HISTORIC SCOTLAND
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CALANAIS

Survey and Excavation 1979–88

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P J Ashmore

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with contributions by T Ballin,[1] S Bohncke,[2] A Fairweather, A Henshall,[3] M Johnson,[4] I Maté, A Sheridan,[5] R Tipping and M Wade Evans

*Vayssières Haut, 82190 Lacour de Visa, France
[1]Lithic Research, Denny, Stirlingshire
[2]Free University, Amsterdam
[3]Edinburgh
[4]CFA Archaeology, Edinburgh
[5]National Museums Scotland, Edinburgh

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This report is dedicated to Fionna Ashmore

Scottish Charity No. SC045925

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PREFACE

Richard Strachan, Senior Archaeologist, Cultural and Natural Resources, Historic Environment Scotland

Calanais needs little introduction as one of Scotland's most iconic sites. Indeed the 'stones of Callernish' were included in the first 'schedule' of ancient monuments to come under the protection of the Ancient Monuments Protection Act of 1882 and subsequently came into State care in 1885 as a monument in guardianship.

Today this enigmatic site still holds a huge attraction to many, receiving almost 40,000 visitors a year. It is as a mystic place to visit, ponder and photograph, to marvel at the sheer scale of these silent grey monoliths and wonder how ancient peoples conceived their construction so many millennia ago. As part of this project Patrick had a rare first-hand experience in the trials of (re-)erecting a monolith – Stone 33 in fact – and documented at the time by Magnus Magnusson and BBC television.

Patrick J. Ashmore was a Principal Inspector of Ancient Monuments with Historic Scotland (and its predecessors) for many decades and will be known to many. Throughout his distinguished career Patrick was always involved in and indeed *excited* in archaeological investigation and analyses, heading up the archaeology programme and ploughing the furrow in developing and promoting the science of radiocarbon dating.

I was privileged to work with Patrick in the twilight years of his career up until his retirement in 2006. He always expressed his ideas with bold honesty and sought a critical eye on many of his theories. With this publication – in many ways Patrick's life's work – he provides his account of the project with the same intellectual honesty and openness that is both modest and admirable. As Patrick himself told me:

> 'I have always distrusted archaeological excavation reports which contain only summary certainties. My 30 years of inspecting excavations and reading the final reports on them convinced me that a lot of observation is faulty, a lot of recording is inadequate, and much interpretation is more speculative than its authors admit. All this is true of this report on Calanais, apart perhaps from the last; for I have (to some people's taste tediously) described many doubts and disagreements. On the other hand, I have described the findings very fully so the report provides material from which others can advocate different interpretations.'

Since retiring in 2006 Patrick has worked diligently on producing this extensive volume on Calanais, including re-engaging with the original field staff and specialists and personally producing the many tables, drawings and illustrations. Apart from the polishing of a specialist report, it was completed by the beginning of 2013.

This final report on Calanais was always intended for digital publication. Since its completion there have been considerable changes and additional complications, which have hindered its publication. Some of these have been beyond our control, but we accept some responsibility for its delay and apologise to all those who have been waiting eagerly for it.

1. Abstract

The main stone setting at Calanais has been known to antiquarians since the end of the 17th century. In plan it is like a prone ring cross, its shaft formed by an avenue of standing stones running roughly north from the Ring and its arms by stone rows pointing south and roughly east and west. When first recorded in the late 17th century most of it was covered in peat to a depth of about 1.5m, and in 1857 the last of the peat was cleared away at the behest of the then proprietor.

The resistivity survey at Calanais in 1979 and the excavations in 1980 and 1981 were needed to allow repairs to the ground surface and cairn and improvements to drainage. In 1982 pollen samples were retrieved and the fallen stone at the end of the east row was re-erected. In 1988 the northwest quadrant of the Ring was excavated to a limited depth prior to the laying down of new turf.

The main excavations revealed complex remains. They included a ditch which was probably part of an early enclosure, cultivation beds dating to about 3000 BC and other remains of agriculture. The central monolith succeeded these. It and the Ring were probably set up within a century or so of 3000 BC. Soil and clay were imported. Light timber structures were built between the monolith and the eastern side of the Ring and the chambered cairn itself was built at some date after 2500 BC when early Beakers were in use in the western seaways. A burial with a later insular Beaker and two barbed and tanged arrowheads was found a couple of metres southeast of the passage entrance. Token deposits of soil including charcoal and potsherds were placed in and to the east of the southeast quadrant of the Ring; the later ones were associated with ground working and dilapidation of the chambered cairn.

Four stages of enclosure were found to the north-east of the Ring. The earliest was defined by stakes and may have replaced one of the functions of the light timber structures when the chambered cairn was built on the site of the latter. The second was represented by a bank, probably the remains of a turf and light timber wall. The two later stages of the enclosure were represented by wall-bases which probably supported turf walls. Only a modicum of information was gained about the avenue and rows; the innermost stone of the East Row was probably erected at some time between 2560 and 1690 cal BC; the early part of this range is preferred.

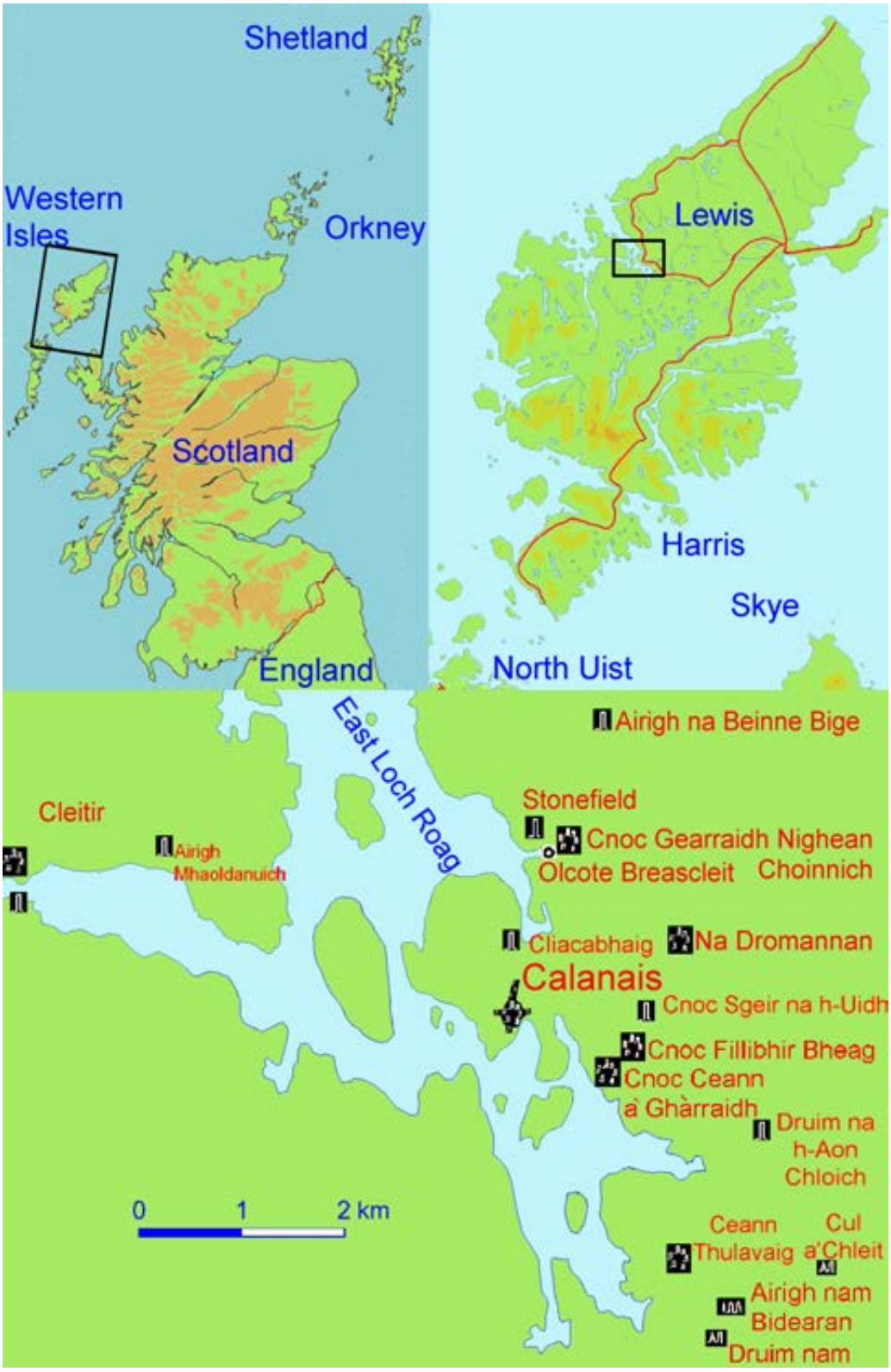
The pottery from Calanais included domestic and fine Early/Middle Neolithic pottery, a Grooved Ware vessel, fine and domestic Beakers and a Food Vessel. The lithics, mostly of a domestic character, included barbed and tanged arrowheads, cores and scrapers. Much of the earlier pottery was brought in with soil and clay from other places.

The discoveries suggest widespread contacts with other parts of Britain in the third and early second millennia BC. Calanais was of more than local significance during that period. No evidence was found for long-distance links after about 2000/1800 BC. Peat started to cover the area in the 1st millennium BC. The ground surface in and by the Ring may have remained largely free of peat until the middle of the first millennium AD.

Much of the area in and immediately round the Ring remains unexcavated, as does to an even greater extent the area of the Rows and Avenue. It seems quite likely that complex and fairly deeply stratified remains of the late 3rd and eraly 2nd millennium survive immediately southeast of the Ring. There may be a 4th or 3rd millennium BC settlement in the south-western part of the area in the care of the State. The wider surrounding area also has a large potential for fresh discoveries because of the peat cover and the gradual submergence of agricultural systems (and presumably other remains) by the waters of the sheltered East Loch Roag.

2. Introduction

2.1 Location



Illus 2.1 Location map

Calanais is on Lewis, in the Western Isles, also known as the Outer Hebrides. Lewis is separated from the mainland by the Minch. To its south beyond Harris are North Uist and numerous other islands including Benbecula, South Uist and Barra, and to its southeast is Skye (Illus 2.1).

Apart from a few small islands there is nothing but the Atlantic between it and North America.

Calanais is by East Loch Roag, its inner part a sheltered inlet. Most of the terrain is now under a blanket of peat, but before that covered the land it supported grass and heather with trees and bushes in spots sheltered from the westerly winds. The many known archaeological sites around Calanais suggest that the area was reasonably fertile (Illus 2.1).

2.2 The names of Calanais

2.2.1 The Classerniss name and variants

The township does not seem to be mentioned by name in any early Gaelic sources, although the Gaelic tradition was far from purely oral (Ferguson 1998, 177-181). Its earliest known written name is 'Classerniss' (Martin Martin 1703). All subsequent 18th century references until 1792 followed Martin, although with a minor variation, Classerness, in Stukeley's accounts (1720 to 1776). Seemingly primary accounts by Headrick (1808) and MacCulloch (1819) use respectively the Classernis and the Classernish variants of the early form.

2.2.2 The Calernish / Callernish / Calarnish name and other designations

In 1792 Mackenzie, in an account based on firsthand knowledge, called the site Calernish (Mackenzie 1792, 283). In the Statistical Account of Scotland Sinclair (1796) referred to it as Callernish, but, as noted above, the next two seemingly primary accounts reverted to the earlier form. In 1814 Huddlestone listed four versions: Classerniss, Clasharnish, Calarnish and Classerniss (Huddlestone 1814). His speculations on Gaelic etymologies need not detract from his record of the variants.

The New Statistical Account published in 1833 used the name 'Callernish', which seems to have stopped use of the Classernish variants in antiquarian literature. Worsaae, in 1846 used mostly Callarnish, but on one sketch Callanish - perhaps in error or perhaps because it was a recognised variant. The first edition of the Ordnance Survey map for the area, researched between 1847/8 and 1853 (Robson 1989, 99-101) and published in 1853, names the place Callernish.

Perhaps basing their usage on the Statistical Account or the OS map, Callender used 'Callernish' in 1854 and so did Palmer in 1857.

Use of 'Callernish' in primary sources survived until at least 1934 where it was used in the list of Donations to the Museum in the Proceedings of the Society of Antiquaries of Scotland (vol 68, 1933-4, 190).

2.2.3 The Callanish / Tursachan Challanish variant

If Worsaae's one-off use of Callanish amongst several uses of Callarnish is discounted, the earliest use of this variant that I have seen is in the Ordnance Survey Name Book of 1847/8-1853. The names were recorded by English speaking surveyors, serving officers and others from Royal Engineer companies along with Civil Assistants. But it was probably not as true in Lewis as it subsequently was in Harris and the southern islands that 'Non-Gaelic speaking men go about among non-English speaking people to take down Norse-Gaelic names with their English meanings! These lists are then sent to the district office at or to the head office Southampton in each of which there is a Gaelic writer who is expected to write out the names correctly.' (Robson 1989, 98, quoting Alexander Carmichael's draft of 19 May 1877). Carmichael provided much of the information about names from Harris southwards and his opinion on the accuracy of names on the Ordnance Survey maps is to be respected. But the Calanais informants included members of the Matheson family, fluent speakers of English.

The 'List of Names to be corrected' column in the Name Book shows that the OS investigators expected that the name for the settlement ('*A*

small village of huts they are built of peat and stones …') would be Callanish, but 5 authorities, John Donald, Angus Matheson, John Mackay, Donald Murray and John Rae, all said that the correct name was Callernish (OS Name Book 63, page 33, entry 83). Only one of them used the Callanish variant for Callernish Inn.

But by the time of the 1878 edition of the Ordnance Survey map 'Callanish' was preferred. In 1985 it was used by General Pitt-Rivers, the first Inspector of Ancient Monuments. The next use of 'Callanish' in primary accounts of the stones seems to be that of Somerville, who in 1912 referred to the stones as Tursachan Challanish, where 'Challanish' is the genitive of Callanish (Somerville 1912, 202). The Royal Commission on Ancient and Historical Monuments (Scotland) used 'Callanish' in 1928. Thereafter all English-language primary sources refer to it as Callanish until the recent transliteration into a Gaelic form.

2.2.4 The Calanais name 1995 onward

In the 1990s, as part of an agreement to use Gaelic orthography on maps of Lewis, the Ordnance Survey started to use the spelling 'Calanais', which is pronounced in the much the same way as Callanish. Modern Gaelic publications and signposts on Lewis use the township name Calanais and refer to the standing stones as Tursachan Chalanais - the Tursachan of Calanais (e.g. An Lanntair 1995, 5). The official guide of 1995 is titled 'Calanais: The Standing Stones'.

2.2.5 Changes over time

Table 3.2 Names of Calanais

Variant	First	Last	Duration in years
Classerniss, Classerness, Classernish, Clasharnish	1703	1819	115 +
Calernish, Calarnish, Callernish	1792	1934	142
Callernish / Callanish	1854-7	1934	
Callanish	1854-7	c 2000	122 +
Calanais	1995		> 15

The 'first' and 'last' dates in Table 3.2 are based on primary rather than secondary sources. The names which appeared in primary sources were based on sometimes significantly earlier visits, and some of the last uses of the name may have been seen by contemporaries as somewhat archaic; so the dates presented in the table are approximate.

2.2.6 Names specific to the stone settings

In 1792 Mackenzie wrote that the country people called stone circles 'taoursanan' (Mackenzie 1792, 283). That may be related to the 'Tursachan' nomenclature of the Ordnance Survey in 1853. He recorded 'that at Calernish is called by the country people, na Fhirr Chrace, who, they say, were thus metamorphosed into stones while dancing' (Mackenzie 1792, 285).

John MacCulloch, after his work in the area at the start of the 19th century, noted that 'the work itself is called, by the people, Fidvreachie' (MacCulloch 1824, 229), which may be an anglicised version of 'fir bhreige', which was the Lewis spelling of the Gaelic "Fir bhreugadh" meaning 'false men'.

On the Ordnance Survey first-edition 6 inch to the mile map of 1853 the name Tursachan was recorded for the stone settings themselves; it was still used on the 1878 map. The name for the hillock at the south end of the setting, 'Cnoc an Tursa', is presumably related. Tursa (the noun) means dejection, sadness or waving the head and lamenting, while taoursach (adjective) means mournful (Mackenzie 1792, 283) and tursach (adjective) means sad or sorrowful (MacAlpine 1929, 273). However the Ordnance Survey Name Book records the meaning of 'tursachan' simply as 'A circle of stones' Other variants of the word for stone circles recorded by the Survey included Turusachan (one informant of five) and Tursainenn (OS Name Book 63 page 41 entry 84). The latter is similar to Colin Mackenzie's 'Taoursanan' of 1792.

Despite the Ordnance Survey's record I cannot avoid the suspicion that through the influence of a stern form of Christianity people had got used to calling stone circles 'those sorrowful things', or something of that kind and the Gaelic word was originally used more as a dismissal than as a name.

2.2.7 Etymology

Although there have been several attempts to find a Gaelic origin for the name they all falter at the termination 'ness' or 'nish', which is a common place-name element in Norse but only found in Gaelic in place-names. In 1846 the Danish speaking Worsaae took Calarnish to mean a harbour or safe place, but he probably had not heard of the earlier Classerniss variants. In 1952 the eminent scholar M Oftedal collected over 126 names and their pronunciations while on a research scholarship in Lewis, between September and December 1950 and between April and August 1951, during which time he was carrying out fieldwork for his PhD thesis on the Gaelic dialect of Leurbost (Cox, n.d.). Professor Oftedal suggested that the original Norse place name was 'Kallaðarnes', meaning 'the promontory where one used to call for a ferry boat from across a sound' (Ponting and Ponting 1984, 32, Oftedal 1956 and Cox 1989, 132).

Three different groups of name variants are known during the last three centuries. Why should there not have been say six changes in the name in the previous six centuries, between the Norse naming of the place and the first surviving record of what it was called? The OS Name Book evidence makes it clear that there was considerable fluidity in the spelling and presumably the sounding of 'Tursachan', and to a lesser extent also in the spelling and sounding of 'Callernish'/ 'Callanish'. If there were that many changes over time, and variants in common use at any one time, could not the original Norse have been even further from 'Kallaðarnes' than is 'Classerniss'?

2.2.8 Naming Calanais

'Classerniss', 'Callernish', 'Callanish' and 'Calanais' are all semi-phonetic renderings of a Gaelic development from a Norse name, whatever it was. It was Gaelic speakers who transmitted the name to English speakers. One archaeologist at least has taken strong exception to the recent name change. "In recent years it [Callanish] has been ludicrously and linguistically [sic] misnamed 'Calanais' as though that were an ancient Gaelic form. It was not. Like many place-names on Lewis the original 'kalladarnes' was Old Norse 'the headland from which a ferry can be hailed'" (Burl 2000, 202). As demonstrated above, this statement is poorly supported by the evidence.

If earliness were any measure of merit, we might revert to 'Classernis', 'Classerniss' or 'Classerness', or if duration of use were to be the key to correctness, 'Callernish' might be the best name. But to prefer either would be pedantic. No doubt the situation will for some time remain as it was for Clive Ruggles in his 'Prehistoric Astronomy in Britain and Ireland', where he refers to 'Calanais, more usually known in the anglicised form as Callanish' (Ruggles 1999, 134-5); in his index he included: "Calanais: see Callanish" (Ruggles 1999, 278). 'Callanish' is, after all, enshrined in 20th century archaeological literature; but although 'Calanais' may seem to some English speakers an unnecessary modern minting, it is no more or less correct than its middle-aged rival. It is now the primary name on Ordnance Survey maps, along with many other previously anglicised place names. That is why it is used in this publication.

2.3 A chronological précis

The two main prehistoric periods of building large structure in Lewis, as elsewhere in highland and island Scotland, were in the mid 4th to late-3rd millennia BC and in the later 1st millennium BC to mid 1st millennium AD. The first period included chambered tombs and stone settings. No domestic buildings of that period have been found in Lewis (with the possible exception of Steinacleit; see Chapter 24: Discussion and Conclusions). The second period included strong domestic buildings, Atlantic round-houses, including their tower-like variants, the brochs. No unarguably ceremonial or ritual sites of large size have been identified for this period, although the people may have exploited the ruined structures of the earlier one.

Christianity was introduced in the mid to late 1st millennium AD. From the latter centuries of that millennium Norse settlers introduced some of the place-names of the island, including at least the 'niss' ending of the earliest recorded forms of the name for Calanais. Their settlement patterns were probably broadly similar to those of the 18th century AD, differences reflecting continued sea rise. The area was predominantly Gaelic speaking in the early or full medieval period and when the stone setting was first named in print it was an anglicised version of the Gaelic form of its name, Classerniss, which was transmitted to us (Martin 1703).

In the first half of the 4th millennium BC when cereals were first grown in the area around Calanais, sea levels had been rising since the end of the last glaciation. The Ring was built at some date between 2900 and 2600 cal BC. The landscape when the stone setting was built was perhaps significantly different from that of today. Calanais may have been near the head of a navigable inlet and there may have been a fresh-water or brackish loch to its south-east (Illus 2.2). In the 2nd millennium BC field walls on the peninsula south-east of Calanais continued down into what is now a tidal area. It seems fairly likely that remains of early farming landscapes survive under the sea and they certainly survive under the peat which covered much of the rest of the landscape from various times in the first millennia BC and AD.

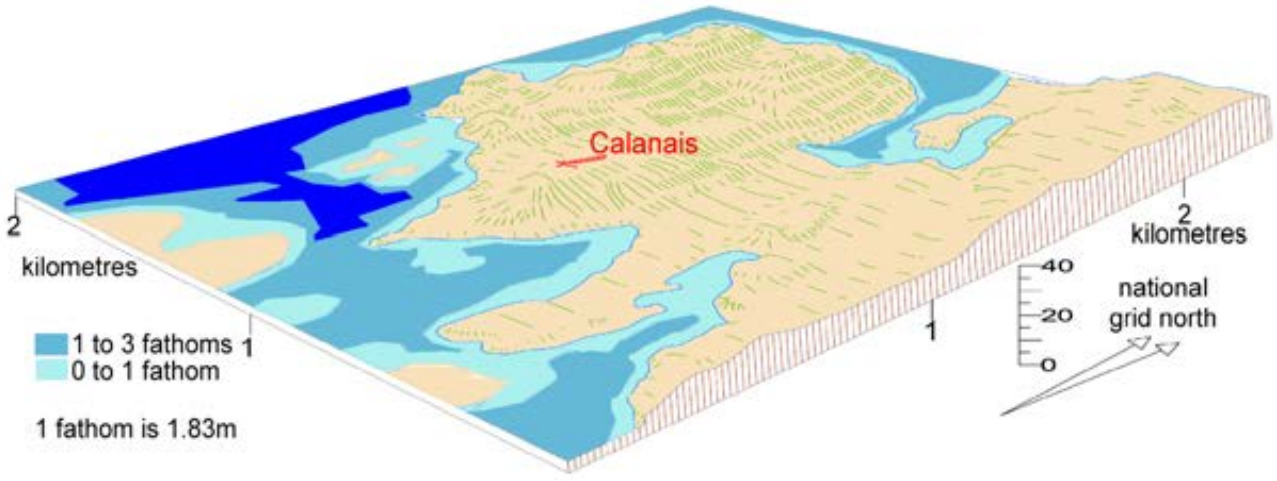
The balance of cereal growing and pastoralism varied as changes in climate, sea level and subsequently peat growth modified local resources. Social factors also played a part; the early farming demonstrated by the pollen record sometime within a century or two either side of 3700 cal BC seems to have ceased locally for several centuries before recommencing at some date in the early 3rd millennium BC.

2.4 Discovery

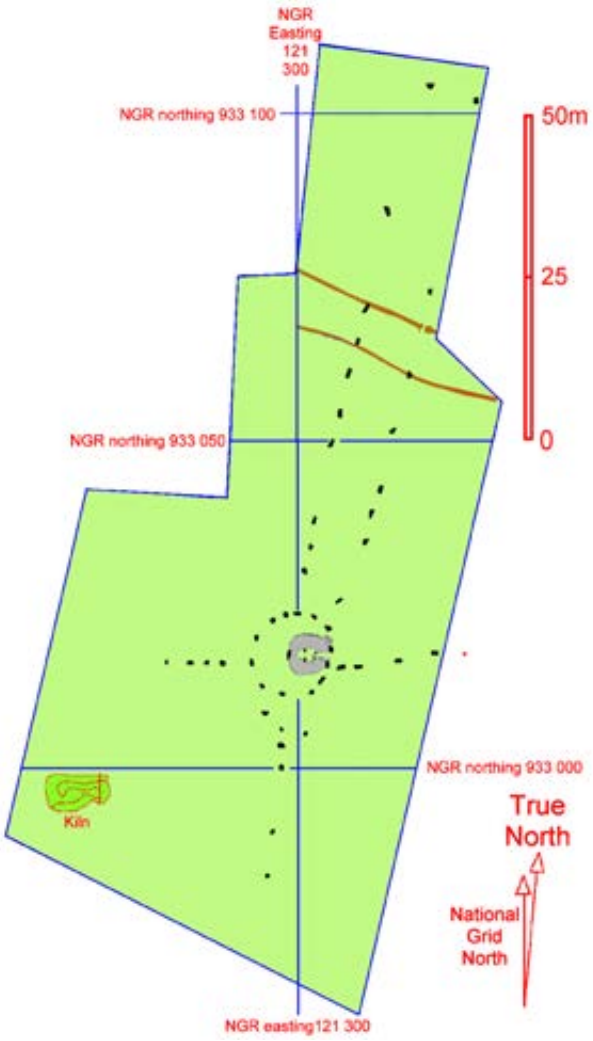
The main stone setting at Calanais has been known to antiquarians since the beginning of the 18th century, when Martin Martin published his A Description of the Western Isles of Scotland (Martin 1703).

Set by East Loch Roag on the western side of Lewis, part of the main island of the Western Isles chain, the setting was a distorted cruciform (Illus 2.3).

When first recorded at the end of the 17th century most of it had been inundated by peat to a depth of about 1.5m, but gradually the peat was cleared. It remained little studied for over a century. That is not to say that it was ignored. It provided a stimulus for several theories, often with a politico-religious tinge. The most informative of the several primary studies which took place between then and 1857 when the central parts of the site were cleared of peat are those of McCulloch



Illus 2.2 Calanais in its surroundings with submarine contours



Illus 2.3 The stone setting before excavation, after Tait 1978.

(1819, 1824) and Worsaae (1846). The antiquarian source material is described in Chapter 3: Previous Studies and Chapter 4: Introduction to the Fieldwork.

In Illus 2.3 the sizes of the stones have been increased slightly to improve visibility. In essence, studies of early sources suggest that the setting looked much the same in 1980 as it did before it was inundated in peat in the 1st millennium BC, apart from damage to the small chambered cairn in the Ring and the interior of the enclosure to its east, removal or burial of loose stones in and around the Ring, the removal of some stones of the avenue, the creation of a road across the avenue, the burial by peat of the easternmost stone of the East Row, and the erection of a stone in a probably spurious position to the south-east of the ring of stones.

2.5 Deterioration

Medieval and early modern peat cutting and agriculture exposed the stones of the avenue, some of which were removed and incorporated in nearby houses. Around 1857 householders living close to the stones were moved to the modern settlement to their north. At Lady Matheson's behest a path was laid out from the Post Office (south of the stone setting near the present Interpretation Centre run by Uras nan Tursachan) to the chambered cairn inside the ring of stones. At some date a road with boundary walls was built across the avenue, perhaps at the southern edge of a frequently cultivated area.

Calanais was listed on the Schedule of Ancient Monuments in 1882 and the site was subsequently sold for a nominal sum to the state. Subsequent damage, mostly unwitting, has been followed by repairs and low key conservation measures to the present day.

In the early 1970s the roads to the north and south-east were connected by a road running along part of the east and north sides of the area in the care of the State. The then Inspectorate of Ancient Monuments did involve itself in the road work but I have not found any record of that and can only imagine that the new road foundations were laid over any potentially surviving anthropogenic remains rather than cutting through them.

2.6 The reason for excavation

By 1979 it had become clear that the chambered cairn and the turf of the area round it had to be repaired, and that drains should be inserted to reduce the effects of water-logging. Since the cairn was sketched in 1857 or 1858 (NMR RCD/13/16) and planned in 1923 (NMR RGD/ 13/11, published in modified form in RCAHMS, 1928, 26), the northeast orthostat had been displaced and the horizontal slab-walling of the chamber had deteriorated. To the north of the circle and inside it a combination of impeded drainage and erosion by visitors was wearing away the ground surface.

2.7 The aims for excavation

Archaeological excavation was needed to record evidence which might be damaged during repairs. The resistivity survey of August 1979 and the excavations which took place in 1980 and 1981 were preceded by a study of the main setting, completed in 1979 and published, unchanged apart from a short postscript, as Ashmore (1984). It set out the thinking, and the problems which would be tackled: '... the purpose of excavation at Callanish is to remedy modern changes in the setting, it will also elucidate the most obvious problems of its early form. The coincidence between excavation necessary for maintenance and display of the site and that desirable for research purposes is thus nearly complete.' (Ashmore 1984, 28-30). This pious statement was qualified five years later in a postscript allowed by the delay before publication: '... [Excavation] revealed a considerable complexity of building history and many episodes of activity which were not visible on the surface.'

The details of aims for excavation are described in Chapter 4: Introduction to the fieldwork.

2.8 Some comments on interpretation of excavation evidence

The perils of interpretation have long been understood by most field archaeologists, but in many excavation reports the authors have assumed that their readers understand the problems well enough that they need not be made explicit. Often they have not described the interpretative models within which they worked. To some extent I shall continue this ignoble tradition. Only a few basic points will be made here, intended mainly to qualify and expand on the fact that the excavations and post-excavation work took place within a cognitive-processual framework (as defined by Renfrew and Bahn 2008, 495-6). A much longer version can be found in Appendix 1.

2.8.1 Observation and information retrieval

All observations and the frameworks within which they are made are affected by (often unconscious) mental models. "… there is no such thing as an unprejudiced observation. All observation is an activity with an aim (to find, or to check, some regularity which is at least vaguely conjectured); an activity guided by problems, and by the context of expectations … There is no such thing as passive experience; no passively impressed association of impressed ideas" (Popper 1976, 51-2).

There is a theory of mind, ascribed in its 2008 form to Karl Friston of University College, London and colleagues, which suggests not only that the brain works in an inductive Bayesian fashion, but that it also works to minimise prediction error. That leads to our tendency to distort or discard sensory information when it conflicts with internal predictions (Huang 2008, 31-3). So during our excavation much data was no doubt discarded by pre-conscious parts of the brain because it did not fit expectations.

On top of that, it is vital to understand what a tiny proportion of the activities which took place at Calanais there left any recognisable trace. More than two millennia passed between the first human interventions and the period when peat covered the place. Most deeds will have left no retrievable; relatively few will have left evidence which could be retrieved by the techniques we used in 1980 and 1981.

In other words our work captured only a miniscule proportion of what people did.

2.8.2 Approaches to interpretation

All non-trivial theories are incomplete and one can never show that a particular non-trivial idea is right in all circumstances; ideas should be tested against the real world (Popper 2002). But scientific tests are limited to rare circumstances; "The systems discussed [in textbooks of science and mathematics] are usually ones that are specifically chosen to be amenable to fairly complete analysis, and whose behaviour is therefore necessarily simple." (Wolfram 2002, 115). Tests, in the sense used by Popper are rarely applicable in archaeology.
But are inferential methods any better? The firmly inferential Bayesian approach 'emphasises that the interpretation of data is conditional on the information available and on an individual's understanding of it at that time' (Buck et al, 1996, 1).

But fundamentally "To choose a 'likely' hypothesis and then test it back on the data that helped to suggest it is clearly to move dangerously in the direction of circular argument" (Ruggles 1999, 77); inferential approaches can lead deep into an intellectual mire.

In earlier drafts of the Calanais report I included explicit Bayesian analyses, and I shall try to explain why I have removed them. Wolfram's point can be translated as meaning that most models for Bayesian analysis in archaeology are over-simplifications. Archaeological evidence usually allows more than one interpretation, and those are often not mutually exclusive; and new evidence can usually bear more interpretations than those initially contemplated in explicit modelling (Buck et al (1996, 290, 355-62). For these reasons I found that my attempts were not satisfying, for they were usually based on an incomplete set of mutually non-exclusive prior beliefs leading to similarly fuzzy posterior beliefs.

Turning to another aspect of interpretation, I have always believed that excavators must try to interpret at all levels in the field, so that interpretations and indeed observations can be challenged while it is still possible to gain new information from the site itself. But interpretation in the field can lead to a failure to record 'irrelevant' information fully, and a foolproof prescription for the best balance between 'objectivity' and interpretation during excavation eludes me; the most one can do is:

— consult, and listen to others,
— adapt excavation techniques to the evidence,
— remain conscious that nothing exists independent of its environment,
— sample systematically and extensively,
— record abundantly and routinely,
in the hope that both acknowledged and unacknowledged biases can be subverted by reality.

2.9 Terminology

The following terms will be used for features at Calanais.

Ring is used instead of circle to describe the set of 13 standing stones round the central monolith because the shape they define is sufficiently far from being a true circle that that term is misleading.

Row is used for a line of standing stones rather than 'alignment'. The latter carries too much baggage with it, not just archaeoastronomical but more generally in implying that a row was meant to point at something. Also, 'alignment' does tend to suggest (perhaps wrongly) a simple single period construction.

Avenue is used for the pair of rows of standing stones running north from the Ring, following normal archaeological usage (Burl 1993, 4). That should not be taken to mean that the rows composing it were necessarily set up over a short period to create a formal approach to the Ring and central monolith at Calanais. The stones may have been set up individually at various times; and they may or may not have lined an existing route. Subsets of the stones may even have had the main purpose of providing an indicator or set of indicators to the southern horizon although that idea requires cautious scrutiny (see Chapter 3; Previous Studies and Chapter 24: Discussion and Conclusions).

Cultivation bed and **trough** are the terms used to describe the early agricultural system at Calanais. It turned out to consist of shallow undulations in ground level. Where well-preserved the bed component sometimes contained soil, clay and upside-down turfs, and the troughs contained short-lived turf lines and other organic-rich layers possibly corresponding to decayed vegetation. The crosswise profile of the system was more like that of a set of waves than like that of a rig and furrow system. At Calanais the beds and troughs were probably made with a spade or hoe.

On the other hand **ard marks** were common in late third to second millennium plough soils at Calanais. They were probably produced by a tool with a wooden share which ripped turf and soil rather than turned it over.

The term **ground working** has been preferred where there was no indication of the nature of

the tool used for working the earth, nor of the reason for doing so.

2.10 The layout of the report

After a summary of previous studies (Chapter 3) the field evidence is described in detail in Chapters 4 to 14; after each short descriptive section in those chapters there is a discussion of the local significance of the evidence. More general consideration of comparanda and significance has been left to Chapter 24, Discussion and Conclusions. The specialist studies form Chapters 15 to 23; information culled from them is incorporated in the excavation narratives. Technical notes can be found in Chapter 25. Acknowledgements form Chapter 26. Chapter 27 provides notes on archiving and Chapter 28 is the Bibliography.

3. Previous studies

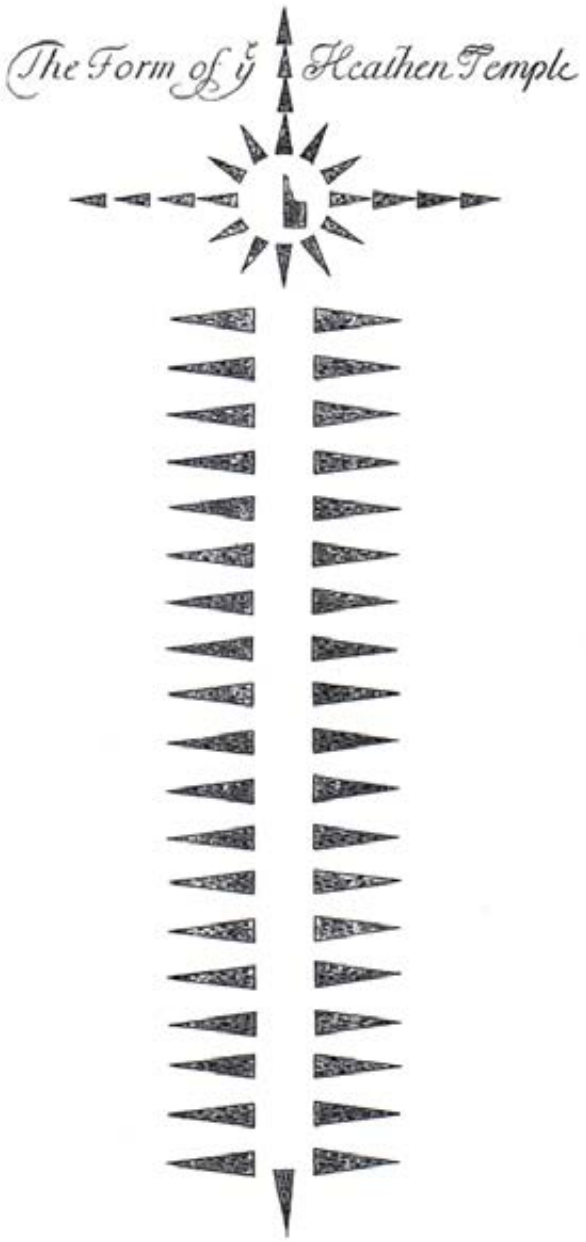
3.1 Antiquarians

3.1.1 John Morison and Martin Martin

The setting at Calanais was first brought to the attention of antiquaries in 1703 by Martin Martin in his Description of the Western Isles. There is one earlier account preserved in Sibbald's Topographical Notices and afterwards printed in Spottiswoode's Miscellany and MacFarlane's Geographical Collections (1907, vol 2, 213). But it does not mention Calanais by name. The author was Iain mac Mhurch' 'c Ailein, also known as John Morison; he was the tacksman of South Bragar. He composed a 'prose map' of Lewis, probably between 1683 and 1686, in response to a questionnaire sent out by Sir Robert Sibbald as part of the latter's scheme for a grand descriptive 'Scottish Atlas' (MacIver 1989, 23).

'In severall places there are great stons standing up straight in ranks, some tuo or three foot thick and 10, 12 & 15 foot high; It is left by traditione that these wer a sort of man converted into stons by ane Inchanter. Others affirme that they wer sett up in places for devotione but the places where they stand are so far from anie such sort of stons to be seen or found either above or under ground that it can not but be admired how they could be carried there.' (MacIver 1989, 28).

John Morison was probably the princal source of information on Lewis for Martin Martin (MacIver 1989, 23). Around 1695 the latter wrote that the avenue was composed of 39 stones, and was 8 ft wide, with 6 to 7 ft between each stone. The northernmost stone was 'set up in the entrance of this avenue'. The circle held 12 stones and a central stone, with 6 to 7 ft between each stone of the circle, and the east, south and west rows each held 4 stones. Judging by his plan he meant 3 stones plus the nearest stone of the circle. However, writing nearly a hundred years later in 1792, but referring to earlier personal observations and measurements, Mackenzie also cites three stones in each of the rows (Mackenzie 1792, 283-4), and it is just conceivable that the peat hid one stone



Illus 3.1 The plan engraved for Martin Martin and published in 1703.

in each of them, though I am more inclined to suppose that Mackenzie allowed Martin's written record to override his own memories.

Two items in Martin Martin's description can be proven to have been wrong at that time. The avenue is now, and seems always to have been, about 9m wide; and the spacing between the 13 stones of the circle varies (edge to nearest edge) between

3 ft and almost 12 ft. Indeed, ironically enough, although the average distance between the stones is about 7 ft, only one interval falls within the limits specified by Martin.

One of Martin's errors can perhaps be simply explained: his breadth for the avenue may be a misreading of 8 yards. Also, given that the intervals between the stones of the circle average nearly 7 ft, we need not be surprised at the figures he gives for them.

The one part of his description which cannot be shown to be an error but which is markedly at odds with what is to be seen at Calanais now is the number of stones in the avenue. Study of later antiquaries' descriptions suggests that in Martin's time several stones were probably covered by peat and others buried to a depth of around 1.5m. It is conceivable that his count was right and that many of the more northerly stones of the avenue were subsequently removed. But it is equally possible that he deduced from the intervals between visible stones that there should originally have been 19 stones in each side of the avenue.

Martin was told by the local people that the stone-setting was traditionally a place appointed for worship in the time of heathenism, and that the chief Druid or priest stood near the big stone in the centre. By the time he wrote, the Druid had become part of the stock-in-trade of the informed antiquarian, although it had not yet gained all the connotations which others were to give it (Piggott, 1968).

3.1.2 Antiquarian speculations in the 18th and early 19th centuries

The next century and more saw use and abuse of Martin Martin's account to bolster religious and political ideas. Toland, a Deist and free-thinker, advocating Natural Religion, believed in ancient origins for Christianity amongst virtuous pagans (Piggott 1975, 151). In his History of the Druids he saw the circle stones at Calanais as representing the signs of the zodiac, the rows as representing the four principal winds, and the 19 stones on each side of Martin's avenue as standing for the 19-year solar cycle (Toland, 1726, 136). He was the first to relate the tales of Diodorus Siculus to Calanais (Toland 1726, 188-91). In his contention that Calanais symbolised both the zodiac and the 19-year solar cycle he may be counted as the progenitor, not only of astronomical speculation about the site, but also of a tradition of basing far-reaching conclusions about Calanais on faulty evidence.

In 1743 Carte, in his History of England, was the first to relate the 'winged temple' explicitly to the Hyperboreans of Eratosthenes; and his is the first mention of one of the nearby stone circles. In 1808, in a footnote to Barry's account of Calanais, Headrich advanced the concept of Calanais as a rude astronomical observatory, using which 'the priests could mark out the rising of the sun, moon and stars; the seasons of the year; and even the hours, or divisions of the day' (Barry, 1808).

For the eccentric and polemical John Pinkerton in 1814 Calanais was 'an ancient gothic court, in which great affairs were decided'. His interpretation supported the 'Germanist' school of thought, which was in competition with the 'Celticist'; those schools reflected deep political and religious divisions (Ferguson 1998, 293). It is alas fairly easy to find other examples of the imposition of prejudice on archaeological sites, but this remains one of the finest specimens of its type.

3.2 Colin Mackenzie

Mackenzie's first-hand account was printed in 1792. 'Calernish is on the side of an arm of the sea on the west side of Lewis : On a rising ground above the village, there is a circle of stones with a remarkable high stone in the center. From this circle a double range extends down the hill to the northward, and at the end there is a higher stone, which at some distance resembles a small obelisk. From the other three sides of the circle stretches a range composed of three stones ; so that the whole forms a cross. … From the idea I still have of it, I have drawn the annexed plan : The measures I actually took on the spot, and still remember. Round each of the stones which compose the circle, there is a hollow "which retains the rain water ; this was so wide round the central stone, as to embarrass me much in taking its dimensions. Were a ditch cast across the circle to a tolerable depth, some utensils, ashes, &c. might be found, to

throw still more light on the subject; I have been told that a stone bowl was found, and afterwards thrown, through a superstitious dread, into the hollow round of the central stone.' (Mackenzie 1792, 283-4).

The plan adds nothing to the narrative. It does however support the idea that the peat was sufficiently deep in the 18th century to bury the shallowest stones of the east, south and west rows.

3.3 A geologist intervenes: John MacCulloch

A more useful original account had to wait for a geologist rather than an antiquarian. John MacCulloch had in the early years of the century prepared several papers for the Geological Society. Using his earlier papers as a basis he published The Highlands and Western Isles of Scotland in 1819 and A Description of the Western Isles of Scotland in 1824. What he knew about archaeology he got from others; in his 1819 publication he titles his plan 'Druidical Temple'; but in that of 1824, no doubt under the influence of people of the 'Germanist' school, he derided Druidical interpretations and took Calanais to be a Norse creation (MacCulloch 1824).

3.3.1 MacCulloch's Calanais texts

As described below, the place was probably covered by about 1.5m of peat in the 18th and early 19th centuries, and it is unlikely that any of the stones once completely covered by peat were noticed by MacCulloch except perhaps in the northern part of the avenue where peat clearance may already have gone further than in the south (Ponting and Ponting 1979).

The two accounts of Calanais do not differ significantly in their descriptive details. In his 1819 account he wrote as follows. The form is a cross, containing at the intersection a circle with a central stone; an additional line being superadded on one side of the longest arm and nearly parallel to it… the longest arm … lies in a direction 24º west of the meridian … The total length of this line is at present 588 feet, but there are stones to be found in the same direction for upwards of 90 feet further, which apparently have been a continuation of it, but which have fallen …The whole length may therefore with little hesitation be taken at 700 feet. The crossline, intersecting that now described at rightangles, measures 204 feet, but as it is longer on one side than the other, its true measure is probably also greater, although I was not able to discover any fallen stones at its extremities; the progress of cultivation having here interfered with the integrity of the work. The diameter of the circle which occupies the centre of the cross is sixty-three feet … The stone which marks the centre is twelve feet in height. The heights of the other stones … are various, but they rarely reach beyond four feet: a few of seven or eight feet are to be found and one reaching thirteen is seen near the extremity of the long line. The additional line already mentioned, extends northwards from the outer part of the circle, on the eastern side. It is however very defective, a great number of stones being absent towards its northern extremity; although there is apparent evidence of their former continuity, in one which remains erect and in others which have fallen from their places. I could not discover any traces of a line parallel to this on the western side; but as some inclosures have been made in the immediate vicinity, it is possible that some such may originally have existed; notwithstanding the superstitious reverence with which the Scots in general regard these remains, and the care with which, in their agricultural operations, they commonly avoid committing any injury to them. The intervals between the stones vary from two to ten feet or more, but it is probable that the larger spaces have resulted from the falling of the less firmly rooted pillars which occupied those places. The number of stones in the circle is thirteen, independently of the central one; and the number in the whole building, either erect or recently fallen, is forty-seven.

The aspect of this work is very striking, as it occupies the highest situation on a gently swelling eminence of moorland; there being no object, not even a rock or stone, to divert the attention and diminish the impression which it makes.

MacCulloch then mentioned, very briefly, the nature of the nearby stone circles, and the existence of solitary stones of a monumental nature.

He discussed the addition of carvings of crosses on stones set up as sepulchral memorials or Druidical worship, and went on to say that Calanais was not a Christian monument.

His 1824 account is more summary, but gives detail (some possibly erroneous) omitted from the earlier narrative. The west side of the avenue had 'only three erect and seven fallen stones and reaches, as far as I could discover, only to 480 feet'. The east-west rows included 10 erect stones and stretched for 204 feet. The circle had 14 erect stones in the circumference. The total number of stones was 48 (one more than the figure he gave in 1819). 'The name of this place is Classerniss, but the work itself is called, by the people, Fidvreachie … There are other circles of the more ordinary construction in the same immediate neighbourhood … The aspect of the large work is very striking … it appears to have been surrounded, at a small distance by a trench or ditch, which is now, in many parts, obscure; the same circumstance occurs in the great circle of Stenhouse in Orkney, as well as at Stonehenge …'.

The number of stones seems not to be based on fresh information, but at least in part on the plan included in the 1819 account which contained the errors discussed below. That said, it is curious that he describes the east side of the avenue as having three erect stones of a total of ten; he showed only two erect out of ten on the 1819 plan (Illus 3.2). His figure of 480 feet (read 8 inch links, for as described below his surveyor probably took his dimensions with a chain and MacCulloch probably misunderstood his units of measurement) for the east side of the avenue is inexplicable if measurement started from the stone circle. It should have been 414 feet (read links). There is, significantly, no mention in either narrative of a large stone set up in the mouth of the avenue.

MacCulloch may have been referring to the circle alone when he wrote that the setting was surrounded by a trench or ditch. That idea was tested during excavation (Chapter 9: Area D) and found no support. Perhaps, if there were hints of a surrounding ditch they were occasioned by peat cutting. It is conceivable however that he referred to the curving land division surrounding the whole setting shown on the Ordnance Survey map of 1853 (Illus 3.21).

3.3.2 MacCulloch's plan

The plan attached to his first description is particularly valuable (MacCulloch, 1819, vol 1, 184 and vol 3, plate 30).

As discussed below, it seems likely that the measurements were taken for MacCulloch some time after his own visit. His plan contained several imperfections. He showed fourteen stones on the circumference of the circle and omitted Stone 9 to its southwest, and gave the dimensions of the setting as being much larger than they were. Like Martin Martin he represented it as a true circle in a rectangular cross. He showed the west side of the avenue in line with the south row; the southernmost three stones of the west side of the avenue are indeed roughly on a line drawn through the south row and central monolith, but all the rest of the avenue stones lie off to the east of that line.

3.3.3 Comparing MacCulloch's plan with the Glasgow plan

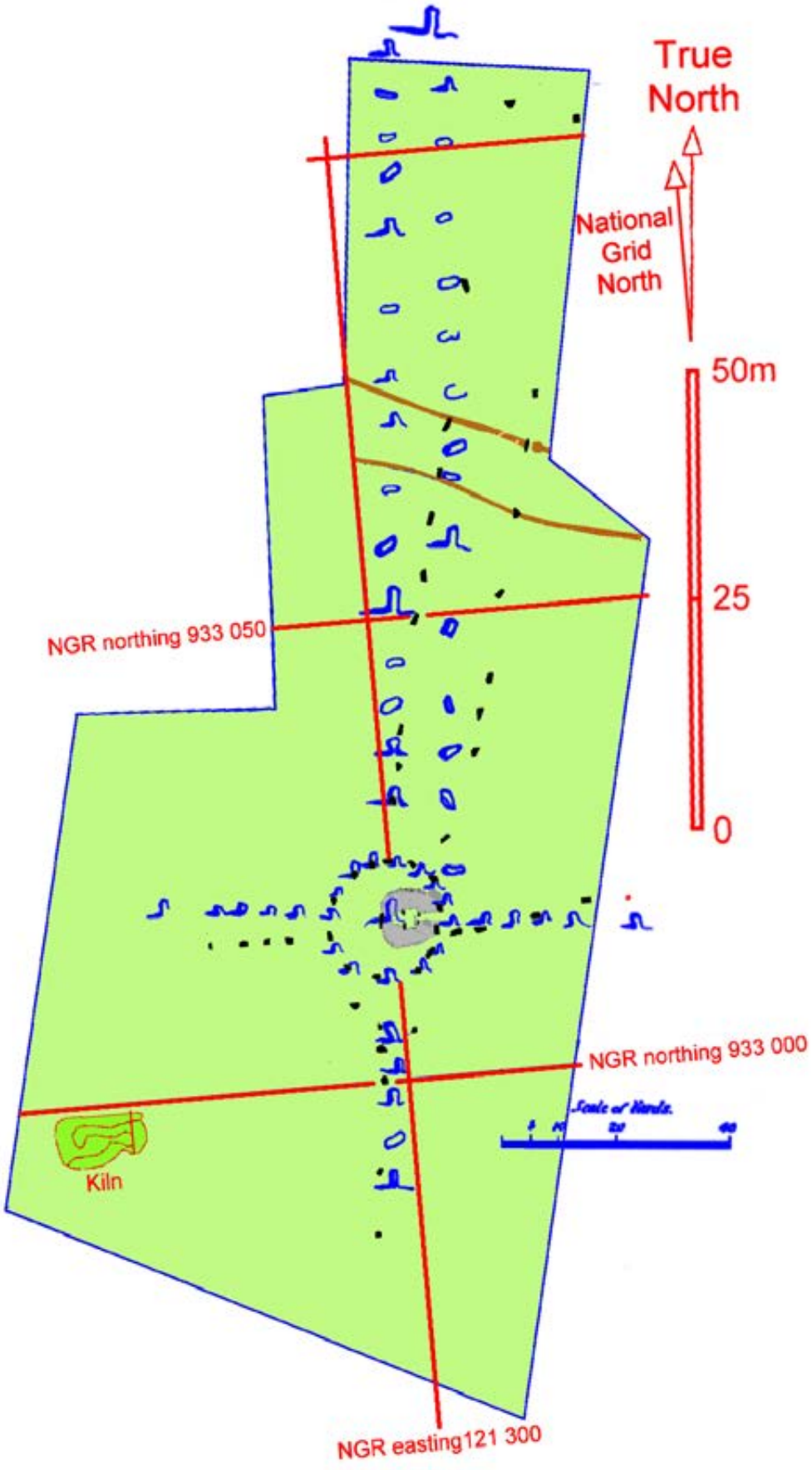
Alexander Thom noted in 1967 that the scale on MacCulloch's plan was wrong. He suggested that the measurements were taken in links (two thirds of a foot) but quoted as if in feet (Thom, 1967, 122). Accepting the Thom correction and changing MacCulloch's 40 yds to 120 links (80 feet) I have brought his depiction of the Ring onto that on the Glasgow University 1978 plan (Illus 3.3). I have increased the size of the stones on the latter slightly, to aid visibility on the illustration.

If MacCulloch forgot or did not know that a surveyor's chain had been used to measure the monument, it seems likely that someone employed by him measured up each row by laying a chain along it, perhaps from the nearest stone of the circle. Therefore it seems sensible to analyse each component of the plan separately.

3.3.4 The Ring and Stone 9

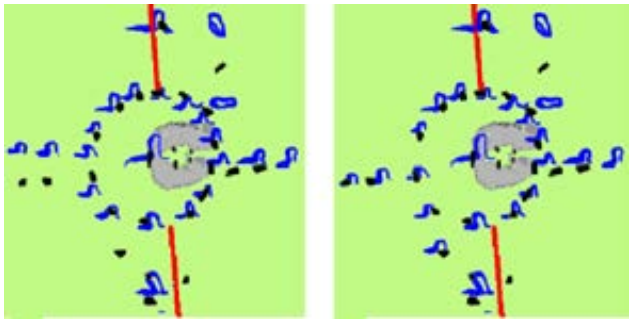
The likeliest reason behind MacCulloch's including 14 rather than 13 stones in the circle is that he included Stone 9 in it. It stood just outside the south-west quadrant of the circle. Presumably his surveyor noted its distance to the two nearest

Illus 3.2 MacCulloch's plan

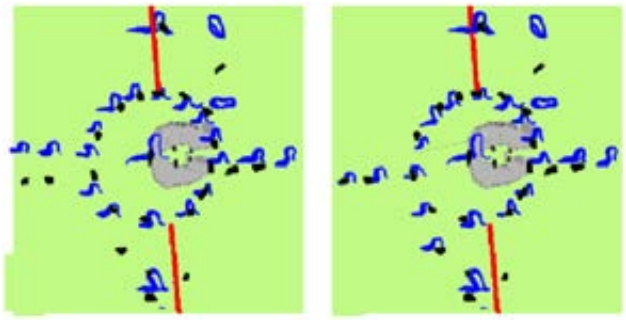


Illus 3.3 MacCulloch's plan in blue at the same scale as the Glasgow University 1978 plan.

stones of the circle (Ring stones 47 and 48). The southern row springs from Stone 47 and MacCulloch would have regarded its position as fixed in his rigid cruciform. He also knew that Stone 49 was opposite the western row and should, according to his preconception of the overall plan, be one right-angle away from stone 47. Between these points he had three interval measurements (from 47 to 9, from 9 to 48 and from 48 to 49). He found that the measurements filled a quarter-circle neatly, so he showed Stone 9 on the circumference of the circle rather than to its SW.



Illus 3.4 Correcting the Ring and Stone 9 error (a) unadjusted extract from Illus 3.3 and (b) adjusted extract



Illus 3.5 Additional manipulation (a) unadjusted extract from Illus 3.3 and (b) further-adjusted extract

For Illus 3.4 I moved MacCulloch's depiction of the stone corresponding to Stone 9 to more or less its correct position. I then rotated and moved the west row, the Ring stone at its end and the next Ring stone south as a block until its distance from Stone 9 remained as before. This procedure worked quite well except that it significantly increased the distance between the Ring stone at the end of the west row and the next Ring stone north.

I therefore rotated another block consisting of the three north-westernmost stones of the Ring (Illus 3.5). That reduced the discrepancy and brought the depicted stones into a better accord with their true positions (Illus 3.5 (b). The simplicity of the adjustments suggests that MacCulloch indeed included Stone 9 in the Ring by mistake.

He published the north-south diameter of the Ring as only one foot (read link) more than the east-west one; if he took the central monolith to be the centre of a near-circle, he should have recorded a greater difference of 3½ links. I have not checked to see whether taking measurements at 1.5m (the depth of the peat in the early 19th century) above present ground level makes the distances indeed only 0.2m different from each other, so MacCulloch's measurements may have been right. But I suspect that the error may be related to the fact that the north-south width of the central monolith is considerably greater than its east-west thickness.

3.3.5 The Avenue

As first suggested by Gerald and Margaret Ponting (1979), MacCulloch may have thought that measurements of the stone rows which in truth started from the circle were to be applied from the first stone of each row, including those forming the Avenue (Ponting & Ponting, 1979). I shall refer to remedies for this as 'the Ponting correction'.

Most of the ground round the Avenue was probably covered by peat when MacCulloch saw it. A decade or so earlier Mackenzie had recorded that 'Round each of the stones which compose the circle, there is a hollow which retains the rain water ; this was so wide .round the central stone as to embarrass me much in taking its dimensions' (Mackenzie, 1792, 284). This depression of the peat round a stone is a common feature today in wet areas (it can, for instance, be seen on Airidh nan Bidhean two miles south of Calanais). Some of the Avenue stones MacCulloch took as fallen may have seemed to lie each in a slight hollow.

At the end of the century Pitt-Rivers and his draughtsman, Tomkin, recorded the height of the marks etched by peat on the stones at Cala-

nais (PRO WORK 39/15, 11, 12 1-7 and PRO WORK 39/16).

Illus 3.6 recreates their record graphically. The stones are numbered as by Somerville (1912). The columns in red represent stones on the east side of the avenue and those in yellow the stones on the west side. The reconstructed peat height is depicted as a green line.

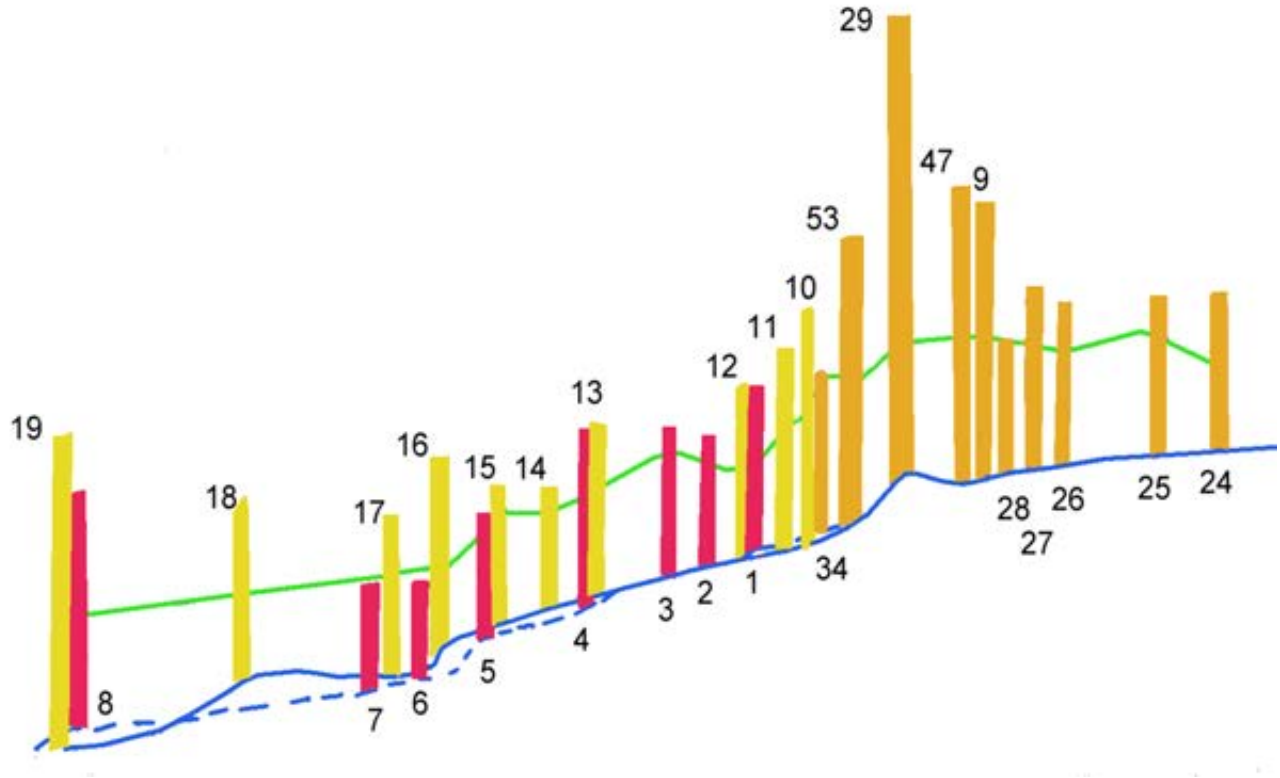
Stone 12 is now only 1.14 m tall, but around 1857, when Sharbau sketched it, it was 1.57 m tall (Ponting 1984, 29). The reconstructed peat hump depicted at Stone 3 may be wrong because in 1857 the sketch made by James Kerr (Illus 3.25) showed Stone 3 leaning quite sharply.

3.3.6 The west side of the avenue

It seems likely that stone 6 and stone 7 in the east side of the avenue were completely covered by peat for a long time. Also, certain stones seem to have been barely visible before the peat was removed from round them. Because some of them had one long horizontal dimension, they may have seemed to be fallen stones. Into this category fall Stone 5 and perhaps Stones 2 and 3 in the east side of the avenue and Stones 14 and 15 in the west side of the avenue, along with Stone 34 outside the north-east quadrant of the circle, (Ponting and Ponting, 1979).

Using MacCulloch's scale with the Thom correction the west side is too long on his plan. Applying the Ponting correction by placing the southernmost stone on the Ring brings his plan into approximate correspondence with what is visible today, if allowance is made for 1.5m of peat (Illus 3.7).

He showed Stone 10 in its correct position. He showed Stones 11 and 12 as 'place holders' or as fallen which is difficult to explain; judging by the etch-marks on them they should have stood well proud of the peat (Illus 3.6). He appears to have shown Stones 13, 14 and 15 but in incorrect positions. As described above only the tops of Stones 14 and 15 would have been visible and that may be why MacCulloch showed them as fallen. Stones 16 to 19 appear to be in their correct positions.



