral work by Robert Legg (see section 6.1.1).

The samples collected from the 2008 excavation season are in the process of being investigated, providing evidence of mammal and fish bones, charred plant remains and marine shells. The samples have been processed in part by trained volunteers from the University of Bradford, and their analysis is ongoing.

4.2 PALAEOBOTANICAL REMAINS FROM HAMAR AND THE UPPER HOUSE, UNDERHOULL

J.M. Bond, M. Church, J.R Summers & Z. Outram

The sampling programme implemented intensified for the final excavation season at the sites of Hamar and the Upper House, Underhoull, in order to maximise the information obtained. Building upon the success of the sampling programme in the 2007 excavation season, this year's sampling and flotation programme maintained the momentum. Due to more favourable circumstances, it was in fact possible to process much larger volumes of sampled sediments than in previous seasons, reducing the backlog of samples. Sampling continued apace at both Hamar House 1 and House 2 as excavation reached a number of interesting hearth features and occupation levels. Sampling also intensified at the Upper House at Underhoull as the excavated area was increased and, as at Hamar, hearths and occupation surfaces were encountered.

Assessment of the 2007 samples is now complete and analysis of the 2008 material is ongoing. For the purposes of this report, only identified macro-remains from the assemblages gathered in 2008 will be discussed since they have most relevance to the other reports in this volume. Since analysis is ongoing, the results presented here are not fully quantified, instead representing a qualitative assessment of the cultivated and wild plants identified to date. Full quantitative analysis of the material will be presented in later publications.

4.2.1 Palaeobotanical remains from Hamar

Hamar House 1:

To date, five samples from House 1 at Hamar (Area A) have been assessed. One of these (SF1327, context [448]) is from the sunken-floored structure discovered at the end of the 2008 season. The others are from the fill and occupation of the upper room (SF1291 and SF1326 from context [402] and SF1325 from context [246]) and the area south of the cross wall (SF1314 from context [404]). The material identified to date shows the great potential of these assemblages.

The cereals recovered are hulled six-row barley (*Hordeum vulgare*) and oat (*Avena* sp.). All samples contained reasonable concentrations of grain. Two in particular, SF1325 from context [246] and SF1327 from context [448], were quite rich, containing over 50 cereal grains each and numerous other carbonised seeds and plant remains. This is greater than any from the 2007 season.

Unfortunately, no oat floret bases have yet been identified, which makes the determination of the species present problematic. It is still, therefore, not possible to firmly state whether this cereal was being cultivated. However, the frequency with which it seems to be occurring (four out of five samples) and the fact that many of the grains recovered are relatively large suggests a domesticated rather than a wild variety and that oat was at least in common usage at the site, if not being cultivated. The size ranges of the oat grains recovered from Hamar are comparable to those recovered from Pool, Orkney (Bond 2007, Table 7.1.5).

The list of wild plant taxa identified to date is quite promising and includes: *Ranunculus* spp. (Buttercups); *Chenopodium* sp. (Goosefoot); *Montia Fontana* (Blinks); *Stellaria media* (Chickweed); *Spergula arvensis* (Corn Spurrey); *Rumex* spp. (Dockens); *Brassica* sp. (Cabbage family); *Empetrum nigrum* (Crowberry); *Tripleurospermum maritimum* (Sea Mayweed); *Plantago lanceolata* (Ribwort Plantain); *Potamogeton* sp. (Pondweed); *Carex* spp. (Sedges); and *Poa* sp. (Meadow Grass).

A number of the wild taxa include wetland and heathland plants, such as Sedges, Crowberry and Pondweed. Fairly large quantities of peat and the frequent occurrence of heather (*Calluna vulgaris*) charcoal, leaves and flowers also combine to indicate that heathland and boggy areas were probably exploited to this end. Numerous taxa, including Goosefoot, Chickweed, Corn Spurrey, Ribwort Plantain and Meadow Grass can constitute weeds of cultivated land. They provide further evidence for the view that cereals were being cultivated locally to the site (see also Bond *et al.* 2007: 78-79). As well as heathland and arable habitats being represented, the proximity of the site to coastal habitats is indicated by the quite common occurrence of Sea Mayweed in four of the five samples.

Evidence of *Brassica* sp. (Cabbage family) seeds demonstrates that these potentially economically important plants were present in and around the site but it is problematic to make any interpretations of their presence, especially at this stage, since the seeds are not a reliable proxy for the presence of the leafy or other fleshy parts that are more likely to represent a food resource. In addition to this, the seeds can be used as a flavouring, although it is dangerous to make such interpretations at this stage. Similarly ambiguous are the Crowberry seeds, which could represent the gathering of berries as food or brought from heathland areas in fuel supplies. Further analysis is needed to investigate all of these issues in greater detail.

Sample SF1327 from context [448], part of the sunken-floored structure, is of particular interest. Over 50 cereal grains were recovered from this 38 litre sample and, although many were abraded, numerous hulled barley and oat grains were recognised. The wild plant assemblage included numerous taxa that could be interpreted as weeds of cultivation. This

can be used to suggest that cereal cultivation was taking place in the local area from some of the earlier phases of the settlement. Results of further analysis of material from this fascinating feature are eagerly anticipated.

Hamar House 2:
House 2 (Area C) is also providing some interesting results, which will hopefully complement those from House 1. Although the radiocarbon dates indicate a later date for this structure, it is still of great importance for understanding the settlement history of Unst.

So far, four samples from the 2008 season have been assessed from contexts related to the occupation of the interior of the structure. Three of these are quite small (2-3 litres), which may account for only two (SF1302 from context [1031] and SF 1316 from context [1045]) containing cereal remains. Samples from the infill of the structure yielded a large number of cereal grains, as outlined in the previous DSR (Bond *et al.* 2007: 79). As from House 1, the cereals are both hulled barley and oat, demonstrating that these crops continued to be important in the area at this time.

The range of wild taxa is similar to that from House 1, including: *Ranunculus acris/bulbosus* (Meadow/Bulbous Buttercup); *Montia Fontana* (Blinks); *Stellaria media* (Chickweed); *Spergula arvensis* (Corn Spurrey); *Rumex* spp. (Dockens); cf. *Brassica* sp. (Cabbage family); *Carex* spp. (Sedges); and *Poa* sp. (Meadow Grass). Some of these, such as the Sedges, are likely to have been incorporated with fuel resources, with peat and heather remains indicating continued exploitation of heathland and boggy areas for fuel. There are also a number of plants that can be considered weeds of cultivation (see above), which can be used to suggest that arable agriculture in the local area continued in this period. This is of course subject to further analysis.

