# Excavations at Aðalstræti, 2003

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# Excavations at Aðalstræti, 2003


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## SUMMARY

Between May and September of 2003 Fornleifastofnun Íslands carried out a multi-phase investigation of multi-period archaeological remains at Aðalstræti 14, 16 and 18 in the heart of urban Reykjavík. This work was carried out in advance of development work on the site – and is the direct continuation of major archaeological investigations carried out in the winter and spring of 2000-2001. The site is known to be of the highest archaeological significance, and the continued work discovered additional remains of buildings dating both to the Viking period, and the 18th and 19th centuries.

Excavation in 2001 had revealed the exceptionally well preserved remains of a Viking period hall, beneath the remains of factory buildings dated to the 18th and 19th centuries. During excavation in 2001 the decision was taken to preserve in-situ the exceptional Viking hall, and to construct a public exhibition space around the extant remains. This decision required a sensitive re-design of the proposed development – including the re-routing of several major services (water, electricity and sewerage) - and this process itself necessitated additional archaeological work.

Excavation in 2003 revealed a small ancillary building attached to a doorway in the eastern wall of the Viking period hall, together with internal paving, floor layers and a possible external midden. The ancillary building is interpreted as a porch or ante-room for the main entrance. The fragmentary remains of 18th and 19th buildings and deposits were also excavated, towards the western limit of the excavation area – although these had been substantially truncated by modern cellarage. A large assemblage of early modern / modern artefacts were recovered from these layers.

## PROJECT DESIGN

Due to the complex requirements of the development project archaeological investigations at Aðalstræti in 2003 were carried out in three major tranches, and additionally frequent monitoring episodes;


**Figure 1 – Excavation outline**

1) Spring 2003 (v) - Excavation of post-medieval (C18th and 19th) remains at the western part of the site. This area had been left in abeyance at the close of work in 2001 due to the continued presence of a standing building – an ancillary building extending north from the rear of Aðalstræti 16.
2) Autumn 2003_1 (h1) – Excavation of modern, medieval and early medieval layers at the eastern limit of the 2001 excavation. Parts of this area had been

left in abeyance in 2001 due to the continued presence of active services (water, electricity, telephones, sewerage). Re-design of the development required the further investigation of a strip up to 6m in width and extending from Grjótagata in the north, to Túngata in the south. The planned construction of a subsurface passage connecting Aðalstræti 14-16-18 to Aðalstræti 10 further required investigation at the rear of Aðalstræti 12 and Grjótagata 4. Additionally, ground works on the plot of Aðalstræti 18 were observed under watching brief conditions – in case any archaeological material remained on site after the investigations of the 1970's.

3) Autumn 2003_2 (h2) – The discovery of further Viking period building remains during work in August 2003 required the slight diversion of a sewer main running beneath Aðalstræti. Although highly truncated by modern services, a small triangular area beneath the roadway was also excavated.

This complex, and at times difficult, process was carried in close co-operation with representatives of Reykjavík City Museum, the City roads authority, the project architects and construction companies, and the public utility companies. We are grateful for their assistance.

## AIMS AND METHODOLOGY

As in 2001 the excavation methodology adopted was one of single context planning within 5m squares, and located within the Reykjavík City co-ordinate system. Plans, sections and contextual data were recorded on pro-forma recording sheets. These were supplemented by conventional and digital photography. All artefacts and bones were recovered by hand, and a programme of environmental sampling was carried out. All archaeological layers were hand-excavated, after modern deposits and overburden had been removed by machine under archaeological supervision

The aims of excavation in 2003 were complex and varied. The primary aim may be described simply as the preservation by record of all archaeological deposits at risk from development, and the recovery of all possible artefacts and ecofacts from those layers. The broader aims were to complete the investigations commenced in 2001, and to the greatest extent this new work shares the aims of that project. These include the recovery of all remains at threat – but also the rapid display and dissemination of the results of all studies deriving from that material. We hope to achieve a new and more complete understanding of the development of Reykjavík from first settlement through to the modern era. We hope to shed new light not only on the Viking period settlement, but also upon the birth of urban Reykjavik in the period after 1750, and to account for the apparent absence of major structural remains on this site in the intervening period. This is a work in progress – further planned development in central Reykjavik will inevitably produce new data and raise further issues. The continued study of material from Aðalstræti 14-16-18 can only reinforce the value of work to date – and further establish these remains as being of major regional, national and international significance.

# RESULTS

## Spring 2003

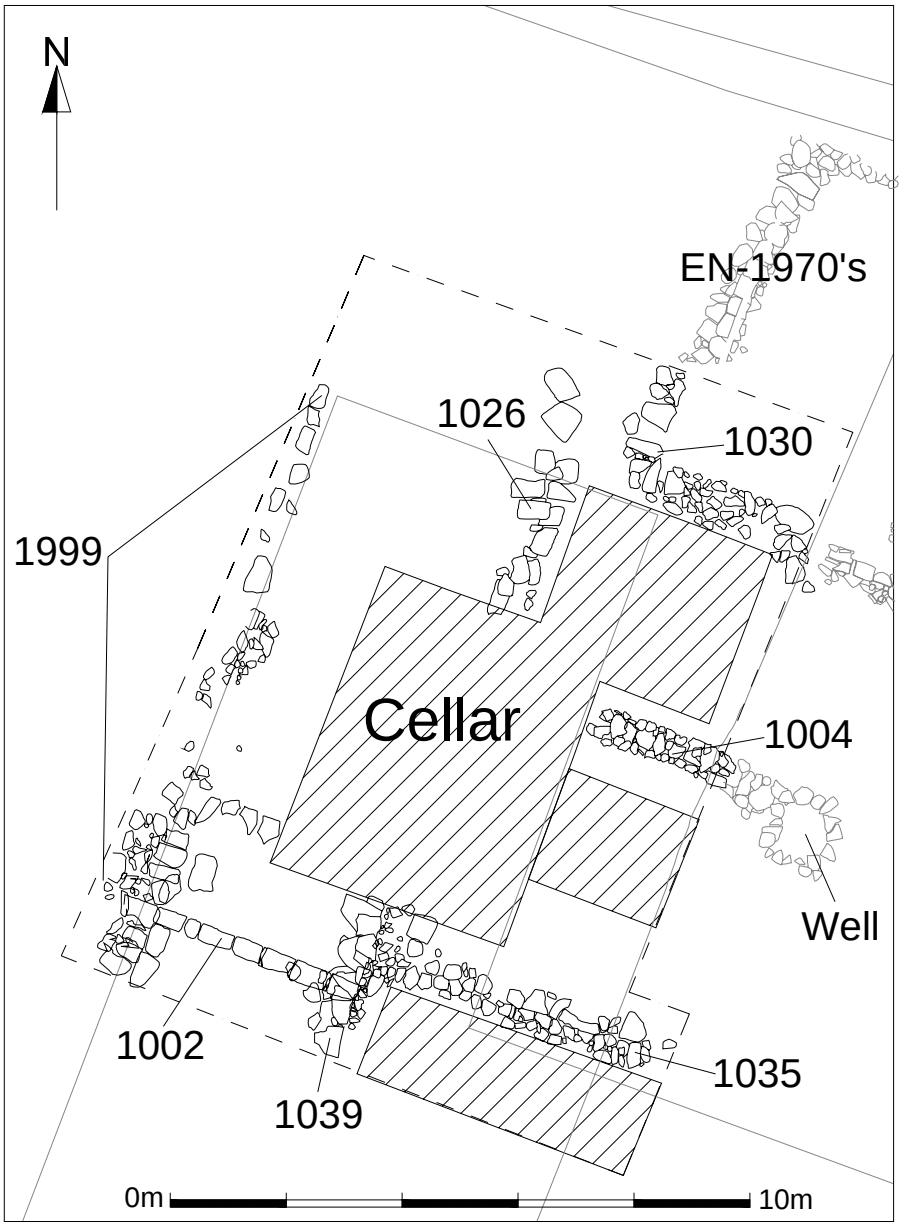


**Figure 2 – Spring 2003.**

**Major structural elements and the extent of truncation.**

Following the demolition of an outbuilding at the rear of Aðalstræti 16, further areas became available for archaeological study. Excavation revealed fragmentary but substantial structural remains dating to the 18th and 19th centuries, along with associated deposits, including traces of the 1764 fire horizon noted previously in 2001. To prepare the site for excavation the remains of 3 co-joined concrete and stone cellars (dating to circa 1900) were first removed by mechanical excavator. Cellarage had severely affected the survival of archaeological remains in this area, and flooding of the void left on removal of the cellar hindered excavation in some areas.

Nonetheless, several phases of construction and development maybe discerned, including terracing (1026, 1039, 1099) wall foundations (1030), wall footings (1002), small areas of paving (1035), and the remains of a stone built drain (1004) - leading to a well first excavated in the 1960's, and re-excavated in 2001. Dating evidence for these events is primarily based upon the artefactual assemblage (largely pottery and glass) – although intrusive and residual material inevitably permits some margin of doubt. Stratigraphic evidence from the excavation does however permit a firm constraint on these issues.

**Phase A – Pre 1750ad**

The structural and anthropogenic deposits shown above were seen to lie above a sequence of naturally deposited layers, broadly consistent with similar deposits recorded in 2001.

At the base of the sequence was a sterile gritty grey green deposit of clay silt (context 1018), and this is thought to be prehistoric in origin. Overlying this were deposits of grey-green silt (1015 and 1016), consistent with colluvial deposits removed from above the Viking period hall in 2001 – and thus perhaps datable to post 900ad. They in turn were sealed by orange brown aeolian deposits (1012, 1013 and 1014), exhibiting both ferric precipitation and some very limited peat ash content. The latter contexts are once more comparable to deposits recorded in 2001 – and may represent soil accumulation from the broader medieval period, perhaps c.1200-1750ad.

The earliest clearly anthropogenic layers recorded in the spring of 2003 lie above these deposits.

**Phase B – 1750-1764 – the earlier factories.**

Some limited activity was seen to lie beneath a widespread but discontinuous deposit of charcoal and peat ash (contexts 1019 and 1043). The latter deposits are interpreted as part of a burning horizon associated with the destruction of the earlier "factory" buildings by fire – and thus closely datable to 1764ad.

Beneath the 1764 fire horizon were;

1020 – a peat ash deposit including brick fragments, recorded in section adjacent to a circa 1900 drain (see below)
1044 – a mixed fill of clay and turf debris, including occasional charcoal
1045 – a shallow irregular cut containing 1044 located at the south eastern corner of the excavation area – and much truncated by later foundations etc. Together with Context 1044 this feature may conceivably represent a levelling/terracing event associated with the construction of the earlier factories.
1046 – a small isolated patch of peat ash including brick fragments.
1047 – two isolated stones – potentially the last truncated remains of a structure of unknown nature and dimensions.

**Phase C – 1764 – c.1800**

Following the fire of 1764, the factory buildings or *"innréttingar"* were reconstructed. Upon previous excavation in 2001 these were seen to be characterised by their massively built stone filled foundation trenches and chimney piers. Excavation in 2003 exposed one corner of the northern wing of the later factories (contexts 1030/1031), and the truncated remains of a massive stone revetment (1026 and 1039) upslope and west of the surviving traces of the factory building itself. Although the stratigraphic relationship between these features remains opaque, it is suggested that the stone reveting may be associated with the major construction project entailed by the reconstruction of the factories. Artefactual evidence for the dating of the revetment (1026 and 1039) is unfortunately unclear. Whereas deposits associated with fragment 1039 are consistent with a date in the late 18th century, fragment 1026 was subject to later disturbance and finds recovered from associated contexts appear to be intrusive.

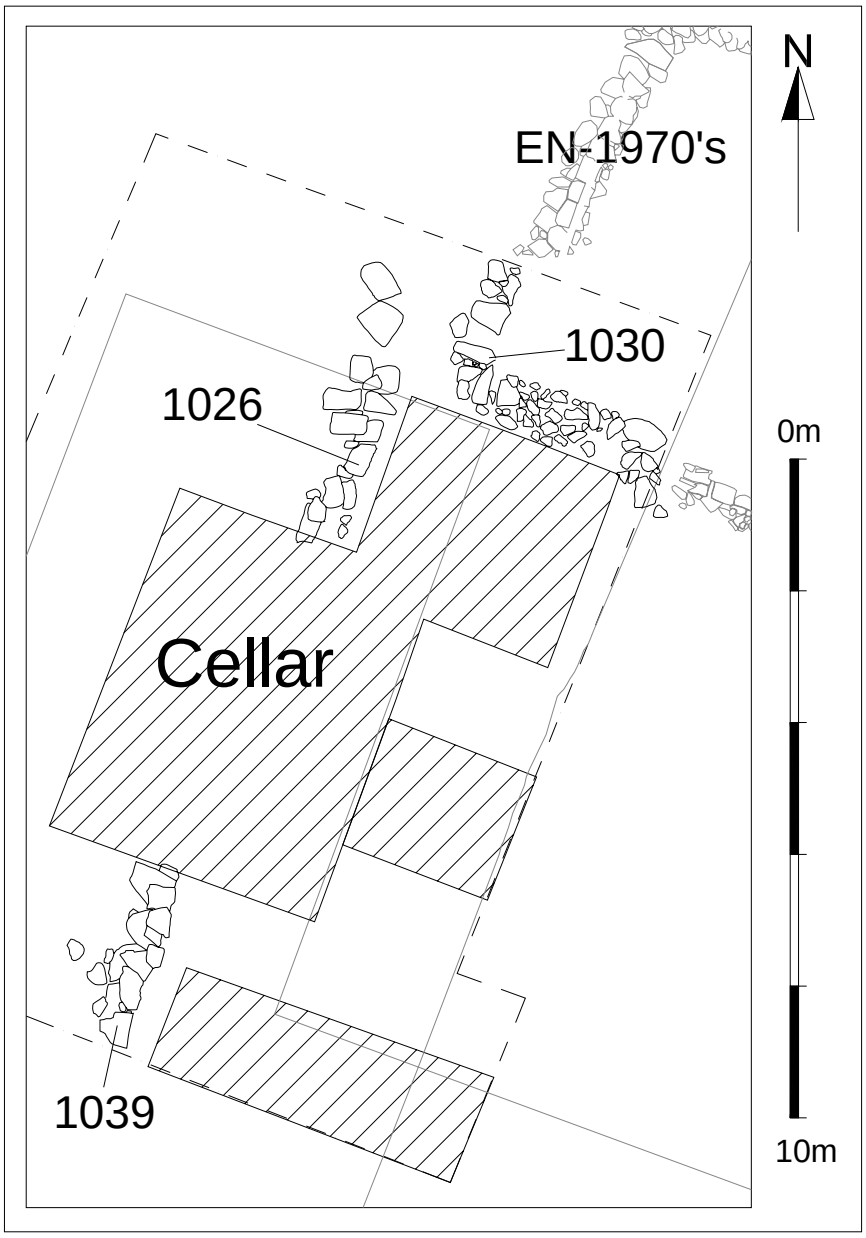


**Figure 3 – The revetment 1026/1039 and the foundation of the later factory (1030).**

The north western gable of the later factory had been previously excavated in the 1970's by a team lead by Else Nordahl. The apparent mismatch between the recorded locations of this foundation is not thought to be due to any planning error now or then – rather, the 2003 excavation has recorded only the surviving basal layers of the foundation, whereas the 1970's excavation was limited to its upper courses.

Revetment 1039 was formed from up to 4 irregular courses of unshaped, but carefully chosen, pieces of grey basalt – each up to 60cms in length and 40 cms in depth. The "fair face" of the construction faces south east. Structure 1039 sat within a steeply sloping construction cut (1038), that had subsequently been backfilled with a mixed deposit of grey brown clay silt (1033), including brick fragments and lenses of peat ash. Revetment 1026, and its fill 1034 clearly form a continuation of the same of the same feature.

The foundation of the later factory comprised a fill of large irregular basalt stones and cobbles (1030), within a shallow trench (cut 1031). This feature had been severely truncated by cellarage, and by previous excavation. It is noted that the western limit of this feature is much shallower and less substantial than the massive foundations recorded at the east in 2001. This change was also noted in 2001 – and is thought to be due to the rising level of bedrock, and firm ground for building, upslope towards the western limit of excavation.

Additionally, this phase of activity was seen to include a short sequence of mixed aeoloian deposits (contexts 1040, 1041, and 1042), beneath fragments of a paved surface (context 1035).

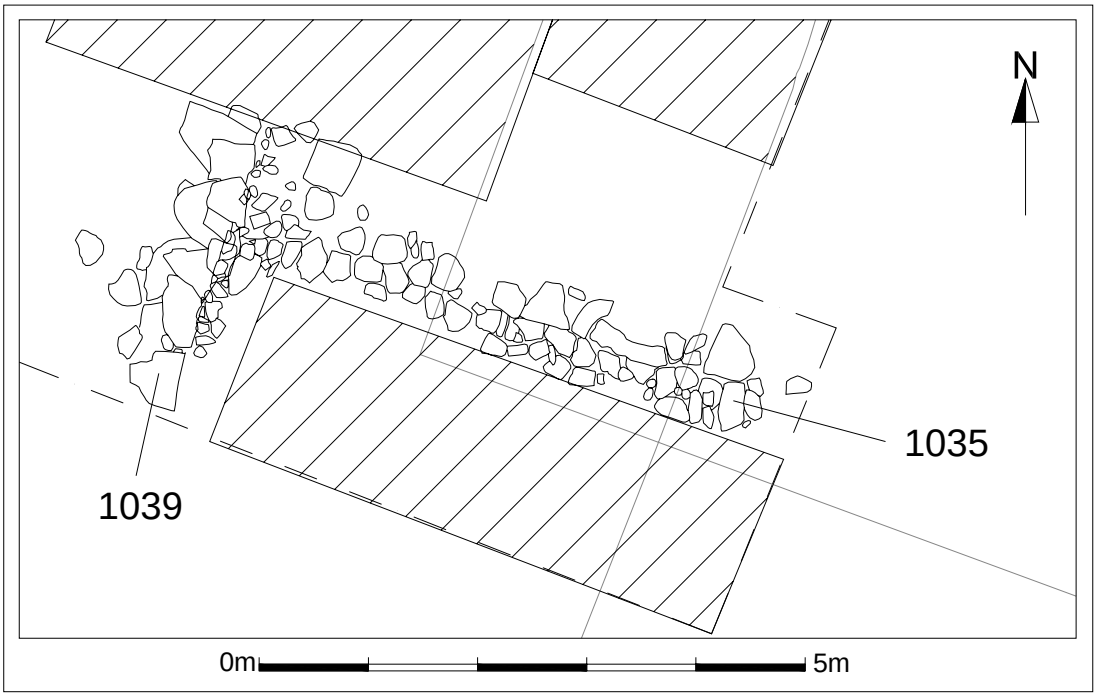


**Figure 4 – Paving 1035 and its relationship to the revetment 1039.**

Paving 1035 was seen to abut the revetment 1039. As such it must date to a slightly later period than the revetment itself – probably circa 1800ad.

Also included in this phase of activity is a minor deposit of peat ash (1011) including brick fragments, and located within an isolated pillar of stratigraphy surrounding a circa 1900 drain (see below). Group 1999 (see figure 2) was a fragmentary spread of building stone located at the western limit of excavation. The latter feature provided insufficient evidence for secure phasing, but may date to the major phase of reconstruction seen post 1764 – although it could however be placed somewhat later, at any point between 1764 and circa 1900ad.

**Phase D – c.1800-1900**

Only 2 structural elements may be securely placed within this phase – a wall fragment (context 1027) and the truncated remnants of a possible surface (context 1032). Artefacts recovered from in and amongst these constructions are suggestive of a date in the 19th century, and they are thought to represent a modification or addition to the surface 1035 described above.

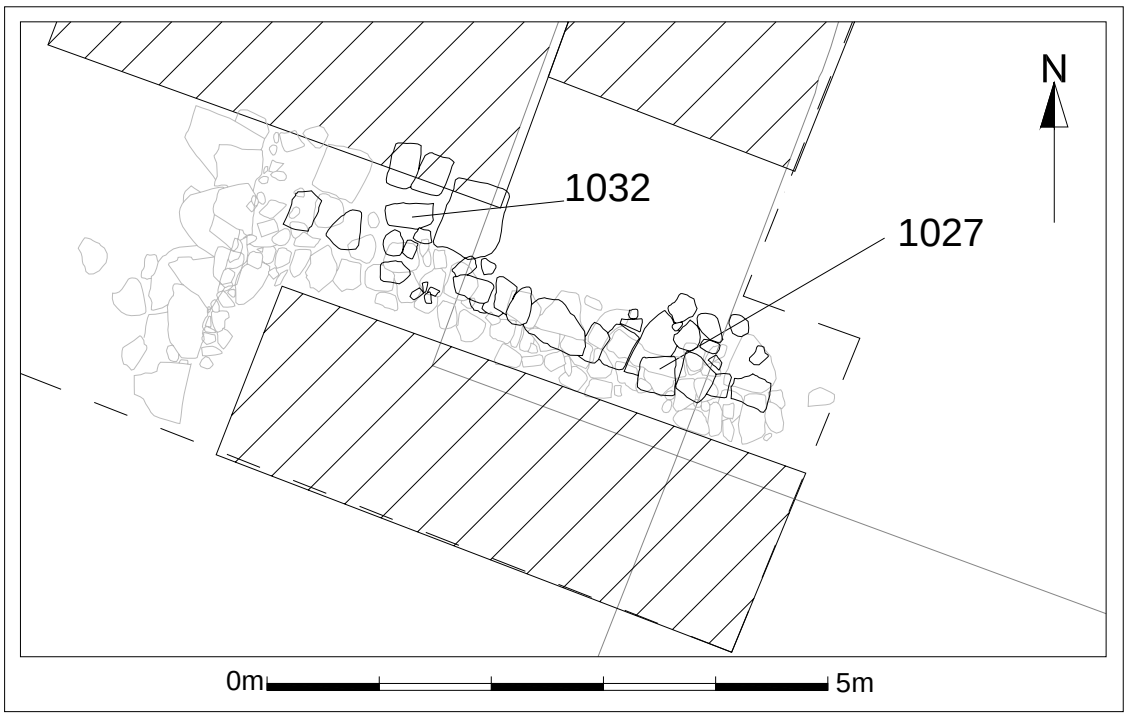


**Figure 5 – Contexts 1027 and 1032, overlying surface 1035**

A number of mixed deposits were found to seal the above structures (contexts 1021, 1025, and 1029) – these may dated to the 19th century.

Sealing a part of the factory foundation (1030, see above) was a minor deposit of yellow brown silt (context 1023). Although this cannot be securely dated, its nature and location make a late C19th date most likely.

Contexts 1006, 1007, 1008, 1009 and 1010 were located above context 1011 (see above). They comprise a mixed sequence of dumps including peat ash, gravel and brick within an enriched dark grey brown clay silt matrix. Finds evidence suggest a date in the 19th century. These latter layers were in turn truncated by the construction trench of a drain (see below).

**Phase E –Post 1900**

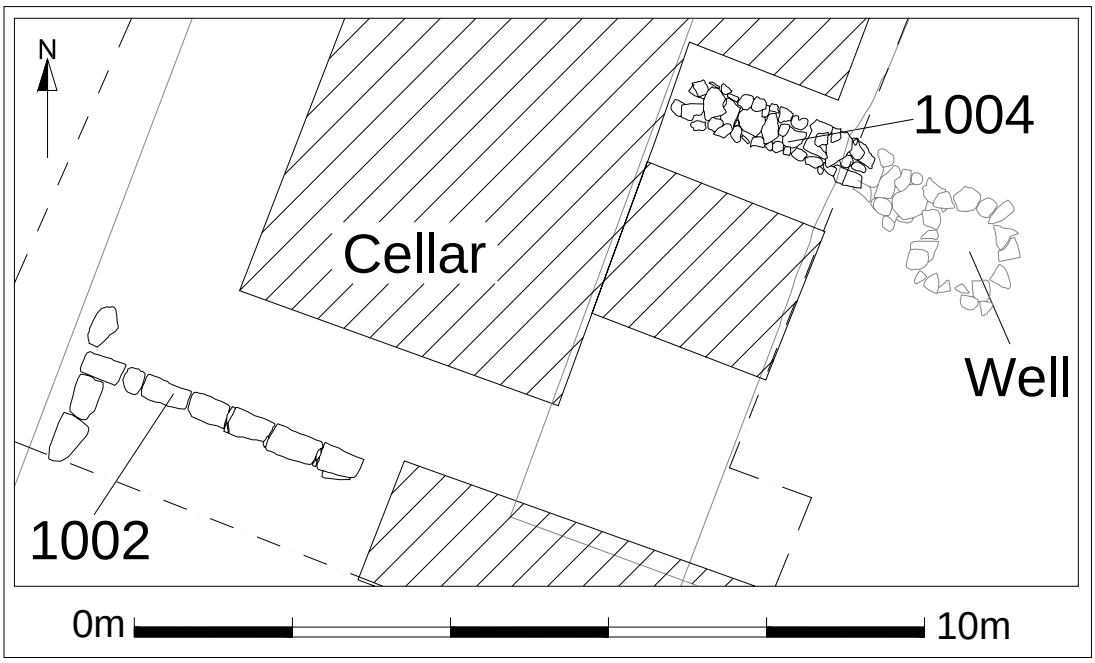


**Figure 6 – C19th structural remains**

From 19th century layers 2 further structural elements were recorded. At the southwestern corner of the excavation an "L-shaped" footing of stone (1002) was noted. This survived only as a single course of large coarsely shaped basalt blocks. The location and alignment of this structure is fully consistent with the extension of Aðalstræti 16, and the stones appear to form a direct continuation of the stone wall/ cellar foundation excavated in 2001. These events are believed to have happened circa 1899[1].

Additionally, the well preserved remains of a stone built drain (context 1004) were excavated at the eastern limit of excavation. Feature 1004 consisted of two rows of small unshaped stones (and occasional bricks), up to 4 courses in depth, forming a channel some 25cms in width and capped with larger, flatter pieces of coarsely shaped stone. The capping stone itself had in places been sealed with both fragments of leather and tar paper, although this feature survives unevenly. The stone structure 1004 was bedded directly onto prehistoric deposits (1018, see above), and sat within a deep vertical cut (context 1005) some 65cms wide and up to 2m in depth. This feature can be seen to be a direct continuation of a drain excavated in 2001, and feeds into a well – first excavated in the 1960's.

[1] Guðmundur Ingolfsson, Guðný Gerður Gunnarsdóttir and Hjörleifur Stefánsson. See page 82, "Kvosin", 1987, Torfusamtökin, Reykjavík for a discussion of the later building history.

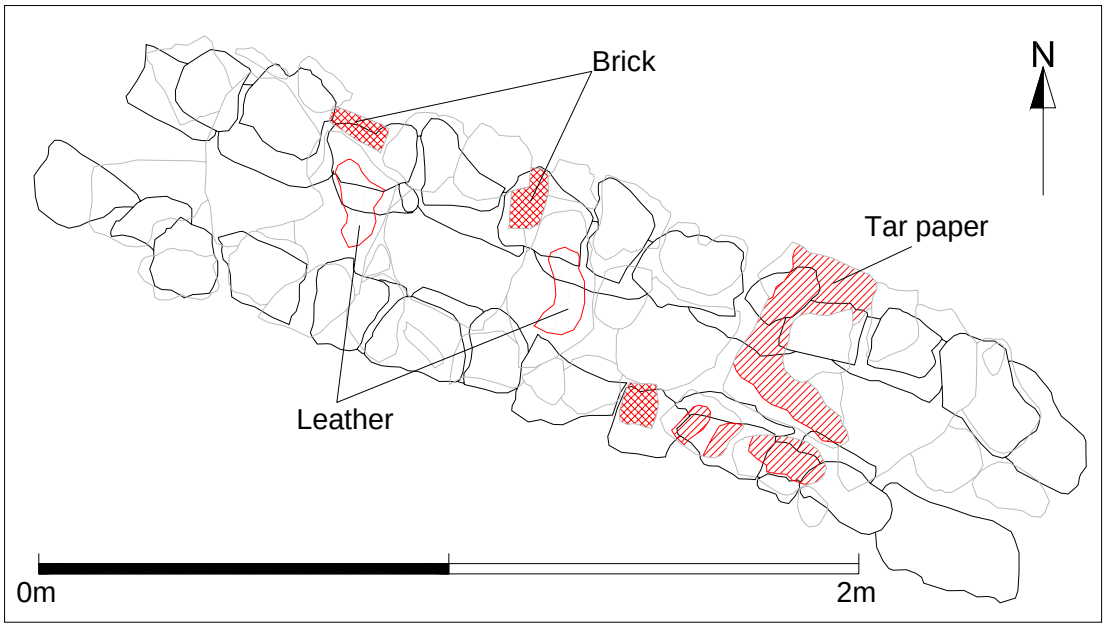


**Figure 7 – Detail of drain construction (1004)**

**Plate 1 – The drain 1004 after removal of the capping stones. Looking north west, the scale is 1m.**

Drain 1004 had been substantially truncated by the construction of a large and deep cellar at sometime in the early 20th century. Whilst these features are not technically of archaeological interest, a selection of ceramics was recovered from the cellar fill (context 1001) for comparative purposes and the creation of a reference collection.

## List of Contexts excavated in Spring 03

| Number | Type | Description |
|---|---|---|
| 1000 | Deposit | Cleaning |
| 1001 | Deposit | Modern cellar backfill |
| 1002 | Deposit | Stone footing |
| 1003 | Deposit | Backfill of drain cut |
| 1004 | Deposit | Drain structure |
| 1005 | Cut | Drain cut |
| 1006 | Deposit | C19th dumping layer |
| 1007 | Deposit | C19th dumping layer |
| 1008 | Deposit | C19th dumping layer |
| 1009 | Deposit | C19th dumping layer |
| 1010 | Deposit | C19th dumping layer |
| 1011 | Deposit | Peat ash |
| 1012 | Deposit | Orange brown aeolian layer - natural |
| 1013 | Deposit | Orange brown aeolian layer - natural |
| 1014 | Deposit | Orange brown aeolian layer - natural |
| 1015 | Deposit | Grey green silt - colluvial - natural |
| 1016 | Deposit | Grey green silt - colluvial - natural |
| 1017 | Deposit | Basal fill of drain cut |
| 1018 | Deposit | Grey green gritty clay silt - glacial? |
| 1019 | Deposit | Charcoal horizon - 1764? |
| 1020 | Deposit | Peat ash |
| 1021 | Deposit | Peat ash |
| 1022 | Deposit | Peat ash cellar fill |
| 1023 | Deposit | Charcoal layer |
| 1024 | Deposit | Structural stones |
| 1025 | Deposit | Mixed gravel horizon |
| 1026 | Deposit | Revetment |
| 1027 | Deposit | Stone foundation |
| 1028 | Cut | Trench cut |
| 1029 | Deposit | Peat ash |
| 1030 | Deposit | Fill of 1031 |
| 1031 | Cut | Foundation trench |
| 1032 | Deposit | Dark brown gravel layer |
| 1033 | Deposit | Fill of 1038 |

| Number | Type | Description |
|---|---|---|
| 1034 | Deposit | Fill of 1026 |
| 1035 | Deposit | Stone foundation in cut 1048 |
| 1036 | VOID | VOID |
| 1037 | VOID | VOID |
| 1038 | Cut | Foundation cut |
| 1039 | Deposit | Stone foundation |
| 1040 | Deposit | Brown aeolian layer |
| 1041 | Deposit | Gravel horizon |
| 1042 | Deposit | Aeolian deposit |
| 1043 | Deposit | Charcoal layer - 1764? |
| 1044 | Deposit | Fill of 1045 |
| 1045 | Cut | Construction, terracing? |
| 1046 | Deposit | Peat ash horizon |
| 1047 | Deposit | Stones beneath 1043 |
| 1048 | Deposit | Foundation cut |

# Aðalstræti 2003 - 16th July to 17th July

By Oscar Aldred

Oscar Aldred, Hildur Gestsdóttir, Garðar Guðmundsson and Uggi Ævarsson.

A monitoring operation was carried on July 16th-17th 2003 during the placement of groundfast steel shuttering around the remains of the viking period hall excavated in 2001. During this process, it was noticed that the remains of an in-situ turf structural element could be seen extending eastwards from the 2001 limit of excavation. This location had been obscured by service pipes during excavation in 2001 – these services had subsequently been removed prior to the driving down of shuttering in the summer of 2003.

**Context List**

1049 disturbed colluvium, probably [1053], brown and sandy infill at base of pipe cut [1050]
1050 pipe cut
1051 same as [1049] but for pipe cut [1052]
1052 pipe cut, goes under edge of excavation towards east
1053 colluvium with patches of peat ash, charcoal fragments and burnt bone fragments, brown gradually getting greener towards the south; truncated by pipes and during machining and all that is above it in this location
1054 turf debris, either collapse, trample or even part of structural elements to the entrance structure
1055 charcoal patch, perhaps part of the floor to the entrance structure or part of the skalí floor

During the excavation a relatively straight forward sequence was observed. Two pipes [1049, 1050 & 1051, 1052] had been cut into the colluvium deposit [1053], which in turn sealed the the turf debris [1054] as well as the in situ turf structure (the northern wall of Group 1066 – see below). The latter context had been partially truncated, perhaps during excavation, but was clearly visible in the better exposed section by several compressed layers of turf with stones either side and organic and dark floor like deposits to the south inside the wall. Under the turf debris, south of the structural element a small patch of charcoal, possibly a floor or a dumping was seen. The deposits [1053, 1054, and the turf element] remained substantially unexcavated.

These deposits were excavated in full in the Autumn of 2003 (below)

# Haust 2003 – Autumn 2003

*Summary*
*During preparation for further building work in 2003, it was decided that additional areas would need to be excavated, i.e., a strip of land beneath the modern pavement next to the hall. This exposed an addition at the eastern side of the hall, ca 3 x 2.5 m, built about the same time as the hall, but seemingly added on to it. The building material was the same as in the hall, stone and turf, and the turf contained a tephra layer dated to 871 +/- 2 A.D. It is not altogether unknown that Viking age hall buildings excavated in Iceland have "entrance buildings," but we do not have many examples of it. This lack of such buildings, may possibly be due, in part, to preservation and/or excavation techniques. Similar additions are also known e.g. in Viking age Denmark.*

Svæðið sem rannsakað var um haustið var undir gangstétt og hluta akbrautar vestanvert við Aðalstræti, löng og mjó skák meðfram lóðunum Aðalstræti 14, 16 og 18, á milli Grjótagötu að norðan og Túngötu að sunnan, en náði þó ekki alveg að þeim. Skákin var víðast hvar um 6 m að breidd og rúmlega 30 m á lengd (2003h1_excavation á Figure 1). Næst Túngötu var svæði sem ekki átti að hreyfa við og ekki var heldur hreyft við lítilli skák næst Grjótagötu. Þar voru lagnir og rafmagnsstrengir í notkun.Eftir því sem best varð séð var þar öllum lögum raskað niður á malarkamb.

Verkið hófst 15. ágúst. Byrjað var að vinna á vestari hluta skákar, en hún var stækkuð til austurs 30.-31. ágúst. Á sama tíma var verið var að grafa með stórvirkum gröfum niður á fast á svæðinu vestan og sunnan við skála, og var jafnframt fylgst með þeim grefti, ef fram kæmu mannvistarminjar. Þegar það gerðist voru gröfur stöðvaðar og minjar skráðar. Þá var einnig fylgst með grefti fyrir gangi neðanjarðar frá lóð Aðalstrætis undir Grjótagötu og meðfram húsinu á Grjótagötu 4. Vegna breytinga á kjallara var svæðið stækkað til austurs og þá, 6.-10. okt., rannsökuð þríhyrnd skák, löng og mjó, 22 m á lengd og mest 3,2 m breið (2003h2_excavation á Figure 1).

Við rannsóknina var notast við bráðabirgðahnitakerfi sérstaklega sniðið eftir lögun svæðisins og var það síðan mælt inn með alstöð í hnitakerfi borgarinnar.

**Fyrri vísbendingar um minjar**

Rannsóknarsvæði haustsins er skammt vestan við elsta kirkjugarð Reykjavíkur, sem er handan Aðalstrætis, á horni Aðalstrætis og Kirkjustrætis. Á korti sem til er af kaupstaðarlóðinni 1787 virðast sýnd vesturmörk á kirkjugarði með brotalínu vestan kirkjunnar. Þessi lína er u. þ. b. 20 álnir frá austurgafli húss á lóð Aðalstrætis 14, um 12,5 m. Ekki er vitað hvort vesturmörk garðsins hafa alltaf verið þarna á sama stað, eða hvort einhverjar breytingar hafa orðið á þeim. Ekkert kom fram við rannsóknina 2003 sem ætla mætti að tilheyrði kirkjugarði.

Á lóð Grjótagötu 4 hafði verið boruð könnunarhola við rannsókn Þorkels Grímssonar og Þorleifs Einarssonar 1962.[2] Hola sú var norðan við húsið, u.þ.b. miðja vegu milli hússins og lóðarmarka að norðan, og u.þ.b. fyrir miðju húsinu. Hún var því töluvert vestar á lóðinni og ofar í brekkunni en staður sá sem grafið var á 2003. Í þessari holu hafði komið í ljós viðarkolalag á um hálfs metra dýpi og að því er virðist eftir lýsingu hreyfð lög þaðan niður á rúmlega 1 metra dýpi þar sem komið var í grjót.[3]

Á elsta korti sem sýnir hús á þessum slóðum, korti Lievogs af kaupstaðarlóðinni 1787 má sjá "Skálann" á þessari lóð, hann var torfhús. Hann sneri norður og suður og gafli að Grjótagötu. Snemma á 19. öld var hann rifinn og reist timburhús á lóðinni Það sneri einnig norður og suður. Hús þetta sést á Reykjavíkurkorti V.Lottins frá 1836. Árið 1896 var reist það hús sem enn stendur, tvílyft timburhús á hlöðnum kjallara.[4]

**Elstu ummerki (9.-11. öld)**

Á rannsóknarsvæðinu var neðsta lagið víðast hvar malarlag það sem er undir miðbæ Reykjavíkur. Þetta er malarkambur sem talið er að hafi myndast fyrir um 1200 árum.[5] Glögglega mátti sjá að malarkamburinn hækkar lítillega til norðurs, í átt að sjó, á þessum slóðum. Hæð hans yfir sjó var á bilinu 2,20 til 2,40 metrar. Það virðist yfirleitt vera þannig að malarkamburinn hækki frá suðri til norðurs, og hefur mátt sjá það víðar í miðbænum.[6] Tvílitt gjóskulag, hið svonefnda landnámslag, sem talið er hafa fallið 871 +/- 2 [7] lá allsstaðar á skákinni meðfram Aðalstræti, nema þar sem síðari tíma rask náði alla leið niður á mölina. Gjóskan lá ýmist beint ofan á malarlaginu, eða ofan á þunnu moldarlagi (um 1 cm) milli malar og gjósku.

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[2] Þorkell Grímsson og Þorleifur Einarsson: Fornminjar í Reykjavík og aldursgreiningar. *Árbók hins íslenzka fornleifafélags 1969*, bls. 80-97.

[3] Sama heimild, bls. 94.

[4] Nanna Hermansson ofl: *Grjótaþorp*, Reykjavík 1977, bls. 141.

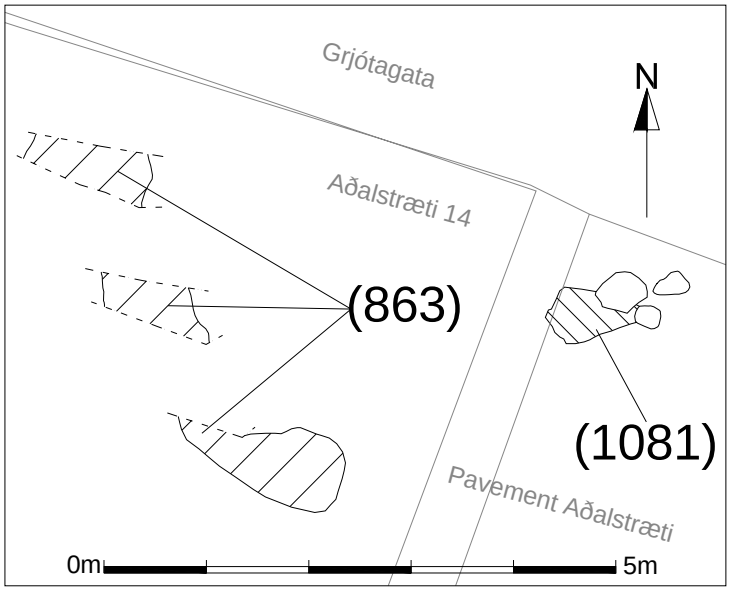
[5] Þorleifur Einarsson: Jarðfræði Reykjavíkur og nágrennis, *Reykjavík í 1100 ár*, Rvík 1974, 44; Margrét Hallsdóttir, Saga lands og gróðurs. *Tjörnin, saga og lífríki*, Rvík 1992, 12

[6] Sjá t.d. Skia: Survey 1993. A Report of Archeological Test Pits in Downtown Reykjavík. Skýrslur Árbæjarsafns XXXI. Rvík 1993, 100, um könnunarholu í Hafnarstræti vestanverðu, þar sem undirlag undir götuna liggur beint á malarkambinum.

[7] Karl Grönvold, Níels Óskarsson, Sigfús J. Johnsen, Clausen, H.B., Hammer, C.U., Bond, G. & Bard, E. 1995. "Ash layers from Iceland in the Greenland GRIP ice core correlated with oceanic and land sediments." *Earth and Planetary Science Letters* 135, 149-55.

*Ummerki sem geta verið eldri en skáli:*
Norðarlega á rannsóknarsvæðinu fundust veggjarleifar [1081]. Það var mjög lítill stúfur úr torfvegg, um 1,40 x 0,6 m og um 0,1 m á þykkt. Þessar torfleifar voru úr fíngerðu, brúnleitu og fremur einsleitu efni. Landnámslagið var ekki í þessu torfi, en dökkar rendur (gömul grasrót) og viðarkol. Undir veggjarleifunum var landnámslagið óhreyft, þar undir 2-3 cm af ljósri mold og þá komið niður á malarkambinn.