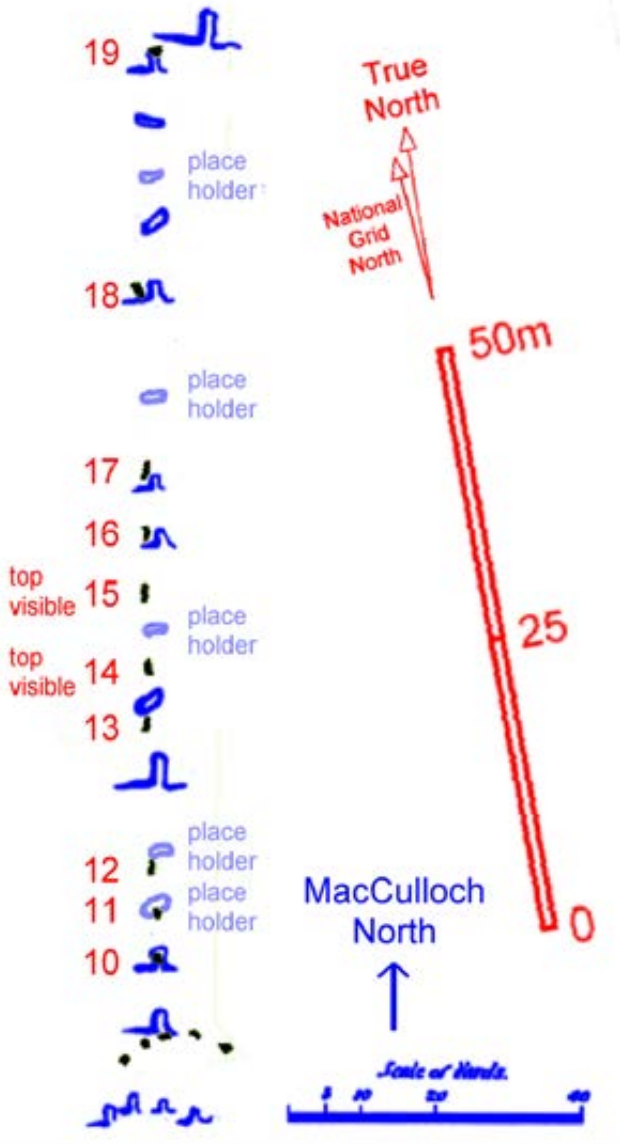
Illus 3.6 The long-term peat height relative to the heights of the stones, with data based on Pitt-Rivers 1882.

Stone 19 is currently the northernmost stone of the west side of the avenue and stands to a considerably greater height than the other avenue stones. Between Stone 18 and Stone 19 he showed two fallen stones and one fallen stone or place-holder. In 1980 we found what we interpreted as a stone-pit close to where he depicted one of the fallen stones.

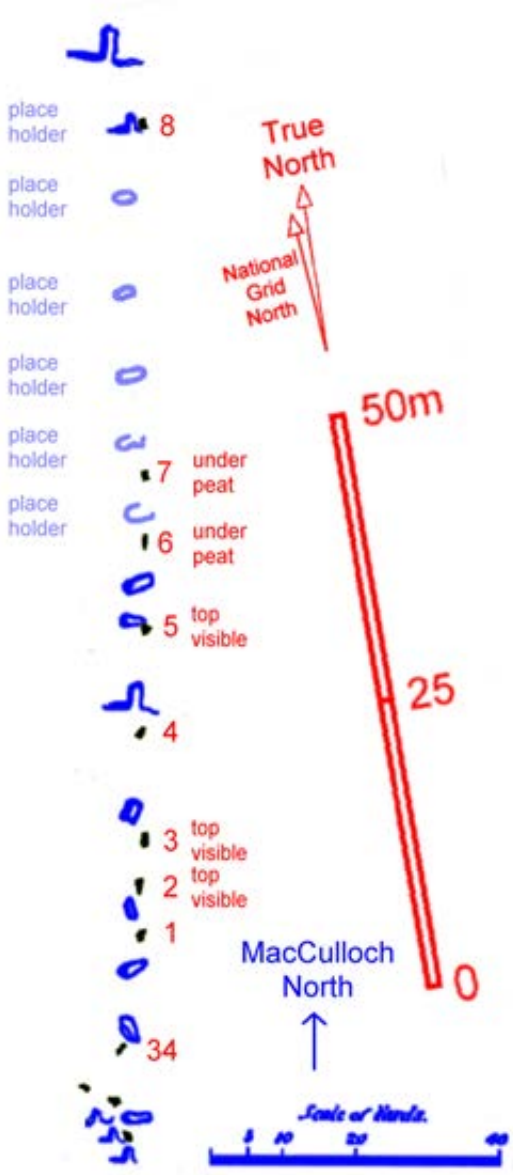
The error in positioning of Stones 13 to 15 is particularly severe. It raises concerns about errors over and above those already catalogued. Otherwise, apart from his showing Stones 11 and 12 as fallen the correspondence between MacCulloch's plan of the west side and the Glasgow plan is quite good.

3.3.7 The east side of the avenue

MacCulloch's depiction of the east side of the avenue is not very accurate even with the Thom correction (Illus 3.8). Only the top of Stone 5 should have been visible and it is shown as fallen. Stone 4 should have stood proud of the peat but it is shown in only approximately the right position. The tops of Stones 2 and 3 should have been visible but

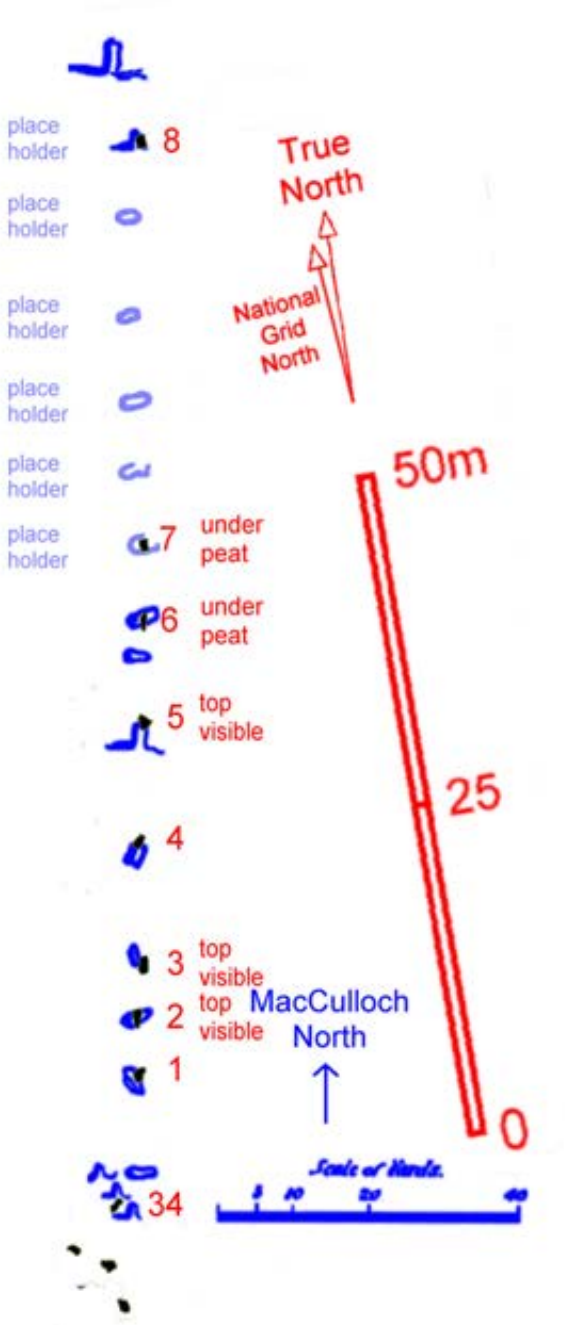


Illus 3.7 The west side of the avenue with the Ponting correction



Illus 3.8 MacCulloch's depiction of the east side of the avenue, with his northernmost standing stone by Stone 8.

they are shown in wrong positions. Stone 1 should have stood proud but it is not shown as standing. Worsaae's sketch of 1846, discussed below, appears to show Stones 1, 2 and 3 standing neatly north of the area of deeper peat round the Ring. Stone 34 does not seem to figure in Worsaae's sketch and is depicted as fallen on MacCulloch's plan; its top should have been visible (Illus 3.6).



Illus 3.9 MacCulloch's depiction of the east side of the avenue rescaled, with his northernmost standing stone by Stone 8 and his southernmost on Stone 1.

I have tried various other possible correlations with the Glasgow plan with MacCulloch's plan at the same scale; all are worse than that shown in Illus 3.8. If his scale is accurate (with the Thom correction) the plan does not particularly suggest that the Ponting correction should be applied. Perhaps the position of Stone 34, which is well west of the line of the east side of the avenue, made the surveyor's measurements more complex and MacCulloch, in trying to fit them to a cruciform, modified them incorrectly. Alternatively the stone shown fallen right next to Ring may have confused matters. It may have been the massive kerb slab excavated in 1981.

In fact a better fit is possible if the scale is ignored and MacCulloch's northernmost east-side stone is placed on Stone 8 and his southernmost on Stone 1. Then his depiction of the Ring covers Stone 34. The weak point in this solution is that he shows a standing stone where Stone 5 should only have its top visible and a fallen stone where Stone 4 should have stood well above the peat (Illus 3.9).

Both of these solutions (Illus 3.8 and 3.9) have problems. He obviously made mistakes in fitting together his data. Although his plan of the east side of the avenue is generically similar to the Glasgow plan it cannot be trusted.

3.3.8 The north end of the avenue

MacCulloch did not mention a stone set up in the middle of the mouth of the avenue in either of his texts. But in this area, on the western side of the avenue, MacCulloch showed both a mid-avenue stone 13ft high at the mouth of the avenue and a stone described as standing to 7 ft. Ponting and Ponting (1979) suggested that MacCulloch drew stone 19 twice, once 7 ft tall and once 13 ft tall. It is conceivable that when MacCulloch visited himself, the peat had not been cleared in this area, and that measurements were later taken by a surveyor using a chain after the northernmost peat had been cut away. The present height of Stone 19 is 11 ft 10 inches. If the average depth of peat over the site was 4 or 5 ft the stone MacCulloch recorded as 7 ft tall might have been stone 19. Indeed, the discrepancy between the height recorded by him for two of the circle stones (51 and 52) and their

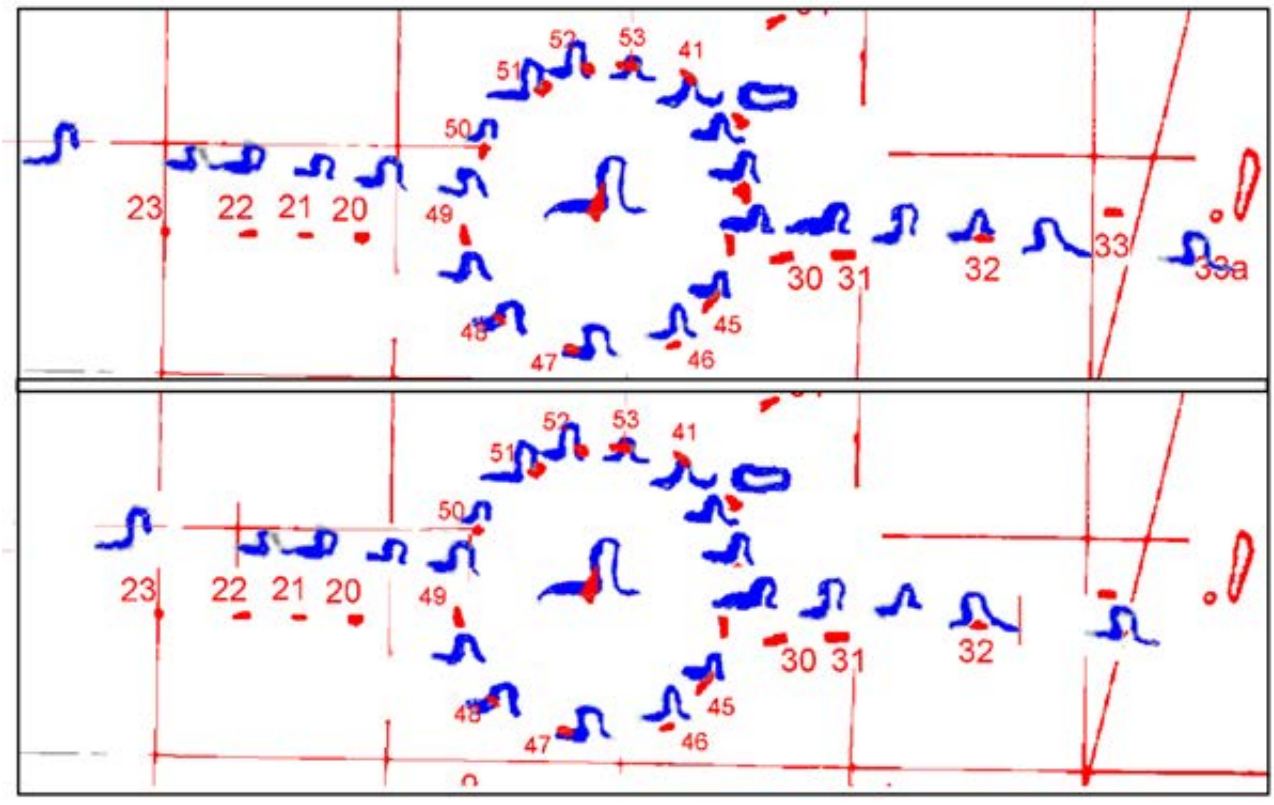
present height is very similar to that necessary in this hypothesis. It may be that MacCulloch drew up his notes with Martin Martin's account in front of him, and was aware of Martin's record that there was a large central stone at the north end of the avenue. A final (faint) possibility is that there was indeed another tall stone at the end of the avenue before 1819, more or less on its centre line, but that it fell and was removed before 1846, when the next interesting account was written (Section 3.3 Worsaae). I think it unlikely because if there had been two tall stones Mackenzie should have mentioned both.

3.3.9 The east and west rows

The east-west dimension of the setting on his plan is 247 links (50.2 m). In his text he records 204 ft (read links). As first suggested by Gerald and Margaret Ponting, MacCulloch may have thought that measurements which in truth started from the circle were to be applied from the first stone of each row (Ponting & Ponting, 1979). If so we must subtract about 35 links from the drawn dimension (the sum of the distances between the first stones of the row and the circumference of the circle measured from the drawing), making it 212 links.

Another consequence, as Ponting and Ponting suggested, is that McCulloch may have inserted extra stones into his plan of the east and west rows. Illus 3.10 depicts the results of moving the first stones of the east and west rows onto the depictions of the nearby stones of the ring.

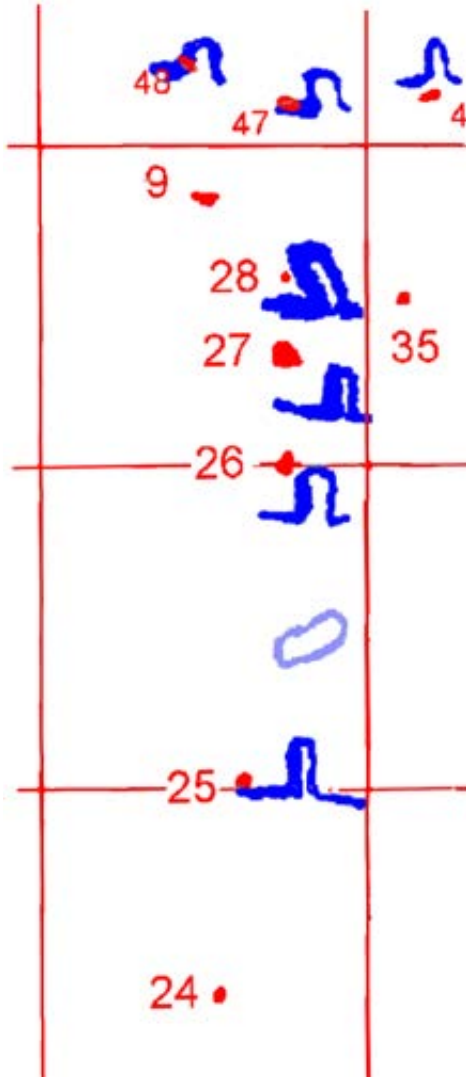
Visually, the correspondence with the west row is much improved. Remaining errors probably stem from MacCulloch's assumption that the stone setting was laid out as a right-angled cross. Another consequence is that there is no need to suppose that the fallen Stone 33a, located by Gerald and Margaret Ponting beyond the east end of the east row as it appeared in the 1970s and subsequently excavated in 1980, was visible when MacCulloch visited. Worsaae in 1846 and Palmer



Illus 3.10 The east and west rows, (a) as shown by MacCulloch but realigned so that his depiction of the Ring fits the University of Glasgow 1978 plan, and (b), below, with the rows moved so that the innermost stone of each overlays MacCulloch's nearest stone of the Ring.

in 1857 seem to have recorded five stones in the east row, but that may reflect peat cutting between MacCulloch's visit and 1846.

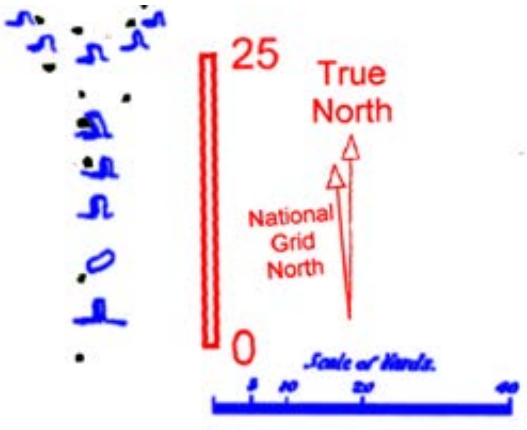
3.3.10 The south row



Illus 3.11 The south row

At first glance, the southernmost stone, stone 24 of the south row, seems not to be shown on MacCulloch's plan (Illus 3.11). However, he shows the stone in the position of today's Stone 28 as the tallest in the row. Stone 28 is notably small. In fact the second stone in the row, Stone 27, is the tallest. Also, there seems to be a reasonable case for suggesting that Stone 28 was not visible before 1857, when the remaining peat was cleared from the around the Ring.

It has a peat-etch mark very close to its tip, and that on nearby stones of the Ring and on Stone 27 appears to be higher or the same height in a photograph of around 1900 (Illus 3.12) and it does not appear on the plan made by Palmer in 1857 just before peat was cleared from the area around the Ring.



Illus 3.13 Matching MacCulloch's northernmost stone with Stone 27

But matching his northernmost stone with Stone 27 does not improve matters much (Illus 3.13); nor does applying the Ponting correction by moving the MacCulloch plan so that his northernmost stone overlies Stone 27.

MacCulloch does not show the small stone, stone 35, to the east of the south row. Had it been standing in its present position it would have been covered by peat, particularly if its top had been snapped off as it was around AD 1900 (Illus 3.12). It is discussed in more detail below.

My own surmise is that his mistaken belief that Stone 9 was on the circuit of the Ring figures somehow led to the discrepancies between what he drew of the South Row and what is visible today. Although he showed four standing stones and four would have been visible judging by the etch marks on them (Illus 3.6) his depiction of the south row cannot be trusted.

3.3.11 MacCulloch's plan

This analysis suggests (as did mine and that of Ponting and Ponting in 1979 (Ashmore 1984; Ponting and Ponting 1979) that the sequence of events was as follows. MacCulloch visited the set-

Illus 3.12 The northern end of the south row around 1900 AD showing peat etch marks on the stones [RC/1432 cropped]

ting and made notes, perhaps including a rough plan, in the early 19th century. At that time all or nearly all of it was in peat 1.5m deep. Some years later when preparing for publication he discovered that his notes and memories were inadequate and commissioned a surveyor to measure the setting using a surveyor's chain. Some of the peat at the north end of the avenue had been cut by then. When he created the plan he misunderstood the surveyor's methodology.

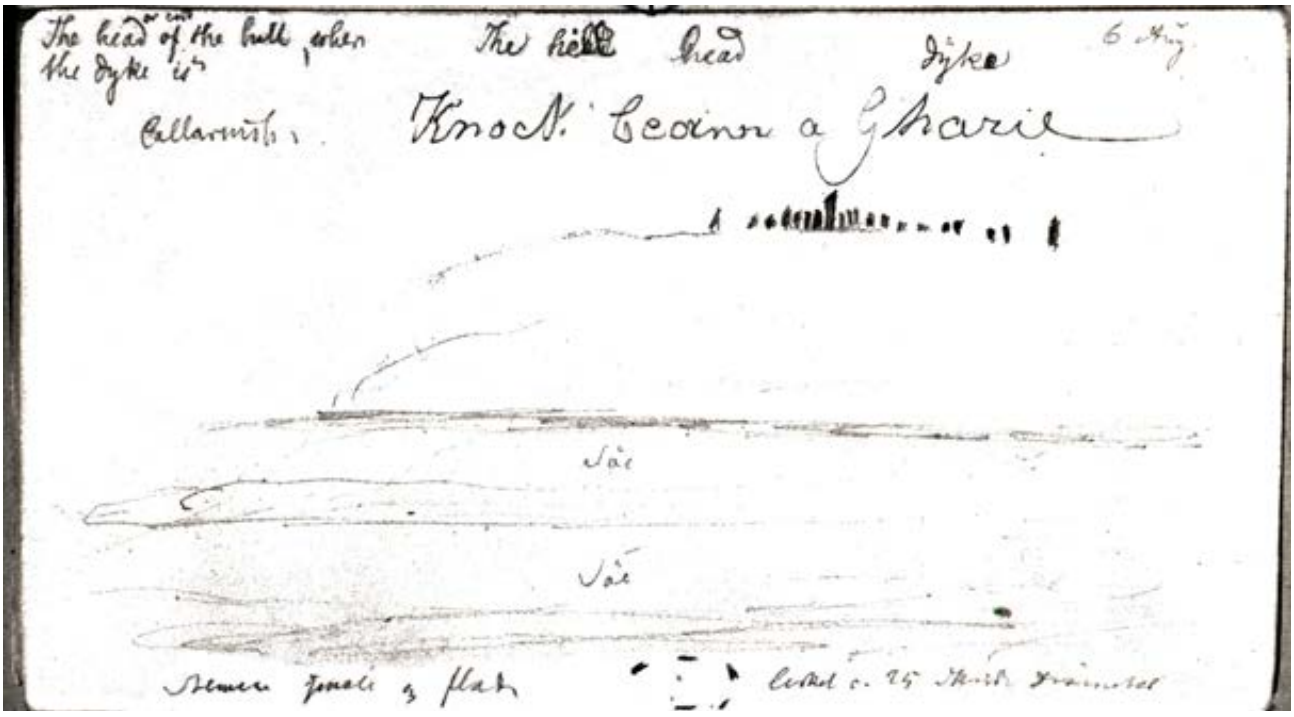
The stones he showed as fallen in the northern part of the avenue were probably close to the stone-holes in which they had once stood. Resistivity survey by the author with the help of Mrs M Ponting in 1979 showed a variation to the north of stone 18, roughly where MacCulloch showed a fallen stone (see Chapter 5: Resistivity Survey). Excavation in 1980 led to the discovery of a pit or stone-hole. It is described in the account of the excavation of Area A (see Chapter 6). However this does not validate MacCulloch's plan of this part of the setting for perhaps a trench of similar size placed anywhere on the line of the west side of the avenue would produce at least one pit of a size making it credible that it might once have held a stone.

My opinion of MacCulloch's plan today is less positive than it was 1979 (published as Ashmore 1984). I am no longer absolutely sure that it proves that the avenue and rows saw no restoration after 1819 (Ponting 1984, 33). Nevertheless, it has some use in formulating research excavation strategies in conjunction with Worsaae's and Palmer's later plans, described below.

In 1831 James Logan published a description in The Scottish Gael (Logan 1831, 332) based mainly on MacCulloch and Borlase. It does not seem to have been based on first hand knowledge. A rough plan includes 5 stones in each of the west, south and east rows while 7 stones are shown standing on the west side of the avenue and two on the east. Stone 9 is omitted, the Ring has one too many stones and a stone (not standing) is shown at the north mouth of the avenue. This corresponds to MacCulloch's count of standing stones and it seems unlikely that the plan includes any fresh information.

3.4 J J A Worsaae

Until 1844 Lewis was owned by the Mackenzies of Seaforth; for the previous 11 years it had been frugally administrated by the Seaforth Trustees. They sold it that year to James Matheson, a Sutherland man who had made his fortune in the Far East. Mr Matheson was well-connected and an active improver; during the famine years of 1845/6 to 1850 he employed his tenants to carry out improvement works. Amongst these, 50 acres round Loch Roag were reclaimed and brought under



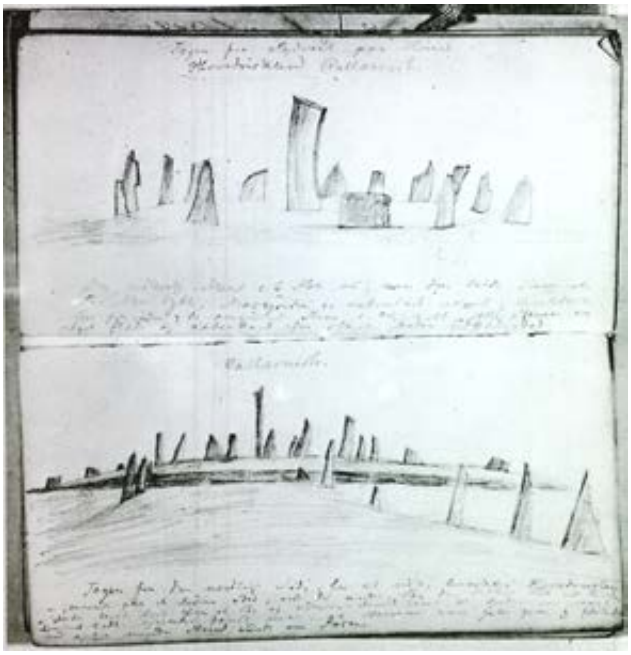
Illus 3.14 Worsaae's view of the setting from Cnoc Ceann a Gharidh

cultivation. In 1849 he received a baronetcy for his efforts (MacDonald 1978, 40-1).

Two years after Matheson bought the estate the Danish archaeologist J. J. A. Worsaae visited Calanais and other monuments on Lewis. His profile view of the setting from Cnoc Ceann a Gharidh was sketched on 6 Aug 1846 while the plan was drawn on 25 Aug and annotated on 26 Aug. He was twenty-five years old, and three years earlier had published his seminal Danmarks Oldtid. He was fulfilling his own recommendation: 'in order that the Danish memorials may appear in their true light and connection, it will be important to enquire in what regions of other countries similar monuments of antiquity have been observed...' Denmark is devoid of tall stone circles, and Worsaae's record of Calanais is more cursory than it appears at first glance. It survives in a notebook (XVII) kept in the National Museum of Denmark.

3.4.1 Worsaae's sketches

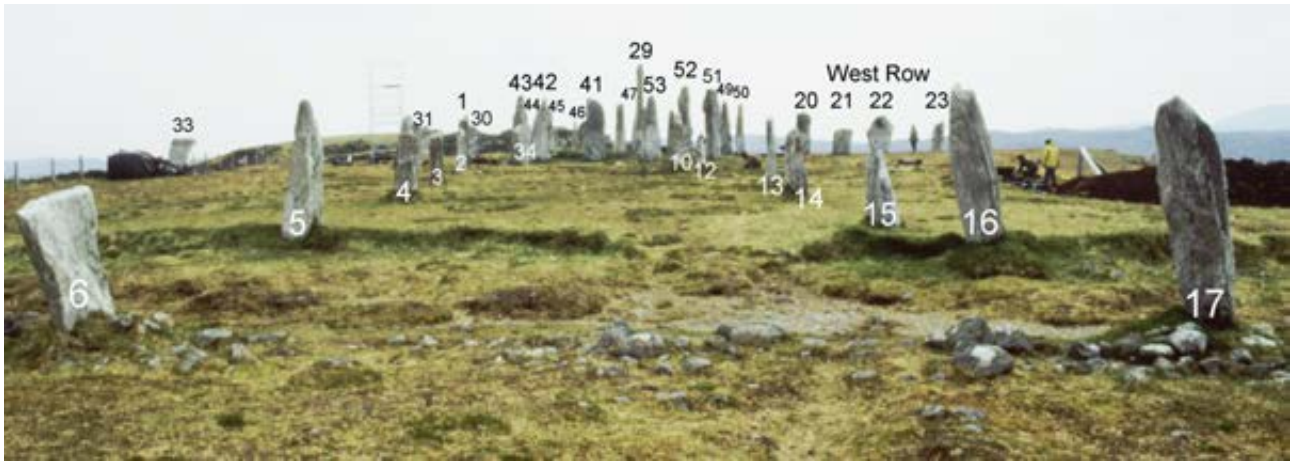
His sketches of the setting are full of verve. They show the circle in deep peat from the west and from the north (Illus 3.15). The peat height diminishes in all directions from the circle, except perhaps the south. He shows it cut away near the south end of the avenue, leaving most of the avenue at a height between that indicated by peatmarks on the stones and the present level.



Illus 3.15 Worsaae's main sketches of Calanais. (Worsaae's personal journal København NationalMuseet XVII 1846).

Illus 3.16 The lower sketch from Illus 3.15 cleaned up

Illus 3.17 A reconstructed view similar to 3.15, based on the background of Illus 3.18.



Illus 3.18 A view from north of the cart track in 1980 [Film 1980-6-1]

His annotations to the sketches, kindly translated in 1979 by Mr. B. Petersen of the Ancient Monuments Drawing Office, give additional information. His marginalia to the sketch of the circle from the southwest, translated, say 'seen from the southwest, on the mound, main circle of Callarnish' and 'The central stone is about 12 feet now, but is believed to reach four feet or so down. The peat soil is evidently untouched, as is seen on the sketch, and the surrounding stones are five or six feet. All the stones are very flat and are for the greater part evidently cleft out.'

His marginalia to the lower sketch, titled Callarnish, say 'from the north side, to show how the main circle is situated at a higher place than the northern stones'. Worsaae also noted that 'on the eastern side of the circle the earth was removed from a couple of stones whereby it was discovered that the earth was somewhat influenced by an iron-pan. Thus it was discovered that the stones were ground-fast and packed with other smaller stones around the foot'.

His notes do not reveal where the earth was removed from the stones. However, during excavation in 1980 iron pan was found only east of the northern half of the Ring (see Chapter 7: Area B). Presumably he dug around two of the East Row stones.

Illus 3.16 was drawn from a view-point near the cart-track which crosses the avenue. Illus 3.17 is based on the background elements of a photograph taken in 1980 from the north side of the track (Illus 3.18). The photograph has been manipulated digitally with the foreground omitted and the ground-level round the Ring raised to match the peat etch-marks on the stones. Although the photograph was not taken from the exact spot from which Worsaae made his sketch the correspondence is fairly good.

Although his sketch gives a fair impression of the setting, its detail is difficult to interpret. It contains a hint that peat-cutting on either side of the avenue had reached a greater depth than cutting within it (Ashmore 1984), but it now seems to me more likely that the lines giving that impression were guide lines for placing the bases of avenue stones.

Remembering that in MacCulloch's time only Stones 10 and 13 were visible at the south end of the west side of the avenue, I think that those must be the stones shown by Worsaae. If so the four more northerly stones might be 14 to 17. Similarly the three stones shown on the east side of the avenue might not be Stones 1 to 3 but 2 to 4 (Illus 3.18).

But Worsaae's sketch cannot be used to prove arguments about the presence or absence of particular stones of the avenue. It is extremely difficult to distinguish the elements of the setting from one another from any single viewpoint. Indeed, in numbering the stones on Illus 3.18 I found it very difficult to match some of the more distant stones on the 1980 photograph to the reliable numbered Birds Eye View produced by Gerald and Margaret Ponting (1984, 28-9). My conclusion is that it is best to enjoy the vitality of the sketches without trying to work them too hard.

3.4.2 Worsaae's plan

Worsaae's plan of the site seems to have been made hastily and without surveying instruments (Illus 3.19). Like his predecessors, he represented it as a rectangular setting. He seems not to have allowed sufficient space in starting the plan, but compensated to some extent through marginal notes. His measurements were given in three units, the pace, the foot, and the alen. Some of the plan distances were given twice, once in feet and once in paces, but it is not clear whether these were independent.

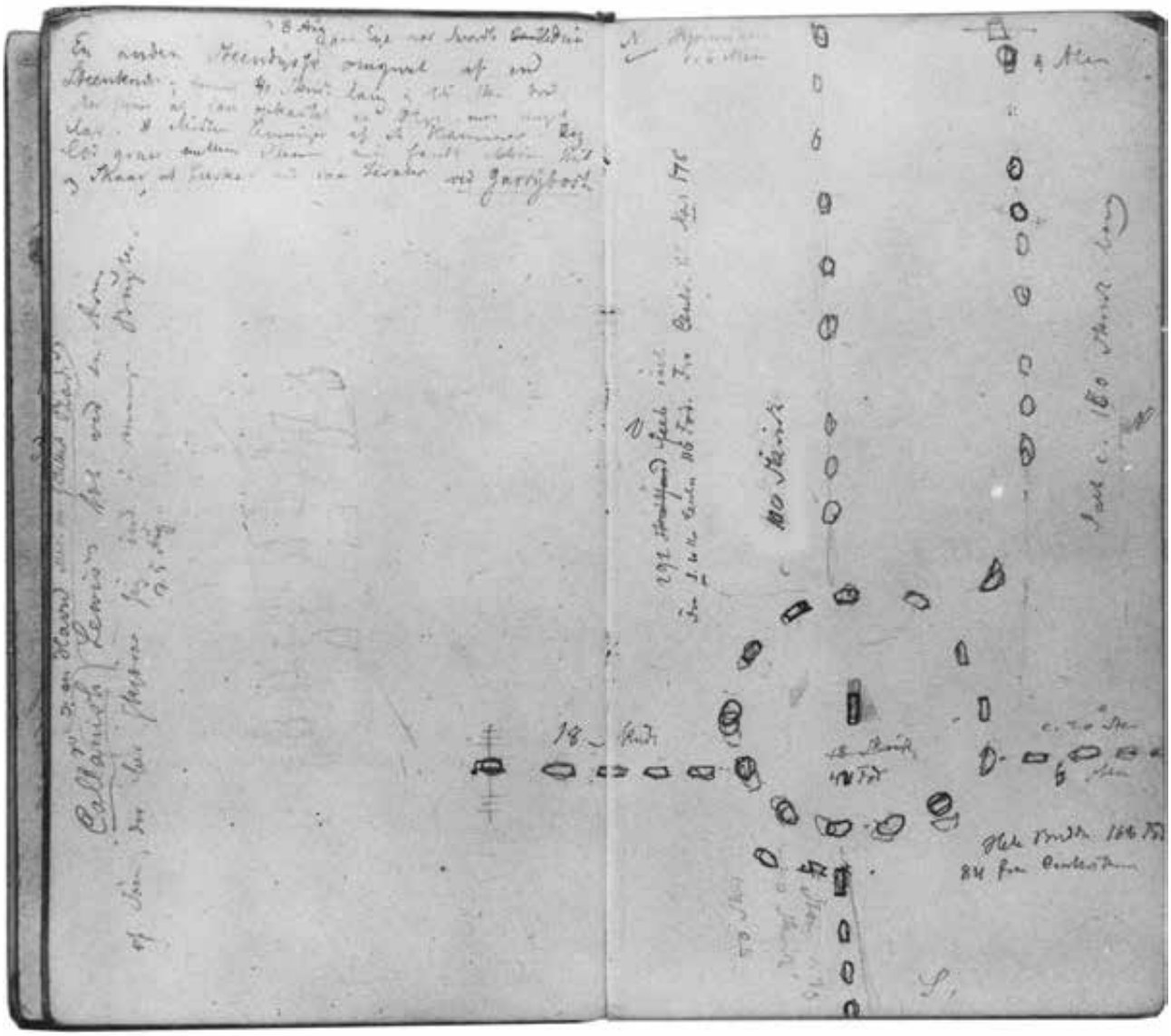
In Illus 3.20 Worsaae's plan has been cleaned up. Annotations are as translated by Mr. B. Petersen in 1979 but alen have been converted to feet (a Danish foot was 1 mm longer than a British one; one alen was two Danish feet).

It may be that he converted paces to feet according to his knowledge of the length of his pace or that he paced out the setting as a rough check on measurements in feet. His measurements in paces were, for the longer distances, all multiples of 50, (indeed, that on the right seems to have been corrected from 160 to 150) implying a strong likelihood of approximation, but when his pace measurements are compared with present dimensions they imply that two different

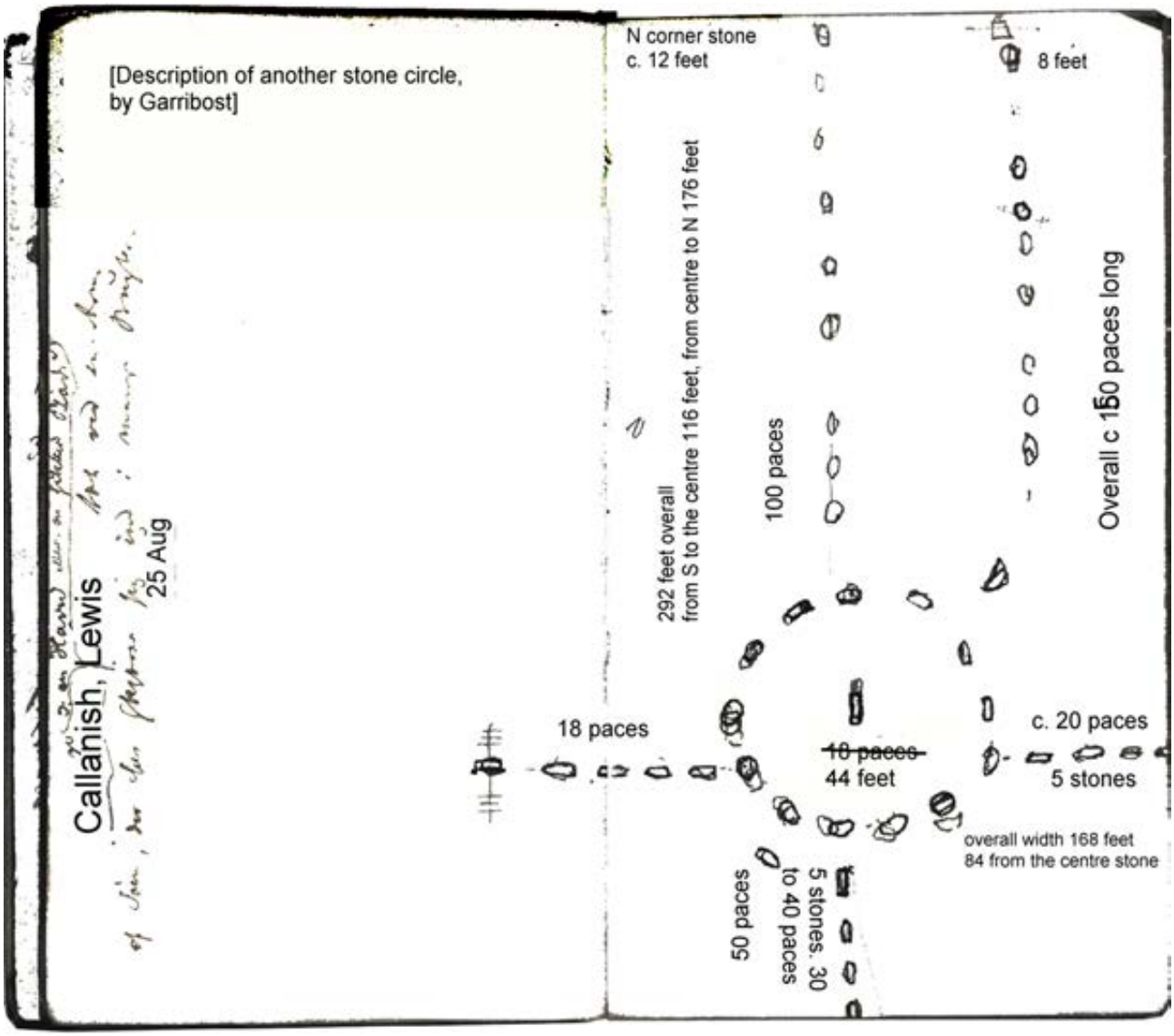
paces were used: a short pace for the circle, the south and the west rows, and a long pace for the overall length, the avenue and the east row (Ponting and Ponting 1979).

Only his figure for the south row is acceptably close to the present length: his measurement for the east-west rows overall was higher than it is now, while his measurements for the avenue were far too short. For his overall east-west measurement of 168 feet to be correct we would have to assume that there was another stone (as he may have tried to show) at the western extremity 23 ft beyond the last now known, some 2 m east of the sharp drop which provides a natural western boundary to the site.

Even if we allow that there was, in his time, a stone beyond the present easternmost stone of the east row, as is implied by an annotation, his measurement seems to be wrong. If we assume that the fifth stone was the same one as that shown by Palmer 19 ft further on, his eastern row measurement would be short by 9 ft.



Illus 3.19 Worsaae's sketch plan of the stone setting. København NationalMuseet. Worsaae's personal journal XVII 1846).



Illus 3.20 Worsaae's plan cleaned up with annotations translated

3.4.3 Worsaae's contribution

The stones depicted on Worsaae's plan or implied by his marginalia are those known today, with the possible exception of an extra stone in the west row, and the omission of the small stone outside the south-east quadrant of the circle (stone 35) which would have been beneath the peat. Notes against both the east and south rows (where he depicted only 4 stones) record the number of stones as 5. Taking into account MacCulloch's earlier depiction of only 4 stones, that suggests to me that Worsaae at first ignored and then included the stone closest to the Ring, Stone 28, which in MacCulloch's time was quite possibly buried in peat up to its tip and looked like a small stone near the surface. His record of a cornerstone 6 alen (slightly over 12 ft) tall at the northwest extremity of the avenue contrasts with MacCulloch's plan showing a tall stone almost central to the avenue and about 13ft high, and with the latter's record of the height of the northernmost stone of the west side of the avenue as 7 ft. It makes it seem even more likely that MacCulloch's positioning of the tall stone was an error.

It is impossible to bring any of Worsaae's measurements into accord with what we now see, except by applying different conversion factors to

his paces for different parts of the site. It is most likely that Worsaae's measurements were very approximate (for a different view, see Ponting, 1979)

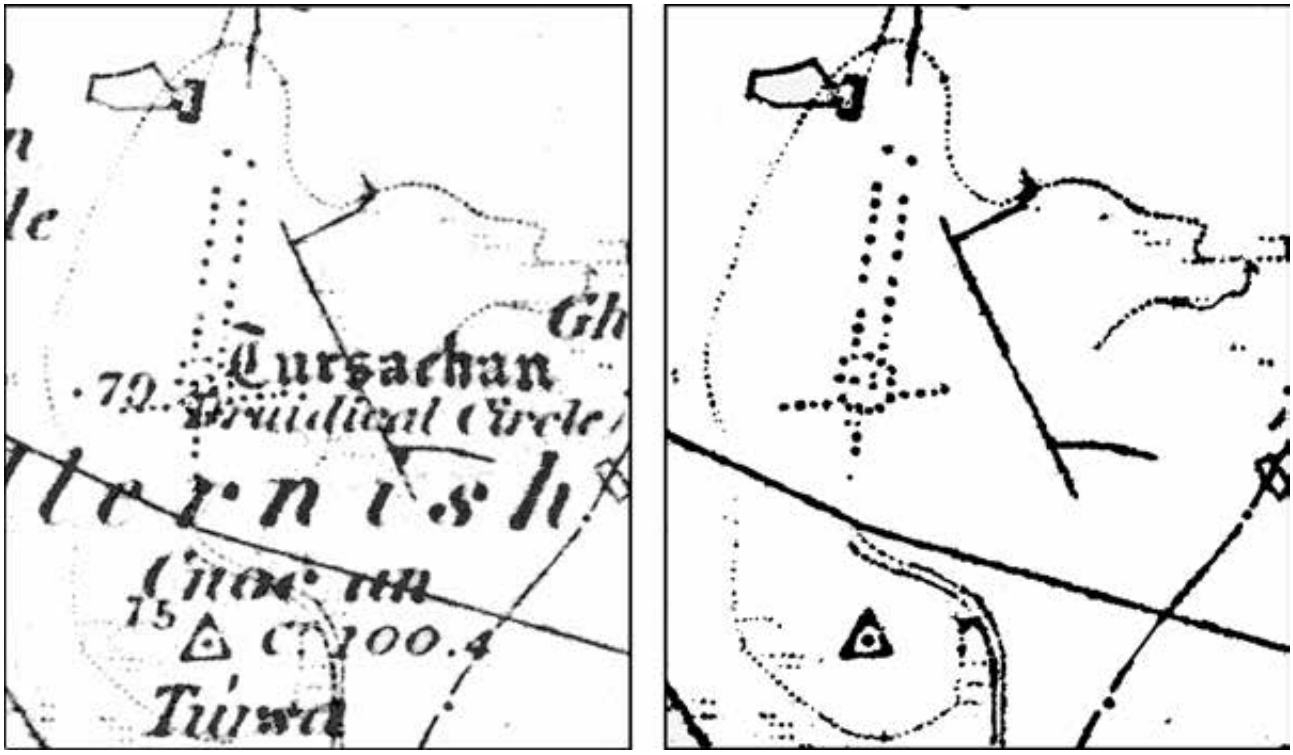
3.5 The Ordnance Survey

Soon after Sir James Matheson acquired Lewis in 1844 he offered to put up at least part of the money for mapping of the island by the Ordnance Survey (Robson 1989, 99). Its work began in 1847-48 and ended in 1853. It published the first-edition 6 inches to the mile map of the area around Calanais in 1853, including a fairly accurate representation of the site (Illus 3.21). Only slightly stylised, it showed the arms of the cross in their correct orientation, and with Worsaae's account provides firm evidence that the setting of standing stones was, by the mid-19th century, much as we see it today except that peat remained around the Ring (to a depth of about 4 feet on the east of the circle where test pits were dug), and to an unascertainable depth over much of the rows and avenue.

It shows ten stones in the west side of the Avenue, in three groups of three followed by a gap and then the tall stone at its north end. Making allowances for the approximations necessitated by the small scale that is exactly what is visible today. It shows nine stones in the east side of the Avenue: a single stone to the south followed northward by a group of three and a group of four, and then a gap before the northernmost stone. If the southernmost stone is Stone 34 the match with what is now visible is good. It depicts four stones each in the West and East Rows. Some sort of structure or an extra stone appears inside the Ring. In Illus 3.21 I have retained the 'D' of 'Druidical' because it obscures the plan and makes the number of stones in the Ring slightly ambiguous, although there seem to be 13, and the 'D' may conceal Stone 9 to its southwest.

There is no sign of the track across the avenue. The kiln (or house and kiln) to the southwest of the setting is not shown. The wall between the setting and Cnoc an Tursa to the south is drawn, as is the track coming up from Calanais Farm to the south. A curving land division around the setting, shown as a dotted line, may explain MacCulloch's reference to a ditch around the main setting.

The only really curious feature is the detail in-

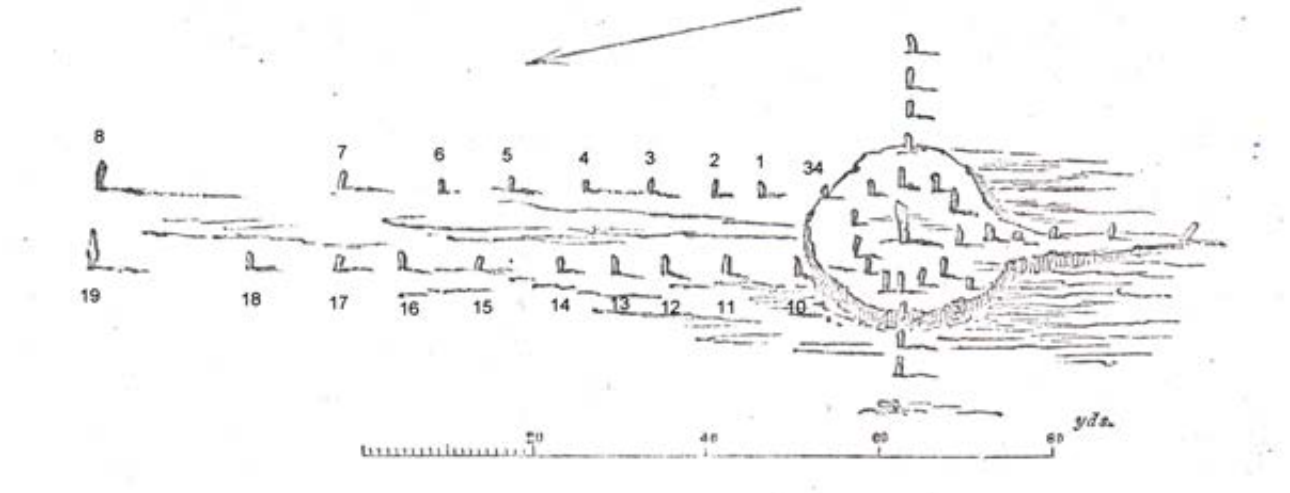


Illus 3.21 The OS map of 1853, with lettering removed on the right-hand version

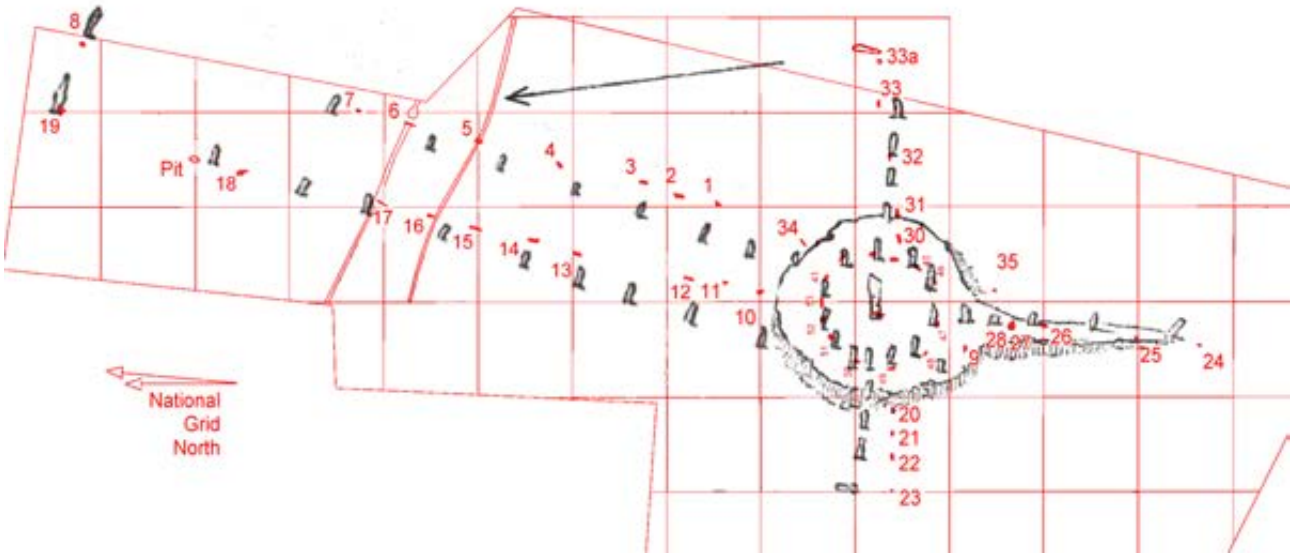
side the ring. It suggests a possibility that the top of the cairn was visible, perhaps in a large hollow of the kind noted over 50 years earlier around the central monolith Mackenzie 1792, 283-4)). A few years later (see below) James Kerr measured the height of the monolith as 12 feet, again suggesting that part of the top of the cairn might have been visible when the Ordnance Survey visited.

3.6 H Callender's account

The Proceedings of the Society of Antiquaries of Scotland for 1857 include a paper by Callender on Calanais which provides the last published information about the site before it was cleared of peat (Callender, 1857, 380-384). He noted that the upper parts of the stones forming the south row were aligned with the central monolith to point at the pole-star. That, he thought, was related to the fact that Lewis had been inhabited by a Scandinavian race. The pole-star was 'an invariable indicator of those northern regions, to which they would look as the land of their ancestors' (ibid, 382). Thus he conceived the builders of Calanais to be of Scandinavian origin; but they were also those Druids mentioned by Caesar (ibid. 383). He wrote at a



Illus 3.22 Callender's Birds Eye View with Somerville's stone numbers added by the avenue stones.



Illus 3.23 Callender's Birds Eye View; background detail is omitted; the avenue has been rotated and the view scaled to fit the Glasgow University 1978 plan

time when the identity of the Scottish nation was still a subject of debate, a debate about 'Goth versus Gaul' or a conflict between 'Germanist' and 'Celticist' schools of thought (Ferguson 1998, 293). Indeed, the urge to relate the early people of Scotland to Scandinavia was to persist at least until 1886, when J. A. Wylie published his 'History of the Scottish Nation. Wylie placed Valhalla in Caledonia and clearly confused the Caledonians with the Vikings (Ferguson 1998, 291-3).

In my previous account of early sources (Ashmore 1984) I was scathing about Callender's Gothicism. However, he may have the last laugh; preliminary studies of the genetic makeup of the population of the Western Isles suggest 'a northern and a southern Scandinavian component dating from 'the Neolithic' and although the details of that argument cannot be accepted as they stand there may be early connections with Scandinavia (Technical Note 24.2.4; Oppenheimer 2007, 231-233).

Although deploring the inaccuracies of earlier accounts, Callender stated that the ring contained 12 stones (1857, 383) rather than the 13 recorded in Worsaae's 1846 and Palmer's 1857 plans, and present today. His Birds' Eye View contained the

Illus 3.24 The engraving which accompanied Callender's article.

Illus 3.25 A sketch of the stone setting, 'Druidical Circle – Callernish – Island of Lewis', a version with township detail added formed the basis for the engraving (Illus 3.24).

same mistake, seemingly omitting Stone 44 at the south side of the passage of the chambered tomb. However he did show Stone 9 to the south-west of the Ring, so clearly his account was not based on MacCulloch's. But although the avenue had the right number of stones, he or his artist spaced them out too evenly. The south row, although having the right number of stones, was too short on his bird's eye view, and the stone heights were wrong, presumably because his artist has confused Stone 9 in Kerr's sketch with the northernmost stone of the row. The measurements he gave in his text (provided by Mr Kerr, clerk of works to Sir James Matheson, the proprietor of the island) were fairly accurate, except for those for the east and west rows. Oddly enough, given that error, they were depicted fairly accurately on the Birds' Eye View apart from their orientation.

His account included some interesting and original information. He noted that whereas Martin Martin had given the height of the central stone as 13 feet, Mr Kerr had recently measured it at 12 feet, from which Callender deduced that the peat had grown by 1 foot (slightly over 0.3 m) over the last 150 years (ibid, 383). He showed the westernmost stone of the West Row as fallen, unless his depiction was an attempt to illustrate the fact that it longest dimension in plan was at right-angles to the line of the row. He also noted that Sir James Matheson "…would, no doubt, if applied to by so influential a body as the Society of Antiquaries, order the moss to be removed, so as to discover in what manner the stones have been originally bedded, and to ascertain, at the same time, whether any building had been erected at the original level".

Included in his account was an engraving (Illus 3.24) of 'an excellent perspective view of the structure' drawn by James Kerr, Clerk of Works to Sir James Matheson, the owner of the estate on which Calanais lay. In Illus 3.24 the background of the engraving has been modified to improve clarity.

An original sketch survives in the National Monuments Record of Scotland (Illus 3.25). The main difference between Kerr's sketch and the engraving is that houses were added to the latter. Foundations of a grain kiln, or house and later grain-drying kiln, still survive close to the position of the structure above the three people to the left. It was not shown on the OS map of 1853 so may have been built recently as part of Matheson's improvements. There seems little reason to suppose that it and the houses shown to the right were not present in 1857. Another difference is that the peat face visible in the engraving is missing from the sketch and the innermost stone of the east row is partly buried in peat in the engraving but not in the sketch. Yet it seems likely that the engraving was made from a later version of the sketch with detail added on-site. Another change is that one of the women carrying peat was transmogrified into a man; in the sketch all the work was being done by women while the man leant on his spade.

Some stones of the avenue were omitted from both sketch and engraving. Some would have been hidden by other stones but as I described when commenting on Worsaae's sketch of 1846 it is extremely difficult to keep track of which stone is which even from modern photographs. In other words I think that some of the omissions were simply errors. How far the other details of the sketch and engraving can be trusted is uncertain; but they show one stone of the east side of the avenue to be leaning (possibly stone 3). That may help to explain why its peat etch-mark is slightly higher than might be expected (Illus 3.6). The small stone to the south-east of the circle (Somerville 35) was not shown. Given that the peat near the circle was quite deep when the sketch was made it may have been upright but buried or, of course, not upright. Nor was the stone discovered in 1977 at the east of the East Row shown even though the peat seems to have been quite shallow at that point.

3.7 Captain F W L Thomas and Lieutenant J Palmer

Two plans of Calanais survive from around 1857, one by J. Palmer and the other, which includes additional detail, unsigned. Both were preserved in the papers of Captain Fredrick W. L. Thomas at the Society of Antiquaries of Scotland until recently, when they were added to the National Monuments Record of Scotland.

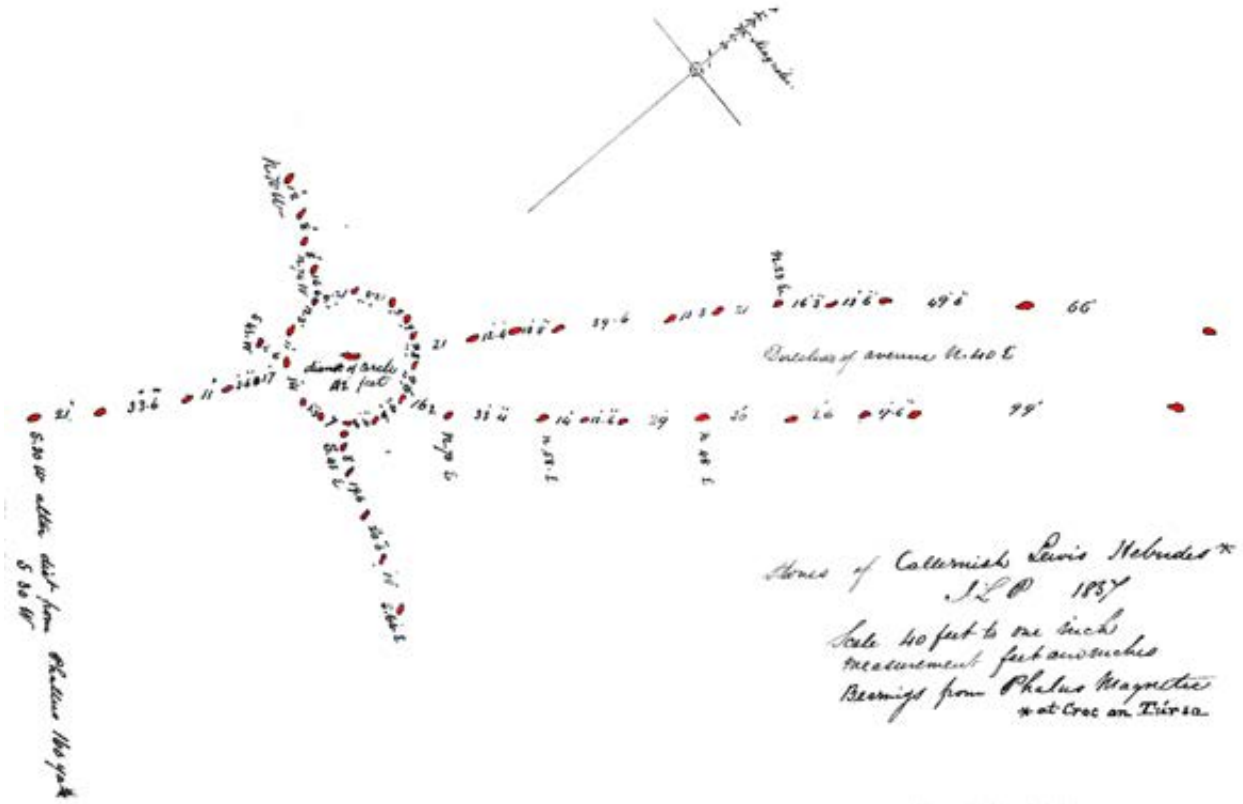
Captain Thomas worked in the Admiralty's Hydrographic Survey. It had begun charting the

waters and coasts of the Western Isles in 1846 under the command of Captain Henry C Otter. Captain Thomas joined him in 1857 (MacLean & MacLeod 1989, 117). The survey was completed in 1863, but Thomas' interest in the Outer Hebrides, its people and its monuments, continued for at least two decades (MacLean & Macleod 1989, 120). He was an accomplished and methodical recorder and among his skills was photography.