Fragments of charcoal have been recovered from the samples, but further identification and analysis of the charcoal material must be carried out to address questions of local wood resources and the potential identification of trade and driftwood

4.2.2 Palaeobotanical remains from Underhoull
As already stated, the 2008 saw the first results from intensive sampling and flotation of deposits from the excavations at the Upper House at Underhoull. To date, assessment of the charred plant remains has focussed on hearth and occupation deposits.

One of the most interesting finds was from sample 920 [170], a deposit rich in steatite in the yard to the north of the structure. A flax seed (*Linum usitatissimum*) was discovered in this assemblage, the first to be identified from any of the structures under investigation. A full discussion of the importance of flax within the Northern Isles has been presented by Bond (2007, 186). Needless to say, it is often considered an indicator of Viking and Late Norse activity and may have had important economic and potentially symbolic roles within Scandinavian societies of this period (*ibid;* Owen & Dalland 1999). However, it must be stressed that an individual seed does not serve as evidence of full cultivation and the wild plant taxa within this sample (Blinks and Sedges) cannot be considered weeds associated with flax cultivation. The sedge seeds are uncharred and may be intrusive. There were also

five barley grains and a single oat grain from this assemblage, the barley being quite large and plump.

The other samples from this settlement are from the central area of the structure, the SW annexe and the SE annexe. Compared to some of the occupation surfaces and hearths from Hamar House 1, the Underhoull samples do not appear to be as rich. Concentrations of cereal grains are relatively low but both hulled barley and oat have been identified. As at Hamar, many of the grains are abraded and the oats are frequently better preserved than the barley. The taphonomic implications of this are not yet clear but further work may offer some insights. Some of the grains show dimpled surfaces. This is a common feature on grains recovered from sites in the Northern Isles (e.g. Bond 2007, 184-185) and may imply harvesting while the grains are immature, early germination (either in storage or as deliberate malting) or fungal disease.

As at Hamar, no oat floret bases have yet been identified. However, oat is present in five of the seven samples processed to date, compared to the occurrence of barley in six. This would again imply that oat was in common usage at the site even if it cannot be used to imply cultivation, although the number of grains is generally lower than barley.

The wild taxa, are similar to those from the houses at Hamar and many other sites in the region (e.g. Bond 2007, 173-193; Dickson 1999, 113-117; Donaldson 1986, 216-219; Bond & Summers *in press*), include: *Ranunculus* spp. (Buttercups); *Montia Fontana* (Blinks); *Stellaria media* (Chickweed); *Spergula arvensis* (Corn Spurrey); *Rumex* spp. (Dockens); *Empetrum nigrum* (Crowberry); *Plantago lanceolata* (Ribwort Plantain); *Potamogeton* sp. (Pondweed); *Carex* spp. (Sedges); and *Poa* sp. (Meadow Grass). As at Hamar House 1 and House 2, heathland and boggy areas are represented along with likely weeds of cultivation. Large quantities of peat and the frequent remains of heather were also recovered from most of the Underhoull samples, suggesting that similar environments were exploited in the surrounding area for fuel resources, as at Hamar.

4.2.3 Discussion and concluding remarks

With the relative absence of faunal remains from any of the three structures excavated, botanical remains represent our best opportunity to investigate their economies. In addition, cereal grains from these assemblages form the basis for the radiocarbon dating programme. A number of important dates have already been produced using cereal grains recovered from samples taken in the 2007 season (Outram *et al*., Chapter 5, this volume).

Societies in areas such as Unst, as in other parts of the Scottish Isles, are frequently perceived as marginal by modern eyes (e.g. Harding 2004: 12). In addition to the large numbers of identified Viking and Norse homesteads (Bond *et al*. Chapter 1, this volume), these newly excavated datasets can perhaps also contribute to an argument against such biases. It has already been considered that a number of the wild plant taxa in the assemblages from Hamar represent crop weeds which would suggest local cultivation of cereal crops rather than import from other parts of the archipelago (Bond *et al.* 2007: 78-79). The results to date from the 2008 season add further weight to this view and the early assessment of material from the Upper House at Underhoull is producing similar results. It

may also be possible to add flax to the list of cultivars, although it is too early to make a firm judgement on current data. This might suggest the presence of successful mixed agricultural economies within Viking and Late Norse Unst, not just the more specialised economies such as those indicated by Sandwick (Bigelow 1985:118-124). Further analysis will clarify these results and allow firmer conclusions to be drawn. As previously stated (Bond *et al.* 2007: 79), these assemblages are very exciting since they represent the first systematically sampled deposits of their kind from Viking and Late Norse Unst.

The environments and settings vary greatly between Hamar and Underhoull and soil conditions contrast significantly. The opportunity to compare detailed datasets from these two quite different settlements will help add considerably to our understanding of how people in this period adapted to and exploited their local environments. Early evidence indicates that there are similarities in terms of the cereals utilised and perhaps grown by the inhabitants of the settlements, as well as the types of environments exploited for fuel. By integrating results from detailed archaeobotanical analyses with other lines of economic and environmental evidence it will be possible to develop a more detailed understanding of Viking and Late Norse societies within Unst.

4.3 MAMMAL BONES

J.E. Cussans

4.3.1 Hamar

In the 2007 season the Hamar site yielded two pieces of poorly preserved mammal bone (Cussans 2007). This year only one bone was recovered from Hamar but this time the preservation was good. The bone was recovered from context [396] an orange-brown layer in the upper room of House 1 containing large angular rubble. The bone was a right sheep pelvis and was generally well preserved; it showed some signs of weathering with the bone surface being flaky in some areas approximating to Behrensmeyer's (1978) weathering stage 2. No other signs of bone modification were noted.

Examination of the various sexually dimorphic features of the pelvis based on characteristics determined by Boessneck (1969) and Hatting (1995) and the pubic index devised by West (1990) the specimen was determined to be that of a castrate. The interschiatic angle, the acetabulum and the pubis all had much more of a female morphology. However the dorsal angle of the ilium did not have a male or female appearance but was most similar to that of a weather castrated at one month old (Hatting 1995). Finally measurements of the pubis (breadth and length, see West 1990) were taken and the pubic index (PBx100)/PL) was calculated giving a value of 28.6 falling just below the range for Soay males and right in the middle of the range for Soay castrates (ibid.). Hence it would seem that this particular specimen was castrated reasonably early in life, probably at about one month of age, allowing it to develop a morphology closer to that of a female than a male.

4.3.2 The Upper House, Underhoull

As for the 2007 season no bone was recovered in the 2008 excavations due to the adverse preservation conditions for bone caused by the peat cover at the Underhoull site. However evidence of animals being at the site was recovered this year. From within the south west annexe in context [189] a cattle horn was recovered in two pieces (SF1669). This was the actual keratinous horn sheath, (better suited to the preservation conditions encountered at Underhoull) and not the bone horn core that is more commonly found.