Veggjarleifar þessar voru í hæðinni 2,22–2,50 m.y.s. Efnið í þessum veggjarleifum er áþekkt efninu í vegg sem leifar fundust af við rannsóknina 2001, og var eldra en landnámslagið og skálinn. Ef til vill mætti túlka veggjarleifarnar sem fundust 2003 sem fallinn bút úr þeim vegg er leifar fundust af 2001, enda er skammt milli þeirra. Um það verður þó ekki sagt með vissu.




Norðarlega á rannsóknarsvæðinu voru tvö þunn lög af viðarkolasalla, einingarnar [1084] og [1085], 0,5-1 sm að þykkt. Sumsstaðar lágu þau beint á landnámslaginu en víðar var þunnt moldarlag, 1–1,5 cm, milli kolalagsins og landnámslagsins. Einingarnar [1084] og [1085] eru samskonar, og eru líklega hlutar úr sama lagi, þó aðeins séu varðveittir þessir tveir blettir af því. Milli þeirra eru um 2 m. Ætla má að þetta lag eða lög séu eldri en skálabyggingin sem könnuð var 2001, eða a.m.k. eldri en fordyrið [1066]. Blettur af áþekku lagi var einnig austar á rannsóknarsvæðinu, eining [1122], og lá einnig beint ofaná landnámslaginu.

Ofan á [1084] var rótuð ljósbrún fokmold og í henni var töluvert af smásteinum úr malarkambinum, eining [1086]. Lagið var 2-30 cm að þykkt, 3 x 2 m að stærð. Lag þetta hefur orðið til við byggingu skálans eða fordyrisins austan hans.

*Fordyri*
Þegar grafið var niður með skálavegg að austan í júlí 2003 vegna stálþils sem reka átti niður umhverfis skála til að verja hann meðan á byggingaframkvæmdum stæði höfðu komið í ljós leifar af veggjum. Vegna þessara byggingaleifa var því frestað að reka þilið niður að austanverðu.

Á skálabyggingunni sem rannsökuð var 2001 voru dyr á báðum langhliðum, norðarlega á austurhlið og sunnarlega á vesturhlið. Ekki voru neinar viðbyggingar á vesturhlið, móti brekkunni. Austurmörk uppgraftarsvæðisins 2001 voru við útvegg skála að austan og því var ekki hægt að sjá hvort nokkuð var byggt upp að húsinu að austan, en þegar svæðið austan skála var rannsakað 2003 kom ljós viðbygging við austurdyrnar.
Viðbygging þessi var byggð úr samskonar efni og skálinn sjálfur. Hún var að utanmáli 5,1 m frá norðri til suðurs og 3,8 m frá austri til vesturs, en austurendi var að einhverju leyti skertur. Breidd að innan frá norðri til suðurs var rúmir 3 m. Veggir voru úr strengjatorfi með landnámsgjósku í. Veggirnir voru 0,9–1,2 m að þykkt. Að innanverðu og utanverðu í veggnum voru hleðslur úr vatnssorfnu grágrýti, flestir voru þeir steinar fremur litlir, 30-40 cm langir. Varðveitt voru 1-4 umför steina. Fordyrið og lögin sem því tilheyrðu eru skráð sem flokkur [1066].


Innan veggja fordyrisins voru nokkur lög úr hrundu torfi [1067], [1071], [1097], einnig fokmoldarlag [1075]. Undir þessum lögum var gráleitt lag, lítillega kolaborið, en ekki harðtroðið [1090], og undir því annað lag, fíngert og dökkbrúnt með örlitlu af viðarkolum [1096], sem lá ofan á landnámslaginu og innsiglaði það. Þessi tvö síðarnefndu lög eru túlkuð sem gólflög. Hellulögn í skáladyrum hélt áfram austur í fordyrið, eining [1116]. Hún er gerð úr hellum og flötum steinum sem lágu í grófri möl. Greinileg skil voru í fordyrinu um 1,5 m frá útbrún skálaveggjar. Þar var einföld steinaröð, eining [1117], lítillega óregluleg og skarð í hana miðja. Þessa

steinaröð ber trúlega að túlka sem ummerki um þilvegg, þ.e. timburþil hafi hvílt á steinaröðinni og dyr verið á því miðju. Austan hennar var gólflag nokkuð frábrugðið og hallaði til austurs, eining [1094]. Syðst í fordyri var moldarlag með möl, eining [1099]. Undir steinaröðinni og moldarlaginu syðst voru torflög, einingar [1089] og [1101] og eru þau túlkuð sem undirlag undir gólf.

Undir gangstéttinni við Aðalstræti vestanvert var skurður fyrir skólplögn og vatnslögn. Skurðurinn var 3-4 m austan við austurvegg skála og var um 1,4 metra breiður. Hann var grafinn niður á eða í malarkambinn sem er undir miðbænum í Reykjavík og hefur því skorið í gegnum allar mannvistarminjar. Báðir hliðarveggir fordyris voru skertir að vestan af skurði þessum. Ekki var hægt að sjá nein ummerki þess að framhald væri á fordyrinu austan lagnaskurðarins. Ekki er fullkomlega víst hve langt hliðveggir kunna að hafa náð áður en skurður sá var grafinn sem skólplögnin lá í, og ekki er víst að veggirnir hafi verið mikið lengri upphaflega en þeir voru þegar rannsóknin var gerð. Miðað við sveigjuna á hliðveggjunum báðum er óvíst að það hafi verið nema ca 0,4 – 0,5 m sneið sem tekin var af fordyrinu að austan (innanmál). Suðurveggur fordyrisins var einnig örlítið skaddaður af nýlegum skurði sem legið hafði fast við hann að sunnan og stefnt austur og vestur.

Þar sem suðurveggur fordyris og austurveggur skála koma saman, má sjá að steinaröð í útbrún skálaveggjar er samhangandi alla leið að dyrunum, og suðurveggur fordyris er hlaðinn þar upp að. Þetta bendir til þess að fordyrið sé reist á eftir skálabyggingunni. Efniviður í veggjum fordyris er samskonar og í skálaveggjum, og er það vísbending um að ekki hafi endilega liðið mjög langt milli byggingar skála og fordyris. Samskeyti norðurveggjar fordyris og skálaveggjar voru skert af síðari tíma skurði og ekki verður séð hvernig frágangur hefur verið þeim megin.

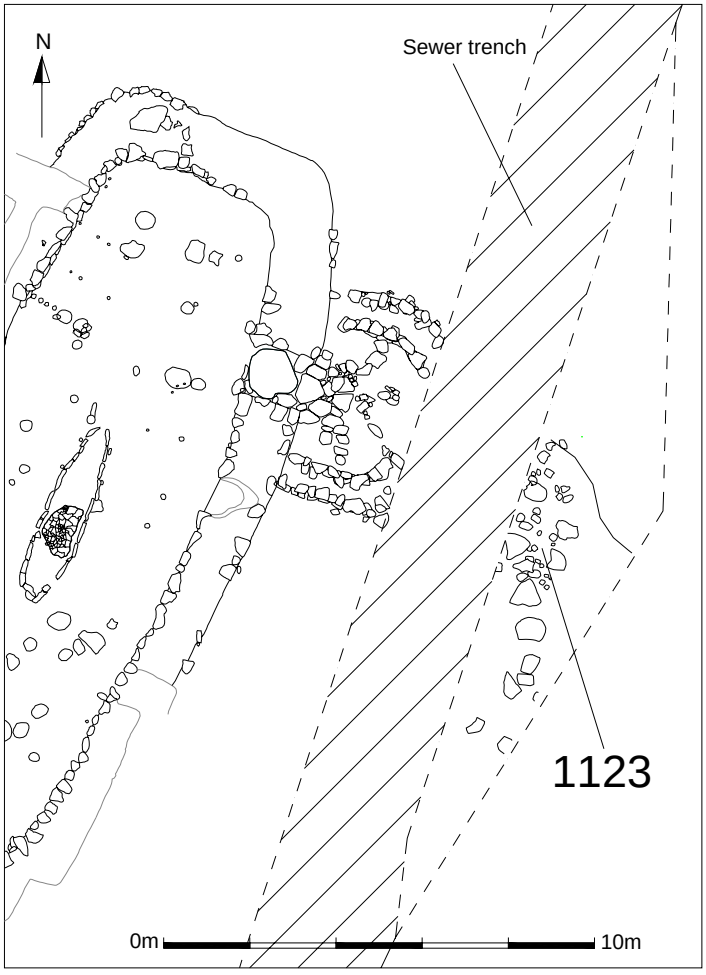
Undir suðurvegg fordyris var lítið gráleitt leirlag með örlitlu af viðarkolum í, [1100], 85 x 20 cm, ef til vill fært á staðinn til að jafna út undirstöðu áður en veggur var reistur. Undir þessu lagi er landnámslagið óraskað.

Ekki þarf að fjölyrða um til hvers slíkt fordyri hefði verið. Það hefur verið til hlýinda og einangrunar og til að koma í veg fyrir dragsúg. Dæmi eru um fordyri á skálabyggingum frá svipuðum tíma, bæði hérlendis og erlendis.[8]

Vegna byggingaframkvæmdanna var talið nauðsynlegt að fjarlægja fordyrið en áætlað er að byggja það aftur á sama stað að framkvæmdum loknum. Veggjagrjót og hluti stéttar var merkt og sett í geymslu í Árbæjarsafni. Vegna fyrirhugaðrar sýningar voru einnig þrír bútar úr torfhleðslunni teknir heilir og pakkað inn.

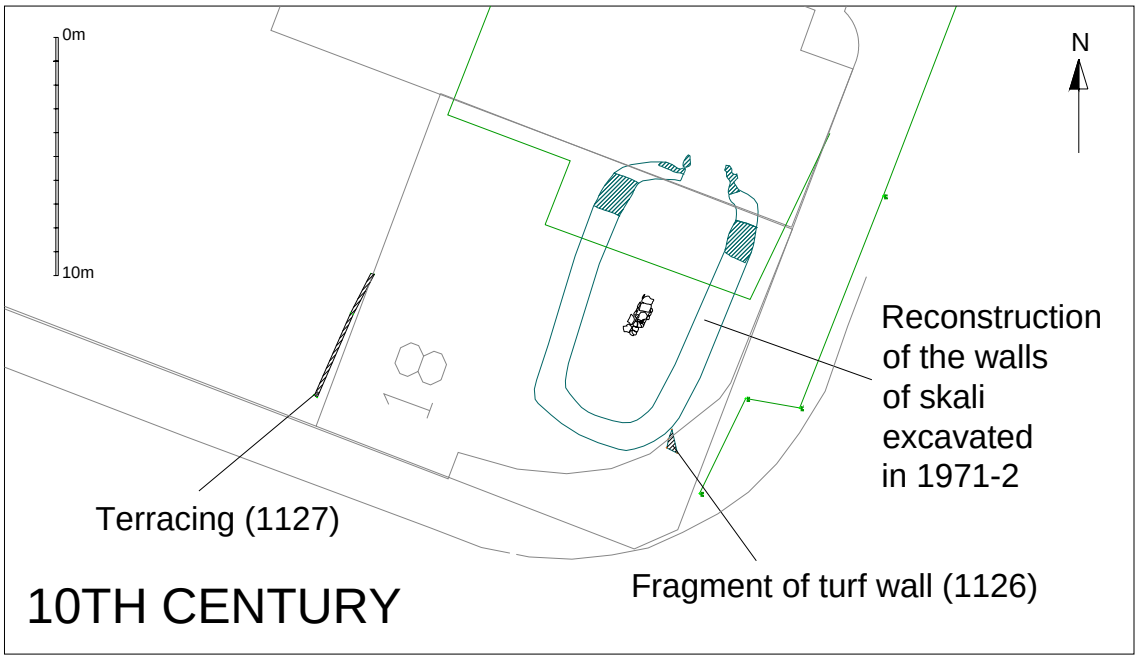
[8] Sjá t.d. Guðmundur Ólafsson, Grelutóttir, *Árbók hins íslenska fornleifafélags* 1979, 25-73; Howell M. Roberts, Area E Excavation Report. *Hofstaðir 1998. Framvinduskýrslur*. Ritstj. Adolf Friðriksson /Orri Vésteinsson, FS156-00161, Rvík 1998, 38-58; Holger Schmidt, *Vikingetidens byggeskikk i Danmark*, Højbjerg 1999, 68-70.

*Ummerki sem gætu verið frá sama tíma og skáli:*
Austan við skála var óregluleg dreif af steinum, sumum allstórum (30–70 cm að lengd) og nokkrum minni í kring, eining [1123], og mátti sjá þessa röð eða dreif á um 6 metra kafla. Steinar þessir hvíldu á landnámslaginu. Ekki virðist líklegt að þeir séu náttúrulegir á þessum stað og meiri líkur á að þeir séu færðir á staðinn. Ef til vill eru þetta leifar af garðlagi, sem ekki hefur varðveist að öðru leyti. Sá garður hefur þá legið nálægt því í norður og suður.




Á lóð Aðalstrætis 18 höfðu árið 1971 verið rannsakaðar leifar af torfhúsi, sem var mikið skaddað af síðari tíma byggingum.

Við rannsóknina 2001 kom í ljós að húsið var áfast stærri skála sem var norðan við það. Eftir að uppgrefti lauk á lóðinni Aðalstræti 18 hafði verið færður ofaníburður á svæðið og það síðan notað sem bílastæði allt fram til 2001. Fylgst var sérstaklega vel með vélgrefti á hinu áður kannaða svæði á lóðinni nr. 18, ef vera skyldi að eitthvað af áður rannsakaðri byggingu hefði verið skilið eftir, enda hafði rannsóknin 2001 á lóð Aðalstrætis 14 sýndi að ýmsar minjar þar, sem kannaðar höfðu verið 1972-4, höfðu verið skildar eftir. Ekki varð vart við leifar af hinni áður rannsökuðu byggingu á lóð Aðalstrætis 18. En utan þess svæðis sem athuganir 1971 tóku til, á suðausturhorni rannsóknarsvæðisins, á horni „Uppsalalóðarinnar", (Aðalstræti 18) var nokkuð af óhreyfðum jarðlögum. Lítill bútur af torfvegg með landnámsgjósku [1127] kom í ljós aðeins austar en húsið hafði staðið sem kannað var 1971. Svo lítið var eftir af þessum vegg að ekki verður mikið um hann sagt, stærð veggjarbútsins var 0,7 x 0,5 x 0,1 m. Ekki varð vart við gólflag sem gæti tengst honum og vel gæti það hafa verið t.d. veggur um húsagarð, eða lítið gerði áfast húsum.




Vestar, á lóð Túngötu 2, þar sem fylgst var með vélavinnu komu í ljós minni háttar mannvistarummerki, eining [1126]. Það var stallur grafinn í óhreyfð lög (ísaldarleir) í brekkunni. Þessi mannaverk voru næst Túngötu, hornrétt á hana, stallurinn var um 7 m að lengd og ca 0,15 m á hæð. Þessi ummerki kunna að vera meðal elstu minjanna, en úr því verður þó ekki skorið.

Víða á rannsóknarsvæðinu mátti finna þunn gráleit lög lítillega viðarkolaborin, sem lágu ofan á landnámsgjóskunni, sem aftur lá ofan á malarlagi því sem er að finna alls staðar undir miðbæ Reykjavíkur. Líklega eiga þessi lög saman, þó að þau hafi ekki verið alveg samhangandi. Þau eru skráð sem einingarnar [1065], [1078], [1087] [1120]og [1121]. Þykkt þessara laga var töluvert misjöfn, á bilinu 0,5-10 cm. Ekki varð séð að neitt þessarra laga næði undir veggi skálans og er trúlegt að lögin hafi myndast um það leyti er skálinn var byggður eða á meðan hann var í notkun. Áþekk lög, einingar [1102] og [1103], eru undir fordyrinu, og eru einnig vísbending um að það sé reist síðar en skálinn.

Sunnan fordyris, við austurvegg skála, komu í ljós þykkari sorplög , flokkur [1113]. Sá flokkur var myndaður af 9 einingum,[1104], [1105], [1106], [1107], [1108], [1109], [1110], [1111], [1112] og eru þau túlkuð sem efni sem safnast hefur utandyra meðan skálinn var í notkun, á hlaði eða svæði utan við húsvegg þar sem umgangur var. Þessi lög voru grafin í eins metra reitum, og voru sýni tekin úr um það bil öðrum hvorum reit, enda voru þessi lög einna vænlegust til að gefa einhverjar lífrænar leifar. Þessar einingar voru á bilinu 2,15 – 2,47 m yfir sjó.

*Ummerki sem líklega eru yngri en skálinn og fordyrið:*
Skammt norðan við fordyrið voru nokkur lög, trúlega frá því eftir að skálinn og fordyrið voru reist. Þetta voru einingarnar [1070], brúnleitt áfokslag með viðarkolum og ösku í (u.þ.b. metri á hvorn veg; þar undir [1073] 2 x 1 m, torfhrun með ösku og kolum í. Nálægt því voru einingarnar [1082] og [1083], svipuð brúnleit moldarlög, hið

síðarnefnda lá að norðurvegg fordyris, en bar merki um nýlegt rask. Tvö lítil viðarkolalög, [1074] og [1077], lágu upp að norðurvegg fordyris.

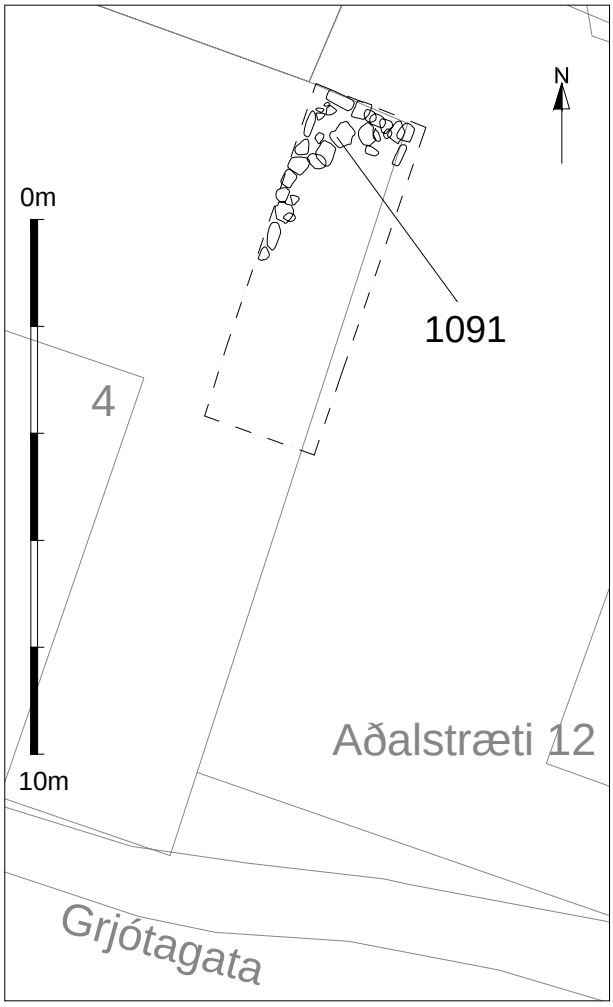
Lag af hrundu torfi, eining [1056], lá meðfram austurvegg skála sunnan fordyrisins. Torfið var grábrúnleitt og í því rendur af landnámsgjósku. Þetta lag er túlkað sem hrun úr eystri skálaveggnum. Kolefnisgreiningar sem þegar er búið að gera á kornleifum úr skálagólfi benda til þess að hann hafi verið í notkun um miðbik 10. aldar.[9] Má því ætla að torfhrunslagið sé frá lokum 10. aldar eða frá 11. öld. Leifar af torfhrunslagi sáust einnig á kafla allra austast á rannsóknarsvæðinu, eining [1118], á um 5 metra löngum kafla en mjótt, með nokkurri vissu skert af síðari tíma framkvæmdum. Ekki varð ráðið hverju það tilheyrði né aldur þess ákvarðaður. Undir því, en yfir sorplögum var troðið yfirborðslag m. grjóti, eining [1119], 2 cm þykkt, sem gæti verið samtíma skála og fordyri.

**11/12. – 18. öld**

Eining [1059] er heildarnúmer gefið ljósum áfokslögum sem hlaðist hafa upp á löngum tíma og eru samskonar og lög sem lágu á rannsóknarsvæði ársins 2001. Þessi lög voru mikið skert af ýmis konar niðurgrefti og skurðum. Líklega er það rask aðallega frá 20. öld.

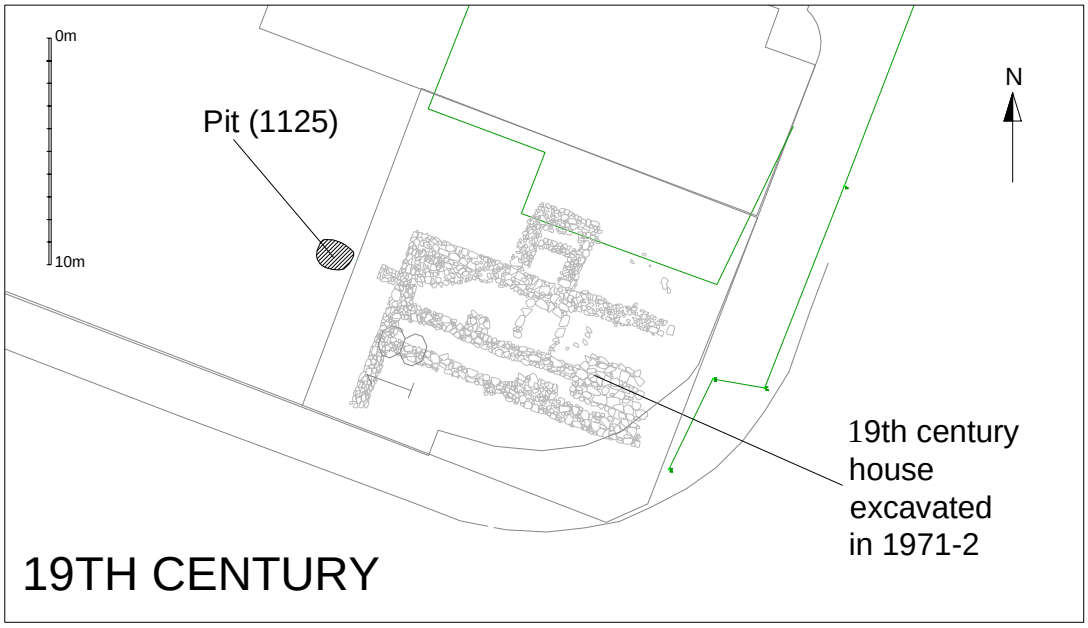
**19. öld**

Þá var einnig fylgst með grefti fyrir gangi sem liggja á neðanjarðar frá lóð Aðalstrætis 14 undir Grjótagötu og meðfram húsinu á Grjótagötu 4 að Aðalstræti 10. Fremur grunnt var á klöpp á þessum stað eins og hafði sýnt sig 1994 þegar grafið var á lóð Aðalstrætis 12.[10] Á þessum stað var komið niður á eitt mannvirki, einingu [1091], á lóð Grjótagötu 4, í vesturjaðri þess svæðis sem grafið var. Var þetta fremur óregluleg grjóthleðsla (1-2 umför steina). Röð af steinum, ca 3,5 m löng lá í norður og suður en styttri bútur í austur og vestur, eða um 2 m. Þannig að sú hleðsla, sem séð varð, var nánast eins og L í laginu. Ekki verður sagt um það með neinni vissu til hvers hleðslan hefur verið, en hugsast getur að þarna hafi verið hlaðinn upp stallur í brekkunni til að skorða jarðveg.




[9] Sjá viðauka / Appendix 2, einnig Howells M
*hins ísl.fornleifafélags 2000-2001*, bls. 219-2
[10] Bjarni F Einarsson: *Fornleifarannsókn í A*
*landnám.* (Skýrslur Árbæjarsafns XLIX), Reykjavík 1995, bls. 49 og 50)

Slíkur frágangur var meðal þess sem fram kom á efri hluta lóðarinnar Aðalstræti 14-16. Armurinn sem lá til austurs þar frá gæti verið hluti úr garði á lóðamörkum. Hleðslan var í hæðinni 4,50 – 5,00 metrar yfir sjó. Frá þeirri hæð og um 20 – 30 cm niður voru lítillega hreyfð lög. Þar neðan við var komið í óhreyfð lög og í klöpp um metra undir hleðslunni. Nokkru var safnað af lausafundum við vélavinnuna, og virðast þeir hlutir sem hægt er að tímasetja vera frá 18. öld og yngri, einkum leirkera- og krítarpípubrot.




Þegar fylgst var með vélavinnu sunnantil á byggingarsvæðinu, á lóð Túngötu 2, kom í ljós hola, eining [1125], skammt vestan við grunn timburhússins stóra á lóð Aðalstrætis 18 frá 1902, sem var kallað Uppsalir. Hola þessi um 1,5 x 1,3 m, en 0.5 – 0,7 m djúp, en líklega skert að ofan af nýlegu raski, og gæti því hafa verið dýpri í fyrstu. Hún var grafin niður í óhreyfð lög. Í henni var móöskublandaður jarðvegur. Líklegt er að hola þessi sé frá 19. öld, en það verður þó ekki fullyrt með vissu.

**20. öld**

Á þessum stað er mikið rask vegna síðari tíma framkvæmda, eins og við er að búast í miðbæ Reykjavíkur. Allt var aðalrannsóknarsvæðið skorið í tvennt af skurði fyrir skólplögn og vatnslögn. Sá skurður lá um 3-4 metrum austar en austurveggur skála og var 1,4 metra breiður. Hann var grafinn niður á eða í malarkambinn sem er undir miðbænum í Reykjavík og hefur því skorið í gegnum allar mannvistarminjar. Austan hans náði nýleg uppfylling einnig víða niður undir mölina, eða nálægt hæðinni 2 m yfir sjó.

**Fundnir gripir**

Fundir voru fremur fáir við þennan síðari þátt uppgraftarins 2003. Engir gripir fundust í fordyrinu, ekki fundust heldur neinir gripir í þeim sorplögum sem telja má að tilheyri skála, nema illa varðveitt hvalbein sem virtist tilskorið, AST03-1749 (í einingu [1102] ). Það var steypt í plast til að ná því heilu, og fært til forvörslu í Þjóðminjasafni Íslands en forvörslu er ekki lokið. Dálítið fannst af gler- og

leirkerabrotum við hreinsun, og einnig eru meðal funda krítarpípubrot og bein, bæði brennd og óbrennd. Um fundna gripi úr báðum áföngum uppgraftar 2003 fjallar Natascha Mehler hér á eftir.

**Niðurstöður**

Helstu niðurstöður haustáfangans voru þær að í ljós kom að við áður rannsakaðan skála var viðbygging á austurhlið, og hafði verið inngangur í skálann eða fordyri. Austasti endi fordyris þessa er skertur en það virðist þó ekki vera mikið. Fordyri þetta hefur verið notað með skálanum. Það virðist byggt eftir að hann var reistur, en líklega ekki löngu síðar. Örlítill veggbútur með landnámsgjósku í torfi fannst sunnan við áður rannsakað hús í Aðalstræti 18, og er ef til vill leifar garðlags. Nokkrir allstórir steinar í óreglulegri röð austan skála kunna einnig að vera leifar af garðlagi. Þá fundust lítilfjörlegar leifar af torfvegg án landnámsgjósku norðan fordyris. Allar eru þessar veggjarleifar of illa varðveittar til þess að sagt verði um hvað þar hefur verið. Allar tilheyra þær fyrstu öldum búsetu á staðnum. Eins og á rannsóknarsvæðinu 2001 höfðu síðan verið lítil umsvif á skákinni sem rannsökuð var haustið 2003 allt frá því að skálinn fór úr notkun og líklega fram yfir lok miðalda. Þykk ljósbrún áfokslög höfðu safnast fyrir á þessu tímabili. Ekki voru á rannsóknarsvæðinu neinar byggingaleifar sem með vissu má telja frá 18. öld eða tímum Innréttinganna. Það kann að skýrast af tvennu. Á Innréttingatímanum var komin þarna gata og eins var mikið af raski og skerðingum frá 20. öld á svæðinu. Ekki voru heldur neinar yngri mannvirkjaleifar á því svæði sem rannsakað var, nema grjóthleðslur á lóð Grjótagötu 4, en töluvert af fundnum gripum er frá þessu tímabili. Þeir voru margir úr röskuðum lögum og fundnir við hreinsun.

Þegar allt er samantekið má segja að niðurstöður haustsins hafi staðfest og stutt niðurstöður frá 2001. Hér við Aðalstræti sunnanvert hefur á 10. öld staðið skáli, íveruhús með viðbyggingu að sunnan og fordyri að austan. Kolefnisgreiningar á korni úr skálagólfinu benda til þess að hann hafi verið í notkun á 10. öld.[11] Eftir að hætt var að nota skálann virðast ekki hafa verið reistar byggingar nákvæmlega á þessum stað um aldir, en áfokslög söfnuðust fyrir ofan á rústunum. Ummerki frá 18. öld og síðar hafa að mjög litlu leyti varðveist á skák þeirri sem rannsökuð var haustið 2003 vegna umsvifa á 20. öld.

Þó að rannsóknin um haustið 2003 hafi aðeins tekið til fremur lítils óraskaðs svæðis hefur hún enn aukið við vitneskju okkar um elstu byggðina í Reykjavík. Það er eflaust óhætt að fullyrða að ekki sé víða til öllu ítarlegri mynd af elstu búsetu í nokkrum bæ eða borg.

[11] Sjá viðauka / Appendix 2.

**Einingaskrá** (haustáfangi AST 03) - **Context List** (Autumn 2003)

| Context | Type | Description |
|---|---|---|
| 1056 | D | torfhrun |
| 1057 | C | skurður fyrir skólplögn |
| 1058 | C | skurður fyrir skólplögn / vatnslögn |
| 1059 | D | áfoks- eða vatnsborin lög |
| 1060 | D | gráleitt lag |
| 1061 | D | grábrúnt leirkennt lag |
| 1062 | C | skurður f. skólplögn sunnantil á svæði |
| 1063 | D | brúnt siltlag í halla |
| 1064 | D | torfleifar |
| 1065 | D | grátt þunnt sorplag rétt yfir landnámslaginu |
| 1066 | G | flokkur: byggingarleifar (viðbygging, fordyri) |
| 1067 | D | torfleifar inni í [1066] |
| 1068 | D | áfokslag |
| 1069 | D | torfleifar |
| 1070 | D | lag með viðarkoli og ösku |
| 1071 | D | torfleifar, undir [1067], en þéttara lag |
| 1072 | D | fokmold með torftætlum og viðarkoli |
| 1073 | D | torfhrun |
| 1074 | D | viðarkolablettur |
| 1075 | D | gult áfokslag inni í [1066] undir [1067] |
| 1076 | D | blandað áfokslag með viðarkolum |
| 1077 | D | Dökkbrúnt /gráleitt þunnt sorpborið lag |
| 1078 | D | þunnt sorplag (S við [1066] ) = 1065 ? |
| 1079 | D | nýleg uppfylling |
| 1080 | C | skurður fyrir skólplögn |
| 1081 | D | hrunið torf og steinar á N enda svæðis – veggjarleifar? |
| 1082 | D | viðarkolalag |
| 1083 | D | blandlag |
| 1084 | D | þunnt viðarkolalag |
| 1085 | D | þunnt viðarkolalag |
| 1086 | D | brúnt siltlag |
| 1087 | D | grábrúnt lag með viðarkolum, austan lagnaskurðar |
| 1088 | D | landnámslag, óhreyft |
| 1089 | D | blandað lag, torfhrun og silt, í viðbyggingu |
| 1090 | D | gólflag í viðbyggingu |
| 1091 | ST | steinhleðsla á lóð Grjótagötu 4 |
| 1092 | D | grjót við suðurvegg (=1117) |
| 1093 | D | steinar í N vegg viðbyggingar |
| 1094 | D | lag í NA-horni viðbyggingar |
| 1095 | D | steinar í norðurvegg viðbyggingar |
| 1096 | D | gólflag í NV hluta viðbyggingar |
| 1097 | D | torfhrun úr suðurvegg útbyggingar, norðan við hann |

| Context | Type | Description |
|---|---|---|
| 1098 | D | torfhrun |
| 1099 | D | blandað grábrúnt silt með möl |
| 1100 | D | grár leir, fyllingarlag undir vegg |
| 1101 | D | torfhrun / veggleifar (?) |
| 1102 | D | grár leir með miklu viðarkoli |
| 1103 | D | rauðgult silt með nokkru viðarkoli |
| 1104 | D | linsur af rótuðu torfi |
| 1105 | D | grábrúnt siltlag, aðeins leirkennt |
| 1106 | D | torfhrun |
| 1107 | D | lag m brunaleifum, aska, viðarkol, brennd bein |
| 1108 | D | áfokslag, silt |
| 1109 | D | móöskulag, neðst í sorphaug |
| 1110 | D | móaska rétt undir yfirborði sorphaugs |
| 1111 | D | viðarkolalag í sorphaug |
| 1112 | D | grábrúnt lag efst í sorphaug |
| 1113 | G | flokkur, einingar 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112 |
| 1114 | D | steinar í N-vegg fordyris (yfir 1039 + 1095) |
| 1115 | D | steinar í N-vegg, ofan á [1114] |
| 1116 | S | grjótlögn í inngangi |
| 1117 | S | steinaröð milli norðurveggjar og hellulagnar |
| 1118 | D | torfleifar, ef til vill hrun |
| 1119 | D | þjappað yfirborðslag með steinum |
| 1120 | D | þunnt viðarkolalag |
| 1121 | D | gráleitt lag, samskonar og þunnu sorplögin |
| 1122 | D | viðarkolalag þunnt |
| 1123 | ST | steinaröð |
| 1124 | D | dökkgrátt sorpblandað lag (undir [1121]) |
| 1125 | C | hola með móöskublönduðum fokmoldarlögum |
| 1126 | C | stallur grafinn í óhreyfð lög |
| 1127 | D | veggjarleifar með landnámsgjósku |

**SKRÁ UM SÝNI, HAUST 2003 - List of environmental samples, Autumn 2003**

Tekin voru sýni úr ýmsum mannvistarlögum til fornvistfræðilegra rannsókna. Þau hafa öll verið fleytt og sigtuð, en ekki er búið að vinna úr þeim að fullu. Því er ekki ljóst hve góð varðveisla er í þessum lögum og hvort vænta má upplýsinga til viðbótar.

| Nr. | Eining | lítrar | lýsing lags |
|---|---|---|---|
| 1 | 1065 | 20 | þunnt sorplag sunnantil |
| 2 | 1067 | 20 | torfhrunslag |
| 3 | 1067 | 20 | torfhrunslag |
| 4 | 1065 | 20 | þunnt sorplag sunnantil |
| 5 | 1065 | 20 | þunnt sorplag sunnantil |
| 6 | 1065 | 20 | þunnt sorplag sunnantil |
| 7 | 1065 | 20 | þunnt sorplag sunnantil |
| 8 | 1065 | 5 | þunnt sorplag sunnantil |
| 9 | 1065 | 10 | þunnt sorplag sunnantil |
| 10 | 1068 | 10 | áfok |
| 11 | 1074 | 10 | viðarkol |
| 12 | 1078 | 10 | þunnt sorplag |
| 13 | 1078 | 10 | sorplag |
| 14 | 1078 | 10 | sorplag |
| 15 | 1078K | 10 | sorplag |
| 16 | 1078O | 10 | viðarkolalag í sorphaug |
| 17 | 1078Q | 10 | leirlag í sorphaug, m.viðark. |
| 18 | 1078L | 5 | móaska í sorphaug, m.viðark. |
| 19 | 1078F | 10 | siltblandinn sandur m.viðark. |
| 20 | 1078E | 10 | brunalag, aska, viðarkol etc |
| 21 | 1078H | | viðarkol |
| 22 | 1078H | 10 | ljós móaska með viðarkolum |
| 23 | 1120 | | viðarkol |
| 24 | 1120 | 10 | kolablorið lag |
| 25 | 1120 | 20 | kolablorið lag |
| 26 | 1121 | 10 | gráleitt mannvistarlag |
| 27 | 1121 | 10 | gráleitt mannvistarlag |
| 28 | 1122 | 5 | kolablorið lag |
| 29 | 1124 | 10 | dökkgrátt lag |

# Appendix 1 - The Finds

Natascha Mehler

The excavations at Aðalstræti 14–16 recovered a total of 1475 finds of various materials such as glass, ceramics, wood, cork, metal, stone, plastic, gum, leather and textile (see Table 1). Bones were treated as samples. The composition of post-medieval and early modern artefacts is of very similar consistence to that of the previous excavations carried out in 2001. Medieval and viking age finds are essentially absent, despite the fact that new structures of the viking age longhouse were discovered – one exception may be the remains of a possible whalebone "sword" – currently awaiting the completion of conservation treatment.

Most of the artefacts were manufactured in the late 18th and 19th century. Unfortunately the area of excavation was heavily truncated and disturbed by modern intrusions, thus a number of objects were either re-deposited or had to be treated as loose finds and cannot serve as dating evidence for some contexts. The total time span of the artefacts ranges from the mid 18th century to late 20th century, only one glass fragment is most likely of slightly older date (see glass vessels: 03-1557). The objects are therefore analysed by their purpose or use rather by dividing them into chronological order.

| **material** | **general name** | **sum** |
|---|---|---|
| ceramics | vessel ceramics | 842 |
| | clay pipes | 49 |
| | bricks, tiles | 123 |
| glass | vessels | 284 |
| | window fragments | 76 |
| wood | building material | 15 |
| | vessel base | 1 |
| | button | 1 |
| cork | stopper | 2 |
| metal | objects | 59 |
| stone | objects | 18 |
| plastic | button, stopper | 2 |
| gum | dental gum | 1 |
| leather | fragment | 1 |
| textile | fragment | 1 |
| **total** | | **1475** |

Table 1: Total sum of finds sorted by material and general name.

# 1. Building material and remains of structural objects

Building material is represented by bricks and roof tiles and window glass, structural objects include a number of nails of various size and fragments of timber.

## 1.1. Bricks

In total 116 fragments of bricks and 7 fragments of roof tiles have been recovered. The fabrics of those bricks correspond well with that of brick types I, II and III recovered during the excavations in 2001 (see table 2).[12] These types occur both in periods of the Factories as well as in modern times, most likely due to re-use or re-deposition. Most of the newly discovered bricks were found in contexts dating to the 19th century such as context 1032, and may in fact be re-deposited. The origin of those bricks is unknown, but a Danish source is most likely. There are a few fragments of roof-tiles but, it is unknown to which building they once belonged.

| Find Nr. | Context | Quantity | Roof Tile | Type I | Type II | Type III |
|---|---|---|---|---|---|---|
| 03-1569 | 1003 | 1 | | | | 1 |
| 03-1570 | 1004 | 2 | | 1 | | 1 |
| 03-1571 | 1005 | 2 | | 1 | | |
| 03-1572 | 1010 | 10 | | | 10 | |
| 03-1573 | 1020 | 1 | | 1 | | |
| 03-1574 | 1020 | 4 | | 2 | 1 | 1 |
| 03-1575 | 1025 | 1 | | 1 | | |
| 03-1576 | 1026 | 1 | | 1 | | |
| 03-1577 | 1029 | 4 | | 3 | | 1 |
| 03-1578 | 1032 | 17 | | 17 | | |
| 03-1579 | 1033 | 1 | | 1 | | |
| 03-1580 | 1033 | 8 | | 2 | 4 | 2 |
| 03-1581 | 1034 | 24 | | 16 | 2 | 6 |
| 03-1582 | 1035 | 3 | | | 3 | |
| 03-1658 | Midden | 1 | | | 1 | |
| 03-1659 | Un-strat | 9 | | | 9 | |
| 03-1662 | Un-strat | 1 | | | | 1 |
| 03-1681 | 1051 | 1 | | | | 1 |
| 03-1694 | Un-strat | 3 | | 3 | | |
| 03-1710 | 1079 | 3 | | | 3 | |
| 03-1732 | Un-strat | 5 | | 2 | 3 | |
| 03-1741 | 1079 | 17 | 2 | 7 | 6 | 2 |
| 03-1733 | Un-strat | 5 | 5 | | | |
| | | **123** | **7** | **58** | **42** | **16** |

Table 2: Brick and roof tile fragments according to fabric type (N = 123).

[12] See Mehler 2001a, 73f. and table 7.2.

### 1.2. Wood

15 small fragments of wood were recovered which are most likely to be the remains of building material such as planks or boards, although parts of furniture or tools cannot be excluded. The pieces are rather fragmentary, burned and in poor condition, thus it remains unknown what purpose they served (see table 3). None of them has been worked.

| Finds nr. | context | number of fragments |
|---|---|---|
| 03-1604 | 1041 | 1 |
| 03-1603 | 1021 | 10 |
| 03-1634 | 1034 | 1 |
| 03-1631 | 1022 | 1 |
| 03-1629 | 1000 | 1 |
| 03-1632 | 1032 | 1 |

Table 3: List of unworked wood fragments.