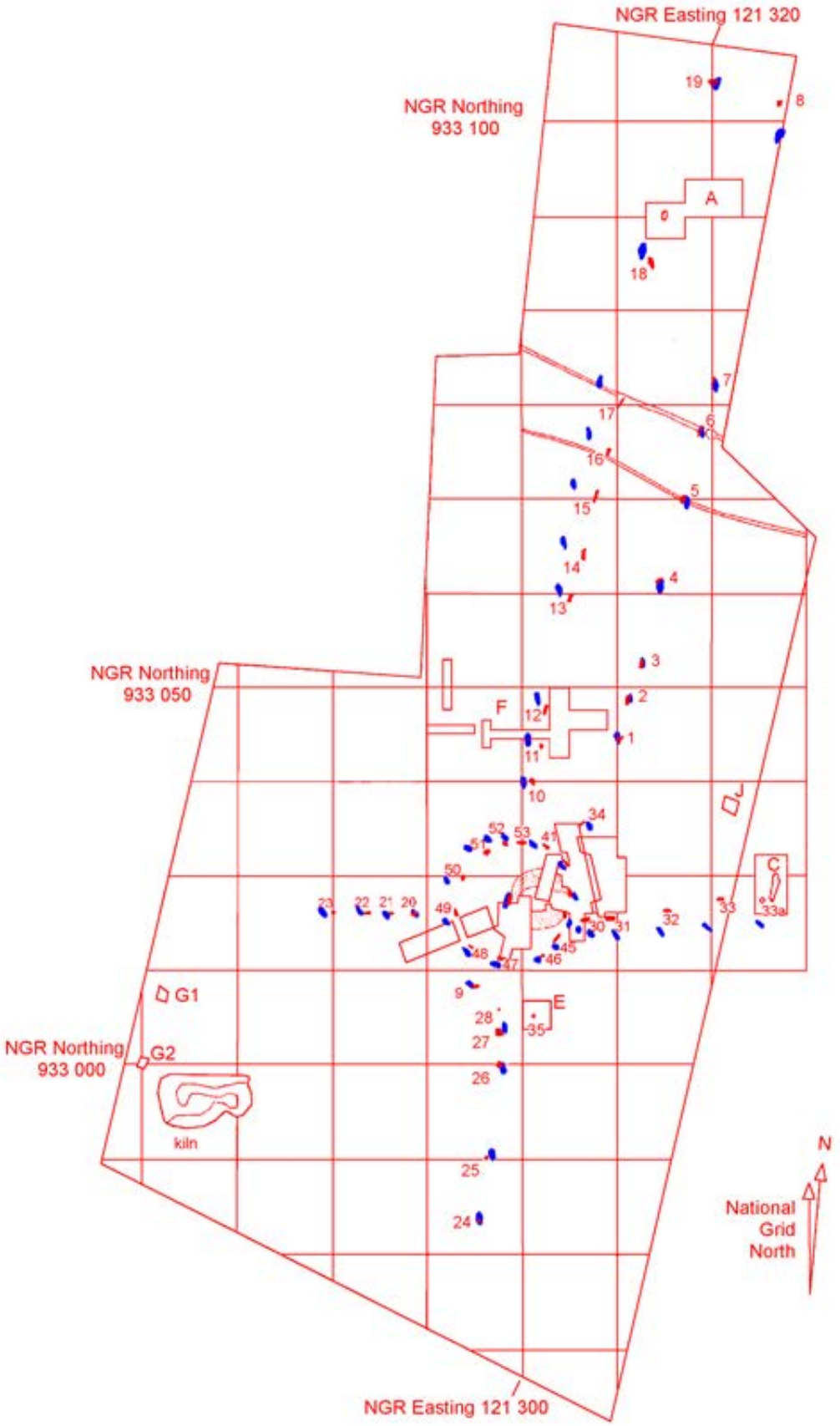
Lieutenant Palmer was probably one of his subordinates. The surviving version of his plan (illus 3.26) is on tracing paper. It is annotated as follows.

*Stones of Callernish Lewis Hebrides**
JLP 1857
Scale 40 feet to one inch
Measurement feet and inches
Bearing at Phalus magnetic
**at Croc an Túrsa*

It omits the chamber and cairn which were revealed in October 1857. It gives written measurements for the distances between stones, and magnetic north is recorded on it. That there was an earlier copy is implied by a miswritten measurement in the western row which, in a gap about 9 foot 7 inches long, is given as 4 foot 6 inches; the likelihood is that the measurement was written upside down on a missing draft whence the surviving plan was copied (Ponting and Ponting, 1979). Overall the plan is superior to earlier ones. Admittedly, the crookedness of the western side of the avenue is exaggerated (Illus 3.27). The ring is shown as a true circle, and when overlaid on the University of Glasgow 1978 plan its east-west dimension is too large; but the stones are distributed on its circumference in a reasonable approximation to their present arrangement. The largest error is in the position of stone 44 of the ring from which the east row springs, both the stone and the row are



Illus 3.26 Plan of Callernish in 1857 by Palmer. A red colour has been added to the stones to help distinguish them from the measurements.

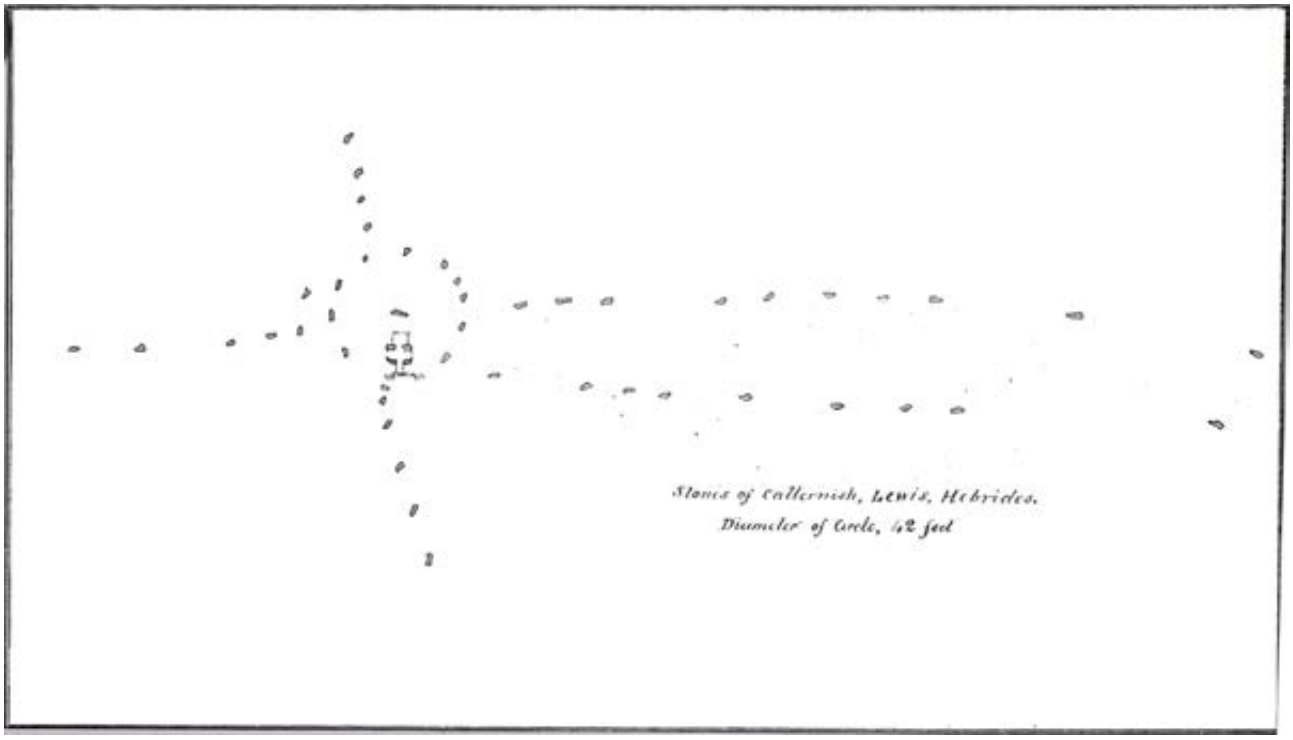


Illus 3.27 Palmer's plan on the Glasgow plan of1978, with excavation areas added. Palmer's stones are in blue.

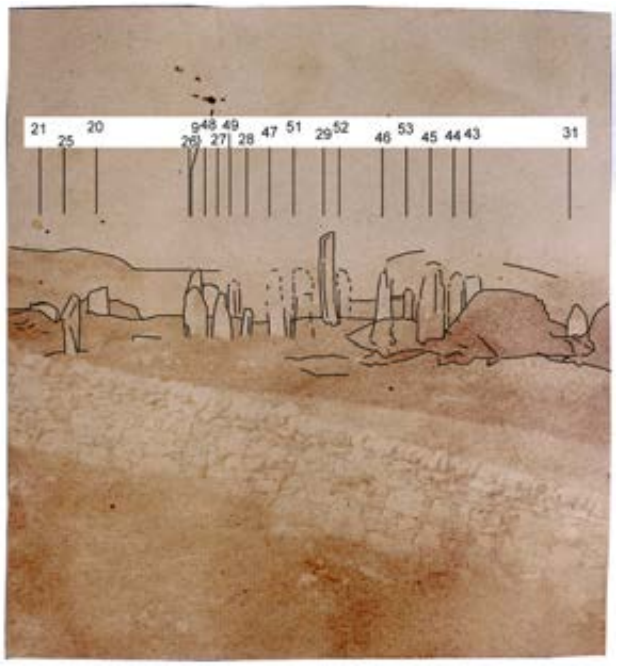
too far south. Apart from this, the relative orientations of the arms of the cross are shown correctly. This version of Palmer's plan does, however, show six stones in the east row, one between the circle and the present closest stone of the row, and the other beyond the currently most easterly standing stone. It is possible that the innermost stone is a tracing error, from an original with measurements scrappily written on it; a measurement annotation may have been mistaken for a stone (Ponting and Ponting 1979). On the other hand, the stone may be the large kerb-stone found fallen during the 1980 excavations. The outermost stone, however, was probably also recorded by Worsaae in 1846, and it was probably partly visible in 1857 near the position in which it was located in 1977 by Gerald and Margaret Ponting (Ponting & Ponting 1984, 11). Stone 28, the innermost stone of the south row is not shown on the sketch (Illus 3.26); it was, judging by Worsaae's sketches 11 years earlier and by the peat etch-mark on the stone, almost certainly only just visible in the peat surface. Nor is Stone 35 to its east; but it would almost certainly have been below the peat.

The anonymous plan (Illus 3.28) omits the written measurements and one of the Ring stones (Stone 45) and is neatly drawn up. In omitting a stone it emulates the error in Callender's Birds Eye View; but the latter omitted Stone 43 or 44 and is presumably an unrelated error. The anonymous plan includes both Stone 28 of the south row and the chamber between the central monolith and the eastern side of the ring. It seems likely to be an updated version of Palmer's plan made after peat clearance. It probably dates to late 1857 or 1858 and was probably prepared for the illustrated talk Thomas gave to the Society of Antiquaries after Sir James Matheson's communication of a description of the clearance of the site through Cosmo Innes (Innes, 1860, 112). Andrew Martin, librarian at the National Museums of Scotland, kindly searched the Minute Book of the Society of Antiquaries of Scotland for any further information associated with the meeting and reported that none was locatable.

Some of Captain Thomas' photographs and stereo views are preserved in the National Archives of Scotland (Mike Brooks pers comm). The pho-



Illus 3.28 Palmer's plan redrawn by an anonymous hand, probably that of Captain Thomas in late 1857 or in 1858.



Illus 3.29 and Illus 3.30 On the left, Captain Thomas' photograph of the stone setting probably taken in late September1857 from over the wall to the south of the setting. On the right, the same image with the stones outlined and numbered after Somerville.

Illus 3.31 A photograph of the setting by Mike Brooks of Historic Scotland, from the same angle as Captain Thomas' 1857 photograph (Illus 3.29)

Illus 3.32 Captain Thomas' photograph of the stone setting from the east-north-east in 1857

Illus 3.33 Thomas' photograph of the Ring and Central Monolith in 1857

Illus 3.34 A photograph from a slightly different position to Illus 3.33 [Strachan R Sept 2009]

tographs are postage stamp size. They have deteriorated considerably since they were taken. Illus 3.29 and 3.30 show Captain Thomas' photograph of the stone setting from the south-east after it had been largely cleared of peat. In the South Row stones 25 to 28 are visible, the latter having been revealed during the clearance. Behind them are stones 21 and 20 of the west row. Also visible are the central monolith (stone 29), the circle (most of stones 42 to 52) and stone 31 of the east row (Illus 3.30). Heaps of peats are visible to the north-east and south-west of the ring of stones.

In Illus 3.30 the outlines of the stones have been accentuated with the aid of a print copy of the original, made by Mike Brooks, which shows some detail better than the digital image. The original photograph has deteriorated so much, however, that in places the outlines could not have been added without the aid of a modern photograph from the same angle by Mike Brooks (Illus 3.31) and the outlines must be treated as indicative rather than as definitive Captain Thomas' photograph does not show the southernmost stone of the south row, stone 24. However, the angle from which it was taken is such that the stone may have been hidden by the wall. The degradation of the photograph means that it provides no independent evidence for or against the presence of a standing or fallen stone at the position of Stone 35. Similarly it does not provide new information about the east row.

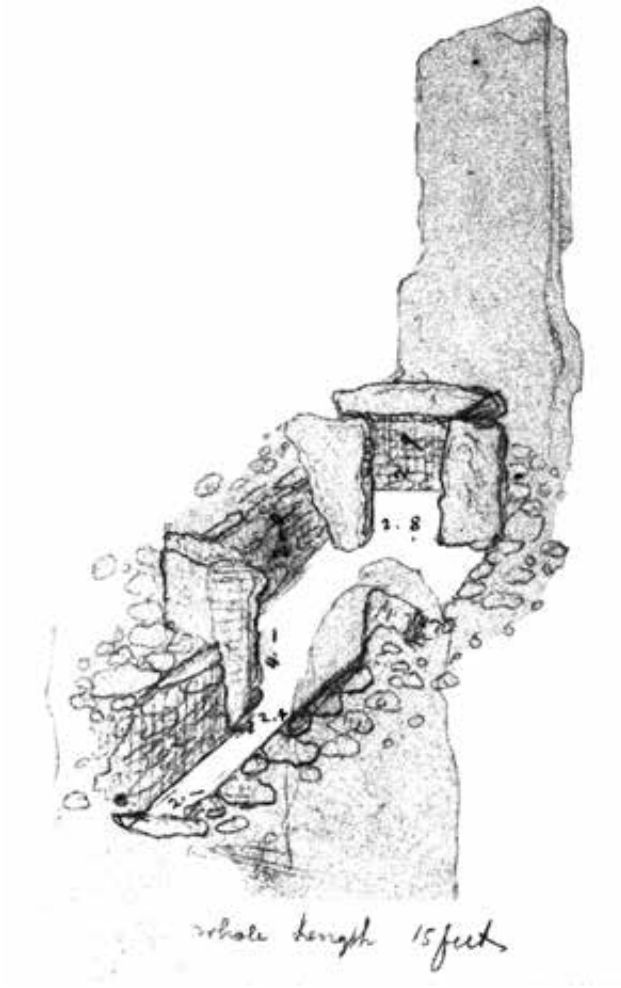
Illus 3.33 is the left-hand half of a much-damaged stereo pair. The stones are partly obscured by a pile of peat, presumably that visible on Illus 3.29.

At this stage, judging by a modern photo taken from a broadly similar position (Illus 3.34) the chamber orthostats were not visible. That dates the photo pretty precisely to several days before the transition of September to October for the peat clearance culminated on 2 October 1857 (James 1867, 16).

3.8 Cosmo Innes and Sir James Matheson

Sir James Matheson's letter to Cosmo Innes gave valuable information. I discuss aspects of it in Chapter 4: Introduction to the fieldwork, and omit some detail here. It confirmed that the peat around the circle was 5 ft thick. It gave, with plan dimensions, a stylised plan of the chamber and cairn and their relationship to the circle (Illus 4.8). It referred, in describing the contents of the chamber, to a 'black unctuous substance in which these fragments [of bone] were contained'. It also men-

tioned a 'rough causewayed basement in which the circle stones were imbedded', a feature not now visible, unless the description was intended to refer to the low ridge of stones between the monoliths of the circle or the tumble of stones to the south-west of the cairn revealed during excavation in 1980 (Innes, 1860, 110-42).



Illus 3.35 Sharbau's sketch of the chambered cairn and monolith shortly after peat was cleared from the site in 1857 (NMRS RCD/13/16)

The clearance of the site took place without, apparently, the attendance of antiquarians. It was supervised by Matheson's chamberlain, Mr. Donald Munro. A trusted servant, appointed in 1854, he was also a despotic martinet, hated by Matheson's tenants (Macdonald 1978, 42). Doubtless his report to his master did not include much of the opinions of those who carried out the work.

Shortly after clearance of the site a series of drawings of the stones and a drawing of the chamber were made. The originals of Illus 3.35 and 3.36 survive in the National Monuments Record of Scotland, together with similar drawings of the stones of the neighbouring stone circles. Although there are plans of the latter in the same hand, the prior existence of Palmer's plan seems to have made a new plan of the main setting redundant; instead it was revised, as described above. The plans of the lesser stone circles must date to 1858, when they were cleared of peat (Ellice, 1860, 202—3). I am indebted to Diana Murray for first suggesting that they were drawn by a Mr Sharbau. Mr Sharbau was probably part of the Scharbau family, with connections to Skaill House in Orkney. Since Captain Thomas employed a Mr. Sharbau as his assistant in 1858 (Thomas, 1860, 127-44), it may be suggested that he produced the drawings of the stones and chamber at Calanais in the same year, in time for them to be included in the views Thomas displayed for the Society of Antiquaries after Cosmo Innes' paper. If this analysis is correct, the drawings were probably made less than a year after its clearance. The record of the chamber is thus potentially extremely valuable. A seemingly independent sketch plan of the cairn included with Innes' account of the 1857 discoveries is illustrated and discussed in Chapter 4: Introduction to the fieldwork.

Sharbau's drawing of Stone 35, which now stands outside the south-east quadrant of the circle, showed it as fallen. He recorded the stones in methodical order, allowing them all to be identified with certainty; and stone 35 was included between the southernmost stone of the south row, and the present westernmost stone of the east row. The implication could be taken that it lay recumbent somewhere between the south end of the south row and the west end of the east row. However there can be no certainty that it was where it now stands. When it was excavated in 1981 its base was in concrete and there was no sign of a prehistoric stone hole (Chapter 10: Area E).

By 1867 stone 35 was erect in its present position (James, 1867, plan and fig.) and, although it seems to have been broken between then and 1885, its base is not recorded as having been moved.

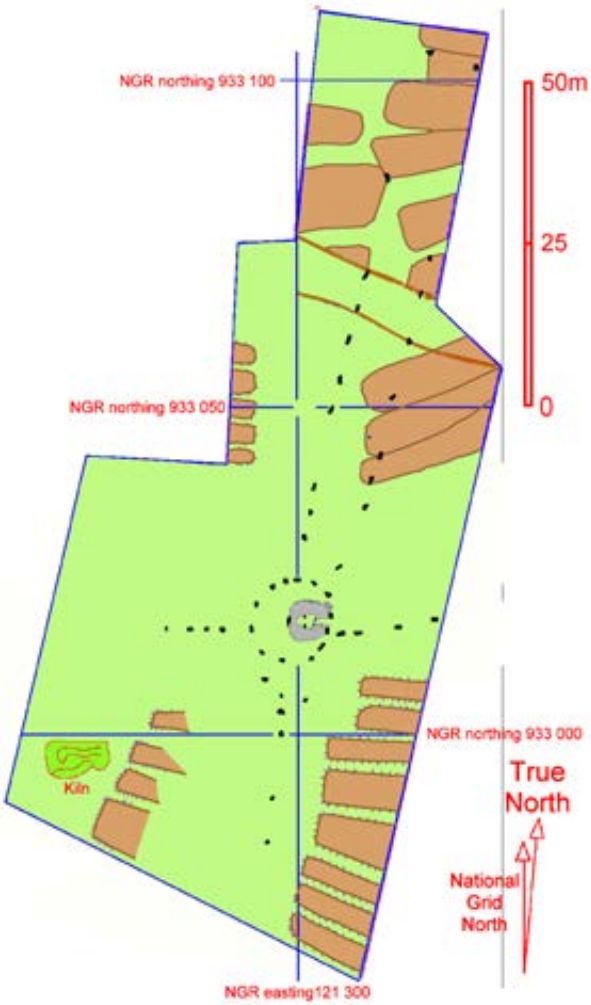
Sharbau did not record a fifth stone in the east row, and Palmer's is the last specific depiction of it until recent times.

Illus 3.36 The chambered tomb in 1861

Judging by the proportions of the west compartment of the chamber the anonymous sketch of 1861 did not base itself on the Palmer/Thomson plan of 1857-8. I wonder whether it relied in part on the artist's interpretation of Sharbau's sketch. It has the particularly odd feature of a closed east end which may relate to the long horizontal stone at the bottom left hand corner in Sharbau's drawing. Whether or not that was so, the 1861 drawing cannot be taken as an independent primary source. For what it is worth, it shows the chamber with neatly squared-off walls and a stone floor.

3.9 Changes after about 1867

By 1867 (James 1867) the site had reached an appearance closely similar to that of the present day. A few details have changed since clearance of the site, without their modification being closely dateable. The road which runs between stones 16 and 17 and stones 5 and 6 was not shown on the Ordnance Survey plan of 1853, nor in Kerr's sketch of 1854. It was not shown on a view of almost photographic exactness drawn by Harvey about 1863 (Wilson, 1863), but unfortunately artistic licence may have played a part in its omission. It existed by 1885, when it was included in Pitt-Rivers' plan of the setting, but those postcards and views which I have seen of the intervening period are taken from angles which would not show it. In the period immediately prior to 1923 it was the only road to enter the south end of the village, according to the location plan of the setting prepared by the Royal Commission then (NMR, RCD/ 13/7).



Illus 3.37 Victorian agriculture

Evidence of early modern agriculture is clear within the present Guardianship area on either side of the south end of the setting. Cultivation beds impinge on the eastern boundary; and in the south-west there are more, between the foundation of a kiln-house or black-house overlaid by a kiln near the western margin of the area and the south .row of the setting. Absent from the first edition OS map prepared between 1847/8 and 1853 it was presumably built less than 10 years before the 1857 clearance. A recent air photograph shows that cultivation beds crossed the avenue where MacCulloch depicted now missing stones (SDD/AM 6756/CN/AL). It seems that cultivation was allowed to impinge on the stones between the early 19th century when MacCulloch described it as lying in moorland and the second half of the century (Illus 3.37).

Harvey's view of the site (Wilson, 1863) shows low mounds of earth or peat lying alongside the stones of the avenue. They seem less pronounced now, and either peat has regenerated over the site, bringing its general level closer than it once was to the height of the mounds, or some spreading or clearance of the mounds has taken place. Excavation on Area F (see Illus 3.27) revealed a low peaty mound fairly close to Stone 11 but it appeared to be modern rather than ancient. It would not be sensible to try to date the basal peat near these avenue stones; for neither it nor the peat which lies immediately outwith the setting is likely to be undisturbed.

3.10 Maclagan's plan of 1879

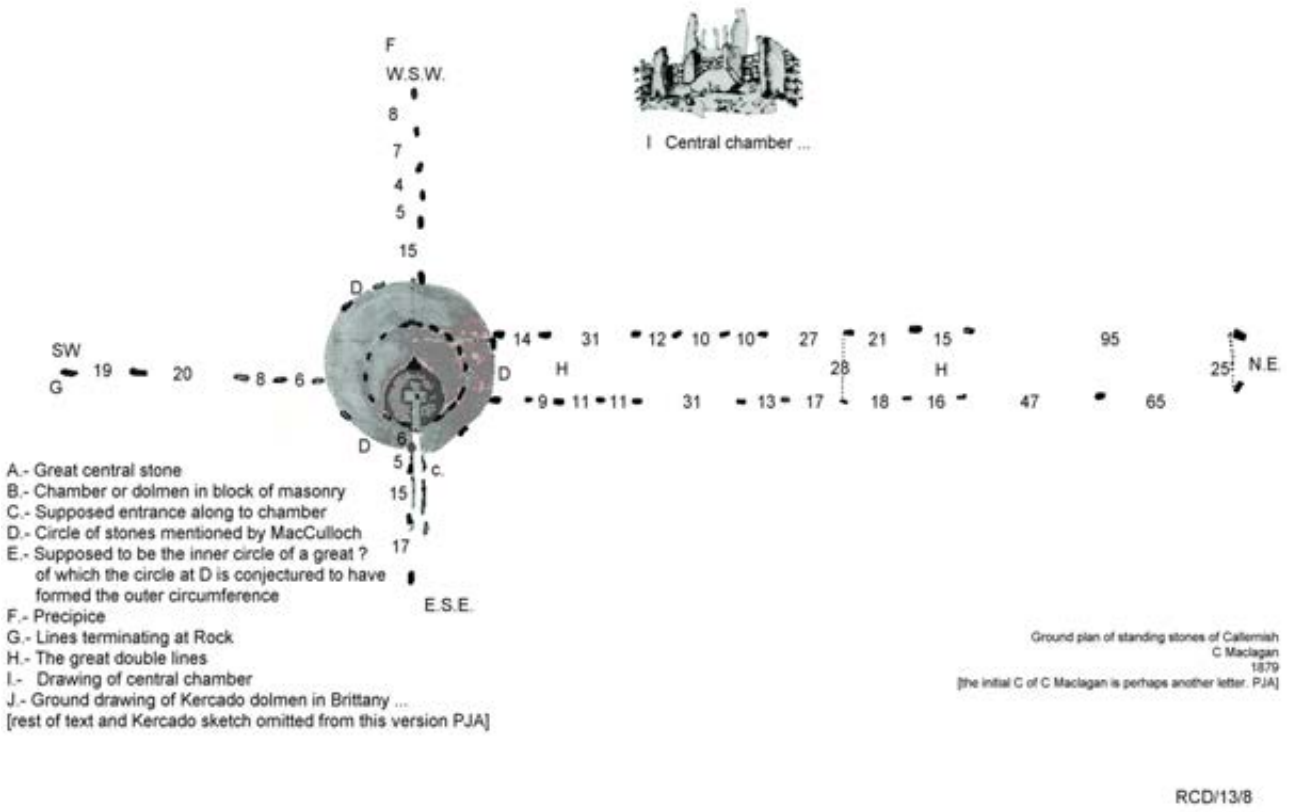
Christian Maclagan's plan of 1879 was never published. It is preserved in the National Monuments Record of Scotland (RCD/13/8). The original has a tear mended with tape.

The version shown in Illus 3.38 has been cleaned up digitally and the annotations typed in. The plan was not drawn to scale and it followed MacCulloch in its cruciform layout; judging by its shape and the reference to him in the marginalia, Maclagan took his plan as a basis for hers. But the avenue and rows are annotated with compass directions and it is clear that she realised that the setting was not truly rectangular. It is significantly different in other ways, and the annotations imply that the distances between stones were measured (though it is not clear in what unit). The plan reflects a visit to the site itself and the collecting of fresh data. Although it has significant faults, it has some features of interest, best considered with the plan laid against the Glasgow plan of 1974 (published in 1978).

3.10.1 Flipping Maclagan's plan

In Illus 3.39 the 1879 plan in black has been sized to allow as reasonable a match as possible to the Glasgow plan in red but the avenue has not been rotated into its correct orientation.

Maclagan's spacing of the stones on the west side

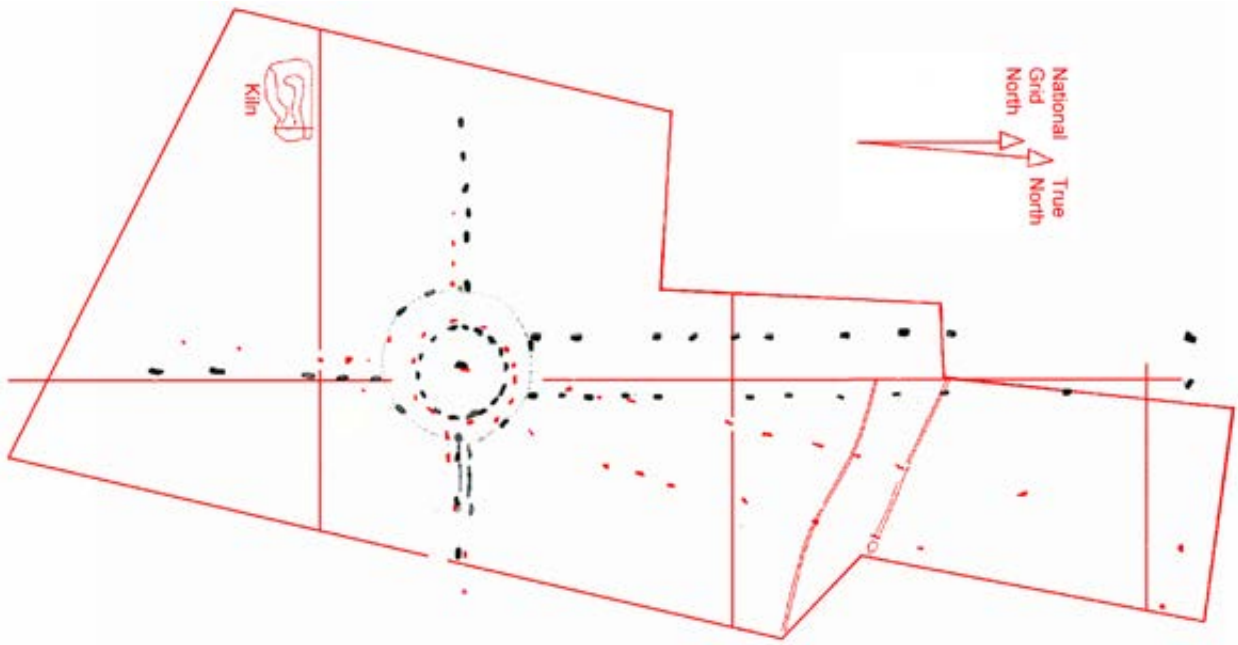


Illus 3.38 A cleaned version of Maclagan's plan of 1879 with retyped marginalia.

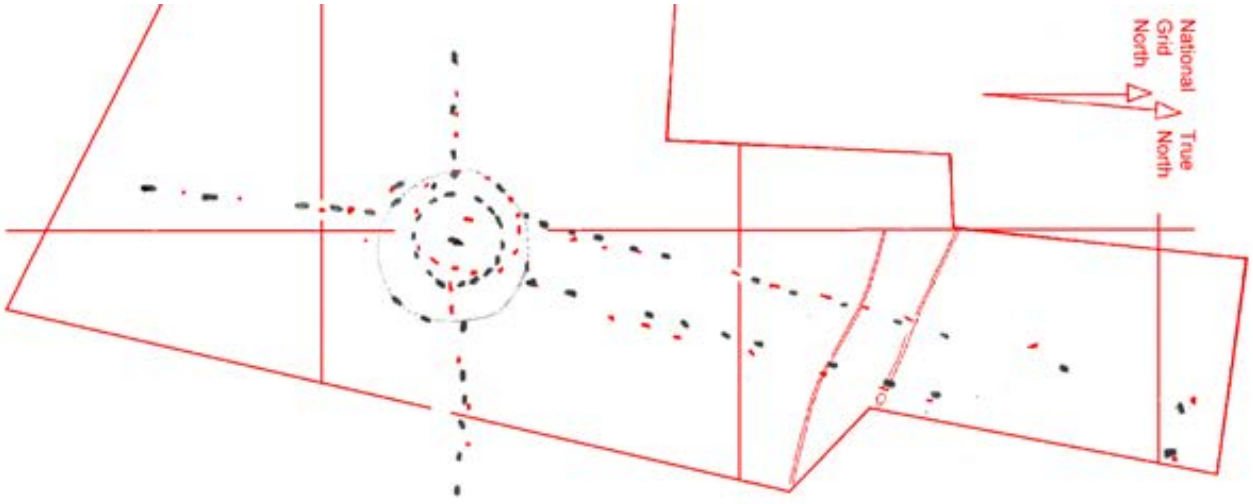
of the avenue is very odd - matching the east side of the avenue much better than it does the west (as if a tracing had been annotated wrong side up).

Illus 3.40 shows the result of flipping her plan vertically and then rotating the depiction of the avenue round its south end by 15 degrees. I also rotated the south row along with Stone 9, bringing Stone 9 close to its true position. Had I included Maclagan's chamber in Illus 3.40, it would have been on the wrong side of the Ring. Also, a large stone (not necessarily Stone 35) south-east of the Ring has been brought to the south-west. Apart from that, the fit of the avenue and the east and west rows is somewhat better than in the unflipped plan, although far from perfect even if Maclagan's extra stones are discounted.

Almost certainly, Maclagan drew the chamber and the standing stones on separate pieces of paper, traced them and at some later date put them together with the tracing of the stone setting upside down.



Illus 3.39 Maclagan's plan of 1879 overlaid on the Glasgow 1978 plan (both cleaned).



Illus 3.40 Maclagan's plan flipped and the South Row and Avenue rotated, overlaid on the Glasgow 1978 plan

3.10.2 The Ring in Maclagan's plan

Maclagan's depiction of the Ring was too small if her avenue length was roughly correct. It included 15 stones rather than the 13 planned by Palmer in 1857 and known today (Illus 3.40). Perhaps she included the two large kerb slabs in the northeast sector.

She drew elements of an outer circle. In Illus 3.41 I have visually fitted her (flipped) inner circle to the Ring and have included stony areas noted during the 1979 resistivity survey. I have omitted her avenue stones because their relationship to her circle is, as described above, ambiguous.

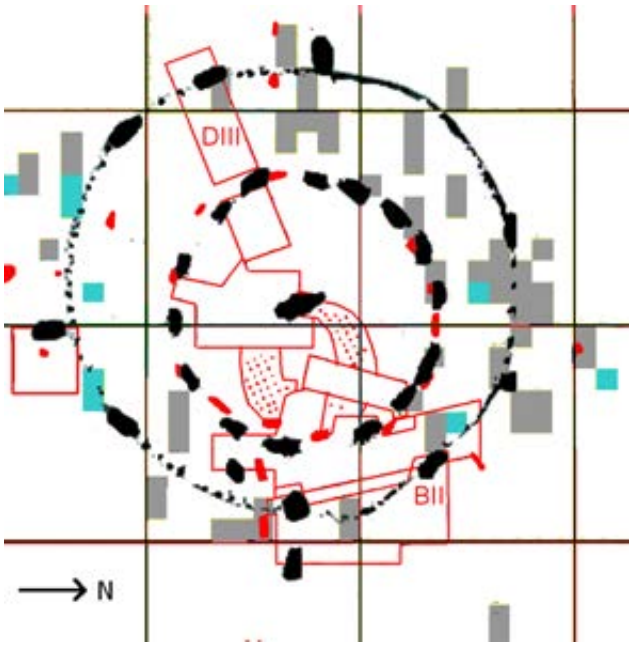
The grey 1m squares show where probes could not be inserted fully during the resistivity survey in 1979 and the blue ones indicate the presence of large field stones. Although her 'outer circle' included stones for which there was no visible evidence in 1857, and none exists today, some may correspond to field stones or the areas where it was impossible to insert probes fully (Illus 3.41). Others however do not.

Intriguingly resistivity survey showed some anomalies approximately on the perimeter of Maclagan's outer circle (Illus 3.42). They are described in Chapter 5: Resistivity Survey. However, once again, others while fairly close to the perimeter did not coincide with stones depicted by her.

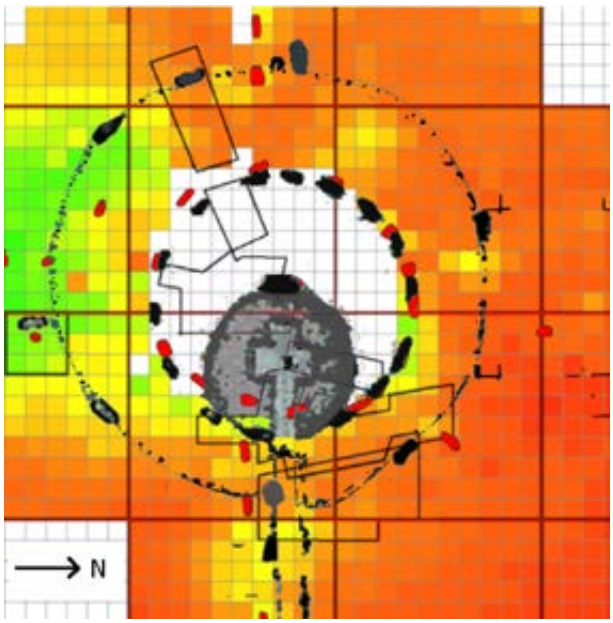
Her suggested outer circle stones show just enough correspondence with field stones, areas where probes could not be fully inserted and resistivity features to suggest that there may have been more than speculation behind her suggestion. It seems likely that she used a probe. But the number of resistivity features and sub-surface stones makes it almost inevitable that some would coincide purely by chance with the proposed outer circle stones. Excavation of Sub-areas DIII and BII produced no evidence for her proposed stones. Nevertheless this exercise does suggest where excavation might further test Maclagan's idea of an outer circle, for which our excavation results provided no support.

3.10.3 The Avenue in Maclagan's plan

After flipping, Stones 13 to 19 on the west side of the avenue are roughly in the right place, but she has five southern stones where Palmer has only three, stones 10 to 12. MacCulloch (1819) did not show any fallen stones in that area. On the east side of the avenue, the stones are roughly in the right places (except that stones 1 to 3 are displaced quite significantly northward) and she has two stones where Palmer has only stone 34 to the



Illus 3.41 Detail from Maclagan's depiction of the Ring with below-surface stones



Illus 3.42 Detail from Maclagan's depiction of the Ring with resistivity features

NE of the Ring. The most credible interpretation of MacCulloch's plan does not suggest any stones there other than those visible today.

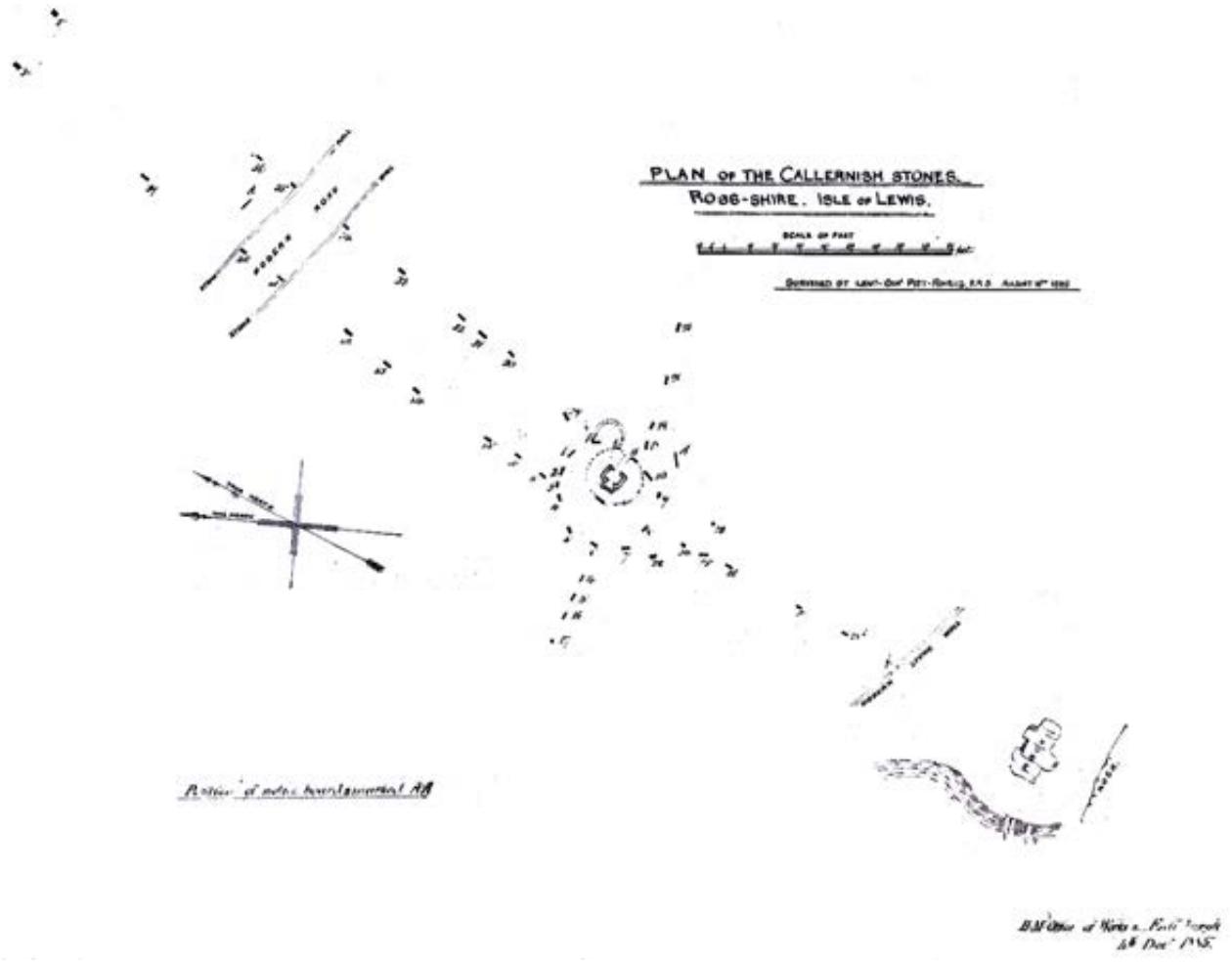
3.10.4 Discussion

Maclagan's plan was never published. It probably represented provisional ideas and was never intended for public consumption. It cannot provide strong support for any theories about the original setting.

3.11 Lieutenant-General Pitt-Rivers and Mr Tomkin

Peat-marks are etched on the stones. Their disappearance is not complete; but the difference between the lower and the upper parts of the stones is now vague. The record of the peat-marks made by General Pitt-Rivers and his assistant, Mr. Tomkin, is thus invaluable. It is preserved in the Public Record Office at Kew (PRO WORK 39/15 and 39/16). It is not mentioned in his assistant's diary-style workbook (Workbook 39/16 Page 223 10th-11th August 1885) although it does mention the plan and a colour sketch (now in the Pitt-Rivers museum collection). 1885 was also the year that Lady Matheson offered the stone for Guardianship (SC 23423/3AI).

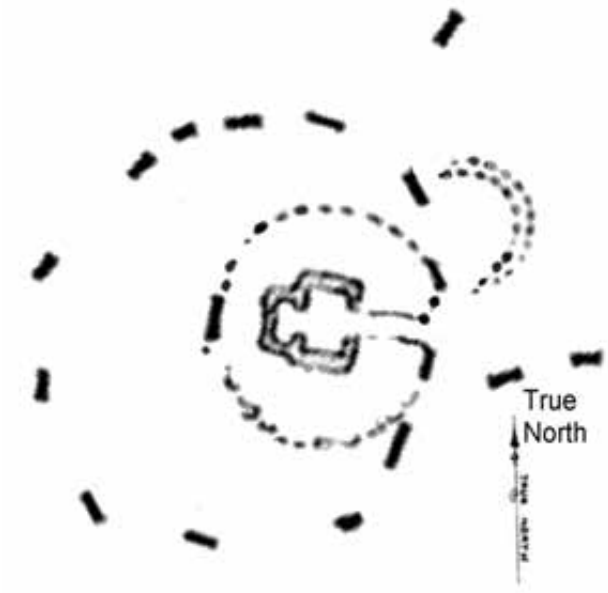
In effect, there are two separate records, for Tomkin drew all of the stones (except for stone 35, their number 23), while Pitt-Rivers drew stone 35 and noted the dimensions of the stones and the height of the peat-mark. Neither of them recorded the peat-mark on all of the stones on which it was visible: Tomkin drew it on 36 stones, and Pitt-Rivers noted it on 29 stones; in all, 38 stones have it recorded in one way or the other. Tomkin seems



Illus 3.43 Survey of Calanais by Lieutenant-General Pitt-Rivers on August 11 1885 (NMRS RCD/13/4)

consistently to have drawn the level an inch or so lower than Pitt-Rivers measured it (Ponting and Ponting 1979). It is likely, therefore, that the boundary between the etched part of the stone and that subjected for a long period to sub-aerial weathering was blurred. Both of the northernmost stones of the avenue have a peat-mark recorded on them, drawn at 4 ft 5 ins on stone 8 of the east side, and measured at 4 ft 6 ins on stone 19 of the west side. The next four most northerly stones of the avenue do not have peat-marks recorded; thereafter most of the stones did bear evidence of the height of the peat (Ponting and Ponting 1979).

There are two implications which can be drawn from reconstruction of the original peat levels. The first has been discussed during assessment of MacCulloch's plan: that some stones were hidden when the peat was at its maximum height and that others were barely visible and may have been mistaken for fallen stones. The second is that, since in general a much lower proportion of the stones of the northern end of the avenue had peat-marks recorded by either or both Pitt-Rivers and Tomkin, they had probably been clear of peat for a long time. I have not found views of the avenue showing the peat-marks clearly although some RCAHMS photographs (e.g. RC/466) do show some colour variations.



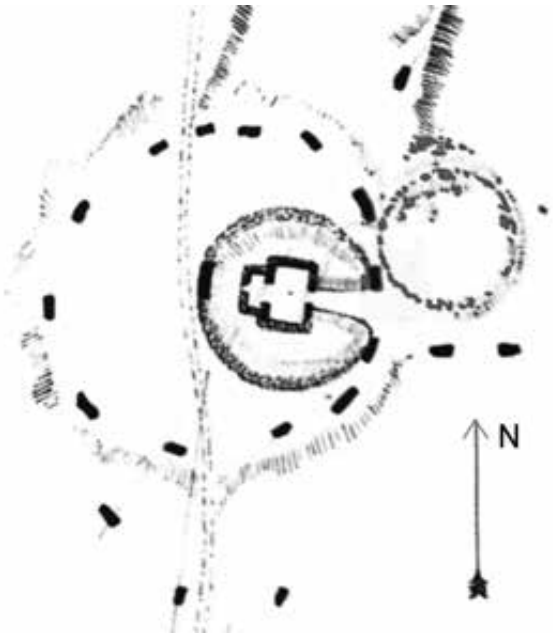
Illus 3.44 Detail of the semi-oval enclosure from Pitt-Rivers' plan of 1885 (Illus 3.43

Pitt-Rivers (and Tomkin?) surveyed the Office of Works plan of 4 December 1885 on 10th-11th August. Unsurprisingly, given the experience of the surveyors, it was pretty accurate, albeit not flawless. For instance at the north end of the avenue it showed Stone 8 slightly too far north compared to Stone 19.

It showed Cnoc an Tursa to the south of the stone setting and detail of the road crossing the site (Illus 3.43).

Their plan of the small semi-oval stone enclosure outwith the north-east quadrant of the stone circle (Illus 3.44) corresponds quite well with what was revealed by excavation in 1980, apart from its lack of an entrance to the east. It is the first record of this feature.

3.12 MacGibbon and Ross



Illus 3.45 Detail from the MacGibbon and Ross plan of 1910

MacGibbon and Ross, the celebrated architectural historians, produced a plan in 1910 which was never published (NMR RCD/ 13/5). It is difficult to interpret the appearance of a change in slope which they showed just outside the Ring. It does not correspond well with the traces of the 1857 peat clearance which survive today. They

showed the passage of the chambered cairn as splaying out more than do other records and they misinterpreted the small semi-oval stone bank as circular (Illus 3.45). However they included 3 lines of wall-face in the northern part of the enclosure and it is conceivable that the outermost related to the Stage 3 enclosure discussed in Chapter 7.6.

3.13 Sir Norman Lockyer, Rear Admiral Somerville and astronomical indications

3.13.1 Sir Norman Lockyer

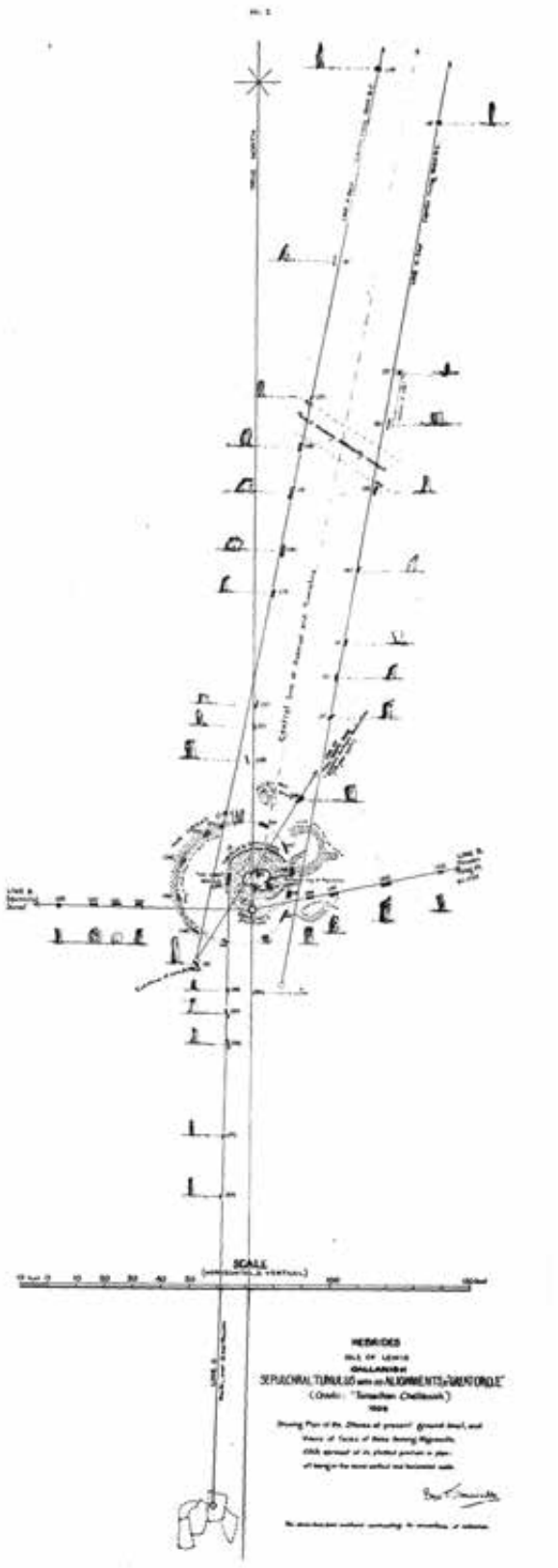
Taking his information from the Ordnance Survey 25 inch to the mile map and from Sir Henry James's plan, Lockyer supposed that the azimuth of the avenue indicated Capella rising around 1720 BC, and that the passage of the chambered tomb faced the rising of the Pleiades in 1330 BC (Lockyer 1906). But Aubrey Burl's comments in 1993 sums up Lockyer's work at Calanais all too neatly: "The alignments were wrong, the date was wrong, and the measurements were wrong …" (Burl 1993, 15).

3.13.2 Somerville's plan

In 1912, Rear Admiral Boyle T Somerville, like Captain Thomas before him a naval hydrographer, published the survey which he had carried out in 1909 (Somerville, 1912, Fig 2). His plan was created using a theodolite and chain at a scale of 1/10 inch to a foot, which is 1:120. It includes sketches of the stones and is in many ways a most attractive and informative depiction.

It differs in some places from the Glasgow plan (Illus 3.47). I checked the latter on the ground in several places when laying out the grid for resistivity survey in 1979 and found it to be more accurate than I could measure. That said, the irregular nature of some stones meant that a plan of the stones a metre above the ground would be slightly different from a plan made near ground level.

Where I checked significant differences between the two plans, Somerville's plan was less accurate. If Stone 19 was not shown a little too far north then many but not all of the other avenue



Illus 3.46 Somerville's plan

Illus 3.47 Somerville's plan (cleaned up) overlain on the Glasgow 1978 plan

stones were shown a little too far south and Stone 8 was much too far south. The three southernmost stones of the west side of the Avenue are in reality on almost the same line as the South Row and central monolith but Somerville showed them in line with the rest of the western Avenue stones. Other minor errors in placement of stones were common.

His contention that the projected lines of the east and west rows met on the mid-line of the avenue inside the circle is wrong. In truth, the alignment of the west row meets that of the east row to the east of the circle; my own visual check on site confirmed Somerville's error. Pitt-Rivers had drawn the relationship more correctly 23 years earlier, so it cannot be claimed that stones have been straightened up or that their irregularities mean that at different heights they line up in significantly different ways. I also checked some of Somerville's suggested sight-lines on the ground; they cannot be as accurate as his plan implies.

Somerville made various suggestions about the astronomical significance of alignments at Calanais. In his paper for the Royal Anthropological Institute (Somerville 1912) he gave figures for the azimuth, hillcrest altitude and declination of the side of the avenue, He suggested that the avenue indicated the rising of the star Capella around 1800 BC, or possibly Castor in 650 BC or Arcturus in 320 BC. For him, the west row indicated equinoctial sunset, its alignment, at 0 degrees 35 minutes and 19 seconds north of true west, being such as to compensate for the height of the westward hills. The east row (when a suitable alignment was chosen) showed the Pleiades rising in 1750 BC, or maybe Spica around 1270 BC, or ά Arietis in 1130 BC or Aldebaran in 800 BC. A line between Stone 9 and Stone 34 indicated moonrise at full moon at the northernmost maximum in its 19 year Metonic cycle, first recorded by the Greeks about 432 BC (the Metonic cycle is not the same as the lunar node cycle which is 18.61 years). Lastly, he noted that from the rock outcrop Cnoc an Tursa, looking northward, the south row and the great central monolith pointed due north. He wondered how true north had been determined at a time when there was no bright star in that exact direction. He recorded his belief

that the arms of the cross and the central monolith were intimately bound up with the chambered cairn, and that the circle was a later addition.

Somerville's plan contains enough minor errors to throw doubt on the conclusions he and subsequent authors drew from it, apart from the due north-south alignment of the South Row and Central Monolith which is visually very convincing despite the slight irregularities in layout of the South Row. The West Row does not line up precisely with equinoctial sunset though it seems to me that its alignment with the latter, if intended, was probably good enough for calendrical purposes in the third or second millennium BC. That said, even if anyone wishes to accept Somerville's claims despite the errors in his analysis, presumably on the grounds that prehistoric observers saw no need to be any more precise than he was, they must accept that similarities in co-alignments can occur by chance. For instance, in reality the West Row is aligned pretty precisely with the National Grid (Illus 3.47) which cannot have been the intention of those who set up the stones, nor of those who set up the National Grid.

Illus 3.48 Detail from Somerville's plan of 1912

Somerville's survey included a plan of the small enclosure east of the Ring. This showed a stub-wall-foundation on the east side of the enclosure, which was confirmed during the excavations of 1980, and although the southern part of the enclosure was shown as more complete than in 1980 it does run up to Stone 43 on the north side of the passage entrance where a substantial fragment of foundation was discovered. Also there appears to have been a gap between its northern end and the Ring, again as we planned it in 1980.

His plan is not only attractive but accurate enough for most non-astronomical purposes, apart from its misplacement of Stone 8. The stones were where they are today except for Stone 33a at the end of the east row, which was not visible, for it seems certain that he would have recorded it if it were. Stone 35 to the SE of the Ring was upright. His survey confirms that the enclosure was much the same in 1909 as in 1980.

3.14 RCAHMS

The published plan made by the Royal Commission in 1923 shows features much as they are today; and it contributes an accurate delineation of the chambered tomb (RCAHMS 1928). A few errors mar the account (Ponting and Ponting 1979). However, the plans and copious photographs remain an irreplaceable and overall very accurate record. It includes the semi-oval enclosure. It is readily accessible and no detail will be provided here. An illustration including its field plan of the cairn is included in Chapter 24: Discussion.

RCAHMS investigators believed that there might have been a southern avenue and that Stone 9 outside the SW quadrant of the Ring might have been the 'rudiments or remains of a second circle' (RCAHMS 1928, 24). They saw the enclosure outside the Ring as the remains of a cairn. Our excavations showed that all three interpretations were very likely wrong, but the conclusion drawn by RCAHMS that the monument was not a single conception but a 'development by additions' remains correct.

3.15 Professor Alexander Thom

Professor Thom's interest in Calanais started in 1933 when the yacht in which he was cruising arrived in East Loch Roag. That evening he went ashore to explore and noticed that the south row pointed to the Pole star. He had previously read Somerville's account (Somerville 1912) but it was his encounter with Calanais which stimulated him

to study the astronomical implications of standing stones in Britain (Ponting 1988, 423-4).
In 1967 he published a description of his study of some three hundred megalithic sites in Britain, almost all personally surveyed (Thom, 1967, 35). He deduced that a unit of measurement, which he called the megalithic yard, 2.720 feet long, had been used in laying out stone settings (Thom 1978, 30). He also said that a Megalithic Rod of 2.5 Megalithic yards had been used. In 1978 he modified these values slightly, noting that at Avebury in Wiltshire, England, a Megalithic Yard of 2.722 ft or 0.8297 m. had been used (1978, 36-8), while at Kermario in Brittany an increase in the Megalithic yard of 0.17 per cent is indicated, making it about 2.724 ft (0.83 m) and the rod (2.5 MY) 6.810 ft (2.076 m) (Thom & Thom 1978, 90).

He also considered that many near-circular settings could be described in terms of a limited number of non-circular geometric shapes some of which had been constructed using Pythagorean triangles. He believed that the solstices were indicated at various sites, particularly Ballochroy (Thom, 1967, 165). Finally, he suggested that subtle variations in the apparent path of the moon were known and fossilised in stone alignments. He refined these deductions in subsequent publications (Thom 1971; Thom & Thom 1978) and in a number of studies on individual sites.

Amongst other things, he believed that the South Row and Central Monolith at Calanais indicated an alignment only 0.1 degrees away from true north (Thom 1967, 96). He followed Somerville in believing that the small semi-oval enclosure to the east of the Ring was a small ellipse, one axis indicating the solsticial sun and the other axis indicating the rising midsummer sun (Thom 1967, 64, 124). He thought that the Ring was a flattened circle of his Type A (Thom 1967, 122). As described in Chapter 24: Discussion Ron Curtis has shown that Thom's suggested geometry for the Ring works well, although the orientation of the construction resulting from Curtis' reconstruction is slightly different from that suggested by Thom (Curtis 1980, 31). But an elliptical fitting also fits quite well (see Chapter 24.9).

Thom suggested that the east row could have been oriented on the rising of Altair ά Aquilae in 1760 BC, and accepted Somerville's arguments, apart from his date, that the avenue was aligned on Capella rising in the same year.

He thought it possible that the avenue indicated the moon passing to the south, accepting Hawkins' idea of 1965.

The deductions Thom drew for Calanais in 1967 were based on an insufficiently accurate survey. Somerville's survey was by no means only 'inaccurate in azimuth and then only by a few minutes of arc' (Thom, 1967, 35). The Glasgow 1974 survey demonstrates that none of the lines claimed by earlier authors to indicate the rising or setting of astronomical bodies do correspond to the particular astronomical events referred to. Thom's claim (Thom 1967; Thom & Thom 1978, 3), that some of the stones at Calanais had been re-erected is for the most part very probably wrong; the records of the mid 19th century described above suggest that the stones visible today are, with the exception of Stone 33a and probably Stone 35, those that were upright when the area round the Ring was stripped of peat in 1857.

In 1978 he modified some of his earlier suggestions in the light of Aubrey Burl's arguments that the setting was much earlier than previously believed. He remained convinced that some lines indicated the star Deneb. Thom added that the sides of the avenue would have recorded the minute 'wobble' of the moon at its maximum. Lack of an accurate horizon profile to the south prevented his reaching any firm conclusion. He claimed also that the southern hills were not visible from the north end of the Avenue (1978, 5, 172).

3.16 Professor G Hawkins

The first highly accurate plan of the setting — apart from the perhaps conscious omission of stone 35 – was that produced photogrammetrically for Professor Gerald Hawkins in 1965 and published six years later as a National Geographic Society Research Report (Hawkins, 1971). Hawkins objected to the earlier ideas of Lockyer and Somerville that the avenue suggested a northward orientation at Capella in 1720, 1800 and 1790 BC respectively, on the grounds of faintness of Capella-rise. He suggested that the avenue was

orientated southward on the midsummer moon at its major southern extreme setting down the slope of Clisham 16 miles away (Hawkins 1965).

3.17 Glasgow University Department of Geography

An extremely accurate plan was produced under the direction of Dr Tait of Glasgow University in 1974. Its inception was aided by Professor Thom, Dr E MacKie, Mr S Hall of the Department of the Environment and Dr (now Professor) Breeze of the Inspectorate of Ancient Monuments, then part of the Property Services Agency. They met to discuss the proposed work on 30 Jan 1974. Topographic field work was undertaken in a 5 by 3 mile area in July 1974, to a local grid, which was subsequently linked to the National Grid. Twelve triangulation stations were set up, marked by 3 cm diameter plastic tubes embedded in concrete. The survey work included plans of 11 other stone settings in the area (numbered Callanish II to XII, the main site being Callanish I). Control sites were set up at each of these stone settings. At Callanish 1 two cemented tubes were used, one at easting 121 309.74 northing 932 968.40, and the other at easting 121 309.05 northing 933 045.64.
A letter from Dr Tait of 5 August 1974 recorded complete success. The map was published in 1978 (University of Glasgow Department of Geography, 1978). It forms the background to several of the illustrations here. Dr Tait kindly made larger scale drawings available before the resistivity survey of 1979.

Where the larger scale version of the main plan was checked during the resistivity survey of 1979, its errors were less than those of the Fibron tapes used for checking. But judging by queries since received it is worth pointing out that the irregular shapes of the stones means that their plan at ground level is different from that at eye level. However accurate a plan is it cannot be used for assessing the alignments between pairs of stones and the horizon. These have to be measured on-site, and have a variety of values depending on observer location, horizon height and on what parts of the stones are used to define lines. Nevertheless the Glasgow plan is a reliable basis for most non-astronomical work.

3.18 Audrey Henshall

Audrey Henshall produced a corpus of the chambered tombs of Scotland in two volumes, the first published in 1963 and the second in 1972. They were based on visits to every site, and use of the written sources to a very high standard of scholarship. Subsequently she and collaborators produced updated corpuses for Orkney, Caithness, Sutherland and the Central Highlands, to the same high standard.

Henshall saw no more or less mystery in Calanais than in other sites, describing it as 'only the familiar forms of avenue and circle, but combined in a unique design' (Henshall, 1972, 1.38). Her account of the chambered cairn added some detail omitted by the Royal Commission (Henshall, 1972, 461). She was the first archaeologist to argue authoritatively that the cairn was later than the circle (Henshall, 1972, 138).

She saw the cairn as unique within the Western Isles, but reminiscent of the tombs of Caithness and Orkney (1972, 125, 138-9). She remarked particularly the fact that the whole of the interior of the Ring was not used. If it had been, the Ring would have formed a peristalith. The fact that it did not positively distinguished Calanais from cairns of the Hebridean group (Henshall 1972, 150).

Some more recent approaches stress the individuality of each chambered cairn. Müller's method of 1988 (his analysis resting on the solid foundation of Henshall's corpus) produced a gradation of similarities and differences which, while embracing the variations of each monument, did not single out any of these structures as unique in the Western Isles. That said, the Calanais cairn did seem to him to be 'exceptional for the region' supporting Henshall's view that it was different from the other tombs of the Western Isles (Müller 1988, 29).

3.19 Aubrey Burl

Of Burl's many books about stone settings, three stand out: Stone Circles of the British Isles (1976), From Carnac to Callanish (1993), and The Stone circles of Britain, Ireland and Brittany (2000). I

shall restrict most of what follows here to summaries of his ideas, including some written after our excavations, leaving most analysis to Chapter 24: Discussion.