4.4 FISH BONES

J.E. Cussans

4.4.1 Hamar

Sorting of bulk sample light fractions has revealed the presence of a few fragments of fish bone. Bulk sample SF1321 [1051] from Area C contained three fragments of fish one of which was burnt and all of which were badly degraded. Bulk sample SF1316 [1045], also from Area C contained one very tiny fragment of fish bone. Finally Bulk sample SF1293 [350] from Area A contained one possible fragment of fish bone. These remains show that although bone preservation at the site is generally poor there is definite merit in searching for such remains in sieved samples.

4.4.2 The Upper House, Underhoull

Underhoull also yielded fish remains from one of the sieved samples examined so far, despite the complete lack of other bone remains at the site. Bulk sample SF903 [166] contained three fragments of calcined fish bone. No doubt that the burning of the bone and the nature of the ashy matrix within which it was found contributed greatly to the bone's survival.

4.5 SOIL MICROMORPHOLOGY

J.T. McKenzie & M.J. Church

Thin section micromorphology is an established technique in archaeology and one which is increasingly seen as an important extension to both field description and the interpretation of site stratigraphy (e.g. Davidson and Simpson 2001; Goldberg and Macphail 2006). Analysis of micromorphological soil features can not only identify elements relating to human activity which may not be identifiable during excavation, but also allow these to be set in context with both the natural pedogenetic and disturbance-related processes to which an archaeological site is subject, both during and after its occupation. When coupled with more traditional spatial and stratigraphic archaeological analyses, soil micromorphology can therefore address key archaeological questions on, especially, the mechanics of site formation and the nature of the soils and sediments - and therefore the wider environment - of the site in question. A key part of the 2007 Viking Unst excavation season was the selection for micromorphological analysis of a range of contexts at both the Hamar Houses 1 and 2, and the Upper House, Underhoull sites. This approach was continued for the 2008

excavation season and a summary of the samples collected for analysis is provided in tables 4.1 and 4.2.

Sample number	Context	Description
874	025/026	Pollen sequence through the purple/black peat layers within the southern extension of the site
896	172/174/166	Sample through possible *in situ* orange-red ash from the putative hearth [166] in the southern annexe, and containing a concentration of barley grains
907	181	Dark peaty material to the north of the field boundary, possibly relating to colluvium/an old ground surface abutting wall [182]
909	183/186	Material associated with the field boundary, possibly relating to an old ground surface/amended soil, external to wall [182]

Table 4.1: Summary of the samples collected from the excavation of the Upper House, Underhoull for assessment using soil micromorphology

The collection of Kubiena samples from the Upper House at Underhoull sampled a range of deposits, including internal ashy layers and deposits associated with the field boundary to the south of the main structure. All of the samples were collected by Dr M. Church. The area sampled during the 2007 season within the southernmost area of the site (McKenzie 2007; 80), was reopened to allow further samples to be collected for dating and environmental analysis. A block sample SF874 was collected from contexts [025/026] to investigate the pollen sequence through the peat, and can be directly related to the samples that were collected in the previous season.

A small trench was placed to the south of the site in order to investigate the chronological relationship between the external deposits contemporary to the paving and the potential prehistoric field boundary (Area F). Two Kubiena samples were collected (SF907 & SF909) from the base of the section in this trench. SF907 was taken from the basal layers of [141] that abutted against the possible prehistoric boundary on the side of the Norse structure. The sample was taken to assess the formation processes of this deposit and to establish if the deposit related to an amended old ground surface or a colluvial soil accumulating against the boundary. SF909 was taken on the other side of the boundary, through the interface of the lowest layers of [183] and the more peaty [186]. Again, the sample was taken to assess the formation processes of the soils and to assess any amendment strategies in place for the different soils.

The final Kubiena sample (SF896) collected from Underhoull, related to the deposits within the southern annexe. An orange-red spread of ash and a putative hearth were recorded within this area. The ash appeared to contain *in situ* ears of barley, but it was not clear if this material could be classified as a surface or a dump of ash. Sample SF896 was collected, which sampled contexts [172], [174] and [166] and related to the material sealing the hearth/ash deposits, context [166]. The ash layers directly sealed an area of flagging,

[176]. The identification of microlamination features caused by packing and trampling of material would confirm if this deposit was an occupation surface or an ash dump.

Two Kubiena samples were collected from the excavations of House 1, Hamar during the 2008 season, summarised in table 4.2:

Sample number	Context	Description
1272	287/306	The upper and lower fills of the channel feature within the southern doorway of the lower room
1296	399/421/422/388	A sample through possible occupation surfaces within the northern area of the upper room.

Table 4.2: Summary of the samples collected from Hamar for assessment using soil micromorphology

In the upper room at Hamar House 1, where a substantial depth of archaeology remained, micromorphological sampling focused on the presence of a possible occupation surface in the northern area of the room. A rabbit burrow had cut through the deposits, exposing the sequence of deposits as well as the bedrock at the base of the burrow. This section was cleaned and sampled for soil micromorphology (SF1272). The deposits cut by the rabbit burrow included (from the top to the base of the sequence):

- [399] - a mid brown layer containing large fragments of charcoal
- [421] – a brown ashy layer
- [422] – a red ash layer associated with burnt bedrock
- [388] – the natural bedrock within this area of the site.

The deposits from this area formed a coherent sequence of different ashy deposits that post-dated the formation of context [422], a potential ashy occupation surface, which in turn directly sealed the natural bedrock in this area. Microstructural analysis of these contexts, particularly the identification of microlamination features caused by packing and trampling of material, may confirm the nature of context [422]. In addition, information can be obtained regarding the makeup of these deposits, and thus the nature of activity upon these surfaces.

During the 2007 excavation season a number of Kubiena samples were collected from the lower room to investigate the generally homogeneous deposits that infilled the room. Samples were also collected from the channel feature that ran down the centre of the structure and under the southern doorway (McKenzie 2007; 81). An addition sample was collected from the infill of the channel feature during the 2008 season, sampling material within the southern doorway that had not been removed during the previous season. Two contexts were sampled and related to the ashy fills of the channel: contexts [287] and [306]. Micromorphological samples were obtained from both contexts in order to investigate the

nature of these infills and any information they may provide on the purpose and use of the gully and the overall use-history of the more severely truncated lower room.