### 1.3. Building material: Iron

Recovered building material made of iron includes nails, strap iron and a bolt fragment (see table 4). In total 12 complete iron nails were found, in addition 9 fragments of other nails. All are heavily corroded, and all of them handmade rather than machine made. The nails are of various size, ranging in length from 2,5 cm (03-1691) up to 9,5 cm (03-1672). Their heads are either round or square shaped, their shank section both round and square. None of the nails was found in a construction. 3 fragments of scrap iron were found, all of them rather small, their purpose unknown. One bar-shaped iron fragment is most likely part of a bolt (03-1597).

| Find nr. | context | general name | sum |
|---|---|---|---|
| 03-1691 | 1076 | Nail fragment | 1 |
| 03-1696 | 1078 | Scrap iron fragment | 1 |
| 03-1672 | peat ash midden | Nails, complete | 2 |
| 03-1701 | us | Nail, complete | 2 |
| 03-1705 | 1059 | Nail fragment | 1 |
| 03-1708 | 1079 | Nail, complete | 1 |
| 03-1717 | 1079 | Nail, fragment | 1 |
| 03-1593 | 1021 | Nail, complete | 2 |
| 03-1600 | 1043 | Nail fragments | 2 |
| 03-1599 | 1035 | Nail fragments | 2 |
| 03-1599 | 1035 | Strap iron fragments | 2 |
| 03-1597 | 1032 | Bolt fragment | 1 |
| 03-1594 | 1022 | Nails, complete | 5 |
| 03-1594 | 1022 | Nail fragments | 2 |

Table 4: List of complete nails, nail fragments, scrap iron and bolt fragments.

### 1.4. Building material: Stone

5 tiny fragments of slate were recovered (3 unstratified). Slate does not occur naturally on Iceland, but was imported for roofing houses.

| Find nr. | context | sum |
|---|---|---|
| 03-1720 | 1076 | 1 |
| 03-1721 | 1078 | 1 |
| 03-1726 | us | 1 |
| 03-1730 | us | 1 |
| 03-1748 | us | 1 |

Table 5: List of slate fragments.

### 1.5. Window glass

76 fragments of window glass were found, most of them made of green glass. They were found in contexts 1022, 1025, 1026, 1029, 1032, 1033, 1034, 1035, 1044 and 1079. All fragments date to the late 18th and 19th century.

## 2. Dress adornments and personal belongings

Items of dress adornments recovered include buttons made of copper alloy and wood, fragments of leather and textile and a spur. In addition, clay pipes are considered as personal belongings.

### 2.1. Buttons

Five buttons were recovered: three made of copper alloy, one made of wood, possibly surrounded by leather, and one made of plastic (see Table 6). The white plastic button 03-1670 is of modern date. 03-1680 represents the poorly preserved fragments of a button made of copper alloy, its shank still preserved, its total shape unknown. Completely preserved is the copper alloy button 03-1657, although the decoration is not visible anymore. Another complete button made of copper alloy was found in context 1034 (03-1618). Its shape is round and flat, the backside bears a completely preserved eye but with no visible decoration. All copper alloy buttons can be dated stratigraphically by their connection with other datable objects to the late 18th and 19th century. They are similar to those copper alloy buttons found during the previous excavations at the site (for example AST 01-1047 or 01-1170[13]) . The only button made of wood was found in the top layer 1000 and is probably of rather modern date.

| Find nr. | context | material | general name |
|---|---|---|---|
| 03-1680 | 1051 | copper alloy | button |
| 03-1657 | 1035 | copper alloy | button |
| 03-1618 | 1034 | copper alloy | button |
| 03-1614 | 1000 | wood and leather (?) | button |
| 03-1670 | 1000 | plastic | button |

Table 6: List of copper alloy, wood and plastic buttons.

### 2.2. Leather

[13] Mehler 2001a, 76.

19 small fragments of indeterminate leather were found in context 1004, although the material is extremely deteriorated and the original shape remains unknown.

### 2.3. Textile

One fragment of textile was recovered. 03-1635 is now discoloured, appearing as a brownish fine woven cloth. It was found in context 1021, a peat ash layer dating to the early 19th century. It is not known whether the fragment is part of a dress or a product made in the Factories.

### 2.4. Spur

Two fragments of a spur made of iron were collected as loose finds 03-1591. The date of this artefact is unknown.

### 2.5. Clay pipes

Clay pipes bear witness of the use of tobacco at the site and are clearly personal belongings. 49 clay pipe fragments were found in total: 6 of those show stamp decoration but cannot be dated, 35 stem fragments are undecorated and are also undated. As it is the case with the clay pipe assemblage recovered during the excavation in 2001[14], the new finds are mainly products of the well-known pipe manufacturers in Gouda, The Netherlands, although imitations of other clay pipe manufactories cannot be excluded in some cases.

Only eight fragments can be dated with certainty (see table 7). Unfortunately, most of those are loose finds. None of the fragments date to pre 1733. 03-1692, the fragment of a pipe head, which can be very closely dated to the period 1733 to 1739, but unfortunately this fragment is a stray find. Marks represented on the preserved pipe heals are rather common to be found in Iceland, and they appear on sites such as Viðey and Skálholt.[15] The mark with the arms of Gouda, placed on both sides of the heel, is a rather useful for dating the fragments. It was introduced in 1739 and had to be placed on every pipe made in Gouda.[16] 03-1609 is a rather interesting pipe head most likely originating in England. The moulded decoration shows two animals, a lion and an unicorn (?), in upright position and holding a medallion in their paws. The inscriptions below the animals and around the medallion are not readable. A pipe fragment found during the excavations in 1971–1972 appears to be similar, but is too fragmented to be sure.[17]

[14] Mehler 2001b.
[15] Mehler 2003, 177 table 2.
[16] Duco 1987, 77.
[17] Mehler 2002a, 70 fig. 4.8. Here provenience suggested to be Swedish or Dutch.

| Finds nr. | context | mark | origin | Arms of Gouda | pipe maker | Meulen[18] | Duco | Dating |
|---|---|---|---|---|---|---|---|---|
| 03-1610 | 1033 | VPS | Gouda | X | Pieter Versluijs<br>Johannes Spit | post 1746<br>1829–1838 | 1746–1829 | 1746 to early 19th cent. |
| 03-1724 | us | key | Gouda? | X | Machiel Storm<br>Jan van Borselen<br>Sijmen Groenendaal | 1730–1819 | 1730–1812 | 1739–1819 |
| 03-1692 | us | VPS | Gouda | X | Pieter Versluijs<br>Johannes Spit | post 1746<br>1829–1838 | 1746–1829 | 1746 to early 19th cent. |
| 03-1692 | us | Snake | Gouda | | Cornelis Vermeul<br>Cornelis van der Wal<br>Lucas de Jong<br>others[19] | 1733-?<br>1744-59<br><br>?-1770 | 1733–1808 | 1733–1739 due to no heel mark! |
| 03-1609 | 1032 | | Gouda | X | | | | post 1739 |
| 03-1609 | 1032 | | England? | | | | | late 18th century |
| 03-1605 | us | key | Gouda | X | Machiel Storm<br>Jan van Borselen<br>Sijmen Groenendaal | 1730–1819 | 1730–1812 | 1739–1819 |
| 03-1605 | us | three crowned squares | Gouda | X | Corneis Bouman<br>Joris van der Dus<br>others of van Dus<br>Hermanus Steinfort | 1730-?<br>1748-?<br><br>1829–1842 | 1686–1839 | 1739–early 19th cent. |

Table 7: List of datable clay pipe fragments; pipes with arms of Gouda dates post 1739.

# 3. Working equipment

Only few traces of working equipment were found, including items used for fishing and treating the fish, and a complete horse shoe.

## 3.1. Fishing equipment

Two dark grey basalt stones are worked but cannot be dated since they are unstratified: 03-1584 is an almost complete net sinker of long oval shape and 16,5 cm length, 03-1583 is a half preserved fish hammer of 17,5 cm diameter. These finds indicate that fish has been processed at this location.

[18] Dates by Meulen 2003 and Duco 1982.
[19] See Meulen 2003, 41.

### 3.2. Horse shoe
A complete but corroded horse shoe was collected as loose find (03-1590). It dates to the 18th to 20th century.

### 3.3. Other
Iron fragment 03-1723 is spatula shaped and most likely part of a tool. The object is of uncertain date and origin.

## 4. Domestic utensils: ceramic vessels and vessel glass
The majority of artefacts recovered during the excavations consist of fragments of imported vessel ceramics and vessel glass. The fragments belong to vessels used for preparation, storage and the serving of food and drinks. These objects were made in many different countries: England, Germany, Denmark, The Netherlands and different continents including Asia and North America.

The ceramics are analysed by their fabric (see Table 8): including redwares, stonewares, faience, European and Asian porcelain, and industrial refined earthenwares such as creamwares, pearlwares and whitewares.[20]

| type of ware | sum | % |
|---|---|---|
| Redwares | 383 | 45,7 |
| Faience | 29 | 3,4 |
| Stonewares | 29 | 3,4 |
| Whitewares | 258 | 30,8 |
| Asian porcelain | 18 | 2,2 |
| European porcelain | 28 | 3,4 |
| Creamware | 76 | 9,2 |
| Pearlware | 9 | 1,1 |
| Other | 5 | 0,6 |
| | **842** | **100** |

Table 8: Distribution of vessel ceramic ware types.

### 4.1. Redwares
45,7% of all ceramic sherds discovered are made of redware. Redware is the most common ceramic fabric in the early post-medieval period up to the beginning of the 19th century. A number of fragments have already been found during the excavations in 2001, and some of the newly discovered sherds are part of the same vessel whose fragments were found previously. The 2003 material includes various vessel forms : tripods, pans, bowls, plates, serving dishes and tea pot.

[20] Industrial refined earthenwares and porcelain were identified by Gavin Lucas. I am very grateful for his help.

| Finds nr. | context | quantity | date | origin | vessel form |
|---|---|---|---|---|---|
| 03-1518 | 1026 | 12 | late 18th to early 19th cent. | | 1 tripod (4 fragments), 1 plate (min. 1 frag.), 1 sieve (1 frag.), others |
| 03-1517 | 1025 | 7 | late 18th to early 19th cent. | | 2 bowls, other |
| 03-1521 | 1029 | 4 | 18./19th cent. | | 2 pots or bowls, others |
| 03-1713 | 1079 | 13 | 18./19th cent. | | 1 plate (3 fragm.), 1 plate (3 fragm.), 1 bowl (2 fragm.), others |
| 03-1693 | us | 39 | 18./19th cent. | | 1 bowl (11 fragm.), 1 tripod (3 fragm.), 1 plate (1 fragm.), 1 bowl (2 fragm.), others |
| 03-1719 | us | 12 | 18./19th cent. | England | 1 plate from Staffordshire, England (1 fragm.), 1 storage jar (2 fragm.), others |
| 03-1505 | 1002 | 3 | 18th cent. | Denmark? | 1 little pot |
| 03-1506 | 1003 | 4 | 19th cent. | | 1 tea pot (1 fragm.), others |
| 03-1512 | 1021 | 1 | 19th cent. | | pot |
| 03-1500 | 1000 | 1 | 18th cent. | Netherland | 1 tripod pan |
| 03-1500 | 1000 | 1 | 18th cent. | England | Staffordshire bowl |
| 03-1525 | 1033 | 3 | late 18th / early 19th cent. | Denmark or Germany | 1 serving dish |

Table 9: Selection of significant redware types with vessel forms, dates and provenance.

Four fragments of a redware tripod were found in context 1026. The tripod is of fine red material, its inner and outer surface covered with an orange lead glaze, the exterior part in addition has yellow and green circular decoration, especially close to the handle (03-1518). The vessel was made in the late 18th or early 19th century. The rim of a large redware plate is unfortunately a stray find (03-1719). It originates in Staffordshire, England, where it was produced in the 18th century.[21] It probably belongs to the same vessel as 01-335, found during the excavations in 2001 in a context belonging to the later Factory, thus dating after 1764.[22] Its fabric is dark red to brownish, the inside is slip-coated and covered with a clear, dark brown lead glaze. The vessel has been moulded and then afterwards turned on a potters wheel. 03-1500, the base of a bowl, is also of the same Staffordshire material and also a stray find.

[21] Stephan 1987, 207 ff.
[22] Mehler 2002b, 123.

The rim of a small pot, probably Danish in origin, was found in context 1002 (03-1505). The glaze is orange, the outside in addition has painted decoration, now fallen off. A bigger pot is represented by 03-1512, found in context 1021. The outside is covered by a white slip and a covering green glaze, the inside is glazed with orange. Three fragments of a rather large redware serving dish were found in context 1033 (03-1525). The vessel's interior and rim area is covered with a white slip and a green glazed. The rim is upright with a diameter of ca. 26 cm. A 19th century tea pot is represented by a spout of redware covered with dark brown glaze (03-1506). A large fragment of an 18th century large tripod pan is unfortunately a stray find. It is part of the same vessel (01-306) found in 2001.[23] The vessel probably originates from The Netherlands or Northern Germany and belongs to the later Factory period, and all connected to the rebuilding activities shortly after the fire thought to have taken place in 1764. The pan originally had a diameter of ca. 27 cm. It is 7.2 cm deep and very sooty on the outside due to heavy utilisation. In- and outsides are covered with orange lead glaze.

### 4.2. Faience

3,4 % of all sherds discovered are made of faience. This refers to tin-glazed redwares often polychrome decorated. As with some of the redwares, some of the newly discovered faience sherds belong to vessel sets whose fragments were found in 2001. Vessel forms include plates and bowls.

| Finds nr. | context | quantity | date | origin | vessel form |
|---|---|---|---|---|---|
| 03-1517 | 1025 | 1 | late 18th to 19th cent. | | plate |
| 03-1522 | 1029 | 7 | late 18th to early 19th cent. | The Netherlands | 1 bowl |
| 03-1507 | 1003 | 1 | late 18th cent. | | 1 handle |

Table 10: Selection of significant faience fragments.

The body sherd of a late 18th to early 19th century faience plate was found in context 1025 (03-1517). The plate had been repaired with drilled holes. The outside is unglazed, the inside is covered with a whitish tin glaze and blueish to purple lined decoration, possibly depicting a landscape. Seven fragments of a Dutch faience bowl were found in context 1029 (03-1522). The vessel can be dated to the late 18th and the beginning of the 19th century. It is part of a set of plates and bowls whose fragments were found during the excavation in 2001 (01-026 and 01-103).

### 4.3. Stonewares

3,4 % of all vessel ceramic sherds are made of stoneware, originating in Germany and England. Vessel forms include bottles and storage jars of various size.

[23] Mehler 2002b, 122.

| Finds nr. | context | quantity | date | provenance | vessel form |
|---|---|---|---|---|---|
| 03-1517 | 1025 | 1 | late 18th to early 19th cent. | | unknown |
| 03-1521 | 1029 | 7 | late 18th to early 19th cent. | Germany or England | 1 bottle (6 fragm.), other |
| 03-1707 | 1079 | 1 | 19/20th cent. | | unknown |
| 03-1713 | 1079 | 4 | 19./20th cent. | | 1 storage jar (4 fragm.) |
| 03-1502 | 1000 | 6 | 1840–1920 | England | 6 storage jars |
| 03-1707 | 1079 | 1 | 19th cent. | England | unknown |
| 03-1713 | 1079 | 4 | mid to late 19th cent. | England | 1 jam jar |
| 03-1506 | 1003 | 3 | 19th cent. | Germany or England | 1 storage jar |
| 03-1523 | 1032 | 2 | 19th cent. | | 1 bowl? |

Table 11: Selection of significant stoneware fragments by date, provenance and vessel form.

Six fragments of a late 18th to early 19th century small sized mineral water stoneware bottle were found in context 1029 (03-1521). The bottle is of German or English origin, its fabric light grey, the inside covered with a dark buff slip, the outside partly salt glazed. 03-1502 includes the remains of six different mid 19th century storage stoneware jars produced in England, all of them industrial and made between 1840 and 1920. Three of them are complete, three others fragmented. Five are of the same origin and manufacture and are most likely to be part of a set. Their fabric is light beige and fine and completely covered by a transparent salt glaze. Two different sizes are represented: three are ca. 13,9 cm high with an inner rim diameter of 6,7 cm, two are slightly smaller with a height of 11,0 cm and an inner rim diameter of 6,0 cm. No serial number is visible on the vessels. The sixth storage jar is of a different fabric: light grey, with clear salt glaze and blueish blemishes. This storage jar is cylindrical in shape, the walls ending in the rim without a shoulder. The outside is decorated with vertical rillings. In context 1079 were found four fragments of another storage jar made of similar fabric and decoration (03-1713). A rather large 19th century storage jar is represented by fragments 03-1506, its origin either Germany or England.
Of unknown stoneware type are two fragments found in context 1032 (03-1523) which belong to a bowl-like vessel. The fabric is dark grey, the outer surface with a metallic tinge, the inside covered with a dark brown blistery lead (?) glaze. This is dated to the 19th century by association with redwares found in the same context.

### 4.4. Asian and European porcelain

Luxurious ceramic types such as Chinese porcelain, but also European porcelain, were found in small numbers. 2,2 % of all sherds could be identified as Chinese porcelain and 3,4 % of European origin. Most of the vessels, like the Chinese porcelain, are part of tea or coffee services: cups and saucers with minimal decoration. Other vessel forms include a bowl and plates.

| Finds nr. | context | quantity | date | origin | vessel form |
|---|---|---|---|---|---|
| 03-1707 | 1079 | 1 | 19th cent. | Germany | doll face, 1 fragment |
| 03-1713 | 1079 | 3 | | | 1 saucer, 1 cup, 1 plate |
| 03-1689 | 1059 | 1 | 19th cent. | Europe | unknown |
| 03-1516 | 1025 | 1 | 19th cent. | China | unknown |
| 03-1519 | 1026 | 1 | early 19th cent. | Denmark | bowl |
| 03-1519 | 1026 | 1 | early 19th cent. | China | Plate |
| 03-1520 | 1026 | 2 | early 19th cent. | China | 2 plates |
| 03-1713 | 1079 | 1 | mid 19th cent. | Europe | saucer |
| 03-1676 | us | 1 | | Europe | |
| 03-1522 | 1029 | 1 | late 18th to early 19th cent. | Denmark or Germany | cup |
| 03-1515 | 1022 | 2 | late 18th cent. | China | 1 cup |
| 03-1503 | 1000 | 1 | early 19th cent. | England | 1 cup |
| 03-1503 | 1000 | 2 | 19th cent. | Denmark | 1 bowl |
| 03-1527 | 1033 | 2 | mid to late 18th cent. | China | 2 cups |
| 03-1529 | 1034 | 5 | mid to late 18th cent. | China | 2 cups |

Table 12: Selection of significant Chinese and European porcelain fragments.

Chinese Porcelain was found in several contexts, for example two fragments of the same plate made in the early 19th century (03-1519 and 03-1520), both found in context 1026. The vessel is decorated with a rose in the center. Two fragments of a small cup of the 18th century were found in context 1022 (03-1515).

European porcelain found during the excavation in 2003 comes from Denmark, England and Germany. Worth mentioning is the fragment of a dolls face made of bisque porcelain found in context 1079 (03-1707), showing a part of the brown painted left eyebrow and eye on buff background. The doll was most likely made in Germany and dates to the second half of the 19th century.[24] Of Danish origin is the porcelain bowl fragment 03-1519, dating to the 19th century. Rim fragment 03-1713, belonging to a saucer with painted decoration showing a pink flower is probably of European origin. From Germany or Denmark, the rim of the cup 03-1522 (maybe Royal Copenhagen?), dates to late 18th and early 19th century. Made by the Danish factory of Royal Copenhagen are two fragments of a small 19th century bowl or cup (03-1503) with blue painted decoration. Of English origin is a small complete cup made of porcelain with gilded rim, the wall bears a painted brownish-red floral decoration (03-1503).

[24] A very similar fragment was found in Skálholt (SKH 02-021), here identified as made in Bavaria, Germany; see Lucas 2002, 51 f.

### 4.5. Whiteware

The term "Whitewares" includes 30,8 % of all ceramic fragments found and refers to the standard body of most refined earthenwares post-dating c. 1820. Most of the vessel forms are plates, cups and saucers with some dishes and bowls and a moulded jug. The origin of most fragments is to be found in England and Denmark, with a single plate most likely manufactured in North-America (03-1655). A number of whiteware fragments were recovered in unstratified contexts.

| Finds nr. | context | quantity | vessel form | date | origin |
|---|---|---|---|---|---|
| 03-1665 | 1125 | 4 | other | 19th cent. | |
| 03-1655 | us | 1 | jug | late 19th to early 20th cent. | Denmark? |
| 03-1655 | us | 1 | plate | late 19th to early 20th cent. | America |
| 03-1522 | 1029 | 18 | 1 bowl | early 19th cent. | England |
| 03-1512 | 1021 | 3 | 1 plate | 19th cent. | Denmark |
| 03-1511 | 1021 | 3 | 3 cups | early 19th cent. | England |

Table 13: Selection of whiteware fragments.

A fragment of a whiteware moulded jug with a bearded mans face at the spout was probably manufactured in Denmark at the late 19th or early 20th century (03-1655). The same context contained a part of a whiteware plate (03-1655) bearing the potter's mark at the base: a crown with the inscription "BIRMINGHAM" below, surrounded by the names "KANNREUTHER FRAUER & CO". Although the manufacturer's name sounds German and the place name Birmingham suggests the provenance to be English, the plate most likely originates in America, where it was made at the end of the 19th or the beginning of the 20th century. A small fragment of a whiteware plate (?) with painted decoration (03-1512) shows the letters "FREDENSBO ", the last letters missing, and is most likely of Danish origin . Of English origin is the whiteware bowl 03-1522, whose fragments were found in context 1029. The outside is covered with a blue handpainted landscape decoration. Of English origin is a whiteware vessel with willow pattern, made in the 19th century (03-1503). Other whiteware decorations include sponge pattern, slip coating and at least three different transfer printed ornaments on whiteware cups made in England, dating to the early 19th century (03-1511), but most were collected as stray finds (all 03-1501).

### 4.6. Creamware

As with the whitewares , most of the creamwares (9,2 % of all ceramic fragments), were recovered in unstratified contexts. The production of creamwares started in England during the mid- 18th century. Fragments found during the excavation date from the late 18th to 19th century. Vessel forms include plates and cups.

| Finds nr. | context | quantity | vessel form | date | origin |
|---|---|---|---|---|---|
| 03-1516 | 1025 | 5 | 1 plate (4 fragm.), 1 cup (1 fragm.) | late 18th to early 19th cent. | England |

| | | | | | |
|---|---|---|---|---|---|
| 03-1693 | us | 5 | 1 plate with fether edged decoration | 1780–1800 | England |
| 03-1526 | 1033 | 17 | 2 cups, 1 plate, others | late 18th to early 19th cent. | England |

Table 14: Selection of creamware fragments.

Five fragments of a feather-edged decorated plate are stray finds. They can be dated to the years ca. 1780 to 1800, and were manufactured in England (03-1693). A half creamware cup with black decoration showing a shepherd sitting under a tree, was found in context 1033 (03-1526), the vessel can be dated to the late 18th or early 19th century.

### 4.7. Pearlware

Pearlwares were developed about 1780 and were intended to imitate porcelain; only a few vessels are represented here, 1,1 % of all ceramic fragments and all are part of tablewares.

| Finds nr. | context | quantity | vessel form | date | origin |
|---|---|---|---|---|---|
| 03-1522 | 1029 | 8 | 1 bowl | 1780–1820 | England |

Table 15: Selection of pearlware fragments.

Eight fragments of a pearlware bowl were found in context 1029 (03-1522). The vessel was made in England between 1780 and 1820. The outside shows blue painted floral decoration.

### 4.8. Other earthenwares

0,6 % of all recovered ceramic fragments are of unknown earthenware fabrics.

| Finds nr. | context | quantity | date | origin | vessel form |
|---|---|---|---|---|---|
| 03-1521 | 1029 | 11 | 19th cent. | | 1 storage jar |
| 03-1528 | 1034 | 5 | 18th cent. | Denmark | 1 cooking pot |

Table 16: Selection of other earthenware fragments.

Eleven fragments of yellow earthenware belong to a 19th century storage jar of cylindrical shape, the fabric is yellow, the outside covered with a brownish glaze (03-1521). Its origin is unknown. Five fragments found in context 1034 are made of greyware and belong to a so called Jydepot, referring to a vessel form (pot) of greyware with polished outer surface and originating in Denmark, dating to the 18th century (03-1528).[25]

### 4.8. Glass vessels

284 glass fragments found during the excavations are part of vessels, such as bottles of various size, drinking glasses, medicine flasks, ink pots and vases. The estimated minimum number of vessels represented is ca. 62. The assemblage is the second largest material group of this excavation. With one exception all glass finds belong to late post-medieval and modern times. In almost all cases the provenance of those vessels is unknown. Only one body sherd (03-1557) found in a modern context, belongs most likely to a late medieval or early post-medieval bottle . The neck is of long and cylindrical shape, the material very thin, blown, light green with many air inclusions. The material resembles that of a similar fragment found during excavations at Þingvellir, although here belonging to a drinking glass.[26] The Aðalstræti fragment was found together with glass fragments of the 19th and 20th century and is re-deposited. As the excavation area was heavily truncated, a number of 18th century vessel fragments are re-deposited as well and were found in more recent contexts.

| vessel form | min. vessel amount |
|---|---|
| beer bottles | 13 |
| wine bottles | 19 |
| liquor bottles | 3 |
| soft drink bottles | 1 |
| other bottles | 2 |
| perfume bottle | 1 |
| medicine flasks | 15 |
| storage bottles | 2 |
| drinking glasses | 3 |
| wine goblets | 3 |

Table 17: Reconstructed minimum amount of glass vessels according to forms (N = 62).

Most of these vessel are of industrial made and pressed glass. The fragments were grouped by their vessel forms. Bottles were sorted by their former contents.

#### Beer, wine and liquor bottles

Most of the bottles can be identified as beer and wine bottles. Five beer bottles were completely preserved, e. g. 03-1539 bearing the letters AC at the base and dating to

[25] For so called “jydepots” see Schia 1981.
[26] Mehler 2002a, 352 and 355.

the late 19th and early 20th century. Another green cylindrical bottle without inscriptions is most likely a beer bottle (03-1540), with its cork stopper preserved inside. No complete wine bottles survived in tact, but the rim and neck sherd (03-1538 ) is part of such a vessel. A complete cylindrical bottle made of green glass has also its cork stopper preserved inside the vessels body. Along the neck is written "STIBBE´S CACAO EXTRA" (03-1540). All bottles mentioned here were found in the top layer and are stray finds.

A rectangular-shaped bottle made of clear glass most likely contained liquor (03-1539), as well as a rectangular shaped blown bottle made of brown glass with air inclusions (03-1547), the latter found in context 1022. Rim 03-1554, found in context 1033, belongs to a square-shaped liquor bottle of the 18th century made of light green blown glass, the neck is short, the rim slightly everted with a cordon. A completely preserved bottle made of green pressed glass is rather small and probably also contained liquor (03-1553). The base 03-1712 is of green pressed glass and bears the inscription "1 LITER HULSTKAMP" and a serial number 3108. It once belonged to a bottle of Hulstkamp Genever, made in The Netherlands. Hulstkamp Zoon & Molyn were the most prolific gin distillers and distributors between the early 1850s and 1920. The fragment was found in context 1079, a layer dated by finds and stratigraphy to the second quarter of the 19th century.

**Medicine and perfume flasks**

Ca. 15 medicine flasks are represented in the find assemblage. One little flask made of clear glass and with a rectangular body probably contained perfume. Its four walls are decorated with striped frames. The neck is rather short, the rim everted (03-1540). Probably for the storage of medicine, is the small flask with rectangular body and a thick neck, its cork stopper preserved inside the body, also the little flask with cylindrical body and long neck, its cork stopper still in place. The wall bears the inscription "VALDEMAR JØRGENSEN KJØBENHAVN", surrounding three little stars (both 03-1540). Out of the top layer comes the fragment of a modern pharmacy bottle of squared shape made of brown glass (03-1552). The rim is lost, but neck and shoulders survive. An almost complete modern medicine flask was found in context 1000 (03-1535). The cylindrical - shaped vessel is made of brown pressed glass, the rim is shaped to take a stopper with screw thread. The body is decorated on one side with vertical rillings and the inscription "INECTO", the base bears the (serial?) number 10.

**Storage bottles**

The remains of two storage bottles were recovered. Rim fragment 03-1559 belongs to a storage bottle with short neck, everted rim and probably rectangular body. The fabric is dark green and contains many air inclusions, the vessel is blown. Of a very similar bottle, but with slightly bigger rim diameter, is rim fragment 03-1560.

**Ink bottle and other**

The peat ash midden contained the fragment of a small dark blue bottle made of blown glass with air inclusions (03-1656), dating most likely to the 18th century. The bottle is blown and has a long, slim and undecorated neck, an upright rim, a sloping shoulder and flat ovoid body decorated with stripes. 03-1539 is a complete ink bottle made of clear pressed glass, its rim slightly chipped. The body is of rectangular shape.

**Wine goblets and other drinking glasses**

The remains of three wine goblets and three other drinking glasses were found. These are two rim fragments of a cylindrically shaped drinking glass made of clear glass ( 03-1554). The rather short stem 03-1542 shows a tear shaped air inclusion inside and belongs to a blown wine goblet made of clear glass. The vessel can be dated to the 18th century. Rim fragment 03-1555 is made of similar material and belongs to a bowl of a similar wine goblet.Context 1033 contained a rim fragments of another wine goblet (03-1554).

## 5. Other finds

Other finds cannot be sorted into such categories because their purpose is unknown. These finds include small fragments of copper alloy sheets (03-1616, 03-1615), a rather big lead fragment (03-1690) found in context 1059. It could be part of a lead tube. Nine unworked stones were collected because they do not appear naturally on the site. Stone types include jasper (2), quartz (1), coal (4) and unknown types (2). Another jasper fragment (found in context 1078) has been worked and could have been used as flint strike-a-light (03-1702). Completely preserved is the wooden base of a small stave box (03-1635), made of oak. It was found in context 1021 dating to the early 19th century. Modern finds include a screw stopper made of plastic (03-1720) and the fragment of a dental gum palate (03-1672).

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# Finds List

| Find | Unit | Name | MaterialType | Weight | Count | Spot Date |
|---|---|---|---|---|---|---|
| 1500 | 1000 | Pottery | Redware | 1039.23 | 32 | 18th century Dutch and English (assoc 01-306) |
| 1501 | 1000 | Pottery | Ceramic | 2123.43 | 40 | 19 -20th century? |
| 1502 | 1000 | Pottery | Stoneware | 2584.56 | 8 | 1840-1920 English |
| 1503 | 1000 | Pottery | Porcelain | 409.04 | 28 | early 19 th century English and Danish |
| 1504 | 1001 | Pottery | Ceramic | 86.77 | 2 | 19-20th century |
| 1505 | 1002 | Pottery | Redware | 42.2 | 3 | 18th century ?Danish |
| 1506 | 1003 | Pottery | Redware; stoneware | 238.81 | 6 | 19th century incl German or English |
| 1507 | 1003 | Pottery | Faience | 172.83 | 28 | late 18th century |
| 1508 | 1003 | Glass | Vessel | 1.54 | 1 | 19-20th century |
| 1509 | 1005 | Pottery | Ceramic | 21.44 | 5 | 19-20th century |
| 1510 | 1010 | Pottery | Ceramic | 35.11 | 3 | 19-20th century |
| 1511 | 1021 | Pottery | Whiteware | 533.3 | 84 | early 19th century incl English |
| 1512 | 1021 | Pottery | Redware; whiteware | 121.4 | 12 | 19th century incl Danish |
| 1513 | 1022 | Pottery | Ceramic | 36.44 | 13 | early 19th century? |
| 1514 | 1022 | Pottery | Redware | 190.14 | 15 | 18-19th century |
| 1515 | 1022 | Pottery | Porcelain | 3.98 | 2 | late 18th century Chinese |
| 1516 | 1025 | Pottery | Porcelain; creamware | 127.04 | 10 | 19th century Chinese ; late 18-19th century English |
| 1517 | 1025 | Pottery | | 50.84 | 9 | late 18 or 19th century |
| 1518 | 1026 | Pottery | Redware | 167.18 | 12 | late 17 to 19th century S Scandinavian? |
| 1519 | 1026 | Pottery | Porcelain | 90.55 | 9 | early 19th century Chinese and Danish |
| 1520 | 1026 | Pottery | Porcelain | 4.18 | 2 | early 19th century Chinese (assoc 1519) |
| 1521 | 1029 | Pottery | Redware; stoneware; earthenware | 915.76 | 23 | late 18 or 19th century German or English; 19th century |
| 1522 | 1029 | Pottery | Faience; porcelain; whiteware; pearlware | 194.54 | 36 | late 18 or 19th century Dutch; also Danish or German and English |
| 1523 | 1032 | Pottery | Stoneware | 418.75 | 52 | 19 th century |
| 1524 | 1032 | Pottery | Ceramic | 52.54 | 5 | early 19th century? |
| 1525 | 1033 | Pottery | Redware | 2038.01 | 117 | late 18 to 19th century Danish/German |
| 1526 | 1033 | Pottery | Creamware | 207.07 | 18 | late 18 - 19th century English |
| 1527 | 1033 | Pottery | Porcelain | 5.5 | 3 | mid to late 18th century Chinese |
| 1528 | 1034 | Pottery | Earthenware | 276.86 | 30 | 18th century Danish (Jydepot) |
| 1529 | 1034 | Pottery | Porcelain | 23.79 | 5 | mid to late 18th century Chinese |
| 1530 | 1035 | Pottery | Redware?; earthenware | 191.77 | 12 | late 18-19th century |
| 1531 | 1035 | Pottery | Ceramic | 47.56 | 6 | late 18-19th century |
| 1532 | 1041 | Pottery | Ceramic | 12.67 | 4 | late 18 -19th century |
| 1533 | 1044 | Pottery | Redware | 223.16 | 19 | late 18 -19th century |
| 1534 | 1000 | Glass | Pitcher/cup | 341.33 | 2 | |
| 1535 | 1000 | Glass | Vessel | 291.13 | 16 | 20th century |
| 1536 | 1000 | Glass | Window | 18.98 | 4 | |
| 1537 | 1000 | Glass | Vessel | 11.16 | 1 | |
| 1538 | 1000 | Glass | Vessel | 1276.05 | 6 | 19th century |
| 1539 | 1000 | Glass | Vessel/Bottle | 1168.03 | 7 | late 19 - early 20th century |
| 1540 | 1000 | Glass | Vessel/Bottle | 1063.24 | 5 | late 19 -early 20th century |
| 1541 | 1001 | Glass | Vessel | 34.37 | 2 | |
| 1542 | 1002 | Glass | Drinking glass | 30.72 | 2 | 18th century |
| 1543 | 1003 | Glass | Vessel | 393.05 | 10 | |
| 1544 | 1005 | Glass | Vessel | 103.34 | 4 | |
| 1545 | 1010 | Glass | Vessel | 1.67 | 1 | |
| 1546 | 1021 | Glass | Vessel/window | 79.97 | 19 | 19-20th century |
| 1547 | 1022 | Glass | Vessel/bottle | 224.84 | 11 | 18th century |
| 1548 | 1022 | Glass | Window | 50.73 | 12 | |
| 1549 | 1025 | Glass | Vessel | 70.92 | 10 | |
| 1550 | 1026 | Glass | Vessel/window | 76.17 | 5 | 19-20th century |

| Find | Unit | Name | MaterialType | Weight | Count | Spot Date |
|---|---|---|---|---|---|---|
| 1551 | 1029 | Glass | Vessel/window | 184.94 | 12 | 19th century |
| 1552 | 1000 | Glass | Vessel | 1268.67 | 7 | 20th century |
| 1553 | 1000 | Glass | Vessel | 1533.3 | 3 | 19th century |
| 1554 | 1033 | Glass | Drinking glass/vessel | 500.43 | 32 | 18th century |
| 1555 | 1032 | Glass | Drinking glass | 226.43 | 30 | 18th century |
| 1556 | 1032 | Glass | Window | 44.7 | 7 | |
| 1557 | 1033 | Glass | Vessel/bottle | 359.88 | 18 | late medieval/early post med |
| 1558 | 1033 | Glass | Window | 60.17 | 17 | |
| 1559 | 1034 | Glass | Vessel | 344.08 | 20 | late 18 - early 19th century |
| 1560 | 1035 | Glass | Vessel | 111.38 | 9 | late 18- early 19th century |
| 1561 | 1035 | Glass | Window | 4.83 | 3 | |
| 1562 | 1041 | Glass | Vessel | 1.57 | 1 | |
| 1563 | 1043 | Glass | Vessel | 2.77 | 2 | |
| 1564 | 1043 | Glass | burnt | 2.47 | 9 | |
| 1565 | 1043 | Glass | Window | 7.67 | 2 | |
| 1566 | 1044 | Glass | Window | 19.68 | 6 | |
| 1567 | 1046 | Glass | Vessel | 25.74 | 6 | |
| 1568 | From Section | | Vessel | 60.38 | 1 | |
| 1569 | 1003 | Brick | | 351.91 | 1 | Type III; post 18th century |
| 1570 | 1004 | Bricks | | 2350 | 2 | Types I and III; post 18th century |
| 1571 | 1005 | Bricks | | 12.15 | 2 | Type I; post 18th century |
| 1572 | 1010 | Bricks | | 162.77 | 10 | Type II; post 18th century |
| 1573 | 1020 | Brick | | 2250 | 1 | Type I; post 18th century |
| 1574 | 1020 | Bricks | | 1209.86 | 4 | Type I; Type II; Type III; post 18th century |
| 1575 | 1025 | Brick | | 17.25 | 1 | Type I; post 18th century |
| 1576 | 1026 | Brick | | 13.99 | 1 | Type I; post 18th century |
| 1577 | 1029 | Bricks | | 635.65 | 4 | Type I; Type III; post 18th century |
| 1578 | 1032 | Bricks | | 132.94 | 17 | Type I; post 18th century |
| 1579 | 1033 | Brick | | 800 | 1 | Type I; post 18th century |
| 1580 | 1033 | Bricks | | 278.98 | 8 | Type I; Type II; Type III; post 18th century |
| 1581 | 1034 | Bricks | | 764.51 | 24 | Type I; Type II; Type III; post 18th century |
| 1582 | 1035 | Bricks | | 1060.49 | 3 | Type II; post 18th century |
| 1583 | 1000 | Stone | Fish hammer | 1020 | 1 | |
| 1584 | 1000 | Stone | Net Sinker | 925 | 1 | |
| 1585 | 1001 | Stone | Rooftile? | 35.65 | 1 | |
| 1586 | 1010 | Stone | Burnt, indet | 4.92 | 1 | |
| 1587 | 1021 | Stone | Pitchstone/biksteinn | 16.86 | 3 | |
| 1588 | 1025 | Stone | Rooftile? | 21.47 | 1 | |
| 1589 | 1043 | Stone | Slag? | 125.29 | 2 | |
| 1590 | 1000 | Metal/Iron | Horseshoe | 150.24 | 1 | |
| 1591 | 1000 | Metal/Iron | Spur | 25.39 | 10 | |
| 1592 | 1003 | Metal | Object | 12.55 | 1 | |
| 1593 | 1021 | Metal/iron | Nails | 23.33 | 2 | |
| 1594 | 1022 | Metal/Iron | Nails | 73.76 | 5 | |
| 1595 | 1022 | Metal | Keyhole | 77.44 | 1 | |
| 1596 | 1029 | Metal | Object | 28.56 | 1 | |
| 1597 | 1032 | Metal/Iron | Nails | 16.49 | 1 | |
| 1598 | 1035 | Metal | Object | 3.1 | 1 | |
| 1599 | 1035 | Metal? | Slag? | 29.73 | 3 | |
| 1600 | 1043 | Metal/Iron | Nails | 2.88 | 1 | |
| 1601 | 1004 | Misc | Tarred Paper | 67.45 | 8 | |
| 1602 | 1004 | Leather | Indet | 40.82 | 19 | |
| 1603 | 1021 | Wood | Burnt, unworked | 4.21 | 10 | |
| 1604 | 1041 | Wood | Unworked | 2.31 | 1 | |
| 1605 | 1000 | Clay pipe | Bowl | 50.4 | 14 | post 1739-1819, Gouda (Netherlands) |
| 1606 | 1022 | Clay pipe | | 6.59 | 3 | |
| 1607 | 1025 | Clay pipe | | 3.82 | 2 | |
| 1608 | 1026 | Clay pipe | | 2.27 | 1 | |
| 1609 | 1032 | Clay pipe | Bowl | 14.52 | 3 | 18th century English |