Burl has consistently seen the sequence at Calanais as a freestanding monolith followed by the Ring, the chambered cairn, the Avenue, and lastly the short rows.

He saw the central monolith as a landmark for seamen (Burl 2000, 94). He compared it to the high sea-side stones of Clach Mhic Leoid and Borvemore in Harris and the 5.8 m tall Clack an Trustal stone 16 miles up the coast to the north-east (Burl 2000, 203).

He regarded the Ring as 'rather unimposing' (Burl 2000, 169-70). He argued that the monolith and ring could not be contemporary with one another because 'The orientation of the Callanish stone does not respect the long axis of the ring … its broader face looking out to sea as a landmark'. He suggested that the Ring was intended as an ellipse with a NE-SW axis (Burl 2000, 203-4). This interpretation of the shape of the Ring is credible (although the long axis would have been at about 20 degrees east of north rather than 45 degrees); but it is not the only possibility. Thom and others suggest that the Ring was a flattened circle facing east (Thom 1967, 122; Curtis 1980; Ponting & Ponting 1984, 49). In Chapter 24.9 I prefer an interpretation that the Ring was not intended to be a precise geometrical shape and its eastern face was flattened to produce an eastern facade and entrance.

In 1993 Burl suggested on the basis of Beaker associations that avenues in general date to between 2600 and 2000 BC (Burl 1993, 67-8), a date range which is certainly possible for the avenue at Calanais. He suggested that short rows of less than 6 stones date to between 1800 and 1000 BC (Burl 1993, 147-8). In 2000 he wrote that the radiocarbon dates published in 1999 (Ashmore 1999, 128-130; see also Ashmore 1997, 116) suggest that the avenue was raised later than the circle (Burl 2000, 206). He probably meant that the dates for the Ring were earlier than his general date for avenues for there are no radiocarbon dates or chronologically diagnostic pottery directly associable with the avenue at Calanais. He thought that the avenue might belong to a period after 2000 BC; 'Overall, avenues can be regarded as very late Neolithic and quite early Bronze Age phenomena … with more distant, later outliers in northern Ireland … and the eastern and western coasts of northern Scotland' (Burl 1993, 69). Although the radiocarbon dates he quoted allow the Avenue to be of this date, they do not directly support it.

The layout of the Avenue may have been influenced by 'high and low' rows of the hillsides in N Ireland; that is to say, the stones of one side of the avenue were consistently lower than those near them on the other side of the avenue, a trait also found in Brittany (Burl 1993, 61; 2000, 145). He saw it as splayed and regarded it as probably multi-phase; indeed he thought that it is arguable that this was a short avenue later extended, given the increasing height towards the circle of the stones nearest the circle and then increasing height in the opposite northward of the rest of the avenue. He accepted that it was perhaps not completed and that the gaps are 'real' (Burl 1993, 61). He thought that 4 avenues may have been planned (Burl 2000, 204; 207), or at least more than one (Burl 1993, 50, 61).

He believed that the short rows were even later than the Avenue, belonging about 1700 BC (Burl 2000, 206). Analysis of the radiocarbon dates suggests that the east row was in existence before some date between 2560 and 1690 cal BC, and while his suggested date may be roughly correct it seems more likely that the East row was started somewhat earlier.

Burl saw Calanais as a staging post. He argued that the Western Isles were not cut off from other areas but on a long busy seaway between the Boyne Valley and Orkney (Burl 2000, 39-40). The outer coast was preferred to a seemingly more protected seaway because of the hazards of the sea from the Mulls of Galloway to the Kyle of Skye (Burl 2000, 93). The stone rings of Callanish 1 to 4, dissimilar to one another, 'may have resulted from the arrival of crews from southern Scotland, Ireland and England taking shelter on the long voyage to the Orkneys' (Burl 2000, 94). He thought that the chambered cairn might have been added as a physical retaliation against alien ideas (Burl 2000,

40), an idea given tentative support by excavation evidence for a possibility that the earliest form of the chamber was a simple bag shape without orthostats.

He supported the idea that it was Calanais that Diodorus Siculus referred to, stressing the point that the event of the moon being but a little distance from the earth occurs only in the latitude (58 degrees north) of Calanais. Referring to Diodorus' statement that 'the god [the moon] dances continuously the night through from the vernal (spring) equinox until the rising of the Pleiades', he noted Brown's criticism that at the spring equinox the Pleiades would rise unseen shortly after sunrise, but thought that the east row might be late enough in date to 'freeze' earlier knowledge of the rising of that group of stars (Burl 1993, 64-5).

Burl's ideas continue to deserve respect. Indeed, the interpretations of the excavation evidence preferred in this report are in accord with, or at least do not disprove, several of them. Others should be modified in the light of the results.

3.20 Gerald and Margaret Ponting

Gerald and Margaret Ponting lived a mile from Calanais from 1974. Their guide to the stones, 'The Standing Stones of Callanish' (1977) was justifiably successful, as was their 'New Light on the Stones of Callanish' which followed in 1984. Their self-published 'Callanish: the Documentary Record' of 1979 and its companion volume on the other stone settings of the area were a substantial contribution to scholarly studies. It is discussed below.

In 1977 they followed up their documentary researches by rediscovering the fallen stone (Stone 33a) at the east end of the East Row. It was re-erected in 1982 (see Chapter 8: Area C).

In early 1978 the tip of Stone 19, was discovered by Margaret Ponting in the low northern wall of the site near Stone 19. In a letter of 21st February 1978 informing me of the discovery, Gerald Ponting made several other interesting points. He noted that the stone-tip must have been in the wall for about a century because it was shown by Sharbau (c. 1857) but not by Pitt Rivers and Tomkins (1885). The tip was replaced by Mr Neil MacPhee for the Property Services Agency in September 1978. The Pontings considered that some 18 of the 48 stones had pieces missing from their top surface. They also noted the brown 'cement' in cracks in the stones, and earlier repairs in grey-white cement.

Their 'Callanish: the Documentary Record' of 1979 was a compendium of earlier studies illuminated by the results of their own fieldwork and photography of the site. I had written most of a draft of a paper on the documentary sources for Calanais in 1979 (published unchanged in Ashmore 1984 apart from a footnote), by way of preparation for the excavations reported here, benefiting from the results of 'frequent discussions in person, by post and by telephone' with the Pontings (Ponting & Ponting 1984, 19, 55). When Historic Scotland subsequently obtained a copy of their compendium it proved exceptionally useful, particularly because they had commented from their first-hand observations on the strengths and weaknesses of the various accounts. Their attempts to get this anthology raisonée republished in a more readily accessible format came to nothing, despite support from Aubrey Burl and others. In my view it still merits wider publication nearly thirty years after it was written, as the many references to it in this publication demonstrate.

After Gerald moved south in 1984, Margaret's work continued with Ron Curtis; they subsequently married. Some of the work done by Gerald, Margaret and Ron after c. 1979 is considered in Chapter 24: Discussion.

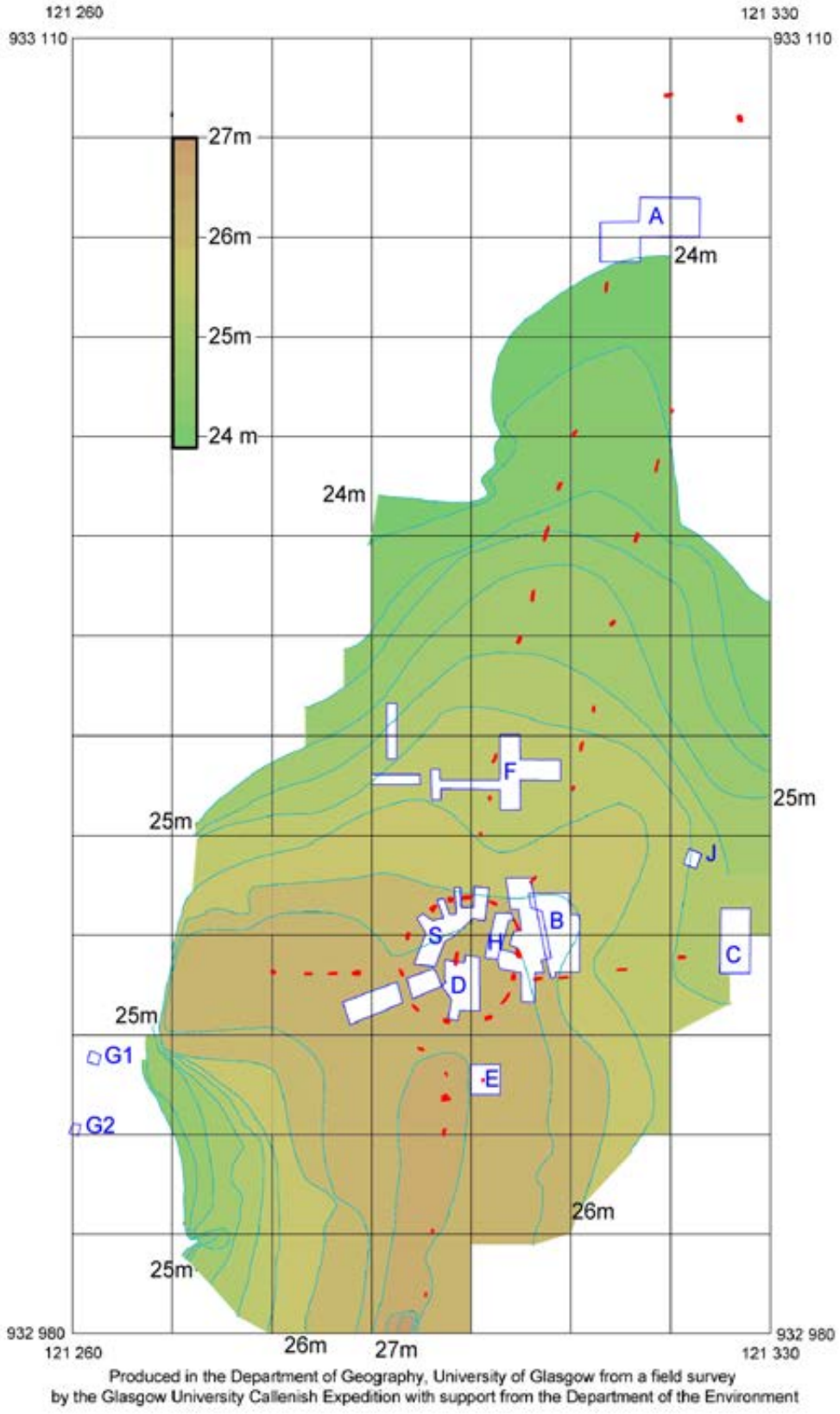
For the most part, although I have included a little from Muller 1988, Burl 1993, MacLeod (ed) 1999 and Burl 2000, this discussion does not cover sources published after 1979. They are considered in Chapter 24: Discussion.

3.21 Summary

Those 'lamentable things', the standing stones at Calanais, have had many ideas imposed on them. In the 17th and 18th centuries they were used to support notions about a pre-Christian 'natural religion'. In the 18th and 19th centuries they figured in debates about whether Scotland was settled mainly by Germanic or Celtic peoples. Some good

fieldwork (for its time) was undertaken, mainly when it was cleared of peat in late 1857. The importance of the place was recognised in 1882 when it was included in the first list of scheduled ancient monuments. In the 20th century it was often seen an astronomical observatory supporting a sophisticated calendar similar to the well attested (but much later) calendars of the pre-Roman Celtic realms. By the time we excavated, and despite a tendency to look at it in isolation from its physical context, it was seen as a ceremonial site with complex connections to other parts of Britain and Ireland. Now it can be, viewed mainly as one of several British and Irish sacred landscapes.

4. Introduction to the field and post-excavation work



Illus 4.1 Contour survey of 1974 (Tait et al 1978) with excavation areas

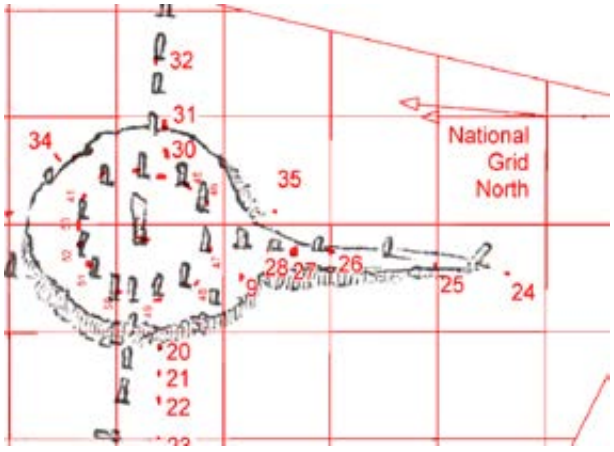
This introduction includes:
4.1 pre-excavation records of the peat cover, chambered cairn and enclosure;
4.2 the aims in excavating;
4.3 a summary of the fieldwork;
4.4 problems with recording and interpretation.

4.1 Pre-excavation records of the peat cover, chambered cairn and enclosure

As described in Chapter 3, Glasgow Department of Geography surveyed the main stone setting at Calanais in 1974 along with many of the subsidiary sites. It included the National Grid (Illus 4.1). Large scale plans were kindly made available by Dr Tait prior to their publication (Tait et al 1978). When I checked the plan of the main setting at the start of the resistivity survey in 1979 it was accurate to within the accuracy of the Fibron tapes.

4.1.1 The peat-stripped area round the Ring and Rows

Studies of early sources and air photographs showed that soils in different parts of the site would have been affected by different histories of peat cover. The main contrasts were those between the soils in the areas used for early modern agriculture north of the old road crossing the avenue, the areas where peat had been stripped or partially stripped for fuel south of the road, and the area round the ring where peat had survived to a depth of up to 1.5m until 1857. The Birds Eye View of 1854 shows surviving peat round the Ring and a long spine to the south (Illus 4.5).



Illus 4.2 Part of Callender's 'Birds Eye View' of 1854 overlaid on the Glasgow plan

In Illustration 4.2 Lady Matheson's Path and various subsequent informal paths run beside the South Row from a gate to the Ring. Spade-created raised cultivation beds are visible to its east and west. South of the Ring a small height change in the peat defines a roughly triangular area. The outermost excavation trench (Area DIII) crossed its western margin. Its eastern margin curves to the East Row.

It corresponds to the area finally cleared of peat in 1857. Outside it peat had earlier been cut for fuel almost to the underlying soil. Inside it the peat was completely removed.

In Illus 4.4 the tones of the standing stones have been remapped to lighter colours for clarity. The edge of the peat-cleared area is visible despite variations in vegetation. Lady Matheson's Path appears to have followed the same line in 1955 as in 1980; but erosion marks show that people walked on both sides of the South Row. The area sampled in Area F before drainage improvements is visible to the left as a ragged whiter scar.

Pre-modern cultivation beds to top right ran to within a few metres of the South Row. Those to bottom right probably belonged with a small structure which was in use about 1857 judging by Kerr's 'excellent sketch' (Illus 4.5). The structure may have been a house superseded by a cereal-drying kiln or a kiln-house. Remaining shallow peat appeared darker than agriculture areas and the area cleared of peat in 1857. To the left of the Ring a patch of darker ground was bisected by an eroded area – the erosion presumably reflecting natural processes rather than wear from visitors' feet.

There are no signs in the air photographs that whoever used the cultivation beds on the slope above and to the east of the structure also used the peat-stripped area for agriculture. In Area DIII (Illus 4.1; see also Chapter 9: Area D) the modern surface could be interpreted as slightly ridged, but that appeared to have been caused by erosion from visitor's feet rather than farming. The sub-peat soil surface on Area DIII probably corresponded to that of the 1st millennium BC unless, as discussed below, it was covered with stones which were subsequently cleared away.

Illus 4.3 Air photograph of Lady Matheson's Path, the South Row, the Ring and Areas D and B in 1980 from the east [Film Calanais AP3]

Illus 4.4 Extract from air photograph from the west-south-west on 16 July 1955 [Cambridge University Collection RA85]

Excavation of Area E round Stone 35 (Illus 4.5) to the east of the South Row and around 5m from the Ring showed that Lady Matheson's Path sat on top of amorphous and presumably ancient peat. It seems quite likely that some peat was left when the area was stripped; Callender's 'Birds Eye View' (Illus 4.5) and Kerr's excellent sketch (Illus 4.4) suggest the hag was old and well rounded by 1854.

By way of contrast excavation of the path in Area D showed that it lay over stacked slabs of peat. Further, the cairn showed evidence for two phases of Victorian activity. It seems fairly clear that the area inside the Ring was completely stripped, and then as an afterthought the path was built up inside the Ring.

Illus 4.5 Part of Kerr's 'excellent sketch' of around 1854

Most excavation (almost all of Areas B, D and H) took place in the stripped area. Area A was in an agricultural field north of the track crossing the Avenue. Areas E, F were in parts of the site where peat had been cut for fuel before 1857. Peat had been cut for fuel in Area C, too; in 1980 it lay outside the area in the care of the State and more of the peat survived there than in other areas.

The significance of this is that much of the area excavated had been covered by peat for 2500 years, give or take a few centuries. Before that normal soil processes and cultivation had produced top-soil changes. Presumably drainage had become impeded before peat started to form although it is not clear what relationship the incipient pod-solisation recorded under surviving peat in the north-east corner of Area B bore to peat inception. When the peat was stripped in 1857 soil weather-ing processes were renewed. They will have oper-ated for the 123 years before our excavation. The

Illus 4.6 The chambered tomb towards the beginning of the 1981 season [Film 1981.1.11]

upper layers of Areas B, D and H thus reflected two well-separated periods of soil processes. By way of contrast, Areas C and F were for the most part not completely stripped of peat when it was cut for fuel prior to 1857. Thus the soils there may represent the pre-peat ones better than those in the stripped area.

4.1.2 Early records of the cairn

When it was excavated in 1980 and 1981 the cairn proved to have been robbed and partially rebuilt. Also, behind the squared-off west end wall the foundations of the original chamber wall were oval in plan. It is still not clear after excavation when the change from oval to square was made

Sharbau's sketch of about 1857 is an early rendering, and faithful even to the sketching in of parts of the outlines of Ring Stones 43 and 44 where they would have appeared from his apparent view-point (Illus 4.7). This suggests that it is a sophisticated drawing.

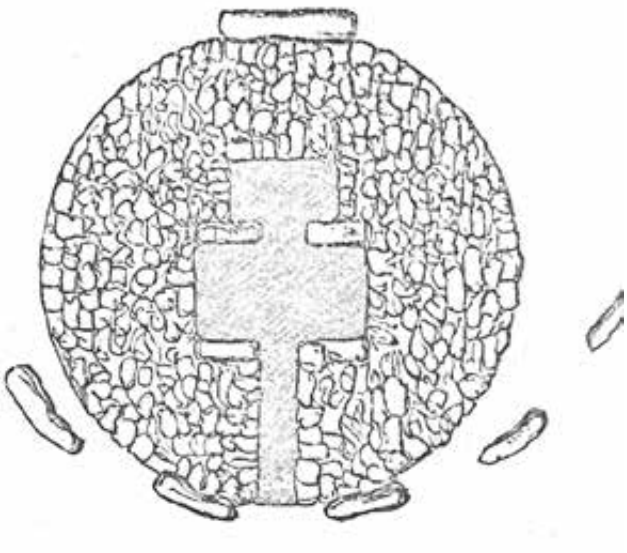
The west end wall is shown as a panel of stone beyond the two western orthostats. It seems to be flat and standing to a height of about four layers of (fairly small) stones. However the drawing does not show an angle between the south and west walls of the end compartment. Admittedly it would be difficult to do so, but it is just possible that when he saw it the west compartment was rounded rather than square. The evidence is ambivalent.

The tops of the walls are level except the south passage wall and even there the west end of the passage wall seems to be fairly complete to the same height as the rest of the cairn.

The woodcut accompanying Innes' version of Matheson's description of the peat clearance of 1857 (Innes 1860, 111) shows a neat rectangular chamber end (Illus 4.8). The proportions of the chamber and the proportion of the chamber length to the distance between the west end and the central monolith are wrong, so it is unlikely that it was based on a measured plan; indeed it may have been based on verbal information.

The chamber outline and orthostats were added to Palmer's plan, probably by Captain F W L Thomas before 1858 (Illus 4.9). The plan was at

Illus 4.7 Sharbau's sketch of the chamber around 1857



Illus 4.8 The cairn and chamber plan included in Innes' account

a small scale; dimensions cannot be scaled off accurately. Through a tracing error it omitted one stone of the Ring. It showed a neat construction with a passage, main chamber and rectangular rear chamber. It did not include the cairn. The relatively accurate RCAHMS plan of 1923 in blue on Illus 4.9 demonstrates the errors in the plan of 1857-8. The main error was in placing the end of the chamber too far east and making the passage too short, but Captain Thomas also oriented it slightly wrong relative to the Ring and central monolith.

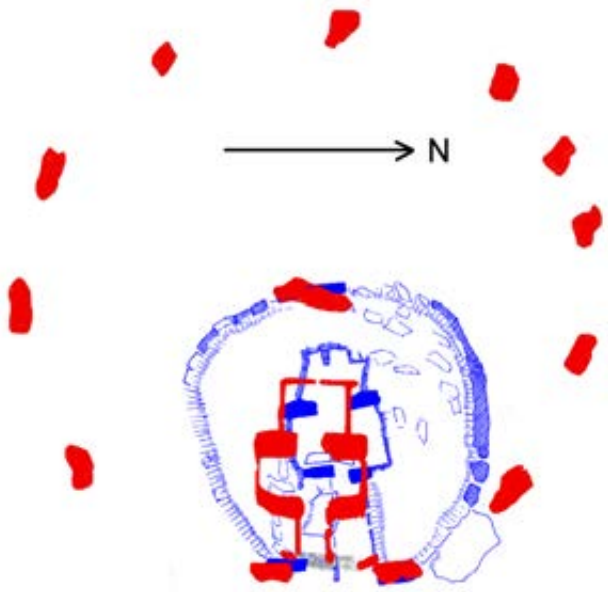
The 1857/8 plan suggests that the cairn and its kerb were far from prominent features when the peat was cleared from the area. The only surviving description was provided in a letter from Sir James Matheson to the Society of Antiquaries of Scotland published in its proceedings for 1857-1860 (Innes 1860, 110-12) "… in front of the large central stone and extending to the eastern wing, [the workmen] came upon an erection which proved, as the work proceeded, to be the walls of a chambered building, consisting of three compartments. … The larger chamber was found to have two stones on each side, forming jambs for the entrance to the smaller chamber; and in close proximity to them was found a separate stone, 4 feet long by 12 inches, which fitted, and was supposed to be a lintel to the jambs referred to. These stones were rough and unhewn. … I enclose some minute fragments of what we suppose to be bones found in the chamber, and a specimen of a black unctuous substance, in which these fragments were contained."

A note to this account records "Professor Anderson of Glasgow has since examined the bones, and pronounced them to be undoubtedly human, and seemingly to have been subjected to the action of fire. The unctuous substance he considered to be peaty and animal matter combined, but after so great a lapse of time he could not speak with certainty as to this." (Innes 1860, 112)

Sir James Matheson added "It is remarkable that the sides of the small chamber are quite undisturbed - not a stone even of the uppermost tier removed from its place, which leads to the inference that it was at one time covered up by design, since, if it had been left uncovered till the moss grew naturally over it, it is to be supposed that some of the upper stones would have been displaced by the feet of cattle, or by any other of the numerous accidents that would have been likely to disturb them, yet I have not heard that the superincumbent substance over the chamber was in any respect different from the surrounding peat moss."

Sir James' contention that the chamber wall top was everywhere neatly preserved must be taken with a pinch of salt even though is compatible with Sharbau's sketch. The 1980 and 1981 excavations which exposed it in the end compartment demonstrated considerable damage to and rebuilding of the chamber wall. The outer, less well-built cairn had been considerably damaged to the south of the chamber. To its north the outer cairn seems to have been rebuilt before peat covered the place.

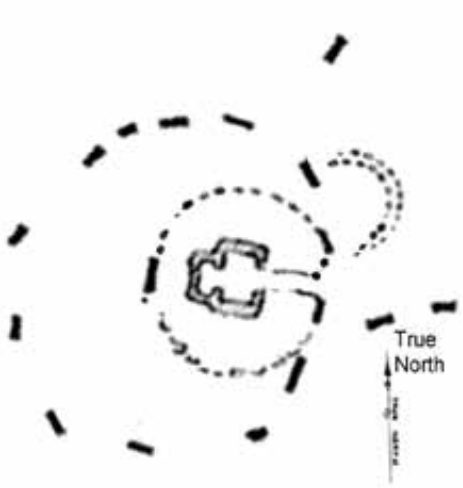
Matheson was a busy and locally all-powerful man. It seems to me quite possible that the chamber was tidied up on the orders of his martinet of a chamberlain, Mr. Donald Munro prior to Matheson's viewing of the work and that nobody felt it their place to tell him that the cairn was not exactly as found. That said, and although his suggestion that the chamber walls were re-



Illus 4.9 Part of the Palmer/Thomas plan of 1857-8 in red with the RCAHMS chamber plan of 1923 in blue [based on NMRS RCD/##/## and RCD/13/12]

markably well preserved should not be accepted without cavil, there is no evidence (apart from an ambiguous hint in Sharbau's drawing) to suggest that the west compartment of the chamber had a round end like that which the 1981 excavation suggested when the area was cleared of peat. It is possible, therefore, that the squared-off end was the remains of a pre-peat feature rather than the Victorian bodge which it looked like during our excavations.

We investigated the cairn and chamber in Areas D (Chapter 9) and H (Chapter 12), and the passage in Area B (Chapter 7).



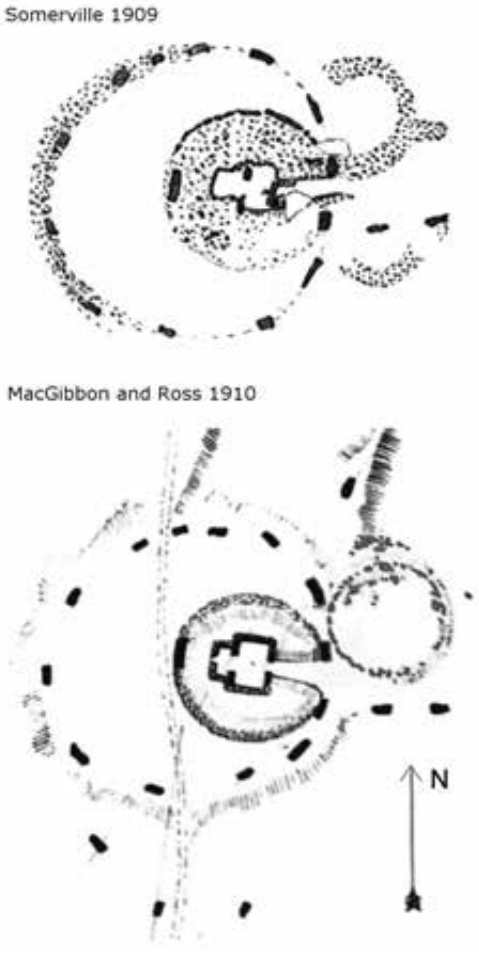
Illus 4.10 Detail from Pitt-Rivers' plan

4.1.3 Early records of the enclosure

The enclosure did not appear on Captain F W Thomas' plan of features revealed by peat clearance; but that plan was merely a tracing of Palmer's pre-clearance one with the addition of the chamber, omitting even the cairn which surrounded it; so the omission of the enclosure is not significant. Pitt-Rivers' plan of 1885 showed it (Illus 4.10), as did Somerville's of 1909 (Illus 4.11) and MacGibbon and Ross's plan of 1910 (Chapter 3 Illus 3.45).

Pitt-Rivers' plan of 1885 did not show the eastern stub wall of the enclosure (Illus 4.10). The detail of the relationship of the Ring stones to the passage was less accurate than in Somerville's plan (Illus 4.11). Nevertheless it showed a gap between the southern part of the enclosure and the Ring stones which corresponds better with the evidence from excavation than Somerville's plan.

Somerville's plan of 1909 (Illus 4.11) presented his interpretation of the remains, which corresponded loosely with those found during excavation except that he showed a southern part to the enclosure, and no gap immediately south of the eastern stub wall. He captioned the part of the enclosure north of the stub wall 'Small stones level with surface', and did not attempt to show individual stones; the southern part of his enclosure wall may have been the swell of surviving early strata between its scooped interior and the modern drainage ditch. The detail of the north-west end is similar to that revealed by excavation, suggesting that the gap found in 1980 existed in 1909.



Illus 4.11 Detail from Somerville's plan of 1909 with text, orientation lines and stone numbering removed for clarity and detail from MacGibbon and Ross 2010

We saw nothing in 1980 or 1981 of Somerville's 'small stones level with the surface' south of the East Row. There remains the intriguing possibility that it was part of an enclosure similar to that north of the East Row. We did find a somewhat amorphous concentration of stones where the northern part of such an enclosure might have lain. That opens up the possibility that at one stage the setting had a pair of enclosures set to either side of the entrance to the chambered tomb. We also revealed a small line of what may have been walling north of Stone 31, the second stone of the East Row, but it did not fit with any of Somerville's southern walling (Chapter 24: Discussion).

MacGibbon and Ross's plan of 1910 appears to show3 wall edges in the northern part of the enclosure. It is conceivable that the northernmost line corresponded to part of the Stage 3 enclosure discussed in Chapter 7.6.

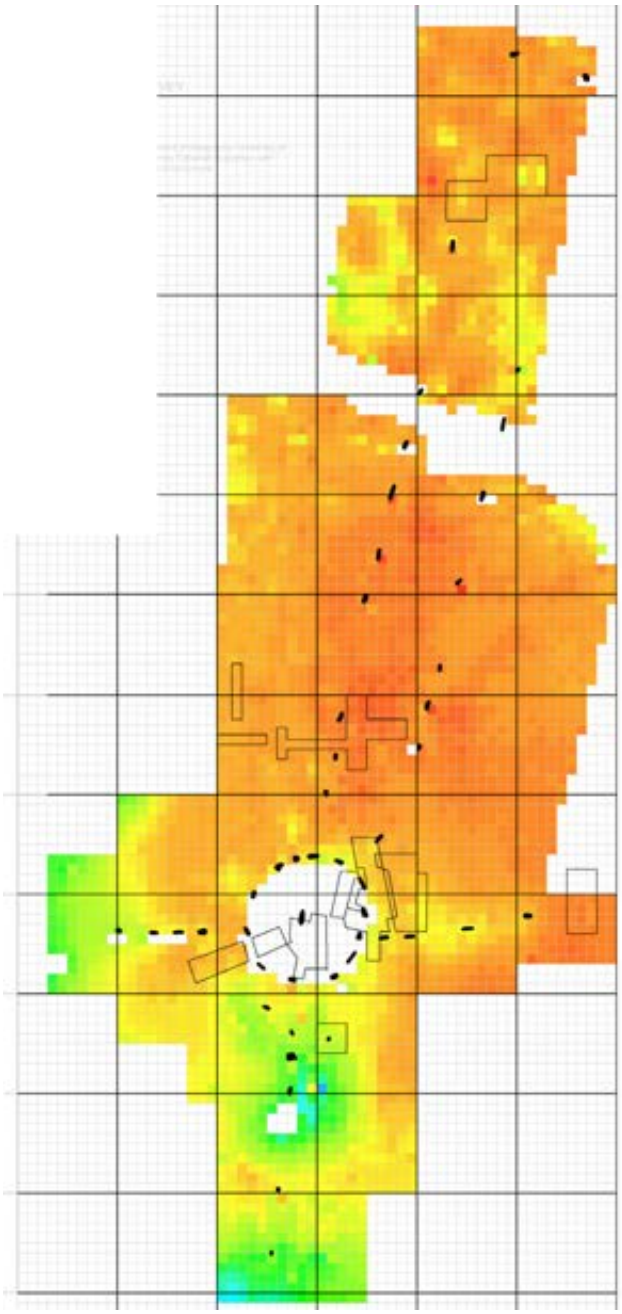
4.1.4 East Row stone 33A

Many of the early plans from MacCulloch in 1819 onwards suggested a fifth stone in the East Row. However MacCulloch's depiction may have been an error, Worsaae's of 1846 took the form of an annotation to a rough sketch plan showing only four stones, and the Ordnance Survey map of 1853 depicted only four stones. Only Palmer's plan of 1857 seems to have shown it in a fairly reliable way. In 1977 a fallen stone was located by Gerald and Margaret Ponting when they probed systematically around the position shown approximately by Palmer (Ponting and Ponting 1979). The stone and its socket were excavated in 1980 in Area C (Chapter 8).

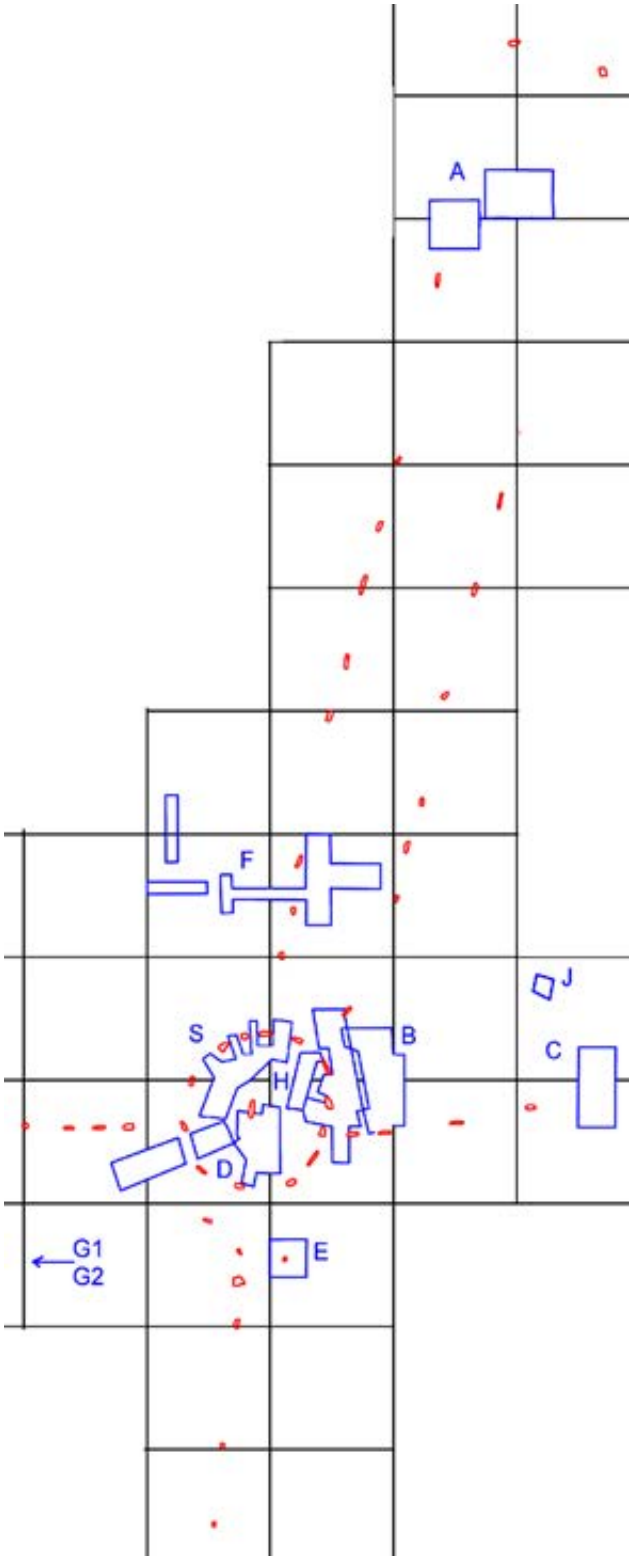
4.1.5 Avenue stone-pit 003

In 1819 MacCulloch showed fallen stones in the Avenue along with those standing today. Resistivity survey in 1979 revealed an anomaly approximately where MacCulloch (1819) had shown a fallen stone. It also disclosed a very strong anomaly nearby in the middle of the avenue. It also showed the superficial geology of the site; areas with a thicker soil or peat and soil cover gave lower readings than those where rock was near the surface (Illus 4.2). Details of the survey are provided in Chapter 5: Resistivity.

In 1980 we tested the idea that there had been an Avenue stone in this area by excavating Area A. A suitable pit was discovered along with what may have been another. We investigated the pits and a glacial erratic in Area A (Chapter 6).



Illus 4.12 Resistivity (High readings green, low brown)



Illus 4.13 The excavation areas

4.1.6 Stone 35

Stone 35 to the southeast of the Ring, had been supposed by RCHAMS to be remains of a second circle or part of a southern avenue (1928, 24). It had first been recorded in 1857 when Sharbau drew its complete profile, demonstrating that it was recumbent. By 1867 it was erect in its present position (James, 1867, plan and fig.). It seems to have been broken between then and 1885. Maclagan's plan of 1879 was ambiguous, seemingly omitting it; although there was a black dot on her plan southeast of the Ring it was further south than the position recorded by others. Pitt-Rivers showed it in its present position in 1885. MacGibbon and Ross included it in 1910, as did Somerville in 1909 (Somerville 1912). We investigated a small area around Stone 35 in Area E (Chapter 10) but found no signs of a prehistoric setting.

4.2 The excavation areas

The excavation areas were labelled A to F, H and S, while soil test pits were labelled G1, G2 and J (Illus 4.2). Details of results are in Chapters 6 (Area A) to 14 (Area S).

Table 4.1 Areas, Years and Supervisors

Area	Year	Area Supervisor
A	1980	Jean Comrie
B	1980	Peter Strong
B	1981	Peter Strong
C	1980	Anne-Marie Gibson
D	1980	Lily Linge
D	1881	Jean Comrie
E	1981	Ian Maté
F	1980	Ian Maté
G & J	1980/81	Ian Maté
H	1981	Anne-Marie Gibson
S	1988	Peter Strong

Area E, on shattered bedrock with subordinate patches of weathered clay, was completely dug, as was Area A, which had been heavily cultivated in the 19th century. Work there and in Area F reached weathered natural in many places, if not the undisturbed natural itself. In Area C the basal soils were slot-trenched along the east baulk but early soils remained over most of the area, in at least one place covering an unexcavated old ground surface.

None of the main excavation areas B, D and H was completely excavated down to indisputably unmodified natural. Modified natural was reached in sub-area BIII (the eastern part of the Area) but in many places the basal soils remained when we finished the 1981 season. It proved impossible to arrange a third season of work. There is more detail of survival in Area B in Appendix 1.

Area S, dug as a separate exercise in 1988, was excavated only to a depth which would allow 0.15m of new turf to be laid down. Early soils remained, and features were not bottomed.

4.3 Excavation

4.3.1 Aims for 1980

In 1979 the main constraint on excavation planning was the need to focus it on areas requiring repair. However some flexibility was allowed to tackle questions arising from prior research. The problems which excavation might resolve were divided, not without overlap, into two types: those which arose directly from what could be seen on the ground and in early descriptions, and those which arose from speculation about the purposes behind and the intended form of the setting.

The aims for excavation written in 1979 (and published 5 years later in Ashmore 1984) were:

— categorisation of nearby areas as little complicated by artificial features as possible;
— categorisation of structures where they seemed to be at their simplest;
— recording of the chamber and cairn and immediate environs prior to repairs;
— investigation of Stone 35, to the south-east of the ring, which possibly had never been erect in prehistory;
— investigation of a fallen stone and its socket at the east end of the east alignment;
— investigation of the path, Lady Matheson's Path, which runs from the southern edge of the site to the ring, which some authorities had supposed to be ancient in origin;
— the nature of the west side of the avenue at its north end, and
— testing the idea that there was an eastern side to a southern avenue.

In all this there was a perceived conflict between the need to excavate sufficiently large areas to allow understanding of what might be found, and the desirability of preserving undisturbed as much as feasible for study at such time as questions not yet posed need answers (Ashmore 1984).

From a modern perspective these were more tactics than aims. The underlying aim was very general; to obtain a better understanding of the features of the site. Even today I believe that that is as respectable a primary ambition as attempts to use excavation to relate a site to general theories and ideas about a wider social sphere, although of course the two things are far from independent of each other; interpretation and observation are as essential to each other as mind and body.

4.3.2 Excavation in 1980

The 1980 excavation of Area A on the west side of the avenue produced what seemed to be at least one stone socket. In Area B, to the north east of the ring of stones, a low curving wall base seemed to cover an earthen predecessor. Ancient cultivation beds were discovered in Area C at the east end of the east alignment. The fallen stone at the east end of the east alignment (Stone 33A) was shown to fit precisely into a socket which still had its packing stones in place.

In Area D, the south-west quadrant of the ring, the excavation revealed that much of southern portion of the cairn had been rebuilt after 1857. It showed that Lady Matheson's Path was later than this rebuilding. Ard-marking was noted in several areas. In Area F, which ran from the southern part of the Avenue westward along the line of a proposed drain, traces of early cultivation and levelling were found.

4.3.3 Superficial geology revealed in 1980

The underlying natural material in most of the excavated areas was green clay. It overlay gneiss. It contained some large stones, one of which (in Area A) was definitely a glacial erratic; others found in Area B were probably of the same origin. Substantial field stones had been recorded on several parts of the area during resistivity survey. The green clay varied in composition. In places it appeared to contain abundant almost completely rotted stones, often grey-green. At another extreme it was homogenous and bright green when damp. In the outermost trench of Area D a band of grey-green stiff clay crossed the trench in a broader context of brighter green clay. In most of the other trenches the natural was not exposed enough to allow observation of any similar systematic variations.

Illus 4.14 Air photograph of excavations in 1980 (north at top).

4.3.4 Revised aims for 1981

The interim report on the 1980 work, widely circulated but not published, concluded with plans for further excavation. It expressed the following intentions:

— relate the ard-marking and shards to the stone ring by extending the site-areas in and to the north-east of the ring of stones (Areas B, D and H);

— confirm that this ard-marking succeeded dilapidation of the cairn;

— discover the original shape of the cairn, and the original nature of its kerb, and the relationship of the cairn to the monolith in Area D;

— further elucidate the bank, slot and scoop outside the north-east quadrant of the ring in Area B [by this I meant the enclosure and possibly independently the palisade slot], and relate them to the cairn and stone ring;

— show the relationship of the cairn to the bank in Area B [by this I meant the supposed linear bank north of the ditch];

— excavate the area round the stone-hole of stone 35 in a new area, E, to see if it was like the two prehistoric stone-holes.

Illus 4.15 Excavation in May 1980, from the east [Film 1980.3.14]

Illus 4.16 Excavation in May 1981, from the east [Film 1981.13.22]

Illus 4.17 Pollen sampling 19 1982 [Film 1982-PO-10 extract]

4.3.5 Excavation in 1981

As it turned out, much of the work in 1981 was driven by different questions, although the exploration of Area E including stone 35 took place exactly as foreseen. In other words, events took a course familiar to all excavators who have dug on a multifaceted site for more than one season. They demonstrated that the superficial work done in the first season had given little inkling of its complexity.

The excavations in and around the Ring revealed a complex sequence of features; the earliest was a probably oval or circular enclosure ditch. It was overlain by cultivation beds. Cultivation ceased locally before the setting up of the central monolith. Several isolated features including a short stretch of slot demonstrated further activities. Probably most of the ring stones were set up in a single operation lasting less than a year. Clay was laid inside the Ring and on it a light timber structure was built to the east of the monolith shortly after the Ring had been erected, at some date between 2900 and 2600 BC. Filling in of the slots of this structure was followed by building of the chambered cairn.

A few large pits were found. They may have been contemporary with or slightly later than building of the stone ring.

During the late third and early second millennia BC burial or domestic material, mostly secondary, was placed around the south side of the cairn, which became dilapidated. A burial or burials were placed just outside the Ring and southeast of the chambered cairn passage entrance. Some of the pottery vessels deposited at the site were of very fine quality. Lithic artefacts included five barbed and tanged arrowheads.

An earthen enclosure was built outside the northeast quadrant of the ring. It was ploughed over. The enclosure was rebuilt twice, each time with a stone wall-base. At some date during the second millennium BC massive slabs were set at the edge of the cairn to create a partial kerb. Further cultivation took place.

Peat began to grow over the site during the first half of the first millennium BC; its most persistent height of about 1.5 m was fossilised by differential weathering of the standing stones.

The excavations did not really resolve the relationships of the avenue and rows to the Ring. Although there was useful stratigraphy around the Ring itself it was largely a consequence of the clay spoil thrown up in digging pits for the standing stones. Away from the Ring and enclosure soil processes and agriculture had truncated the stratigraphy so much that the tops of stone pits were in modern subsoil. Yet the overall impression from what stratigraphy did survive was that the East Row was significantly later than the Ring and less certainly that the Avenue was also later than the Ring.

Hopes for a third season turned out to be unrealistic. There was no interim report on the 1981 season; instead work to bring the excavation records into order started, as described in Chapter 2 Introduction.

4.3.6 Sampling in 1982

Sampling to retrieve more pollen samples from the Area D site sections took place in 1982 with Sjoerd Bohncke, the pollen specialist, in attendance. It was hoped that pollen would help to characterise layers and allow the sequence at Calanais to be linked to the radiocarbon dated pollen columns at Calanais Leobag, 600 metres SE of the main setting (Bohncke 1985).

Stone 33a at the end of the east row was re-erected in the same year. It fitted precisely between the packing stones in its socket.

4.3.7 Shallow excavation in 1988

In 1988 turf repairs were required in the north-western part of the Ring (Area S). The superficial layers were excavated to ensure that evidence would not be damaged without record. The results strengthened the basis for interpretations of the evidence from the other excavated areas but the only novel feature uncovered was the top of a pit.

4.4 Recording and interpretation problems

4.4.1 Problems with single context recording

All site recording was intended to be 'single context', in its simplest sense; our ambition was that each context label would correspond to a single coherent feature. This was supplemented by 2-dimensional or 3-dimensional recording of significant finds. However some layers, notably mineral soils 112 and 117 on Area B, were widely distributed. Fundamentally, single context recording is not well designed to cope with layers developed by the chemical and physical weathering of earlier soils and features. Several parts of the site were therefore excavated by fairly level trowelling and frequent planning of features and finds, rather than by the optimum method of emptying the latest visible contexts first (Technical Note 4.4). The reason for using this method was that patchy soil processes had modified many layers locally, producing variations which suggested successive layers where in fact the deposits were stratigraphically the same. On the other hand some originally different layers had been partially homogenised by later soil processes and ploughing.

4.4.2 Problems with maintaining stratigraphic coherence

Despite good intentions, the various sub-areas of Area B could not be kept precisely in stratigraphic step with each other. The same was true with Area D and even the relatively small Area H. This meant that parts of some features, for instance the bank of the first enclosure, were revealed at different times.

Iron panning, again the result of processes rather than events, was common on Site B, particularly in the enclosure bank and near the entrance to the passage of the chambered tomb. Its origins are discussed in Chapter 19: Soils. It may for the most part have reflected the prior presence of concentrations of organic material.

Some of the prehistoric agricultural soils were very similar to one another. Old ground surfaces in the form of thin, black, greasy to velvety layers, often with a slightly leached layer under them, were fairly abundant. It is important to recognise that formation of these thin layers, like that of the other soil horizons, was the result of processes, not events.

If there had been only a few short periods of depositional activity interspersed amongst long periods of inactivity, the turf lines might have provided simple stratigraphic markers. However, both the stratigraphy and analysis of the radiocarbon dates (Section 23) makes it plausible that there were many short episodes of human depositional activity resulting in new local turf lines. These could for instance cover a small area of clay spoil, merging with the earlier turf line at its edges. Also, some turf lines were partially or completely stripped away, and others were interrupted by

stones or distorted by chemical processes associated with iron panning. Nevertheless, the excavations left a strong impression that in Areas B, D H and S there was a well-developed turf line covering areas near the Ring stones immediately prior to their erection, and that another turf line formed over low spreads of spoil from the digging of pits for erection of the stones, and in some places a third covered material used to level up the area inside the Ring. But for the reasons adduced above such correlations must be treated very cautiously.

4.4.3 Residuality

The later layers and features at Calanais often contained soils, charcoal, pollen and artefacts derived from earlier layers and features. This must have been true (albeit sometimes in a trivial sense) of all but those made entirely of clean natural clay.

That introduced a difficulty related to the problems discussed above. For instance on Area B loam 183 in the enclosure was probably formed in prehistory but parts of it were probably dug away in modern times to create Pit 129 and quickly thrown back after the pit was filled up. In a sense it is valid to say that the replaced loam was prehistoric, because it had not been visibly modified since prehistory. But stratigraphically it was of course modern and its modern displacement and replacement may in fact have resulted in subtle changes to its structure and content. It may for instance have incorporated new pollen.

Routine single context recording sufficed where old anthropogenic material was used to fill later sharply defined features, for instance the slot cut into the green clay platform by the chamber on Area H. But there were several cases where matters were far less clear, because of difficulties in maintaining stratigraphically consistent surfaces. For example, on Area D we found several small low spreads of material dissimilar to the layer on which they lay but similar to a layer below that again. In fact small pits had been dug and the spoil, which was thrown to one side and in part left where it lay, consisted almost entirely of material from buried layers.

During all but the latest phase of post-excavation work the amount of residuality at Calanais was underestimated. It was really only reanalysis of some of the layers south of the cairn in Area D, and the implications of the radiocarbon dates and artefacts solidly stratified in the cairn on Area H that brought home the degree to which old material had been recycled.

4.4.4 Accuracy and errors

The excavation areas were laid out with Fibron tapes. Pegs were subsequently used as the base points for triangulation of features, location of planning grids and re-drawing of trench outlines. Triangulation errors were fairly frequent on Areas B and D. Sometimes they arose because the tapes stretched from the pegs met features at too acute or obtuse angles. At other times high wind and rain prevented accuracy, bending tapes and plumb lines. In the worst cases post-excavation analysis of successive plans of the same stones and cut features suggests errors of up to 0.2m. More generally claim an accuracy of better than 0.1m can be claimed only on Area H, sub-areas BIN and BV and sub-areas DII and DIII which were of a shape ideally suited to our recording method. The errors, combined with slightly sloping trench sides, resulted in apparently different trench shapes at different levels. Lastly, different planners perceived the outlines of rounded or facetted stones and irregular features in dissimilar ways to one another and therefore drew them in different ways.

4.4.5 Recording, context sheets and day books

Some written descriptions were recorded mainly in day books and others on pre-printed context sheets; others were recorded in both. In retrospect the day books often provided more usable information than context sheets. The latter were too complex, demanding that information be entered in too many different boxes; as a result many boxes were left blank. Combined with the fact that most features were excavated over a period of several days, with understanding of their relationships to other features developing as excavation proceeded, this meant that characteristics and relationships

were surprisingly often recorded incompletely. Depths of features and layers which appeared only on plan were not always written down. Conversely the dimensions in plan of features and layers recorded in section were not always documented.

Another problem with the context sheets was that they tended to result in static records, whereas excavation is a dynamic process. On the other hand day book entries often omitted basic information presumably because it was thought to have been recorded on context sheets. Although in some cases it produced more rounded descriptions and interpretations than might otherwise have been expected, recording information in more than one place proved to be a risky idea.

Finds were only assigned a final number after they had been taken to the site office. The numbers were global; for instance in 1980 Find 181 was from DI, Finds 182 was from BI and find 183 was from BIV. It would be better, probably, to label find bags on site with a context and unique sub-number, 315 F15 for instance for the 15th find from context 315.

4.4.6 Photography

Most features were photographed, but the same cannot be said of the main excavation baulks. Also, the baulks should have been freshly cleaned and watered before photography. Labels were not used in the second season, nor always scales. Not enough thought was put into how they would be used for publication and lectures. It would have been helpful during writing up if more detail shots had been contextualised by one covering a wider area.

4.4.7 Sampling

The intention was that samples would be taken from all significant contexts.

Of course definitions of significance are subjective. In the end only a small proportion of contexts were sampled (Table 4.2). Some were chosen for their stratigraphic or interpretational significance and others because they contained charcoal. Standard samples should have been taken from all contexts, a practice that the Inspectorate's own internal excavation unit had already standardised. Again in retrospect it would have been useful to make much more use of Kubiena box samples taken from sections. They allowed detailed examination of the structure of the sampled layers, as well as their contents.

Table 4.2 Sampling percentages

Area	Total contexts	% sampled
A	110	16
B	243	19
C	20	30
D	183	22
E	51	18
F	43	35
G	7	57
H	104	36

4.4.8 Conclusions on excavation techniques and sampling

Recording was not methodical enough despite good intentions. Plans were not always checked against earlier ones, allowing planning discrepancies and shortfalls to remain. Single context recording was supplemented by 2-dimensional (and sometimes 3 dimensional) recording, but although finds were (with but one or two exceptions) always assigned to a context, too often plan details of find-spots did not make their way in usable form into the record. Photography and sampling were not adequately standardised, and no grid spot sampling was used; it might have allowed a better understanding of the turf lines. More broadly, better ways of recording extensive layers of soil are required. Better ways of dealing with soil processes must be employed, including, probably, box sampling of baulk sections.

Although the excavations had multidisciplinary elements they were not applied systematically enough. Nor were post-excavation specialists stimulated to cross-link each other's work. Inadequate resources were provided for some post-ex-

cavation scientific specialists. No doubt these problems will not apply in any future excavation projects at Calanais, but it is perhaps worth stressing that it will be a great advantage to have an on-site laboratory to provide testable propositions for immediate follow-up investigation.

4.5 Post-excavation work

In 1984 I had written 'It [the final report] will provide an interesting contrast between the preconceptions with which the site was approached and the realities revealed once the excavations are published in 1985 or 1986.' By the end of 1985, matrices, diagrams and specialist reports had been prepared, although my full-time official work precluded much hands-on involvement. However, checks made when the time came to translate the records into a report showed that there were many discrepancies in the work so far completed. Other official duties pressed hard. The report was set aside.

Several attempts to complete it followed, notably a stint in 1987, updates in 1995 and 1997 and a substantial effort working at home in 2000. Successive research assistants tried to take the report forward but my conclusion at the end of each effort was that far more work needed to be done to integrate written records, drawings and photographs.

It was not until it became feasible to digitise all of the drawings and records, and until (after my retirement) I had considerable time to go back through the original photographs, drawings, day books and context sheets, that I could produce an account which I found at all satisfactory. The present report is based on about 4500 hours of work since I retired in April 2006, interrupted by a thankfully fairly minor stroke which nevertheless led to my completing only 160 hours of productive work in 2006.

Deplorable though the delay in publication has been, it allowed many single entity radiocarbon dates to be obtained. Their analysis produced a surprise, the use of material containing much earlier charcoal to fill slots under the cairn. Slowly, I should probably say embarrassingly slowly, it has become clear that some of the artefacts and charcoal we found were already ancient when they were incorporated into the site (see Section 4.7 below).

During the last few decades I have had to read many draft excavation reports, in some cases to approve funding for their publication and in others to prepare reports on radiocarbon dating. My very strong impression, up to the day I retired, was that there is still a prevalent belief (except perhaps amongst practicing field archaeologists) that post-excavation work can be completed cheaply and quickly. That may be true of simple sites. It is untrue of the vast majority of sites with significant stratification. Although things have improved, my experience over many years has been that all too often reports written under pressure contain significant discrepancies in presentation of the evidence.

I am very conscious as I write this that there may be inconsistencies in my report on the excavations. I fear that there will prove to be some mistakes. I am certainly aware of gaps in the original record. However, I trust that I have presented enough evidence in such a fashion that shortcomings can be readily detected by readers.

4.6 The specialist reports

Most specialist reports were originally obtained in the early phases of post-excavation.
Chapter 16: Coarse stone is about a pounder found by Margaret Ponting. No other coarse stone artefacts were found, a matter of some interest given the ard-marking detected on several excavation areas.

The original lithic assemblage report was written by Caroline Wickham Jones. When updating was required she had many other commitments; and Torben Ballin's work on a prehistoric quartz quarry in the area (Ballin 2004) led to my asking him to provide the report (Chapter 17) included here. Ms Wickham-Jones's original report and catalogue are available in the archive.

The original pottery report by Audrey Henshall was written in the early 1980s. It was updated, retaining much of Dr Henshall's text and catalogue, by Mel Johnson in the early 2000s. Between 2009 and 2011 Alison Sheridan reviewed the pottery, updating many aspects to create Chapter 18. The

original report by Dr Henshall and the revised version by Ms Johnson are both available in the digital (and the paper) archive.

Ian Maté provided specialist advice on soils during the excavations as well as supervising the excavation of Areas E and F. His other commitments meant that he was able to provide only broad guidance. The report presented here is based largely on his on-site notes.

The vegetation report (Chapter 20) is substantially as written by Alan Fairweather in the early 1980s. A much more recent botanical report independently commissioned by HS for management purposes has not been consulted.

A palaeoenvironmental report was written by Sjoerd Bohncke in the 1980s. However he had been supplied with faulty stratigraphic information. Due to other commitments he was unable to update the report. I have revised it substantially for the present version, Chapter 21. The palynological interpretations have, of course, not been changed but major changes have been made to the grouping of samples from various contexts and to the stratigraphic elements of the chapter. I have added archaeological comments along with a section on dating.

The original macroplant report was written by Rod McCullagh. In 2006 surviving soil samples were sieved and the charcoal from them identified and analysed by Robin Inglis of AOC. He and Ann Crone, also of AOC, produced most of Chapter 22, to which I have added a few comments about dating and the implication of Dr Bohncke's palaeoenvironmental report (Chapter 21).

4.7 Comments on dating

The first version of Chapter 23: Radiocarbon employed a simple Bayesian model in the belief that the charcoal in a subset of the contexts was contemporaneous with those contexts. It led to the conclusion that the Ring and chambered cairn were built between about 2900 and 2600 cal BC. However subsequent re-examination of the stratigraphic information from the cairn showed that (with a very high degree of probability) it included a beaker sherd which I had previously imagined might be intrusive in the original cairn build. Re-examination of the Calanais pottery by Alison Sheridan in 2010-11 showed that there were probable beaker sherds under the cairn. Not only did this show that the cairn must have been built after 2500 cal BC but, of as much importance, that even more of the charcoal found at Calanais must have been residual than I have previously supposed. The large number of residual sherds in the cairn and other contexts reinforced that conclusion. It made use of a simple Bayesian model impossible, so the current version of Chapter 23 reflects my belief that nearly all of the pieces of charcoal provide only loose termini post quem for the contexts in which they were found.

5. Resistivity Survey

5.1 Introduction

I carried out the resistivity survey with assistance from Margaret Ponting (now Margaret Curtis) between 3 and 8 August 1979. A 20 m grid was set out, based on the National Grid as surveyed during the 1974 Glasgow Department of Geography survey (Tait et al 1978). Dr Tait had kindly made large scale versions of the plan available. The individual squares used for the resistivity were laid out to an accuracy of better than 0.1 m along their diameters. The consistency of corners of the 20 m squares of the resistivity grid relative to the stones was better than 0.02 m when checked with Fibron tapes.

A Martin-Clark resistivity meter was used in twin probe configuration. The readings for different 20 m squares were harmonised with one another by equalisation of reference probe readings. Analysis does not indicate any bias between the edge readings of adjacent squares, so correlation seems to have been reliable. Soil moisture deficiencies probably did not occur during the course of the survey. Indeed, it rained in varying amounts every day, and the readings on 6th August when the ground was particularly badly waterlogged were notably uniform. Thus although readings in similar areas on different days gave generally similar values it is difficult to escape the suspicion that when the ground was particularly waterlogged the range of readings was less than when the ground was drier.

On the first day of survey the resistivity of the ground in the northernmost 20 m square was measured at 0.5 m intervals and also at 1 m intervals (Illus 5.1). The former should have been influenced mostly by soil and subsoil in a hemisphere about 0.5 m across between the probes, and the latter by a greater proportion of subsoil in a hemisphere about 1 m across. Analysis that evening suggested little difference between the results. It did not seem worth quintupling work for little gain, and subsequently all readings were taken (from east to west) only at 1 m intervals. That decision was wrong. The 2007 analysis shows that subtracting the 1m readings (modified to average the same as the 0.5m readings) from the 0.5m readings produced particularly interesting information, as described in Section 5.5. With hindsight, even though the work would have taken five times as long it would have been better to cover the whole site with both 0.5 m and 1m probe-spacing surveys, allowing the primitive form of tomography illustrated in Illus 5.9. Thus measuring both would have allowed a significantly more useful analysis than either on its own.

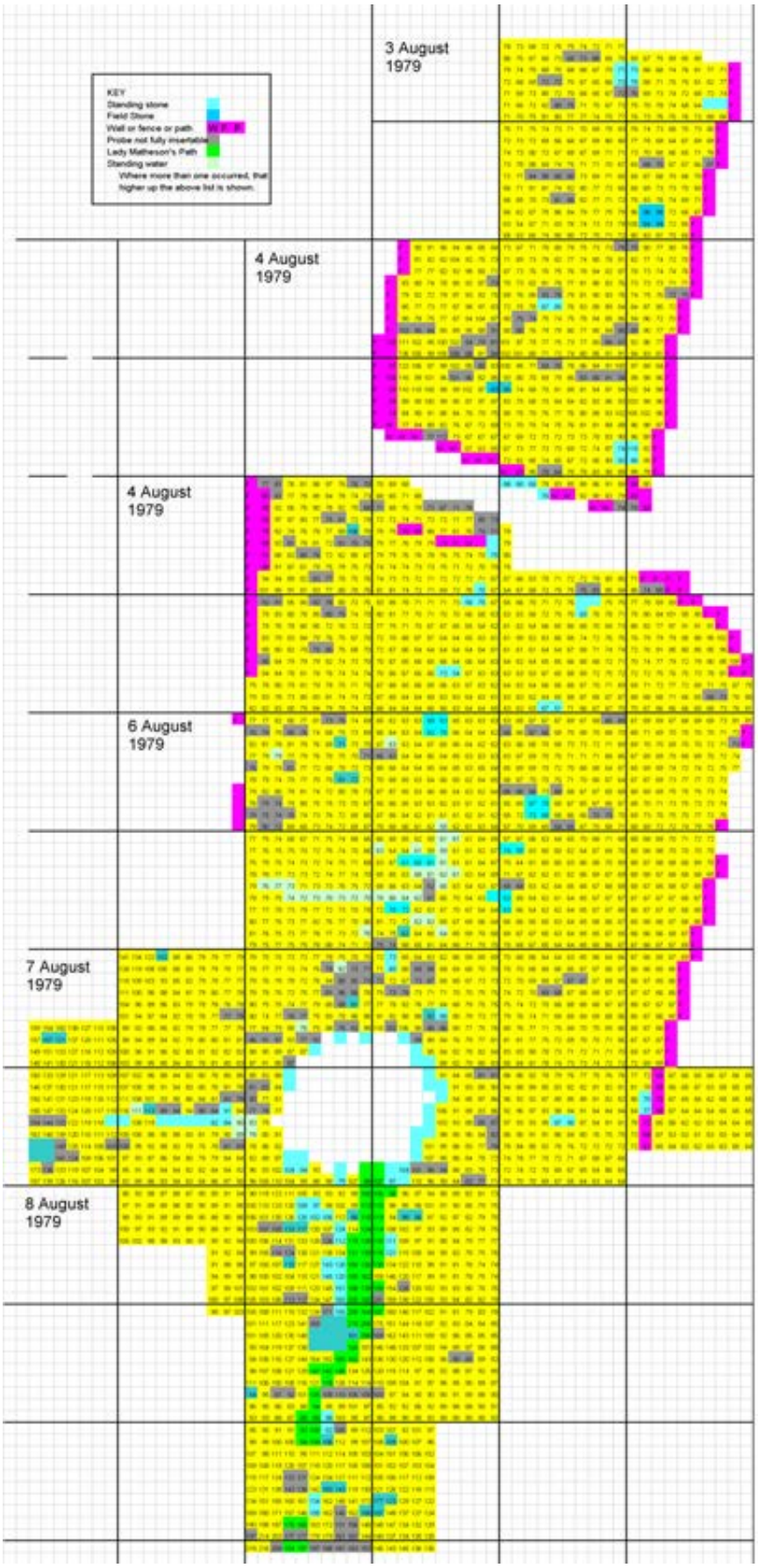
At some points the probes could not be inserted at all because of field stones, outcrops, standing stones and the chambered cairn. Where it was possible to insert the probes only partially, readings did not differ to any unusual extent from adjacent ones.