4.6 A GEOARCHAEOLOGICAL ASSESSMENT OF DEPOSITS AT HAMAR AND THE UPPER HOUSE, UNDERHOULL

Z. Outram & M.J. Church

A programme of geoarchaeological assessment of occupation deposits was carried out at Hamar during the 2007 excavation season, and was continued at both sites in the 2008 season. It was hoped that any activity carried out on these deposits would be reflected in the chemical and magnetic signatures recorded by the samples. A number of techniques have been used to analyse the deposits with the aim of identifying evidence that relates to its use, including: magnetic susceptibility and viscosity, organic and inorganic phosphates, pH, and soil lipid analysis. A multidisciplinary approach is advantageous as it allows the information produced by the different techniques to be compared, contrasted and correlated, providing a more detailed assessment of the processes that resulted in the formation of the sampled deposits.

Samples were collected at regular intervals where possible, spaced 20cm apart from the upper room House 1 and at the Upper House, Underhoull. The exceptions to this relates to the samples collected using the *in situ* magnetic susceptibility survey, which was carried out using a 5cm grid. The deposits sampled at Hamar related to a potential occupation surface defined by contexts: [369], [389], [401], [402], and [246]. The deposits sampled from the interior of the Upper House, Underhoull, collected material from a 2m wide transect through the centre of the structure, and sampling contexts: [070], [123], [143], [168], and [169].

4.6.1 Magnetic Susceptibility & Viscosity

The background magnetism of a site is a measure of the concentration and composition of the magnetic minerals present, as well as the size and shape of the magnetic grains within these minerals. This largely reflects the underlying geology of the area, but the effects of human and natural activities can enhance/alter these different parameters, such as through heating/burning, fermentation and dehydration (Tite & Mullins 1971; 209; Thompson & Oldfield 1986; 75; Dearing 1999; 60). With this in mind, samples were collected for assessment using both magnetic susceptibility and magnetic viscosity in order to identify any possible evidence of enhancement to the deposits.

Magnetic susceptibility provides a measure of the ability of a material to become temporarily magnetised when placed within a magnetic field, being dependent on the mineralogy, size and concentration of the magnetic minerals present. Enhancement of the magnetic susceptibility of a deposit is largely related to processes of heating/burning, converting non-ferrimagnetic minerals to ferrimagentic minerals, such as magnetite (Thompson & Oldfield 1986; 75; Marwick 2005; 1359). In addition to heating, fermentation/decay processes of organic material within a deposit have been linked to the enhancement of magnetic susceptibility through the action of microbial, organic matter and

iron within the soils (Gaffney & Gater 2003; 38; Tite & Mullins 1971; 209-210; Linford 2004; 178). Both of these processes can occur in archaeological deposits. The patterns of enhancement across the structure will therefore be useful in the interpretation of the site.

In terms of the magnetic viscosity, this provides a measure of the ease of which magnetic grains become aligned with an external magnetic field. Materials with higher magnetic viscosity values are dominated by larger magnetic grains, as these take longer/more energy to align with the magnetic field (Gaffney & Gater 2003; 46). It has been noted that the repeated heating and cooling of magnetic materials tends to reduce the size of the magnetic grains, corresponding to a decrease in the magnetic viscosity (Gaffney & Gater 2003; 46). An assessment of this parameter will therefore provide some indication as to the intensity of activity within the area, as well as the occurrence of industrial activities such as metal working.

In addition to the individual measurements of magnetic susceptibility and viscosity, the benefits of combining the assessments have been demonstrated. By simply determining the relationship between these two parameters, Gaffney and Gater have shown that a distinction can be made between samples enhanced through industrial and domestic activities, providing further information regarding the intensity of the activities carried out at Hamar and the Upper House, Underhoull (Gaffney & Gater 2003; Figure 157).

The measurements of magnetic susceptibility and viscosity are carried out on 50g of dried and sieved samples. The assessment of magnetic susceptibility will be carried out using a low field A.C. susceptibility bridge (Evans & Heller 2003; 63), while the magnetic viscosity will be assessed using a pulsed induction meter (P.I.M). In addition to the laboratory measurements of magnetic susceptibility, *in situ* assessments were carried out in the field using an *Exploranium* KT-9 Kappameter across a 5cm grid of the lower room of House 1.

The preliminary results from the use of the *Exploranium* meter have been very encouraging for the measurements collected from the lower room of House 1 at Hamar during the 2007 season. The background level of magnetic susceptibility was subtracted from the readings before being plotted as a 2-dimensional contour map; higher values were represented as the darker areas of the plot and therefore highlighted potential 'hotspots' of activity within the lower room. It was clear that there were two main areas of high magnetic susceptibility measurements, corresponding to the area adjacent to the southern doorway, and a small circle within the upper area of the lower room, which appears to correspond to a small gully feature running down the centre towards the upper room (figure 4.1). It is not yet clear what these 'hotspots' relate as the other geoarchaeological techniques applied to the samples have not yet been completed.

4.6.2 Phosphate analysis

The use of phosphate for geochemical prospection is a well documented technique (Bethell & Máté 1989). Phosphorus is abundant within soil systems, being present in both inorganic and organic forms, as well as in both soluble and insoluble forms. The use of this element in prospection is based on the fact that different activities enhance the levels of phosphate

within a deposit, such as disposal of refuse, the presence of manure, plant remains and ash, and the preparation of food (Terry *et al.* 2004; Guttmann *et al*. 2005; Bethell and Máté 1989; 303; Middleton 2004; 53-54). The abundance and stability of this element within the archaeological record therefore supports its use as an indicator of human activity. However, the fact that so many processes result in an enhancement of phosphate complicates the significance of the results, making it difficult to determine what an enhanced phosphate signal specifically relates to for the site in question (Middleton 2004; 55).

In terms of the assessment of the material from Hamar and Underhoull, the relative concentrations of both organic and inorganic phosphates will be compared, providing some indication of the source that dominates the phosphorus signal of the samples. The samples will be processed using the standard molybdenum blue colorimetry method using 0.1g of dried and sieved material (Murphy and Riley 1962, in Holliday and Ganter 2007; 309). A preliminary assessment of the potential of phosphate analysis has been carried out by Robert Legg from the lower room at Hamar (Legg 2007) and has produced some promising results. However, the assessment and interpretation of these samples is ongoing.

4.6.3 Soil Lipids

The preservation of lipids within archaeological contexts has been frequently demonstrated within the literature (Copley *et al*. 2005; Heron *et al*. 1991; Bull *et al*. 1999; Simpson *et al*. 1999; Heron 2001). It has been demonstrated that key lipid biomarkers can be used to identify the activities that were occurring. Of importance to the assessment of the deposits at Hamar is the identification of lipids associated with manure. The main lipids of interest are 5β-stigmastanol and coprostanol, lipids frequently associated with herbivorous faecal remains. In addition, bile acids have also been shown to persist in archaeological soils, such as deoxycholic and lithocholic acid, which are indicative of both human and cattle faecal remains (Simpson *et al*. 1999; 223; Simpson *et al*. 1998; 742; Heron 2001; 569). The presence of these key lipid biomarkers within the samples collected from Hamar would indicate the presence of faecal matter within the lower room of House 1. This in turn could be used to suggest whether the lower room was used as a byre during its final use.