| Find | Unit | Name | MaterialType | Weight | Count | Spot Date |
|---|---|---|---|---|---|---|
| 1610 | 1033 | Clay pipe | Bowl and stem | 21.5 | 11 | post 1746 -early 19th century, Gouda (Netherlands) |
| 1611 | 1034 | Clay pipe | | 12.03 | 6 | |
| 1612 | 1035 | Clay pipe | | 1.69 | 1 | |
| 1613 | 1043 | Clay pipe | | 0.24 | 1 | |
| 1614 | 1000 | Wood/leather | Button | 0.31 | 1 | |
| 1615 | 1022 | Copper alloy | Sheet | 2.69 | 2 | |
| 1616 | 1034 | Copper alloy | Sheet | 0.8 | 1 | |
| 1617 | 1034 | Copper alloy | Button? | 0.45 | 1 | |
| 1618 | 1034 | Copper/Bronze | Button | 2.41 | 1 | |
| 1619 | 1000 | Cork | Stopper | 0.73 | 1 | |
| 1620 | 1000 | Metal | Bottle top | 1.4 | 1 | 20th century |
| 1621 | 1032 | Cork | Stopper | 0.35 | 1 | |
| 1622 | 1003 | Shell | | 2.02 | 3 | |
| 1623 | 1032 | Shell | | 4.7 | 5 | |
| 1624 | 1033 | Shell | | 2.92 | 3 | |
| 1625 | 1034 | Shell | | 1.14 | 7 | |
| 1626 | 1046 | Shell | | 0.5 | 13 | |
| 1627 | 1000 | Plastic | False teeth | 5.31 | 1 | 20th century |
| 1628 | 1041 | Stone? | Burnt | 2.83 | 1 | |
| 1629 | 1000 | Wood | Unworked | 3.41 | 1 | |
| 1630 | 1022 | Wood | Toothbrush | 9.27 | 1 | |
| 1631 | 1022 | Wood | Unworked | 16.93 | 1 | |
| 1632 | 1032 | Wood | Unworked | 1.84 | 1 | |
| 1634 | 1034 | Wood | Burnt , unworked | 3.15 | 1 | |
| 1635 | 1021 | Wood | Barrel base | 17.47 | 2 | |
| 1636 | 1021 | Textile | | 0.24 | 1 | |
| 1637 | 1000 | Bone | | 467.67 | | |
| 1638 | 1000 | Bone | | 77.76 | | |
| 1639 | 1003 | Bone | Tooth from cattle or horse | 42.01 | 2 | |
| 1640 | 1005 | Bone | | 2.9 | 1 | |
| 1641 | 1021 | Bone | | 106.96 | | |
| 1642 | 1022 | Bone | | 208.83 | | |
| 1643 | 1025 | Bone | | 145.86 | | |
| 1644 | 1026 | Bone | | 68.59 | | |
| 1645 | 1029 | Bone | | 13.1 | | |
| 1646 | 1034 | Bone | | 224.8 | | |
| 1647 | 1032 | Bone | | 319.78 | | |
| 1648 | 1032 | Bone | | 47.53 | | |
| 1649 | 1033 | Bone | | 588.41 | | |
| 1650 | 1033 | Bone | | 109.98 | | |
| 1651 | 1034 | Bone | | 495.73 | | |
| 1652 | 1034 | Bone | Tooth | 5.72 | 1 | |
| 1653 | 1035 | Bone | | 42.67 | | |
| 1654 | 1046 | Bone | | 1.05 | | |
| 1655 | Peat ash midden | | Whiteware | 288.92 | 11 | late 19 - 20th century ?Danish and USA |
| 1656 | Peat ash midden | | Bottles | 59.05 | 2 | 18th/19th century |
| 1657 | Un-strat | | Button | 4.96 | 1 | 19-20th century |
| 1658 | Peat ash midden | | | 92.63 | 1 | Type II; post 18th century |
| 1659 | Un-strat | | | 62.62 | 9 | Type II; post 18th century |
| 1660 | Peat ash midden | | Window and vessel | 50.56 | 10 | 19-20th century |
| 1661 | Un-strat | | Window and vessel | 212.3 | 8 | 19th century and vase 20th century |
| 1662 | Un-strat | | | 19.4 | 1 | Type III; post 18th century |
| 1663 | Un-strat | | Redware | 2.65 | 1 | |
| 1664 | Un-strat | | Stem | 5.85 | 2 | |
| 1665 | 1123 | Pottery | Whiteware | 7.32 | 4 | 19th century |
| 1666 | 1123 | Glass | Obsidian fragment | 11.29 | 1 | |
| 1667 | 1123 | Bone | | | | |
| 1668 | 1123 | Bone | Burnt | | | |
| 1669 | Un-strat | | Nails etc. | 27.6 | 3 | |

| Find | Unit | Name | MaterialType | Weight | Count | Spot Date |
|---|---|---|---|---|---|---|
| 1670 | Un-strat | | Button | 1.15 | 1 | |
| 1671 | Un-strat | | Basalt | 17.02 | 2 | |
| 1672 | 1123 | Metal/iron | Nails | 24.57 | 2 | |
| 1673 | Un-strat | | | 4.26 | 3 | |
| 1674 | Un-strat | | Burnt | | | |
| 1675 | Un-strat | | Bird bone, cut | | | |
| 1676 | Un-strat | | Porcelain | 79.81 | 22 | nd European porcelain |
| 1677 | Un-strat | | | | | |
| 1678 | 1049 | Clay pipe | Stem | | | |
| 1679 | Un-strat | | Ceramic | 4.83 | 1 | 19 - 20th century |
| 1680 | 1051 | Copper Alloy | Button | 2.37 | 1 | 19 - 20 th century |
| 1681 | 1051 | Brick | | 128.94 | 1 | Type III; post 18th century |
| 1682 | 1053 | Bone | | | | |
| 1683 | 1058 | Bone | | | | |
| 1684 | 1058 | Bone | | | | |
| 1685 | 1059 | Stone | Slate? | 2.73 | 1 | Possibly roofing |
| 1686 | 1059 | Bone | | | | |
| 1687 | 1059 | Bone | ?Whalebone | | | |
| 1688 | 1059 | Bone | ?Whalebone | | | |
| 1689 | 1059 | Pottery | Porcelain | 3.34 | 1 | 19th century incl European |
| 1690 | 1059 | Lead | ?Tube | 70.54 | 1 | |
| 1691 | 1059 | Metal/iron | Nail | 8.73 | 1 | |
| 1692 | Un-strat | | 2 bowls | 23.87 | 2 | post 1746-early 19th century, Gouda (Netherlands) |
| 1693 | Un-strat | | Redware; creamware | 310.05 | 55 | late 18 or 19th century ; 1780-1800 English |
| 1694 | Un-strat | | | 88.69 | 3 | Type I; post 18th century |
| 1695 | Un-strat | | Window/vessel | 237.28 | 9 | Window sherd?17th century; rest 19-20th century |
| 1696 | Un-strat | | Indet | 43.98 | 1 | |
| 1697 | 1064 | Bone | Burnt | | | |
| 1698 | 1066 | Bone | Teeth | | | |
| 1699 | 1067 | Stone | Quartz? | 11.78 | 1 | |
| 1700 | 1068 | Bone | | | | |
| 1701 | 1076 | Metal/iron | Indet | 37.49 | 2 | |
| 1702 | 1078 | Stone | Jasper | 5.15 | 1 | Flake? Could be reddish flint |
| 1703 | 1078 | Stone | Jasper | 6.58 | 1 | Waterworn |
| 1704 | 1079 | Metal/iron | Plate | 7.2 | 1 | |
| 1705 | 1079 | Metal/iron | Possible nail | 16.75 | 1 | |
| 1706 | 1079 | Glass | Bottles | 378.36 | 2 | 19th century? |
| 1707 | 1079 | Pottery | Stoneware;porcelain | 80.28 | 20 | 19 or 20th century incl English and German (doll face) |
| 1708 | 1079 | Metal/iron | Nail | 4.07 | 1 | |
| 1709 | 1079 | Bone | | | | |
| 1710 | 1079 | Brick/ Tile | | 674.85 | 3 | Type II; post 18th century |
| 1711 | 1079 | Glass | Vessel/window | 470.95 | 11 | 18-20th century |
| 1712 | 1079 | Glass | Vessel/window | 336.84 | 31 | mid 20th century |
| 1713 | 1079 | Pottery | Redware; stoneware; porcelain | 337.73 | 42 | late 18 to 20th century incl English; mid 19th century European |
| 1714 | 1079 | Bone | | | | |
| 1715 | 1086 | Bone | | | | |
| 1716 | Un-strat | | Plate fragments | 85.6 | 1 | 19 - 20th century |
| 1717 | Un-strat | | Indet | 139.85 | 6 | Possibly includes base of tin can |
| 1718 | Un-strat | | | | | |
| 1719 | Un-strat | | Redware | 490.2 | 24 | Late 18 or 19th century English |
| 1720 | Un-strat | | Bottle top | 4.3 | 1 | Modern |
| 1721 | Un-strat | | Jasper | 14.35 | 1 | Waterworn |
| 1722 | Un-strat | | Burnt | | | |
| 1723 | Un-strat | | Spatula | 34.81 | 1 | Tanged probably modern |
| 1724 | Un-strat | | Bowl | 18.15 | 1 | post 1739-1819, Gouda (Netherlands) |
| 1725 | Un-strat | | | | | |
| 1726 | Un-strat | | Teeth | | | |

| Find | Unit | Name | MaterialType | Weight | Count | Spot Date |
|---|---|---|---|---|---|---|
| 1727 | Un-strat | | Vessel/window | 17.28 | 4 | 19-20th century |
| 1728 | 1078 I | | | | | |
| 1729 | Un-strat | | | | | |
| 1730 | Un-strat | | Whiteware; pearlware | 138.7 | 31 | 19th century |
| 1731 | Un-strat | | Vessel/window | 64.23 | 8 | 19-20th century |
| 1732 | Un-strat | | | 104.08 | 5 | Type I; Type II; post 18th century |
| 1733 | Un-strat | | | 341.39 | 5 | Roof tile; post 18th century |
| 1734 | 1059 | Bone | | | | |
| 1735 | 1065 | Bone | Burnt | | | |
| 1736 | 1069 | Bone | Burnt | | | |
| 1737 | 1071 | Bone | Burnt | | | |
| 1738 | 1078 | Bone | Burnt | | | |
| 1739 | 1078 | Bone | Burnt | | | |
| 1740 | 1079 | Bone | | | | |
| 1741 | 1079 | Brick/ Tile | | 1650.66 | 17 | Roof tile; Types I,II and III; post 18th century |
| 1742 | Un-strat | Bone | | | | |
| 1743 | 1059 | Bone | Teeth | | | |
| 1744 | 1059 | Bone | Burnt | | | |
| 1745 | 1059 | Bone | | | | |
| 1746 | 1059 | Bone | | | | |
| 1747 | 1059 | Bone | | | | |
| 1748 | Un-strat | | Slate | 7.13 | 1 | |
| 1749 | | Whalebone | ?Worked | | | To conservation |

# Appendix 2

## The Settlement of Iceland in Light of New 14C Dates from Reykjavik

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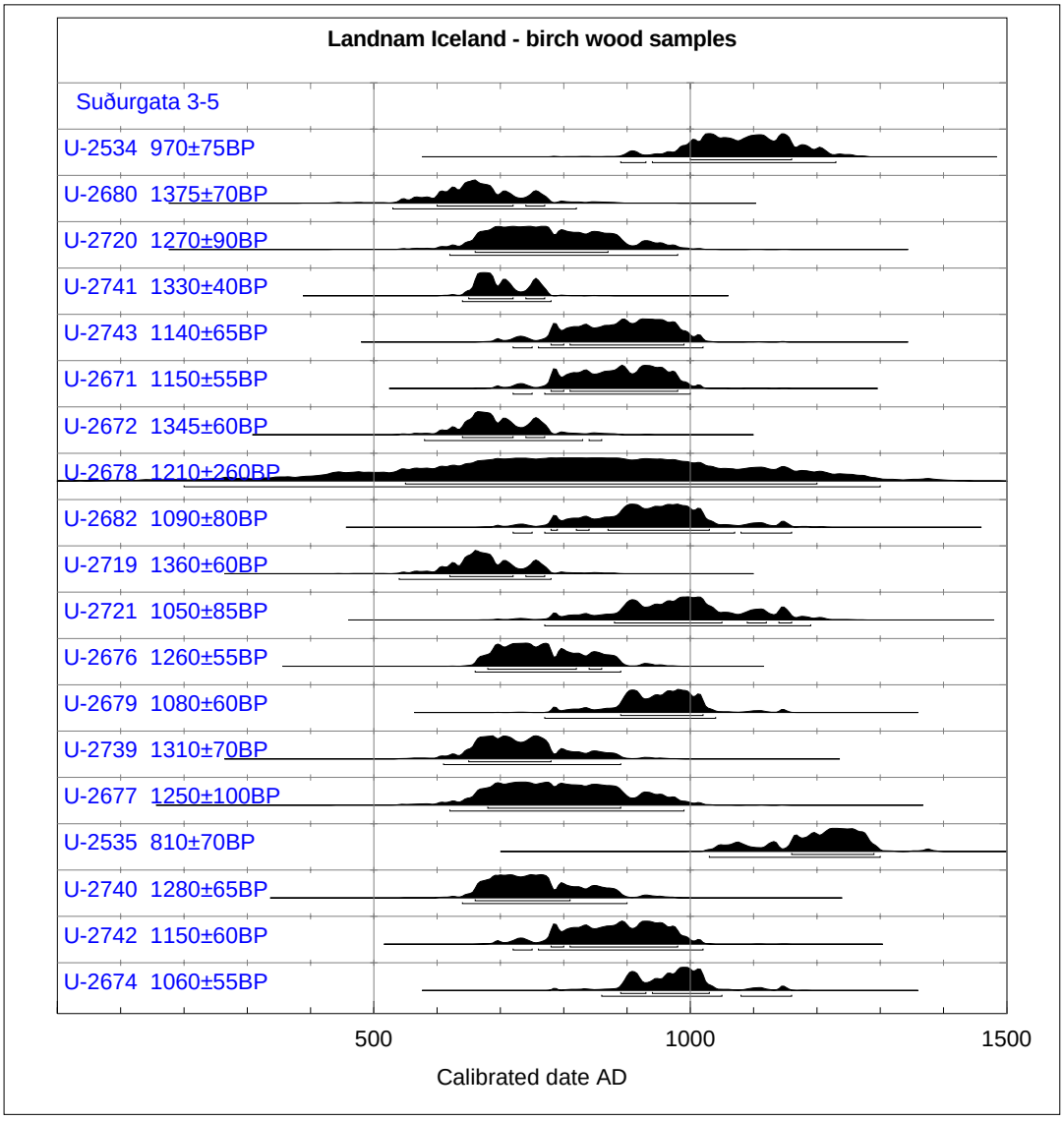
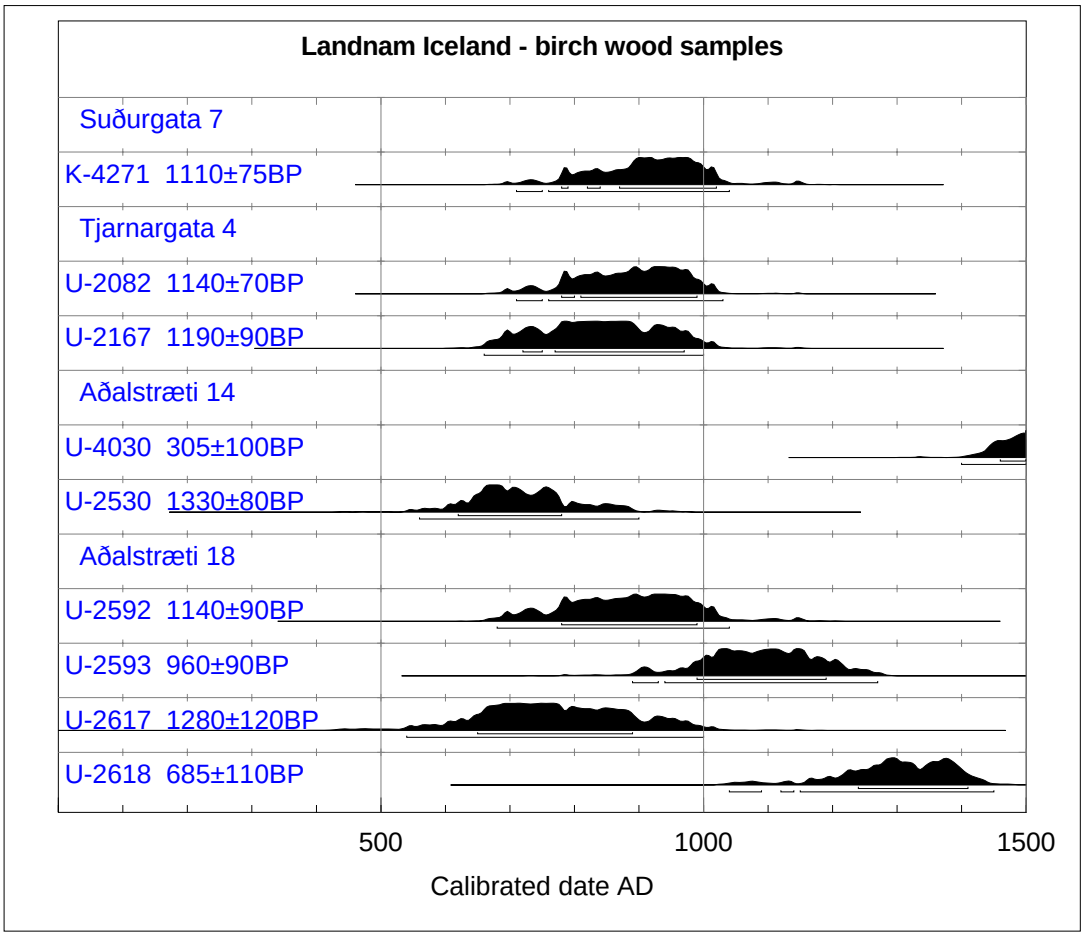
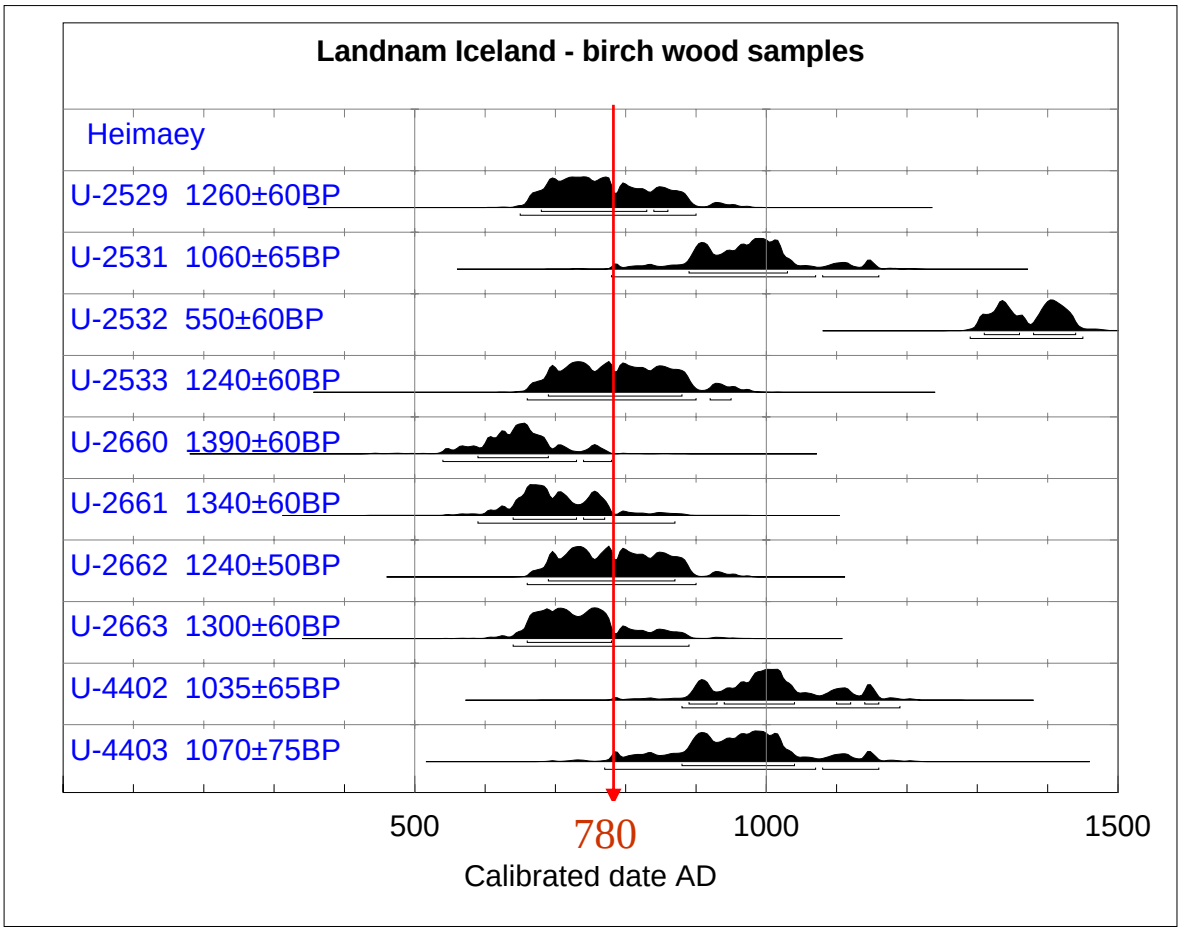
### Introduction

Icelandic written records from the 12th century state that the first settlers came to Iceland in AD 874 thus marking the beginning of the Settlement period, or Landnam. The archaeological record does not contradict the written sources. Previous 14C dates from various excavations around the country, however, have suggested that the Landnam took place up to 150 years earlier, in the 7th or 8th century (Nordahl 1988, Hermanns-Audardóttir 1989). This has caused a fierce, if not unproductive, debate among Icelandic, as well as foreign scholars. Various reasons have been put forward to explain the high 14Cdates, for example volcanic or geothermal activity and the so-called "island effect" (Olson 1983).






Previous $^{14}C$ datings of charcoal samples from the Reykjavik excavation. (Nordahl 1988).



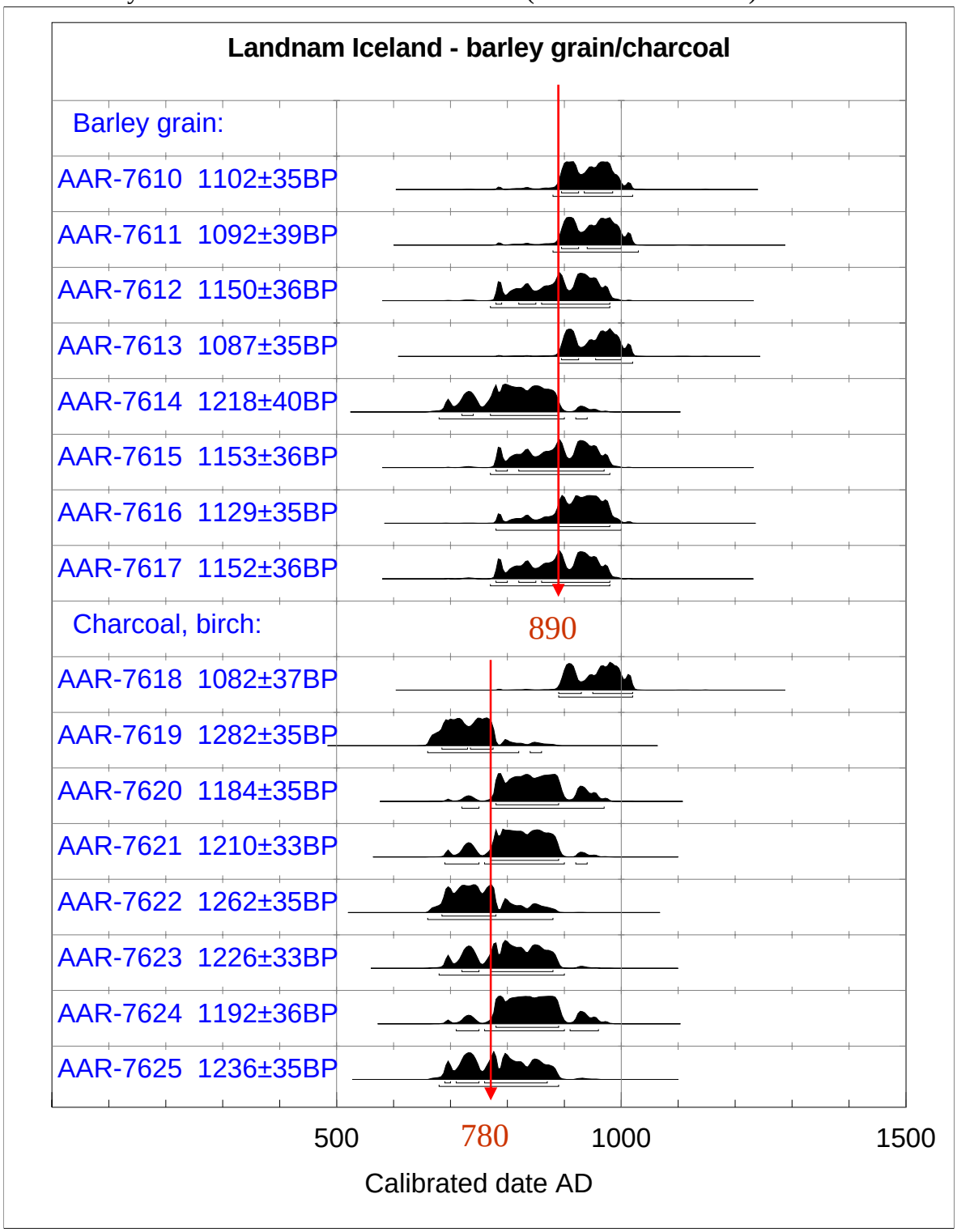

Samples of charcoal previously dated (mainly in Uppsala) from Heimaey, Vestmannaeyjar (Hermanns-Auðardóttir 1989). Forced latest landnam age limit: AD 780 (allowing for one outlier).

There is little doubt that the material submitted to the laboratories which give these high dates are, as far as they go, true and accurate dates. The question is whether these dates are meaningful in terms of the archaeology. The material used that has given these high 14C dates has predominantly been charcoal (Betula pubescens). We suggest that material to be submitted for 14C dating must be carefully selected. We recommend that, one should avoid charcoal but opt for seeds of annuals, such as barley which has the advantage of a short "shelf life", typically being consumed within a year from the time it was harvested. Alternatively, or additionally for comparison and confirmation, bones of young domestic animals should be preferred to charcoal.

**New $^{14}$C dates from Reykjavik**

During archaeological excavations in the centre of Reykjavik in 2001, a Viking Age longhouse was discovered (Roberts 2001). The longhouse had been built shortly after the Landnam tephra had fallen. The whole longhouse floor was sampled layer by layer and flotated to extract charred plant remains. This facilitated the extraction from contemporary cultural layers of, among other things, both charcoal and charred grains of barley (Hordeum sativum) for 14C dating. Fragments of charred bone was also obtained, but these contained too little material for reliable 14C dating results.

The Landnam tephra is a volcanic ash layer that has been associated all over Iceland with the earliest cultural layers (hence the name). The results of several 14C dates of organic remains adjacent to the Landnam tephra give AD 845±45 (Hallsdóttir 1987). This result is confirmed by the precise result AD 871±2 obtained by absolute dating of the ash layer in the GRIP ice core in Greenland (Grönvold et al. 1995).




$^{14}$C datings of charcoal and barley from the Reykjavik excavation in 2001.

**Results**

The charcoal samples from the excavation in Reykjavik in 2001consistently yield dates about 130 years older than the barley grains. The 14C dates of the barley are in a general conformity with dates of the Landnam tephra from the GRIP ice core given the relation of the cultural layers to the Landnam tephra.

Charred seeds of barley (*H. sativum*).

**Conclusion**

Although the results of the investigation presented here may not solve all problems related to 14C dates from Iceland, some basic conclusions can be drawn from it. Our result indicate that the dry wood used by the first settlers in Iceland to build their fires most likely had been dead for more than a century. This makes ‘landnam’ wood unsuited for 14C dating. AMS technique in 14C dating and careful sampling and extraction methods facilitate the use of seeds for dating cultural layers in Iceland with more confidence than previously possible.

Roberts H.M. 2001. Fornleifarannsókn á lóðunum/Archaeological Excavations at Aðalstræti 14-18, 2001. A Preliminary Report/Framvinduskýrslur. Fornleifastofnun Íslands FS156-00161 Reykjavík.

# Appendix 3

## High resolution pollen and microcharcoal analysis from a Viking Period skáli at Aðalstræti, Reykjavik, Iceland: Evidence of pre-Landnam settlement? (April, 2003).

**Alex Chepstow-Lusty**

**Introduction:** This present study forms part of a multidisciplinary approach to the analysis of occupation deposits associated with a Viking Period skáli (hall) from the southern end of Aðalstræti in the central historic area of Reykjavik. This Viking Period structure is not only significant in its own right for its preservation and location, but it appears to overlay earlier archaeological remains predating the "Landnam layer" (LNL). This widely occurring tephra layer in Iceland dated at 871±2AD is often used as the horizon for colonisation by Norse settlers, hence the importance of these earlier deposits.

All three profiles examined traverse the LNL. Pollen and microcharcoal analyses of two profiles (S106) and (S119), *ca*. 1m east and *ca.* 5m west of the skáli respectively, provide high resolution records following a promising preliminary investigation (Chepstow-Lusty, 2002). In addition, a new profile (S105) *ca.* 2m north of the skáli was examined for its longer pre-LNL record; this should provide a comparative baseline for environmental history prior to major anthropogenic impact.

Pollen analyses can be used to elucidate how the landscape was altered such as the loss of birch woodland with the onset of land clearance and agriculture, including the cultivation of cereals. The climatic context is also noteworthy as these events were made possible by the warmer temperatures of the "Medieval Warm Period" ("MWP"), a climatic period that may have been responsible for societal changes in many parts of the world. It is possible that the "MWP" may have begun earlier at higher latitudes such as in Iceland and Greenland. One of the indicators for this warming response in Iceland may have been recolonisation by birch woodland after a previous cool episode. A gradual phase of earlier settlement involving fewer people might be expected before the rapid major migration occurred. However, did these earlier settlers leave a clear imprint on the vegetation record distinguishable from climatic variability and other natural processes? Aðalstræti, located in an area highly favourable to early settlement, is potentially well suited to answer this question.

**Methodology:** Volumetric sub-samples (1cm²) were taken from three columns traversing the LNL at 1-2cm intervals for high-resolution pollen and microcharcoal analysis. Prior to pollen preparation, the sub-samples were placed in sealed containers, preventing the possibility of contamination from modern pollen rain. The samples were processed according to Method B of Berglund and Ralska-Jasiewiczowa (1986), after the addition of a *Lycopodium* tablet; this contains a known number of *Lycopodium* spores, which are counted during pollen analyses, allowing the calculation of pollen/spore and microcharcoal concentrations. Additional techniques during pollen processing included washing in nitric acid to remove pyrite prior to acetolysis. This reduces confusion when assessing microcharcoal abundance. The residues were mounted in silicone oil, and a count of over 300 terrestrial pollen and spores was made at a magnification of X 400. Finally, the microcharcoal was assessed using the point-count method of Clark (1982), where 100 fields of view are examined at a magnification of X 400, using an eye-piece graticule. The number of fields of view has been increased from 50 to 100 in these terrestrial samples as frequently the microcharcoal has an uneven distribution on the microscope slide.

Generally, a count of over 100 grass (Poaceae) pollen grains was made during pollen analysis. The diameter of all the grasses was measured where possible using an eye-piece graticule. This was in particular to assess size changes in the grass pollen assemblage associated with human impact. This is also an important tool for defining those grasses that fit into the "cereal category", though other grass species do occur with large pollen grains, which can be associated with anthropogenic activities. To simplify, grasses with a diameter reaching 36µ or more could include barley (*Hordeum vulgare*). Long distance wind transportion of these large pollen grains is unlikely, but incorporation and concentration in sediments can be helped by human activities. In addition, because of the large size of cereal pollen, this makes them vulnerable to breakage and hence preservation. Occasionally the diameter of the pore annulus attaining 8-10µ has been an additional determining factor, especially when associated with a sizeable fragment of exine.

The preliminary pollen investigation included as part of the pollen sum (Chepstow-Lusty, 2002) only well preserved, clearly identifiable undifferentiated Polypodiaceae (frequently referred to as filicales for this lumping category of fern spores). There were however many

less well preserved monolete spores, assumed to be extremely worn filicales. These were not counted. In this new study, this distinction within the undifferentiated Polypodiaceae continues; undifferentiated Polypodiaceae are also not included within the original sum of 300 terrestrial pollen and spore types. This minimizes any bias in the environmental reconstruction and interpretation caused by these spores.

**Results and Interpretation:**

***Sample 106.*** **Profile west of the skáli (S106).**
Subsampling every 2cm, from 1-19cm.

Ten samples have been analysed from this short, but important organic profile. Of the three sections examined in this report, the LNL is located close to the middle of the profile at c. 8cm (Figures 1 & 2).
The preservation is highly variable within samples, appearing to improve up the section, but this presents no problem to achieving sufficient pollen counts.

1. At the base of the profile (17-19cm), pollen concentrations are generally high (20,000-40,000 grains/cm$^3$), dominated by grasses (Poaceae) and *Betula*. No microcharcoal is present. Unexpectedly, a large grass pollen grain >45µ, with a pore annulus diameter > 8µ was observed at 19cm, which is easily within the cereal category. The landscape appears to have been wooded with little indication of disturbance. Higher pollen diversity is evident at 17cm, prior to a decline of *Betula*, but there is little to suggest that this is not a natural event.

2. Between 13-15cm, there is a noticeable decline in *Betula*, and expansion in herbaceous taxa, such as Liguliflorae, Apiaceae and sedges (Cyperaceae), followed by a reduction in pollen concentration.
Microcharcoal was not observed. A large pollen grain >45µ, with a pore annulus diameter > 8µ was observed at 13cm, which can be easily considered within the cereal category.
This appears to represent a return to a more open landscape, dominated by annuals, rather than pioneering woody species such as *Betula*. It may suggest a downturn in climatic conditions prior to the onset of the “Warm Medieval Period” which subsequently allowed

major human settlement. These conditions may even have been wetter favouring the expansion of sedges, though this is speculative. It is not possible to determine whether a single pollen grain within the cereal category confirms early settlement without other direct evidence of anthropogenic landscape disturbance.

3. Directly below the LNL (9-11cm), the pollen concentrations increase again and although microcharcoal is in fact rare, it does occur for the first time. *Betula* pollen indicates a marked rise, and other taxa including Poaceae, Cyperaceae, Liguliflorae and Apiaceae correspondingly decrease. A grass pollen grain >40 µ was found at 9cm which can be considered within the cereal category. There is little pollen evidence though for expansion of weeds associated with agricultural activities. Indeed, there is generally an increase in the size of smaller grasses, probably resulting from ecological changes associated with the expansion of *Betula*.

This appears to represent a landscape in which *Betula* woodland has become an important component, but it is difficult to assess how dense this cover might have been. *Betula* is also a major pollen producer.

If the single cereal category pollen grain, and minor quantities of microcharcoal are not natural in origin, they could represent the first indication of human activity on a very minor scale. The rise of *Betula* pollen may be linked to wider climatic events such as increasing temperatures, or to more local activities such as *Betula* products, including leaves being collected as fodder. This might cause higher concentrations of *Betula* in the vicinity of the new settlement. The former explanation is probably more likely. One must also consider that the frequency of natural fires may have risen due to climatic amelioration and the increase in fuel load provided by woody taxa, though this is not apparent further down the section.

4. Directly above the LNL (5-7cm), the pollen concentrations show a reduction and microcharcoal though rare, does occur. The reduction in pollen concentration could well be linked to the decline in *Betula* pollen, and hence woodland cover. A single grass pollen grain reaches the cereal category, and there is a corresponding increase in grass sizes >20µ. This is associated with greater diversity in pollen taxa, some of which such as the Chenopodiaceae, *Gallium* type and Apiaceae may be benefiting from the newly established anthropogenic conditions. Increased floral diversity is frequently related to agricultural disturbance in pollen records, whereas woodland cover can restrict the expansion of herbaceous taxa and

seemingly reduce diversity. This interval appears to provide evidence of vegetation clearance for agricultural activities, including cereal cultivation.

5. Towards the top of the sequence (1-3cm), the pollen concentrations remain relatively low, whilst microcharcoal was extremely rare and not recorded during quantitative analysis. There is further reduction in the relative abundance of *Betula* pollen. A fragment of exine containing a pore annulus attaining 8µ is considered as being representative of the cereal category from the 3cm horizon. The pollen assemblage is diverse, including noticeable relative abundances of Tubuliflorae, Rosaceae and Apiaceae pollen. There is an increase in the grass categories >20µ and >25µ. This topmost interval can be interpreted as showing further evidence of agricultural activity, including cereal cultivation, though the lack of microcharcoal could indicate changes in land-use practices, such as less *Betula* available and/or used for domestic fuel consumption.

***Sample 119*. Profile east of the skáli (S119).**

Subsampling interval, every 2cm, from 2-58cm.

At S119, the LNL has been identified at *ca*. 56cm, i.e. very close to the base of the sequence. Sixteen samples were examined, only one of which pre-dates the LNL (Figures 3 & 4). Below 50cm, samples were analysed every 2cm; above 50cm, samples were analysed generally every 4cm. Preservation was much better than observed in S106, and the prevalence of microcharcoal also greatly exceeds S106.

1. The sample (58cm) immediately prior to the LNL contains high pollen concentrations and some large fragments of microcharcoal, though unevenly distributed. Relative *Betula* pollen abundance attains *ca*. 23%, in association with a diverse pollen assemblage, including Rosaceae, Apiaceae and Liguliflorae. Grasses comprise *ca.* 48% of the pollen assemblage, but none were observed to reach the cereal category. There was probably a mosaic of vegetation types, including birch woodland. This could be completely natural, though the presence of large charcoal fragments suggests human impact in the vicinity.

2. The sample at 56cm is either on the LNL or extremely close to the event. A single grass pollen grain reaches the cereal category >35µ, with a pore annulus diameter *ca*. 10µ.

Microcharcoal is common, including the presence of large fragments. Pollen concentrations are maintained (>20,000 grains/cm³), with a noticeable decline in general diversity. Hence, relative abundances of *Betula* and grasses (Poaceae) increase slightly.

3. At 54cm, only 2cm above the LNL, this sample achieves the highest pollen concentration of the profile (*ca*. 30,000 grains/cm³), except for a sample close to the top of the section. This means that *Betula* is in fact increasing in terms of pollen concentration, though its relative abundance has declined to *ca.* 20%. Although, microcharcoal appears low, this is more a function of its unequal distribution on the microscope slide as some sizeable fragments of microcharcoal were present. The high pollen concentrations could be linked to increasing temperatures promoting plant productivity. No cereal category grass pollen grains were observed.

4. Between 34-54cm, pollen concentrations have declined. Large pieces of microcharcoal were observed during pollen analysis, but because of their uneven distribution, the point count method probably underestimates their abundance. Relative *Betula* pollen abundance increases to almost 45%, accompanied by a slight reduction in grasses. There is a minor increase in smaller grass pollen categories, possibly related to the expansion of *Betula*. At 46cm and 34cm, several grass pollen grains reached the cereal category, although the latter is based only on a pore annulus diameter of *ca*. 8µ, associated with a sizeable fragment of exine. The evidence for human impact in this sample is ambivalent, suggesting that the natural environment may have been reacting more to climatic factors, allowing the continued colonisation of *Betula* . However, the common, if unevenly distributed, occurrence of charcoal in these samples provides probably the most significant evidence for human impact in the vicinity.

5. Between 12-34cm, pollen concentrations are maintained with a noticeable increase at 12cm. *Betula* shows a reduction in relative abundance at 30cm, after which it continues to increase gradually again. Land clearance is probably a factor in the initial reduction of *Betula* as the horizon at 30cm contains four cereal category grasses, two of which exceed 47µ in diameter. Three other horizons above also contain grasses attaining the cereal category. Large fragments of microcharcoal were observed during this interval. The grass category 20-22.5µ maintains a consistent abundance >25%.

6. The interval 2-12cm reveals a significant increase in pollen concentration, particularly grasses (Poaceae), but a marked decline in relative *Betula* pollen abundance. Microcharcoal, including large fragments, was common during analysis and grasses reaching the cereal category were found across this interval. There is concomitantly an expansion in the larger grass categories between 22.5µ-30µ.
Pollen diversity expands slightly, with a noticeable occurrence of Caryophyllaceae, associated with lesser abundances of Liguliflorae, Brassicaceae and *Plantago* undiff. pollen. This interval probably indicates major human impact caused by agriculture associated with clearance of *Betula*.

***Sample 105.*** **Profile north of the skáli (S105).**
Subsampling interval, every 1cm, from 1-35cm.

At S105, the LNL has been identified at 7cm, i.e. close to the top of the sequence. Even after pollen preparation using hydrofluoric acid, tephra is highly abundant in this horizon. Sixteen samples were examined, only two of which postdate the LNL (Figures 5 & 6). The topmost 4cm were disturbed and are not included in this study. Above 12cm, samples were analysed every 1cm; below 12cm, the samples were analysed every 2-4cm. Preservation of pollen was generally good.
This sequence is of importance as it provides a relatively long vegetation record leading up to the LNL.

1. Between 20-32cm, the interval is dominated by grasses (Poacaeae), associated with minor abundances of other herbaceous taxa. Relative abundances of *Betula* pollen are suppressed and microcharcoal is completely absent. Pollen concentrations are high declining towards the top of this interval, and similarly Polypodiaceae undiff. are more abundant than further up the record. The larger grass categories >25µ are particularly noticeable. At 32cm a grass pollen grain attains a diameter of >37µ, but the diameter of the pore annulus is less than 5µ, so it is not classified in the cereal category. At 20cm, another grass pollen attains a diameter of >37µ, with a pore annulus diameter closer to 8µ. Its classification in the cereal category may have to be revised. This is the only grass pollen grain in this profile which was considered in the cereal category. No other grass pollen grains attained such a size. This

interval is considered to be an open landscape, probably during a colder period, with no evidence for human impact except this questionable grass pollen grain in the cereal category.

2. Between 12-20 cm, *Betula* begins to expand, associated with other taxa such as *Empetrum* and Rosaceae. There is a concomitant decline in the Poaceae and Polypodiaceae undiff. The smaller grass categories 12.5µ-20µ expand, whilst the larger grass categories >25µ decline, which may be a function of a more wooded landscape. The initial expansion of *Betula* at 18cm corresponds with high pollen concentrations possibly linked to a marked temperature increase. There is a subsequent decline in pollen concentration, with another marked rise towards the top of the interval. Some large fragments of charcoal were encountered from 16cm indicating increasing fire frequency in the vicinity. This is 9cm below the LNL. No grass pollen grains attain the cereal category in this interval. The landscape was in transition to becoming wooded. Whether these fires were caused by natural or human agents is unclear. However, the fuel load provided by the *Betula* was increasing, accompanied probably by higher annual temperatures.

3. Between 8-12cm, *Betula* continues to expand reaching its maximum cover, and similarly grass (Poaceae) cover appears to be in equilibrium. This is the interval just prior to the LNL. Microcharcoal is variable between the samples. At 10cm there is a distinct reduction in pollen concentration, corresponding with low abundances of microcharcoal. At 9cm, which is highly inorganic, tephra rich and quite different to the previous organic samples, charcoal fragments are common. There is also a higher diversity of pollen types. During this interval the grass categories 12.5µ-30µ continue to be maintained, with further decline of categories >22.5µ towards the top. It is still difficult to conclude whether maximum woodland cover and a marked rise in burning are not natural phenomena, but this would have been a suitable time for human colonisation. Landscape scale changes by early settlers would have been small with the creation of new openings. *Betula*, itself an important light demanding pioneer, may have even benefited from minor human induced disturbance.