When the probes were placed either side of a standing stone unusually low readings were obtained. When both probes were to one side of a standing stone and one probe was close to it, unusually high readings were obtained. Thus some pairings of high and low readings reflect standing stones and the pits in which they stood.

In general, uniform-looking areas which felt peaty when probes were inserted gave readings which varied only slightly. Areas near visible bedrock gave high and variable readings. Casual visitor tracks tended to have lower readings than nearby areas; and as described below the difference between 1m and 0.5m probe spacing readings showed up visitor tracks very clearly (Illus 5.9). That suggests compaction of the upper levels of the soil, as might be expected.

The illustrations here do not have archive references attached to them; most of them are subsets of the main resistivity survey drawing. In the digital archive the relevant plans are in the folder '... Calanais Final Resource Files/Calanais Drawings/CSD04-Phase 1-product/CSD04-General Plans'.

Spreadsheets with the raw resistivity data are in '... Calanais Final Resource Files/Resistivity'.



Illus 5.1 The resistivity readings and surface features (numbers readable at 200%)

5.2 The northernmost 20 m square, and 0.5 m and 1 m probe-spacing survey

The results were analysed manually prior to the first season of excavation, and then in September 1980 by Colin Heathcote at the Bradford School of Undergraduate Studies. He produced isometric plots and perspective views (Illus 5.3). In 1996 the values were passed through two software packages, Geoplot 2 and Surface, by Iain Banks under a contract with GUARD (Glasgow University Archaeological Research Division). In 2007 I re-analysed the resistivity survey results. The colour figures reproduced in Sections 5.2.3 and 5.2.4 were created using Microsoft Excel and Micrografix Picture Publisher 8.

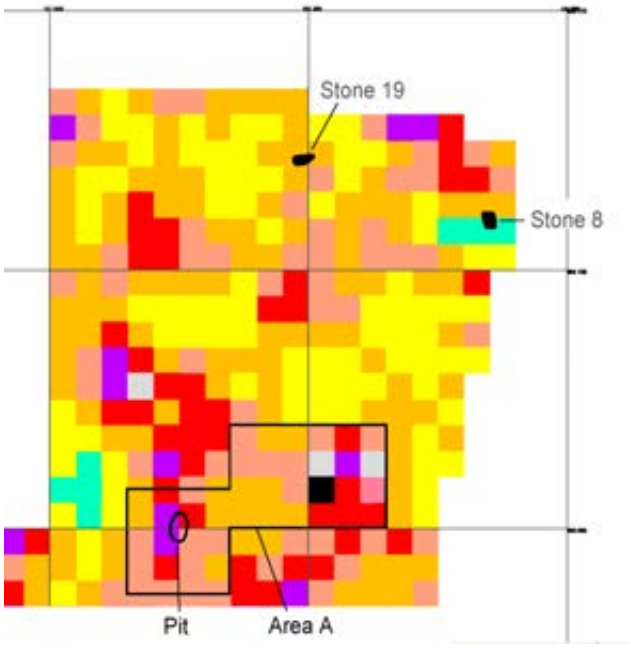
5.2.1 Pre-excavation manual analysis of the 1 m survey

Illus 5.2 shows the results of 1979 analysis of the 1m probe-spacing survey for the northernmost 20 m square with parts of the adjacent squares. The colours chosen were somewhat arbitrary - more influenced by the colouring pencils available than by consideration of an even-handed representation of the results. Its use of strong colours for values associable with likely features seems to have been successful (except for a failure to highlight the anomalies round Stone 19 and 8). The plot showed a feature (marked 'Pit' on Illus 5.2) which appeared to be roughly where MacCulloch had shown a large fallen stone, and a strong feature in the middle of the avenue which excavation of Area A showed to correspond with a glacial erratic.

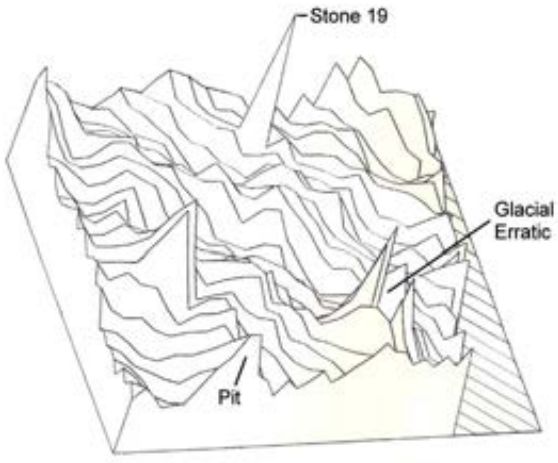
in 1979, I have used a fit with the 'Ponting Correction' of MacCulloch's plan of the west side of the Avenue, with stones outlined in blue, to the Glasgow plan, with stones outlined in black (Tait et al 1978; see Chapter 3: Previous Studies)),. It shows that the fallen stone might have been near to the point marked 'Pit'.

5.2.2 The Bradford analysis

Although most grateful for it, I did not find that the perspective view (Illus 5.3) produced after the 1980 season correlated intuitively with a plan view. However, the irregularity round the tall stone 19 at the NW end of the avenue was readily identifiable, as was that round the glacial erratic. The pit discovered during excavation (see Part 6 Area A) was apparent as a peak. Stone 8 on the east side of the avenue did not produce a strong irregularity.



Illus 5.2 Part of the manual colouring-up of the resistivity plot in 1979. The main grid lines are 10m apart.



Illus 5.3 Results of the Heathcote analysis of the northernmost 20 m by 20 m square after excavation in 1980

A major feature several metres north-north-west of the pit was also visible, as it was on the coloured-up plan (Illus 5.2). The Bradford analysis of other areas produced no more and no less information than the colour plots used in this narrative and they have been archived in NMRS.

5.2.3 The GUARD Analysis

The GUARD analysis commissioned in 1996 produced various views including this false perspective. The north edge of the 20m by 20m square is to the left in Illus 5.4. Stone 19, Stone 8 and the pits are not identifiable except perhaps with hind-sight from the excavation results. Only very large resistivity features show clearly and the analyses discussed below seem to provide more readily readable information. The results have been archived in NMRS.

5.2.4 The 0.5 m survey and the 2007 analysis

In 2007 I used the hue range (Illus 5.5) provided by Micrografix Picture Publisher to colour up the results.

In this colour scale different hues appear (to my eye) to vary at different rates; for instance the greens vary very subtly over a wide range, in contrast to the orange-brown-yellows which change quite rapidly. I used the hue shift and the colour remapping facilities where it seemed useful to maximise the contrast of those aspects of the survey discussed in the text (compare, for instance, Illus 5.6 with 5.7).

On the 0.5m probe spacing survey with the originally chosen hues (Illus 5.6) very high values are in blue, high values in strong green and low in orange-brown. Part of excavation Area A is shown at the bottom. The position of Stone 19 shows clearly and Stone 8 is just visible as a rapid alternation between higher and lower values, although similar alternations are abundant elsewhere on the plot. In excavation Area A, partly shown at the bottom of Illus 5.5 and 5.6, the glacial erratic shows less well than in the 1979 analysis. The main stone-hole on the west side of the avenue was found ten readings (5m) east of the southwest corner of the 20 by 20m square. Its position coincides with two bright green squares on Illus 5.5 but it is worth noting that a visually more striking variation appears in the form of a rapid alternation between a yellow and a light brown square a metre to the right where no features were discovered during excavation. Without prior knowledge from antiquarian records this choice of hues to colour up the plan would not have suggested a pit where it was found.

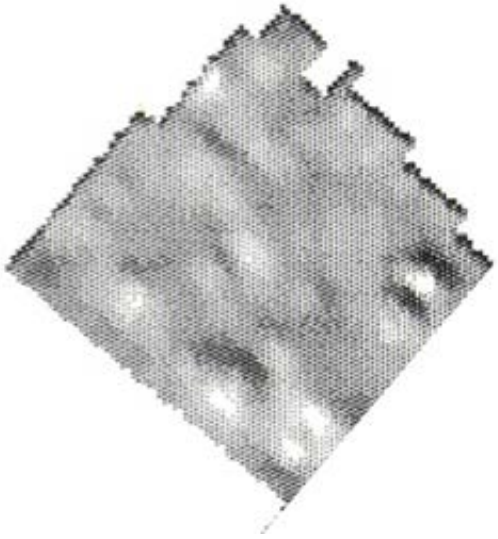
With different hues (Illus 5.7) the pit is a fairly prominent, although the other features visible on Illus 5.5 are still prominent. Very high values are in orange, high values in red and low in blue. The very prominent pink to red feature in the SW quadrant of Illus 5.7 covered the western half of something hard enough to prevent full probe penetration (the 1m squares where probe insertion was impossible are shown in grey on Illus 5.1). It measured more than 4m east-west and less than 1m north-south. This feature could be a buried Avenue stone or, despite its shape, a glacial erratic.

There was a scatter of high readings between the pits found in Area A and Stone 19. Some may, as discussed below, represent stone-holes for the fallen stones recorded by MacCulloch and shown on Illus 5.9 (see also Section 3 Previous Studies). But the others raise the possibility of a set of pits, perhaps defining a predecessor to the Avenue. A somewhat weaker and more ragged scatter along the east side of the avenue could be interpreted in the same way. But the high readings may be the result of ground compaction by visitors walking along the stone rows and only excavation can disentangle these possibilities.

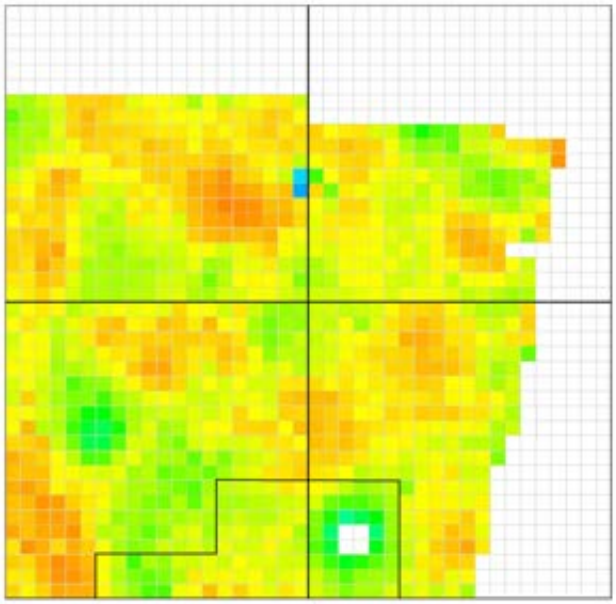
5.2.5 Contrasting the results of the 0.5 m and 1 m surveys

The 1 m probe-spacing survey (Illus 5.8) was less informative on its own than the 0.5 m survey. In Illus 5.8 lower readings are brown and higher readings green. Standing stones are black.

Comparison of the 0.5 m and 1 m probe spacing surveys took two forms. First the ratios of the readings were explored; but that produced little information; basically all of the results looked much like weaker versions of the 0.1 m survey. Then the 1 m readings were subtracted from the

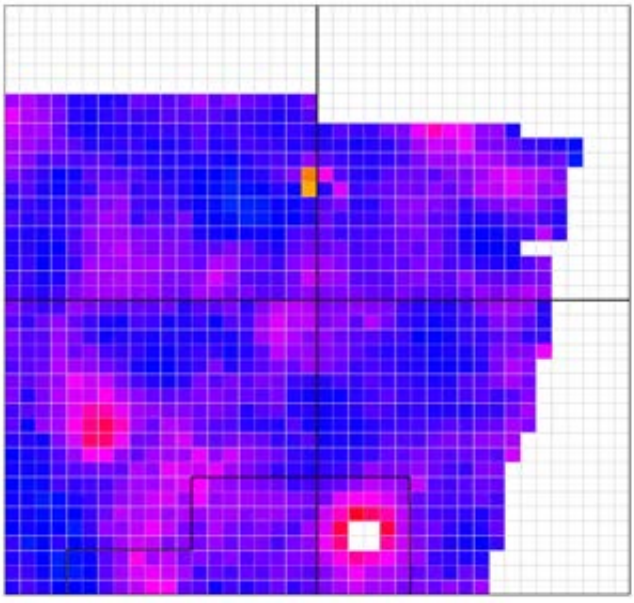


Illus 5.4 Results of analysis of the NE-most 20 m by 20 m square in 1996

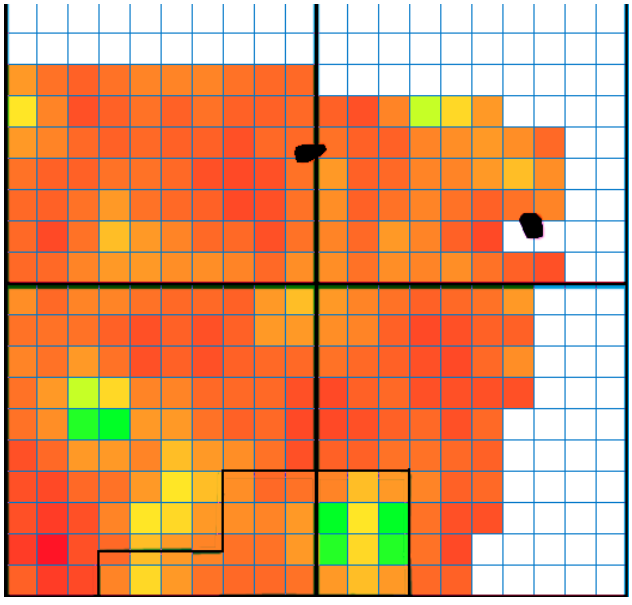


Illus 5.6 Results of the 2007 analysis of the 0.5 m probe spacing survey

Illus 5.5 Hue ranges



Illus 5.7 The same results as in Illus 5.5 with hue range shifted to make high values more prominent

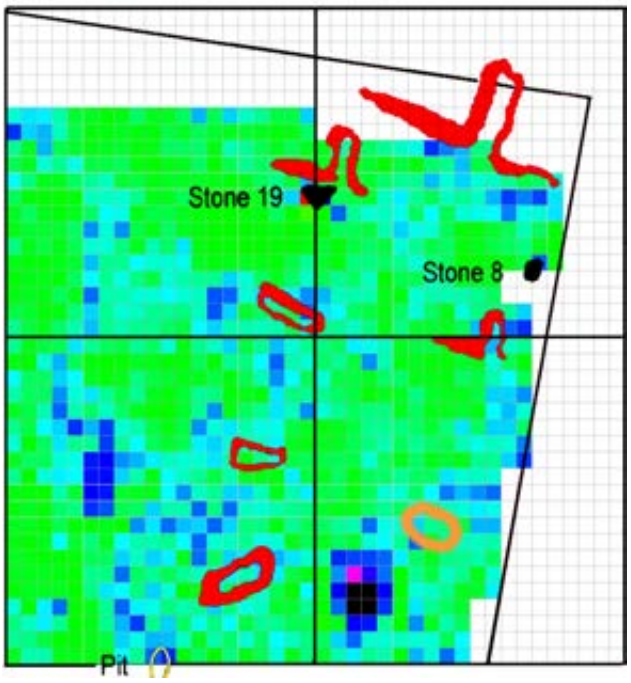


Illus 5.8 Results of the 1 m probe-spacing survey.

0.5 m readings after modifying the 1 m readings to bring their average to the same value as the average for the 0.5 m readings (Illus 5.9).

In Illus 5.9 green reflects smaller differences and dark blue, red and black larger differences. The known stones and stone-pit are in black and the MacCulloch plan in red. His more faintly inscribed fallen stone or gap in the East Row of the Avenue (I called it a 'place-holder' in Chapter 3) is shown in brown. MacCulloch's inaccuracies are discussed in Section 3.3. In Illus 5.9 I have used a different fit of his plan to the Glasgow plan from that used in 1979 based on the whole site. The outline of excavation Area A has been omitted to reduce complexity. I interpret Illus 5.9 as emphasising 0.5 m variations by reducing the contribution to the 0.5 m readings from somewhat large-scale and deeper changes. Resistivity features corresponding to the stone-pit in Area A, the glacial erratic and Stone 19 are very obvious. Stone 8 (in the Glasgow plan position) is next to an isolated resistivity irregularity.

Taking from MacCulloch's record only that there were two fallen stones between the one he showed closest to the stone-pit found in Area A and Stone 19, Illus 5.9 may indicate where they originally stood. Allowing for the suspected unreliability of the details of MacCulloch's plan there are good candidates amongst the resistivity features for three out of four of the stones which he recorded as fallen. That said, and although I believe that his representation of the east side of the avenue misplaced stones so that they appeared southward of their present positions, there is also a feature (shown as a dark blue square) close to the (erroneous?) position he gave for Stone 8 and another close to where he showed a very large stone in the north mouth of the avenue. However, there is a scatter of other similar resistivity features and those close to where MacCulloch showed fallen stones are no more than candidates for future exploratory work.



Illus 5.9 The 0.5 and (modified) 1m probe-spacing survey readings subtracted from one another.

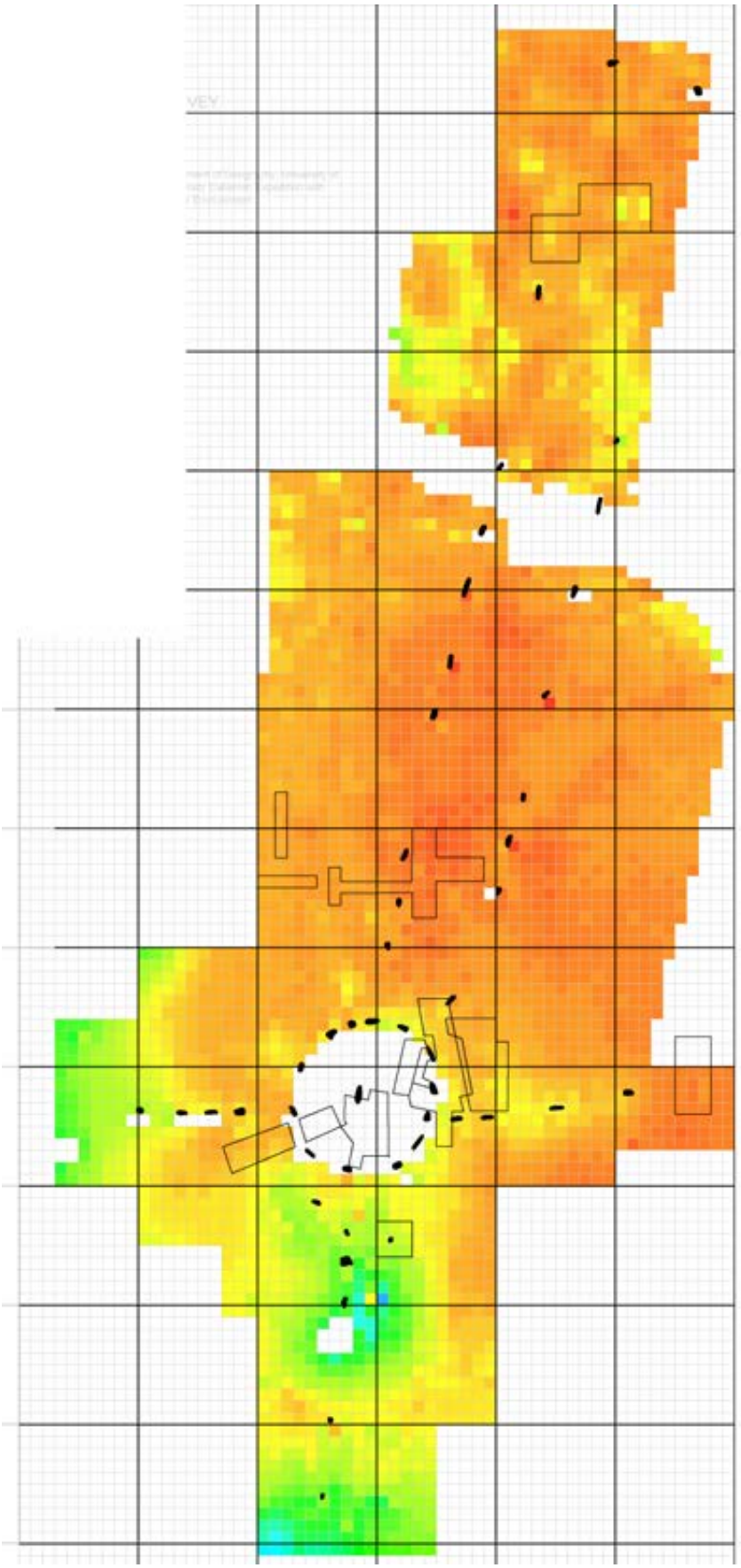
Illus 5.9 seems to me to confirm the possibility that the scatters of higher readings along the sides of the Avenue reflect compaction by visitors' feet. It includes not only distinct blue bands running along the west and east sides of the avenue but also others from the gate at the northwest corner of the area in State care. That does not exclude the possibility that some higher readings may have been due to the presence of pits or stone-holes or both. Here the 1 m probe-spacing survey (Illus 5.8) may prove useful on its own, because it shows a marked variation in readings at eh centre of the 20m square close to where MacCulloch showed a fallen stone.

5.3 The general 1m probe-spacing survey

Despite the shortcomings of the 1m probe-spacing survey it did produce some other interesting information (Illus 5.11). In that illustration hues have been chosen to provide a good overall contrast between broad areas of higher and lower resistivity, but also to emphasise the anomalies near to standing stones.

5.3.1 General patterns

In Illus 5.10 lower readings are browner with the lowest almost red. Higher readings are greener to blue. Excavation trenches are shown. Standing



Illus 5.10 The 1m probe spacing survey.

stones are in black. The overall pattern is of a valley of low readings running from the north end of the site to near the Ring (brown to red squares), and ridges of higher readings running east, south and west from the Ring. The resistivity valley is not parallel to the avenue. The readings to either side of this valley are higher north of the old road than to the south of it, and it may be that that reflects the pattern of cultivation in the 19th century.

Despite the on-site observation that casual tracks did not in general give different readings from immediately surrounding areas, there is a pretty certainly a contribution to variation in the 1m survey resistivity readings from the effects of visitors following rough paths. There is a rivulet of locally lower readings running from the eastern gate to just north of the circle, and another from the north-western gate (across a generally high resistivity area) to the middle of the old road. Braids of worn areas, presumably caused by visitors' feet, coincide roughly with the rivulets.

The areas of medium resistivity (yellow to light brown) around the ring seem to correspond roughly to the area cleared by Matheson's labourers in 1857. In particular, there is a rough correlation between higher readings (yellow rather than the surrounding brown) and the cleared areas. However, further south and west, the areas of high readings (yellow to green) may reflect the farming activities of those who lived in the small house in the southwest of the site as well as areas where the rock lies close to the surface. Probably yellow and light green areas reflect farming and dark green and blue areas reflect rock near the surface. The picture confused by the effects of Lady Matheson's Path, which runs from the Ring to the south gate.

5.3.2 The avenue north of the old road

The area north of the old road included the study 20-m square discussed in Section 5.2. Part of the area was tested by excavation in Area A. The small area of very high readings in the middle of the avenue proved to be caused by a glacial erratic. The readings around the erratic oscillated from east to west. I therefore suspect that it was the material round the erratic rather than the stone itself which produced the resistivity feature. The readings to north and south of Stone 18 on the west side of the avenue are locally relatively high and relatively low as are those to the west and east of Stone 7. A fairly small positive resistivity feature in the western part of Area A (yellower on browner) corresponded to the subsequently excavated stone pits. There are similar candidate features roughly where MacCulloch (1819) showed fallen stones.

Given the correspondence between paths and areas of relatively low resistivity discussed in section 5.3.1, the almost straight line of relatively low values (brown squares) just east of the west side of the avenue in the area north of the old road most likely relates to the effects of visitors' feet. A path is visible on air photographs. Observations of people's activities when the well-worn paths were muddy suggest that they tended to walk within a corridor a few metres wide to either side.

Air photographs such as Cambridge University Collection RA84, taken before the modern road to the east of the site was constructed, suggest that the last strong pattern of strip cultivation stopped at the fence lines, but older cultivation beds may have spread onto it (see Chapter 6: Area A). There is however no correlation between areas of high and low resistivity readings and the presence or absence of possible old cultivation beds visible on air photographs.

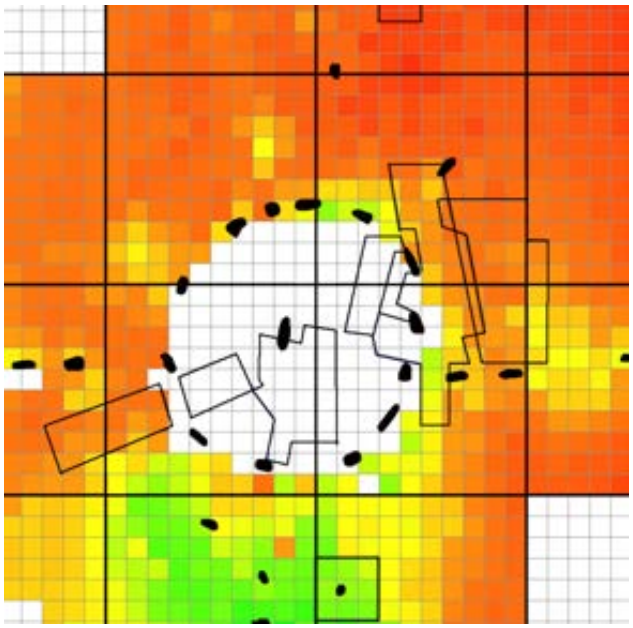
5.3.3 The avenue south of the old road

An area to the west of the avenue was sampled by excavation, in Area F, and the low to medium value readings there seem to correspond approximately to deeper soil with a peaty component. The generally lower readings between the Ring and the old road across the site, along and to the west of the avenue, thus probably reflect an area of uncultivated or less cultivated peat and soil above clayey material. The area of slightly higher (mainly light brown with some yellow) readings to the east of the avenue just south of the old road seems to correspond roughly to faint lazy beds visible on the air photo. However, the rivulet of lower readings mentioned above, running from the eastern gate to an area just north of the Ring, confuses interpretation. A broad faint corridor of locally slightly lower readings does seem to correspond roughly

to the area to either side of an informal footpath, visible on all air photographs, whose position is influenced by the relationship of the north-western gate to the Ring.

Three standing stones in this southern part of the avenue prevented insertion of probes and the gaps are shown as white rectangles on Illus 5.10. Four stones stood next to distinctively low resistivity readings shown by redder squares on Illus 5.10. One stone produced a pairing of a slightly high and a slightly low reading. Two were not associated with a resistivity feature. There were no obvious resistivity features suggesting stoneholes between the known stones. Two resistivity features (yellower) were found to the west of the stones forming the southernmost part of the avenue. Intriguingly, they were on the line of the northern part of the west side of the Avenue rather than the line defined by the three southernmost stones. They are candidates for any future excavation programme, to explore the possibility that they represent a different version of the southern part of the Avenue.

5.3.4 The Ring

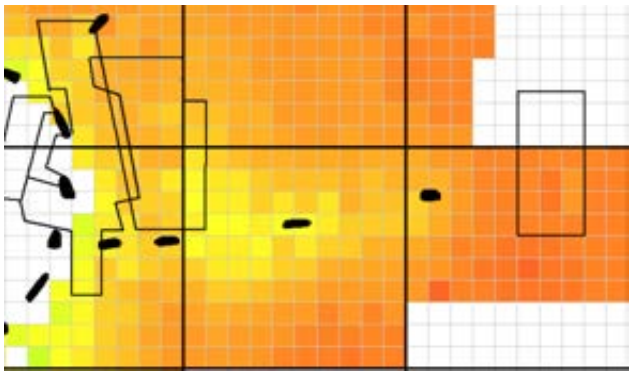


Illus 5.11 The area round the ring.

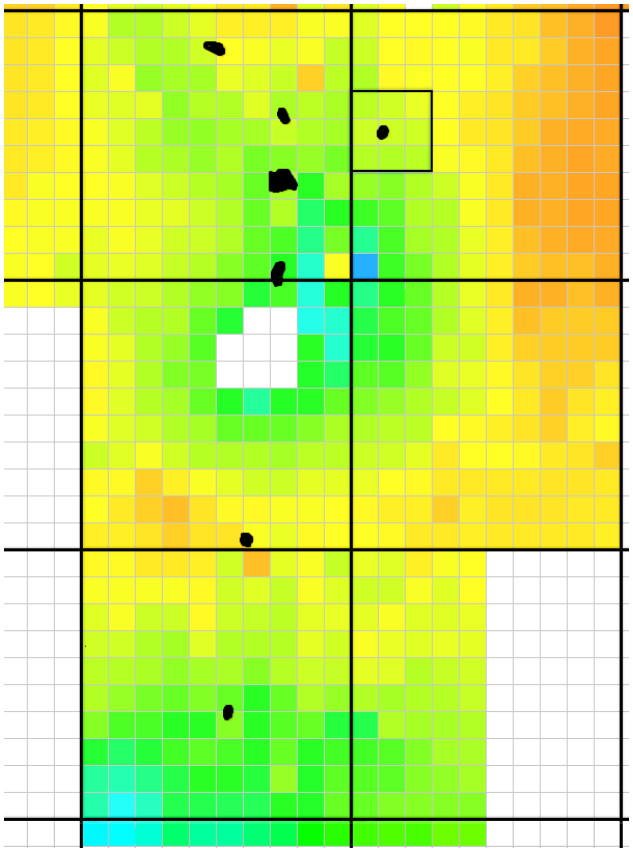
In Illus 5.11 hues have been chosen to emphasise anomalies some 3m out from the Ring (brown is lower, yellow medium, and green higher). The area inside the Ring was not surveyed, because of the presence of the cairn and abundant stones. The variations in values immediately outside the ring seem to correlate most immediately with areas of compacted waterlogged ground revealed by bare soil, and the rickles of small stones between the standing stones. The enclosure excavated in Area B to the east of the stone ring does not show clearly as a resistivity feature. Nor is the strong iron pan found during excavation in this area obviously reflected in the resistivity readings. Although the lower (browner) readings in Area B may relate to wear and compaction from visitors' feet or to the archaeological features later discovered during excavation, their resolution is too low for certainty.

Several authors have suggested that there might once have been another ring of stones outside that visible today Maclagan (1879) seems to have been the first to do so; she suggested that it ran through Stone 9 in the south-west of the circle, and this suggestion was also raised by Henshall (1972, 138) followed by Burl (1976, 153). The halo of lighter resistivity readings round the Ring seems to me to be explained more economically by the clearance ordered by Sir James Matheson. However, there are two resistivity features to the north-west of the ring (yellow surrounded by brown on Illus 5.12). The northernmost of these is also one of those which might be seen to suggest an earlier version of the avenue. There is a fainter resistivity variation just south of the easternmost stone of the West Row which could be a candidate for a stone hole of an outer ring and there are features outside the south-east part of the Ring which might possibly reflect the presence of stone pits. With Stone 9 and Stone 34 to the north-east of the Ring the resistivity features could suggest an outer ring, perhaps of eight stones.

However the anomalies do not correspond to stone positions suggested by Maclagan. Further, at least one of the stones of an outer ring should have fallen within excavation Area B, on the east side of the Ring, and none did. Perhaps the features were caused by bedrock near the surface or large glacial erratics like that found in the north-western extension of Area B.



Illus 5.12 The East Row



Illus 5.13 The South Row.

5.3.5 The East Row

The zone of medium (yellow) values around the East Row broadly matches the area stripped on the orders of Sir James Matheson, the edges of which are still clearly visible as a slight height difference.

In Illus 5.12 hues have been chose to maximise the visibility of the variations in readings near the fallen monolith in excavation Area C to the east. Excavation Area B is to the west. The fallen monolith at the end of the East Row had been located by probing by Mr G and Mrs M Ponting in 1977 (Ponting & Ponting 1984, 11). It was subsequently excavated in Area C. It was just detectable through resistivity as a pairing of slightly higher and slightly lower readings in a generally uniform area. However, it seems unlikely that it the significance of this resistivity feature would have been recognised without prior knowledge that the stone was there. There are no variations strongly suggesting that there were more stones in the gaps between stones visible today. Burl (1976, 153) suggested that four avenues formed part of the original concept which led to building of the setting. But there are no hints of another line of stones and Burl's suggestion is not supported by the resistivity survey.

5.3.6 The South Row and areas to either side of it

In this area of generally high resistivity readings, there were locally slightly lower readings by all except the middle stone of the South Row. A similarly slightly lower reading coincided with the small Stone 35 excavated in Area E (Illus 5.13).

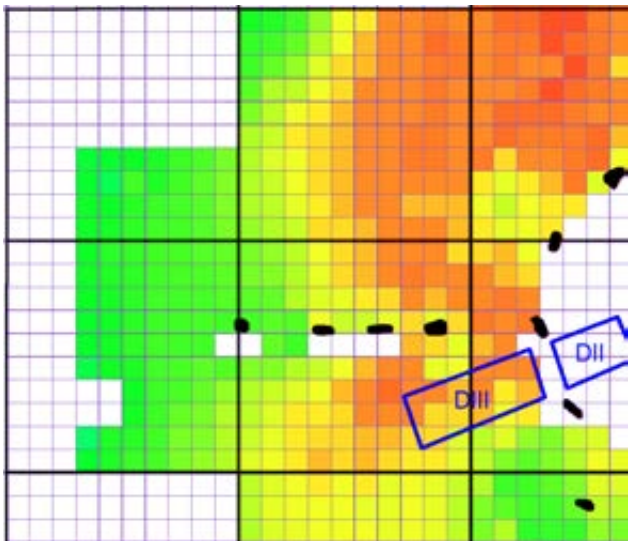
In Illus 5.13 hues are as on Illus 5.10. Excavation Area E is shown Henshall (1972, 138), basing her argument on stone 35, supposed there to have been an eastern side to a southern avenue. The striking resistivity feature 4m to the south of Area E (a yellow square next to a dark blue one) provides some support for that notion. The probes here could not be fully inserted but Lady Matheson's Path and bedrock seemed during survey to provide the likeliest explanation for local high resistivity values, with variations in readings broadly corresponding to local surface features.

The presence of pits and other features some 20 m south of the southernmost standing stone of the row has been demonstrated by excavations undertaken by Edinburgh University, and this suggests that, while it is not possible to be sure that any resistivity survey signal came from prehistoric artificial features, some may have.

In this southern part of the site, the areas of relatively low resistivity (brown) near the eastern fence seem to correspond to the presence of rigs, the ends of which have been included within the fenced area of the site. The areas of relatively lower values to the west (light browns) may relate to cultivation by the

inhabitants of the small house in the south-west of the site (not covered by the resistivity survey).

5.3.7 The West Row



Illus 5.14 The West Row.

In Illus 5.14 hues have been chose to enhance the visibility of the variations in readings (brown is lower, yellow medium, and green higher). The resistivity results revealed mostly the underlying geology although the medium (yellow) readings around the east end of the West Row probably corresponded to the area stripped by Matheson's workmen, interrupting an area of low (brown) readings to its north and south. The low readings at the west end of Area DIII approximately matched an area of deeper peat and those in its middle part to a natural variation in the clay.

The three innermost stone of the row had minor resistivity variations associated with them. There were no signs of a stone hole west of the westernmost known stone where bedrock lies close to the surface, and there were no hints of another row parallel to the West Row.

5.4 Conclusions

The resistivity survey undertaken in 1979 gave a good impression of variations in the superficial geology of the site. It also indicated broad variations in the thickness of soil and peat. Some variations seemed to correlate approximately with post-medieval cultivation (Illus 5.11). Some localised variations corresponded to prehistoric features, as was shown by excavation of Area A The possibility of surviving fallen stones in the northern part of the avenue, although intriguing, seems low because (at least some) avenue stones were taken and used in houses as lintels. However there was at least one candidate variation possibly corresponding to a recumbent stone and several candidate resistivity features for stone-holes.

The centre line of the avenue has been assumed significant in the laying out of the circle (Thom, 1967, 123). There were some variations in resistivity values near its central line, but none leaped out as providing support for the suggestion. However, as discussed below, the effects of visitors' feet confound attempts at interpretation in several parts of the avenue.

Maclagan's suggestion (1879) of an outer stone circle running through Stone 9 in the south-west of the circle is discussed in Chapter 3 and in Section 5.3.4. Several resistivity features round the Ring, particularly one to the north-west of the Ring, provide candidates for further exploration of this theory. My own view is that traces of such an outer ring should have been found during excavation of Area B and the theory is therefore unlikely to be correct.

Henshall (1972, 138), basing her argument on stone 35, supposed there to have been an eastern side to a southern avenue, while Burl (1976, 153) has suggested that four avenues formed part of the original concept which led to building of the setting. We did not interpret anything we found as supporting these theories.

Somewhat surprisingly given the broad probe spacing of the 1m survey, which should be sampling a hemisphere of soil and subsoil roughly a metre in diameter, the repeated effects of visitor's feet seems to have produced areas of slightly lower readings, on and round informal paths in several parts of the site; the visible worn areas are one aspect of a deeper malaise.

The primitive tomography technique used in the northernmost square provided clearer results than either the 0.5m or the 1m probe spacing surveys. Any future resistivity survey at Calanais should use tomography along with ground penetrating radar.

6. Area A

Illus 6.1 Area A near the north end of the avenue, from the north. [CAL-AP-13 (part)]

6.1 Introduction

The excavation of Area A took place in 1980, supervised by Jean Comrie.

6.1.1 General aims

The main aim was to see whether there was any evidence for a stone recorded before 1819 (MacCulloch 1819). Its position on MacCulloch's plan coincided fairly well with a feature in the resistivity survey undertaken in August 1979. A much stronger anomaly lay to its northeast and another aim was to see whether it might provide any support for Somerville's idea that the centre-line of the avenue was important to those who built or used it (Chapter 3: Previous Studies).

6.1.2 Resistivity Survey

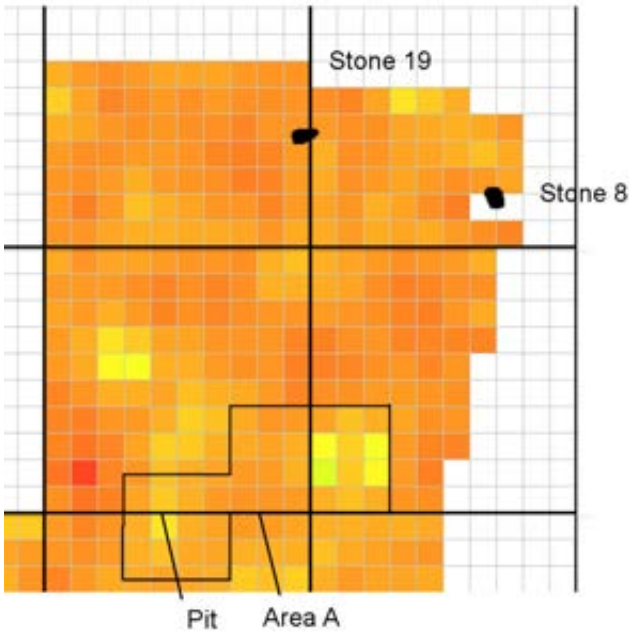
The 1979 high resolution resistivity survey partly included Area A, which was wholly included in the low resolution survey. I have not made any attempt to include the MacCulloch plan, which can be fitted to the Glasgow plan in various ways (see Chapter 3.3.6: Previous Studies and Chapter 5 Illus 5.9: Resistivity for details).

The massive anomaly in the right-hand part of Area A was investigated in Area AII where it was shown to correspond to a glacial erratic.

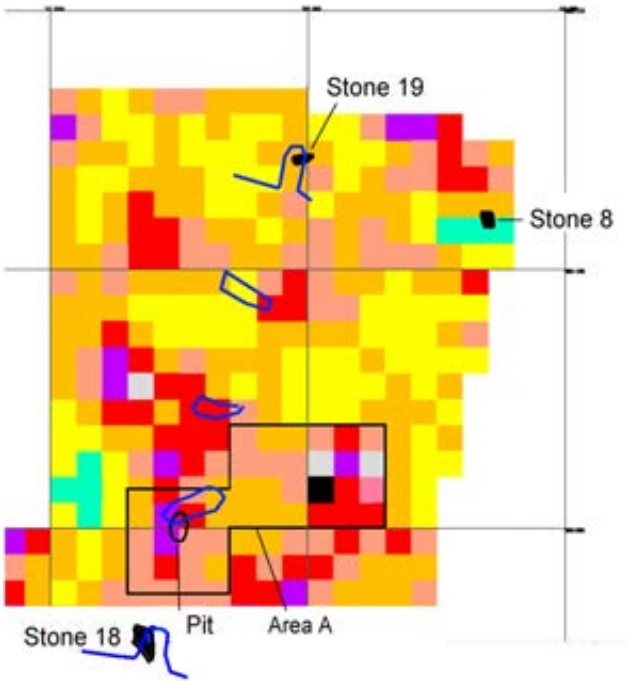
Illus 6.3 (the 1979 analysis) provides a better insight into why Area A was placed where it was. In 1979 it was believed to show that the fallen stone might have been near to the point marked 'Pit' on Illus 6.2 and 6.3.

In Illus 6.3 the colours were chosen in 1979 somewhat arbitrarily - indeed, they depended on what crayons I happened to possess. The stones of the west side of the Avenue, are outlined in blue, the stones on the Glasgow plan are shown solid black (Tait et al 1978). For this illustration, as in 1979, I used a fit with the MacCulloch plan using the 'Ponting Correction' (see Chapter 3.3).

Perhaps there was an element of luck in finding a stone hole where expected in Area AI, given the different interpretations of the MacCulloch plan. Alternatively, it is conceivable that there were pits all along the west side of the avenue and the apparent similarity in positions of the pit and MacCulloch's fallen stone was coincidental.



Illus 6.2 The area covered by Illus 6.3 copied from the main low resolution (1m spacing) resistivity plan (see Illus 5.10)



Illus 6.3 Part of the manual colouring-up of the resistivity plot in 1979 with a local fit of MacCulloch's plan of the west side of the avenue. The main grid lines are 10m apart

6.1.3 Contour survey

The area was flat and no local contour survey was undertaken (but see Chapter 4: Introduction to the Fieldwork Illus 4.1).

6.1.4 Trench layout and excavation progress

Illus 6.4 Area A from the south during deturfing [Film 1980.1. 21]

The standing stone on the left side of Illus 6.4 is Somerville 18, the second most northerly stone of the west side of the Avenue. The northernmost stones of the Avenue are visible to the right of the site huts, Stone 19 to the left of Stone 8.

Area A consisted of two rectangles laid out to cover resistivity anomalies in the avenue area. It was aligned with the National Grid depicted on the Glasgow survey by (Tait et al 1978). The western area, Area AI measured 4m by 4m; to the left in Illus 6.4, it included the site of McCulloch's fallen stone and the resistivity anomaly on the west side of the avenue. Area AII (eventually) measured 5.5m E-W by 4 m N-S. It covered the major resistivity feature in the middle of the avenue. Excavation showed that it was caused by the glacial erratic Q and changes to the subsoil related to its presence.

6.1.5 Context numbering

Context numbers were initially in the range 0 to 99, and when those ran out, numbers 400 to 408 were used. The numbers were shared between the two subdivisions of the site. For instance, the topsoil in AI was numbered 001 and the topsoil in AII was given the next free number, 002.

6.2 Victorian and earlier activities

6.2.1 Cultivation beds

The northern part of the avenue was at least partly used for agriculture in the 19th century. Air photographs (Illus 6.1, 6.5) show raised spade-cultivation beds, ironically sometimes called lazy-beds, with ditches between them.

The small light-coloured area to the right of the northernmost Avenue stones on Illus 6.5 may be an expression of the glacial erratic discovered during excavation. The pre-excavation site plan extract shown in Illus 6.6 covers a slightly smaller area than the air photograph but it is oriented in a similar way. Area A is shown with the glacial erratic outlined in red and the two stone-pits. The dark grey areas show how the cultivation beds were interpreted from CUP RA84 and other contemporaneous air photographs before excavation in 1980.

The interpretation differs slightly from that on Illus 6.5. The cultivation beds were not clear on the ground in the vicinity of Area A despite variations in vegetation between them and flat areas (Chapter 20: Vegetation).

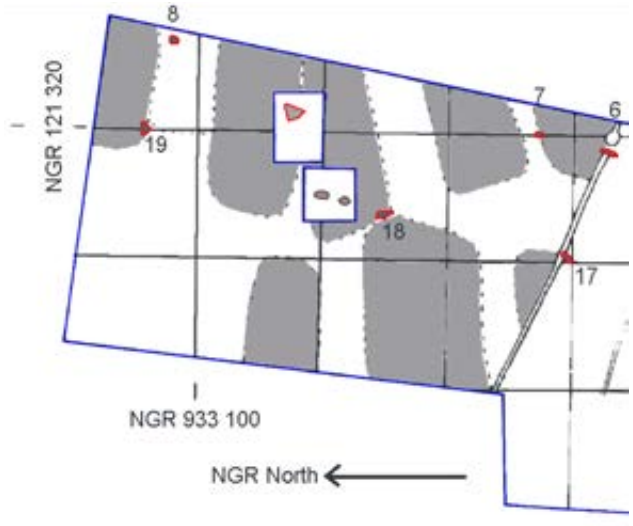
Recent re-interpretation of the air photograph resulted in a different portrayal again of the beds from that made prior to excavation (Illus 6.7). Standing stones are in dark blue, erratics and worn areas are in cyan and various man-made features are shown in pink. It suggests that there are traces of at least two successive systems.

6.2.2 Topsoil and cultivation

Before excavation the ground showed no signs of intrusions or of lazy beds or other mounded features. Despite the evidence from air photographs none was apparent during the removal of turf.

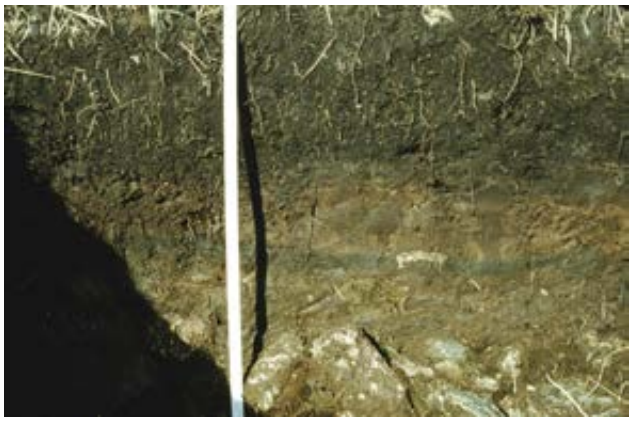
The topsoil was about a spade depth deep (Illus 6.8). The soil included a faint band of different material halfway down the profile (Illus 6.8). It was not noticed during deturfing. It may have been an old turf line and, if so, it may reflect the earlier of a succession of cultivation beds at this position. An alternative explanation is that this slightly darker band resulted from downward migration of colloidal matter through the profile.

Illus 6.5 The area in which Area A was subsequently located, from the west in 1955. [Cambridge University Collection air photograph CUP RA84 (part)]



Illus 6.6 The pre-excavation interpretation of the evidence for cultivation beds

Illus 6.7 A more recent interpretation of CUP RA84.6.2.2



Illus 6.8 Section of the modern soil [Film 1980.2.3]

In sub-area AI the finds were 10/80 China, 45/80 iron cauldron fragment, 199/80 slate and the following pieces of pottery:

Table 6.1a Unglazed pottery from 001 topsoil in AI

Cat	Description & comments
597	A sherd from a fairly large pot of hard but not gritty fabric, probably Iron Age or later. The bright brick orange exterior is unique in the Calanais assemblage;
675	A sherd from a medium-sized, thin-walled, fine and hard-textured pot; most likely to be post-EBA, possibly significantly later.
743	A small sherd from thin, fine, probably fairly large pot. While this could be a fine (or fine domestic) Beaker, the other pottery from Area A looks to be post-EBA, so the possibility that this, too, is relatively late must be borne in mind
749	Small, abraded sherd not characteristic for domestic Beaker, and since the other pottery from Area A looks to be post-EBA and possibly relatively recent, this may well be too.
1108	A sherd previously suspected to be peat. Too small, and identification too insecure, to guess likely date

In sub-area AII the topsoil finds were 22/80 China, 204/80 slate, 203/80 clay pipe, 206/80 iron horseshoe, 205/80 quartz and the following potsherds:

Table 6.1b Unglazed pottery from 002 topsoil in AII

Cat	Shd Nos	Description & comments
673_674	4	Distinctive fabric and colour, not exactly matched elsewhere in Calanais assemblage. Not wheel-thrown but likely to be Medieval or post-Med.

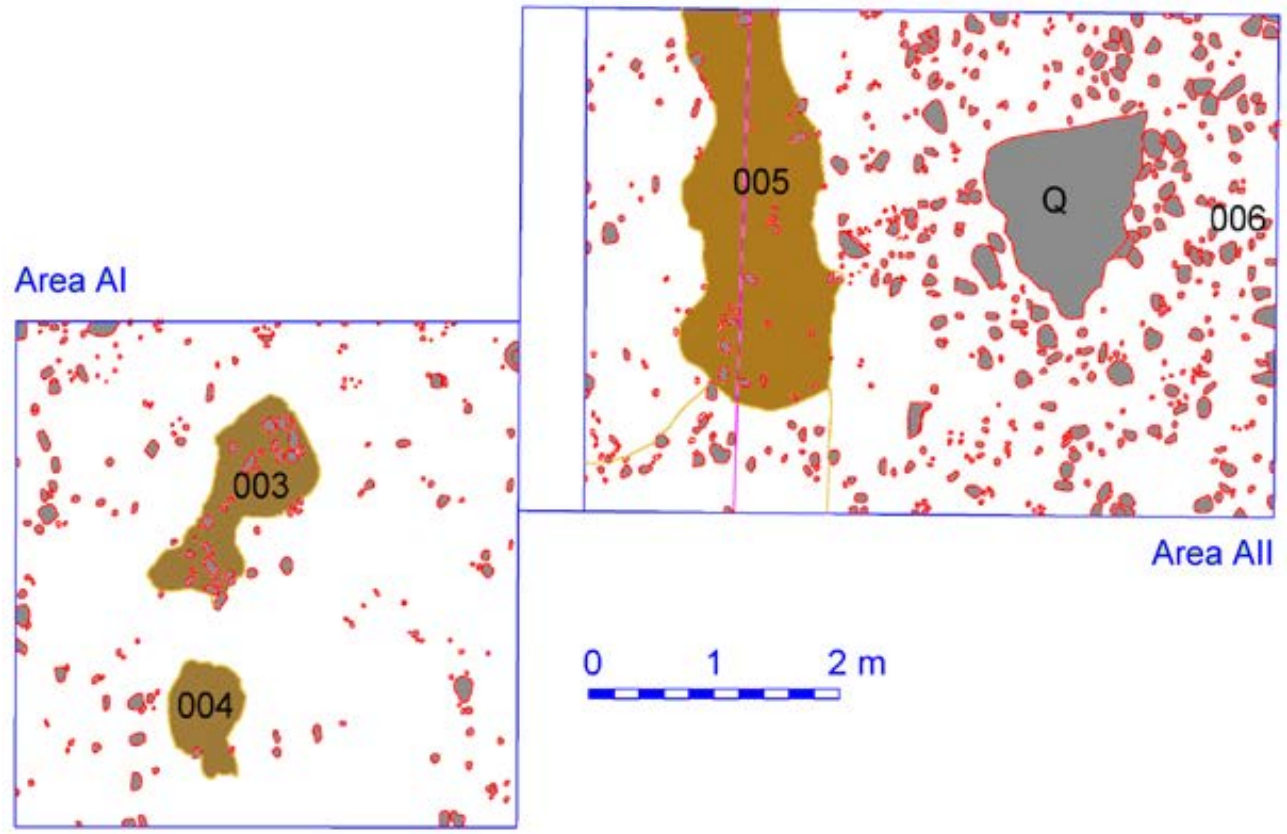
6.2.3 Patterns of small stones

In Area AII, two straight-line demarcations formed by small stones ran roughly north-south and roughly east-west at slight angles to the trench edges, separating a more stony area filling most of the trench and a less stony area to its west and south (Illus 6.9). This distribution of small stones can be interpreted to support the notion that there were cultivation divisions in this area, despite their on-site interpretation as possibly figments of the excavation process (Illus 6.9, 6.10). However, the cultivation beds visible on air photographs were part of a palimpsest of cultivation systems frozen at some time in the 19th century and it may be that the differences between the west and the east parts of AII reflect the end of an earlier cultivation bed, or the edge of a flat field plot which excluded the area of glacial erratic Q.

6.2.4 Depression 005

A broad shallow linear depression 005 in the west part of Area AII (Illus 6.9, 6.10, 6.12) measured 0.5m wide by 4m long. It lay over a mixed layer of clay, iron pan and peat (008) which covered the trench between the bottom of topsoil and greener underlying layers.

The depression was 0.1m deep and filled with loose fibrous brown clay (092). With further cleaning it appeared to run further south than shown on Illus 6.9, very nearly to the southwest corner



Illus 6.9 Plan of features immediately below topsoil [NMRS DC38001]

Illus 6.10 Area AII, looking north. Depression 005 is by the ranging rod [Film 1980.3.4]

Illus 6.11 Stony layer 069 looking south between glacial erratic Q and the east side of the trench [Film 1980.8.11]

of AII. It seems most likely to have been related to agriculture in the area after peat was cleared, given that it overlay layer 008 which looked like the layer left when basal peat was removed.

6.2.5 Beach pebbles 006 and stony layer 069

To the east of the erratic Q was a rough setting of beach pebbles 006 on a stony layer 069 (Illus 6.11).

This stony layer 069 was subdivided for excavation purposes into fairly compact dark brown humic peaty clay (070) over loose and fibrous brown humic clay (071) over light brown sandy clay with some decaying sandstone (073) over compact brown humic clay (072).

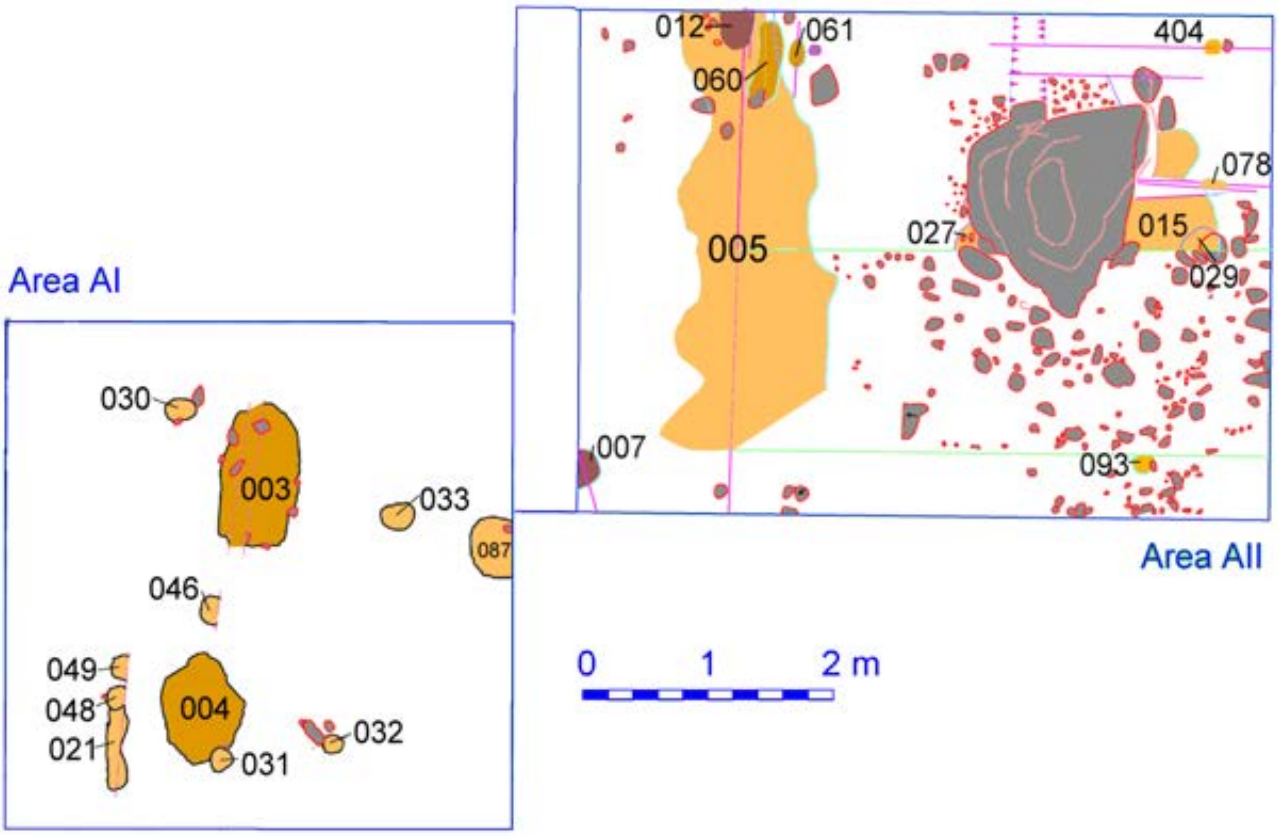
6.2.6 Discussion of layers 006 and 069

After considerable work the sub-layers of 069 were all interpreted as natural. It is conceivable that the beach pebbles reached the local cultivation bed attached to seaweed. Seaweed was used for enriching cultivation soils in the 19th century AD and earlier. However, it does remain odd that beach pebbles 006 overlay two features containing early charcoal which in turn overlay the rough angular stones 069. Although the radiocarbon dates for these features provide only termini post quem it is possible that the pebbles and underlying features reflect much earlier activities.

6.3 Post-hole bases and other small features

6.3.1 Description and grouping

The stratigraphy of most of the small features was uninformative. Some probably date to after clearance of peat from the local area (Table 6.2), two probably pre-date peat clearance (Table 6.3) but most were of pretty ambiguous date relative to the peat cover. Amongst these, two contained early charcoal and, as described and discussed below, they could be early in date even though the stratigraphy does not demand it.



Illus 6.12 Plan of features above disturbed natural [NMRS DC38014 and DC38019]

Table 6.2 Probably post-peat small features

A	Cntxt	W mm	L mm	D mm	Stratigraphy	Fills
ÍI	007	240	360	20	under fill of depression 005; cut mixed layer of clay, iron pan and peat 008	loose, brown fibrous clay 014
I	030	200	240	90	cut green gritty clay and pebbles 020	loose fibrous humic clay with roots 034 above compact ginger sandy clay 035.
I	031	250	250	90	cut clay and pebbles 020 and also cut pit 004	brown humic clay 041 above ginger sandy clay 042
I	032	150	150	70	cut clay and pebbles 020	brown compact humic clay 043 and mid brown compact mottled clay 044
I	033	150	180	40	cut clay and pebbles 020	loose humic fibrous loam 045.

Table 6.3 Possible pre-peat small features

A	Cntxt	W mm	L mm	D mm	Stratigraphy	Fills
II	060	200	500	50	below mixed layer of clay, iron pan and peat 008; cut brown, mottled gritty clay 024	compact mottled sandy clays 064, 065 and 067 and loose mid brown fibrous sandy clay 066.
II	061	150	200	40	below mixed layer of clay, iron pan and peat 008; cut brown, mottled gritty clay 024	compact fibrous sandy clay 068

Table 6.4 Small features of ambiguous relationship to peat

A	Cntxt	W mm	L mm	D mm	Stratigraphy	Fills
II	012	400	600	50	under fill of depression 005; cut brown, mottled gritty clay 024	loose dark brown humic fibrous clay 062 over compact mottled sandy clay 063
II	015	100	450		Below beach pebbles 006, over stones 069.	root mass 016, dark brown fibrous peaty clay 017, and black greasy clay 018.
I	021	180	600		cut gritty clay 020, and brown mottled gritty clay 022	mottled, compact, sandy clay 059.