A total of six samples were collected for analysis from the lower room and prepared for assessment using gas chromatography-mass spectrometry (GC-MS). This technique is one of the most effective methods of separating, detecting and identifying complex mixtures of lipids (Evershed 1993; 359). This work is in its preliminary phases at present, but will be crucial for the understanding of the function of House 1 within its later period of use.

4.6.4 pH measurements

The measurement of pH indicates the relative acidity or alkalinity for a given sample. Human activity on a site can influence the pH level of the local area through the addition of certain materials, such as ash, mortar, vegetation etc. In addition to this, the pH of a deposit will affect the preservation of certain types of materials, as well as the stability of certain elements, such as phosphorus within a deposit. pH measurements will therefore add vital background information to the study of these deposits. Samples were processed using a Jenway Model 3150 pH meter using 10-15ml of material.

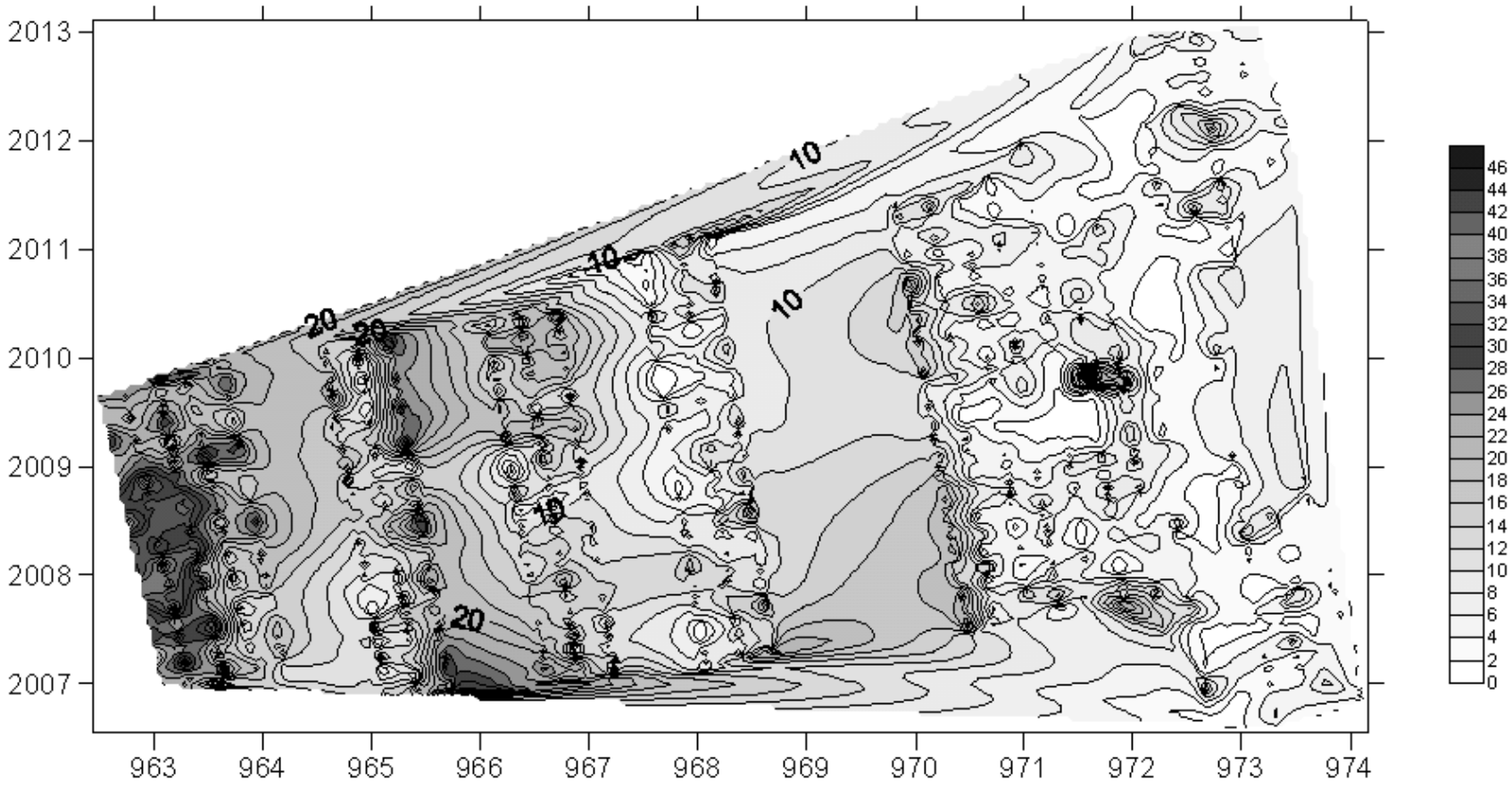

Figure 4.1: The graphical representation of the magnetic susceptibility survey of the lower room of House 1, Hamar, plotted using Golden Software Surfer 8. Image produced by Robert Friel (2008). The axis relate to the site grid points (x and y), with the intensity scale relating to the strength of magnetic susceptibility recorded by the deposits, measured in SI units. Darker colours correspond to higher values of magnetic susceptibility recorded at that location.

5. DATING AT HAMAR AND THE UPPER HOUSE, UNDERHOULL

Z. Outram, C.M. Batt, G.T. Swindles, & M. Church

5.1 OBJECTIVES OF THE DATING PROGRAMME

The main aim of the dating programme of the Viking Unst Project is to provide a precise absolute chronology for the development of the sites under assessment. This is seen as an essential part of the overall research agenda and is particularly important given that there are relatively few scientific dates produced for the North Atlantic during the Viking and Norse periods (Jansen 1972, 30; Fridriksson & Vésteinsson 2003). Dating these structures is crucial for answering the research questions proposed as part of the Viking Unst Project. Without accurate dates we cannot begin to build a model for Scandinavian settlement and society on Unst or to relate it to other North Atlantic sites.

In addition to the archaeological dating methods of stratigraphy and typology, three scientific dating techniques have been employed at the sites of Hamar and Underhoull; AMS radiocarbon dating, archaeomagnetic dating and tephrochronology.

5.2 AMS RADIOCARBON DATING

AMS radiocarbon dating forms the major component of the dating strategy. Contexts for dating have been selected by J. Bond, Z. Outram, C. Batt, G. Swindles and M. Church. Decisions were based on the availability of suitable material, the integrity of the deposit and the importance of its position within the stratigraphic sequence. It was noted that the deposits excavated during the 2006 season at Hamar were heavily bioturbated, possibly compromising the security of the contexts in terms of movement of residual/intrusive material through the sequence of deposits. It was concluded that the selection of material for radiocarbon dating should be weighted towards the deposits sampled during the 2007 and 2008 season, with the exception of the deposits at the base of the trench first excavated by Stummann Hansen (2000) and selection and preparation of samples is ongoing.