4. Between 5-7cm, *Betula* is maintained at high abundances across the LNL. At 7cm (the LNL), a horizon packed with tephra and highly inorganic, microcharcoal is common. No major changes occur in the pollen concentrations after the LNL, and the herbaceous taxa observed are largely a continuum of the vegetation mosaic observed in the previous interval. A grass pollen grain observed at 5cm was at the threshold of the cereal category for its

diameter and pore annulus. Small grass categories 12.5µ-17.5µ continue to be maintained, whilst no noticeable expansion is evident in the larger grass categories >30µ. This is a wooded environment with only minor human disturbance.

**Comments and conclusions:** The interpretation at this stage is highly speculative. The only time control for these profiles is the LNL dated at 871±2AD. Unlike deposition in a lacustrine environment, sediment accumulation above and below this datum on land may well have been highly variable and discontinuous. It is probable that rates may have increased with land clearance and agricultural disturbance, which could also mix sediments of different ages. It may also not be unexpected that differences occur between different profiles, such as S106 and S105 both of which contain useful records of the pre-Landnam history. These are not continuous records being compared, but a sequence of "snapshots" with hiatuses at different times creating the sections examined. Similarly in spite of the relative proximity of the profiles, preservation of the pollen may vary as well as the processes that allowed the pollen or charcoal to be incorporated in the sediment, or even reworked. In addition, the point count method (Clark, 1982) used for assessing microcharcoal abundance should be complemented by other techniques to give a more accurate reflection of charcoal abundance as frequently the microcharcoal is irregularly distributed on the microscope slide. In lacustrine sediments, where this method is mostly used, the distribution of charcoal particles is more uniform.

Nevertheless in spite of all these caveats, unusually for archaeological samples, the samples from Aðalstræti are fortuitously rich in pollen and show consistent trends. The preservation though variable within a sample is fine for standard pollen counts.

Both profiles S106 and S105 provide evidence of marked *Betula* colonisation paralleling increased burning prior to the LNL; large charcoal fragments are particularly prominent at S105. Only at S106, the shorter of the two profiles, has cereal type pollen been identified below the LNL. These larger pollen grains would be expected to be rare, poorly dispersed and liable to breakage. Higher pollen counts and scanning more slides from S105 may still locate rare cereal type pollen. With increasing colonisation of *Betula*, smaller grass categories become more common.

It is possible that the shorter pre-Landnam sequence of S106 is in fact represented by the *Betula* colonisation phase in the longer S105 profile. However, does the S105 profile with its distinct LNL and gradual *Betula* colonisation record provide the more reliable environmental reconstruction, or is there a genuine decline in *Betula* in the S106 record, before expanding

again? The apparent decline of *Betula* at S106 may be explained by local sedimentological/preservational differences. Only more profiles can provide the wider environmental history and circumvent the possibility of such local anomalies.

Increasing human impact is particularly shown in profile S119, with only one sample below the LNL. Cereal type pollen and large fragments of charcoal are observed throughout this sequence. There is also a noticeable decline in *Betula* towards the top, with larger grass categories beginning to expand. This trend continues to complete deforestation, with expansion of the larger grass categories >30µ as shown at S18 (Figures 7 and 8), the profile consisting of sediments accumulated since the abandonment of the skáli (Chepstow-Lusty, 2002).

To conclude, it appears quite probable that settlers in low populations were the vectors mostly responsible for increasing fire frequency pre-A.D. 870 at the same time that *Betula* markedly expanded. Some of the cereal size category pollen below the LNL are probably genuine cereal pollen grains. These trends continued above the LNL, with increasing exploitation of *Betula* until its complete removal, whilst increased grazing pressure would have prevented its regeneration. The major difficulty is resolving how early these settlers arrived, which could be partly resolved by AMS dating of some of the charcoal rich layers; it is probably the order of decades rather than centuries. Other tephra layers beneath the LNL may provide a more precise time control. Unfortunately, natural processes could also have increased fire frequency at the time of the MWP with the increased fuel load provided by *Betula* woodland. Grasses with large pollen grains falling into the cereal category may also occur naturally. A multidisciplinary approach incorporating a reliable chronology from several profiles crossing the LNL at Aðalstræti could help in resolving this exciting, but controversial puzzle.

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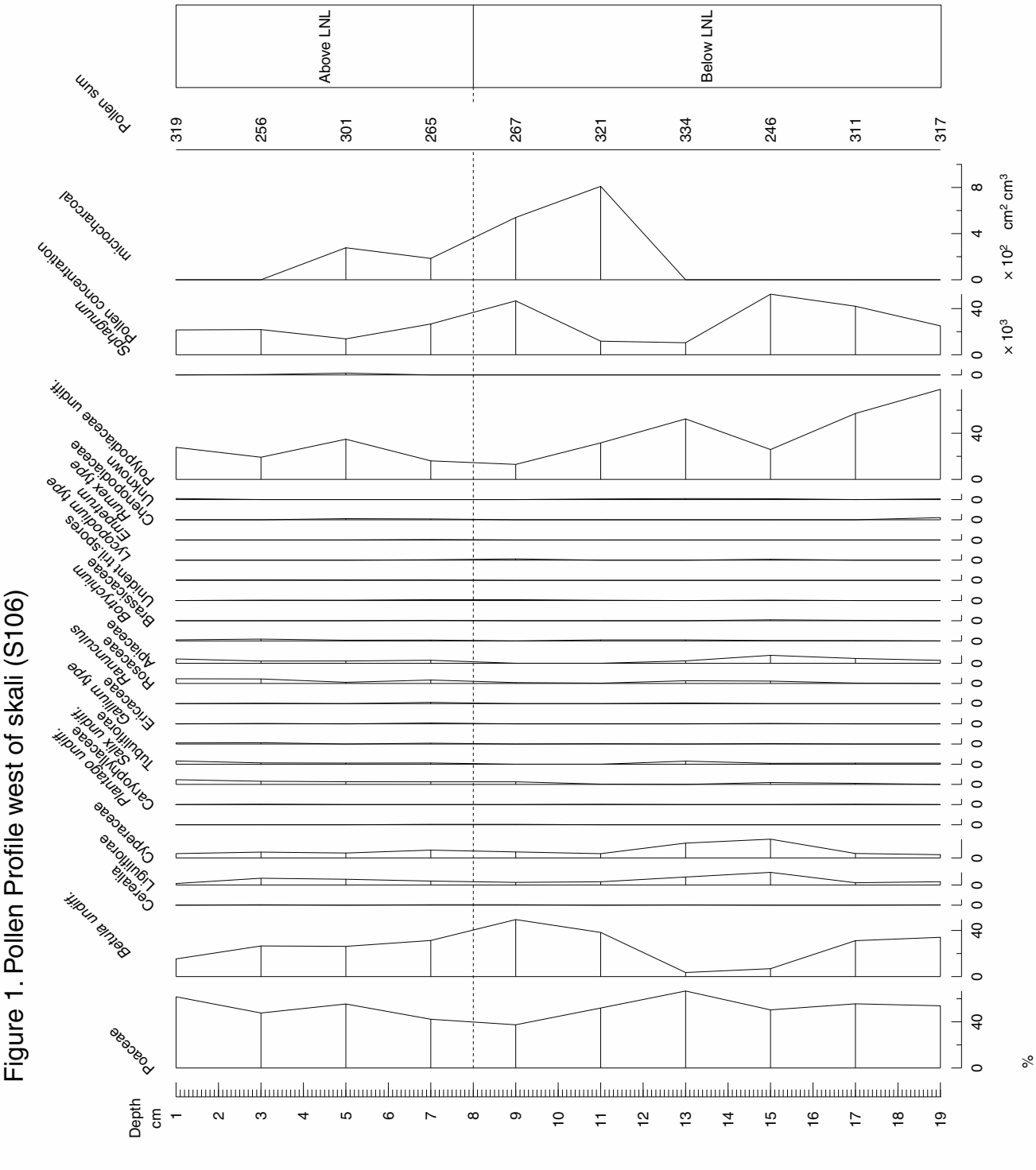



Figure 1. Pollen Profile west of skali (S106)

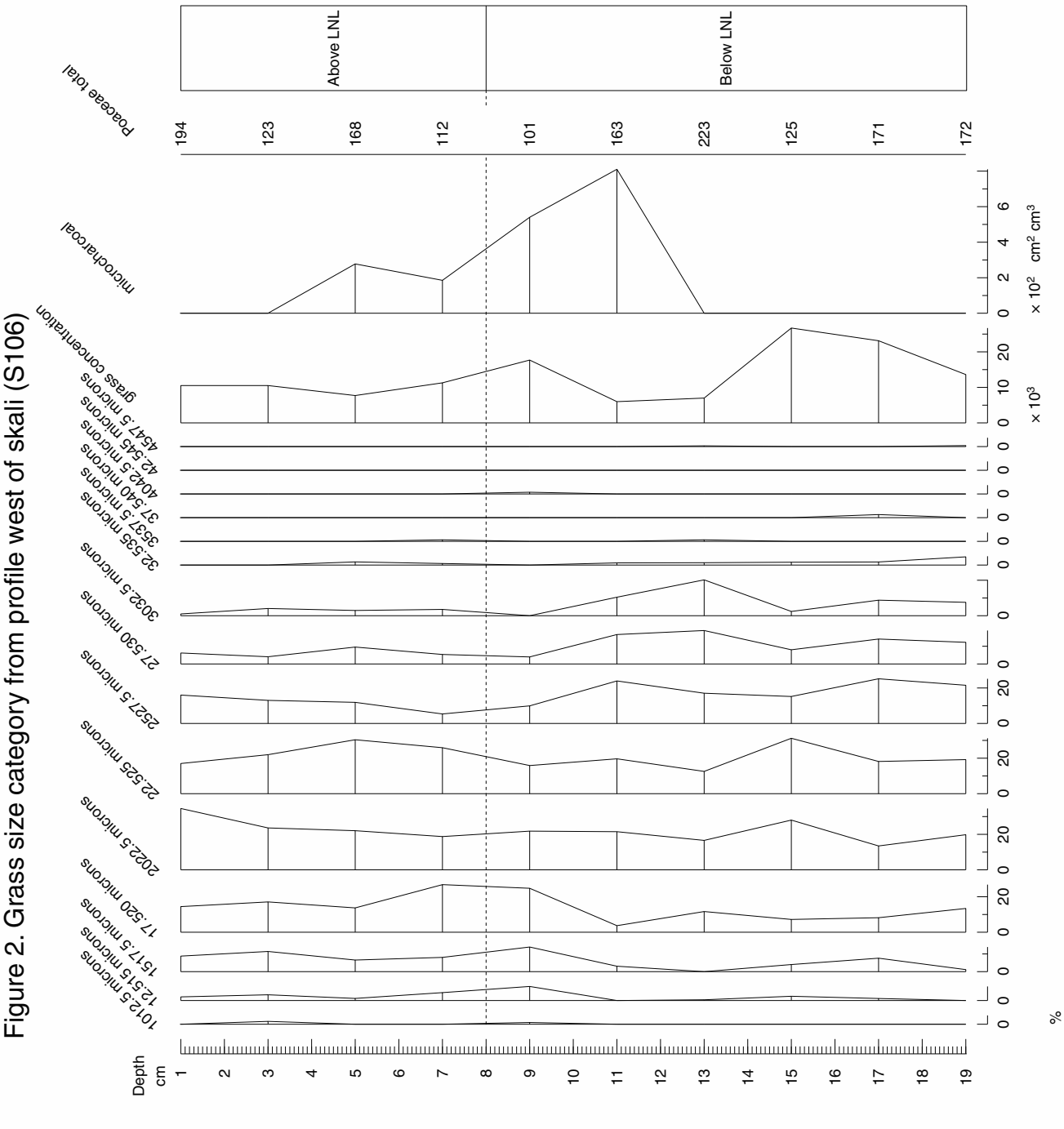
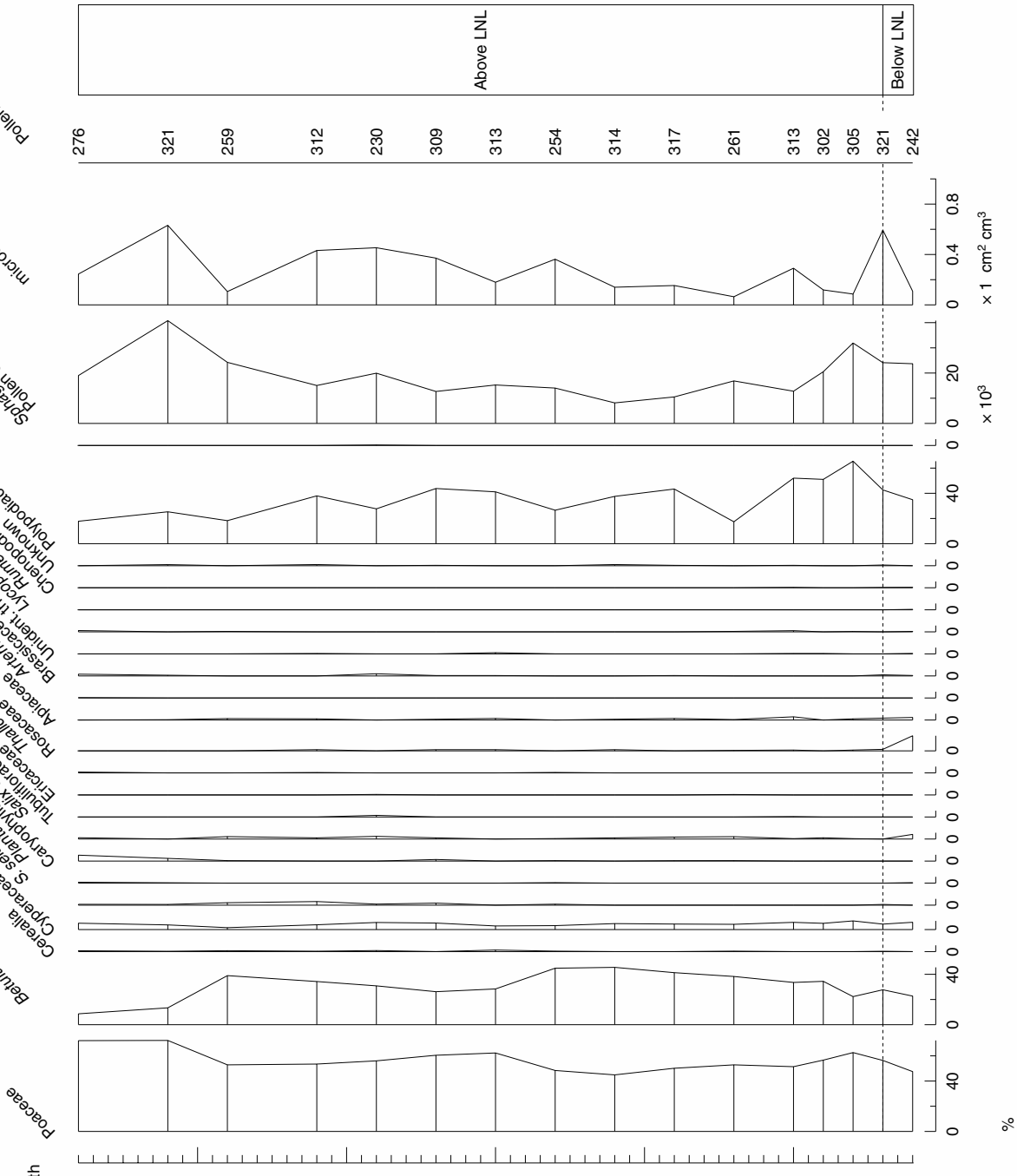



Figure 2. Grass size category from profile west of skali (S106)

Figure 3. Pollen profile east of skali (S119)



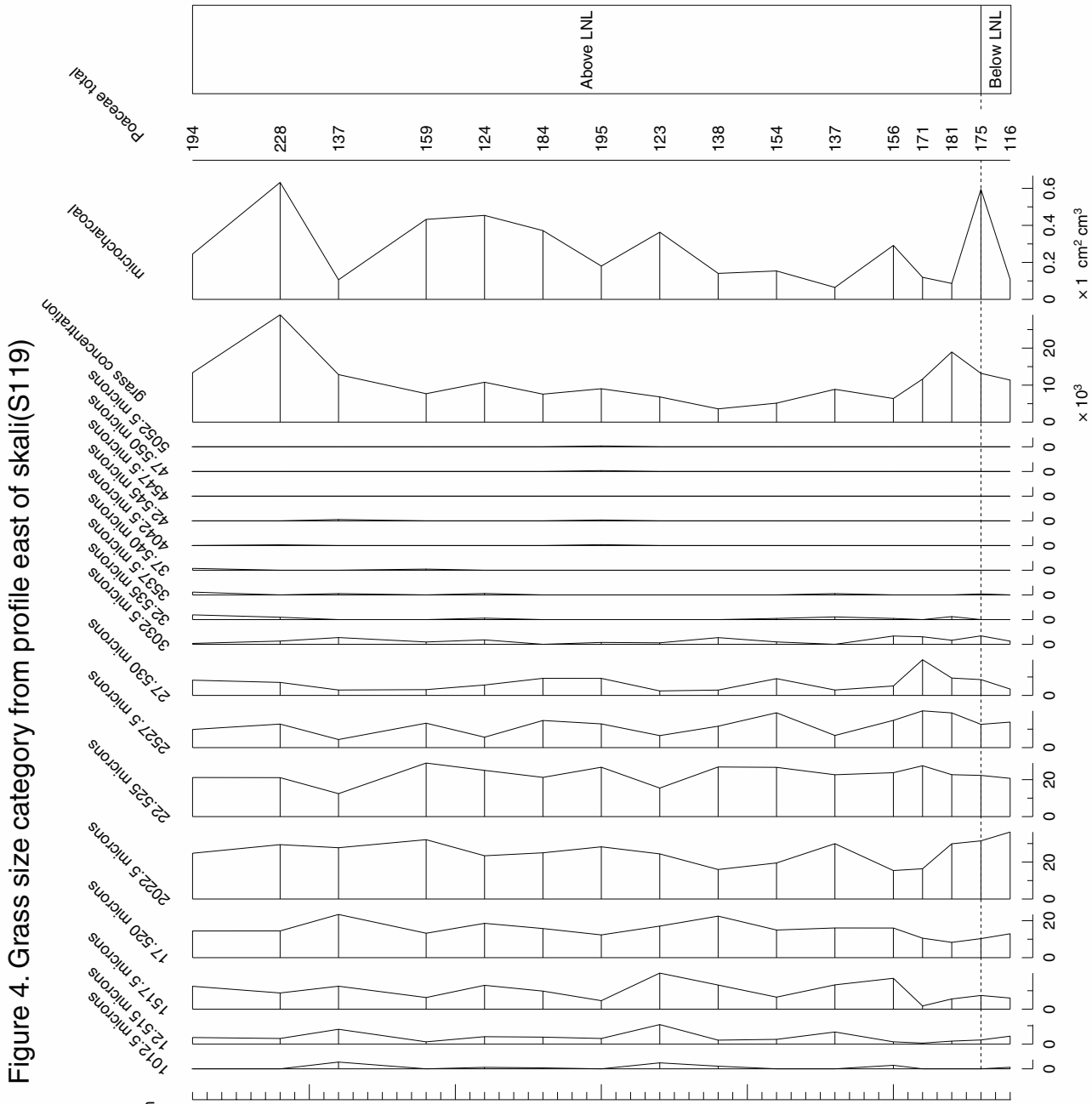



Figure 4. Grass size category from profile east of skali(S119)

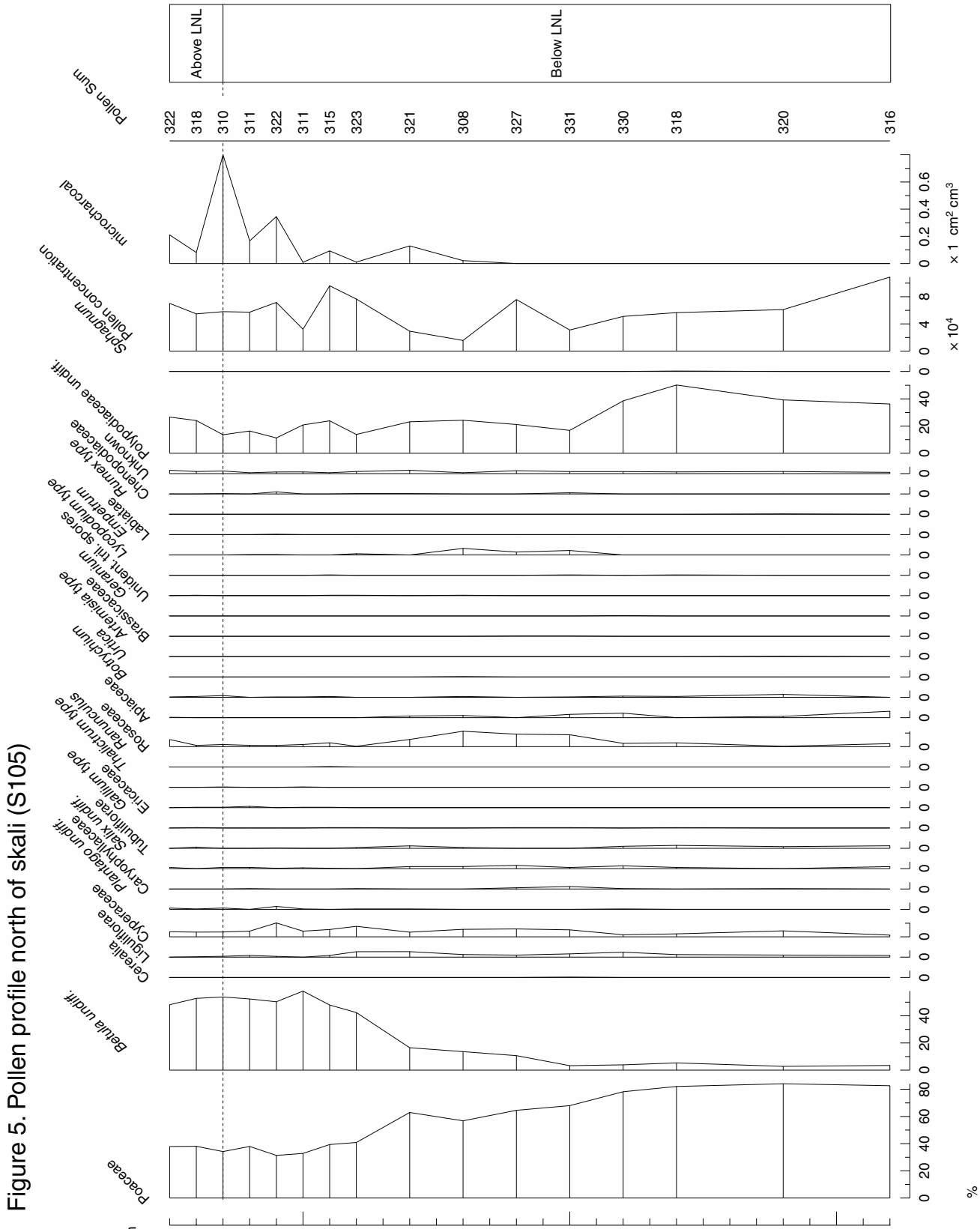



Figure 5. Pollen profile north of skali (S105)

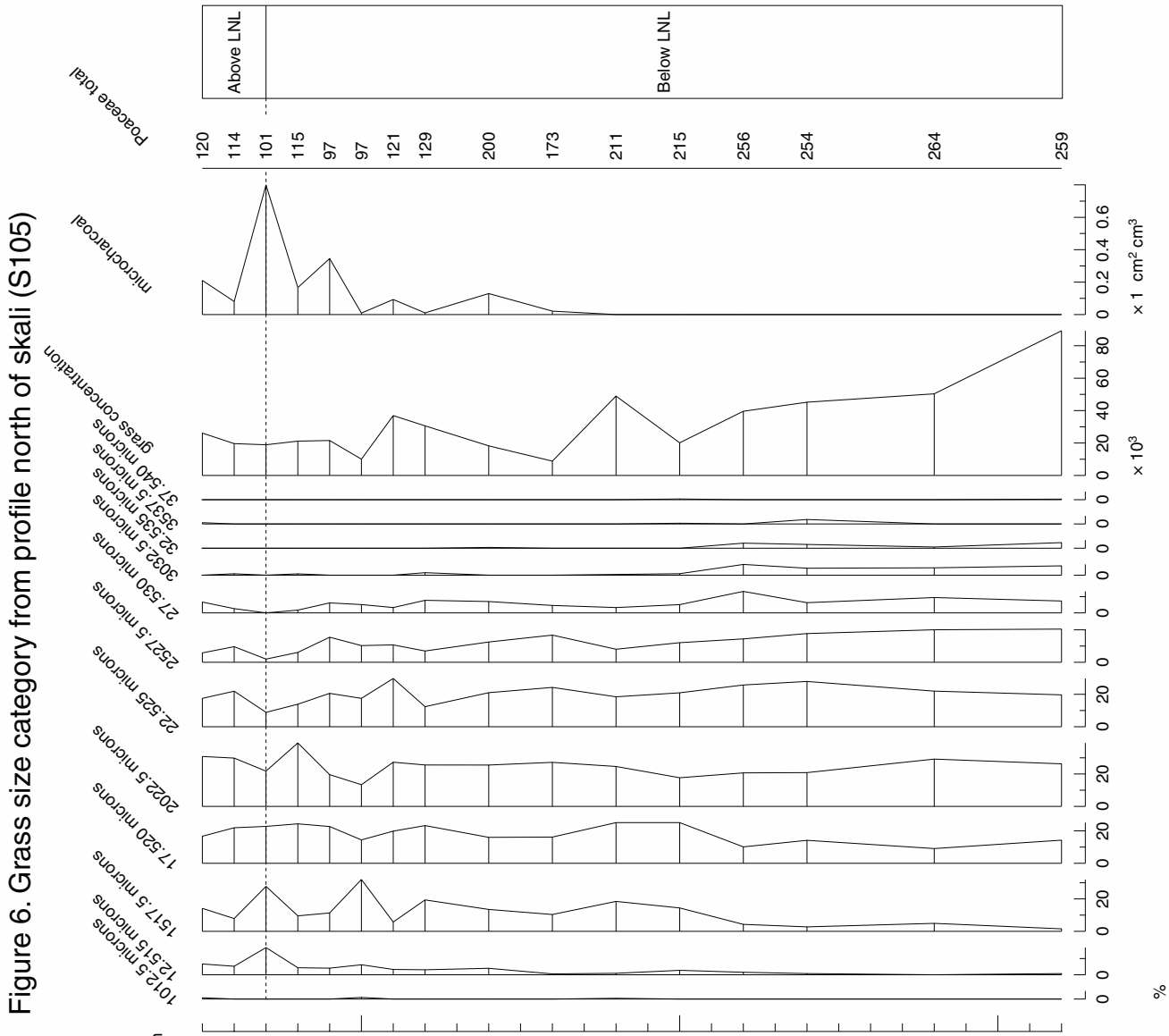



Figure 6. Grass size category from profile north of skali (S105)

Figure 7. Preliminary pollen record from northern end of skali

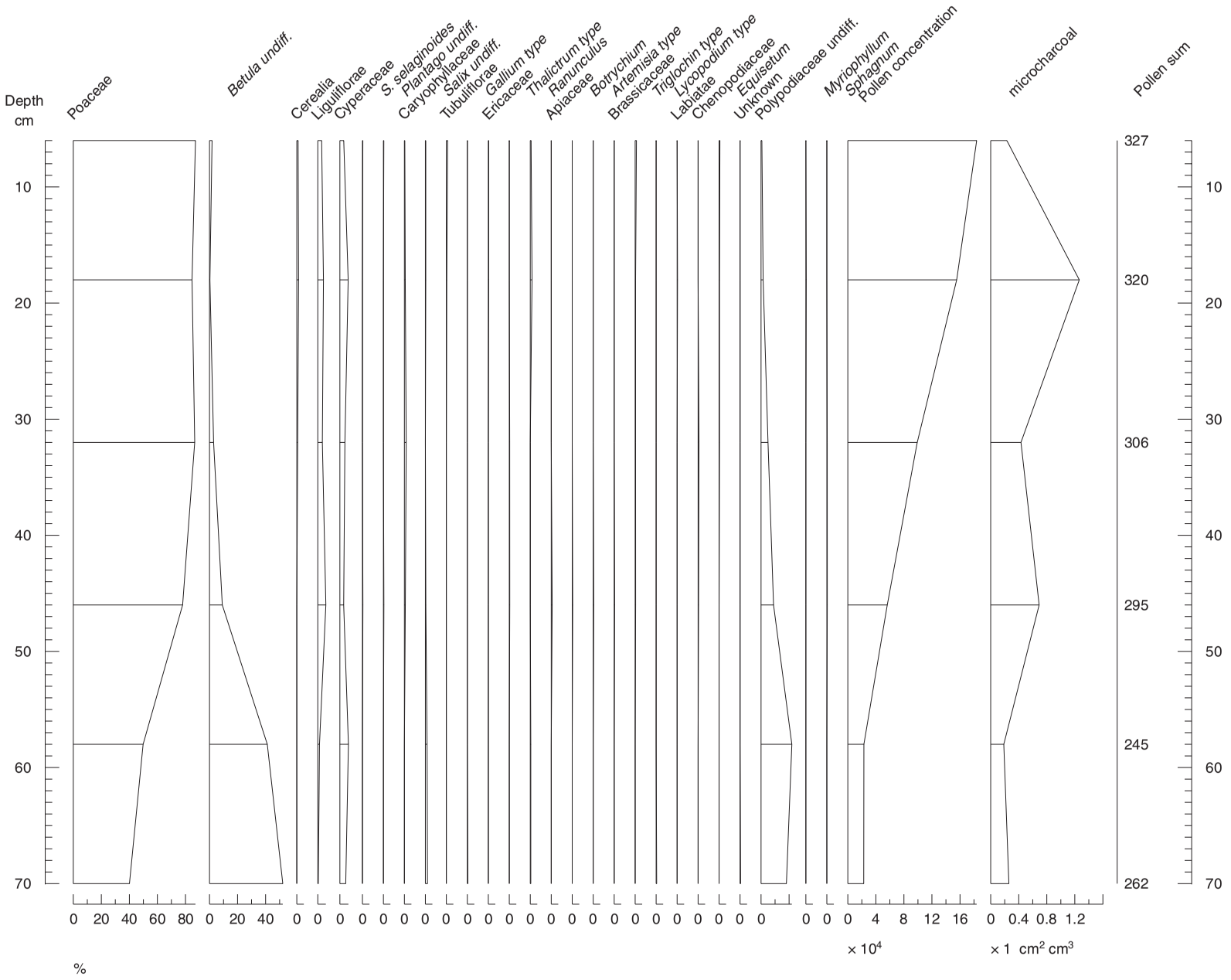
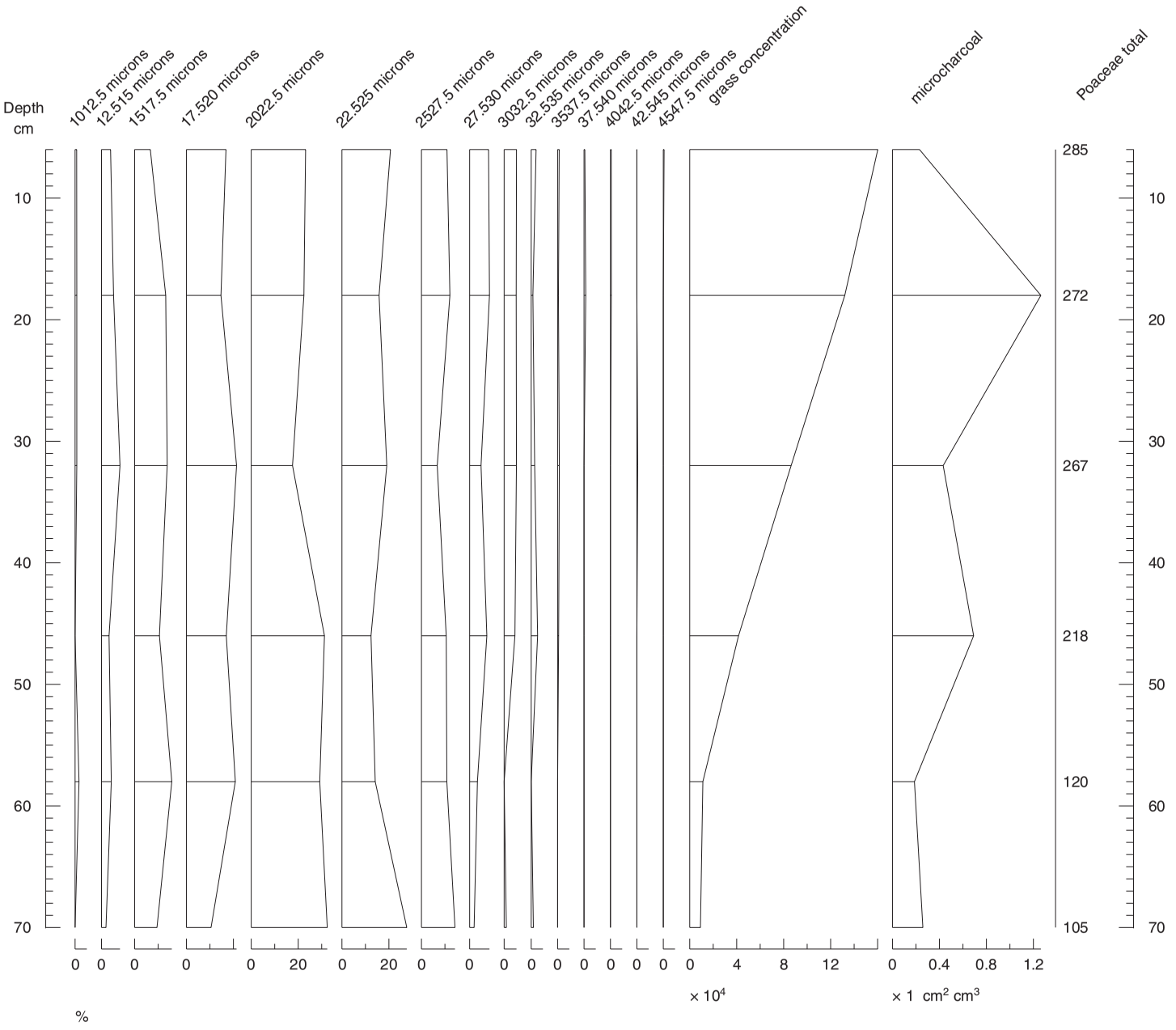


Figure 8. Grass Size category from profile in northern end of skali



# Appendix 4

## AÐALSTRÆTI, REYKJAVÍK, 2001: GEOARCHAEOLOGICAL REPORT ON THE DEPOSITS WITHIN THE HOUSE AND THE SOILS IMMEDIATELY PRE- AND POST-DATING ITS OCCUPATION

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**Report Outline**

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Methodology
    Geoarchaeological Sampling Strategy
    Analytical Methods
Results
    Soils Pre-Dating the Occupation of the House
    Occupation Deposits
    Post-Abandonment Deposits
Conclusion and Recommendations for Future Work
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Appendix 2. Data tables containing analytical results for LOI, magnetic susceptibility, pH, electrical conductivity, and multi-element analysis by ICP-AES.

# AÐALSTRÆTI, REYKJAVÍK, 2001: GEOARCHAEOLOGICAL REPORT ON THE DEPOSITS WITHIN THE HOUSE AND THE SOILS IMMEDIATELY PRE- AND POST-DATING ITS OCCUPATION

Karen B. Milek (Department of Archaeology, University of Cambridge, United Kingdom)

## Introduction

The excavation at Aðalstræti included an extensive soil and sediment sampling programme designed to enhance the understanding of the nature and date of the first human activity on the site, the composition and origin of the archaeological sediments, the spatial distribution of residues in the occupation deposits that may indicate the locations of activity areas or internal partition walls, the depositional and post-depositional processes affecting the site, and past environmental conditions. This report presents the results of a number of analyses conducted on sediments excavated within the house, in addition to the soils immediately above and below these occupation deposits. Following a discussion of the geoarchaeological sampling strategy and analytical methods, the results are presented in three separate sections: the soils pre-dating the occupation of the house, the sediments dating to the period of occupation of the house, and the deposits from the period following the abandonment of the structure. The interpretation of these results must be considered in association with other specialist analyses, particularly the pollen and soil micromorphological work conducted on the natural soil profiles surrounding the house, and the distributions of artefacts, faunal and botanical remains within the house. This report concludes with some recommendations for other scientific analyses, which have the potential to enhance the interpretation of certain archaeological deposits.

## Methodology

### Geoarchaeological Sampling Strategy

The house was excavated in alternate sextants, which exposed the internal occupation deposits in three long sections that could be utilised for micromorphology sampling: one which ran northeast-southwest through the central axis of the building, and two, north and south of the longfire, which ran northwest-southeast. After making detailed records of the exposed sections, micromorphology samples were taken following the method outlined in Courty et al. (1989). Rectangular aluminium tins (*c*. 5 x 6 x 10 cm) were inserted into the sections, the undisturbed blocks were cut free with a sharp knife or trowel, and the samples were wrapped carefully in plastic to prevent water loss during storage and transport. Two micromorphology samples were taken from the ashy deposits within the central hearth, five from the floor deposits and the turf collapse above, one from the deposits within the south-western entrance, and one from the turf wall in the north-western part of the building, which had been exposed in section by a later truncation (see Figure 1 and Table 1). Although the occupation deposits were the main targets of this sampling programme, many of the blocks

also captured the boundary between the archaeological sediments and the natural soils below, including the *in situ landnám* tephra layer (LNL).

Every floor layer within the house was 100% sampled on a 1 $m^2$ grid in order to permit the controlled spatial analysis of the faunal and organic remains, microrefuse, magnetic properties and chemical residues in the floor sediments (see Figure 1). Small subsamples (*c.* 200 ml) of the 152 bulk samples that resulted from this sampling programme were retained for chemical and magnetic analyses (see Table 2), while the remaining sediment was floated and wet sieved for the retrieval of botanical remains and microrefuse.

## Analytical Methods

### *Soil Micromorphology*

Micromorphology samples were manufactured at the McBurney Geoarchaeology Laboratory at the University of Cambridge. They were dried using acetone replacement of water, impregnated with a crystic polyester resin, and thin sectioned following the method described by Murphy (1986). Thin sections were first studied under a light box at a scale of 1:1 and then analysed with petrographic microscopes at magnifications ranging from x4 to x400, using plane polarised light, crossed polarised light, oblique incident light, and ultra-violet light. Descriptions conform to the internationally accepted terminology in Bullock et al. (1985), and can be found in Appendix 1.

In thin section, it is possible to identify and quantify the mineralogy, structure and texture of soils and sediments, as well as any bone, shell, artefacts, coprolites, phytoliths, diatoms, ash crystals, pollen, charcoal and plant remains that are present. In addition, it is possible to observe soil faunal activity, as well as the presence of, iron, manganese, calcium carbonate, and to some degree phosphorous, the mobility of which can be linked to specific environmental and pedogenic conditions. The interpretation of these thin sections was aided by reference to the experimental and ethnoarchaeological materials collected by the author and other researchers, and by the accumulated experience of other soil scientists who have been applying micromorphological techniques to archaeological questions (e.g. Courty et al. 1989).

### *Loss on Ignition*

Loss on ignition was conducted at the Department of Geography, University of Cambridge, following a procedure based on Nelson and Sommers (1996). After air-drying for one week, samples were pulverised using a mortar and pestle, and sieved in order to remove constituents over 2 mm in size. Approximately 5 g of sediment was measured into crucibles of known weight, which were heated for six hours at 105ºC to remove all water. They were then ignited for six hours to 550ºC and 950ºC consecutively. The weight loss recorded after these two periods of ignition, divided by the oven-dry weight of each sample, gives a proxy measurement for the percentage of organic matter and the carbonate content respectively. These properties were then plotted on the plan of the house in order study their spatial patterning.

Concentrations of organic matter in a floor deposit are likely to represent areas in which plant matter or animal excrement accumulated and decomposed *in situ*. It is extremely valuable to test this property using loss-on-ignition, because even partially decomposed organic matter cannot be recovered by flotation. Since Icelandic soils do not naturally contain calcium carbonate, any concentrations of carbonates in the sediments from Aðalstræti are likely to be derived from ash crystals or microscopic bone fragments. The properties tested by loss-on-ignition can therefore give some indication of activity area patterning, and can be used as a framework for understanding the chemical properties of the floor deposits.

### *Magnetic Susceptibility*

Magnetic susceptibility was conducted at the Department of Geography, University of Cambridge. After air-drying for one week, samples were gently pulverised using a mortar and pestle, and sieved in order to remove constituents over 2 mm in size. 10 $cm^3$ plastic pots were filled with the powdered sample, weighed, and measured using a Bartington Instruments MS2 magnetic susceptibility meter in order to obtain the mass specific magnetic susceptibility of each sample. This property, which is a measure of the ability of the sediment to be magnetised when it is placed in a magnetic field, was then plotted on the plan of the house in order to investigate its spatial distribution.

Enhanced magnetic susceptibility on archaeological sites is usually due to burning, a process which can cause iron to be reduced to magnetite. The distribution of high magnetic susceptibility readings is therefore usually associated with hearths, and it is expected that high magnetic susceptibility will be concentrated around the central hearth of the house. However, high magnetic susceptibility readings elsewhere in the structure could also represent *in situ* burning outside of the main hearth, or the movement of sediment away from the hearth to other locations within the building.