A	Cntxt	W mm	L mm	D mm	Stratigraphy	Fills
II	027	400	600		below beach pebbles 006, over band of quartz chips 090	dark brown peaty fibrous clay 026, similar to fill of 015.
II	029				amorphous and maybe natural	
I	046	150	200	50	cut clay and pebbles 020	greasy reddish-brown clay (047) over mottled, compact gritty clay (053),
I	048	180	250	90	cut linear feature 021	post pipe filled with mid brown loose humic clay 056 in pit with green compact sandy clay 057 and light brown, compact sandy clay 058
I	049	150	150	60	cut linear feature 021 and clay and pebbles 020	loose mid brown humic clay with roots 054 over compact mottled sandy clay 055
I	087	500	500	90	below turf 001. Cuts ill-defined linear feature 021	mid brown fibrous compact gritty clay 088 over mottled gritty, fibrous, less compact clay 089.
II	078	80	200		Below 017 (fill of 015) Over stones 069.	stone packing
II	093	180	120		Below beach pebbles 006. cuts small angular stones 095.	
II	408	50	50		Under brown compact silty clay 407	brown compact silty clay like 407

Around stone-pits 003 and 004 was a cluster of post-hole bases (Illus 6.12; Table 6.2), including four ((030 to 033) which were 0.15 to 0.25 m in diameter and contained fills which seemed to be variants of the modern topsoil. Of these, post-hole base 031 cut Pit 004 which is interpreted below as being earlier than the stone-socket fills of Pit 003. In the southwest corner of Area AII, an extension of depression 005 lay over a truncated post-hole base 007 which cut the general mixed layer of clay, iron pan and peat (008) at the base of topsoil. If layer 008 was greatly turbated after peat clearance then 007 must have been later.

Two features were judged to date to before peat clearance because they lay below the mixed layer of clay, iron and peat 008. A small linear depression (060) was treated as a single feature although at one stage we supposed it might be a group of overlapping post-hole bases (Illus 6.12). Despite its depiction in Illus 6.12 it underlay depression 005. Nearby was a possible post-hole base 061. They may have been cut from a higher level and their upper parts subsequently truncated by post-clearance cultivation but it is not at all clear whether this happened before or after peat covered the place.

Features 015, 027 and 093 can be grouped together because they underlay beach pebbles 006. But because the date of the latter relative to local peat could not be established that is not very helpful. Still, two of these features included early charcoal and they are discussed separately below Perhaps 021, 048 and 049 can be grouped together. Linear feature 021 ran nearly parallel to the west side of the avenue (Illus 6.12, 6.13). Possible post-hole bases 048 and 049 continued that line northward and together the three features formed a line 1.1 m long. The basal fill of 049 looked like redeposited natural.

The other five or six small features of ambiguous date are impossible to divide into useful subgroups. At its north end the fill of linear depression 005 overlay a pit 012. It may have been a heavily truncated post-hole base; it probably cut clay (024).

Another feature (87), on the east edge of Area AI may have been a post-hole base or the socket of a field stone.

One of the post-hole bases (046) had a non-fibrous clay fill, which may suggest that it was ancient. It lay on the line between 003 and 004, the probable avenue stone-holes.

An amorphous area of clay 029 cut by 015 was interpreted as natural.

6.3.2 Discussion of the postholes.

There was no obvious pattern amongst the post-hole bases and they were not dateable. Some of them may have been the casts of field stones.

One possible explanation for the posthole bases 030 to 033 near stone-pit 003 is that they reflect an attempt to fence off the standing stone which once stood in the stone-pit, after the standing stone had become unstable. Or possibly posts were erected as part of an attempt to protect it. It seems unlikely that they had anything to do with the standing stone's original erection because their fills were reminiscent of modern topsoil. On the other hand, it has to be admitted that they may have had no connection at all with the stone-pit.

The small linear feature 021 with its amorphous fills of mottled, compact, sandy clay was originally interpreted as the relics of root disturbance. But the fact that it was orientated the same way as the west side of the avenue suggests that it was originally an artificial feature, although it may have suffered subsequent disturbance from natural agencies.

In the end all that can be said with confidence about the small or shallow features was that taken as a group they indicate activity in the area.

6.4 General layers in Area A

Thin, widespread layers and patches of stonier material at the base of the cultivation soil presumably reflect agriculture and other activities after peat had been removed from this part of the site, but some may have been the results of natural modification of the underlying, variable green clay by pre-peat soil processes.

A layer of brown compact silty clay 407 (archive plan 14 and section 14) at the base of the cultivated soil overlay and filled a small stake hole 408 (Table 6.4). It overlay a layer of mottled gritty clay (025) and also overlay a general layer of gritty clay and natural (020).

That in turn overlay a brown mottled gritty clay (022), similar to (024), which overlay a mottled gritty green clay (023) which (with various different feature numbers) extended over nearly all of Area A.

The lowest level of the trench in AI consisted of a layer of stony green clay natural (091) and a grey green clay layer, stony and very compact (019) which was very similar to layer 013 found in parts of Area AII.

A natural scatter of stones (028) ran east from the west baulk. An exploratory cut (050) was put through a stony area to east of 028. The sequence was brown mottled gritty clay (022) over mottled compact, fibrous clay (084) over green, grey compact sandy clay (085).

In another exploratory cut (051), layer 022 was underlain by brown humic clay 080 over green grey sandy clay 081 over 023, which was the mottled green clay with grits referred to above as the lowest part of the general succession reached by excavation in AI.

Exploratory cut 052 showed a succession of brown roots (082) over mottled sandy clay (083) over the general layer 023.

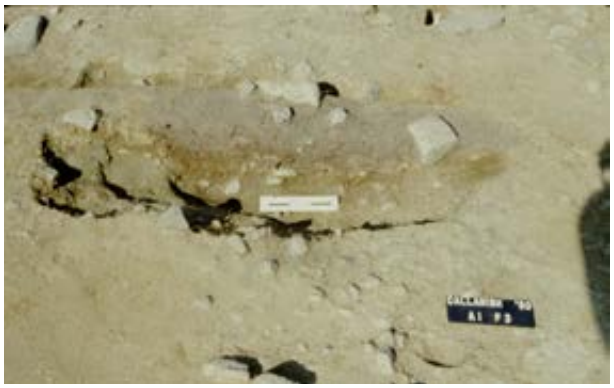
These were all interpreted as variations of the natural, influenced by sub-soil weathering. The relevant plans and sections are archived in NMRS.

6.5 Two pits, probably for standing stones

In addition to the small features listed in Tables 6.2 to 6.4 a pit (003) was discovered near or at the position of the resistivity anomaly on the west side of the avenue and another (004) was found immediately to its south. They cut brown mottled gritty clay 022 and the underlying natural layers.

Illus 6.13 Area AI, looking south over Pits 003 and 004 to Avenue stone 18 [Film 1980.10.16]

Illus 6.14 Pit 003 looking north along the west side of the avenue, as revealed after topsoil clearance [Film 1980.4.10]



Illus 6.15 North-south section of Pit 003 [Film 1980.8.4]

6.5.1 Pit 003

Pit 003 contained what was probably the socket for a standing stone. The pit was 1.15 m long by 0.65 m deep and its long axis was nearly on the line of the western stones of the Avenue at this point, as was the line between it and Pit 004 (Illus 6.13).

The ragged outline of the pit when first discovered probably reflected cultivation of the overlying soils (Illus 6.9, 6.14).

The fill of Pit 003 itself (as distinct from the socket hole) included green, compact gritty clay (097, 400) and mottled, compact gritty clay (098) (Illus 6.15). These did not contain any peat, which suggests that the pit was dug when peat was absent from this part of the site.

Some of the contents of the pit consisted of redeposited upcast including mottled, compact gritty clay (401), mottled, fibrous gritty clay (402) and green compact gritty clay (403).

The probable socket hole contained brown fibrous humic clays (009) over more compact versions (009 and 010) and a peat sod (011), all above a thin layer of mottled, fibrous gritty clay (Illus 6.16).

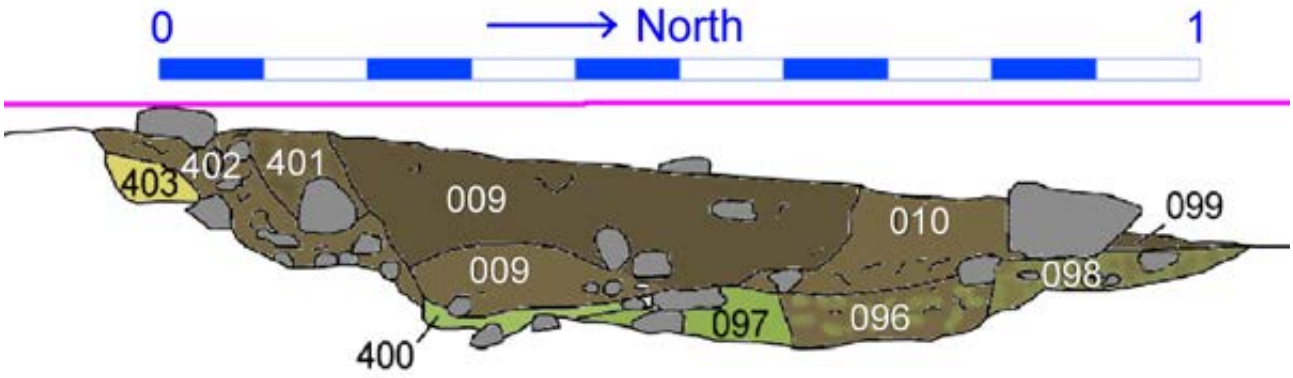
6.5.2 Pit 004

The possible other stone pit (004) was 0.9 m long and 0.6 m wide.

Pit 004 was 0.2 m deep and cut a layer of clay and pebbles (020) and a layer of brown mottled gritty clay (022). No distinctions between the north and south fills were noticed in plan but they were clear in section, where the remnants of a possible socket or a later cut appeared in the south part of the pit (Illus 6.17, 6.18). The northern and southern features contained similar clays, mostly compact and mottled by soil processes. They included loose humic clay (036) above compact, mottled, fibrous gritty clay (037) overlying compact fibrous mottled clay (038) above compact fibrous mottled gritty clay (039) and, at the bottom, compact brown, mottled, gritty clay (040).

6.5.3 Discussion of pits 003 and 004

Pit 003 seems fairly easy to interpret as a stone pit dug before peat covered the area and the socket



Illus 6.16 North-south section of 003, showing the pit and socket of a stone-hole [NMRS DC38003]

left by the stone when it fell. Admittedly, without MacCulloch's record (1819) that interpretation might be less obvious. The soil and peat in the socket suggests that the stone fell as or soon after the last peat was cleared from this area, probably in the 18th or 19th century AD.

There are two possible interpretations for Pit 004. One is that the northern and southern parts together represent a pit dug to erect a standing stone and the northern part contained fills which entered the pit after the stone was removed. The other possibility is that the southern fills were in a pit which was subsequently cut by a new pit represented by the northern fills.

Illus 6.17 North-south section of 004, showing the pit of a stone-hole [Film 1980.7.20]

6.6 Features east and south of the glacial erratic containing early charcoal

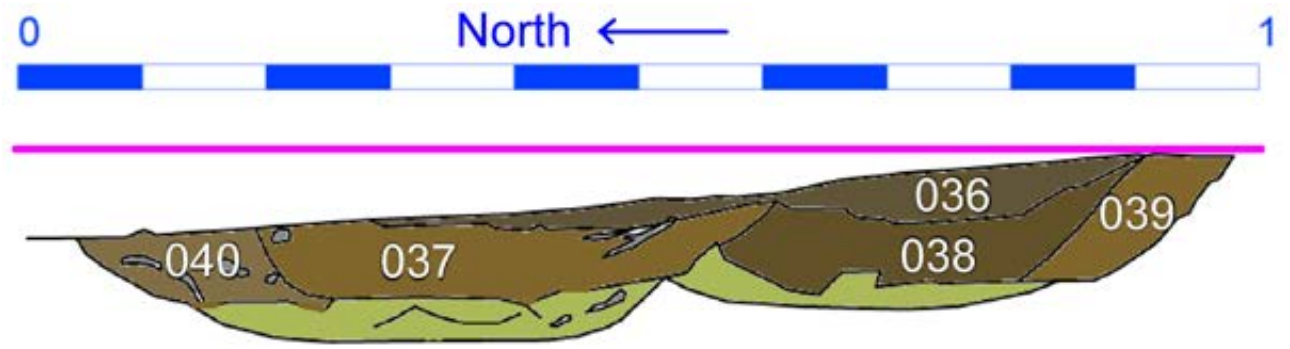
There were two possible artificial features (015, 078) under pebble layer 006 immediately to the east of the erratic. Another probably artificial feature (093) was found under 006 to its south (Illus 6.12; Table 6.4).

A possible plank-hole base 015 contained a root mass (016) over peaty clay (017) (Illus 6.19; Table 6.4). The roots seem to have invaded it after it had filled up. The root mass included a small fine pottery wall sherd ((46/80) not in Pottery Catalogue) of indeterminate date.

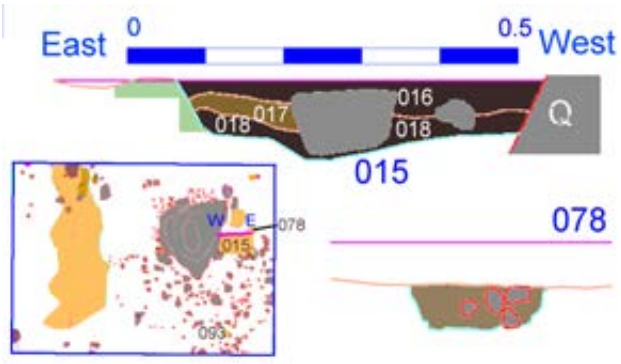
The basal black greasy clay 018 contained a piece of birch charcoal which was dated to 5350 to 5210 cal BC (SUERC-11588; 6295+/-35). Because this date was unexpectedly early the sample was re-measured, producing a similar date of 5310 to 5070 cal BC (SUERC-11989; 6245+/-35).

A post-hole base (078) with stone packing (Table 6.4) was cut by Feature 015. Whether it and the possible plank-base hole 015 were part of a single construction is impossible to determine.

A depression (027) under 006 measured 0.6 by 0.4m. Its dark brown peaty fibrous clay fill 026 was similar to the middle fill of 015. It and the super-incumbent layer of stones 006 lay over a band of angular quartz chips (090) surrounding



Illus 6.18 North-south section of Pit 004 [NMRS DC38010]



Illus 6.19 Sections across Features 015 and 078 [NMRS DC38009 & DC38015]

Illus 6.20 Exploratory cuts to the east of the glacial erratic [Film 1980.10.A3].

the natural erratic boulder Q. Elsewhere 006 lay over a layer of ginger sand (406) which appeared to be natural.

To the south of the glacial erratic there was a possible post-hole base (093 (Illus 6.12; Table 6.4). A piece of birch charcoal from this produced a radiocarbon date of 3760 to 3530 cal BC (SUERC-11589; 4880+/-35). This possible post-hole base 093 cut a small patch of angular stones (095).

6.7 The glacial erratic

Much effort was spent on elucidating the complex features immediately around the glacial erratic, with the conclusion that they were all natural apart from those described in Section 6.6. The details are omitted here; the numerous sections and plans have been archived in NMRS; but in essence sondages on the east side of stone Q revealed no artificial cuts or fills (Illus 6.19, 6.20). Instead variations in the clay merged into one another, and the patterns of stones seemed, after careful consideration, to show no signs of artificial placement.

6.8 Summary description

The only features in Area A which are interpreted positively as both artificial and prehistoric are the pits 003 and 004. Features 060 and 061, and those below pebbles 006 to the east of the glacial erratic are identified more tentatively as prehistoric.

Pit 003 may have been the stone hole for the

stone recorded by McCulloch. There were no artefacts or datable charred organic material in the socket or packing, so absolute dating is not possible. That said, the most economical explanation for the difference between the lack of peat and humus in the fills of the pit and the inclusion of soil and peat in the socket hole fills is that the pit was dug before peat covered the site but the stone socket filled with material after most of the peat had been removed from the surrounding area.

The nearby pit (004) was also very probably prehistoric. If its fills reflect a stone-pit and a stone-socket then, because the line between the two features is along the local line of the avenue, 004 was probably the remains of another avenue stone hole. In this interpretation the similarity between packing material and socket fill suggests that the stone was removed and the hole filled in long before peat covered the site.

The other possible interpretation of Pit 004 is as two successive pits with very similar fills to one another. The pits do not seem to have held wooden uprights but it is not clear whether they ever held stones. They may have. After all it is perfectly feasible, with care, to cut a hole matching the base of a stone the size of the smaller avenue stones and insert the stone so that its base completely fills the pit, leaving no distinction between pit and socket.

That said 004 may represent successive pits which never held stones. Instead they may have been dug along the line of the west side of the avenue for ritual or ceremonial reasons.

There is no pressing reason to suppose that the avenue was conceived and created as a whole with only minor subsequent revisions. It may have been the result of the setting up of individual stones as memorials to individuals or events over a period of many generations, perhaps to either side of a traditional approach to the Ring. Nor is there any pressing reason to suppose that 'empty' pits were not used to mark its sides before any stones were set up.

The dating of charcoal in the lower fills of the possible post-hole bases 093 and 015 to the 4th and 6th millennia respectively suggests that they may also be prehistoric. It does not prove it because the charcoal might have been residual. Indeed that seems quite likely for 018 which was part of 015, the upper level 016 of which, as described above, contained a piece of pottery.

Nor, indeed, can it be demonstrated beyond doubt that the pieces of charcoal represent burning in the immediate area. If in pre-peat times the erratic protruded above the ground surface then the charcoal may have fallen in the lee of the erratic after being blown by the wind from elsewhere. This is unlikely to have been very distant but the point is that the charcoal only proves burning of wood in the general area of the erratic, not necessarily in fires set by people.

Nevertheless, this minimalist interpretation is rendered less likely by the rarity of residues of burning except in these features immediately east of the glacial erratic under the pebble layer. It seems to me likelier that the features represent activities in the 6th and early 4th millennia BC. Those activities possibly included the digging of small pits or post-holes and perhaps the setting of fires. Further interpretation has to be highly speculative; but it is possible that the glacial erratic served as a natural focus for people who watched the moon setting at the major lunar standstill before the standing stones were erected.

7. Area B

7.1 Introduction

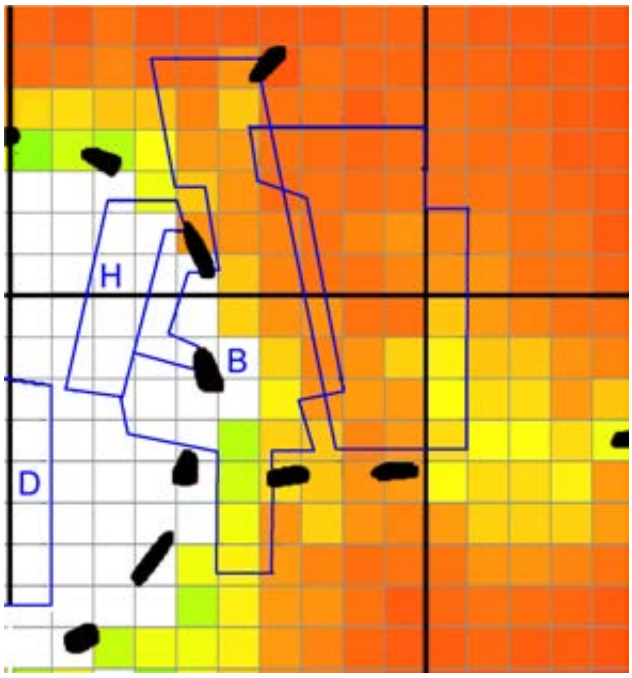
Area B was excavated in both 1980 and 1981, with supervision by Peter Strong. The area had been suffering from erosion and compaction by the feet of visitors, and water-logging, especially immediately outside the chamber passage. The chambered cairn passage walling was deteriorating.

7.1.1 General aims

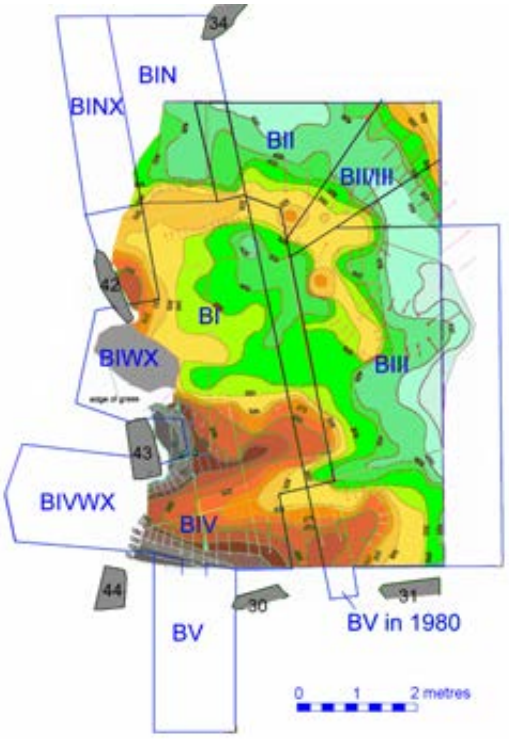
The main research aim at the start of excavation of Area B was to understand the nature of the enclosure and its relationship to the Ring, and the relationship of the chambered cairn passage to the Ring. As excavation progressed the area was extended for wbetter understanding of the deep black deposits south of the entrance to the passage and the relationship of early clay layers and turf lines to the Ring. We tried to relate the archaeology of Avenue stone 34 to the layers north of the enclosure.

7.1.2 Resistivity

The colours used to represent resistivity readings in Illus 7.1 range from red-brown (low resistivity) through orange and yellow to green (high resistivity). The probe spacing at 1m was too large to reveal details. In general red-brown colours correspond to peat, clay and deeper soil while green colours correspond to rock or stones near the surface. However, the general correspondences masked much variation. The consistently high values in the southern extension are difficult to explain. Judging by the general pattern at Calanais they should correspond to rock near the surface, but they did not. Although there were abundant surface stones the soils were fairly deep. Perhaps they relate somehow to iron-panning. The medium resistivity (yellow) squares in the south-east part of the trench suggest that the soils and natural clay should have been thinner than elsewhere on Area B but although this part of the area was fairly featureless, probably because of prehistoric ploughing, the soil was not noticeably shallower.



Illus 7.1 Resistivity survey; probe spacing 1m.



Illus 7.2 Pre-excavation contour survey at 25 mm intervals; heights below local datum; blues and greens signify low areas and brown to grey high ones.

7.1.3 Contour survey

A 25mm contour survey of Area B before excavation (Illus 7.2) showed a general change in height from SW to E and NE of 0.2 to 0.3m over a distance of around .5.5m to 7m. The specific total height variation of 0.42m over the area was partly due to a mound round the base of Ring Stone 43. A local linear depression about 1 m wide, which turned out to be a modern drain, stretched slightly north of east from the entrance of the passage of the chambered tomb to the eastern side of the excavated area. It was flanked to the north by a ridge about 1.5 m wide. To the north again, there was a gentle depression corresponding to the area inside the enclosure, measuring about 3 m north-south and east-west. The bank of the enclosure was visible. The higher area in the north-east corner of Area B corresponded to surviving peat beyond the edge of the area stripped in 1857 by Sir James Matheson's workers.

7.1.4 Trench layout

Illus 7.3 shows Area B, the monolith and the northern part of the Ring at the beginning of excavation, with stones of the East Row to the left and avenue stones to the right.

Area B was initially laid out as three trenches (Illus 7.4). The north, south and east sides of BI to BIII were parallel to the National Grid and overall they measured 8m north-south. The west side of Area BI ran 10 degrees to the west of national grid north. The width of Area B thus varied from east to west between 5.5m and slightly under 6.5m; but various extensions increased those dimensions (Illus 7.5).

At the end of excavation none of the areas shown on Illus 7.6 had been completely dug to subsoil level. Most had in part. The main surviving areas of archaeology were in BIVWX, BIV/BV and adjacent to the medial baulk. That baulk itself was not excavated and preserves a record of the stratigraphy of the enclosure.

Appendix 1 consists of a much fuller account of the changes to trench layout in Area B and lists surviving archaeology.

7.1.5 Context numbering

Context numbers were initially in the range 100 to 199, and when those ran out, numbers 800 to 899 were used. The numbers were shared between all of Area B rather than being allocated in blocks to sub-areas. All finds were recorded by sub-area and context and some were included on plans.

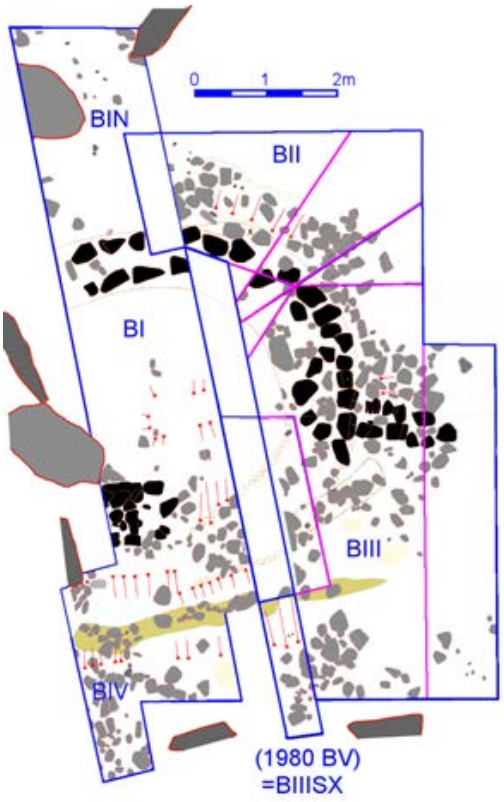
7.2 Phase 18: Victorian and later activities

7.2.1 Superficial soils

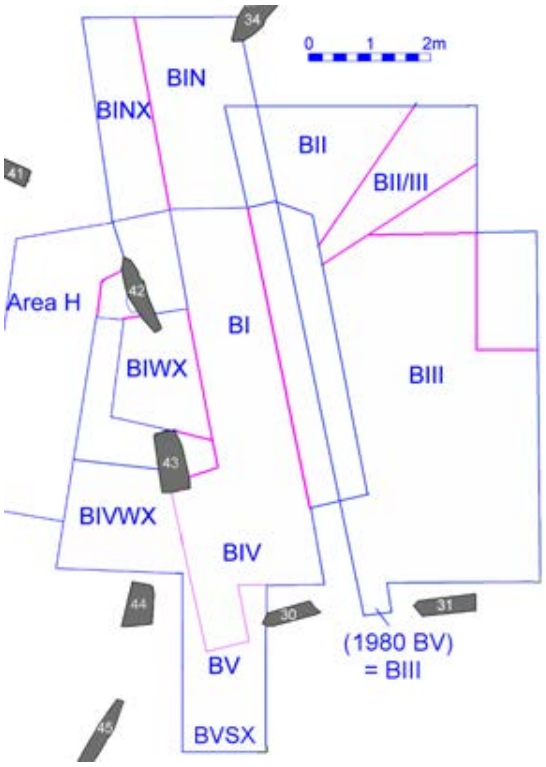
Area B was covered with on average about 80mm of turf and topsoil (107). Through it poked a few stones, including parts of an enclosure wall-base of head-sized stones (103) with what looked like tumble (102) outside it (Illus 7.4). Illus 7.7 shows the general pre-peat soil 117 in Area BIN near the start of 1981(the third soil type described below).

Illus 7.3 Area B from the south-east during laying out [Film 1980.2.4]

Illus 7.4 Area B as first opened, from the east [Film 1980.2.27]



Illus 7.5 The layout of the trenches forming Area B at the end of the 1980 season [NMRS DC38024]



Illus 7.6 The layout of Area B at the end of the 1981 season

Illus 7.7 Area BINX superficial soils [Film 1981.3.34]

1. Broadly speaking, there were six different types of soil under the modern topsoil. Each had a different history of erosion and deposition. Two were largely late 19th century and later.

2. The interior of the enclosure (mostly in BI) contained imported turf, or soil and gritty layers, covering pits which had been dug inside it seemingly after peat clearance.

3. The area of the modern drain running from the passage eastward contained a variety of clay deposits reflecting recent erosion and maintenance.

4. Four were prehistoric.

5. The area outside the enclosure in Areas BI, BIN, BII, BII/III and BIII was largely covered by a gritty grey to brown mineral soils (117). It was modern in the sense that weathering had changed its character; but apart from that it had largely formed before Phase 15 when peat gradually covered the place. But its development near the Ring itself may have continued to Phase 16 (in the mid to late 1st millennium AD) when remains of the cairn were disturbed. It is discussed in Chapter 7.3.

6. Some peat survived in the extreme north-east part of Area B the result of throwing back peaty material during the peat cutting which had reduced it locally to a shallow skim before 1857. Under it was an incipient podzol. We did not determine whether this podzol formed before or after local peat cutting. It is discussed in Chapter 7.3.1

7. The south-western trench (BIV/BV) was dominated by almost black deposits below turf, topsoil and stones. The topmost of them might have been a result of the chamber clearance alluded to by Sir James Matheson in his letter to the Society of Antiquaries of Scotland (Innes 1860). Our conclusion after excavation was that they were not. Nevertheless, small intrusions provided evidence that the pre-peat soil in BV had been disturbed after peat clearance; but the black surface layers were predominantly of Phase 10 and 11, in the 2nd and 1st millennia BC. They are discussed in Chapter 7.8.

8. The label 112 was used for less fibrous soils than soil 117, mostly underlying 117. To the north of the enclosure soil 112 lay near the pre-peat surface. But elsewhere it looked as if it might simply be the lower facies of soil 117; and in places it was separated from the latter by an iron pan. In the same and in other places it appeared to be the result of levelling of the Stage 2 enclosure bank and although the label 112 does not automatically mean 'ploughed down Stage 2 bank' this is at least sometimes true. It is described and discussed in Chapter 7.7.

There were also smaller areas with soil histories sharing some characteristics of more than one of these zones, notably the material between the stones of the Stage 4 enclosure wall.

7.2.2 Modern and superficial soils in BI (mostly the enclosure)

Illus 7.8 The stone enclosure 103, with soil 108 in its interior (Film 1980.4.17).

Most finds from topsoil (107) were modern, including slate, glass, china and a 1988 penny. It also produced the following pottery; that from BI was probably from above the enclosure and that from BISX was approximately from above the drain.

Table 7.1 Pottery from topsoil 107

Cat	Area	Comments
354	BI	Part of a thin fine Early International Beaker (ASH 39..
726	BI	An abraded spall from a fairly fine corky probably E/MN pot.
769_770	BI	Spall from an E/MN corky pot and a second sherd possibly from the same pot.
534_535	BISX	2 sherds from a large flanged-rim Hebridean incised pot.
796	BISX	Spall probably from a small corky E/MN or domestic Beaker pot.

Sunk into and on top of soil 107 was a large slab (122), which had previously stood upright along the edge of the cairn (Illus 7.8).

Overlain by and incorporating soil 107 was a small cluster of stones (110) at the SE corner of Ring Stone 43 immediately to the north of the drain (Illus 7.9, 7.13). It lay over the worm turned soil 108. No small finds were recorded from it. It was interpreted as stones piled against the base of the Ring Stone in post-clearance times.

Over the central area of the enclosure modern stratigraphy was deeper than elsewhere, lying on truncated clay-rich layers. The truncation was not caused by modern soil processes but by human activities, judging by the stratigraphy described below.

The uppermost pre-topsoil fill of the interior of the enclosure (120) contained some glass and a piece of chert. It also included the following pot sherds.

Table 7.2 Pottery from upper fill 120 of the enclosure in BI

Cat	Comments
239_242	Three sherds and a fragment from an E/MN non-corky pot.
357	A rim-and-upper neck sherd from a thin fine Early International Beaker; very probably from ASH 38, or possibly ASH 37, rather than ASH 39.
358	A small abraded sherd probably from a thin fine Beaker; exterior spalled off..
359	A heavily abraded sherd probably from a 'domestic' Beaker.
360	Undecorated non-corky sherd with fabric similar to that seen on Heb Inc sherds.
361	A tiny sherd from a thin fine pot, probably a Beaker, and a crumb.
563	A body sherd from large Food Vessel ASH 75.

Five of these pieces (Cat 357 to 361) were found at the south end of the enclosure in mixed rubbly green material next to wall-base 133; the material was sufficiently disturbed that it was not given a separate context number. It is however possible that it was related to the Stage 4 enclosure (Chapter 7.6.3))

A dark brown-grey loam (108) with a high grit component and no fibres was the only part of Area BI where worms were frequently seen during excavation. Worms did not, in general, seem to have penetrated earlier strata except where they lay immediately under high-level earth or turf. A few patches of yellow clay, possibly clods of buried turf, and also patches of blue-grey grit 113 lay in the surface of 108. The only recorded finds from 108 and 113 were a few stone chips and pieces of glass, the latter close to the turf.

Below soil 108 was a dark grey-brown loam 183 with a gritty mineral content, part of which underlay a well-formed hummock of multi-coloured clay (119) which also lay beneath soil 108. Neither produced any finds. The loam was continuous over the interior of the enclosure except at the hummock 119 where it was mixed with yellow clay and subsoil, apparently spoil from modern pit 129, and also where cut by another modern pit 128 close to the base of Ring stone 42. Loam 183 may have corresponded to soil 117, which lay outside the enclosure.

7.2.3 Discussion of the modern soils in the enclosure

The small cluster of stones (110) by Ring stone 43 probably resulted from modern tidying of the site. Loamy soil 108 was probably a modern import. The patches of clay, turf and grit in it almost certainly reflect modern repairs to the site using materials resourced locally. The lack of pot sherds and lithics suggests that the source was away from the Ring, although it may also in part have been due to the lack of sherds in the underlying soil 183. The existence of a modern pit (129) with green glass bottle fragments in it under soil 108 strengthens the argument that the soil had been imported recently, although the possibility that parts of it were re-sorted by modern soil processes including worm activity in earlier strata cannot wholly be rejected.

The relationship of loam 183 to the peat which covered this part of Calanais until 1857 is hard to determine. Soil facies 117 at a similar absolute level outside the enclosure contained many finds of pottery and lithics and the fact that 183 did not suggests (even allowing for its lesser volume) a different taphonomy. It may reflect post-peat soft landscaping. But it may instead have been formed by post-enclosure ground-working; ard or spade marks were observed in the northern part of the interior (Illus 7.25)

7.2.4 The modern drain, modern disturbances and repair patches

A modern drain ran along the middle of the passage (Illus 7.9). It was filled with rubble and dark soil. On its south side close to Ring stone 44 was a pit 859. It contained a broken vertical slab (188). It will be described along with the cairn in

Illus 7.9 The drain in the passage from the east on 19 May 1981 [Film 1981.11.26]

Chapter 7.11.5 and 7.11.6 but the pit contained a potsherd and fragment (Cat 614-5) reminiscent of 1st millennium AD, pre-Viking Plain Style pottery from Hebrides. One of the more attractive explanations for its presence is that the vertical slab was placed in Pit 859 after the 1857 peat clearance, and large potsherds found on the dilapidated cairn, as it was being explored and tidied up, were put in Pit 859 as packers for slab 188. If that is right, the slab may have been used to deter people from walking in the passage, perhaps because the south wall was poorly built.

The modern drain (100) ran east from the mouth of the passage of the chambered cairn (Illus 7.10 to 7.11). It may have run along a pre-peat depression or channel. The upper soils in the drain area included many artefacts: china, flint, glass, a piece of mirror, pottery, quartz, slate and a piece of shell. Other finds from these levels were ascribed to topsoil 107. The prehistoric pottery specifically recorded as from (upper) fills of drain 100 included the following potsherds.

Table 7.3 Pottery from drain 100

Cat	Area	Comments
405	BI	An abraded sherd from a medium-sized 'domestic' Beaker.
410	BI	A spalled sherd from a fine Beaker (another sherd was found in BVSX (Cat 409 (ASH 45a)).
411	BI	Two spalled and refitted sherds from a thin-walled Beaker or (less likely) an E/MN vessel.
412	BI	An abraded sherd, with most or all of interior spalled off; could be E/MN but can't rule out possibility that it's Beaker.
557	BIVWX	An abraded and partly spalled sherd from, probably, a Hebridean Incised pot; otherwise.
767	BI	Minimally corky, and with one large buff fine-grained inclusion 5 x 4.5

Illus 7.10 The drain and surrounding areas from the south-west [Film B&W 1980 7.6]

Illus 7.11 Sectioning of the modern levels of the drain (100) and the ridge of soil to its right, from the east [Film 1980.12.13]

Illus 7.12 Grit 113 [Film 1980.3.17]

Most of these sherds had surface damage. No doubt they derived from erosion of the sides of the drain.

In the drain was a sparse scatter of stones (137) up to 0.2 m long (Illus 7.10, 7.11). Under the stones was a main fill of black grey silty/sand 138 with white grits (Illus 7.11).

There were patches of green and yellow clay (114) to the north of the modern drain, in and under worm-turned earth 108, probably derived from cleaning of the drain. This clay included a sherd of Early/Middle Neolithic corky type (Cat 064). The drain edge cut some of these patches showing that it was, as one might expect, cleaned out more than

once. Near East Row Stone 31 a patch of yellow gritty clay 181 lying on the topmost turf line 157 in this area probably also represents digging or cleaning out of the modern drain. It produced no artefacts.

North of the enclosure, near the west baulk, was a large patch of grit (113), material used to repair the site (Illus 7.12, 7.14). It lay over the brown fibrous general upper soil 117 and the stones of the enclosure 103 and in the enclosure itself; a patch in BIWX near the recumbent stone 122, excavated in 1981, produced part of a burnt flint short end-scraper (CAT 207). It is conceivable that it was imported with the grit.

7.2.5 Discussion of the modern drain, modern disturbances and repair patches

Several processes may have contributed to creation of the drain, possibly in prehistory as much as in modern times. It was aligned in much the same direction as early cultivation beds and troughs. Victorian investigations emptied the chamber of the cairn and may also have created the shallow gulley found during excavation in the passage. It was however at least partially created by erosion from visitor's feet. In modern times the passage was choked with stones, but there will have been periods after 1857 when the green clay floor was vulnerable to erosion.

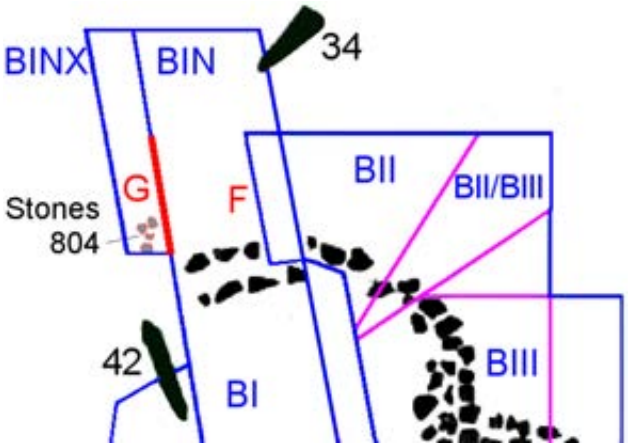
Grit 113 was probably mainly laid down long after peat clearance to fill hollows caused by visitors' wear; but possibly in some instances it came from the bottom layer of turfs laid down for the same purpose. Some patches of it and a similar material 109 may have been in-situ degraded stone.

7.2.6 Victorian disturbance north of the enclosure in BINX

Four large stones 804 beneath topsoil near the SW corner of BINX were interpreted as disturbed by Victorian activity. They lay to the north of the line of the Stage 4 enclosure wall-base (Illus 7.13).

Black humic material (802) lay mainly below them, and itself overlay soil 117. On Sketch Section G another black humic layer labelled 806 underlay

Illus 7.13 Stones 804 at the south end of BINX, from the northeast early in 1981 [Film 1981.2.19]



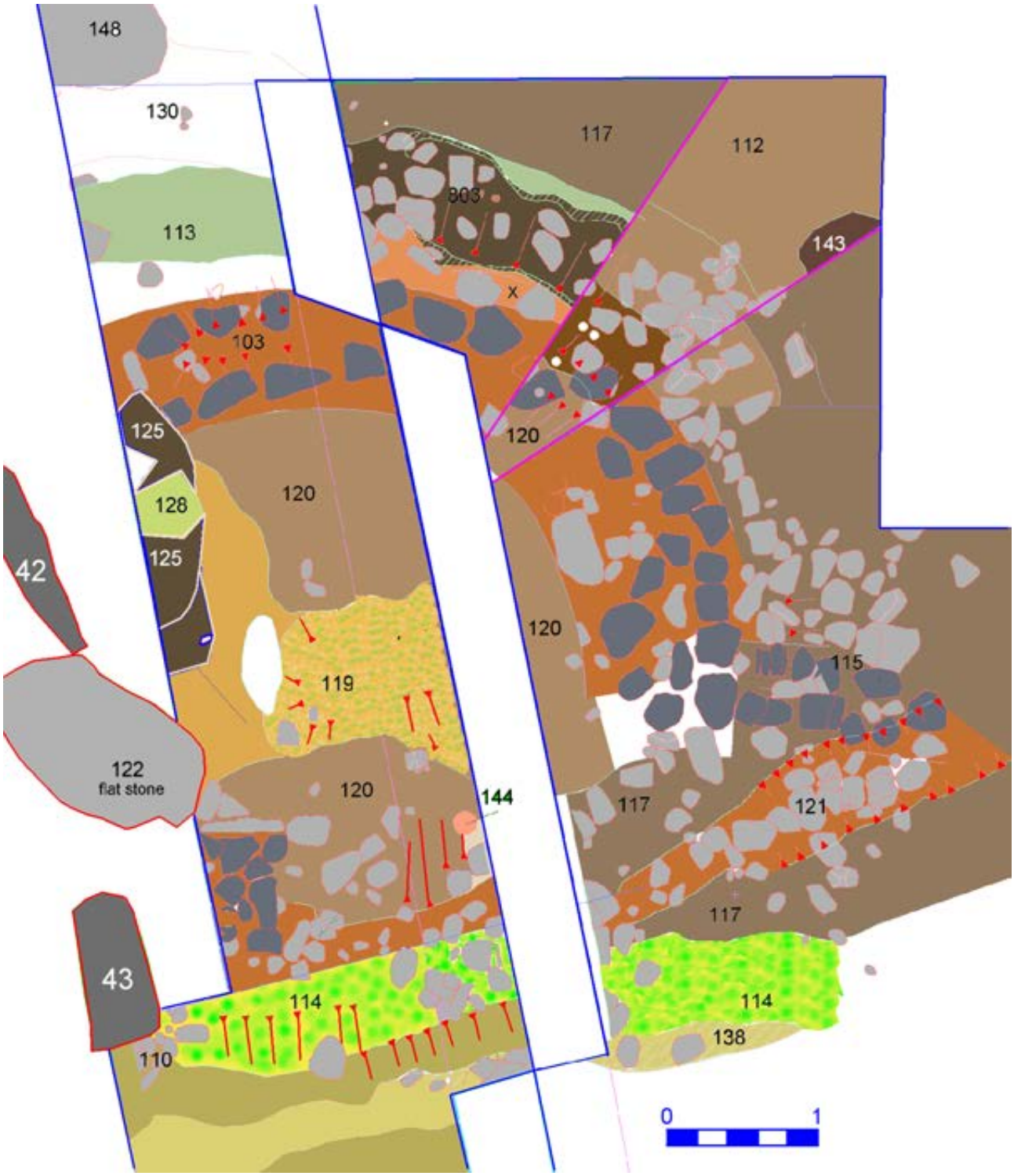
Illus 7.13 key plan

117 and 802. It is possible that these two humic layers were the same as bifurcated turf line separated by soil 117 on Section F. They are described and discussed in Chapter 7.4.8 and Chapter 7.6.6.

Black humic layer 802 may instead be equivalent to the basal peat in the NE corner of Area B, although the non-podzolised nature of 117 immediately below it argues against that interpretation.

7.2.7 Phase 18 hummocks, pits and other features

Pit 128 (Illus 7.15, 7.16) lay under worm turned earth 108 near Ring stone 42, and was cut into soil 183 filling the central part of the enclosure. It was shallow, with its bottom on green-yellow clay. It first showed as a rectangular blotchy yellow patch near the west baulk by Ring Stone 42. It cut the

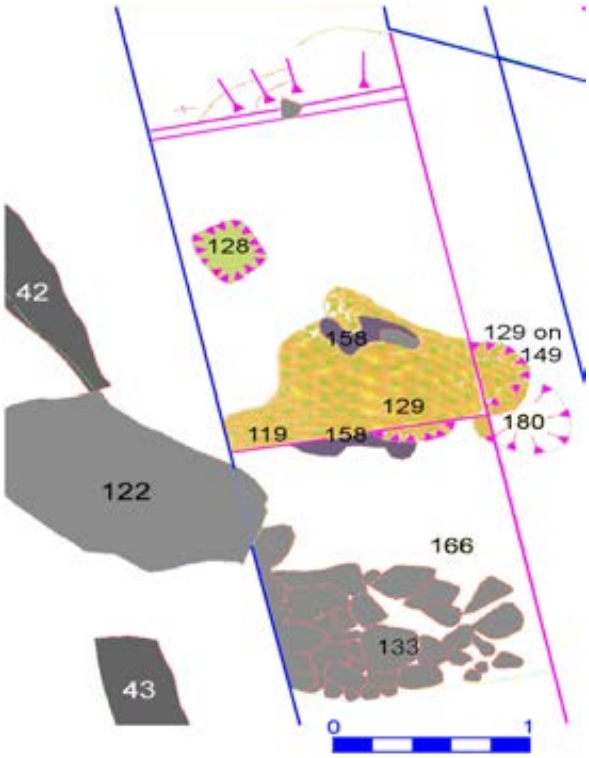


Illus 7.14 Soils in 1980 [Plans 05/80 and 06/80 NMRS 38024 &38025 combined]

impressions of slabs around Stone 42 (labelled 125 on Illus 7.14; the label was mostly used for a slab impression dug mainly in 1981).

Within the enclosure, in the worm-turned earth 108, was a pile of upcast in the form of an oval shaped hummock of patchy green/yellow/brown clay 119 (Illus 7.14, 7.15, 7.17).

It was difficult to determine whether the hummock truly underlay worm-turned earth 108 but in the end it was concluded formation of the hump might best be interpreted as earlier than importation of earth containing worms.



Illus 7.15 Post-peat features discovered inside the enclosure in BI in 1980 [Plan 06/80 and 07/80 NMRS DC 38025-6]

Illus 7.16 Pit 128 (near north-east corner of Ring stone 42) [Film 1980.9.34]

Green and yellow brown mottled clay 129 partially underlay hump 119. The same material filled most of Pit 129, the largest of the pits. It contained glass (80/162) near its base and must therefore have been recent. Its fill included black/mauve sandy material (158) on one side and on its bottom (Illus 7.15). This sandy material 158 also lay on the surface under the up-cast clay 119 and stretched in patches across to the stub wall (133) to its south. There were other patches of it in the fill of the pit and it looks as if it had been thrown back higgledy-piggledy.

Illus 7.17 Hummock 119 in worm-turned soil 108 in 1980 [Film 1980.4.17 part]

Pits 149 and 180 were earlier and deeper than Pit 129 (Illus 7.19). Pit 149 will be discussed in the context of the various stages of enclosure (Chapter 7.6 and 7.10).

A mixed area of gritty sand and clay (159) partly underlay loam 183 near pit 129. It contained variegated patches of yellow, brown and black, representing clay, humic material and pieces of turf line and may also have been the remains of upcast from pit 129.

A shallow irregular feature with a rooty dark soil fill (170) was cut into clay 131 in the extreme NW corner of the north extension of Trench BI. It contained a stone under which was a void. It looked as if it post-dated peat clearance, although no confirmatory evidence was found.

Under the peat in the NE corner in BII, were two possible post-pipes (176) both with a humus-rich fill including charcoal. They were interpreted as root-holes.

Immediately under the peaty soil in the NE part of Trench BII/III was an irregular pit 143 (Illus 7.14, 7.20). It measured about 0.6 by 0.3m and persisted to lower levels. Although it was interpreted as formed by the roots of a bush or tree,

subsequent excavation of the area to the south revealed a patch of dark brown soil with fairly clear ard marks in it (Chapter 7.10.8 Illus 7.144).

A root-hole 834 was first noticed near the southwest corner of BV, the southern extension, after the plough soil 141 and part of layer 810, a disturbed greenish sandy material with loam in it, had been removed. It had a piece of clear bottle glass in it. It measured 0.3m N-S by 0.2m E-W and a stone overlay its west side (Illus 7.21). Its surviving fill was brown, surrounded by a ring of grey sand with charcoal in it. At its centre was charcoal-rich material with roots. It was interpreted as a root-hole rather than a purposeful cut but that interpretation is slightly suspect given the glass in it.

7.2.8 Discussion of the Phase 18 pits and features

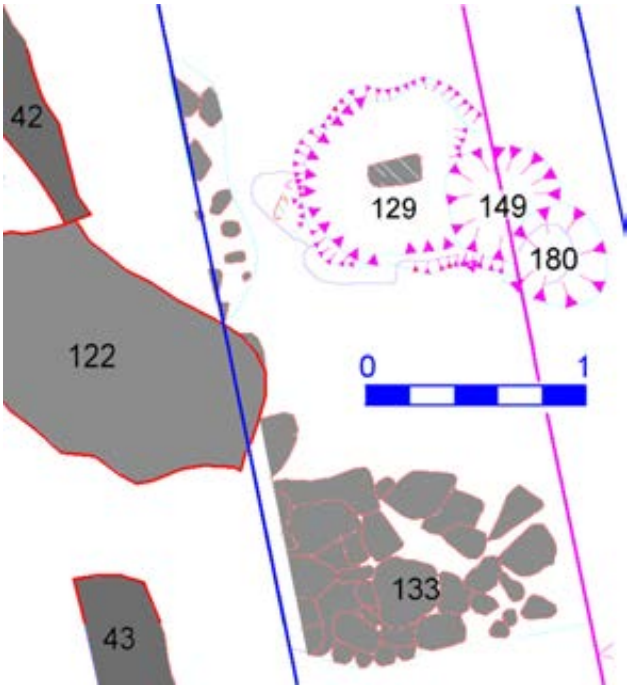
In truth, the relationship of pit 129 to soil 183 was thoroughly ambiguous and the excavator's tentative interpretation was that 183 was removed over quite a large area, pit 129 was dug, and material derived from 183 and Pit 129 was thrown back to fill the pit and the area around it.

It is conceivable that this was related to the activities of J Worsaae, the Danish archaeologist who visited the site in 1846 and excavated test pits. He recorded that 'on the eastern side of the circle the earth was removed from a couple of stones whereby it was discovered that the earth was somewhat influenced by an iron-pan. Thus it was discovered that the stones were ground-fast and packed with other smaller stones around the foot'. However, the test pits which Worsaae dug were close to the base of the Ring stones so, unless he also excavated a hole in the enclosure, Pit 129 and the disturbances around it were probably created in or after 1857.

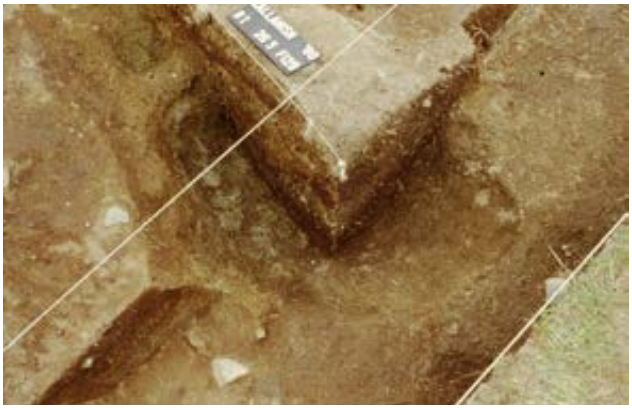
Perhaps the glass in Pit 129 was left by someone who wished to make it clear to subsequent investigators that the pit was modern, but it seems quite as likely that the pit represents a drink-fuelled attempt to find treasure or antiquities.

7.2.9 Pits and features of ambiguous date

There were several features of ambiguous date inside and outside the oval enclosure. For instance,



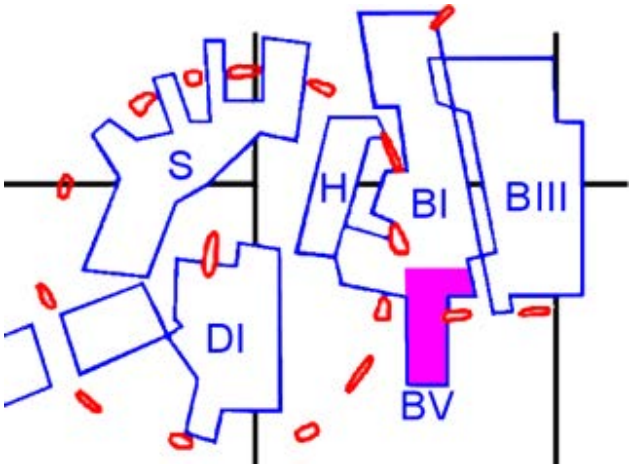
Illus 7.18 Pit 129 excavated [Plan 8/80 NMRS DC 38027]



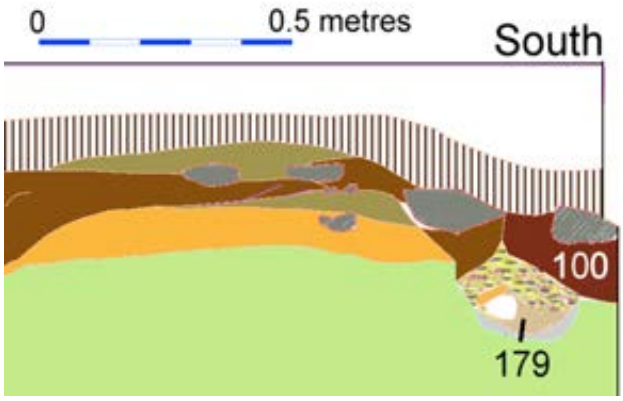
Illus 7.19 Pit 129 sectioned (and 149 partly emptied) showing dark material near bottom [Film 1980.12.27]

Illus 7.20 he irregular pit 143 in the NE part of Trench BII [Film 1980.10.31]

Illus 7.21 Root-hole 834 near the SW corner (top right in this picture) of Area BV, partially excavated [Film 1981.15.5]



Illus 7.21 Key Plan BV



Illus 7.22 Pit 179 on Section 11 Part B [NMRS DC38031-B]

near the centre of the enclosure a possible pit (149) was cut by Pit 129; its fill was of a 'clooty-dumpling' texture and colour. It contained a sherd (Cat 677) possibly from a fine Beaker. What may have been, but probably was not, a posthole (178) also lay under the recent hummock of patchy green/yellow/brown clay (119). It abutted Pit 129. These and other potentially early features are discussed later in the narrative.

At the end of Section 11/80B the southern edge of the bank was cut by posthole 179 and ditch 100 (Illus 7.22-7.24).

It was about 0.25 to 0.3m across and, judging by the packing stones, about 0.25m deep. It was filled with a light-coloured greenish sandy gritty material with large pieces of broken stone, charcoal, a material like bone (not submitted for specialist examination) and flecks of vermillion red ochre.

Below that were mottled red, black and yellow-brown sands above a basal layer of loose ashy material with large grits. Its top soft fills had been lost to the ditch and modern soil developments. It lay under what may have been tumble from the latest wall-base. It may have dated to the second millennium BC but that cannot be proved because the tumble may have been moved in the Victorian period and the ditch was last eroded or re-cut during cleaning then or later.

7.2.10 Conclusions

It was impossible to be certain how much tidying up had been done to the east of the Ring after the peat clearance of 1857. The excavated evidence showed that pits had been dug inside the enclosure in the 19th century and that soil and grit had been imported but we could not tell whether the enclosure stones near the modern surface had been re-arranged. Twelve decades of erosion and repairs since 1857 may have led to many minor adjustments.

Some post-peat disturbance is suggested by artefacts. Potsherd Cat 599 from BIIISX layer 117 is reminiscent of post-Medieval 'craggan' pottery. Possibly post-medieval (albeit indeterminate) sherd Cat 600 lay in soil 117 amongst stones 134, There was a glass fragment amongst the stones of cluster 116 near East Row stone 31. The nature of these disturbances is not known. After the peat

was cleared in 1857 clusters of stones lay exposed. Postcards of the late 1870's in the St Andrew's Special Collections suggest they remained exposed for decades. But by the 1970s they were firmly bedded in turf. the excavation demonstrated that turf and grit had been imported after the peat was cleared and it seems likely that most of the disturbance on Area B consisted of casual erosion and episodes of consolidation and infilling rather than stone-clearance. And although individual stones may not have been in their exact original positions our interpretation was that as a whole the wall-base lay-out was as it had been before peat covered the place, largely because if the Stage 4 enclosure wall-base had been built after 1857 one could expect it to have been more complete.

7.3 Phase 16: Possible disturbances in the first millennium AD

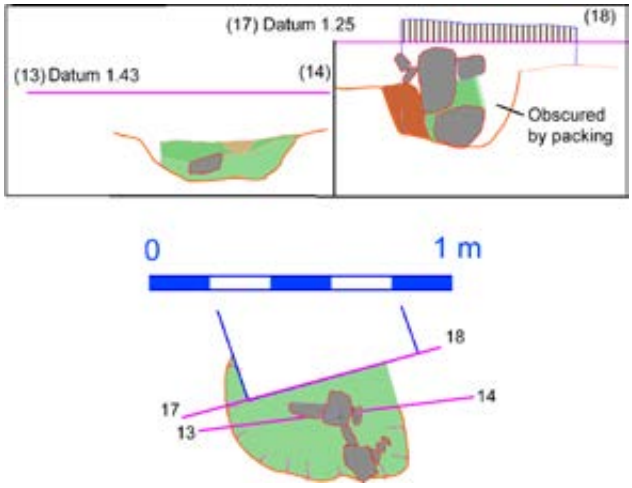
7.3.1 Pottery finds

Several sherds from large pots with distinctive features were found in Area B (see Sheridan Chapter 18.8).

Two contexts in BVSX produced pot sherds (Cat 752–7 and 759–61) from a very large pot whose coil joints include the distinctive 'tongue and groove' form seen in post-Roman Iron Age 'Plain Style' Hebridean pottery. This 'Plain Style' pottery came into use around the middle of the 6th century AD and continued in use after Viking pottery appeared in the Hebrides during the 10th century. The sherds in question were found in BVSX contexts 141, a plough soil and in a sandy green clay layer 812.1 below it disturbed by ploughing and by at least one modern intrusion. Despite the modern intrusion the occurrence of 1st millennium AD pottery is surprising. It implies that, locally, peat was absent or very shallow until after the 6th century AD.

Two refitted sherds (Cat 605–6) from another potentially very late pot (1st or 2nd millennium AD) came from context 813, a scoop full of black material in BIVSX. While this pot could theoretically be an unusual 'domestic' Beaker, it seems more likely that it was of much later (albeit indeterminate) date.

Illus 7.23 Pit 179 [1981 18 29]



Illus 7.24 Plan and sections of Pit 179

Table 7.4 Pottery from pit 859

Cat	Comments
4	A fairly fine and thin rim or rim flange sherd from an E/MN Corky pot.
5	A featureless, abraded body sherd, from an E/MN Corky pot.
308	A sherd from an E/MN Heb Inc pot, possibly a large jar
422	A rim sherd from a large, unusually-shaped 'domestic' Beaker ASH 48.
423_424	Rim sherd from same Beaker as 422
450	A rim sherd from a thin fine early Beaker ASH 49a.

Cat	Comments
602	A sherd from a large pot with a hard, non-gritty, laminar fabric; given its stratigraphy the least unlikely pot type is domestic Beaker (undecorated), although the fabric is harder than that seen on other Calanais Beaker pottery.
603_604	Sherds refitted; dimensions and weight are for the two together. From same pot as Cat 602
614_615	A sherd and fragment from a large, uneven-walled coarseware pot, with very hard but not gritty fabric. Cannot be accommodated comfortably within Neolithic, Chalcolithic or EBA ceramic repertoire at Calanais; is reminiscent of 1st millennium AD, pre-Viking Plain Style pottery from Hebrides, although sherd too small to be diagnostic.
863_864	2 burnt and heavily-abraded fragments, wholly undiagnostic.
865_867	Featureless spalls too small to be diagnostic.

More 'Plain Style' sherds (Cat 614–5) formed part of an odd mixture of pottery found in context 859, the fill of the socket of a broken vertical slab flanking the passage in BVWX. Other 'late-looking' sherds (Cat 602 and 603–4) came from the same context and even through this pot could conceivably be an unusually hard domestic Beaker, the fact that context 859 also produced Cat 614–5 allows it to be much later.

7.3.2 Discussion of the contexts in which the pottery was found.

It is of course technically possible that the pot sherds represent previously undescribed types or aberrant pieces of 3rd or 2nd millennium BC date but their analogies in the 1st millennium AD suggest instead a phase of activity which was not suspected during excavation. Certainly the finds from BIVSX, BV and BVSX could have been in intrusions not noticed during excavation, for a piece of glass was found in a nearby root hole at the same level which had not been noticed during excavation of an overlying ground-worked soil 141.

And even without the probably 1st millennium AD sherds the pot assemblage in pit 859, dug for the slab flanking the passage entrance, is a very curious collection and it is hard to understand the occurrence of such different types of pottery in such a small context. Might the flanking stone have marked a symbolic closing of the entrance to the passage in the 1st millennium AD? If so that might provide an explanatory framework for the cramming of diverse 'ancestral' sherds into the pit.

But Sheridan (Chapter 18.8) has carefully qualified her conclusions. If they survive the discovery of new collections of pottery from the Western Isles the idea of Phase 16 activities proposed here will gain extra credence. But it has to be noted that without the seemingly late pottery in Areas B and D, mostly from seemingly prehistoric contexts, there is no hint of activities in the vicinity of the Ring in the 1st millennium AD.

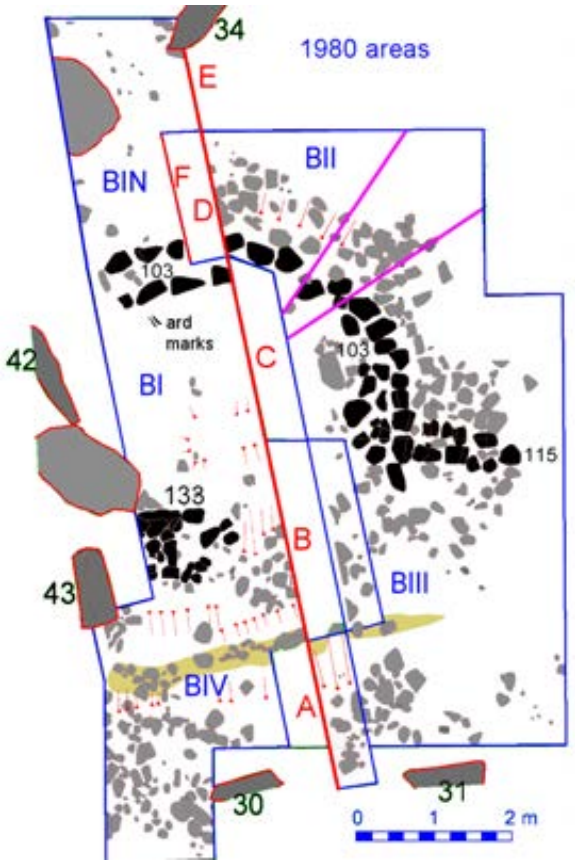
The other possibilities include erection of Stone 188 in Pit 859 after 1857, when peat was cleared from the area, as described in Chapter 7.2.4

7.4 Phase 14: late pre-peat ploughing

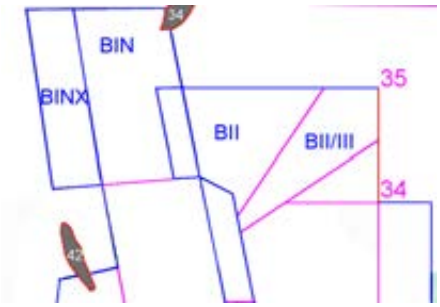
7.4.1 Introduction

The late pre-peat soils outside the enclosure were labelled 117 and 112. Fibrous red-brown soil 117 had probably been modified by human activity and natural processes since 1857; but it was interpreted as having attained its modern position and basic form through ploughing before peat covered the area in the first millennium BC.