The AMS technique allows small samples to be dated, reducing interpretive difficulties due to contamination, delayed use and residual material. The main material which used is charred barley grains due to the short-lived and seasonal nature of the grains. The grains have been obtained by flotation of carefully excavated samples (see Section 4.1). The results of the radiocarbon dating are calibrated using the Oxford Radiocarbon Accelerator unit programme OxCal v.3.10 (Bronk Ramsey 2005) that utilises the most recent Reimer *et al.* (2004) calibration curve (INTCAL04) and, where appropriate, Bayesian models will be used to interpret the results. The final results will be presented in appropriate academic publications.

A total of six radiocarbon dates have been produced to date, five from Hamar and one from the Upper House at Underhoull, summarised in table 5.1. There is a good agreement recorded for the dates from the different areas sampled at Hamar, and they are broadly as expected, but further dating evidence is required to enable questions regarding the length of use of the site to be investigated more fully.

Site code	Sample code	Context	SF number	Area	Uncalibrated date (BP)	Calibrated date (95% confidence)
HMR	GU-16692	089	075	A	950±30	AD1020-1160
HMR	GU-16693	165	350	A	945±30	AD1020-1160
HMR	GU-17734	306	864	A	900±30	AD1030-1220
HMR	GU-16694	261	849	C	310±30	AD1480-1650
HMR	GU-16695	305	841	C	365±30	AD1440-1530 (51.5%); AD1540-1640 (43.9%)
UND	GU-17733	026	994	A	970±30	AD1010-1160

Table 5.1: Summary of the AMS radiocarbon dates produced for Hamar (HMR) and the Upper House, Underhoull (UND)

The date produced from the Upper house, Underhoull samples *Sphagnum* leaves and stems collected from the peat that directly seals the archaeological deposits in the west of Area A. The date therefore relates to the onset of peat development in this area, being an important event in the life of the site. However, this date should be regarded as preliminary until further dating evidence can be produced to support it.

5.3 ARCHAEOMAGNETIC DATING

The method of archaeomagnetic dating assesses *in situ* burnt features in terms of the last heating event recorded by the magnetic minerals within the clay.

Standard sample collection methods were carried out by attaching a plastic reference marker to the feature with fast-setting glue or the insertion of plastic tubes into soft deposits (Clark *et al.* 1988, 655-7). The samples were orientated in the present geomagnetic field using a magnetic compass. Magnetic direction is determined in the laboratory using a spinner fluxgate magnetometer and the stability of the sample is assessed using alternating-field demagnetisation. The stable magnetic direction is calibrated using the UK calibration curve to give a calendar date at 95% confidence (Clark *et al*. 1988; Batt 1997) as well as the most recent calibration curve, Rendate (Zananiri *et al.* 2007).

A total of seven features were sampled for archaeomagnetic dating during the 2008 season; four from the Upper House at Underhoull and three from the structures at Hamar. Work is ongoing but the samples are summarised in table 5.2:

Site code	Sample	Context	SF No.	Area	Description
UND	AM148	216	1019	A	Bright red ashy deposit sealed by [093], marking a possible burning event and containing a large quantity of fuel ash slag
UND	AM149	166	1365	B	Putative hearth in south east annexe, reddish orange spread of burning containing many carbon flecks.
UND	AM150	166	1367	B	Putative hearth in south east annexe, reddish orange spread of burning containing many carbon flecks

UND	AM151	214	1369	B	Orange/red hard baked ashy deposit in south-west annexe.
HMR	AM152	345	1420	A	Red ash hearth sealed by black ash [346] in the annexe, against wall face [009]/[079]
HMR	AM153	1044	1593	C	Bright red area of burning within House 2, associated with areas of black/grey ash.
HMR	AM154	246	1595	A	Area of possible burning on the west side of the upper room of House 1, associated with burnt bedrock and fragments of charcoal.

Table 5.2: Summary of the archaeomagnetic samples collected from Hamar (HMR) and the Upper House at Underhoull (UND).

5.4 TEPHROCHRONOLOGY

The principles behind using volcanic ash (tephra) as a dating technique are based on the distinctive geochemical properties of the material being specific to a volcanic system. During an eruption, material is ejected into the atmosphere; the majority of this material will settle relatively close to the source of the volcano, but fine particles of volcanic ash can be rapidly dispersed across an extensive area through the atmosphere and form characteristic horizons (isochrons) wherever this material is deposited. These horizons enable the correlation of different areas, linking spatially distinct areas to a common event in time (Dugmore 1989, 168; Dugmore & Newton 1999, 70; Swindles *et al*., 2008). Annual dates for the various tephra layers can be obtained through historical records, or where these are not available for prehistoric tephras, through complementary dating techniques such as radiocarbon or ice-core chronologies (Dugmore *et al*. 1995, 379; Wastegård *et al*. 2003, 278). The precision of the associated radiocarbon dates have been greatly improved in recent years through the application of wiggle-matching to the sequences of dates (Swindles *et al.* 2007, 667). It has been noted that some Holocene tephras can be dated with a decadal accuracy, which clearly exceeds the available precision associated with radiocarbon dating (Hall & Pilcher 2002, 229; Wastegård *et al*. 2003, 278).

Dugmore (1989) was the first to identify the occurrence of tephra within Scotland, but despite the potential of this technique to both the chronology and palaeoenvironmental studies, only limited work has been carried out within Shetland. An assessment of a lake core from Catta Ness, Lunnasting was carried out by Bennet *et al* (1992), while an investigation of the deposits at Kebister was carried out by Dugmore and Newton (1999, 70).

A number of tephra layers may have been deposited on Shetland during the periods that pre- and post-date the settlements at Hamar and Underhoull (Hall & Pilcher 2002, Table 2; Swindles *et al*., 2008, Table 1.4). The identification of these tephras would constrain the chronological assessment of these sites, as well as allowing the evidence recorded at Hamar and Underhoull to be unambiguously linked to sites across the North Atlantic. A preliminary assessment of samples collected from the layers of peat sealing the site of Underhoull collected during the 2007 excavation season has been carried out (details in Outram *et al*. 2007, Table 5.2). Analysis of samples SF238 and SF239 demonstrated the

presence of tephra within the deposit. Further samples were collected during the 2008 season, summarised in table 5.3:

Sample number	Context number	Section	Description
991	001/025/026	N-facing section	A purple-black well-humified peat with some silt and clay, with successive layers of well-humified peat representing the pre- and post-abandonment horizon of the site. The lower deposits are associated with a layer of paving (context [029]) and may include some evidence for soil amendment.
992	001/025/026	N-facing section	A purple-black well-humified peat with some silt and clay, with successive layers of well-humified peat representing the pre- and post-abandonment horizon of the site. The lower deposits are associated with a layer of paving (context [029]) and may include some evidence for soil amendment.
993	001/025/026	N-facing section	A purple-black well-humified peat with some silt and clay, with successive layers of well-humified peat representing the pre- and post-abandonment horizon of the site. The lower deposits are associated with a layer of paving (context [029]) and may include some evidence for soil amendment.