### *Electrical Conductivity and pH*

After air-drying for one week, samples were gently pulverised using a mortar and pestle, and sieved in order to remove constituents over 2 mm in size. 10 ml of sediment was placed in 50 ml plastic pots, and mixed with 25 ml de-ionised water. They were then tested for electrical conductivity and pH using DiST WP3 and pHep 3 electronic meters.

Electrical conductivity measures the ability of the soil solution to conduct electricity, and is used as a proxy for the quantity of soluble salts, or nutrients in the soil. It is not possible to identify the precise chemistry of these soluble salts without conducting further elemental analyses (see below). Electrical conductivity readings were plotted on the plan of the house in order to detect any activity areas containing enhanced levels of soluble salts.

pH is defined on the basis of the hydrogen ion activity in the soil solution, and is used as a measure of the acidity or alkalinity of the sediment. The spatial distribution of pH readings can provide information about the concentration of humic acids resulting from the decay of organic matter. In addition, if there are vast differences in the pH across a floor deposit, it can be used to explain any variations in the preservation of bone, shell and calcareous ash.

### *Multi-Element Analysis (ICP-AES)*

Multi-element analysis by inductively coupled plasma atomic emission spectroscopy was carried out by ALS Chemex, in Mississauga, Ontario, Canada. 5-15 g of sediment were air dried, pulverised and sieved to remove constituents over 180 µm in size. The elements in the sample were then leached using a nitric acid – aqua regia digestion system, and the resulting solution was heated to a temperature of 8000ºC, which excites all of the elements in the sediment and causes them to emit light at their characteristic wavelengths. This light is then collected by an atomic emission spectrometer, which diffracts the light, resolves it into a spectrum of its constituent wavelengths, measures the intensity of each wavelength, and converts it to an elemental concentration by comparing it to calibrated standards. The elements quantified in this way were then plotted on the plan of the house in order to determine their spatial distribution.

Concentrations of elements in certain parts of the house may indicate the location of activity areas. Concentrations of phosphorus, for instance, indicate the location of *in situ* decomposed organic matter, and very high concentrations of phosphorus can pinpoint the location of accumulated animal excrement, such as might occur in a byre or stabling area. Potassium is present in high concentrations in wood and plant ash, and high potassium readings can help to identify locations where this material had been deposited, even if it had subsequently been decalcified, and is somewhat difficult to identify in the field – a post-depositional process that may occur in acidic conditions. Since Icelandic soils generally lack calcium carbonate, high concentrations of calcium in the floor may be taken to indicate the location of calcareous ash, bone or shell deposition and dissolution.

## Results

### Soils Pre-Dating the Occupation of the House

The *in situ landnám* tephra sequence (LNL) was easily identified on the basis of its single grain microstructure, and its mineral composition: fine and very fine sand-sized shards of white and green volcanic glass, plagioclase crystals, and opaque black minerals. It was present in 4 of the micromorphology samples taken from within the house: in sample 92, where it was sealed below the northwest wall of the structure, in samples 71 and 79, where it was sealed below occupation deposits, and in sample 94, where it was situated below turf collapse in the southwest entrance of the structure (see micromorphology descriptions in Appendix Tables A.3, A.6, A.8 and A.9).

The soils below the LNL (context 913) were silt loams and silty clay loams with a moderately developed angular blocky structure. In sample 92, which had captured the greatest thickness of pre-LNL soil, the silty clay loam also contained thin lenses (< 5 mm thick) of fine windblown sand. It may be possible to relate these fine layers of windblown sand to human-induced surface exposure in the vicinity of the site, but this interpretation would require a longer soil and pollen chronosequence, and the issue will be broached more conclusively in forthcoming work by Ian Simpson and Alex Chepstow-Lusty. All three samples showed strong evidence of pedogenesis, in particular the precipitation of iron oxides, mineral weathering and bioturbation. In addition to the orange to reddish brown colour of the clay in these soil horizons, which indicates that the groundmass as a whole had been affected by the

oxidation of iron, up to 50% of the soil matrix showed moderate to strong impregnation by iron nodules. In addition, rare fragments of plant tissue had been replaced by iron, which had formed pseudomorphs of the original cell structures. These pedofeatures are a product of very frequent wetting and drying in what are naturally iron-rich soils. Repeated wetting and drying had also weathered many of the sand grains in sample 92, producing domains of oriented clay around sand grains and in the groundmass. These characteristics are in marked contrast to the occupation deposits within the house, which do not exhibit the microstructure, weathering or pedofeatures that may be created when water percolates through the soil, translocating particles and ions, and causing clay to swell and shrink.

All of the pre-LNL soils had a mixed fabric, indicating that they had been substantially reworked by soil fauna. The abundance of voids created by the movement of soil fauna (channels and irregularly shaped vughs), and the faunal excrement that was occasionally found within them, testify to the last phase of biological activity in these soils, which was not entirely inhibited by the deposition of the *landnám* tephra sequence – a fact demonstrated by the few channels that cut across both the LNL and the soils below. In general, the amount of organic material preserved in the pre-LNL layers was extremely low, particularly in comparison with the occupation deposits that will be described below. No anthropogenic inclusions were found in any of the pre-LNL soils, in spite of the charcoal flecking described in the field.

The *in situ landnám* tephra sequence itself (context 910) consisted of lenses of perfectly sorted shards of fine sand-sized white glass, and very fine sand-sized shards of green glass, which are associated with plagioclase crystals and the grains of a black, opaque mineral. In sample 92 there was a fine lens of silty clay loam between the white and green tephra lenses. Plant material within the tephra layer tends to be in the form of long strands of amorphous organic matter – horizontally oriented except where disturbed by soil fauna – which represent stems or leaves that had fallen, been buried, and decomposed *in situ*. In sample 94, which was taken from the floor within the southwest entrance of the house, the LNL had been partially disturbed and truncated, presumably by trampling, and then subsequently reworked by water. The disturbed LNL was directly overlain by a layer of water-deposited silt and clay, which will be described in more detail below. In samples 71, 79 and 92, the LNL was capped by a thin lens of horizontally bedded phytoliths and decomposed organic matter, indicating that a at least some herbaceous vegetation had died as a result of the tephra fallout. The phytoliths in sample 92 are predominantly the rod-shaped silica bodies most typical of grass stems, but a detailed phytolith study could provide more information about the vegetation cover at the site when the LNL was deposited.

In samples 71 and 92, a silty clay soil was preserved between the LNL and the anthropogenic layers above. Like the soils below the LNL, this layer exhibited a weakly granostriated birefringence fabric due to the weathering of fine sand grains, and was heavily impregnated by iron oxides, a pedogenic process resulting from repeated wetting and drying. Below the wall of the house, this soil had a strongly developed ultrafine granular microstructure (rounded peds < 0.5 mm in size), which is typical of surface horizons in Andisols (Arnalds et al. 1995), and indicates that this horizon had been the surface layer prior to being sealed by the turf wall. This soil had also been heavily reworked by soil fauna, which produced an open fabric with large, excrement-filled channels, and a very undulating boundary with the turf wall above. In contrast, within the building, north of the central hearth, the soil above the LNL had an extremely compact, prismatic microstructure that can only have been produced by trampling and compaction during the construction and occupation of the house. The soils

above the LNL, like those below, had minimal organic content, and were completely lacking in anthropogenic inclusions, including charcoal. In spite of field evidence for pre-LNL activity elsewhere at the site, the soils that were sealed below the house (and that were captured in these particular samples) show no sign of having been affected by human activity prior to the construction of the building. The sharp boundary between this soil and the floor sediment above it, the lack of a sealed and compacted layer of vegetation in sample 71, and the lack of any soil at all between the LNL and the occupation deposits in sample 79, all suggest that the surface soils and vegetation cover of had been removed prior to the construction of the house.

### *Summary of Soils Pre-Dating the Occupation of the House*

The pre-LNL soils examined here exhibited pedogenic properties typical of Icelanic andosols. They had been substantially reworked by soil fauna, but showed no sign of disturbance by human activity, and did not contain any anthropogenic inclusions – not even microcharcoal.

## Occupation Deposits

Occupation deposits within the Viking Age house were very variable, which enabled 38 separate contexts to be distinguished on the basis of differences in composition, colour, texture, and compaction. These different contexts were spatially related to features within the house, such as the entrances and the central hearth, and they often had boundaries associated with lines of post holes, making it clear that the differences between them were genuinely a product of how space within the house had been partitioned and used (see Figure 1). It was common for several contexts to share the same boundary line, indicating that space had been partitioned and used in a similar way for the entire life of the house. There were only a few exceptions to this: in the southwest sextant, where a number of overlapping contexts showed shifting boundaries, and space had clearly been re-organised at some point during the occupation of the building; and in the central floor area south of the hearth, where a series of large posts had been installed, removed, and reinstalled in slightly different locations several times.

Since the occupation deposits were so well-defined in terms of their spatial extent, a good understanding of their composition has real potential to provide information about how different parts of the house had been used. Loose sediment samples were taken from all 38 contexts on a 1 $m^2$ grid (137 samples in total) in order to see if there were broad patterns in their chemical and magnetic characteristics that grouped contexts together, or cut across context boundaries, or showed up significant variations within contexts. In addition, 8 micromorphology samples were taken from some of the most important occupation deposits: context 824, within the southwest entrance (sample 94); context 844, in the northwest corner of the house, which was associated with several lines of post holes running perpendicular to the west wall (sample 80); contexts 851 and 852, which lay against the west wall and the south end of the presumed ‘bench’ (sample 79); context 864, which lay around the central hearth (sample 71); context 868, which lay up against the eastern long wall (sample 68); and contexts 792, 793, 795, and 802, the ash layers within the central hearth (samples 74 and 75). In addition, one micromorphology sample (67) captured a thin occupation deposit where none had been recorded, in the area of the presumed western ‘bench’.

***General Preservation of Occupation Deposits***

When the house was abandoned, all occupation layers with the structure were sealed by substantial layers of turf roof collapse, and were therefore preserved relatively intact. Bioturbation by soil fauna, which disrupts the original structure, orientation, and relationships of sediment constituents, was the major source of post-depositional disturbance of the occupation deposits. The effects of bioturbation varied, depending on the palatability of the original sediment (i.e. how much digestible organic matter was present to attract the fauna) and its compaction, since highly compacted sediments are difficult for soil fauna to penetrate and tend to be avoided. Those sediments that were highly palatable and less compacted had been heavily reworked by soil fauna, so that sometimes only tiny fragments of the original sediment fabric remained to give some indication of the original orientation and organisation of constituents (e.g. context 844).

The occupation deposits were also subject to some post-depositional chemical alterations, most notably the leaching of calcium carbonate and phosphorus in some parts of the house. The behaviour of these elements is closely associated with the pH of the soil solution, and it is also related to their relative abundance to each other. Calcium, in particular, is sensitive to acidic conditions, and tends to dissolve and leach very rapidly when the pH of the soil solution is less than 7.0 (neutral). A comparison of the calcium distribution plot (Figure 7) with the pH distribution plot (Figure 2) shows a close association between the two. Particularly evident is the extremely acidic strip south of the hearth, directly underneath the post-medieval foundation trench, where pH values of 4.5- 5.5 have caused most of the calcium to leach out – if indeed there had been any present in the original sediment. The pH values along this strip are probably not a product of the original composition of the occupation deposits, but rather the later foundation trench, which used to hold water rich in organic acids. The view that the foundation trench had concentrated the flow of water in this part of the site is supported by the fact that an iron pan and a concentration of sulphur had formed along this strip (sulphur is produced by bacteria breaking down organic matter in anaerobic conditions, and is indicative of wet conditions; see Figure 9). The leaching of calcium carbonate was also evident in thin section, particularly in the decalcification of wood ash, which normally has a significant proportion of calcium carbonate aggregates (Canti 2003). None of the wood charcoal in any of the thin sections remained associated with calcitic ash. Aggregates of fine crystalline material were observed only in the peat ash deposits within the central hearth (contexts 793, 795, 802), where the shear quantity of alkaline ash had kept pH values over 7.5.

Phosphorus can remain in mobile ionic form, and is susceptible to leaching at pH 6.0-7.0, but in more alkaline conditions phosphorus can combine with calcium to form stable calcium phosphates, and at pH less than 6.0, phosphorus can form stable compounds with iron or aluminium. The clays particular to Icelandic andosols also have the capacity to adsorb phosphorus, making Icelandic soils very retentive of this element. Those occupation deposits that contain a proportion of soil are therefore more likely to retain phoshorus, while those deposits composed almost entirely of human-made, or animal-made non-soil material (e.g. organic accumulations, dung, or ash), lack the clay that can adsorb phosphorus, and are therefore more likely to lose this element if their pH happens to be between 6.0 and 7.0. For example, context 844, in the northwest corner of the house, which was composed almost entirely of dung (see below) and would be expected to have a very high phosphate content, had a pH between 6.0 and 7.0, and was in fact dephosphatised. The effects of

dephosphatisation are visible in the phosphorus distribution plot (Figure 6), and are confirmed by the fact that this context (including the bone within it) does not autofluorescence when sample 80 is viewed under UV light. A similar process may also have occurred in the south end of the structure, where there are a number of deposits with low phosphorus values and a pH of 6.0-7.0 (contexts 859, 866, 861, 871), but in this case there are no thin sections available to clarify what the original composition of the deposit may have been. Suffice it to say that in such cases, the abundance of phosphorus is more related to pH conditions than to the original composition of the sediment, and it is not possible to infer the presence or absence of dung from relative phosphate concentrations alone.

***Northeast Entrance***

The sediment within the elaborated northeast entrance (context 890) was described in the field as a compact light brown silt, containing charcoal, ash, and turf fragments. The bulk chemistry revealed this sediment to be extremely acidic (pH 5-5.5), and to have an unusually high sulphur content, characteristics that can be associated with prolonged exposure to water. Such conditions would not be unusual in an entrance passage, where the combination of water from the outdoors and the impermeability of heavily compacted sediment would both contribute to prolonged wet conditions. Heavy compaction and perpetual damp have in fact been observed in the entrance passages of 19$^{th}$-century turf houses, and it is interesting to note that in the early 20$^{th}$-century, both ash and fresh layers of turf were laid down in entrance passages in order to counter these problems: the ash to keep the floor dry, and the turf to even out the surface that had a tendency to become worn (Milek forthcoming). Context 890 is bounded on its south side by a row of post holes that probably supported a partition wall, and the fact that its western edge coincides with the edges of two layers that stretch up and down the central floor area (contexts 864 and 907) strongly suggests that there was a short partition wall on its west side as well. Instead of moving directly from the entrance to the central floor area, traffic appears to have been directed to the right, into the northeast corner of the building. The entrance therefore seems to have consisted of a small, square vestibule (1.5 m$^2$), which would have effectively reduced any draughts, and if high enough, would also have cut off the line of sight from the entrance to the central hearth.

***Northwest Corner***

In the northwest corner of the house there was a dark greyish-black 'clayey' silt deposit, described in the field as 'fatty', or 'greasy' (context 844). This layer was associated with three short rows of posts, spaced 1 m apart, which ran perpendicular to the western long wall: its northern and western edges were bounded by the walls of the house, while its eastern and southern edges were bounded by the edges of the post rows (see Figure 1). In thin section (sample 80), context 844 was seen to consist predominantly of amorphous organic matter and phytoliths (silica bodies deposited in the cells of plants, which do not decompose); it is the high proportion of pale brown amorphous organic matter in the sediment that gave it its sticky, 'clayey' texture in the field.

Four lenses were distinguished within this context. 844.1 (the uppermost lens) and 844.4 (the lowermost lens) were stained dark brown by organic acids, and contained 20-30% dark brown, partially decomposed plant matter. Although these lenses had been heavily reworked by soil fauna, in localised areas where the original fabric was preserved, it was possible to see

the original horizontal bedding of the organic matter (Figure 14). Herbivore dung within these lenses was identified by the presence of short, truncated strands of articulated phytoliths (a biproduct of the mastication of phytolith-rich grasses; see Figure 15), and where the original sediment fabric was preserved, it was possible to see that the dung aggregates had been flattened and were horizontally bedded with plant matter – presumably by trampling.[1] The short rows of posts running perpendicular to the west wall therefore appear to represent the partition walls of stalls for small herbivores, such as goats or sheep.

The thickest lens, 844.3, was composed primarily of phytoliths and very pale brown amorphous organic matter, with 2-5% charcoal, and an usually high concentration of fungal spores (2-5%) and small bone fragments (also 2-5%). Soil fauna had heavily reworked the layer, forming a crumb structure that would normally be considered typical of A horizons, so that horizontal bedding was preserved in only a very few, tiny localised areas (Figure 13). The bone content of this layer was surprising, because in every other way it resembled reworked herbivore dung. The bone fragments themselves were unusual, not merely because of their unusually high concentration, but because they were minute (the largest 5 mm long) and highly weathered: they had abundant pits and cracks, were often partially stained brown by organic pigmentation, and had weathering rims (class 0-1 pellicular alteration, following Bullock et al. 1985: 61). No fish bones could be distinguished, all of the bone being mammal or avian in origin, and no burnt bones were present. It is unfortunate that the bones from this particular context were not analysed, but in thin section it is evident that they are not normal domestic waste products. They are completely embedded in the dung, and appear to have been an original component of it. It would seem, therefore, that either the livestock kept in these stalls was occasionally fed food waste, or humans sometimes used the same area as a lavatory. Lipid biomarker analysis would be required to distinguish the species that produced this material.

Between lenses 844.3 and 844.1 there was a thin lens of turf containing the LNL tephra (844.2). This lens had not been identified in the field, and it is therefore possible that it was localised, rather than spread across the entire context. If it was indeed intentionally deposited, it is not unlikely that it served as bedding material. As mentioned above, turf had been regularly used to renew floor surfaces in 19$^{th}$ century turf houses in Iceland, and it had been used as bedding material in animal stalls in other parts of the North Atlantic region until the early modern period. There is also evidence to suggest that the excreta was confined at floor level by a low sill: the extent of context 844 was limited by the length of the stalls, and there was actually a small gap between the eastern edge of this context and the one laying adjacent to it to the east (context 862).

### *Central Floor Area*

A number of heterogeneous, ashy, and charcoal-rich contexts extend up and down the central aisle of the house (contexts 858, 862, 864, 873, 907). These all overlap to some extent, and their edges share the same boundaries, making it clear that the central floor area had been physically delimited, at least at floor level (see Figure 16). It has already been mentioned that an entrance vestibule with a post-supported partition wall also appears to have bounded the central floor area on its northeastern edge, while its northwestern edge, where it bordered the

[1] It should be noted that one of the best indicators of herbivore dung – calcareous spherulites – are not normally produced by animals in Iceland; of the many samples of dung studied by this author in thin section, the only example to contain spherulites was from sheep that had been grazing in a limed infield.

animal stalls, had probably been bounded by a low sill. The central part of the floor area had been bounded on its eastern and western sides by bench-like features, which will be discussed in greater detail below. The sediments in this central floor area were characterised by relatively high concentrations of phosphorus, calcium, and potassium due to their high ash content (Figures 6-8), and the calcareous ash also had the effect of increasing the pH of the sediment above its base line, to between 7.0 and 8.1 (Figure 2).

Contexts 858 and 864 were examined in sample 71, which was taken just north of the central hearth. In the field, context 858 was described as an orange and black silt deposit, mixed with burnt bones and charcoal, while context 864 was described as a black and orange brown ashy deposit, somewhat coarser than 858, but also containing burnt bones and charcoal. It is testimony to the heterogeneity of these layers, and perhaps their microtopography, that the floor deposit captured in sample 71 bore no resemblance to this description. The upper layer in the sample, which had been labelled as context 858 in the section drawing, did not consist of ash, but turf fragments containing aggregates and lenses of the LNL tephra layer – the uppermost one substantially mixed with soil that had been reworked by soil fauna. This layer represents turf collapse, rather than an occupation deposit.

The layer labelled as context 864 in the section drawing was certainly an occupation deposit, but it did not contain any ash or burnt bone, and only 2-5% charcoal. Instead, it was characterised by high organic content (40-50% amorphous, decomposed organic matter), dark brown organic pigmentation, an unusually high concentration of fungal spores (5-10%), and a high proportion of phytoliths (40-50%). About 20% of the layer consisted of small (<5 mm) grey aggregates of phytoliths, within which the phytoliths were packed together in randomly oriented, short, articulated segments (see Figure 12). These aggregates of phytoliths are undoubtedly herbivore dung (sheep or goat), but they are so small that they must be described as 'crumbs' of dung. Moreover, this deposit shows no evidence of compaction or trampling. It would therefore appear that dung had been stored in this area, presumably to be used as fuel.

### *Central Hearth*

The large, well-made central hearth was filled with a sequence of ash deposits distinguished on the basis of their colour and the abundance of charcoal (contexts 792, 793, 795, 802, 831). The two thin sections taken from these ashy deposits, samples 74 and 75, offer the opportunity to identify the types of ash present, and therefore the types of fuels that had been used at the site. It has already been noted that dung was stored just north of the hearth, and that this was likely to have been used as fuel. Samples 74 and 75 did not, however, contain any dung ash. Contexts 793 and 795, which had been described as black and brown silt in the field, consisted of lenses of wood ash and peat ash, as well as lenses containing a mixture of the two. The wood ash had been decalcified, but was easily identified on the basis of a high concentration of wood charcoal. The peat ash was identified on the basis of a high quantity of bright red, oxidised iron nodules, burnt sand and silt grains, aggregates of microcrystalline calcium carbonate, and melted phytoliths. In sample 75, these lenses appeared to have accumulated *in situ*, but in sample 74, they were more mixed, and appeared to have been redeposited – perhaps during an episode when the more central part of the hearth was cleaned out. Context 802, which had been described as a mixed brown, white, and grey ash in the field, consisted of pure peat ash that had accumulated *in situ* during the use of the hearth. Context 831, which had been described as a very dark greyish brown and black ashy deposit

in the field, consisted of mineral-based turf ash that had also accumulated *in situ*. This was identified on the basis of the relatively high proportion of sand and silt (20%) – a proportion that was identical to the proportion of sand and silt in the turf observed in other thin sections. The central hearth therefore contained a surprising variety of fuel residues, including peat, mineral-based turf, and wood. These, in addition to the dung found to be stored just north of the hearth, suggest that the full range of fuel types were in use, and that the type of fuel selected at any particular time depended on what was currently in stock, or the type of fire required. A similar range of fuels has been identified in Viking Age middens in northeast Iceland (Simpson et al. 2003), and was also recorded in an ethnohistoric study of 19th-century turf houses in Iceland (Milek forthcoming).

The ash layers in the central hearth contained an unusually high proportion of burnt bone (ranging from 2-10%). In sample 74, the boundary between contexts 802 and 831 was actually marked by a continuous lens of burnt fish bone. Although it is possible that this bone was a product of accidental burning during cooking, it is perhaps even more likely that it was intentionally thrown into the fire once the meal was consumed as a convenient and sanitary method of waste disposal. It should be noted that minute fragments of burnt bone were found throughout the house due to the redeposition of hearth residues; they give an indication of how hearth waste was moved around the house, rather than the location of cooking activities.

***Eastern and Western Side Aisles***

Beside the western long wall was a rectangular-shaped area, about 1.7 m wide, where turf collapse appeared to rest directly on top of beach cobbles, and no occupation deposit was recorded (see Figure 1). Sample 67, which was taken from this area, revealed the presence of a thin occupation deposit below turf collapse 747: an organic silt loam about 1 cm thick, containing 5-10% charcoal, as well as <2% bone and burnt bone. The deposit had been very heavily bioturbated by soil fauna, and much of its fabric had been reworked into a crumb structure, but where the original fabric survived, it does not show any evidence of compaction by trampling (see Figure 10). The deposit therefore does not appear to be a 'floor', as such, but may have accumulated under a raised bench or platform.

Support for such a feature also comes from sample 79, which was taken on the very southern edge of the rectangular space. This sample captured occupation deposit 851, a small context, which was described in the field as soft, black and silty. In thin section, context 851 was observed to be extremely mixed and heterogeneous, containing an abundance of charcoal (20-30%), amorphous organic matter (30-40%), as well as ash (2-5%), burnt bone (2-5%), and bone (<2%). There was also a lens of very coarse sand and fine gravel running through the middle of the layer. The loose, porous fabric, the unusually large size of the charcoal (up to 7 mm), and the lack of any horizontal bedding or compaction, all suggest that the layer had not been trampled. In addition, the lensing within the layer argues against it being the product of a one-off dumping event. Instead, the evidence suggests that this layer accumulated against a physical barrier, on the edge of a floor. The horizontal displacement of larger artefacts by kicking and scuffing, their accumulation on the edges of floors and pathways, and their particular tendency to accumulate against physical barriers, has been observed in numerous ethnoarchaeological and experimental studies (e.g. Nielsen 1991; Stockton 1973; Wilk and Schiffer 1979). It would therefore appear that there had been a real physical barrier delimiting the edge of the occupation deposits, which kept the rectangular area against the

west wall fairly 'clean' and untrampled. It is likely that there was a raised a 'bench' or low platform in this area, similar to that observed at dozens of other Viking Age houses in Iceland and the North Atlantic region. While it was more standard practice to create this raised platform by digging the central floor aisle 20-30 cm deeper than the side aisles, this was probably not possible at Aðalstræti due to the shallowness of the natural soils, and the occupants therefore opted to construct a raised platform, supported by the row of posts that can be observed in Figure 1.

Instead of having a similar feature in the eastern side aisle, which would be more typical of Viking Age houses in Iceland, the context that occupies the identical rectangular space on the eastern side of the house was described as being a mix of brown, black, and grey silt and ash (context 868). In thin section (sample 68), context 868 was observed to be a very highly compacted organic silt loam, with horizontally bedded lenses of organic matter, articulated phytoliths, and dark greyish brown organic silts (see Figure 11). It was predominantly dark brown due to an abundance of amorphous organic matter and organic pigmentation, but the lenses of articulated phytoliths were grey. Although it contains the rare charcoal fragment (<2%), the occupation deposit captured in this thin section does not contain any ash. Instead, it consists almost entirely of herbaceous plant matter that had been heavily trampled and compacted, and had decomposed, undisturbed, *in situ*.

The eastern side aisle clearly represents a very different use of space from the central floor aisle, which was dominated by redeposited ash. In contrast, context 868 was very 'clean', containing even very little charcoal, and the activities that took place in this space – perhaps sitting and sleeping – were conducted on a thick layer of clean hay. The edges of this context were in fact as well defined as the platform on the eastern side of the house: on its northern side it was defined by the partition wall of the entrance vestibule, on its western side it shared a context boundary with the edges of the floor deposits in the central aisle (858, 864, 901), and on its southern side it shared a context boundary with the edge of 871 (see Figure 1). This suggests that there was a real physical barrier delimiting the edges of context 868, perhaps a low sill that acted to contain the hay and to prevent ash from the central aisle spreading into this space.

### *Southeast Corner*

In the southeast corner of the house, there was black and dark brown, charcoal-rich deposit (context 871), which was roughly contained by a row of posts running parallel to the eastern long wall. This context was enriched in phosphorus, calcium, and potassium, reflecting its high concentration of wood ash (Figures 6-8). In addition, 871 had the distinction of having exceptionally high electrical conductivity values (see Figure 3), which mark it as having an especially high nutrient, or soluble salt content. The enrichment of this context with soluble salts suggests that sea salt or seaweed was being used and/or stored in this area. This small alcove may therefore have been used for processing and storing food.

### *Southwest Entrance*

One sample (94) was taken from occupation deposits in the southwest entrance. The uppermost layer in the sequence (context 763) consisted of compact, multiple fine lenses of waterlain silty clay, plant matter, organic soils, and ash (both wood ash and peat ash). It had

clearly been very heavily compacted by trampling, as would perhaps be expected from an entrance passage. More surprising were the number of waterlain silty clay lenses within the occupation deposit. They suggest that a slight depression had been worn into the floor, which permitted mud to settle there during wet periods. Below 763 there was a reddish brown layer which was entirely waterlain, consisting of multiple fine lenses of well-sorted silt in fining-up sequences such as those typically found in puddles (context 824). The southwest entrance clearly had a problem with water, probably because it faced up slope.

The small entrance vestibule in the southwest corner of the house, which was delineated by rows of post holes, contained compact brown clayey silt deposits with charcoal flecks (contexts 859 and 862) and a small ash and charcoal deposit (context 870). The ash content of these layers is reflected in their elevated concentrations of phosphorus, calcium, and potassium (Figures 6-8), their high pH (Figure 2), and the concentration of burnt bone in this corner. Since the floor deposits surrounding the vestibule were not particularly ashy (contexts 849 and 866), the ash within the vestibule could not have been tracked in, but had probably been intentionally deposited. The fact that sulphur had not accumulated within this vestibule, as it had in the other wet parts of the house (along the walls, within the northeast entrance, and the strip below the post-medieval foundation trench; see Figure 9), indicates that the ash and charcoal did an effective job of absorbing moisture coming in through the entrance.

### *Summary of Occupation Deposits*

The occupation deposits within the house indicate that space was delineated in a very clear, visual way, often with physical barriers. The house had the three-aisle construction typical of other Viking Age houses in the North Atlantic region, and each aisle had been used very differently. The central aisle was the main artery for movement up and down the length of the building, while the side aisles contained other activity areas: entrance vestibules, stalls for animals, an alcove for food processing and storage, and in the middle of the building, 'clean' sitting and sleeping areas. In addition to this symmetrical, longitudinal division, the house was clearly divided into three segments, from north to south:

1) The north section, which contained the entrance vestibule on the east side and the sheep/ goat stalls on the west side.

2) The larger, more open central section, which contained the long hearth and the 'clean' sitting and sleeping areas: the western one slightly raised, the eastern one boxed-in at floor level.

3) The south section, which contained the entrance vestibule on the west side and the alcove for food processing and storage on the east side.

The over-all impression is that of a well-planned, ordered, and symmetrical building.

**Post-Abandonment Deposits**

Five micromorphology samples (67, 68, 71, 79 and 80) taken from within the house contained post-occupation deposits, which were derived from the collapse of the turf walls and roof (contexts 747 and 858). These deposits were predominantly silt loams with a heterogeneous fabric showing clear evidence of having been heavily bioturbated by soil fauna: mixed soil fabrics with different particle size and mineralogy and therefore of diverse origins, abundant channels and irregularly shaped pores, and up to 20% soil fauna excrement. These deposits had an ultrafine granular structure (rounded peds < 0.5 mm in size), and contained occasional phytoliths and amorphous organic matter, as well as lenses and aggregates of the *landnám* tephra sequence (up to 60% in sample 68). Although reworked, this material closely resembles the soils associated with the *in situ landnám* tephra sequence (LNL), which were observed in samples 71, 92 and 94 (described above). Thin section analysis therefore confirms the observation that had already been made in the field, that the house was constructed of turf containing the LNL, and was therefore built not long after that tephra was deposited.

In samples 67 and 79, both of which were taken from the western side of the house, context 747 also contained a microstratigraphic unit (4-11 mm thick) that was not distinguished as a separate context in the field. This thin layer contained horizontally bedded, very well sorted laminations of fine silts and very fine sands. The fine sands included not only mineral grains, but also 'pseudosands': subrounded nodules of soil that were strongly concreted by the impregnation of iron oxides, and which were subsequently transported with all of the same properties as normal sand grains. Within this layer, there was a tendency for phytoliths and other rod-shaped mineral grains, as well as the few strands of amorphous organic matter, to be horizontally oriented. The sorting of the mineral material and horizontal bedding indicate that this was a waterlain deposit. It was probably formed by rain or snow-melt running-off the partially collapsed turf roof, picking up mineral material from the exposed undersides of turf fragments, and carrying it down into a shallow depression, where it settled out. The fact that this layer is only evident on the western side of the house would suggest that the turf roof had collapsed inwardly on this side of the building first.

Sample 79 also contained two fine lenses of anthropogenic material within context 747, which were not in evidence in any other sample. These were 3-5 mm thick, and contained a poorly sorted mix of charcoal fragments, amorphous organic matter – much of which was horizontally bedded – as well as the rare fragment of burnt bone in a porous, silty loam matrix. These lenses were not deposited by water, but by the dumping of midden debris into the collapsing building.

***Summary***

The turf roof seems to have collapsed on the western side of the house first, creating a depression that acted as a trap for water-borne sands and silts. Midden debris was also dumped into the partially collapsed building, indicating that there was continued human presence in the area for some period after the abandonment of the house

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## Conclusion and Recommendations for Future Work

The geoarchaeological analysis of the soils and sediments at Aðalstræti 14-18 has made a significant contribution to the interpretation of the site, particularly to the understanding of the occupation deposits within the house. Most significant, perhaps, was the identification of an area in the northwest corner where small sheep or goats were stalled indoors, and where several centimeters of dung were allowed to accumulate. Additional phytolith analysis and lipid biomarker analysis would confirm this interpretation, and would indicate more specifically which species were responsible for the deposition of the dung. The identification of an alcove in the southeast corner of the house, where sea salt or seaweed may have been used/stored, was also a surprising and significant find. Ideally, further tests would be carried out to try to confirm the exact source of the soluble salts in this small room. The evidence for the wide range of fuels used in the central hearth – including peat, wood, mineral-based turf, and dung – supplements and supports the work of an ongoing project into fuel resource exploitation in Iceland (Ian Simpson and Orri Vésteinsson). In addition, several charred seeds were observed in the ashes in the central hearth, as well as in other contexts containing charred residues, such as the charcoal lens in 844.3. While these seeds cannot be identified in thin section, the fact that they are present even in such small samples indicates the potential of conducting further analysis of the charred seeds within the occupation deposits.

**Acknowledgements**

Field descriptions and micromorphology samples were taken on site by Garðar Guðmundsson, and bulk samples were taken by the excavation staff. Thin sections were manufactured by Julie Miller at the McBurney Geoarchaeology Laboratory, University of Cambridge, and multi-element analysis by ICP-AES was conducted by ALS Chemex, in Mississauga, Ontario, Canada. Thanks are due to Steve Boreham and Charles French for their permission to use the Physical Geography Laboratory and the McBurney Geoarchaeology Laboratory at the University of Cambridge. The author is also grateful to Marco Madella for valuable discussions about the phytoliths seen in thin section, and to Gianna Ayala and Matthew Fitzjohn, for their patient instruction in the use of ArcView GIS.

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Table 1. Undisturbed block samples for micromorphological analysis taken from within the house.

| Sample | Context(s) | Location | Field Description (from top to bottom) | Micromorphology Description |
|---|---|---|---|---|
| 67 | 747 | S edge of NW sextant | Light reddish brown and dark brown turf, containing small patches of a light tephra, and a reddish brown lens; a dark brown, friable deposit just overlying the beach pebbles was captured at the bottom of the thin section. | Appendix Table A.1 |
| 68 | 747, 868 | N edge of ME sextant | Light reddish brown turf containing patches and lenses of the LNL, and a dark brown lens; a brown, black and grey floor deposit containing ash and charcoal was captured at the bottom of the thin section. | Appendix Table A.2 |
| 71 | 858, 864, 910, 913 | S edge of NW sextant | Brown and black silty floor deposits containing ash, burnt bones and charcoal, separated by a bright reddish brown layer, just north of the central hearth; the LNL was captured at the bottom of the thin section. | Appendix Table A.3 |
| 74 | 792, 793, 795, 802, 831 | W edge of ME sextant | Black, brown and yellow ashy deposits within the central hearth; a light brown clayey layer was captured at the bottom of the thin section. | Appendix Table A.4 |
| 75 | 792, 793, 795, 802 | W edge of ME sextant | Black, brown and yellow ashy deposits within the central hearth. | Appendix Table A.5 |
| 79 | 747, 851, 852, 910 | N edge of SW sextant | Light brown turf containing patches and lenses of the LNL; black, dark brown and light red brown floor deposits; the LNL was captured at the bottom of the thin section. | Appendix Table A.6 |
| 80 | 747, 844 | E edge of NW sextant | Reddish brown turf containing patches of the LNL; dark brown, clayey floor deposit. | Appendix Table A.7 |
| 92 | Turf wall, 910, 913 | NE wall | Dark brown to black, and light reddish brown turf, with lenses of the LNL; the LNL; a light brown soil was captured at the bottom of the thin section. | Appendix Table A.8 |
| 94 | 763, 824, 910, 913 | SW entrance | Dark grey brown silt; reddish brown silt mixed with charcoal; the LNL was captured at the bottom of the thin section. | Appendix Table A.9 |

Table 2. Bulk samples for geochemical and magnetic analyses taken from within the house.

| Sample | Context | Sampling Location | Field Description |
|---|---|---|---|
| 54 | 792 | Central hearth | Medium to dark brown silt. |
| 60.1-4 | 793 | Central hearth | Black, ashy deposit. |
| 62.1-8 | 795 | Central hearth | Black and brown silt, mixed with abundant charcoal. |
| 63 | 796 | | Black, charcoal deposit under burnt stones, on the floor. |
| 66-3, 7a | 802 | Central hearth | Mixed brown, white and grey ashy deposit. |
| 72 | 807 | | Compact black, brown, clayey silt deposit. |
| 73 | 798 | S entrance | Compact black and dark grey floor or midden layer. |
| 77 | 814 | | Firm, medium dark brown, clayey silt deposit. |
| 78 | 824 | SW entrance | Friable brown silt layer containing patches of purple and red, flecks of wood ash and charcoal. |
| 81 | 752 | S end of house | Soft, black, dark brown and orangey brown silt deposit. |
| 82.1-3 | 793 | E half of central hearth | Soft, black, brownish black ashy deposit. |
| 83 | 824 | SW entrance | Friable brown silt layer containing patches of purple and red, flecks of wood ash and charcoal. |
| 84.1-8 | 795 | Central hearth | Black, brown, and brownish white ashy deposit. |
| 85 | 826 | S end of house | Firm, medium dark greyish brown clayey silt floor deposit. |
| 86.1-8 | 802 | Central hearth | Soft, brownish white and grey ashy deposit. |
| 87 | 831 | Central hearth | Very dark greyish brown and black ashy deposit. |
| 88.1-12 | 844 | NW sextant | Firm, dark greyish-black clayey silt deposit. |
| 89 | 846 | S end of house | Pale grey ash and charcoal lens. |
| 90.1-6 | 849 | SW sextant | Soft, black, silty deposit. |
| 91 | 851 | SW sextant | Soft, black, silty deposit. |
| 95.1-6 | 852 | SW sextant | Soft, medium brown silty deposit. |
| 97.1-2 | 854 | SW sextant | Pale grey and black ash deposit. |
| 101.1-3 | 859 | SW sextant | Compact, medium brown clayey silt deposit. |
| 102.1-6 | 858 | NW sextant | Orange and black silt deposit. |
| 109.1-2 | 866 | SW sextant | Soft, light reddish brown silt deposit overlying beach pebbles. |
| 110.1-17 | 864 | ME and MW sextants | Black and orange brown ashy deposit around the central hearth. |
| 111 | 870 | SW sextant | Pale brownish grey ash and charcoal deposit. |

| | | | |
|---|---|---|---|
| 113.1-7 | 871 | SE sextant | Black and dark brown charcoal-rich deposit. |
| 115.1-3 | 873 | SE sextant | Black, silty, charcoal-rich deposit around the central hearth. |
| 116.1-16 | 868 | ME sextant | Brown, black and grey, mixed silt and ash. |
| 118 | 890 | NE sextant | Compact, light brown silt, containing charcoal, ash and turf fragments. |
| 120 | 892 | SE sextant | Dark brown, charcoal-rich silt. |
| 122 | 894 | NE sextant | Medium dark brown silt, containing small stones and rare charcoal fragments. |
| 124.1-4 | 901 | ME sextant | Black, silty, charcoal-rich deposit. |
| 127.1-3 | 904 | NE sextant | Brown, grey and black silt and gravel deposit. |
| 128.1-3 | 907 | NE sextant | Light brown friable silt with abundant charcoal. |
| 131.1-5 | 861 | SW sextant | Mottled medium brown and black clayey silt deposit with occasional charcoal flecks. |
| 132.1-3 | 862 | NW sextant | Mixed light brown and grey silty deposit |


Figure 1. Plan of the house, showing sampling locations.


Figure 2. pH distribution

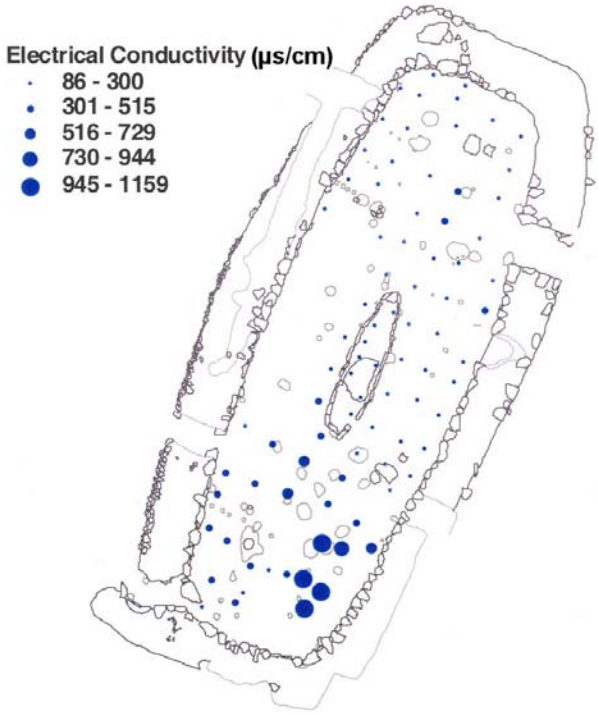



Figure 3. Electrical conductivity distribution

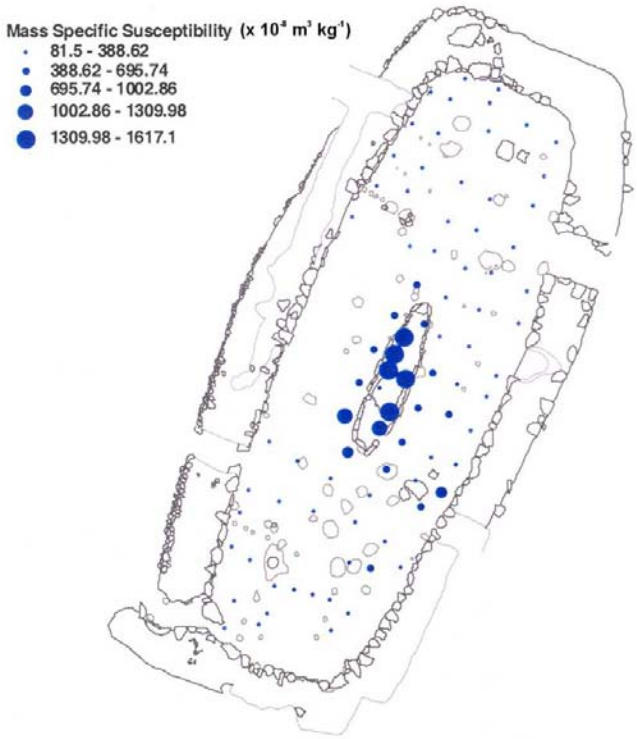



Figure 4. Magnetic susceptibility distribution


Figure 5. Loss on ignition distribution (proxy for organic matter content)


Figure 6. Total phosphorus distribution, given in standard deviations from the mean.