The rule of thumb difference between soils 117 and 112 during excavation was that soil 117 was more 'fibrous brown' and tended to overlay iron pan, while 112 generally underlay the pan. One real possibility is that the differences between (most of) 112 and (most of) 117 had been created by modern root penetration and chemical weathering. However even if there was some truth to that, soil 117 seems most likely to have formed from the plough-levelled remnants of



Illus 7.25 The Stage 3 enclosure and other stones [Plan 5 simplified NMRS DC38024]

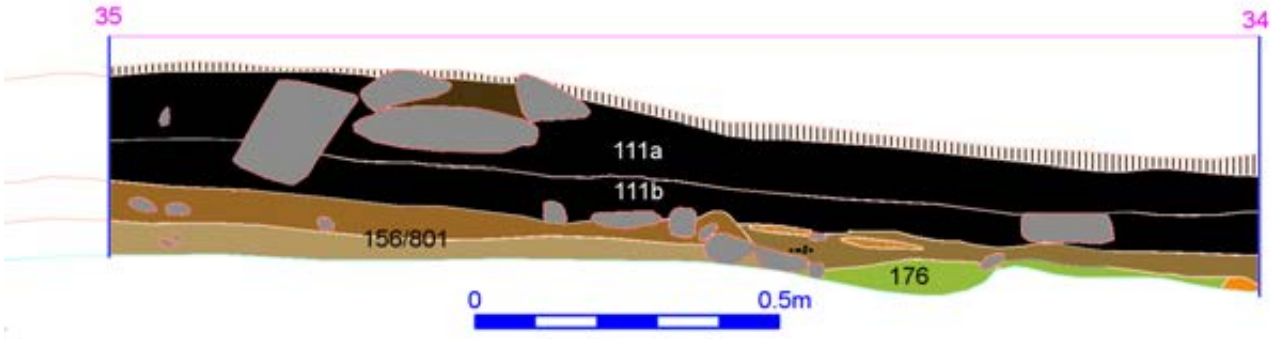


Illus 7.26 Key plan for Section 34-35

the later enclosure (Illus 7.25). Soil 112 on the other hand is thought to go mostly with an earlier period of ploughing related to flattening of the Stage 2, earth-banked enclosure in and after Phase 10. Although soil 112 probably continued to be modified by ploughing throughout pollen zone CaN-3c, which started some time between 1880 and 1520 cal BC and ended some time between 1072 and 424 cal BC, description and discussion of soil 112 will be deferred until Chapter 7.7 (discussion of ploughing-down of the Stage 2 enclosure).

A clue to the nature of soil 117 before it was covered by deep peat is provided by soils 156 and 801. They survived under solid black peat (111a above the more compact 111b) at a high level in the northeast corner of Area BII/III (Illus 7.26). The peat survived outside the area cleared down to soil by Matheson's work force in 1857. More than a metre of peat had previously been cut in this area, presumably for fuel. At its base what were thought to be crumbs of prehistoric pottery were recorded, but all but two of those examined by specialists turned out to be fragments of dry peat. The fragments suggested that the seemingly soil-free black basal peat at this point may have consisted of debris thrown down at the base of a retreating peat-cutting face. Nevertheless, Peat 111 contained a sherd and a fragment of an E/MN non-corky or Beaker pot (Cat 268-269).

The underlying soils 156 and 801 were hard-packed dark brown to black clays with many stones up to 50 mm across. On Section in June 1981, however, the soils were recorded as mid-brown slightly gritty silt above greyish brown gritty material. There were patches of slightly podsolized soil at the level of the top of the silt. Soil 156



Illus 7.26 Section 22/81 (34-35) of the east side of BII/BIII [NMRS DC38056]

contained a sherd (Cat 235) from a fairly fine E/MN non-corky pot. The soils were interpreted as lightly podzolised variants of soil 117.

7.4.2 Late ploughing in the area south of the drain in BIII

The main late features south of the drain were clusters of stone and charcoal-rich layers by the East Row. They both overlay and were included in soils 117 and 141, which are illustrated on the main section Part A ('A' on Illus 7.26 and 7.28), which ran from the modern drain to the line of the East Row.

A metre or so north-west of East Row stone 31 was a cluster of head-sized stones (116). It lay partly in Trench BIII and partly in its southern extension (Illus 7.28, 7.29). A burnt turf (107) and associated black material (172) lay immediately under the upper stones of 116 and the modern turf. They sat on top of fibrous brown loamy soil 117 and during excavation black material 172 was equated to the general spread of burnt material 139 further to the west in BIV. But 139 underlay soil 117 in Area BIV whereas 172 overlay it in BIIIS, so 172 cannot have been the same as BIV 139.

The earth between the upper stones of cluster 116 contained a piece of glass. This earth most probably therefore accumulated after peat was removed from the area, although the glass may have been moved downward by natural processes.

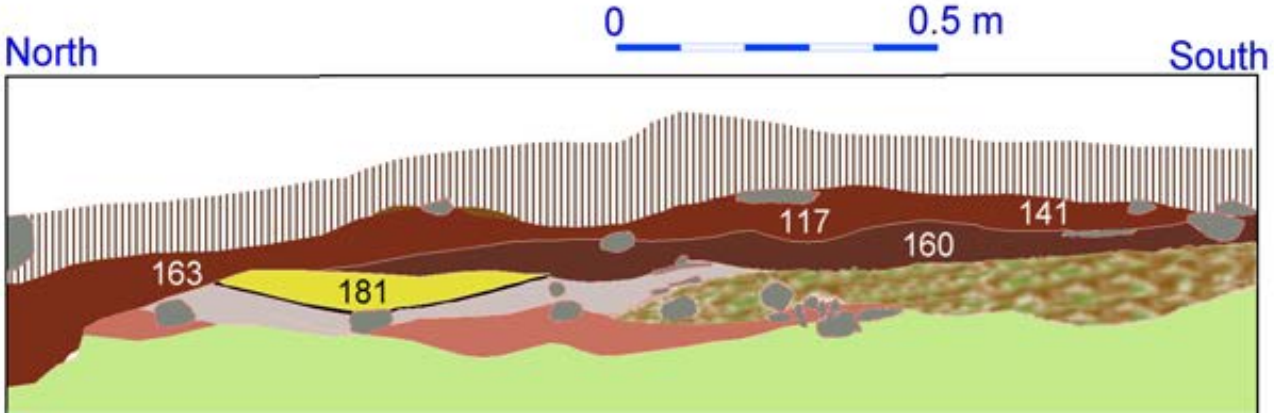
The cluster lay on and in the brown fibrous clay 117, which like other soils homogenised by post-peat sub-aerial weathering, showed the effects of plant roots.

Table 7.5 Pottery from soil 117 in Area BIIISX

236_237	BIIISX	2 conjoining and refitted sherds from fine E/MN non-corky pot.
576	BIIISX	A sherd from large Food Vessel 75
577	BIIISX	A sherd and a crumb from large Food Vessel 75
599	BIIISX	A sherd from a large, globular-bellied pot of hard but not gritty fabric. It's hard to reconcile the shape with an E/MN or Beaker date; it looks rather like craggan pottery.
691	BIIISX	A sherd either from a fairly fine E/MN pot, minimally corky, or else from a Beaker.
692	BIIISX	Could be either E/MN non-corky or 'domestic' Beaker.

The basal flat stones of cluster 116 overlay a spread of black charcoal (140, Illus 7.28) which consisted mostly of reedy straw but with some chunks up to 5 cm large (Day book, 44).

The presence of a possibly post-medieval possibly craggan ware sherd (Cat 599) in Soil 117 near East Row Stone 31 may reflect the post-1857 activities, like the piece of glass in stone cluster 116.



Illus 7.27 Main N-S section Part A flipped to bring north to the left [CSD-DC38031]

Table 7.6 Pottery from BIIISX below 117

Cat	Ctxt	Comment
845	116	E/MN Heb Inc
856	139	Spall from a possibly E/MN non-corky cooking pot.
68	140	E/MN corky

No charcoal samples can be related to this context, possibly because the excavator thought the material modern, or possibly because of some other mistake. One potsherd was found in 116 and one each in the underlying 139 and 140 (Table 7.6).

Also, probably E/MN non-corky sherd Cat 856 was recorded in the Finds Book as coming from soil 117 in BIIISX, but its finds bag had it as coming from 139 in that area. It presumably came from the interface.

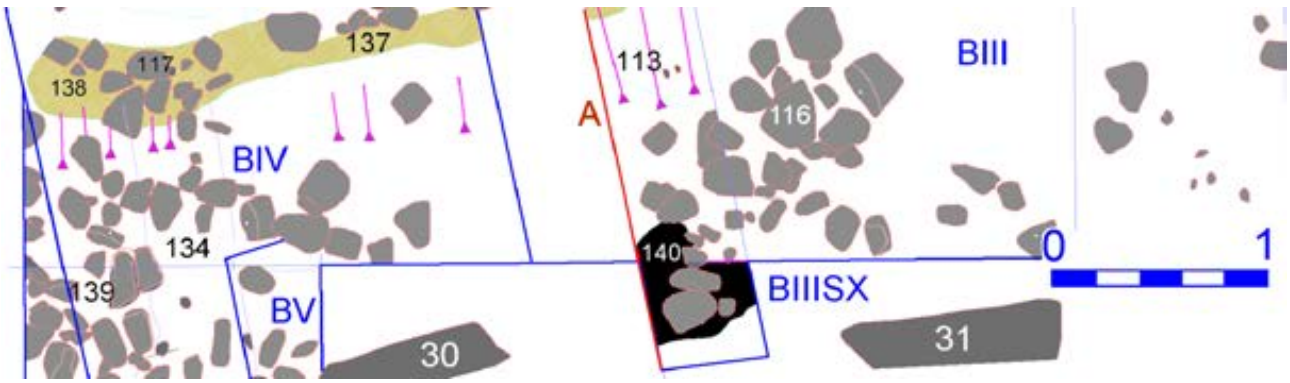
Under the turf and modern soil, red-brown fibrous soil 117 merged sideways towards its south end into a similar soil containing much charcoal (141). Judging by Plan 05/20 (Illus 7.28) charcoal 140 which was not depicted on Section A must there have been part of layer 141 (Illus 7.27). Under this was a much earlier dark brown gritty soil (160.1) thought to be much the same as the much earlier Phase 7 dark soils (160 and 160.3) recorded respectively below sandy green clays southeast of the passage entrance in Areas BIV and BV and just inside the passage.

7.4.3 Late ploughing in Area BIV

In Illus 7.30 the loosely bedded uppermost stones of cluster 134 had been removed before the photograph was taken; under them a line of stones (also labelled 134) ran along the south side of the modern drain from Ring Stone 44 at an angle of about 20˚ to the East Row (Illus 7.24, 7.26). They were sometimes referred to in the Day Book as forming a wall. The soil amongst the stones was also labelled 134. Near the Ring it produced several potsherds.

Table 7.7 Potsherds from layer 134 in the northern part of BIV

Cat	Comment
65	An E/MN corky sherd
328	An E/MN Heb Inc sherd
374	2 conjoining (and now refitted) sherds from large Beaker ASH 42.
473_475	3 base sherds from a fairly large, flat-based domestic Beaker ASH 59a
476_479	5 sherds, mostly spalls from friable pot most likely to be a Beaker or E/MN corky.
480_483	4 sherds from a fine Beaker.
833_835	3 sherds (2 conjoining) from laminar, friable non-corky possibly E/MN pot.



Illus 7.28 Plan of the clusters of stones along the East Row and charcoal spread 140 [Plan 05/80 NMRS DC38024]

Illus 7.29 The cluster of stones 116 near East Row Stone 31, from the north [Film1980.5.4].

Illus 7.30 Cluster of stones 116 and part of the line of stones 134 on the south side of the modern drain. [Film 1980.5.2 cropped]

Table 7.8 Pottery from soil 117 in Areas BIV and BV (with Cat 600 omitted; see above)

Cat	Area	Comments
366	BV	A sherd from thin fine Early International Beaker ASH 39
537	BV	A sherd from a small 'domestic' Beaker.
846	BV	A sherd from thin fine Early International Beaker ASH 38
847_855	BV	4 spalls and 5 fragments from a non-corky E/MN pot or a 'domestic' Beaker.

Another sherd (Cat 600) was originally recorded as from BIV 117(134), meaning in soil 117 amongst stones 134. It was a spall from a large pot with a particularly hard, virtually inclusion-free fabric that is harder than anything seen among the Early Bronze Age and earlier pottery and it is strongly suspected to be of post-Medieval date. A fragmented mylonite short end-scraper (CAT 212) was also found in 134.

In Areas BIV and BV the upper facies 117 of the pre-peat soil lay mostly to the side of the stones of feature 134. It contained several pieces of pottery. Under the stones was a charcoal spread 139 containing a dozen potsherds and a scraper. A radiocarbon date of between 1940 and 1690 cal BC (AA-24957) was obtained from a single twig of heather charcoal in it. Samples 2021 and 2030 from soil 139 contained pollen generally characteristic of Pollen zone CaN-3c which started sometime between 1880 and 1520 cal BC and ended at some date between 1072 and 424 cal BC. Layer 139 is interpreted as the result of ground clearance including burning of bushes in Phase 12 or less likely in Phase 14 and is described in more detail (along with the finds from it) in Chapter 7.6.1.

7.4.4 Discussion of late ploughing near the East Row

Stone groups 134 near the Ring and 116 near East Row Stone 31 had similar stratigraphy to each other. They both lay on a charcoal rich layer, in the west on 139, the upper charcoal spread of a sequence merging down into soil 141 and in the east on 140, which seems to represent a short-lived event on the surface of a soil equivalent to BIV 141 and included under that label on Section A (Illus 7.27).

However in BIII soil 117 definitely underlay the cluster of stones 116 but in BIV it was between the stones of 134. That can be interpreted in various ways.

It seems most likely that soil 117 was diachronic. In places it resulted from recycling of ground-worked soil 141 in Phase 14 after the Stage 4 enclosure was abandoned. But later post-peat disturbance is suggested by artefacts. Potsherd Cat 599 from BIIISX layer 117 is reminiscent of post-Medieval 'craggan' pottery. Possibly post-medieval (albeit indeterminate) sherd Cat 600 lay in soil 117 amongst stones 134, There was a glass

fragment amongst the stones of cluster 116 near East Row stone 31.

So stone clusters 116 and 134 were probably disturbed after peat was cleared from the area in AD 1857.

However, whether or not that was the case, cluster 116 is similar enough in character to the Stage 4 enclosure wall-base to suggest that it was prehistoric. Its lower slabs seemed to form part of a structure such as a wall-base, and may have been related to some largely unexplored southern feature. The possibilities are considered in Chapter 24: Discussion and Conclusions.

The preferred interpretation, then, is as follows. Cluster 134 was a line of field clearance stones collected during (possibly late Phase 12) cultivation. Cluster 116 may have come from a wall-base disturbed during Phase 12 or Phase 14 cultivation. It was in Phases 12 and 14 that cultivation damaged the southern part of the Stage 4 enclosure wall-base.

7.4.5 Late ploughing and the interior of the enclosure in BI and BIWX

At their simplest the superficial soils inside the enclosure formed continuous layers (Illus 7.31) but as described in Chapter 7.2 the stratigraphy of the interior was greatly disturbed by modern pits. Loam 183, albeit disturbed, seemed to be of earlier date than the peat cleared away in AD 1857. It contained a fragmented mylonite short end-scraper. (CAT 214). Below it were prehistoric pits. It was difficult to disentangle the various processes and events which had affected the interior of the enclosure, but a pair of ard (or spade) marks survived near the northern part of the enclosure bank (Illus 7.25). Their date is unclear; they were only seen in dark clay soil layer 159, but may have been much later. They are described in more detail in Chapter 7.4.6. More generally the depth of loamy soil in the interior does suggest late cultivation.

The western side of the enclosure near the Ring was marked by an abrupt change of level. To its west and south pre-cairn and pre-enclosure strata survived; they had been completely removed in the enclosure (Illus 7.32).

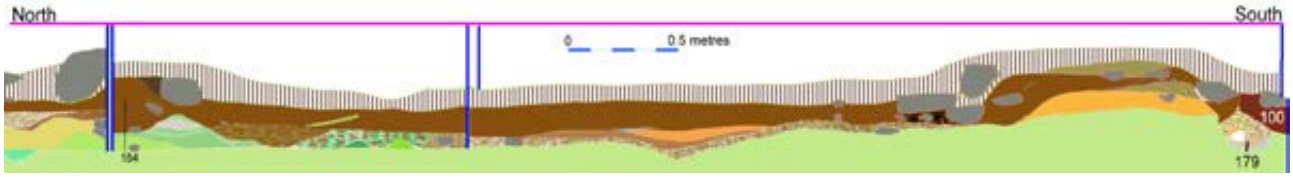
Shallow broad rectilinear marks were found in Area BIWX (Illus 7.33). They were interpreted during excavation as ard marks cut into these earlier strata. However, another possibility is that the features interpreted as broad ard marks were scars made during manipulation of the massive kerb slab in Phase 13 and quite possibly at more than one period subsequently, for the kerb slab very probably fell and was re-erected more than once.

Neither explanation is entirely satisfactory, given the highly rectilinear shapes of the marks, but they were very shallow and their interpretation as scrapes made during manipulation of the kerb stone is preferred.

7.4.6 Discussion of ploughing in the enclosure

The abrupt change in height on the western edge of the enclosure appears to have been original (see Chapter 7.5.16-17). However the following processes could have contributed to its final appearance:

— purposeful levelling down of the enclosure floor during use, except next to the Ring and cairn;
— some sort of use of the enclosure involving much wear and disturbance, except close to the Ring and cairn;
— truncation of earlier strata by later ground-working including ploughing in an area defined by the enclosure interior.



Illus 7.31 Main N-S Section 11 Parts B, C and (part) D across the enclosure (see Illus 7.21 for section line) [NMRS DC38031 parts]

Illus 7.32 The change in level on the west side of the enclosure [Film 1981-15-5]

Illus 7.33 Ard marks or damaged turf (see previous Illus for context) [Film 1981.17.24]

Perhaps both of the first two processes played a part, the second feeding on the first; but because of the depth of soil overlying the remains of prehistoric pits in the enclosure later ground-working seems to be the only one essential to explaining what was recorded.

Some of the ground-working succeeded the earlier wall-base because the two small ard marks near the north end of the enclosure (Illus 7.25) were cut through layer 159, the soils above which (probably worked by the same ard) are ascribed to deterioration of the second stage bank. The third stage enclosure wall-base was almost entirely disrupted either during the same or a later phase of ploughing, discussed below. The destruction of the southern part of the latest wall-base is best attributed to late ground-working. The survival of much of the northern half of the fourth stage enclosure wall-base and differences between the upper mineral soils in the enclosure and those outside it to the north and east suggests that the those parts of the wall-base served as a division during post-enclosure ploughing.

7.4.7 Plough soil 117 in BI outside the enclosure

Patches of pre-peat soil 117 were found in Area BI amongst Stones 103 and just outside the enclosure. They contained two early Beaker sherds.

Table 7.9 Pottery from Area BI pre-peat soil 117

Cat	Ctxt	Comments
355	117	A neck sherd from thin fine Early International Beaker ASH 39
356	117	Sherd from Early International Beaker, probably ASH 38

Another two small, abraded sherds (Cat 794_795), too small to be diagnostic but either E/MN or Beaker, came from soil 117 in BIWX, the area to the west of the enclosure including large prone slab 122.

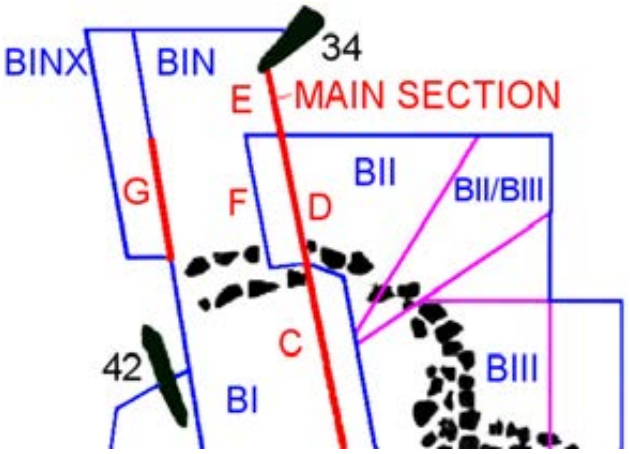
Soil 117 in BI also included a flint flake (80.182 CAT 13) and in BII a piece of quartz (81.87).

7.4.8 Possible late ploughing north of the enclosure

On Section F soil 117 directly overlay clay soil 130 which was material ploughed down from the bank (Illus 7.34) and there were ard marks at its base. It covered rich brown soil 132 on Section F and soil 130.1 filling a depression in BIN and depicted on Section 14/80 (Section G) (Illus 7.35). No finds were recorded from soil 117 in BIN and BINX.

The two sides of the baulk between BIN and BII just north of the enclosure (sections D and F) had only the most general features in common. On Illus 7.34 Section D has been flipped to bring north to the left. At its south end was the early enclosure bank (184), its top composed of material like greyish-brown gritty soil 113 and soil 112 (the latter according to Context Sheet 184).

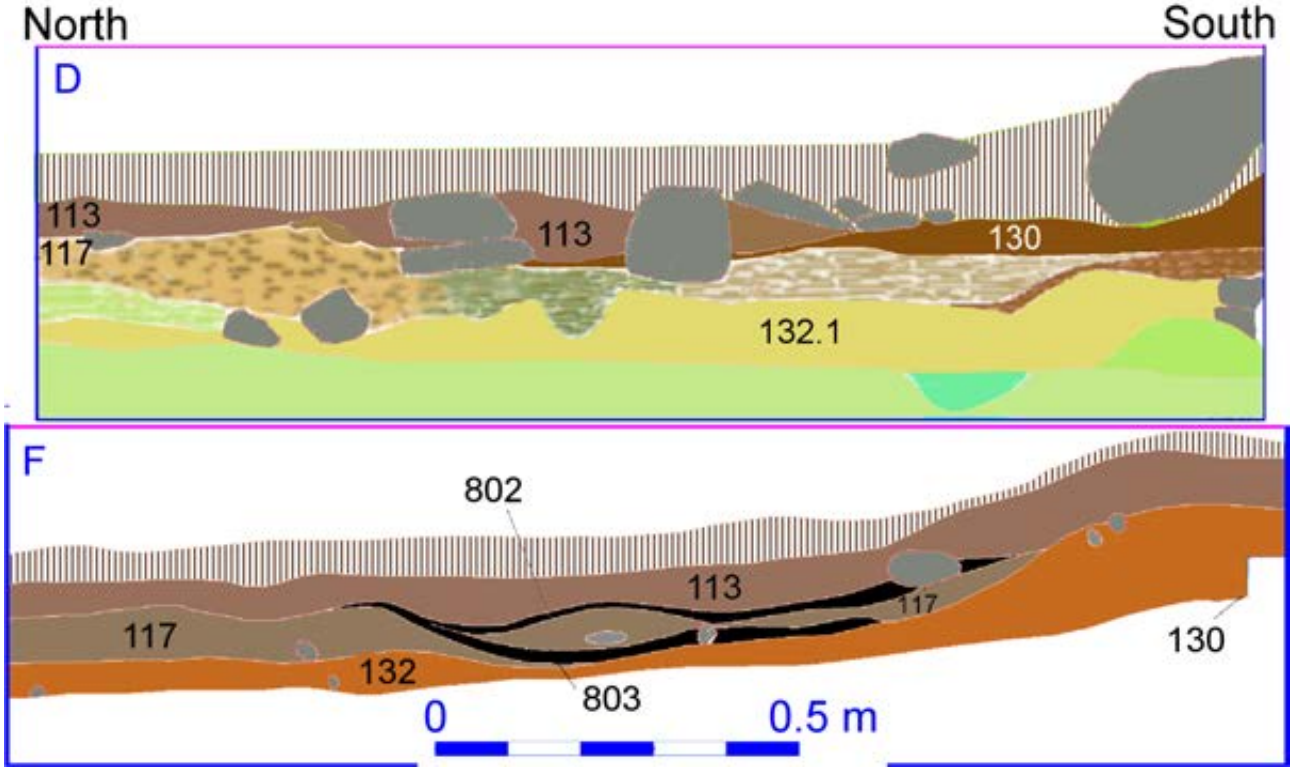
These and soil 117 overlay soil 130 which elsewhere seems to have been part of the bank or derived from the ploughed down bank of the Stage 2 enclosure. The bank was overlain by the stones of the latest enclosure, and less than a metre north of it was the fairly well built third stage wall base (Illus 7.34). Neither showed signs of plough damage at this point even though the soils above them were quite thin. Late ploughing should be represented by soil 117, but it is hard to believe that the layer marked 117 on Section F (described on the section drawing as pinkish and clayey with some roots) was really the same as 117 elsewhere. It seems quite as likely to have been a variety of soil 112.



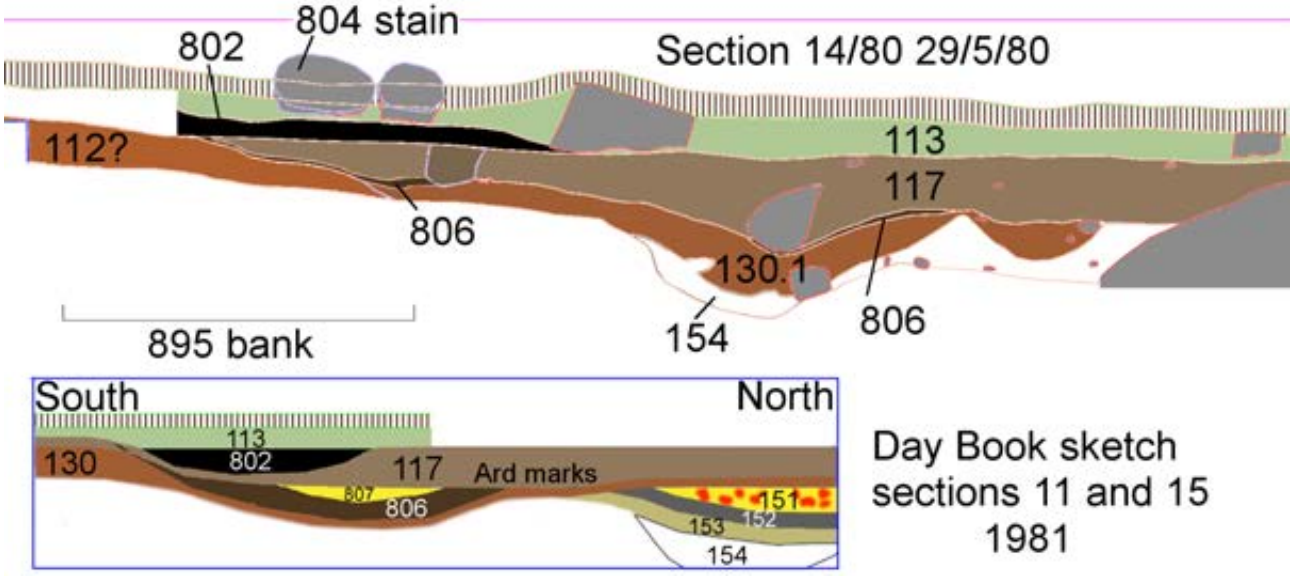
Key plan Area B northern part of main section and related sections

Section F, parallel to Section D and only 0.5 m west of it, shows turf line 803 at the same stratigraphic level as the third stage wall-base (Illus 7.34). The near-absence of stones and the presence of turf lines suggest that there was a gap in the third stage enclosure.

To the north of the enclosure in Area BIN was a black organic material 802 (in BINX overlying a turf line 803). It overlay pre-peat plough soil 117 (Illus 7.35). Under that again was a grey lens of turf line 806. It overlay a soil labelled '112?' on Section G and perhaps it grew on the plough



Illus 7.34 Section D drawn in late 1980 [Section 11 NMRS DC38031D reversed to bring south to the right] and Section F, drawn on 6 May 1981 Section 81/7 NMRS DC38041]



Illus 7.35 Section 14/80 [NMRS DC38034] and Sketch section G, 6 to 7 May 1981 [Day Book 11 and 15, the latter corrected]

soil associated with reduction of the Stage 2 bank. There were suggestions of ard marks in turf line 806. The pollen in layer 806 (sample 2013) was high in hazel and correlated with a possibly early stage during zone CaN-3c because of the relatively high Corylus values. CaN-3c started at some date between 1880 and 1520 cal BC. Sample 2013 can also be compared to that in a sample (2021) from black material 139 to the south of the East Row at a high level, above most of the layers associated with dumping of chamber deposits and/or deposition from other sources. Layer 139 was dated by a piece of heather charcoal to between 1940 and 1690 cal BC (AA-24957). These layers, then, were earlier than the ploughing discussed here.

Pollen from one ard mark cut into layer 806 (Sample 2063) had different grass and heather pollen values and lacked Cerealia pollen and Cruciferae, and could not be assigned to any specific pollen zone (see Chapter 21.5.10). It and other ard-marks nearby may be of much later date, perhaps only shortly before peat covered the area in the first millennium BC or AD.

The ard-marking noted at the base of soil 117 also cut the top of the pit around prone stone 148. But these ard-marks (Illus 7.36, 809) contained pollen of Zone CaN-3c, earlier than the ploughing discussed here.

7.4.9 Discussion of the possible late ploughing north of the enclosure

The pollen in the ard mark cutting soil 806 provided the only direct evidence for late ploughing post-dating the fourth stage enclosure here. The almost complete loss of stones of the north-western part of the third and fourth stage enclosures could be explained by their removal for repairs to the cairn (best seen in Area H) rather than by late ploughing.

But although there was no firm evidence for late ploughing north of the enclosure that lack is not evidence of absence. The surviving wall-base may have served as a division between small plots of ground.

7.4.10 Late ploughing northeast and east of the enclosure; soils 117 in BII and BII/BIII

To the north and northeast of the enclosure a fairly large expanse of soil 117 contained only one prehistoric potsherd, and that of ambiguous type and date (Table 7.10).

Table 7.10 Pottery from soil 117 in Area BII

Cat	Comments
808	Heavily abraded spall, burnt; could be non-corky E/MN but impossible to be sure

Even when the two sherds from the base of the peat (111) in the northeast of Area B (see Chapter 7.3.1)) are taken into consideration the scarcity of sherds in the latest pre-peat soil is striking.

7.4.11 Late ploughing in Area BIII and linear depression 121

In the main body of Area BIII north of the ditch seven sherds were found in Soil 117 (Table 7.11)

Table 7.11 Pottery from soil 117 in Area BIII

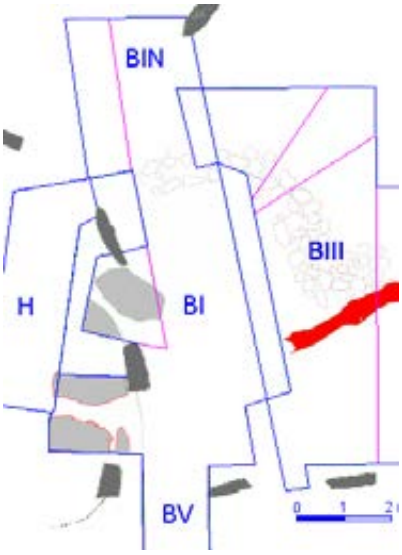
Cat	Comments
554	Small abraded body sherd from probable 'domestic' Beaker;
568_572	3 sherds, a fragment and 2 crumbs, mostly abraded spalls from large Food Vessel ASH 75
573_575	Three abraded sherds of a fairly small, thin fine corky E/MN pot

A linear depression (121) first appeared 1980 at a high level, partly under the brown fibrous soil 117, and cleaning showed it cut into soil 112. It was up to 0.6 m wide and extended at least for at least 2 m, with a line of six head sized stones and some smaller stones lying in it (Illus 7.37). There was iron panning in its fills, and also occasional streaks of black.

It ran eastward from just to the south of the easternmost part of the late wall-based enclosure. It appeared to respect the south side of the enclosure and it tapered out east of the stub wall 115; but faint traces of it ran to the east baulk. It did not have any definite shape in cross-section and

was characterised mainly by differential dampness and the flat stones lying in its bottom.

Illus 7.37 Linear depression 121 from the east in early May1980 [Film Brooks-3-21]



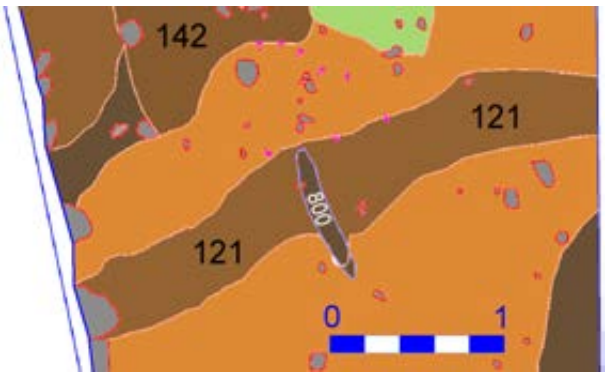
Illus 7.37 Key plan for linear depression 121

Pollen (sample 2014) from depression 121 was zoned in CaN-3c, which started at some date between 1880 and 1520 cal BC and ended after 1070 cal BC (Chapter 21: Pollen).

Table 7.12 Pottery from linear depression 121

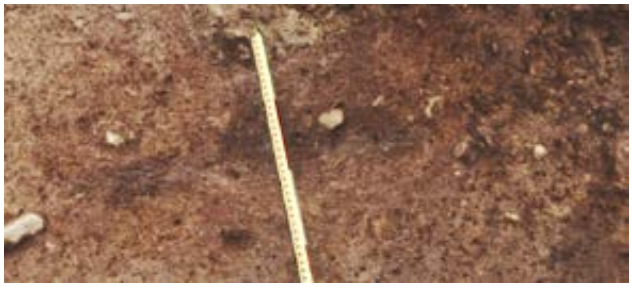
Cat	Comments
488	Base sherd from 'domestic' Beaker.
828	Small, heavily-abraded sherd from thin fine pot, possibly fine Beaker.

The finds in it probably derived from the plough soils 117 and 112 though which it had been worn or, less likely, cut.



Illus 7.38 Ard mark 800 cutting depression 121 [NMRS DC38026 part]

Cleaning of the bottom of 121 below the stones revealed an ard-mark (800). Although the evidence was ambiguous it seems that the ard mark was cut into the underlying soils rather than having cut the basal layers of the depression (Illus 7.39).



Illus 7.39 Ard mark in linear depression 121 [Film 1981.1.34]

Pollen (sample 2019) in the ard mark also dated to CaN-3c. The date of the transition to Can-3c is poorly defined, being somewhat different in pollen reference columns CN1 and CN3 at Calanais Leobag, but it was probably at some date between 1880 and 1520 cal BC.

In Area BII/III three ard marks were recorded cutting the immediately pre-peat soil 156 where it merged into mineral soil 112 / 117. An E/MN non-corky rimsherd (Cat 235) was found in horizon 156. In the sense that they immediately underlay peat these were the stratigraphically highest ard marks on Site B. Nevertheless their date relative to other ard marks is ambiguous. The underlying soil was not excavated.

7.4.12 Discussion of late ploughing east of the enclosure and linear depression 121

Linear depression 121 is probably best explained as created by erosion from the feet of people approaching the entrance to the chambered tomb at a time when the third or fourth stage enclosure was in existence. The stones were presumably laid to fill an area liable to water-logging.

The late pollen in the ard mark in depression 121 suggests that some ploughing did take place after the depression had ceased to mark a habitual approach to the east side of the Ring. I suspect that this ploughing was contemporary with that which removed the southern part of the late enclosure. The ard marks in soil 156 could be of a similarly late date but there is nothing to show that they were not earlier.

7.4.13 Discussion of soils 117 and 112

Both soil label 112 and soil label 117 were portmanteau terms, in the sense that gritty grey to brown mineral soils may well have fossilised at different times in different parts of the site. The main distinction between 117 and 112 was that 117 was more fibrous, probably because of the presence of incompletely decayed roots. Where an iron-pan occurred in grey mineral soil the soil above was called 117 and that below was called 112, although it is not clear how much difference in texture and colour was independently visible between the soils when they were thus separated. In many areas soil 117 could be seen as the upper facies and soil 112 the lower facies of a single plough soil. But that is probably an over-simplification.

Although the two soils became in many places a single deep soil their mineral and artefactual contents continued to reflect their different origins.

Both soils post-dated construction of the Phase 9b Stage 2 embanked enclosure, possibly around 2350/2300 BC. The latter three stages of enclosure wall probably each had a large turf component. In several places outside the enclosure soil 112 seemed to have formed through ploughing down of the second stage enclosure. Soil 117 may have originated partly in ploughed-down turves of the later enclosures (thought to have been built between 2000 and 1500 BC). The near- absence of 112 and 117 from Areas BIVS and BV some distance from the enclosure strengthens those interpretations.

Although the source material for both 112 and 117 outside the enclosure was mainly turf decayed from the various enclosure walls, it included other soils, notably underlying soils from an early bed-and-trough cultivation system. If the overall interpretation of the excavation results is correct there were many other episodes of ground working through the 3rd and 2nd millennia BC. The finds in soils 117 probably came mostly from ploughing of earlier deposits rather than deriving from middens used as a source of soil improver, judging by their very various dates and types. For instance near East Row Stone 31 it seems to have resulted from recycling of the mainly Phase 10 ground-worked soil 141 in Phase 14 after the Stage 4 enclosure was abandoned.

However several sherds in 117 and 112 were found very distant from the contexts in which sherds from the same vessel clustered. The best example, but not the only one, is the Food Vessel, ASH 75, which probably dated between 2000 and 1700 BC; pieces of ASH 75 were found in contexts in Areas BIINE 112, BIII 117, BIISX 117 (see Chapter 18.7.14). It was also found in other contexts in BI, BIWX, BIN, DII, HII (cairn) and BV. The sherds cannot have been simply dragged to their position by ploughing. Therefore artefacts

Illus 7.40 Prone slab 122 on 14 May [Film 1981.8.16]

Illus 7.41 Area BIWX and the enclosure to the east of Area BIWX from the north on 15 May 1981 [Film 1981.9.19]

Illus 7.42 Plan 60/81 of prone stone 122 on 15 May 81 [NMRS DC38094]

were either moved along with soil (maybe as part of turves used for wall construction) or picked up as interesting objects and discarded elsewhere during ground-working before peat formed and/or during modern landscaping.

Although continuous peat growth started on Area C at the east end of the East Row between 920 cal BC and 400 cal BC finds of 1st millennium AD potsherds at various points around the cairn suggest peat growth was inhibited there and it is conceivable that ploughing continued very locally around the Ring until a millennium after peat began growing steadily elsewhere.

It seems likely that the superficial soils outside the enclosure, when first stripped of peat in AD 1857, had an appearance similar to that of the lightly podzolised sub-peat horizons 156 and 801, unless the podzolisation seen in them was a post-clearance phenomenon. But once free of peat (and perhaps encouraged to support grass-rich vegetation), they changed in character under sub-aerial processes. Probably most soil equivalent to 156 was converted to soil 117 or the bottom of modern topsoil.

7.5 Phase 13: the late kerb slab in BIWX

7.5.1 The slab

Illus 7.40 shows prone slab 122 when the turf in BIWX had been removed to reveal the collapsed cairn and brown soily clay which had eroded down or been pulled down from it.

On Illus 7.41 the colours in the shadow from Ring Stone 43 have been remapped to lighter shades to clarify the cairn rubble west of (to the right of) the slab.

The cairn material behind the prone slab was loose. Between the stones of the cairn was a pale to darker brown charcoal-rich loam (856) which covered the slope of the cairn from Stone 43 to the west baulk.

Note that Plan numbers 60 and 59 are out of date order. Soil 856 contained two small E/MN corky sherds (Cat 57, Cat 58). Although no modern artefacts were recorded from it, it seems highly likely that it reflected both pre- and post-clearance disturbance. Removal of the

uppermost stones around slab 122, on 15 and 16 May 1981, revealed more of the brown loam with fewer stones in it (Illus 7.43).

On 19 May 81 the slab was removed to a temporary resting place on the baulk between BI and BIII by the Ancient Monuments Works Squad led by Neil MacPhee (Illus 7.44).

7.5.2 The slots under the slab

Under the slab soil 856 spread over at least half of the area, above complex underlying layers; to the east orange sandy gritty material covered an area with slab impressions 125 and 853 in it.

Cleaning of soil 856 revealed slot 852 (Illus 7.45-7.47). It was the latest of three or four casts or slots in which slab 122 had been set up at various times (Illus 7.46).

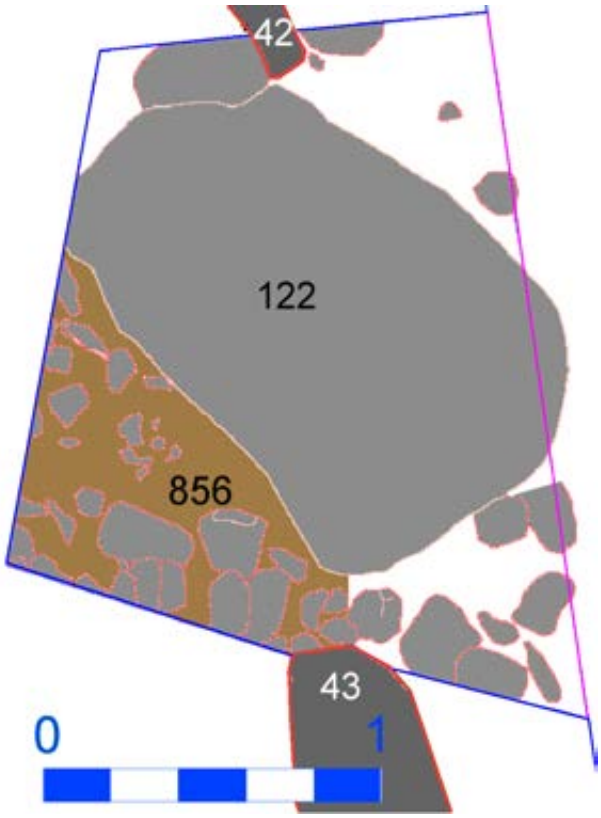
This topmost cast 852 was shallow and filled with soil similar to 856 but including black peaty material. It contained two small E/MN corky sherds (Cat 786) and a (refitted) Hebridean incised sherd (Cat 785).

Slot 852 was much disturbed in its lower portion, which overlay another, better formed slot (855) with a slightly peaty brown loamy top fill indistinguishable from the soil 856 which lay amongst the cairn stones.

After removal of slot 852 (its position has been added in dotted lines to Plan 63 (Illus 7.48) the slumped cairn soil 856 could be seen to cover other slots and casts. To its east orange sand (the top of layer 892) had appeared. Its colour probably owed something to oxidisation of iron leaching from the slumped cairn fill and soil above it and this may have destroyed evidence for the tops of any slight features cut into it; it seems to have affected the outline of the cast 853 of a small slab, which was more extensive in subsequent plans.

Slot 855 was filled with soil similar to that (856) which covered the slope of the cairn (Illus 7.46, 7.49). There was a patch of charcoal rich material at its base. It was not on entirely the same line as 852 and appears to represent the latest formal setting of the massive kerb-slab. It contained six sherds They probably got into the slot with soil which entered it when the kerb stone fell.

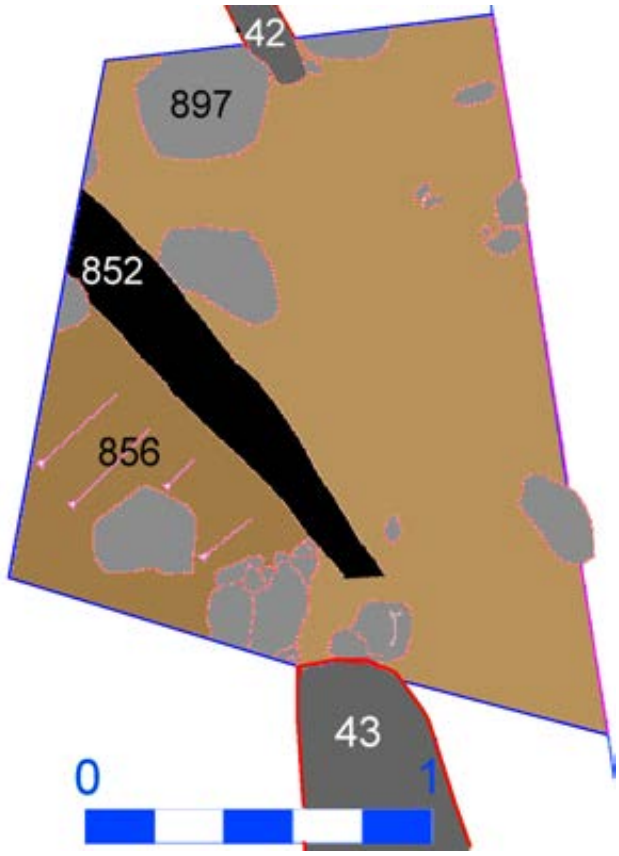
A band of mottled yellow clay survived near it



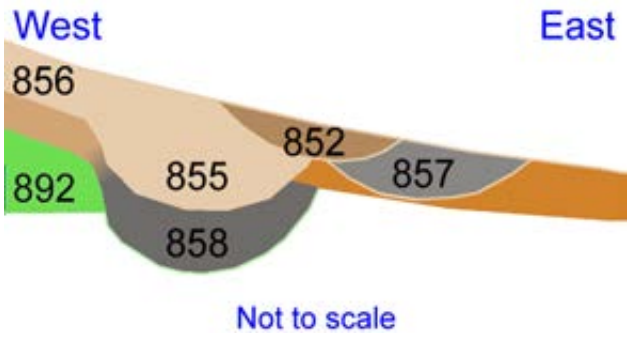
Illus 7.43 Plan 59/81 of prone stone 122 between Ring stones 42 and 43 on 16 May 81 [NMRS DC38093]

Illus 7.44 The slab during removal [Film 81.10.24]

(Illus 7.50). It was not given a context number. It may have been spoil from slot 855 when it was dug to take the kerb stone. The mottled yellow clay also overlay part of the fill of the cast of a small slab 853. At this level the cast was larger than it appeared higher up suggesting that its surface layer had been modified by natural soil



Illus 7.45 Cleaning of the surface below the prone slab 21 May 1981 [Plan 62/81 NMRS DC38096]



Illus 7.46 Relationships of the slots and casts to one another.

processes; it may be that some of the mottled yellow clay had also been modified in the same way and originally extended further than shown on Illus 7.50.

Table 7.13 pottery from slot fill 855

Cat	Comments
56	E/MN corky sherd. Exterior partly spalled off.
59	A probable E/MN corky sherd. Fabric very slightly grittier than that seen in other E/MN sherds; can't rule out a post-Neo date.
60_61	A sherd, a fragment and several crumbs from an E/MN corky pot.
787_789	3 sherds from a thin, fine E/MN corky pot.
790_793	2 refitted spalls, 2 fragments and a crumb from a fine E/MN corky pot.

By slot 855 was a shallow black greasy stone-rich feature 868 (Illus 7.50). It was cut into the redeposited subsoil layer 872, variously described as khaki clay and as silty yellow-reddish-brown clay with some grit. It may reflect a disturbance at some time when the kerb-slab was in place but a similar patch (873) was interpreted as fill of the cast of a packing stone for Ring stone 43 (Illus 7.49).

Another slot or cast (857) lay mainly to the north-east side of the higher slot 852 but was truncated by it to the south-east. This slot 857 was filled with a dark coarse material with much charcoal. It does not seem to have been numbered on plans but it is shown on an annotated photograph (1981.12.14) in the Day Book (Illus 7.51).

A sketch section of 21 May 1981 (Illus 7.52) in the Day Book is presumably based on the section

◄ **Illus 7.47** Area B1WX immediately after removal of slab 122 showing black slot 852 near the edge of the cairn, and other features [Film 1981.10.31]

shown in Illus 53 but does not make the relationship of the lowest slot 858 to the other slots clear; that is because it lay to the west of the other higher slots. The sketch section of 25th May (Illus 7.52) suggests that slot 855 at some points removed 858 entirely, abutting the green puddle clay directly even though the 'View' shown in Illus 7.51 records that they ran roughly parallel to one another. But in fact 855 was almost certainly broader than sketched in the 'View', and 858 curved more than shown there.

Subsequent excavation showed that slot 858 was cut into the green clay 892 under the cairn (Illus 7.51-7.53). It curved more than it would have done if it was designed to hold the kerb slab. It was and is interpreted as a gulley defining the green clay platform. It is further described and discussed in Chapter 7.15.7.

7.5.3 Discussion of the slots in BIWX

The latest of the slots, 852, seemed to represent the cast of the slab edge rather than a dug slot; the slot was exactly at the edge of the fallen slab (Illus 7.43, 7.45). It was as if the slab had been propped up against the cairn. The lack of peat under the rest of the slab when prone suggests that it fell before peat covered the area in the first millennium BC; although the lack of peat could also be explained if the slab fell after peat had been completely removed locally, that is unlikely because the slot itself presumably filled up with eroded soil and peat as the peat was forming.

Slot 857 was also shallow; it had been removed in places by the latest slot or cast 852 and its relationship to the substantial slot 855 was unclear. Like 852 it may represent a cast of the stone edge, and judging by the angle at which it ran perhaps at a time when it was leaning against the cairn at a fairly shallow angle.

The main slot 855 had held the kerb stone upright. At the end of excavation the slab was placed back in this slot.

Slot 858 is interpreted as a cut for an edging to the green clay under the cairn, and perhaps earlier than the latter. It may have been contemporaneous with a slot cut in green clay in the passage. It may also be a better preserved version of a slot which lay nearly under the cairn edge on Area D. It is discussed in Chapter 7.15 along with the green clay.

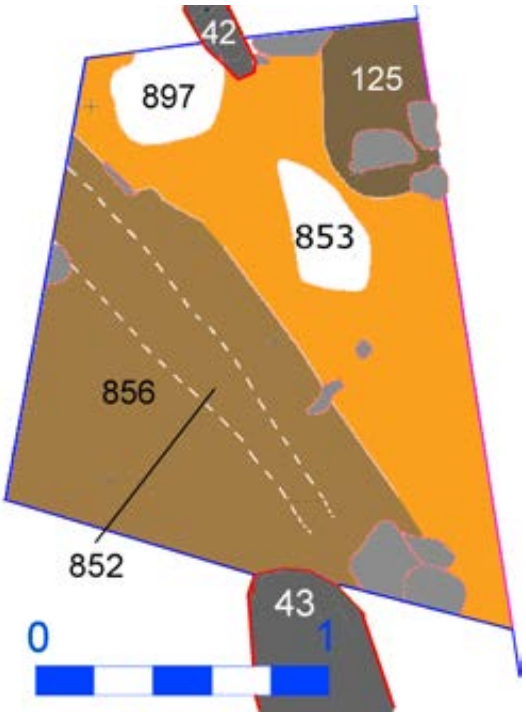
It is tempting to suppose that the outer cairn was robbed here as it was on Areas D and H. Perhaps the kerb stone was part of an attempt to consolidate it; erection of a similar kerb slab on Area H went with refilling of the cairn behind it. Whether or not such an attempt was made the kerb slab on BIWX fell down. It was then leant against the cairn, and subsequently it was manoeuvred into a different albeit still leaning position. Between these later episodes of activity soil continued to wash down away from the cairn. Finally the kerb stone fell or was pushed down and peat covered the area.

There was no formal incontrovertible dating evidence for the first erection of the kerb stone, except that it was later than the green clay platform under the cairn but it seems almost certain that it was later than robbing of the primary cairn. The very similar kerb stone on Area H was erected and the area of the cairn behind it was back-filled in the 2nd millennium BC after robbing of the cairn. The possibility that its erection was earlier than the fourth stage enclosure is discussed in Chapter 24: Discussion and Conclusions.

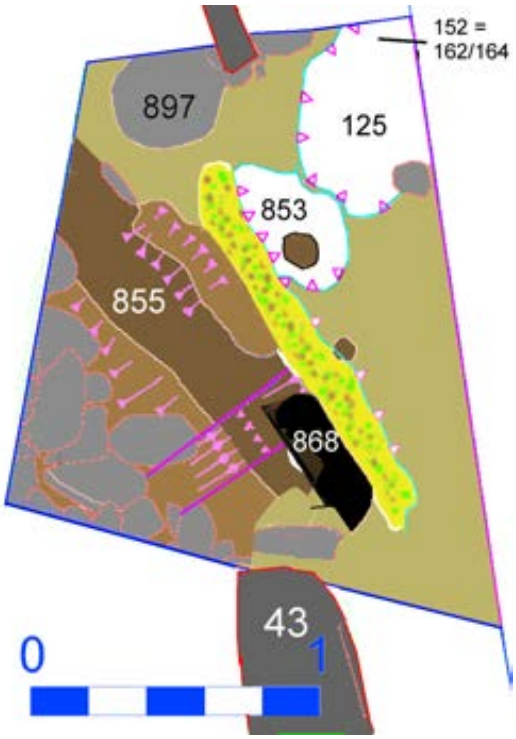
7.6 Phases 12 and 11: the Stage 4 and Stage 3 enclosures

The most prominent structure after clearance of topsoil in 1980 was an arc of head-sized stones (103) which lay in Trench BI, Trench BII and Trench BIII. In Illus 7.50, a photograph taken near the start of the 1980 season, Area B had not yet been extended from its original layout.

An enclosure had been planned here by Pitt Rivers in 1885, Somerville in 1909 and MacGibbon and Ross in 1910 (see Chapter 4: Introduction to the field and post-excavation work 4.1.3). The enclosure was shown to have four stages of building. A small stake-built enclosure enclosing an area about 2m across from north to south was succeeded by a larger embanked enclosure. Both were probably built around 2350/2300 BC (in Phase 9). This Stage 2 enclosure was succeeded at some time between 2000 and 1500 BC by two



Illus 7.48 Brown loamy soil 856 after removal of slot 852 [Plan 63/81 NMRS DC38097]



Illus 7.50 Plan 65/81 of 25 May 1981, an overlay to plan 64/81 [NMRS DC38099]

Illus 7.49 Plan 64/81 showing Slot 855 [NMRS DC38098]

stages of stone wall-base enclosure (Phases 11 and 12). The Stage 4 and Stage 3 enclosures are described here; the Stage 2 and Stage 1 enclosures are described in Chapter 7.10.

Use of the enclosures spanned a long period, with intervals during which ploughing took place. When the second stage enclosure was built in Phase 11a the bank of the Stage 2 enclosure survived in places to a height of at least 0.3m. The northern part of the second stage enclosure wall was set slightly to its north.

The wall-base of the northern part of the third stage enclosure was built largely on top of the original bank in Phase 12.

Strata possibly related to destruction of the Stage 4 enclosure will be described first. That will be followed by a description of its building, the destruction of the underlying Stage 3 enclosure and then building of the latter.

7.6.1 Phase 12b: damage to the Stage 4 enclosure

As mentioned in Chapter 7.4.3 in the context of late ploughing, it is possible that the ground

clearance associated with ploughing of the Stage 4 enclosure wall base resulted in the charred material in layer 139 and the clusters of stones 134 between East Row stone 30 and the Ring. In Illus 7.55 and 7.56 a line of stones formed part of cluster 134. Immediately under stones 134 by the west baulk was a spread of charcoal 139. The label 139 was first used in 1980 for a group of dark layers but in 1981 the group was subdivided to make 139 the topmost layer. Another patch of 139 was found near the base of East Row Stone 30 (Illus 7.56). Soil 139 was first recorded in BIIISX. The label was subsequently applied to a similar dark layer in BIV

From soil 139 came several potsherds.

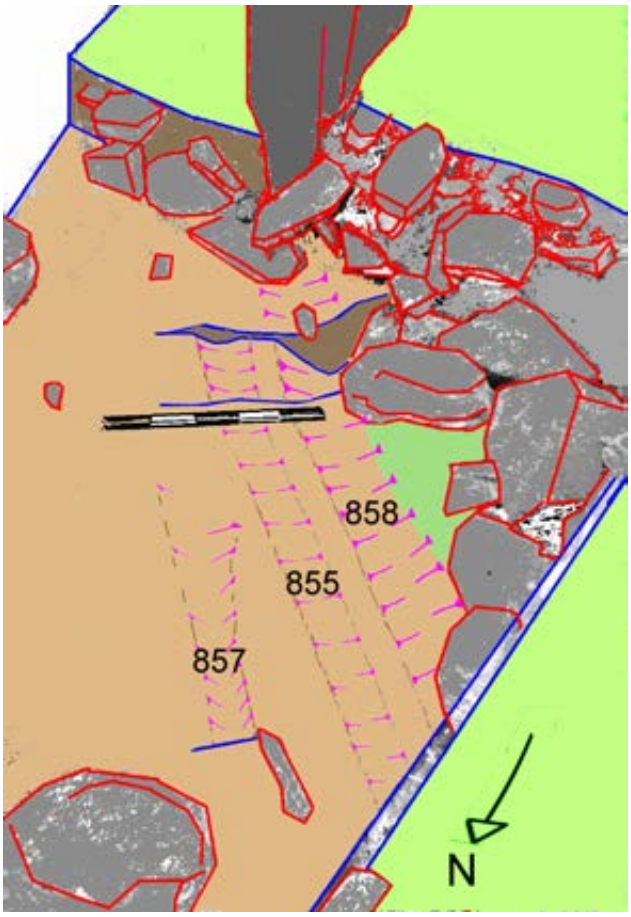
Table 7.14 Pottery from dark soil 139 in BIV

Cat	Comments
375_377	3 sherds from neck of large Beaker ASH 42. Cat 377 is a spall.
378_379	2 conjoining spalls (now refitted) plus crumbs from neck of large Beaker ASH 42.
380	Spall from large Beaker ASH 42
601	A sherd from a large pot with hard, gritty fabric. Could be unusual E/MN non-corky, or domestic Beaker but may well be post-EBA.
836_840	Four sherds, a fragment and a crumb from more than one pot, possibly E/MN corky.

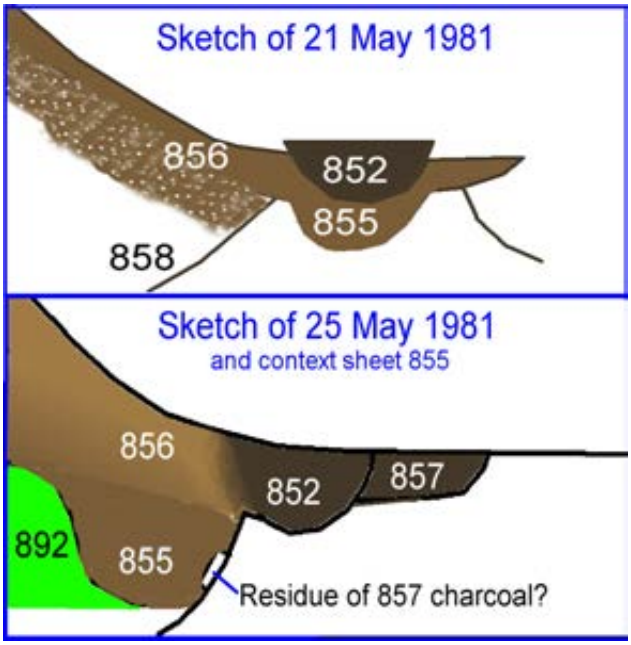
All these sherds were found in 1980 when the label 139 was used mostly for subsequently separated layers in BIV, including dark soil 141, so the sherds may have been from 139 or 141. The sherds of Beaker ASH 42 would fit well in the plough soil 141 because the pot was deposited in a scoop dug during working of the plough soil. The possibly late sherd (Cat 601), however, might fit well in layer 139 A piece of mylonite (CAT 29) was also recorded from BIV 139.

Another patch of soil labelled 139 was found in BIIISX and is discussed in Chapter 7.4.2.