Table 5.3: Summary of the monolith samples that will be used to investigate the presence of tephra within the deposits at Underhoull, Area A.

The individual shards of tephra are generally 10-100µm in size, being contained within the matrix of the deposit so that they are not commonly visible with the naked eye, and are referred to as crypto-tephra (Hall & Pilcher 2002, 224; Dugmore 1989, 169). The presence of tephra within a deposit will therefore require the samples to be assessed using light microscopy. The samples can then be geochemically assessed using electron microprobe analysis with the hope of identifying the source, and therefore the date of the material present (Pilcher & Hall 1996, 101). Funding has been obtained from the Natural Environment Research Council (NERC) to use the Tephra Analytical Unit facilities, School of Geosciences, University of Edinburgh in February 2009, where the samples will be geochemically assessed and characterised.

6. PROJECT OUTCOMES

6.1 RESEARCH PROJECTS

6.1.1 PhD Research

Department of Archaeological Sciences, University of Bradford

THE WESTWARD VIKING EXPANSION: A STUDY IN POPULATION RECONSTRUCTION

Antony RR Mustchin

The principle aim of this research is to develop a straightforward model for calculating Viking Age population sizes from archaeological settlement data, namely, structural remains. In so doing, this project builds upon the demographic/archaeological investigations of Naroll (1962) and others, but attempts to resolve the recognised shortcomings of these earlier works.

A fundamental yet largely unanswered question regarding the Viking Age is that of numbers. Although much has been done to explicate the archaeological timeframe and socio-economic character of the Viking Age, little is certain regarding the number of individuals that formed the very essence of this diaspora. This question is linked inexorably to the driving forces behind the Viking expansion, i.e. why people left Scandinavia in the first place, and the nature of *Landnám* or 'land taking' in each settlement region. As archaeologists, are we witnessing a large-scale or relatively small Nordic migration into the North Atlantic, and did this occur rapidly or over a prolonged or even staggered timeframe? Moreover, what were the population densities of each Nordic region and what could this information tell us about the day-to-day lifeways of the Viking/Norse colonists?

It is not the intention of this doctoral research, at least initially, to 'reconstruct' the size of regional Viking Age populations. In fact, large-scale population size estimation via the interpretation of settlement archaeology, the principle modus operandi of this research, may well be restricted by the comparative lack of modern excavation within a North Atlantic Viking context. What will be attempted however is the formulation of a straightforward and all-encompassing model to examine Viking settlement populations on a domestic scale. Specifically, a mathematical formula(s) that can be applied throughout the North Atlantic to estimate the size of Viking Age populations on a house-by-house level.

Since Naroll's groundbreaking essay (1962) numerous researchers have attempted to reliably reconstruct the size of past human populations from archaeological settlement data (Kardulias 1992, 276; Chamberlain 2006, 126). Although not the earliest study in this field, Naroll's was the first to propose a formulaic approach to archaeological population 'reconstruction'. Through studying the dwellings of eighteen modern societies Naroll concluded that the population of a given prehistoric settlement could be estimated as "*...of the order of one-tenth the floor area in square meters*" (Naroll 1962, 587). More simply put, Naroll proposed that each inhabitant of a dwelling requires $10m^2$ of floor space (Chamberlain 2006, 126; Hassan 1978, 55). Although the premise of Naroll's 'Constant'

has been widely criticised as too general to produce meaningful estimations of past population (Casselberry 1974, 117), later ethnographic studies have continued to produce variations on this method.

Like previous studies, this PhD research employs ethnohistoric analogy as a basis for modelling past human populations. Principally, to calculate the size of domestic Viking Age populations this project utilises census and floor size data from the Crofting period in Unst (Shetland) and Fara (Orkney). The Crofting period provides a good comparison to the earlier Viking Age with geographical, environmental, and even social and economic similarities existing. Initial application of this approach has produced encouraging results, a case study of the 'longhouse' at Hamar (Unst) producing population figures of c.3-6 individuals. Any knowledge of Viking/Norse populations, even on a domestic scale, will provide archaeologists with a powerful interpretive tool. The re-peopling of the Viking/Norse North Atlantic landscape will offer a fundamental foundation for social and economic modelling, as well as cast new light on previous research.

MUCK, FARMSTEADS AND LANDSCAPES: GEOCHEMICAL AND GEOPHYSICAL INVESTIGATIONS OF FARMSTEAD AND LANDSCAPE INTERACTION ON THE ISLE OF UNST (SHETLAND)

Robert M. Legg

This PhD intends through geochemical and geophysical analysis to model agricultural and social interaction of abandoned farmsteads and their landscapes on the island of Unst. The study then intends to assess and explain differences between the different abandoned farmsteads on the island. To answer these questions the project will aim to:

- Identify geoarchaeological characteristics that can be associated with the different parts of the agricultural activity
- Identify different strategies for agricultural processes such as grazing and manure management.
- Assess how different strategies, such as different mucking out processes, affected interaction between the farmsteads and the landscape
- Evaluate the traditional identification and interpretation of the byre, which is largely based upon ethnographic studies

Manuring and grazing practices historically would have been an integral part of both economic and social life on the farmstead and in the surrounding landscape. For example during the nineteenth and early twentieth centuries, events such as the springtime mucking out of the byre and the movement of cattle to the shielings were important events in the agricultural calendar for the Northern and Western Isles (Fenton 1997; Holden 2004).

Historically a wide range of materials such as seaweed, hearth ash and animal excrement were used for sources of manure in the Northern Isles (Fenton 1997, 274-84). Use of animal manures would have required a combination of joint pastoral and arable agriculture with animals being stalled for period time to enable the collection of manure (Simpson *et al.* 1998b, 123). Within the North Atlantic region cattle byres often provide evidence for animal stalling on Viking period and later farmsteads.

This thesis follows on from a masters' dissertation that assessed whether the lower area of House 1 at Hamar was possibly used as a byre (Legg 2007). This study will make use of existing and new soil samples from excavated byres and longhouses on Unst and survey samples from the surrounding farmsteads and landscape. Analysis for the project will include:

- Measurements of organic and inorganic phosphorus fractions.
- Lipid analysis to be conducted on selected soil samples.
- Geophysical surveys to study the layout of the farmsteads and also extending survey work into the landscape.
- Geographical information systems to spatially portray and integrate the different data sets.