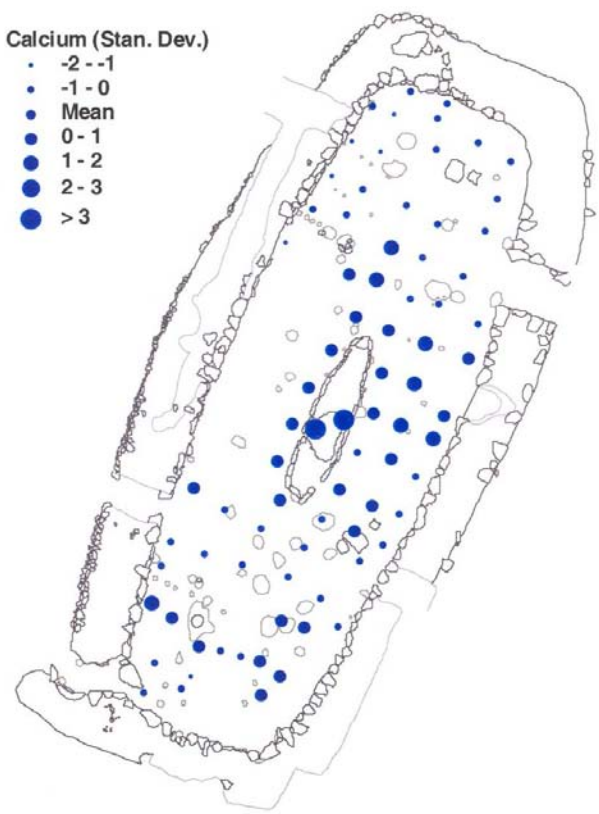



Figure 7. Total calcium distribution, given in standard deviations from the mean.


Figure 8. Total potassium distribution, given in standard deviations from the mean.


Figure 9. Total sulphur distribution, given in standard deviations from the mean.

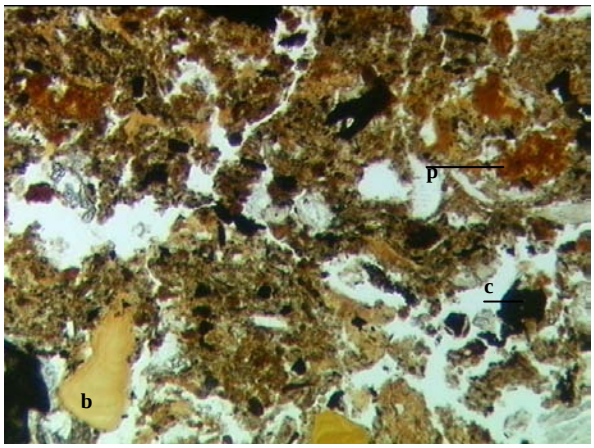



Figure 10. Sample 67, Context below 747. Thin layer containing charcoal (c), unburnt bone (b), and decomposing plant matter (p). There is no evidence for compaction or trampling.

250 µm

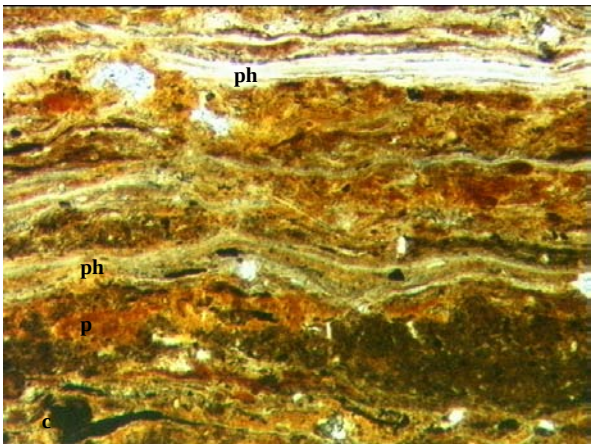



Figure 11. Sample 68, Context 868. Thin layer containing horizontally bedded and compacted phytoliths (ph), decomposing plant matter (p), charcoal (c), and organic silts.

250 µm

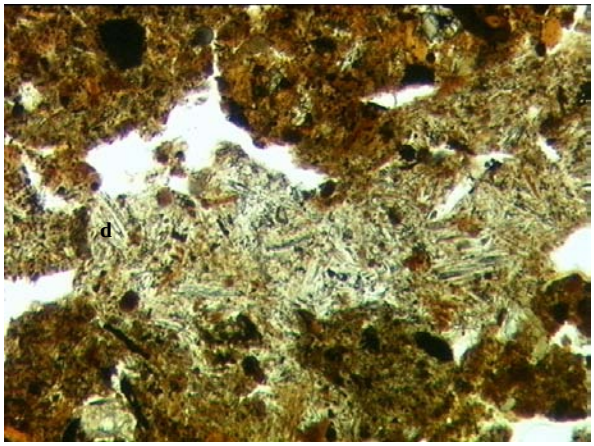



Figure 12. Sample 71, Context 864. Aggregate of herbivore dung (d), showing the characteristic, random orientation of articulated phytoliths.

250 µm

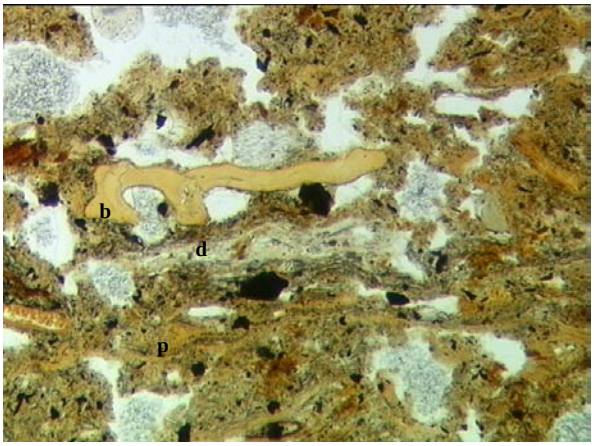



Figure 13. Sample 80, Context 844.3. Horizontally bedded bone (b), herbivore dung (d) and plant matter (p) in a localised area not disturbed by bioturbation.

250 µm

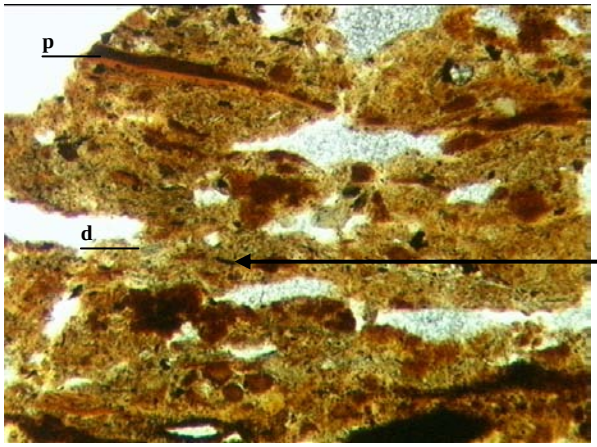



Figure 14. Sample 80, Context 844.4. Horizontally bedded plant matter (p) and dung (d).

250 µm

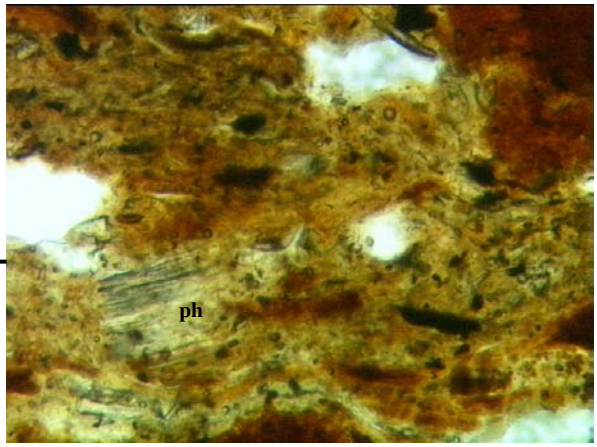



Figure 15. Close up of Context 844.4. Note the short, truncated aggregates of articulated phytoliths (ph), a common component of herbivore dung.

100 µm

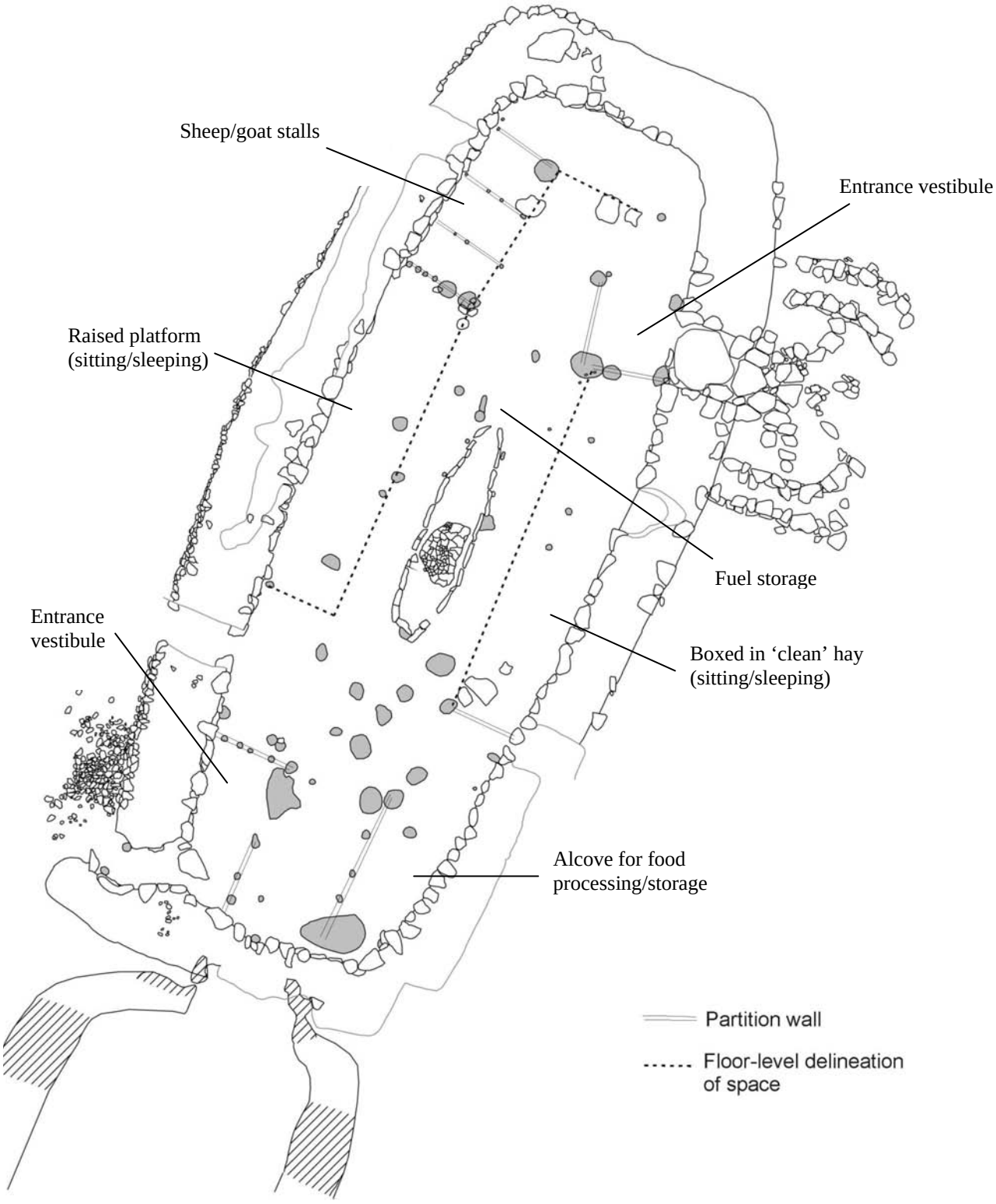


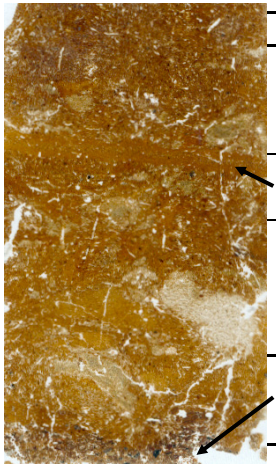

Figure 16. Interpretive plan of the house.

**Table A.1.1** AST01-67: Thin section description.

| Context and Microstratigraphic Unit | Structure | | Porosity | | | | | Groundmass | | | | | Biomin. | | Organic Matter | | | | Inclusions | | | | Pedofeatures | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Microstructure | Dominant Orientation/Distribution of Basic Components | Planar Voids | Simple Packing Voids | Compound Packing Voids | Vesicles | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10 µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Fungal Spores | Charcoal | Bone | Burnt Bone | Aggregates/Lenses of Tephra | Amorphous and Cryptocrystalline (sesquioxide nodules) | Excremental |
| 747.1 | Moderately developed ultrafine granular, with interaggregate channels | Random | ■ | | ■■■ | | ■■■ | Silt loam | 30:70 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | ■■ | + | | | | | ■■■■ | ■■■■■■■ | ■■ |
| 747.2 | Lenses of very fine silty clay: massive. Lenses of very fine sand and pseudosand: single grain. | Fine horizontal bedding of perfectly sorted mineral material. Strands of amorphous organic matter, phytoliths and other rod-shaped minerals, have a predominant horizontal orientation. | + | ■■■ | | ■■ | ■■ | Lenses of fine silty clay and very fine sand | Lenses of fine silty clay: 10:90 Lenses of very fine sand: 98:2 | Lenses of fine silty clay: Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | + | + | | | | | | ■■■■■■■■■ | |
| 747.3 | Weakly to moderately developed ultrafine granular, with interaggregate channels | Random | ■ | | ■■■ | | ■■■ | Silt loam | 30:70 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | ■■ | + | | | | | ■■■■■ | ■■■■■■■ | ■■ |
| n/a | Moderately to well developed crumb | Mineral: random Organic: predominantly horizontal | | | ■■■■■ | | ■■■ | Very organic sandy silt loam | 30:70 | Porphyric | Brown, orange brown, dotted | Undifferentiated | ■■ | | ■■■ | ■■■ | + | ■ | ■■■ | ■ | ■ | | ■■■■ | ■■■ |

Floor deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%

**Table A.1.2** AST01-67: Thin section interpretation.



1 cm

| Context | Summary of Important Features Observed in Thin Section | Interpretation |
|---|---|---|
| 747.1 | 27 mm+ thick; silt loam with a mixed, heterogeneous fabric, containing aggregates of white and green glass shards, and occasional amorphous organic matter; no anthropogenic inclusions; knife-edge lower boundary. | Reworked turf containing the LNL; heavily bioturbated; deposited during the collapse of turf roof and walls. |
| 747.2 | 4 mm thick; fine horizontal lenses of perfectly sorted silt and very fine sand, including pseudosand particles; horizontally oriented minerals and strands of amorphous organic matter; knife-edge lower boundary. | Waterlain silts and sands, formed by run-off carrying silt and sand from the collapsed turf roof pooling into a small depression and settling out *in situ*. |
| 747.3 | 55 mm thick; silt loam with a mixed, heterogeneous fabric, containing aggregates of white and green glass shards, occasional amorphous organic matter, and no anthropogenic inclusions; sharp, undulating lower boundary. | Reworked turf containing the LNL; heavily bioturbated; deposited when turf roof and wall material collapsed directly on top of the floor. |
| -- | 8 mm+ thick; organic silt loam with a loose, porous structure, containing an abundance of charcoal (up to 2 mm in size), burnt and unburnt bone (up to 300 µm in size), and amorphous organic matter. | Anthropogenic debris, mainly consisting of hearth residues, but also unburnt organic matter; heavily bioturbated; where original structure survives, it does not appear to have been compacted by trampling; material probably accumulated underneath a raised bench by being swept and/or kicked from the central floor area |

**Table A.2.1** AST01-68: Thin section description.

| Context and Microstratigraphic Unit | Structure | | Porosity | | | | Groundmass | | | | | Biomin. | | Organic Matter | | | | Inclusions | | | | | Pedofeatures | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Microstructure | Dominant Orientation/Distribution of Basic Components | Planar Voids | Simple Packing Voids | Compound Packing Voids | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10 µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Fungal Spores | Charcoal | Bone | Burnt Bone | Aggregates/Lenses of Tephra | Aggregates of Well-Humified Herbaceous Matter | Amorphous and Cryptocrystalline (sesquioxide nodules) | Excremental |
| 747 | Weakly to moderately developed ultrafine granular, with interaggregate channels | Random | ■ | | ■■■ | ■■■■ | Silt loam | 30:70 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | ■■ | + | + | + | | | ■■■■■■ | ■ | ■■■■■ | ■■ |
| 868 | Massive, with few channels | Horizontally bedded phytoliths and strands of amorphous organic matter | + | | ■ | ■■ | Organic silt loam | 30:70 | Porphyric | Brown, red brown, dotted | Undifferentiated | ■■■■■ | + | ■■ | ■■■■■■ | ■ | + | ■ | | | | | ■■ | |

Floor deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■ ■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%

**Table A.2.2** AST01-68: Thin section interpretation.

1 cm

| Context | Summary of Important Features Observed in Thin Section | Interpretation |
|---|---|---|
| 747 | 82 mm+ thick; silt loam with a mixed, heterogeneous fabric, containing lenses and aggregates of white and green glass shards, and occasional amorphous organic matter; very few anthropogenic inclusions – only two small pieces of charcoal (<2 mm) and one aggregate of well-humified plant matter (<13 mm) –all of which were found at the bottom this layer, just above the floor; knife-edge lower boundary. | Turf debris containing the LNL; deposited when turf roof and/or wall material collapsed directly on top of the floor; the aggregate of peat and the small charcoal fragments just above the floor may be a result of post-abandonment dumping prior to the collapse of the turf roof and walls. |
| 868 | 5 mm+ thick; highly compacted silt loam showing organic pigmentation, bedded with horizontal lenses of amorphous organic matter and articulated phytoliths; contains rare and very minute charcoal fragments (<100 µm). | Highly compacted floor deposit consisting almost entirely of herbaceous matter that had decomposed *in situ*, as well as small amounts of highly fragmented charcoal. |

**Table A.3.1** AST01-71: Thin section description.

| Context and Microstratigraphic Unit | Structure | | Porosity | | | | Groundmass | | | | | Biomin. | | Organic Matter | | | | Inclusions | | | | | Pedofeatures | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Microstructure | Dominant Orientation/Distribution of Basic Components | Planar Voids | Simple Packing Voids | Compound Packing Voids | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Fungal Spores | Charcoal | Bone | Burnt Bone | Aggregates/Lenses of Tephra | Aggregates of Phytoliths | Amorphous and Cryptocrystalline (sesquioxide nodules) | Amorphous and Cryptocrystalline (sesquioxide plant pseudomorphs) | Excremental |
| 858.1 | Moderately to strongly developed ultrafine granular, with many interaggregate channels | Random | | | ■■■ | ■■■■ | Silt loam | 30:70 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | ■■ | + | | | | | ■■■ | | ■■■■■ | + | ■■■■ |
| 858.2 | Weakly to moderately developed ultrafine granular, with interaggregate channels | Random | | | ■■ | ■■■ | Silt loam | 25:75 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | + | + | | | | | ■■■■ | | ■■■■■■ | ■ | ■■■■ |
| 864 | Moderately developed crumb structure, with interaggregate channels; localised weakly to moderately developed ultrafine granular with interaggregate channels at the bottom of the layer | Random | | | ■■■■ | ■■■■ | Silt loam | 30:70 | Porphyric | Brown, orange brown, dotted | Undifferentiated | ■■■■■■■ | + | ■■■ | ■■■■ | ■ | ■■■ | ■■ | | | ■■ | ■■■■ | ■■ | | ■■■■ |
| >910 | Very fine prismatic, with localised weakly developed ultra-fine granular | Random | ■■ | | | ■■■ | Silty clay loam | 20:80 | Porphyric | Orange brown, red brown, speckled | Mosaic speckled and weakly granostriated; partially masked by sesquioxides | ■ | + | ■ | | + | | | | | | | ■■■■■■■ | | ■■ |
| 910 | Single grain | Mineral: random Organic: horizontal | | ■■■ | | ■■■■ | Fine and very fine sand | 98:2 | Monic | n/a | n/a | | | ■ | ■■ | | | | | | | | | | ■ |
| <910 | Very fine prismatic, with localised weakly developed ultra-fine granular | Random | ■■■■ | | ■■ | ■■■ | Silt loam | 20:80 | Porphyric | Brown, red brown, speckled | Undifferentiated | ■ | + | ■ | ■ | + | | | | | | | ■■■■■ | | ■■ |

Floor deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■ ■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%

**Table A.3.2** AST01-71: Thin section interpretation.

1 cm

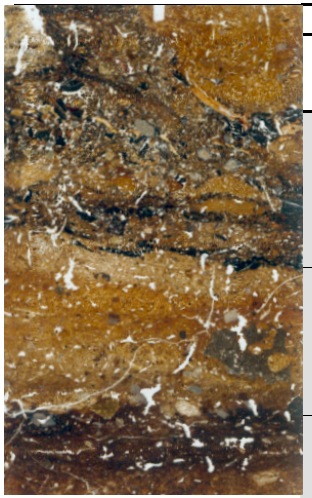
| Context | Summary of Important Features in Thin Section | Interpretation |
|---|---|---|
| 858.1 | 25 mm+ thick; very mixed, heavily bioturbated silt loam containing small aggregates of white and green glass shards, and randomly distributed amorphous organic matter and phytoliths; no anthropogenic inclusions; clear but irregular lower boundary. | Small turf fragments, aggregates of the LNL, and a reworked soil derived from turf collapse debris. |
| 858.2 | 15-24 mm thick; silt loam with an ultrafine granular microstructure, containing a lens of white and green glass shards; one quarter of this layer is composed of a large faunal channel infilled with anthropogenic material from the layer below (intrusive material excluded from quantification); sharp, undulating lower boundary. | Piece of turf containing the LNL; deposited by the collapse of turf roof or wall material falling directly on to the floor. |
| 864 | 30 mm thick; organic silt loam containing an abundance of fungal spores, phytoliths, and amorphous organic matter; 20-25% of the layer is composed of aggregates (< 5 mm) of phytoliths in the form of short, randomly oriented, articulated clusters; a few aggregates of the LNL are present towards the bottom of the layer; heavily bioturbated; very sharp, undulating lower boundary. | Floor layer dominated by small crumbs of herbivore dung, and dung reworked by soil fauna; at the bottom of the layer is a small patch of reworked turf; these are probably the residues of fuel stored on the northern edge of the fireplace. |
| >910 | 6 mm thick; very compact silty clay loam, with a very fine prismatic microstructure (squared peds <10 mm); some planar voids show evidence of being compacted/collapsed channels; no anthropogenic inclusions. | Natural land surface, compacted during the occupation of the house; lack of vegetation cover indicates that the upper layer of turf and grass was removed during the construction of the building. |
| 910 | 10 mm thick; tephra layer dominated by white and green glass shards, plagioclase and a black, opaque mineral. | *In situ* Landnám Tephra Layer (LNL). |
| ~913 | 5 mm+ thick; dark brown silt loam, containing minimal organic material; no anthropogenic inclusions, | Natural soil below the LNL; no human presence is detectable. |

**Table A.4.1** AST01-74: Thin section description.

| | Structure | | Porosity | | | | Groundmass | | | | | Biomin. | | Organic Matter | | | | Inclusions | | | | | | Pedofeatures | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Context | Microstructure | Dominant Orientation/Distribution of Basic Components | Planar Voids | Simple Packing Voids | Compound Packing Voids | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL); Colour and Aspect in OIL (if different from PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Fungal Spores | Charcoal | Bone | Burnt Bone | Nodules of Highly Oxidised Iron (bright red between XP; yellow orange and glittery under OIL) | Aggregates of Grey, Microcrystallitic Granules | Aggregates/Lenses of Tephra | Amorphous and Cryptocrystalline (sesquioxide nodules) | Excremental |
| 792 | Weakly to moderately developed ultrafine granular; interaggregate channel | Random | | | ■■ | ■■■■ | Silty clay loam | 20:80 | Porphyric | Orange brown, red brown, speckled | Undiff. | ■■ | ■ | ■■ | ■■ | ■ | ■ | ■■ | | | | | ■■■ | ■■■■■■ | ■ |
| 793/ 795 | Spongy | Horizontal lensing; tendency for elongated charcoal and organic matter to be horizontal | | | ■■ | ■■■■■ | Sandy silt loam | 50:50 | Porphyric | Pale brown, red brown, dotted | Undiff. | ■■ | + | ■■■ | ■■■■ | + | | ■■■■■ | ■■ | ■■ | ■ | ■ | | ■ | ■■ |
| 802 | Channel | Horizontal lensing; tendency for elongated bone and clusters of grey granules to be horizontal | ■ | | | ■■■■ | Silt loam | 5:95 | Porphyric | Pale brown, grey, red brown, speckled | Undiff.; localised micro-crystallitic | ■ | | ■ | | | | ■ | | ■■■ | ■■■■■■ | ■■■ | ■ | ■ | ■ |
| 831 | Weakly developed ultrafine granular; interaggregate channel | Horizontal lensing; tendency for elongated bone, clusters of grey granules and organic matter to be horizontal | ■■ | ■ | ■■ | ■■■■ | Fine sandy silt loam | 20:80 | Porphyric and enaulic | Dark brown, pale brown, grey, speckled; yellow orange and glittery (OIL) | Undiff.; localised micro-crystallitic | ■ | | ■ | | | | ■ | | ■■ | | ■■■■ | ■■ | ■ | ■ |

Hearth deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■ ■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%

**Table A.4.2** AST01-74: Thin section interpretation.



1 cm

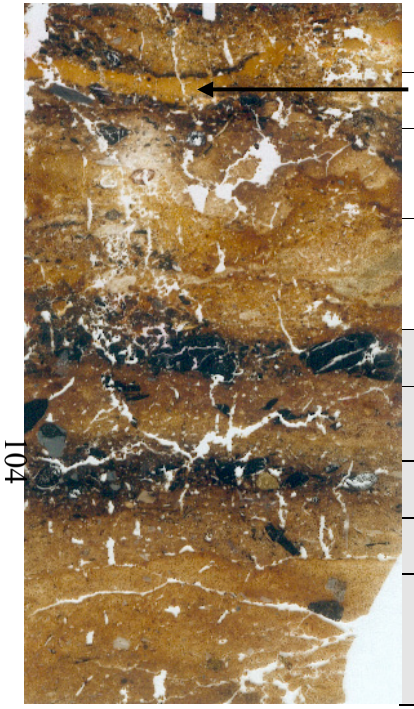
| Context | Summary of Important Features in Thin Section | Interpretation |
|---|---|---|
| 792 | 17 mm thick (present in one corner); silt loam with an ultrafine granular structure, containing aggregates of white and green glass shards, occasional phytoliths, and rare organic matter and charcoal; sharp lower boundary. | Turf containing aggregates of the LNL; deposited when turf roof and/or walls collapsed directly on top of the hearth; charcoal fragments reworked from the ash layer below by bioturbation. |
| 793/795 | 40 mm+ thick; poorly sorted, very heterogeneous fabric; mainly consists of sandy silt loam heavily mixed with charcoal, burnt and unburnt bone (heavily pitted), amorphous organic matter and unburnt aggregates of soil (silt loams closely resembling context 747 turf collapse (e.g. in AST01-68)); at the bottom of this layer are lenses of charcoal, nodules of highly oxidised iron and grey, microcrystallitic granules; sharp lower boundary. | Mixed lenses of ashes and soil; predominantly wood ash, but there are lenses of charcoal and mixed peat ash and wood ash at the bottom of the layer; deposited by dumping, probably during a clean-out of another part of the hearth; for interpretation of nodules of highly oxidised iron and grey granules, see context 802, below. |
| 802 | 24 mm thick; three lenses of fine silt, separated by clear boundaries, which are distinguished by variations in the nature of the fine mineral material and the proportions of inclusions; matrix is pale brown (PPL) and isotropic (XPL), and contains nodules of highly oxidised iron, and grey, microcrystallitic granules; contains an abundance of burnt bone (much of it in a lens of burnt fish bone at the lower boundary of the layer), grains of fine sand and coarse silt (c. 5%), and rare charcoal fragments; phytoliths, where identifiable, are deformed and indistinct; diffuse lower boundary. | Lenses of peat ash; accumulated *in situ* during the use of the hearth; sharp, horizontal boundaries between the lenses suggest that they were created during separate burning episodes; the pale brown, isotropic fine mineral matrix is probably composed of amorphous silica derived from melted phytoliths and diatoms, which are abundant in peat; the fact that most charcoal has been burnt off (threshold of 550ºC), and phytoliths have lost structure (threshold of c. 800ºC), indicates that high temperatures were achieved in this hearth; nodules of highly oxidised iron are derived from the dissolved iron that is normally abundant in peat bogs, which had been oxidised with the heat of the fire; grey, microcrystallitic granules are calcitic ashes derived from plant tissues heated to above 550ºC; the fine sand and coarse silt, including the tephra aggregates, is windblown material that had been present in the original peat fuel. |
| 831 | 18 mm+ thick; lenses of fine sandy silt, separated by clear boundaries, distinguished by variations in the nature of the fine mineral material and the proportions of inclusions; matrix is dark brown to pale brown fine mineral material, which is bright orange and glittery under OIL; contains an abundance of grey, microcrystallitic granules; silt and sand have been altered to brown (PPL), and exhibit pellicular alteration (<class 2); phytoliths deformed and indistinct. | Turf ash; accumulated *in situ* during the use of the hearth; the alteration of the fine mineral material, fine sand and silt (including tephra aggregates) to a dark brown colour in PPL and a bright orange, glittery colour under OIL is likely to be a result of oxidation in the heat of the fire; grey, microcrystallitic granules are calcitic ashes derived from plant tissues heated to above 550ºC. |

**Table A.5.1** AST01-75: Thin section description.

| Context and Microstratigraphic Unit | Structure | | Porosity | | | | | Groundmass | | | | | Biomin. | | Organic Matter | | | | Inclusions | | | | | | Pedofeatures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Microstructure | Dominant Orientation/Distribution of Basic Components | Planar Voids | Simple Packing Voids | Compound Packing Voids | Vesicles | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10 µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL); Colour and Aspect in OIL (if different from PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Fungal Spores | Charcoal | Bone | Burnt Bone | Nodules of Highly Oxidised Iron (bright red between XP; yellow orange and glittery under OIL) | Aggregates of Grey, Microcrystallitic Granules | Aggregates/Lenses of Tephra | Amorphous and Cryptocrystalline (sesquioxide nodules) | Amorph. and Crypt. (plant pseudomorphs) | Amorph. and Crypt. (hypo-coatings) | Excremental |
| 792.1 | Weakly to moderately developed ultrafine granular, with intraggregate channels; localised vughy | Horizontal lensing; tendency for elongated charcoal and organic matter to be horizontal | ■ | | ■■ | | ■■■■ | Sandy silt loam | 30:70 | Porphyric | Orange brown, red brown, brown; speckled to dotted; localised yellow orange and glittery under OIL | Undiff; localised grano-striated | ■■ | + | ■■ | ■■ | ■ | + | ■■■■ | + | ■ | ■ | + | ■ | ■■■■ | | | ■■ |
| 792.2 | Single grain; intergrain channel and localised vesicular | Horizontal bedding of very well sorted coarse silt and very fine sand and pseudosand | ■ | ■■■■ | | ■ | ■■■ | Very fine sand | 98:2 | Gefuric | Orange brown, speckled | Undiff. | ■■ | ■ | ■ | + | | | ■ | | | | | | ■■■■■ ■■■■ | | | ■■ |
| 792.3 | Complex: spongy, with localised ultrafine granular and localised channel | Horizontal lensing; elongated charcoal and amorphous organic matter: horizontal | ■■ | | ■ | | ■■■■ | Silt loam; localised organic silt loam | 5:95-20:80 | Porphyric | Pale brown, brown, orange brown, dotted | Undiff. | ■ | | ■■■ | ■ | | | ■■■■ | + | | ■■■ | ■■ | ■ | | ■ | | |
| 792.4 | Moderately developed ultrafine granular, with interaggregate channels | Mineral: random. Organic: horizontal | ■ | | ■■■ | | ■■■■ | Sandy silt loam | 25:75 | Porphyric | Orange brown, red brown, speckled | Undiff. | ■■■ | ■ | ■ | ■■ | + | + | ■ | | | | | ■■■■■■ | ■■■■■ | ■ | | ■■ |
| 795.1 | Spongy | Elongated charcoal and amorphous organic matter: horizontal | | | | | ■■■■■ | Very organic sandy silt loam | 25:75 | Porphyric | Brown, orange brown, dotted | Undiff. | ■ | + | ■■■ | ■■ | + | ■ | ■■■■■■■■■ | | ■ | ■■■ | ■ | | ■ | | | ■■ |
| 795.2 | Channel | Horizontal lensing; elongated charcoal and amorphous organic matter: horizontal | ■ | | | ■ | ■■■■ | Sandy silt loam | 25:75 | Porphyric | Pale brown, grey, red brown, speckled | Undiff.; localised micro-crystallitic | ■ | | + | + | | | ■■■ | + | ■ | ■■■■■■■ | ■■ | ■ | ■■ | | | ■ |
| 795.3 | Channel | Elongated charcoal and amorphous organic matter: horizontal | | | | ■ | ■■■■ | Very organic sandy silt loam | 25:75 | Porphyric | Brown, orange brown, dotted | Undiff. | ■ | + | ■■■■ | ■ | | | ■■■■■■ | | ■■■ | ■ | ■ | ■ | ■ | | | ■ |
| 795.4 | Channel | Horizontal lensing; elongated charcoal and clusters of grey granules: horizontal | | | | ■ | ■■■ | Silt loam | 5:95 | Porphyric | Pale brown, grey, red brown, speckled | Undiff.; localised micro-crystallitic | ■ | | + | + | | | ■■■ | + | ■■ | ■■■■■ | ■■■ | ■ | ■ | | + | ■ |
| 802 | Channel | Horizontal lensing; elongated bone and amorphous organic matter: horizontal | ■■ | | | ■ | ■■■■ | Silt loam | 5:95 | Porphyric | Pale brown, red brown, grey, speckled | Undiff.; localised micro-crystallitic | ■ | | ■ | | | | ■ | | ■■■ | ■■■■■■ | ■■ | | ■ | | ■ | ■ |

Hearth deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■ ■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%

**Table A.5.2** AST01-75: Thin section interpretation.



1 cm

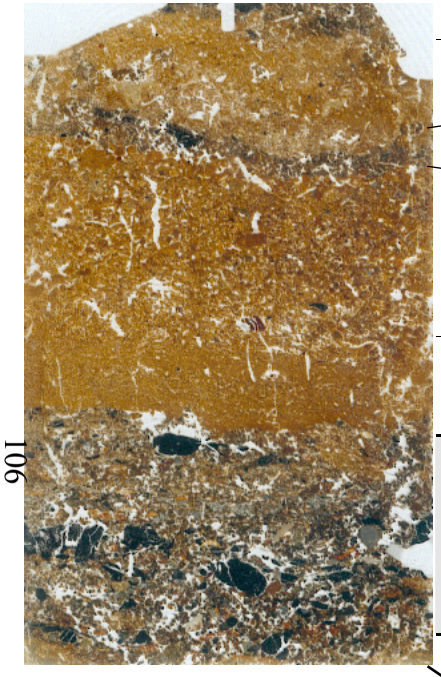
| Context | Summary of Important Features in Thin Section | Interpretation |
|---|---|---|
| 792.1 | 10 mm+ thick; very heterogeneous fabric; silt loam with an ultrafine granular structure (closely resembling context 747 turf collapse), containing significant quantities of charcoal, occasional fragments of burnt bone, and rare fragments of unburnt bone; contains lenses with higher frequencies of charcoal, amorphous organic matter and highly oxidised iron nodules; very sharp, undulating lower boundary. | Mixed turf collapse and dumped ash. |
| 792.2 | 3 mm thick; lens of very well sorted very fine sand and coarse silt in a fining-up sequence; includes pseudosand particles consisting of relic (ie, transported) iron nodules; the single grain microstructure is perforated by both channels and vesicles; very sharp, undulating lower boundary. | Waterlain deposit; formed when slow-moving water picked up silt and very fine sand from the exposed turf collapse and carried them into a small depression, where they settled out *in situ*. |
| 792.3 | 7-20 mm; very mixed, heterogeneous layer, consisting of mixed soil and charcoal (c. 30%, mainly in a lens at the top of the layer), mixed ashes, charcoal and amorphous organic matter (c. 30%, mainly in a lens in the middle of the layer), and peat ash (c. 30%, mainly in a lens at the bottom of the layer); contains occasional burnt bones; very sharp, undulating lower boundary | Dumped deposit within turf collapse. |
| 792.4 | 13-20 mm; sandy silt loam with an ultrafine granular structure, containing abundant aggregates of white and green glass shards, occasional phytoliths, and occasional amorphous organic matter and rare charcoal fragments; very sharp, undulating lower boundary. | Turf containing aggregates of the LNL; deposited when turf roof and/or walls collapsed directly on top of the hearth; charcoal fragments reworked from the ash layer below by bioturbation. |
| 795.1 | 5 mm; lens of silt loam containing an abundance of large charcoal fragments (up to 10 mm), occasional amorphous organic matter, occasional nodules of highly oxidised iron and aggregates of grey, microcrystallitic granules, and rare bone fragments; very sharp lower boundary. | Lens of wood ash, mixed through bioturbation with some peat ash from the lens below; appears to have accumulated *in situ* during the use of the hearth; contains some charred seeds. |
| 795.2 | 10 mm; lens of sandy silt loam; the fine matrix is pale brown (PPL) and isotropic (XPL), and contains abundant nodules of highly oxidised iron, and grey, microcrystallitic granules; contains occasional charcoal fragments and rare burnt bone; grains of fine sand and coarse silt exhibit alteration by burning; phytoliths, where identifiable, are deformed and indistinct; clear, undulating lower boundary. | Peat ash; accumulated *in situ* during the use of the hearth. |
| 795.3 | 2-10 mm; lens of silt loam containing an abundance of large charcoal fragments (up to 7 mm), occasional amorphous organic matter, occasional burnt bone, rare nodules of highly oxidised iron and aggregates of grey, microcrystallitic granules; diffuse lower boundary. | Mixed wood ash and peat ash; accumulated *in situ* during the use of the hearth; contains some charred seeds, including one large enough to be a barley grain. |
| 795.4 | 7 mm; lens of silt loam; the fine matrix is pale brown (PPL) and isotropic (XPL), and contains abundant nodules of highly oxidised iron, and grey, microcrystallitic granules; contains occasional burnt bone and charcoal fragments; phytoliths, where identifiable, are deformed and indistinct; knife-edge lower boundary. | Peat ash mixed with some wood ash; accumulated *in situ* during the use of the hearth; knife-edge boundary probably the result of the truncation of 802 during a cleaning-out episode. |
| 802 | 21 mm+; the knife-edge upper boundary is accentuated by compaction and iron panning at the top of context 802; silt; the fine matrix is pale brown (PPL) and isotropic (XPL), and contains abundant nodules of highly oxidised iron, and grey, microcrystallitic granules; contains occasional burnt bone, grains of fine sand and coarse silt (c. 5%), and rare charcoal fragments; phytoliths, where identifiable, are deformed and indistinct. | Peat ash; accumulated *in situ* during the use of the hearth. |