To date 55 samples have been collected from a hand auger survey surrounding house 2 along with the 42 samples taken for the Masters dissertation. The survey samples will be analysed for organic and inorganic phosphorus fractions, loss on ignition and soil pH. A geophysical survey of area around House 1 and House 2 in intended, incorporating both electrical and magnetic techniques.

School of Biological and Environmental Sciences, University of Stirling
INHERITED LANDSCAPE: THE PRE-HISTORIC FIELD SYSTEMS OF SHETLAND
Val E. Turner

6.2 PRESENTATIONS

Bond, J M 2008. *Researching the Scandinavian settlement of northernmost Britain.* Seminar, Division of Archaeological, Geographical and Environmental Sciences, University of Bradford, February 2008.

Bond J M 2008. Participant and panel member in funding and research workshop: *Pathways to the past: research approaches in genetics and linguistics in the study of migrant women and men in Viking Age Scotland and Iceland.* University of Nottingham, June 2008.

Bond, J.M. 2008. *The Viking Unst Project: excavations at Hamar and Underhoull*. Unst Heritage Centre. 8/07/08

Bond, J.M. 2008. The Viking Unst Project: excavations at Hamar and Underhoull. *NABO 08; Towards a research framework for the North Atlantic*. University of Bradford, August 2008.

Bond, J.M, Dockrill S J, Turner V E 2008. Researching the Scandinavian settlement of northernmost Britain: Shetland in the Late Iron Age and Viking Age. *Maritime Societies of the Viking and Medieval World*. Kirkwall, Orkney 31st May-4th June 2008.

Larsen, A.C. 2008. Excavations at Belmont and the Norse settlement of Unst, Shetland. Unst Heritage Centre. 15/07/2008.

Outram, Z., Cussans, J.E., Summers, J.S., Batt, C.M., Swindles, G.T., and Friel, R.F. The Science of the Viking Unst Project. Unst Heritage Centre 01/07/08

Outram, Z., Batt, C.M., Church, M.J., and Swindles, G.T. 2008. Dating Vikings: Geochronology and Palaeoenvironments of Viking Unst, Shetland. Poster presented at *NABO 08; Towards a research framework for the North Atlantic*. University of Bradford 27/08/08

Poster presentation: Archaeological Research in the North Atlantic. *University of Bradford Research Day*, February 2008.

6.3 PROJECT RELATED PUBLICATIONS

Bond, J.M., Larsen, A-C, and Turner, V.E. forthcoming. Viking Unst: Hamar and Belmont. In Turner, R. (ed.) *Discovery and Excavation in Scotland*. Edinburgh: the Council for Scottish Archaeology.

6.4 AWARDED GRANTS

6.4.1 Student bursaries

Antony R.R. Mustchin, PhD studentship awarded by the Division of AGES, University of Bradford

Robert Legg, PhD studentship awarded by the Division of AGES, University of Bradford

Seth Brewington, travel bursary awarded by the International Polar Year for participation in the Viking Unst excavations at Hamar and Belmont.

Megan Hicks, travel bursary awarded by the International Polar Year for participation in the Viking Unst excavations at Hamar and Belmont.

6.4.2 Additional grants

NERC grant awarded for use of the Tephra Analytical Unit, Edinburgh

7. PERSONNEL

7.1 MANAGEMENT TEAM

Jimmy Moncrieff (Manager, Shetland Amenity Trust)
Val Turner (Project Manager, Shetland Amenity Trust)
Julie Bond (Excaavation director, University of Bradford/Shetland Amenity Trust)
Robina Barton (Viking Unst Co-ordinator, Shetland Amenity Trust)
Anne Christine Larsen (Roskilde Viking Ship Museum)

7.2 EXCAVATION

Excavation Director
Julie Bond

Excavation Staff
Daniel Bashford
Alan Braby
Julia Cussans
Robert Friel
Antonty Mustchin
Zoe Outram
John Summers

Project Specialists
Colleen Batey
Cathy Batt
Mike Church
Stephen Dockrill
Joanne McKenzie
Gerry McDonnell
Rebecca Nicholson
Ian Simpson
Graeme Swindles

Placement Students
James Coyne
Lauren Hughes
Amy Jeffry
William Marshall
Ruth Nottage

Experienced Volunteers, Local Volunteers, Postgraduate and Field School Students
Suzy Blake
Seth Brewington
Louise Brown
Harry Edwards
Jean Edwards
Tom Frankland
Rebeccca Goulding
Glen Harrison
Megan Hicks
Cliff Hopkins
Margaret Hunter
Joanne Lathan
David Leask
Iain Leask
Robert Legg
Lisa McCaig
Liam O'Neil
Elizabeth Pierce
Keith Prosser
John Pulley
Laura White
Andrew Thomson

Level Two Students

Kirsty Bennell
Johnathan Carter
Julie Doyle
Sinead Fitzgerald
Joe France

Liam Fraser
Christopher Hill
Kevin Horsley
Victoria Lucas
Adam Mager

Robin Putland
Paul Renner
Tamra Shepherd

Charlotte Stodart
Matthew Webster

Survey Staff & Specialists

Ian Simpson
Robert Friel
Chris Dyer

Kevin Edwards
Eileen Brooke Freeman

7.3 INTERPRETATION

Interpretation Manager

Val Turner

Viking Unst Co-ordinator

Robina Barton

Interpretation Staff

Keith Prosser
Tony Sherrat
Janet Holt

Derek Jamieson
David Leask
Mike Smith

7.4 POST-EXCAVATION

Post-Excavation Manager

Julie Bond

Assistant Post-Excavation Manager

Zoe Outram

Research Assistant

Chrissie Freeth

Post-Excavation Staff

Daniel Bashford — *Illustrator*
Julia Cussans — *Archaeozoological Assistant*

Project Specialists

Colleen Batey
Cathy Batt
Mike Church
Rebecca Nicholson

Carl Heron
Gerry McDonnell
Sonia O'Connor
Graeme Swindles

Post-Excavation Volunteers

Charlotte Alexander
Wayne Arnold
Susannah Bartindale
Kirsty Bennell
Joe France
Liam Fraser
Andrew Halfpenny
Sam Harris
Christopher Hill
John Kemp
Victoria A.L. Lucas
Adam Mager
Kayleigh Owen
Robin E. Putland
Celise Richardson
Tamra Shepherd
Michael Siddall
Charlotte Stodart
Laura Teivainen
Peter Turner
Owein Wells
Beth Whitaker

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