**Table A.6.1** AST01-79: Thin section description.

| Context and Microstratigraphic Unit | Structure | | Porosity | | | | Groundmass | | | | | Biomin. | | Organic Matter | | | | | Inclusions | | | | | | | Pedofeatures | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Microstructure | Dominant Orientation/Distribution of Basic Components | Simple Packing Voids | Compound Packing Voids | Vesicles | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Tissue Fragments (light brown to light reddish brown) | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Fungal Spores | Charcoal | Bone | Burnt Bone | Aggregates of Reddened Fine Mineral Material | Aggregates of Grey, Microcrystallitic Granules | Aggregates of Well-Humified Herbaceous Matter | Aggregates/Lenses of Tephra | Amorphous and Cryptocrystalline (sesquioxide nodules) | Excremental |
| 747.1 | Spongy; localised crumb | Mineral: random Organic: horizontal | | ■ | | ■■■■■ | Very organic silt loam | 70:30 | Porphyric | Brown, orange brown, dotted | Undiff. | ■ | | | ■■■■ | ■■■■ | + | ■ | ■■■■ | | ■ | ■ | | ■■■ | | ■■ | ■■■ |
| 747.2 | Weakly to moderately developed ultrafine granular; interaggregate channels | Random | | ■■■ | | ■■■■ | Silt loam | 25:75 | Porphyric | Orange brown, red brown, speckled | Undiff. | ■■ | + | | ■ | ■■ | + | + | ■ | | | | | | ■■■■ | ■■■■■■ | ■ |
| 747.3 | Spongy; localised crumb | Mineral: random Organic: horizontal | | ■ | | ■■■■■ | Very organic silt loam | 70:30 | Porphyric | Brown, orange brown, dotted | Undiff. | ■ | + | | ■■■■ | ■■■ | + | + | ■■■ | | | ■■ | | ■■■ | | ■■ | ■■■ |
| 747.4 | Moderately to strongly developed ultrafine granular; interaggregate channels | Random | | | | | Mixed silt loam and sandy silt loam | 25:75 | Porphyric | Orange brown, red brown, speckled | Undiff. | ■■ | + | | ■ | ■ | + | | ■ | | | | | | | ■■■■■■■ | |
| 747.5 | Lenses of very fine silt and clay: massive. Lenses of very fine sand and pseudosand: single grain | Horizontal bedding of very well sorted silt and sand. Strands of amorphous organic matter, phytoliths and other rod-shaped minerals are commonly horizontally oriented. | ■■■■ | | ■■ | ■■■ | Lenses of fine silty clay and very fine sand | Silty clay lens: 10:90. Very fine sand lenses: 98:2 | Lens of fine silty clay: porphyric; lenses of sand: gefuric | Orange brown, red brown, speckled | Undiff. | ■ | + | | ■ | + | + | | | | | | | | | ■■■■■■■■■ | ■ |
| 851 | Crumb; localised spongy in upper 10 mm | Mineral: random. Organic: horizontal, with localised random orientation. Lens of very coarse sand/fine gravel in middle of layer. | | ■■■■■ | | ■■■ | Very organic sandy silt loam | 90:10 | Porphyric | Brown, orange brown, dotted | Undiff. | ■■ | | | ■■■■ | ■■■ | + | | ■■■■■ | ■ | ■■ | ■ | + | | ■ | ■ | ■■■ |
| 910 | Single grain | Mineral: random. Organic: horizontal and subhorizontal | ■■ | | | ■■■■ | Very fine sand | 98:2 | Monic | n/a | n/a | + | | ■■ | | ■■■ | + | | | | | | | | | | |

Floor deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■ ■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%

**Table A.6.2** AST01-79: Thin section interpretation.



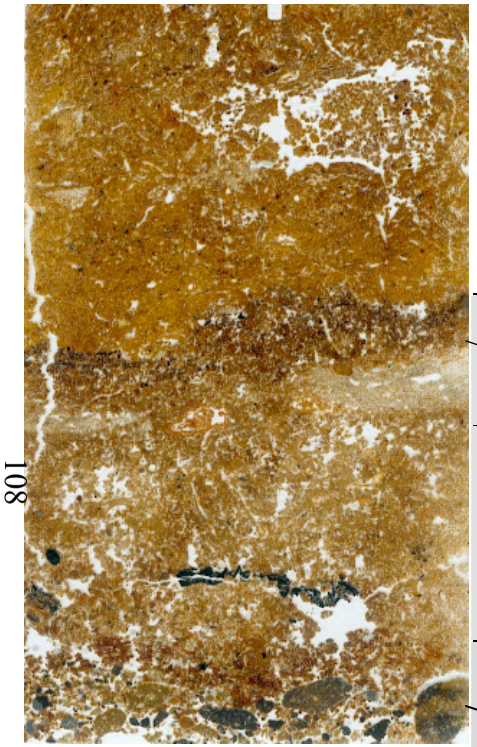

| Context | Summary of Important Features Observed in Thin Section | Interpretation |
|---|---|---|
| 747.1 | 5 mm + thick; silt loam containing an abundance of charcoal fragments and amorphous organic matter, much of it horizontally bedded, and the rare fragment of burnt bone. | Lens of anthropogenic debris within the turf collapse. |
| 747.2 | 15 mm thick; silt loam with a mixed, heterogeneous fabric, containing aggregates of white and green glass shards, occasional amorphous organic matter, and the rare charcoal fragment. | Reworked turf containing the LNL; heavily bioturbated. |
| 747.3 | 3 mm thick; silt loam containing an abundance of charcoal fragments and amorphous organic matter, much of it horizontally bedded, and the rare fragment of burnt bone. Very sharp, undulating boundaries with the layers above and below. | Thin lens of anthropogenic debris within the turf collapse. |
| 747.4 | 22 mm thick; very mixed, heterogeneous layer, containing subrounded aggregates of different soil fabrics (differing in particle size, mineralogy and the nature of the fine material), occasional fragments of organic matter, and the rare charcoal fragment. | Heavily bioturbated turf debris, with occasional aggregates of waterlain silt. |
| 747.5 | 11 mm thick; fine horizontal lenses of very well sorted fine silt and very fine sand, including pseudosand particles consisting of relic (ie, transported) iron nodules; minerals and strands of amorphous organic matter are horizontally oriented; very sharp, gently undulating boundary with the layer below. | Waterlain silts and sands, formed by run-off from the collapsed turf roof pooling into a small depression and settling out in *situ*. |
| 851 | 28 mm thick; very mixed, heterogeneous layer, containing an abundance of charcoal (up to 7 mm in length), burnt and unburnt bone (up to 3 mm in length), amorphous organic matter, and ash (aggregates of rubified fine mineral material and grey, microcrystallitic granules) and aggregates of organic silt loam; there is a lens of very coarse sand/fine gravel in the middle of the layer; loose, porous fabric; very sharp, undulating boundary with the layer below. | Anthropogenic debris, mainly consisting of hearth residues, but also unburnt organic matter. It appears to be untrampled, and therefore probably accumulated underneath a raised bench on the west side of the structure. |
| 910 | 3 mm + thick; tephra layer dominated by white and green glass shards, plagioclase crystals, and opaque black minerals; the upper 1 mm contains abundant organic matter in the form of partially decomposed, partially birefringent root tissues and light reddish brown amorphous organic matter. | Top of the *in situ* Landnám Tephra Layer (LNL), containing some partially preserved root tissues. The lack of soil between the LNL and the anthropogenic layer above would suggest that the vegetation cover and associated soils were removed during house construction. |

**Table A.7.1** AST01-80: Thin section description.

| Context and Microstratigraphic Unit | Structure | | Porosity | | | | Groundmass | | | | | Biomin. | | Organic Matter | | | | | Inclusions | | | | Pedofeatures | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Microstructure | Dominant Orientation/Distribution of Basic Components | Planar Voids | Compound Packing Voids | Complex Packing Voids | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Fungal Spores | Fungal Hyphae | Charcoal | Bone | Burnt Bone | Aggregates/Lenses of Tephra | Amorphous and cryptocrystalline (sesquioxide nodules) | Amorphous and Cryptocrystalline (sesquioxide plant pseudomorphs) | Excremental |
| 747 | Weakly to moderately developed ultrafine granular, with interaggregate channels | Random | | ■■ | | ■■■ | Silt loam | 25:75 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | ■ | + | | | | | | ■■ | ■■■■■ | | ■■■■ |
| 844.1 | Moderately developed crumb structure; localised spongy structure | Random; where not disturbed, some horizontal bedding of amorphous organic matter | | ■■■ | | ■■■■■ | Organic silt loam | 30:70 | Porphyric | Brown, red brown, dotted | Undifferentiated | ■■■ | + | ■■■■■ | ■■■ | ■ | | | | | | | ■■■ | | ■■ |
| 844.2 | Weakly developed ultrafine granular, with interaggregate channels | Mineral: random; organic: horizontal | | ■■ | | ■■■ | Silt loam | 25:75 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | ■■■ | + | | + | + | | | ■■■■■■■ | ■■■■■ | | ■ |
| 844.3 | Moderately developed crumb | Random; localised preservation of horizontally bedded phytoliths and amorphous organic matter | | ■■■ | | ■■■■ | Silty clay | 20:80 | Porphyric | Very pale brown, orange brown, dotted | Undifferentiated | ■■■■■ | + | ■■ | ■■■■ | ■ | ■■ | | ■■ | ■■ | | | ■■ | | ■■■ |
| 844.4 | Weakly to moderately developed platy, with moderately to well developed crumb where disturbed by bioturbation | Horizontally bedded phytoliths and amorphous organic matter; localised random orientation where disturbed by bioturbation | ■■ | ■■ | | ■■■■ | Organic silty clay | 20:80 | Porphyric | Brown, red brown, dotted | Undifferentiated | ■■■■■ | + | ■■■■■ | ■■■■ | ■ | ■ | | ■ | | | | ■■ | | ■■ |
| n/a | Intergrain microaggregate | Random | | | ■■■■■■■ | | Gravel | 95:5 | Enaulic | Very pale brown, red brown, dotted | Undifferentiated | ■ | + | ■ | ■ | + | + | | + | | | | ■ | | ■■ |

Floor deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■ ■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%

**Table A.7.2** AST01-80: Thin section interpretation.



1 cm

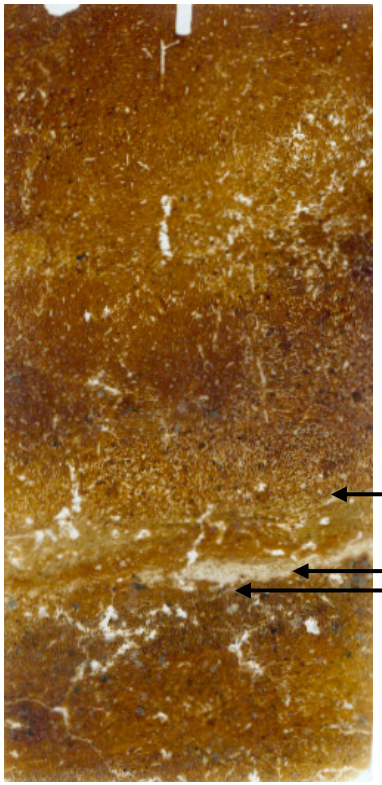
| Context | Summary of Important Features Observed in Thin Section | Interpretation |
|---|---|---|
| 747 | 43 mm + thick; silt loam with an ultrafine granular structure, the upper 20 mm of which has a more mixed fabric, larger faunal channels, and an abundance of faunal excrement, particularly in one very large channel (10 mm wide). Contains aggregates of white and green glass shards, occasional phytoliths, minimal organic matter, and no anthropogenic inclusions; sharp, undulating boundary with the layer below. | Turf and reworked, heavily bioturbated soil containing the LNL. |
| 844.1 | 7 mm thick; lens of organic silt loam stained dark brown by organic pigment; contains an abundance of amorphous organic matter (30% of which exhibits first order orange and red interference colours); a few short, truncated aggregates of articulated phytoliths; the original horizontal orientation of organic matter is preserved in only a few places; diffuse lower boundary. | Lens of mixed soil and herbivore dung; interference colours in plant tissue are normally associated with preserved cellulose, and the concentration of cellulose-rich tissue in this layer is unusually high; very heavily bioturbated. |
| 844.2 | 8 mm thick; silt loam with an ultrafine granular structure; two large aggregates of white and green glass shards make up 40-50% of this thin layer; diffuse lower boundary. | Turf fragments containing lenses of the LNL. |
| 844.3 | 22 mm thick; organic silty clay; the very pale brown colloidal material making up the groundmass has diffuse boundaries with the light brown amorphous organic matter, and may itself be amorphous organic matter; 20-30% of the amorphous organic matter exhibits first order interference colours (pale yellow and yellowish orange in the case of light brown amorphous organic matter; orange and red in the case of dark brown amorphous organic matter); contains an abundance of phytoliths, c. 10% of which are in the form of short, articulated aggregates; contains 2-5% bone, which exhibits weathering features in the form of cracks (often filled with dark brown amorphous organic matter) and class 0-1 pellicular alteration (ff. Bullock et al. 1985: 61); the bone does not autofluoresce under blue light, as it does in other contexts; contains 2-5% charcoal (and one charred seed), up to 5 mm in size, most of which is concentrated in a thin lens; contains 2-5% fungal spores; clear lower boundary. | Layer of herbivore dung; bone fragments are embedded in the organic, phytolith-rich sediment, and therefore appear to have been a component of the dung; the loss of autofluorescence of the bone and the groundmass indicates the layer has been dephosphatised; heavily bioturbated; in a few localised, undisturbed areas, horizontal bedding of organic matter is visible, and may indicate that the layer had originally been trampled. |
| 844.4 | 3 mm thick; silty clay, very similar to 844.3 (above), but with brown organic pigmentation and a higher concentration of horizontally bedded dark brown amorphous organic matter; 20-30% of the amorphous organic matter exhibits first order interference colours (pale yellow and yellowish orange in the case of light brown amorphous organic matter; orange and red in the case of dark brown amorphous organic matter); contains rare small charcoal fragments (up to 700 µm); clear, undulating lower boundary. | Herbivore dung and plant matter, horizontally bedded, and compacted by trampling. |
| -- | 8 mm + thick; subrounded gravel and coarse sand; fine soil material similar to 844.4 has been reworked down into this layer, and is present in the form of faunal excrements. | Gravel and sand beach deposit, representing the base geology of the site; the absence of surface soils or vegetation indicate that they were removed prior to the occupation of the house. |

**Table A.8.1** AST01-92: Thin section description.

| Context and Microstratigraphic Unit | Structure | | Porosity | | | | Groundmass | | | | | Biominerals | | Organic Matter | | | Inclusions | | | | Pedofeatures | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Microstructure | Dominant Orientation/Distribution of Basic Components | Planar Voids | Simple Packing Voids | Compound Packing Voids | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Charcoal | Bone | Burnt Bone | Aggregates of Tephra | Amorphous and cryptocrystalline (sesquioxide nodules) | Amorphous and Cryptocrystalline (sesquioxide plant pseudomorphs) | Excremental |
| Wall | Weakly to moderately developed ultrafine granular, with interaggregate channels | Random | + | | ■■■ | ■■■ | Silty clay loam | 25:75 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■■ | + | ■ | ■ | | | | | | ■■■■■■ | | ■■ |
| >910 | Strongly developed ultrafine granular, with interaggregate channels | Random | + | | ■■■■ | ■■■ | Silty clay loam | 20:80 | Porphyric | Orange brown, red brown, speckled | Mosaic speckled and weakly granostriated; partially masked by sesquioxides. | ■ | + | ■ | ■ | | | | | | ■■■■■■■ | | ■■ |
| 910.1 | Platy | Horizontal | ■■ | | | ■■■ | Silt loam | 50:50 | Porphyric | Light brown, red brown, speckled | Undifferentiated | ■■■■■■■ | + | ■■■ | ■■■ | + | | | | | ■■ | | ■ |
| 910.2 | Single grain | Random | | ■■ | | ■■ | Very fine sand | 98:2 | Monic | n/a | n/a | | | + | ■ | | | | | | ■■■ | | + |
| 910.3 | Weakly developed ultrafine granular | Random | ■ | | ■■ | ■■■ | Silty clay loam | 20:80 | Porphyric | Orange brown, red brown, speckled | Undifferentiated | ■ | + | + | ■ | | | | | | ■■■■■■ | | + |
| 910.4 | Single grain | Random | | ■■■ | | ■■ | Fine sand | 98:2 | Monic | n/a | n/a | | | | ■ | | | | | | ■ | | |
| 913.1 | Weakly developed ultrafine granular | Random | ■ | | ■■ | ■■■ | Silty clay loam | 30:70 | Porphyric | Yellow brown, red brown, speckled | Weakly granostriated; partially masked by sesquioxides | ■ | + | + | + | + | | | | | ■■■■■■ | ■ | ■ |
| 913.2 | Moderately developed subangular blocky, with strongly developed ultrafine granular within blocky peds | Random | ■■ | | ■■■ | ■■■ | Fine sandy silt loam | 80:20 | Porphyric | Orange brown, red brown, speckled | Weakly granostriated; partially masked by sesquioxides | ■ | | + | | | | | | | ■■■■■■ | | ■ |
| 913.3 | Moderately developed subangular blocky, with weakly to moderately developed ultrafine granular within blocky peds | Random | ■■ | | ■■ | ■■■ | Silty clay loam | 20:80 | Porphyric | Orange brown, red brown, speckled | Weakly granostriated; partially masked by sesquioxides | ■ | | + | + | | | | | | ■■■■■■■ | + | ■ |
| 913.4 | Moderately developed subangular blocky, with strongly developed ultrafine granular within blocky peds. | Random | ■■ | | ■■■ | ■■■ | Fine sandy silt loam | 80:20 | Porphyric | Yellow brown, red brown, speckled | Mosaic speckled and weakly granostriated; partially masked by sesquioxides | ■ | + | | + | | | | | | ■■■■■■ | | ■ |

Floor deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■ ■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%

**Table A.8.2** AST01-92: Thin section interpretation.



1 cm

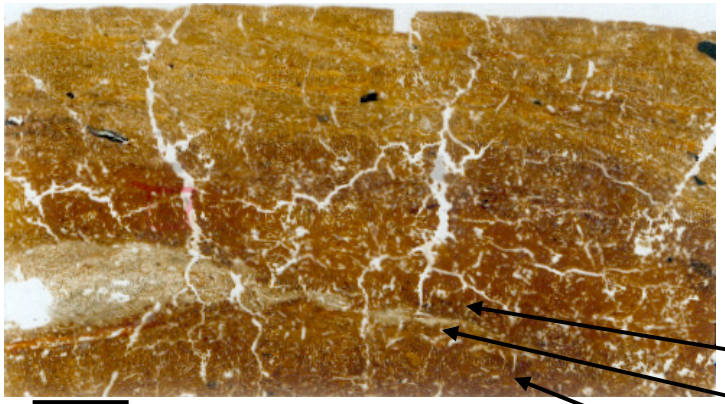
| Context | Summary of Important Features in Thin Section | Interpretation |
|---|---|---|
| Wall | 50 mm + thick; silty clay loam containing minimal organic matter and no anthropogenic inclusions, but with a greater abundance of phytoliths than the other soil layers examined in this thin section. | Turf. |
| >910 | 10-20 mm thick; silty clay loam with a porous, heavily bioturbated ultrafine granular structure, containing minimal organic matter; no anthropogenic inclusions; clear, but very undulating boundary with the turf wall above. | Soil surface prior to the construction of the turf wall. |
| 910.1 | 1 mm thick; horizontally bedded phytoliths (mainly rod-shaped). | Vegetation cover that died after the deposition of the LNL. |
| 910.2 | 3 mm thick; tephra layer with green glass shards, plagioclase, opaque black minerals. | Upper part of the *in situ* Landnám Tephra Layer (LNL). |
| 910.3 | 2 mm thick; silty clay lens, minimal organic material; no anthropogenic inclusions. | Fine silt accumulation in the LNL sequence. |
| 910.4 | 1-3 mm thick; tephra layer dominated by white and green glass shards. | Lower part of the *in situ* Landnám Tephra Layer (LNL). |
| 913.1 | 3 mm, 5 mm, 12 mm, and 4 mm + thick respectively; mixed, poorly sorted, heavily bioturbated, silty soils, containing lenses of windblown sand and minimal organic matter; they have a weakly granostriated birefringence fabric that is largely a result of the *in situ* weathering of sand grains. Sesquioxide nodules (predominantly iron, but also some manganese) are common throughout. | Pre-LNL soils; no human presence is detectable. |
| 913.2 | | |
| 913.3 | | |
| 913.4 | | |

**Table A.9.1** AST01-94: Thin section description.

| Context and Microstratigraphic Unit | Structure | | Porosity | | | | | Groundmass | | | | | Biomin. | | Organic Matter | | | | Inclusions | | | | | Pedofeatures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Microstructure | Dominant Orientation/Distribution of Basic Components | Planar Voids | Simple Packing Voids | Compound Packing Voids | Vesicles | Channels and Vughs | Texture Classification | Coarse:Fine Ratio (10µm) | Coarse/Fine Related Distribution | Nature of Fine Mineral Material (PPL) | Birefringence Fabric (XPL) | Phytoliths | Diatoms | Amorphous (dark brown to black) | Amorphous (light brown to light reddish brown) | Fungal Sclerotia | Fungal Spores | Charcoal | Bone | Burnt Bone | Nodules of Highly Oxidised Iron (bright red between XP; yellow orange and glittery under OIL) | Aggregates of Grey, Microcrystallitic Granules | Amorphous and Cryptocrystalline (sesquioxide nodules) | Amorphous and Cryptocrystalline (sesquioxide plant pseudomorphs) | Silty Clay Crusts/Intercalations | Excremental |
| 763.1 | Moderately developed subangular blocky; intraggregate channel | Horizontal bedding of amorphous organic matter, silt loam lenses and silt intercalations | ■■ | | | | ■■■ | Silt loam | 25:75 | Porphyric | Pale brown, orange brown, speckled | Undiff. | ■■■ | + | ■■ | ■■■■ | | + | ■ | | | ■ | + | ■ | | ■■ | ■ |
| 763.2 | Moderately developed subangular blocky; interaggregate channel | Random | ■ | | | | ■■ | Silt loam | 30:70 | Porphyric | Pale grey brown, pale brown | Undiff. | ■ | + | ■ | ■■ | | ■ | ■■■■■ | ■ | ■ | ■■■■■ | ■■■ | ■ | | | ■ |
| 763.3 | Moderately developed subangular blocky; intraggregate complex structure: spongy, localised platy, localised alveolar* | Horizontal bedding of amorphous organic matter, silt loam lenses and silt intercalations | ■■ | | | + | ■■■■ | Silt loam | 25:75 | Porphyric | Pale brown, yellow brown, orange brown, speckled | Undiff. | ■■■ | + | ■■ | ■■■■ | ■ | ■ | ■ | ■ | ■ | + | + | ■ | ■ | ■■ | ■ |
| 763.4 | Moderately developed subangular blocky; intraggregate complex structure: channel, localised spongy, localised platy, localised alveolar* | Horizontal bedding of amorphous organic matter, silt loam lenses and silt intercalations | ■■ | | | + | ■■■■ | Organic silt loam | 25:75 | Porphyric | Pale brown, brown, red brown, dotted | Undiff. | ■■■ | + | ■■■ | ■■■ | ■ | ■ | ■■ | ■ | + | ■ | + | ■ | ■ | ■■■ | ■■ |
| 824. | Moderately developed subangular blocky; intraggregate structure: channel and vughy | Fine horizontal bedding of well sorted silty clay; rod-shaped minerals and organic matter are horizontally oriented | ■■■ | | | ■ | ■■■■ | Silt | 5:95 | Porphyric | Orange brown, speckled | Undiff. | ■ | + | ■ | ■ | | + | ■ | + | | | | ■■■ | | n/a | ■■ |
| >910 | Moderately developed subangular blocky; intraggregate complex structure: ultrafine granular and channel | Mineral: random; organic: horizontal | ■■ | | ■ | | ■■■■ | Silt loam | 30:70 | Porphyric | Orange brown, red brown, dotted | Undiff. | ■ | + | ■ | ■■ | ■ | | | | | | | ■■■■■ | + | | ■ |
| 910 | Moderately developed subangular blocky; intraggregate complex structure: channel and localised single grain | Mineral: random; organic: horizontal except where disturbed | ■■ | ■■ | | | ■■■■ | Fine sandy silt loam; localised fine sand | 90:10 | Porphyric; localised monic and enaulic | Brown, dotted | Undiff. | + | | ■ | ■■ | | | | | | | | | ■■ | | |
| 913 | Moderately developed subangular blocky; interaggregate complex structure: ultrafine granular and channel | Mineral: random; organic: horizontal | ■■ | | ■■■ | | ■■■■ | Silt loam | 40:60 | Porphyric | Orange brown, red brown, speckled | Undiff. | ■ | + | ■ | ■■ | | | | | | | | ■■■■■ | ■■ | | ■ |

Floor deposit; + present in trace amounts, ■ <2%, ■■ 2-5%, ■■■ 5-10%, ■■■■ 10-20%, ■■■ ■■ 20-30%, ■■■■■■ 30-40%, ■■■■■■■ 40-50%, ■■■■■■■■ 50-60%, ■■■■■■■■■ 60-70%
* cf. FitzPatrick 1993

**Table A.9.2** AST01-94: Thin section interpretation.




| Context | Summary of Important Features in Thin Section | Interpretation |
|---|---|---|
| 763.1 | 2 mm + thick; same as 763.3, below; clear to knife-edge lower boundary. | Same as 763.3, below. |
| 763.2 | 1 mm thick; heterogeneous silt loam, containing an abundance of highly oxidised iron, microcrystallitic aggregates, and charcoal; contains rare bone, burnt bone and amorphous organic matter; clear lower boundary. | Mixed wood ash and peat ash; compacted and possibly trampled. |
| 763.3 | 15 mm thick; multiple fine lenses (c. 1 mm thick) of: light brown amorphous organic matter, often associated with phytoliths, and exhibiting first order interference colours; silty clay, identical to 824, below; and heterogeneous silt loams, some of which contain abundant fine charcoal; contains rare bone and burnt bone; clear lower boundary. | Floor layer, compacted by trampling, containing multiple layers of waterlain silty clay, plant matter, and soils; there must have been a slight depression in this entrance that permitted mud to settle there during wet periods. |
| 763.4 | 8 mm thick; organic silt loam containing occasional phytoliths, amorphous organic matter, and charcoal; contains rare bone; some horizontal bedding is visible; very sharp lower boundary. | Floor layer, containing organic soils and anthropogenic inclusions deposited by trampling; heavily bioturbated. |
| 824 | 10 mm thick; multiple fine lenses of very well sorted to perfectly sorted silt, in fining-up sequences, separated by horizontal discontinuities; knife-edge lower boundary, except where disturbed by bioturbation. | Waterlain deposit, which has reworked a soil or floor deposit containing a bone fragment, the natural soil above the LNL, and the LNL itself |
| >910 | 1-2 mm thick; silt containing rare amorphous organic matter and rare charcoal fragments; clear lower boundary. | Natural surface soil prior to the occupation of the house, truncated and reworked by the waterlain deposit. |
| 910 | 1-10 mm thick; tephra layer dominated by white and green glass shards, plagioclase and opaque black minerals, which has been partially truncated and disturbed; clear lower boundary. | *In situ* Landnám Tephra Layer (LNL), partially reworked and truncated by trampling within the entrance of the house and by the waterlain deposit. |
| 913 | 10 mm + thick; silt loam with an ultrafine granular structure; contains minimal organic matter and no anthropogenic inclusions. | Pre-LNL soils; no human presence is detectable. |

**Table A.10** Chemistry data table.

| Context | Sample | Loss on Ignition (%) | Magnetic Susceptiblity ($x10^{-8}$ $m^3$ $kg^{-1}$) | EC (µS/cm) | pH | Ca (%) | Fe (%) | K (%) | Mg (%) | Mn (ppm) | Na (%) | P (ppm) | S (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 795 | 62.5 | 10.6 | 81.5 | 157 | 7.8 | 7.02 | 5.21 | 0.73 | 3.59 | 3700 | 0.5 | 26300 | 0.05 |
| 795 | 84.4 | 16.4 | 1337 | 110 | 8.1 | 6.39 | 4.33 | 0.31 | 2.53 | 3140 | 0.38 | 22520 | 0.05 |
| 844 | 88.1 | 13.7 | 153.4 | 160 | 7.6 | 2.26 | 6.47 | 0.09 | 1.05 | 2020 | 0.5 | 2800 | 0.09 |
| 844 | 88.2 | 17.8 | 150 | 183 | 7.8 | 2.09 | 4.64 | 0.1 | 0.74 | 1765 | 0.36 | 10500 | 0.12 |
| 844 | 88.3 | 16.5 | 138.2 | 167 | 7.5 | 1.62 | 5.91 | 0.08 | 0.77 | 1690 | 0.35 | 2840 | 0.11 |
| 844 | 88.4 | 19.5 | 107.3 | 191 | 7.5 | 1.37 | 5.52 | 0.08 | 0.59 | 2060 | 0.38 | 3710 | 0.11 |
| 844 | 88.5 | 17.2 | 134.7 | 169 | 7.3 | 1.77 | 5.31 | 0.09 | 0.72 | 1345 | 0.36 | 6020 | 0.11 |
| 844 | 88.6 | 17.2 | 161.6 | 195 | 6 | 1.19 | 6.67 | 0.05 | 0.6 | 1295 | 0.26 | 1220 | 0.14 |
| 844 | 88.7 | 19.8 | 107.4 | 209 | 6.7 | 0.88 | 3.11 | 0.06 | 0.29 | 1370 | 0.19 | 3250 | 0.12 |
| 844 | 88.8 | 18.2 | 173.1 | 160 | 7 | 1.09 | 6.66 | 0.04 | 0.4 | 1370 | 0.17 | 1260 | 0.1 |
| 844 | 88.9 | 16.5 | 166.1 | 170 | 7.3 | 1.61 | 5.35 | 0.07 | 0.68 | 2090 | 0.26 | 2580 | 0.09 |
| 844 | 88.10 | 17.0 | 154.7 | 203 | 6.6 | 1.66 | 6.08 | 0.08 | 0.67 | 1335 | 0.3 | 2040 | 0.1 |
| 844 | 88.11 | 13.6 | 147.2 | 165 | 7.3 | 2.35 | 5.25 | 0.12 | 1.02 | 2270 | 0.45 | 2480 | 0.08 |
| 844 | 88.12 | 15.4 | 180.3 | 191 | 5.2 | 1.5 | 5.93 | 0.07 | 0.79 | 2110 | 0.34 | 2380 | 0.12 |
| 849 | 90.1 | 17.1 | 168.3 | 432 | 5.3 | 1.62 | 6.17 | 0.07 | 0.77 | 1400 | 0.33 | 2570 | 0.13 |
| 849 | 90.2 | 16.7 | 201.5 | 514 | 4.5 | 1.83 | 5.67 | 0.09 | 1 | 1760 | 0.4 | 3500 | 0.11 |
| 849 | 90.3 | 15.8 | 322.5 | 595 | 4.9 | 2.1 | 6.13 | 0.1 | 1.09 | 1925 | 0.4 | 6410 | 0.1 |
| 849 | 90.4 | 17.9 | 229.2 | 494 | 6.5 | 2.32 | 5.71 | 0.11 | 0.93 | 1465 | 0.41 | 3140 | 0.1 |
| 849 | 90.5 | 15.1 | 259.7 | 312 | 5.8 | 1.69 | 6.01 | 0.08 | 0.91 | 1090 | 0.37 | 3040 | 0.11 |
| 849 | 90.6 | 17.0 | 256.2 | 488 | 5.3 | 1.79 | 6.51 | 0.09 | 0.94 | 1875 | 0.4 | 5400 | 0.1 |
| 852 | 95.1 | 12.3 | 142.5 | 259 | 4.6 | 2.93 | 5.94 | 0.12 | 1.5 | 1170 | 0.69 | 3080 | 0.11 |
| 852 | 95.2 | 12.1 | 250.7 | 470 | 4.8 | 1.56 | 6.57 | 0.09 | 1.21 | 1200 | 0.35 | 5230 | 0.11 |
| 852 | 95.3 | 13.9 | 240.9 | 663 | 5.3 | 1.6 | 6.67 | 0.08 | 1 | 1350 | 0.36 | 4880 | 0.12 |
| 859 | 101.1 | 14.2 | 199.3 | 366 | 6.8 | 2.41 | 5.61 | 0.14 | 0.86 | 1825 | 0.36 | 6750 | 0.09 |
| 859 | 101.2 | 12.7 | 163.8 | 395 | 6.3 | 2.34 | 5.97 | 0.1 | 1.05 | 1485 | 0.45 | 3010 | 0.08 |
| 859 | 101.3 | 15.3 | 219.3 | 131 | 6.5 | 1.85 | 6.36 | 0.09 | 0.75 | 1840 | 0.32 | 4400 | 0.09 |
| 866 | 109.1 | 13.0 | 150.4 | 273 | 6.9 | 2.32 | 5.93 | 0.1 | 0.93 | 1695 | 0.41 | 4890 | 0.08 |
| 866 | 109.2 | 12.5 | 178.2 | 480 | 6.2 | 2.37 | 6.1 | 0.11 | 1.07 | 1560 | 0.46 | 3930 | 0.07 |
| 864 | 110.1 | 21.5 | 310.1 | 244 | 7 | 3.71 | 4.75 | 0.13 | 0.81 | 2070 | 0.33 | 11800 | 0.09 |
| 864 | 110.2 | 16.8 | 336.2 | 169 | 7.4 | 3.81 | 5.17 | 0.14 | 1.06 | 1645 | 0.44 | 10800 | 0.08 |
| 864 | 110.3 | 19.2 | 431.3 | 224 | 8 | 3.39 | 5.33 | 0.11 | 0.83 | 1830 | 0.31 | 8510 | 0.08 |
| 864 | 110.4 | 20.3 | 481.1 | 215 | 6.1 | 2.55 | 5.16 | 0.1 | 0.94 | 2460 | 0.38 | 9420 | 0.09 |
| 864 | 110.5 | 20.0 | 566.3 | 185 | 7.9 | 3.44 | 5.18 | 0.15 | 0.88 | 2220 | 0.35 | 11100 | 0.07 |
| 864 | 110.6 | 18.5 | 533.7 | 154 | 7.8 | 3.23 | 5.63 | 0.14 | 0.91 | 2080 | 0.35 | 7910 | 0.08 |
| 864 | 110.7 | 21.2 | 1080 | 386 | 5.5 | 2.95 | 5.37 | 0.16 | 0.99 | 2200 | 0.29 | 16000 | 0.11 |
| 864 | 110.8 | 21.8 | 742 | 361 | 4.8 | 2.69 | 5.59 | 0.15 | 1.06 | 2160 | 0.36 | 11900 | 0.11 |
| 864 | 110.9 | 24.6 | 649 | 122 | 5.4 | 2.34 | 5.26 | 0.15 | 0.89 | 2090 | 0.31 | 13900 | 0.09 |
| 864 | 110.10 | 17.5 | 564.5 | 118 | 6.7 | 2.64 | 5.97 | 0.14 | 1.03 | 910 | 0.43 | 11600 | 0.07 |
| 864 | 110.11 | 21.0 | 462.3 | 177 | 6.1 | 2.19 | 5.4 | 0.09 | 0.72 | 1890 | 0.29 | 9980 | 0.09 |
| 864 | 110.12 | 18.6 | 417.2 | 202 | 7.9 | 3.15 | 5.61 | 0.12 | 0.82 | 1985 | 0.29 | 8520 | 0.09 |
| 864 | 110.13 | 21.0 | 380.3 | 132 | 6.5 | 2.79 | 6.31 | 0.1 | 0.74 | 3720 | 0.33 | 14500 | 0.12 |
| 864 | 110.14 | 19.8 | 384.2 | 141 | 7.7 | 3.43 | 5.09 | 0.1 | 0.78 | 1635 | 0.32 | 8540 | 0.09 |
| 864 | 110.15 | 16.4 | 221.8 | 140 | 7.7 | 2.33 | 5.75 | 0.08 | 0.79 | 2010 | 0.35 | 3640 | 0.09 |
| 864 | 110.16 | 16.8 | 311 | 435 | 6.3 | 2.32 | 5.4 | 0.09 | 0.82 | 1690 | 0.34 | 8140 | 0.09 |
| 864 | 110.17 | 15.8 | 232 | 302 | 5.8 | 1.78 | 5.39 | 0.07 | 0.76 | 1735 | 0.33 | 5190 | 0.1 |
| 871 | 113.1 | 19.9 | 378.1 | 370 | 6 | 2.23 | 5.85 | 0.15 | 0.92 | 2380 | 0.37 | 7470 | 0.09 |
| 871 | 113.2 | 16.6 | 605.9 | 760 | 6.3 | 3 | 5.79 | 0.17 | 1.03 | 2330 | 0.41 | 7530 | 0.09 |
| 871 | 113.3 | 20.4 | 367 | 530 | 6 | 2.37 | 5.63 | 0.15 | 0.82 | 2350 | 0.3 | 10400 | 0.12 |
| 871 | 113.4 | 13.8 | 257.9 | 1088 | 6.6 | 3.26 | 5.61 | 0.13 | 1.06 | 2010 | 0.48 | 7280 | 0.06 |

| Context | Sample | Loss on Ignition (%) | Magnetic Susceptiblity ($x10^{-8}$ $m^3$ $kg^{-1}$) | EC (µS/cm) | pH | Ca (%) | Fe (%) | K (%) | Mg (%) | Mn (ppm) | Na (%) | P (ppm) | S (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 871 | 113.5 | 15.1 | 147.4 | 954 | 6.8 | 2.91 | 5.79 | 0.12 | 1.05 | 2130 | 0.51 | 4130 | 0.07 |
| 871 | 113.6 | 15.9 | 184.1 | 1159 | 6.8 | 2.79 | 5.68 | 0.12 | 1.02 | 1940 | 0.49 | 4230 | 0.07 |
| 871 | 113.7 | 15.0 | 164.9 | 1068 | 6.7 | 2.57 | 5.7 | 0.11 | 0.96 | 1980 | 0.46 | 3810 | 0.07 |
| 868 | 116.1 | 16.0 | 750 | 95 | 6.2 | 2.09 | 6.58 | 0.2 | 0.86 | 2100 | 0.37 | 8920 | 0.07 |
| 868 | 116.2 | 19.7 | 222.7 | 234 | 5.7 | 1.54 | 6.5 | 0.07 | 0.64 | 1910 | 0.33 | 7210 | 0.11 |
| 868 | 116.3 | 22.2 | 280.4 | 253 | 6.7 | 2.07 | 5.1 | 0.1 | 0.73 | 1820 | 0.46 | 9510 | 0.1 |
| 868 | 116.4 | 24.6 | 241.7 | 143 | 7.7 | 4.1 | 4.89 | 0.13 | 0.77 | 1975 | 0.41 | 10100 | 0.1 |
| 868 | 116.5 | 17.3 | 191.7 | 152 | 7.5 | 2.92 | 6.06 | 0.11 | 0.94 | 2020 | 0.39 | 6010 | 0.08 |
| 868 | 116.6 | 17.0 | 165.7 | 303 | 7.2 | 2.86 | 6.01 | 0.09 | 0.84 | 1530 | 0.43 | 6440 | 0.1 |
| 868 | 116.7 | 17.3 | 306.9 | 162 | 6.9 | 2.72 | 6.78 | 0.12 | 0.96 | 2190 | 0.45 | 7260 | 0.07 |
| 868 | 116.8 | 16.7 | 361.6 | 116 | 7.1 | 2.96 | 7.06 | 0.14 | 1.09 | 1275 | 0.48 | 9070 | 0.07 |
| 868 | 116.9 | 20.9 | 550.2 | 173 | 7.6 | 3.21 | 6.14 | 0.14 | 1.05 | 1815 | 0.41 | 12000 | 0.07 |
| 868 | 116.10 | 18.4 | 296.3 | 167 | 7.9 | 3.79 | 5.36 | 0.13 | 0.87 | 4340 | 0.4 | 8630 | 0.08 |
| 868 | 116.11 | 21.3 | 338.5 | 184 | 7.9 | 3.62 | 5.07 | 0.11 | 0.86 | 2240 | 0.41 | 8210 | 0.08 |
| 868 | 116.12 | 14.6 | 257.1 | 161 | 7.6 | 3.63 | 6.34 | 0.1 | 1.2 | 1735 | 0.62 | 4870 | 0.06 |
| 868 | 116.14 | 22.4 | 561.2 | 137 | 5 | 1.73 | 6.58 | 0.17 | 0.73 | 2160 | 0.27 | 14200 | 0.12 |
| 868 | 116.15 | 17.2 | 155.9 | 191 | 6.9 | 2.14 | 6.96 | 0.06 | 0.77 | 1355 | 0.41 | 2500 | 0.09 |
| 868 | 116.16 | 16.5 | 175.7 | 170 | 6.8 | 2.44 | 6.59 | 0.08 | 0.88 | 2290 | 0.45 | 3530 | 0.08 |
| 890 | 118 | 16.1 | 323.5 | 239 | 5.1 | 1.87 | 5.82 | 0.08 | 0.87 | 1680 | 0.35 | 9510 | 0.12 |
| 894 | 122 | 18.6 | 163.8 | 148 | 7.3 | 1.85 | 6.49 | 0.06 | 0.64 | 1820 | 0.37 | 2600 | 0.08 |
| 904 | 127.1 | 17.7 | 146.4 | 179 | 7.6 | 1.99 | 6.34 | 0.06 | 0.7 | 1525 | 0.37 | 2420 | 0.08 |
| 904 | 127.2 | 18.3 | 142.6 | 156 | 6.9 | 1.81 | 6.2 | 0.06 | 0.71 | 1670 | 0.36 | 3030 | 0.09 |
| 904 | 127.3 | 16.9 | 147.4 | 86 | 6.7 | 1.89 | 6.75 | 0.08 | 0.8 | 2210 | 0.45 | 3250 | 0.09 |
| 861 | 131.1 | 11.5 | 222.7 | 415 | 6.7 | 3.66 | 5.55 | 0.2 | 0.97 | 1970 | 0.5 | 8340 | 0.07 |
| 861 | 131.2 | 10.0 | 200 | 344 | 6.8 | 3.05 | 6.02 | 0.13 | 1.11 | 1445 | 0.58 | 4620 | 0.06 |
| 861 | 131.3 | 18.1 | 185.1 | 430 | 6.7 | 2.53 | 6.1 | 0.11 | 0.83 | 2030 | 0.41 | 6430 | 0.08 |
| 862 | 132.1 | 17.9 | 324.1 | 142 | 6.9 | 2.92 | 5.97 | 0.1 | 0.78 | 2060 | 0.38 | 6310 | 0.07 |
| 862 | 132.3 | 18.2 | 205.1 | 222 | 6.3 | 1.6 | 5.98 | 0.06 | 0.64 | 1785 | 0.28 | 5160 | 0.1 |
| 862 | 132.4 | 16.9 | 103.6 | 127 | 7.5 | 2.24 | 5.13 | 0.1 | 0.72 | 1815 | 0.44 | 7480 | 0.1 |