Pollen samples 2021 and 2030 from soil 139



Illus 7.51 View of slots in Area BIWX from the north [Based on Day Book and Film 1981.12.14]



Illus 7.52 Sketch sections of the relationships of slots 852, 855 and 857 [Day Book 43 and 57]

Illus 7.53 Sectioning slots on 21 May 1981 [Film 1981.12.31]

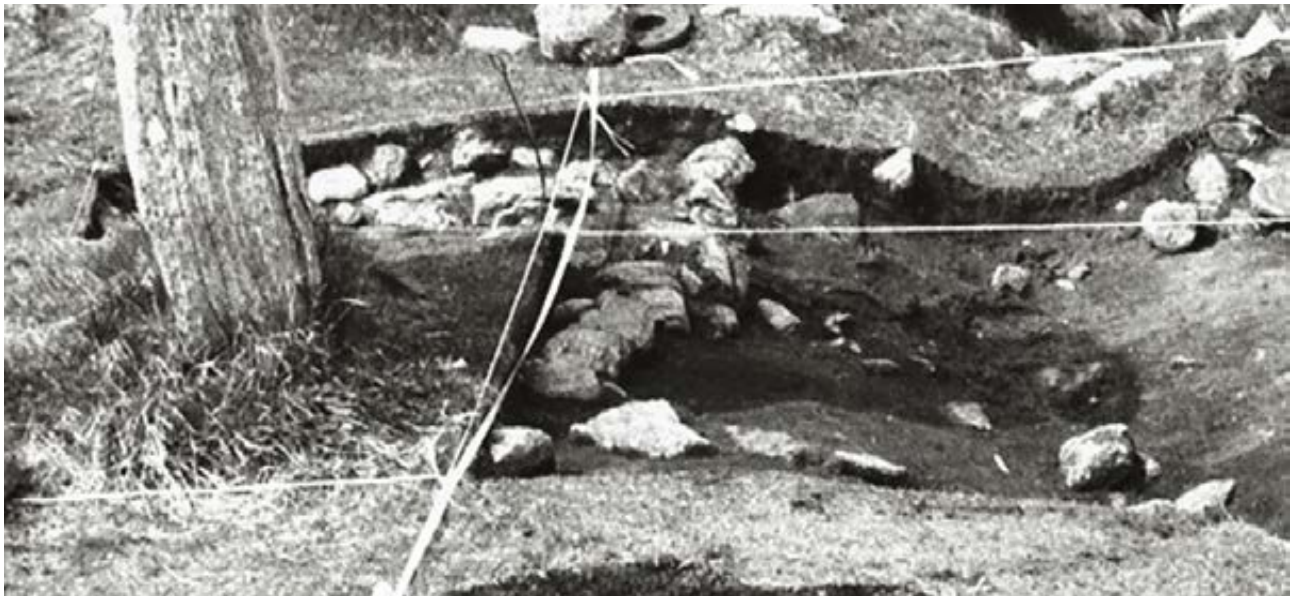
Illus 7.54 The enclosure from the east on 3 May 1980 [Film 1980.3.14]

in BV contained pollen generally characteristic of Pollen sub-zone CaN-3c which started sometime between about 1880 and 1520 cal BC and ended sometime between about 1070 and 420 cal BC.

In these samples the tree pollen values were low (4%). The non-arboreal pollen values were dominated by heathers and grasses. Plantago lanceolata reached high values (10.8 and 11.9%). Compared to the Ranunculaceae and Compositae, lig, Cruciferae pollen was relatively abundant.

Both samples could also be compared with zone CaN-3a but heather values were relatively high for this zone. A combination of both cattle breeding indicators (Plantago lanceolata, Ranunculaceae and Cruciferae) together with indicators for agriculture (cereal and Compositae lig) in sample 2021, points to a correlation with zone CaN-3c.

Sample 2030 lacked cereal pollen but contained more grass and pine pollen. This difference between the two samples can be explained by assuming that sample 2030 lay somewhat earlier in time, possibly the transition of zone CaN-3b to zone CaN-3c, before the regional pine decline. The ascription of 2021 and 2030 to the second millennium BC suits the archaeological interpretation well, and there is no reason why the layer should not include diachronic material if, as suspected, it was not thoroughly mixed but had originated as a set of dumps of field clearance vegetation and stones.



Illus 7.55 Stones 134 between East Row stone 30 and the Ring [Film 1981.1.17]

A piece of well preserved heather twig charcoal from layer 139 produced a radiocarbon date (AA-24957) between 1940 and 1690 cal BC. This almost certainly did come from 139 rather than the underlying 141; because the fragile charred stem was well preserved it seems unlikely that it had been perturbed (as was much of 141) before the patch of soil 139 reached the position in which it was found.

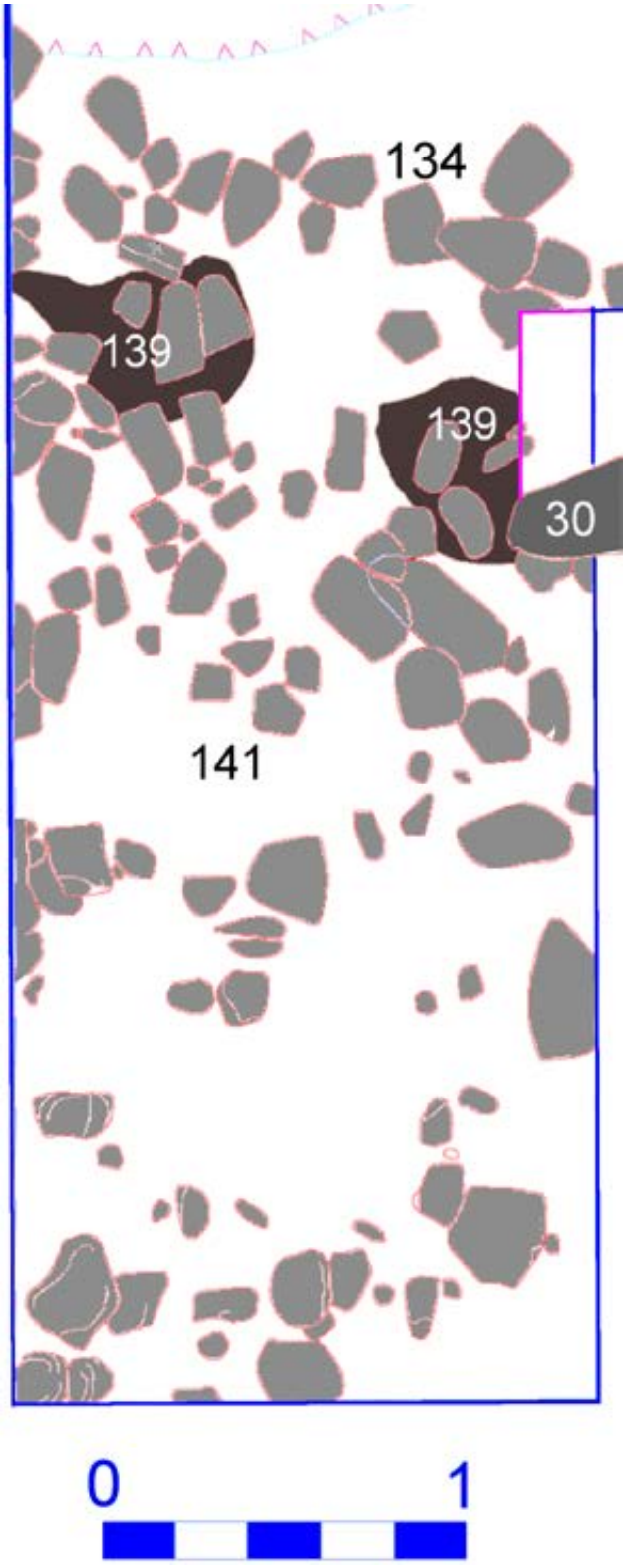
Strictly speaking, this provides only a terminus post quem for the layer, and the dating of the enclosures is so vague that the ploughing could have gone with the ploughing which partially levelled the embanked Stage 2 enclosure. Indeed some of the plough marks north of the enclosure included pollen of the same period CaN-3c.

But the presence of Stones 134 immediately above charred material 139 does suggest destruction of a wall-base enclosure.

Pollen from soil and from an ard mark in linear depression 121 immediately southeast of the enclosure was also assigned to CaN-3c (Chapter 7.4.12).

To the north of the enclosure near Ring stone 42 a set of ard marks (809) survived. Two pollen samples (2023 and 2029) from ard marks 809 were analysed. Both were assigned to early CaN-3c. Sample 2029 could be compared with sample 2021 and 2030 from the late charcoal rich spread of material 139 under the stones in Areas B4 and B5 south of the enclosure near the Ring roughly on the line of the East Row. They contained relatively high Pinus values and lacked Cerealia pollen.

The other sample from 809, 2023, had comparatively high tree pollen values (13%), dominated by hazel but with pine pollen relatively abundant (2.2%). Heather (36%) and grass pollen (34%) each represented more than a third of the pollen identified. Cereal pollen was present, together with relatively high Compositae lig. values (3.4%).



Illus 7.56 Area BV; stone patterns and the last remnants of layer 139 at the top of layer 141 in 1981 [NMRS DC38050]

7.6.2 Discussion of the damage to the Stage 4 enclosure

CaN-3c lasted for at very least half a millennium. It started at some date between 1880 and 1520 cal BC and ended at some date between 1072 and

424 cal BC (see Chapter 21.2.3). The regional and local landscapes became effectively treeless during this time. Pollen associable with pasture and cereal farming became more pronounced, the latter peaking at some time probably between 1500 and 1200 cal BC.

One possible interpretation of the pollen evidence described above is that ard marks 809, the soil in linear depression 121 and the ard mark near its base were part of the ploughing which damaged the fourth stage enclosure. The ploughing probably started in the earlier part of CaN-3c. The radiocarbon date from 139 suggests a similar date with ground preparation at some date between 1940 and 1690 cal BC.

Since most of the northern part of the wall-base survived the ploughing and other ground-working it seems probable that the cultivated patches of ground were quite small and irregularly shaped.

And given the length of the period during which cultivation took place (judging by the diachronicity of the pollen ground-working continued into the later part of CaN-3c) those cultivated patches probably changed shape over time. Also, as discussed in Chapter 7.3 the ground near the Ring may have been largely peat-free until the 6th century AD and stones could have been removed up until that time. It is only the presence of stones 134 and their relationship to dark soil 139, interpreted as the result of burning of vegetation cleared for cultivation, which suggests that robbing of the Stage 4 enclosure took place earlier.

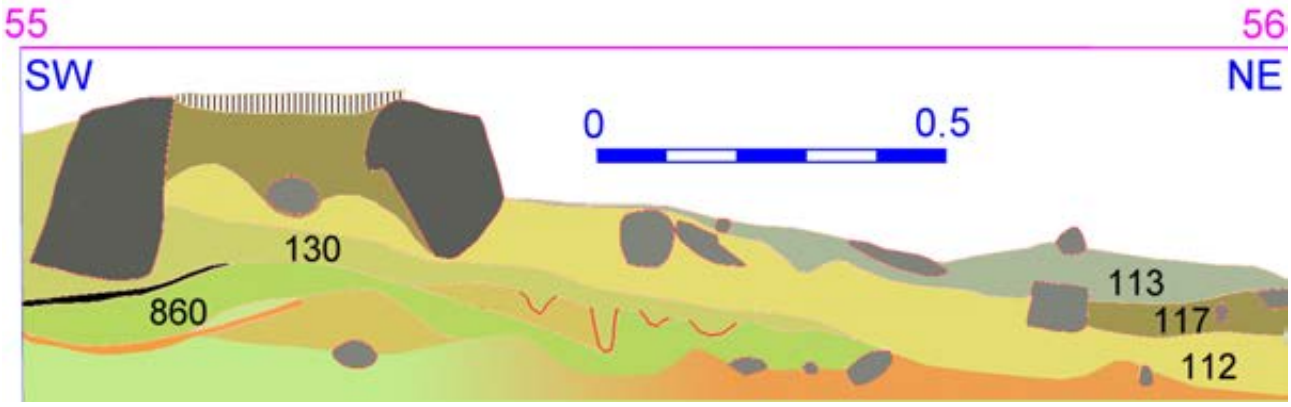
7.6.3 Phase 12a: the Stage 4 wall-based enclosure

The Stage 4 wall-base was well preserved in Section 80.13 (Illus 7.57-7.58). At that point it was slightly outside the line of the north terminal of the Stage 2 bank; the entrance to the latter had lain just to the south. It was between 0.6 and 0.7m wide. More generally the wall-base was about 0.8 m wide; but because for the most part it did not have a neat inner face its true width may have been greater in places (Illus 7.58). On the north side of the enclosure grit (135) had washed down through the stones of the wall-base accumulating above the underlying soil. Outside the wall-base depressions showed where stones had been removed.

After peat clearance there may have been attempts to stabilise the surface stones using turfs dug from an area with a high grit component similar to 113 (and therefore given the same number despite its being possibly of much later date).

Some of the stones from this were displaced to form the tumble fraction of stone spread 102, disguising the true nature of the latter.

A short and roughly west-east length of wall-base (115) composed of head sized stones abutted the arc of stones at its south end, about 4 m east of the Ring (Illus 7.58). It was between 0.6 and 0.8 m wide and, once the trench had been extended to the east, it was seen to run for 1.4 m at right angles to the local part of 103. The stones forming the enclosure and the short length of wall-base



Illus 7.57 Part of Section 80.13 (55-56), a section through the Stage 4 wall-base and ploughed-down Stage 2 bank in Trench BII [NMRS DC38033A]

were wrapped in the brown fibrous base of the turf (107) and were interleaved with a humus-rich worm-turned dark brown soil with a minor mineral component (108).

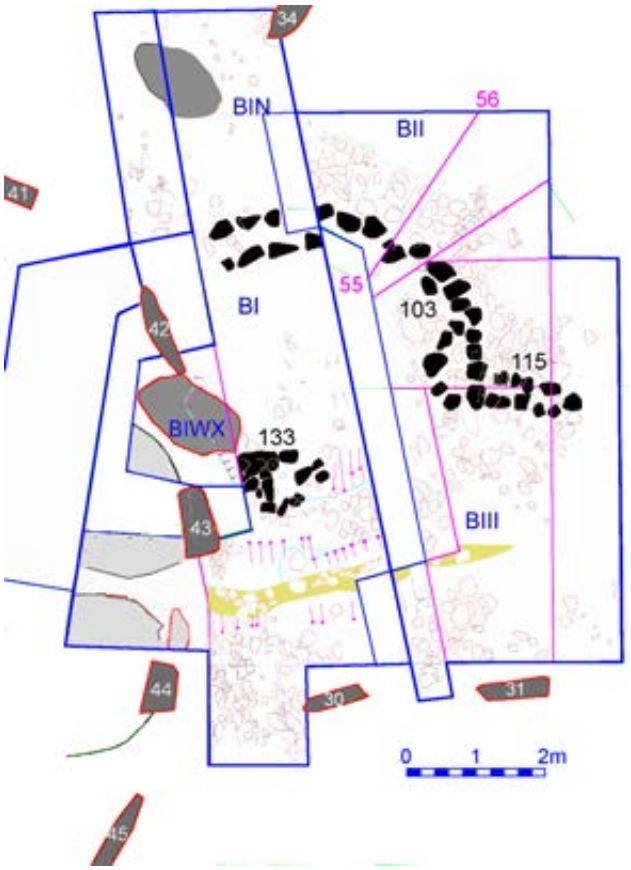
By Ring Stone 43 (on the north side of the entrance to the chambered tomb) was another short length of wall-base (133). It was 0.9 m wide and ran east-west, surviving for a length of less than a metre (Illus 7.58-7.59). Some of its upper stones were loose, and may have been placed recently, but others were well set. They were in a matrix of rooty, peaty, dark brown soil (146) presumably reflecting invasion by post-peat plants. This wall-base sat over the north side of a ridge (101). The ridge was not a built bank; it consisted entirely of relatively early strata surviving between the depressions formed by the ditch and the interior of the enclosure (Illus 7.59).

Five potsherds (Cat 357 to 361) were found in mixed rubbly green material next to wall-base 133 inside the enclosure.

Table 7.15 Pottery from rubbly green material by wall-base 133

Cat	Comments
239_242	Three sherds and a fragment from an E/MN non-corky pot.
357	A rim-and-upper neck sherd from a thin fine Early International Beaker; very probably from ASH 38, or possibly ASH 37, rather than ASH 39.
358	A small abraded sherd probably from a thin fine Beaker; exterior spalled off..
359	A heavily abraded sherd probably from a 'domestic' Beaker.
360	Undecorated non-corky sherd with fabric similar to that seen on Heb Inc sherds.
361	A tiny sherd from a thin fine pot, probably a Beaker, and a crumb.

The material was sufficiently disturbed that it was not given a separate context number from the general upper fill of the enclosure (120; see also



Illus 7.58 The fourth stage enclosure

Illus 7.59 Stones 133 with ridge of surviving strata to its south [Film 1980.11.23]

Table 7.2). It is however possible that it was related to construction, use or modification of the Stage 4 enclosure

7.6.4 Discussion of the Stage 4 enclosure

The three stone wall-base elements (wall-base 103, stub wall 115 to the east and the stones 133 by Ring Stone 43) were similar enough to one another to have been part of a single structure (Illus 7.58). They suggest an enclosure measuring internally up to 4m east-west by about 3 m north-south, backed onto the east side of the cairn and Ring Stones 42 and 43. This enclosure flanked the north side of the approach to the passage of the chambered tomb. The stub wall at the east end of the arc of stones may have lined an entrance way. Although there may also have been a north-western entrance between the cairn and ring stone 42 it is quite possible that any original stones there had been robbed.

The Ring stones and a massive kerb-stone seen just south of Ring stone 42 on Illus 7.59 may have formed part of the back wall.

As argued in Chapter 7.2.10 it is conceivable that the wall-base was made during Victorian tidying. It did not appear on plans of around 1857 when peat was cleared; the earliest record of it was on Pitt-Rivers' plan of 1885. Further, some of the stones were in worm-turned earth, and it is possible that worms at Calanais reflect importation of turfs after the area had been cleared of peat. But if it had been a mid-Victorian creation (for instance to tidy up remnants of the third stage enclosure) it would surely have been more complete.

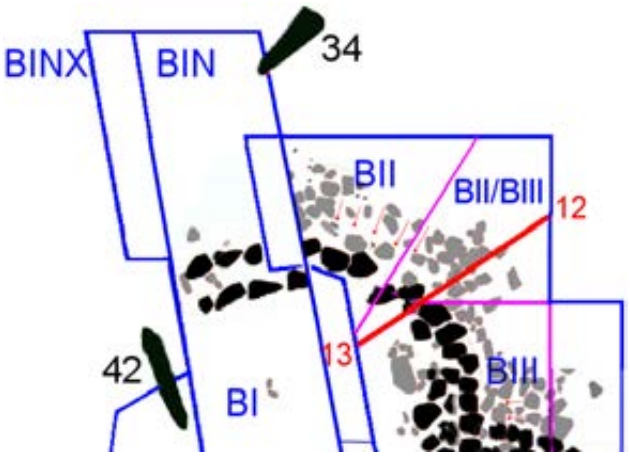
So the preferred interpretation is that the latest wall-base 103 was basically prehistoric.

In Chapter 24: Discussion and Conclusions it will be suggested that the best analogy for it is provided by a putatively 'special-purpose domestic' structure at Dalmore, Lewis. But there was no direct evidence for its function or functions at Calanais.

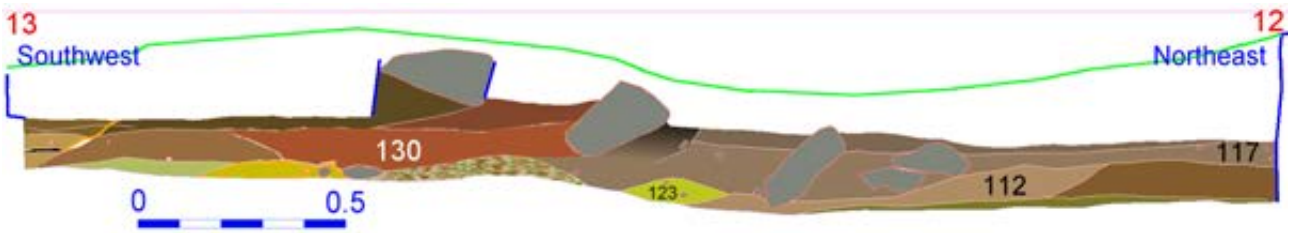
The (faint) possibility that there was also a southern enclosure, or that the Stage 4 enclosure had two sub-stages, with one terminating at wall-base 133 and the other continuing through possible wall-base 116 near East Row stone 31 is also discussed in Chapter 24: Discussion and Conclusions).

7.6.5 Phase 11b; Destruction of the Stage 3 enclosure

Clay soil 130.1, which looked like ploughed down bank makeup, was found in a depression outside the enclosure; it included conjoining sherds of Food vessel ASH 75 (Cat 580-1). It may reflect reduction of the bank by ground-working including ploughing before the Stage 3 enclosure was built, but another possibility is that, in part or whole, it went with destruction of the Stage 3 enclosure. The former possibility suggests that destruction of the second stage enclosure had been completed in the last century of the third millennium or the first quarter of the second. The latter possibility is that the same date should be applied to destruction of the second stage enclosure; but in that case, be-



Illus 7.60 Key plan



Illus 7.60 BII/III South-east section 03/81 [NMRS DC38037 flipped; modern surface added from contour survey Chapter 7.1, Illus 7.2]

cause Food Vessels seem to have been in use during its lifetime, it has to be recognised that the Food Vessel sherd in soil 130.1 may have been deeply residual.

The lower parts of Section 03/81 (Illus 7.60) will be described and discussed in Chapter 7.10.3 and 7.10.4, along with other evidence relating to the early enclosure.

The Stage 4 wall-base 103, was still in place when the section was drawn and the damaged Stage 3 wall-base lay further to the north-east in soil labelled 117 above a slight local dip in the soil filled with clay soil labelled 112. Elsewhere on Area B soils labelled 112 seem to have been a plough soil associated with levelling of the early bank 130; soil 117 was usually seen as a form of 112 modified in part by later ploughing and in part by natural soil processes. However, the layers labelled 112 and 117 on Section 03/81 (12-13) are hard to interpret that simply.

It looks as if the right-hand end of layer 130 of the spread Stage 2 bank had been cut into by the Stage 4 wall-base. Before the latter event, the Stage 3 wall-base had been set on soil labelled 112, and if that label is correct it too should originated as ploughed-down remnants of the Stage 2 enclosure bank. It must subsequently have been damaged by ploughing associated with creation of soil 117 (i.e. a red-brown fibrous soil lying on somewhat less fibrous soil 112).The likeliest explanation is that the edge of the Stage 3 entranceway wall-base was close by (see key plan for Illus 7.60); in that interpretation the stones in Section 03/81 ascribed to the Stage 3 enclosure had tumbled down from the north (Illus 7.60). That would explain why they appeared to be in soil 117.

Thus here one simple explanation for the evidence is that soil 117 built up later than ploughing which damaged the Stage 3 enclosure.

7.6.6 Phase 11a: the Stage 3 wall-base

Lying mainly outside the arc of stones 103 was what was interpreted during its cleaning and re-

Illus 7.61 The Stage 4 and Stage 3 enclosure wall-bases from the north-east on 9 May 1980 [Film 1980.5.15]

Illus 7.62 Stones 804 in BI N extension on 2 May 1981 [Film 1981.2.20]

moval as tumble (102) (Illus 7.61, 7.63). Yet even when observation was muddied by that assumption it was hard to see it as deriving from the wall-base 103, as comments in the Day Book confirm. In Illus 7.61 some of the stones had been removed, but the absence of the Stage 3 wall-base north of the Stage 4 enclosure one near the Ring was probably real (Technical Note 7.6.6). There is no surviving plan of stones 102 to the west in BIN; they were absent on Section F and perhaps they never extended that far or had been removed before the Stage 3 enclosure was built.

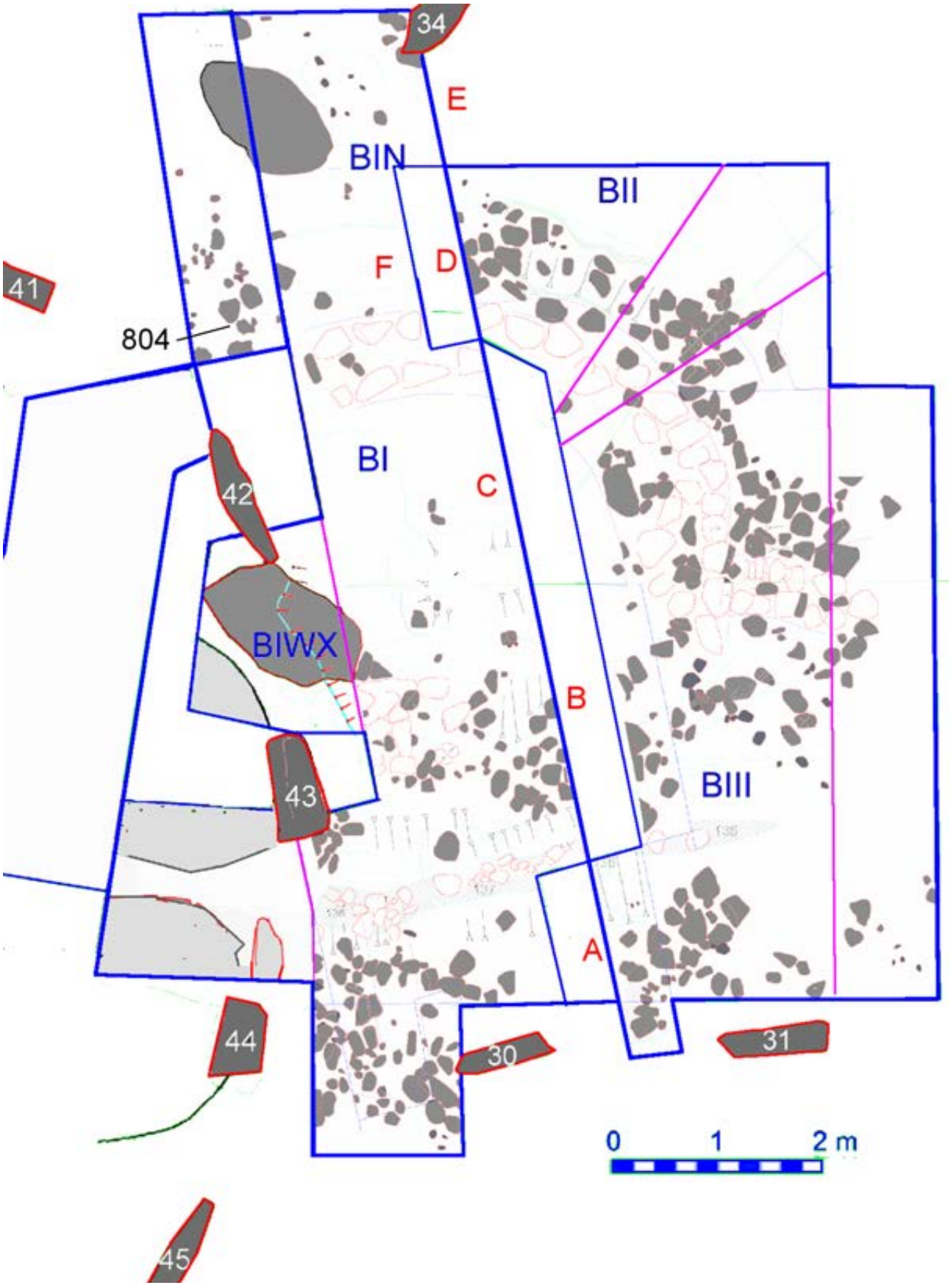
In 1981 more stones (804) appeared at a similar level in BINX the westward extension of BIN (Illus 7.62, 7.63). But they were interpreted as reflecting Victorian disturbance.

Parts of the wall-base element of 102 were wrapped in brown fibrous soil 117, which had developed semi-naturally through modification of earlier deposits. The soil was thus not a stratigraphic marker. The gritty material filling the tumble in some places did seem very similar to the grit used to soft-landscape the site in modern times; but it also looked like decayed stone.

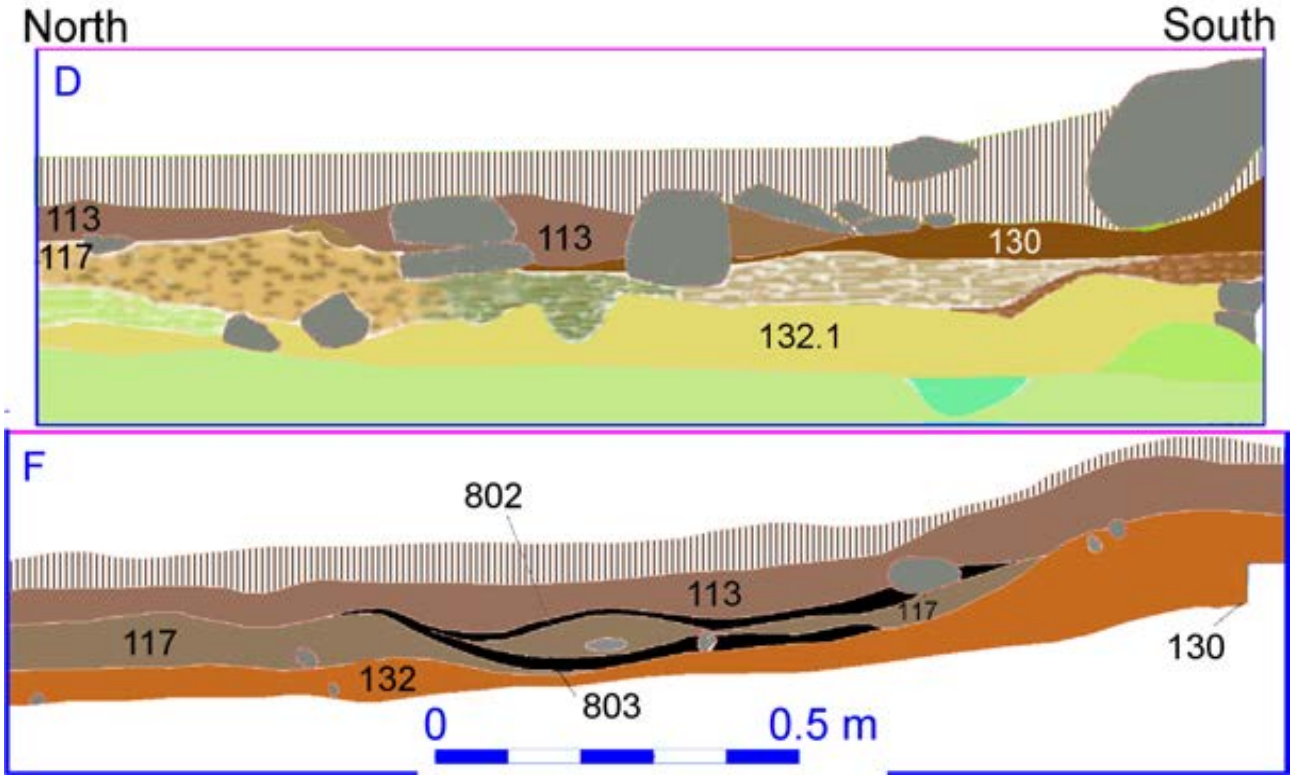
In various places stones 102 clearly overlay bank elements and post-dated the ploughing which damaged the bank, but that evidence, on its own, did not preclude its going, in some fashion or other, with the later wall-base.

The most persuasive evidence that parts of stones 102 formed a separate wall-base came from Section 80/11 part D (Illus 7.64) taken in conjunction with the plan of stones 102 (Illus 7.63). The distance of c. 0.5m between the wall-base on Section D and the later wall base suggests that it was not simply cobbling associated with the latter. The plan shows a continuation of the wall-base visible on Illus 7.64. The absence of the wall-base in BI/BIN appears to have been real.

On Section D (which has been flipped to bring north to the left) the Stage 3 wall base (part of 102) was 0.45 m wide. It was filled with grey-green grit 113 and a streaky brown-green clay soil underlay the stones. Immediately to its south, extending for about 0.3m over more than half of the space between it and the bank, was a thin layer of



Illus 7.63 Third stage wall-based enclosure Plan 5/80 with the stone of the late wall-base digitally removed [NMRS DC38024]



Illus 7.64 Sections D and F on the opposite side of the baulk [Sections 80/11D flipped and 81/7 NMRS DC38031D and DC38041]

tumble, lying in part on dark brown sandy material with charcoal in it.

Brown clay 130 ran for about 0.5 m between the bank and the earlier wall-base, which had sunk into the sandy material; it should represent ploughing-down of the Stage 2 enclosure bank; it is conceivable that it was the soil of turf line 803. Under the wall-base was a brown gritty clay soil with white particles in it. It had been invaded by iron pan on the northern edge of the bank.

The unlabelled light brown gritty clay soil with lighter particles below the Stage 3 wall-base varied in its composition north of the Stage 2 bank, seemingly because the third stage wall base and its southern tumble had preserved some of the soil from weathering. Without an obvious stratigraphic break, it changed colour to streaky brown-green below the wall base, and back to a brown soil north of the wall-base (Illus 7.64). On this section the layer below the light brown gritty clay soil with lighter particles, and its variants, was sandy green-yellow clay 132.1.

It had what may have been a well developed ard mark cut into its top, surviving in this section most clearly where overlain by the wall-base 102 (Illus 7.64). This ard-marking may reflect the ploughing which partially levelled the early bank before the Stage 3 wall-base was built or pre-enclosure ploughing.

It was probably a variant of 112 and 130 which often seem to have reflected ploughing of the Stage 2 enclosure bank (Technical Note 7.4.8). In its southern part 132 merged downward into 130, at the time of drawing incompletely excavated.

The soil through which the ploughing took place was in general labelled 112 north of the enclosure but there it was generally a red-brown clay soil rather than the streaky brown-green clay soil underlying the stones on Illus 7.64. That difference may reflect the protection provided by the wall-base and if so provides an interesting insight into the original nature of soil 112 before it became, in effect, the subsoil of the late plough soil generally represented by soil 117.

The south end of Section F lay just north of wall-base 103 (Illus 7.64). The layer underneath the turf consisted of a greyish gritty material 113, with a tinge of green, which overlay a pinkish

clayey soil here labelled 117 but of different character from the general soil 117 (Technical Note 7.4.8). No Stage 3 wall-base stones were visible. Soil 117 lay between turf lines 802 and 803 and also underlay the latter (Illus 7.64).

To the east of the central baulk dark grey greasy grit free layer 803 was found immediately below the stones of the Stage 3 wall-base (Illus 7.65). Layer 803 was 3 mm thick and had all the characteristics of the lower part of turf lines in other areas of the site. Truncation to north and south revealed the edge of the layer (the thin dark green strips near either edge of the dark brown stone-filled area on Illus 7.65). Outside it were fragments of gritty greenish-grey material 113, which had overlain both 803 and the stone tumble 102/804 on Section F (Illus 7.64); gritty material 113 overlay soil with similar characteristics to mineral soil 117 locally. In some parts of Area B this gritty material 113 represented a component of rotten stone and in BIN it may, as described above, reflect the former presence of the earlier wall-base.

7.6.7 Discussion of the Stage 3 wall-base

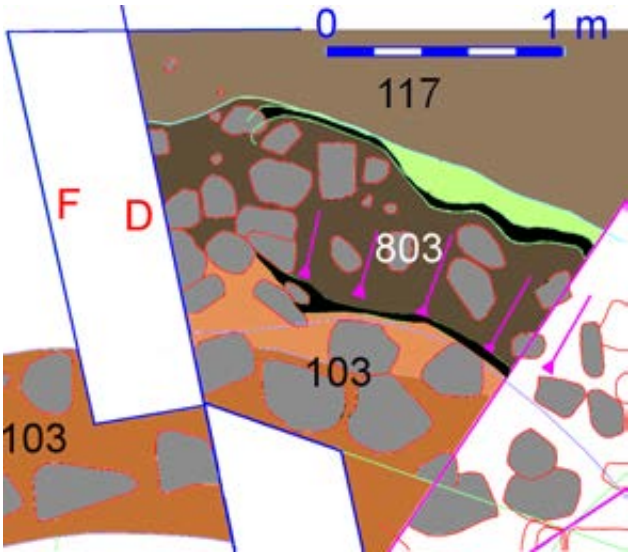
The wall-base of the Stage 3 enclosure was constructed on the outer side of the bank (Illus 7.66). It enclosed the largest area of the four, with interior dimensions at 4.2m north-south and 3.7m east-west.

On Section D (Illus 7.64-7.65) it was just under 0.5m wide. If, as supposed, it served as the base for a turf wall the latter might have been up to a metre tall. Its entrance was similarly placed and similarly sized to the Stage 2 enclosure entrance. It was about 0.65 to 0.75m across, much the same width as a modern internal house door.

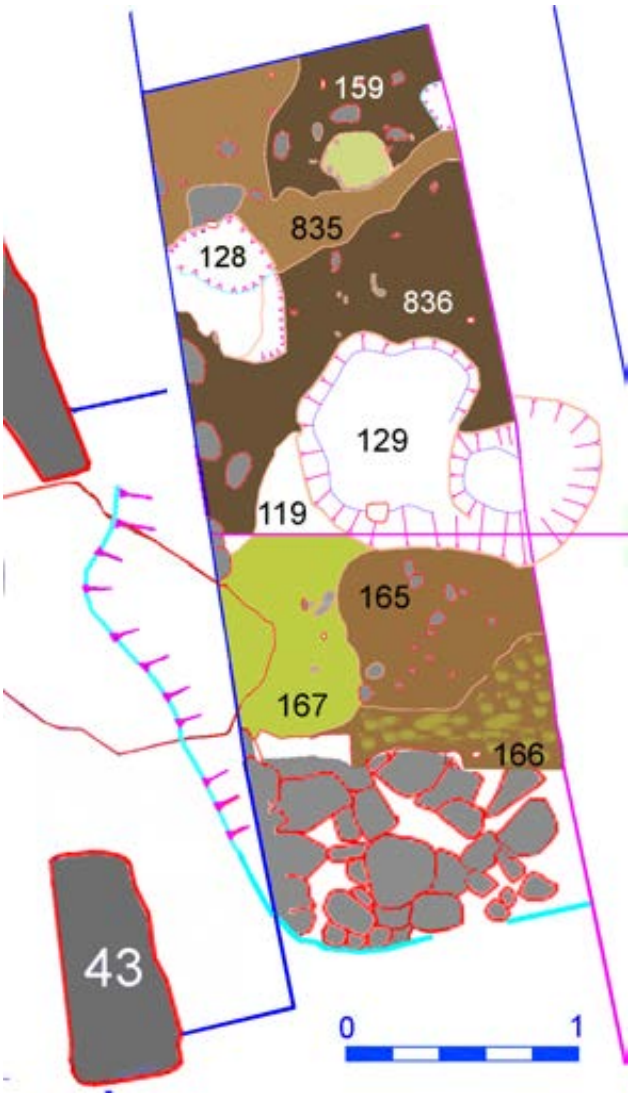
A single line of stones ran above the entrance. The function of the line is difficult to understand. None of the other enclosures had any features suggesting a gate, so that does not seem to a sensible explanation. Could it have been part of a low barrier to keep out ground water?

The entrance was in a different position from the Stage 4 enclosure entrance (Illus 7.67).

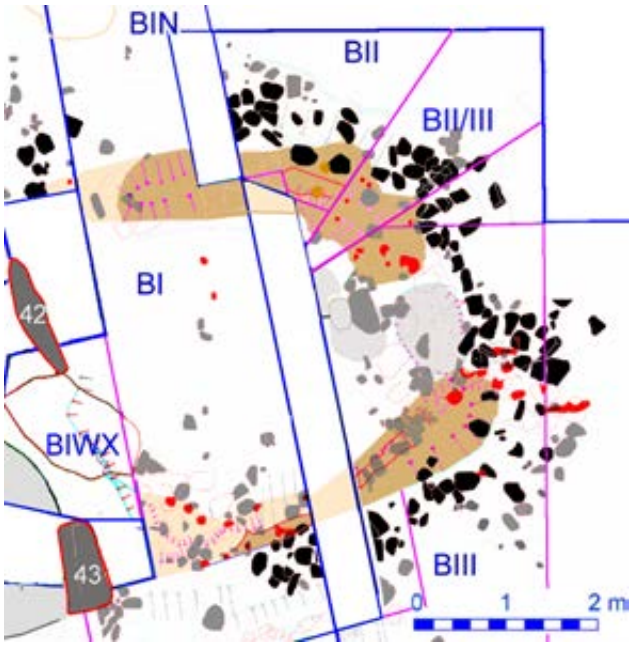
The Stage 3 wall-base could not be identified with any confidence amongst the rubble in the south, although it may have continued west of the



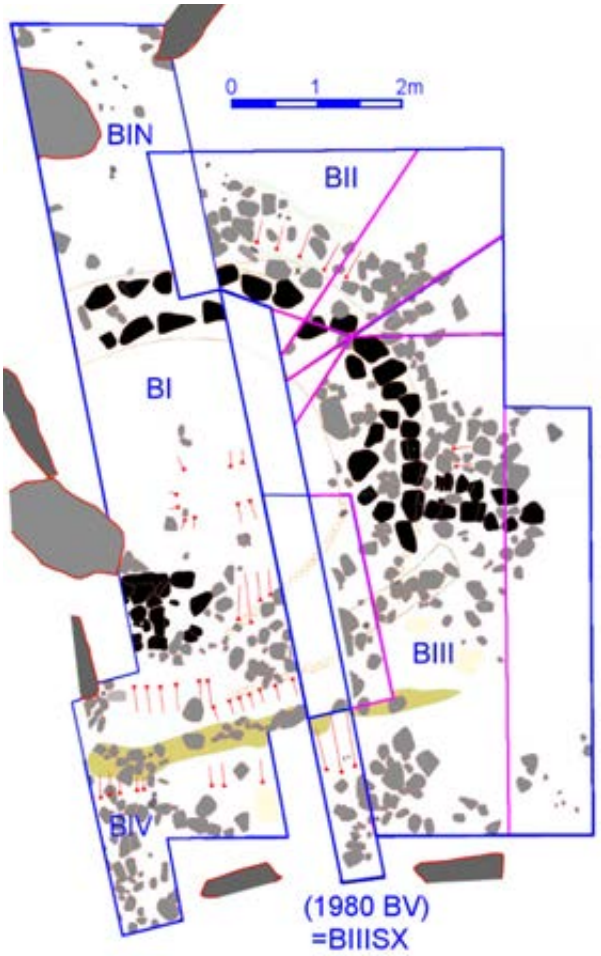
Illus 7.65 Extract from Plan 05/80 [NMRS DC38024]



Illus 7.65 Plan 81-44



Illus 7.66 The Stage 2 bank in brown and the Stage 3 wall-base in black



Illus 7.67 The Stage 3 enclosure in black on the Stage 2 enclosure [DC38024]

medial baulk (Illus 7.67). Its former presence to the south of the Stage 4 enclosure wall-base stub 133 by Ring stone 43 (see Illus 7.68) might explain why the old turf lines there survived as part of a 'ridge' of early strata between the ditch to the south and the down-cut enclosure interior to the north (in the top of which stones 133 sat).

7.6.8 Floor levels in the enclosure

Illus 7.68 shows BI at the end of the 1980 season. The Victorian intrusions 129 and 128 had been dug to below the general level. In the southern part of the enclosure were several layers interpreted as floor levels.

The uppermost was a patch of stones in a layer of hard red-brown charcoal flecked clay 147 which itself immediately underlay the brown fibrous fill 146 of the stones forming stub wall 133 and abutted the stones themselves. It was referred to as a possible floor level. No plan of layer 147 survives. It can be located fairly precisely because it was described as over floor level 166 but not as over 165 and 167, all planned in 1980 and early in 1981 (Illus 7.68,7.69).

The most prominent features on Illus 7.69 are the emptied Victorian pits but to the left of Pit 129 it also shows layer 167 as lighter in colour than 165; layer 166 to bottom left was of an intermediate tint.

Illus 7.70 shows that the edge of the enclosure was scalloped back in the same way to the northwest as it was to the south. This scalloping is interpreted as starting in Stage 1 and is discussed below in Chapter 7.10

Clay 165 was described at this level as a patch of mixed yellow clay and brown lumps with patches of khaki clay (Illus 7.68, 7.69, 7.71); It included two small potsherds, and a fragment and a crumb, all from a probably E/MN corky pot (Cat 781-785).

Clay 166, was variously described as yellowish compact and at a lower level as mottled green-brown.

Clay 167 was described as variegated greenish khaki gritty clay. It contained several pieces of pottery.

Table 7.16 Pottery from clay 167 in BI

Cat	Comment
297	A sherd from a large Hebridean Incised pot.
318	A sherd from a large Hebridean Incised pot.
319	A small sherd from a very thin, very fine pot – possibly Beaker, or else E/MN non-corky.
566	A sherd of large Food Vessel ASH 75

In the north were brown clay soils 159, 835 and 836. There were two ard-marks, in clay 159 (Illus 7.68; see also Chapter 7.10.2). It was 0.2m thick and interpreted as bank material disturbed by ground-working; the ard marks were so slight that the ard must have cut from a much higher level.

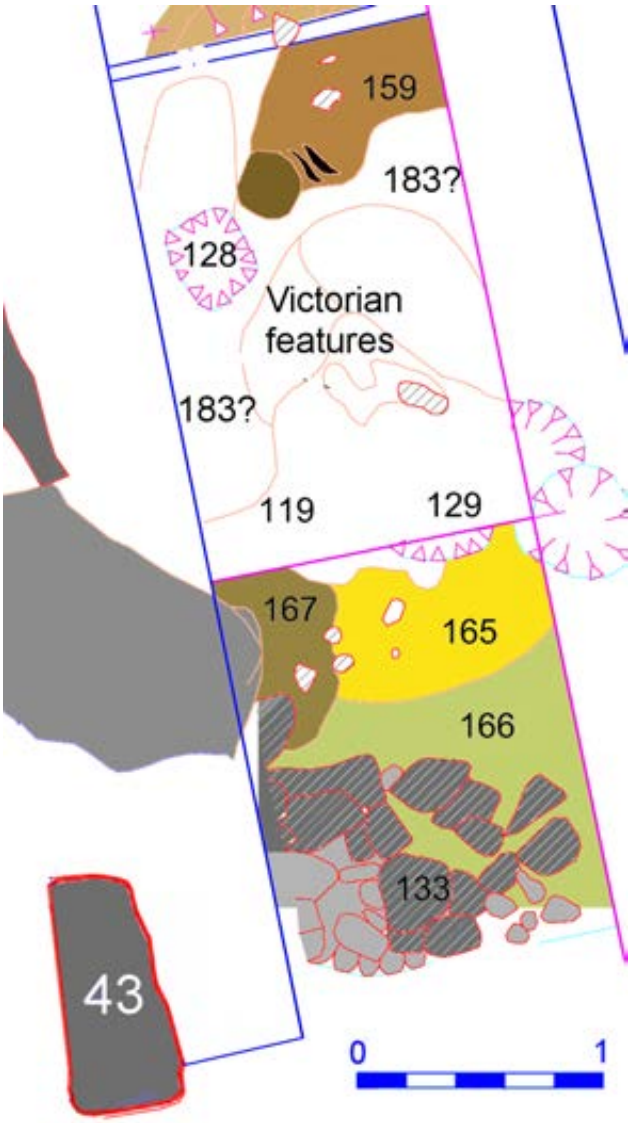
Clay soils 835 and 836 ran roughly parallel to the enclosure bank. Clay 836 was khaki-coloured and gritty and was cut by the early modern pit 129. Clay 835, between 836 and the bank, was red-brown and sandy and produced two sherds from a Hebridean Incised pot (Cat 295_296).

With further trowelling floor 165 became browner. Under it was floor level 167 which, once 165 had been removed stretched almost completely across the trench (Illus 7.73, 7.74).

Under the stones and presumably at the same level or lower than 167 and 166 was a medium brown sandy clay (not given a separate context label) which overlay Stage 1 and Stage 2 stake holes. Removal of 167 and 166 further north revealed greenish brown clay (Plan 47/81 of 16 May 1981, discussed in Chapter 7.10). These may well have gone with the Stage 2 enclosure

In the north of the enclosure removal of the brown surface layer of the clay soil (836) revealed dull greyish green sand and sandy clay, given the same label. In it were numerous small round features (Illus 7.74). They were interpreted as stake holes (see Chapter 7.10).

Finds numbers 81.164-6 were marked on Plan 46/81 in layer 836. One sherd was Hebridean Incised (Cat 294), one was Food Vessel (Cat 567)



Illus 7.68 Plan 08/80 [NMRS DC38027]

and one was E/MN non-corky or Beaker (Cat 784). But the Finds List and the bags attribute them to BI 810 (either BI or 810 must be wrong). It is impossible to know which record was more correct but if it is that on Plan 46/81 then the upper part of soil 836 may have been contemporary with context 167, which also contained a Food Vessel sherd (Table 7.16) or may have been introduced by ploughing; the sherds were worn and may have ended up in features of different date from one another.

Near the centre of the enclosure was a possibly prehistoric pit 149 with a mottled fill. Most of it had been removed by modern pit 129. It was slightly over 0.5m in diameter and it was roughly

Illus 7.69 Enclosure pits including Victorian disturbances from the east on 8 May 1981[Film 1981.4.23]

Illus 7.70 Scalloped edge of the enclosure in BIWX on 26 May 1981[Film 1981.15.5]

central to the enclosures of all stages. A small sherd probably from the rim of a thin fine beaker (Cat 677) and a quartz flake (CAT 14) were found in it.

A round-bottomed pit 180 cutting 149 produced no finds and its date is ambiguous although it preceded the Victorian pit 129 the southern small pit on Illus 7.75).

In the south of the area a few shallow features appeared (Illus 7.74). 831 was a patch of khaki, gritty soil appearing in the side of round bottomed pit 180. 832 first appeared on plan under yellow clay 165 as a strip of dark brown slightly silty clay which at a slightly lower level it became roughly circular and 0.2 to 0.3m across. It was described as a patch of small stones in a khaki gritty matrix lying over green clay and partly surrounded by darker grey subsoil.

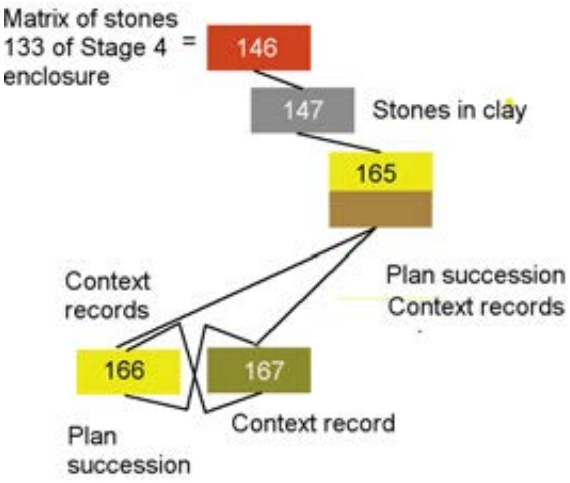
It may have been on of the several truncated shallow features in the enclosure but equally it could have been a pre-enclosure feature.

833 was a rectangular patch of yellow clay within an outline of dark brown root-marks. Its plan dimensions do not match those on the context sheet (28x80cm). However it was almost exactly below the fallen stone which had lain in BIWX and it seems likely that it had weathered in a different way from the rest of the area; it should thus count as a natural feature.

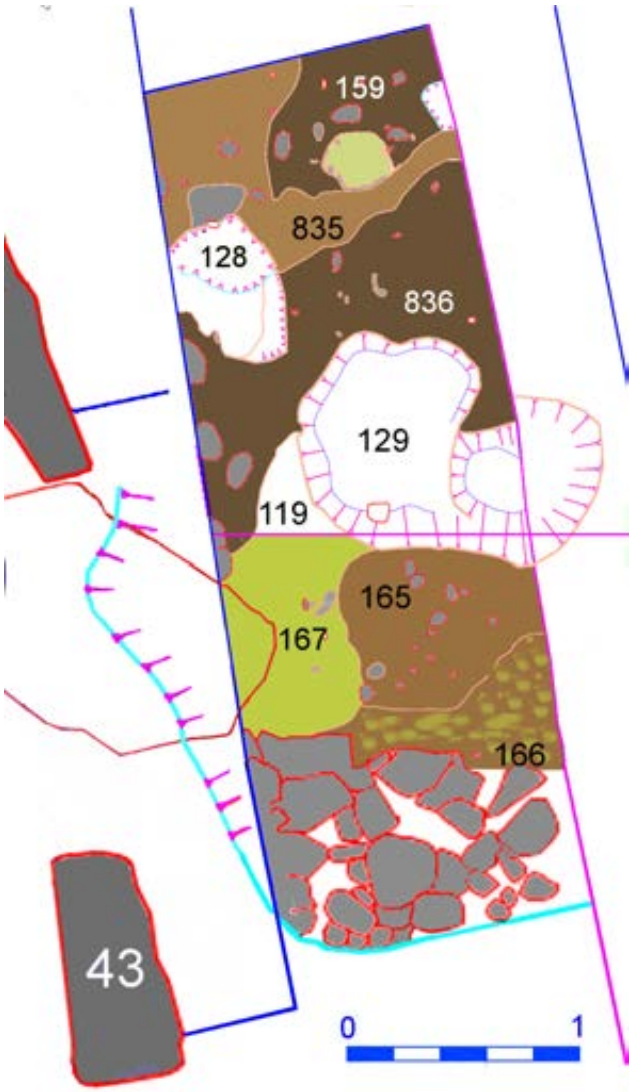
7.6.9 Discussion of the Stage 3 wall-based enclosure

During excavation we saw Stones 102 as tumble or just possibly a pavement running outside the late wall-base; but we were uneasy about these interpretations. In retrospect the wall-base seen in section north of the fourth stage wall-base (Illus 7.64) in particular provides convincing evidence that the Stage 3 and Stage 4 enclosures were separate from one another. The suggestion of an entrance overlying the Stage 2 entrance but well north of the Stage 4 entrance provides more support for the separate existence of a Stage 3 enclosure (Illus 7.63, 7.66, 7.67).

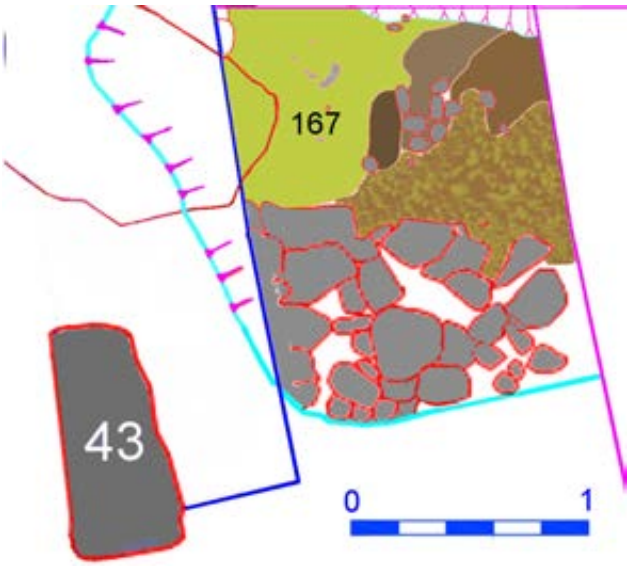
The main floor level of the third stage enclosure was clay 167; clays 166 and 165 seem to have been patches in it. Floor level 167 included a large Food



Illus 7.71 Relationship of floor levels in the south of the enclosure



Illus 7.72 Plan 44/81of 5 May 1981 [NMRS DC38078]



Illus 7.73 Plan 45/81 [NMRS DC38079]

Illus 7.74 Plan 46/81 [NMRS DC38080]

Vessel sherd (Cat 566) from a vessel probably made between about 2100 and 1750 BC (for that date range see Chapter 18.7.15).It was heavily worn and suggests that the third stage enclosure was in use at some date in the 2nd millennium BC.

There is no dating for the Stage 4 enclosure except that provided by an analogy with a putatively Early Bronze Age enclosure at Dalmore, Lewis. Although a Victorian date would not conflict with the stratigraphy that idea has been rejected mainly on the grounds that the incompleteness of the enclosure wall-base makes no sense in a Victorian building context and its probable form has no obvious Victorian prototypes.

The possible uses of the enclosures, their affinities and other matters are discussed in Chapter 24: Discussion and Conclusions.

7.7 Phase 10d: Stone 34 in BIN

7.7.1 Plough soils

Ploughing of indeterminate date and soil processes including iron panning had destroyed all evidence for the stratigraphic relationship of the stone-pit of Stone 34 to the enclosure and the Ring. The main pre-peat soil level in this area was labelled 131 (Illus 7.76).

Soil 131 was described as a red-brown (when damp) mixed material in the north part of B1 near Stone 34, notable for the stones in it which seemed to dip into a depression round the base of Stone 34. When dry it appeared as a fine biscuit coloured silty sand, iron coloured and root-penetrated, a fact worth remembering when looking at photographs (Illus 7.77 and 7.79).

Table 7.17 Sherds from Soil 131 in BIN

Cat	Comments
729	A sherd from a fine, slightly corky E/MN round-based pot.
730	Small sherd from a thin-walled, fairly fine pot, either E/MN corky or less likely a fine Beaker.
797_801	Abraded spalls; could be either E/MN corky or Beaker.

On the original find bag for Cat 797-798 the Area was given as BII rather than BIN. That may be correct; a small patch of soil 131 may have survived east of the central baulk.

Although 131 had probably been ploughed there was no particular evidence that this ploughing took place late in the prehistory of the area. It was stratigraphically lower than another brown fibrous soil 130.1, which filled the top of a shallow east-west linear depression. Soil 130.1 was similar to soils in the bank of the Stage 2 enclosure. Amongst other sherds it contained two conjoining pieces (Cat 580-1) of Food Vessel ASH 75.

Once that and some of soil 131 had been removed a rubbly layer 151 filled the shallow depression. It was mottled yellow and a third of it consisted of rotted stones 40 to 50mm across; a few un-rotted stones were present in it (Illus 7.77, 7.78). It was interpreted as a purposeful fill of the linear depression.

The lowest stratum in BIN was layer 150, visible to the right in Illus 7.77; it was yellow at its top, merging lower down into mottled orange-green sandy clay, it was almost certainly modified in-situ natural clay

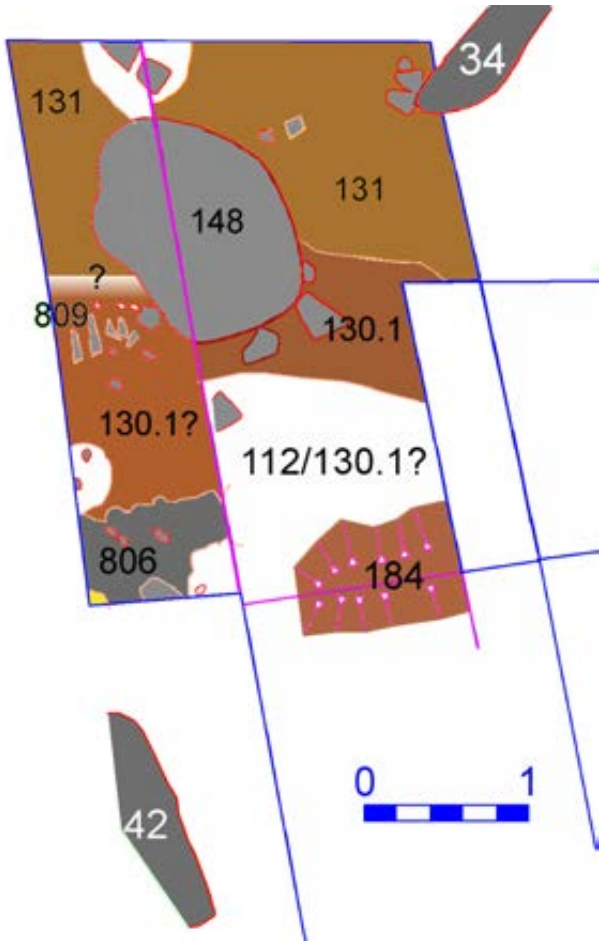
The northernmost part of the main north-south section, Section 11 Part E, reached Avenue stone 34, and contained the junction between the pit dug for stone 34 and surrounding strata (Illus 7.80).

The patch of overlying black brown humic soil to mid-right on Illus 7.70 was not recorded in plan but it may have been part of the general pre-peat soil development 117.

The interpretation of the section is complicated by what seems to have been part of a pit or depression, possibly at the base of 131 planned early in 1981 (Illus 7.81). But the red brown fibrous soil on section drawing 80/11E must be soil 131 recorded as covering the area on Plan 80/06 of 12 May 1980 (Illus 7.76). So the pit for Stone 34 must have been cut through 131.

On Plan 81/.53 (Illus 7.81), drawn early in the 1981 season, the base of red-brown fibrous soil 131 survived in a depression round the base of Stone 34. The pit for Stone 34 was cut through 131, perhaps from well above that level. The northernmost of the large stones in the modern topsoil overlying

Illus 7.75 Pits 149 and 180 to the right, cut by modern Pit 129 [1980 10.20]



Illus 7.76 Plan 80/06 (part) of c. 12 May 1980 [NMRS DC38027]

the pit of Stone 34 dipped into the pit and appeared to be part of original stone-hole fill rather than a slab thrown relatively recently against the base of the stone. That suggests that the pit was originally cut from a ground surface which by 1980 had been converted to modern topsoil.

7.7.2 The fills of the pit for Stone 34

The edge of the cut for the stone-pit, at the level at which it first became unambiguous, lay 0.2 to 0.22 m south of Stone 34 and its curving profile was lined with soft iron-pan in its upper 0.2 m. We considered the possibility that the apparent pit was a figment of iron-panning. However we concluded that it was a real cut because the stone-pit had a top fill of dark brown even textured sand, above grey gritty sand with charcoal flecks (Illus 7.80). The colour of the latter may reflect in part or whole post-depositional soil changes, but the remaining dark brown fill had retained its colour and was different from the soil to its south, which would not be easy to explain if the differences between pit fills and surrounding layers were entirely created by natural processes.

Under the red-brown clay 131 through which the pit was cut was a block of mottled yellow-ochre clay with a fringe of soft red-brown iron-pan about 0.25 m from, the stone pit (Illus 7.80). This yellow-ochre clay block seems to be stratigraphically the same as the grey brown mottled soil which lay above the natural to the south; its difference in colour was probably related to the iron pan which embraced it and has little or no stratigraphic significance.

7.7.3 Discussion

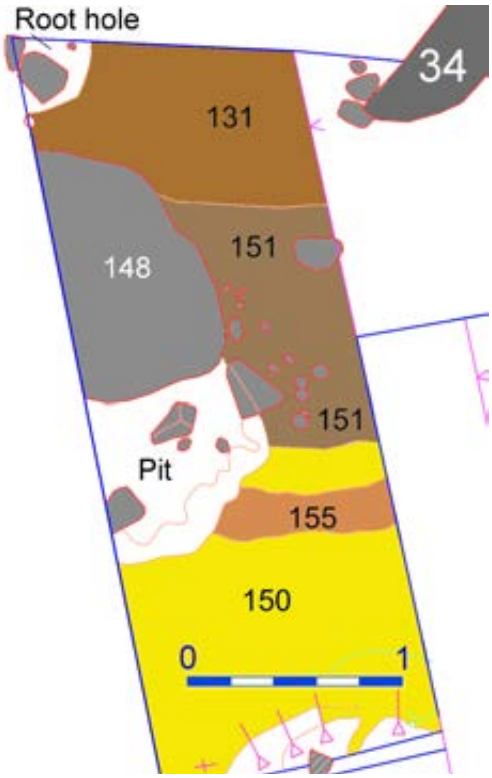
The sequence of activities seems to have been as follows. First superficial soils and stones were cleared over a larger area than required for the main depth of the pit for Stone 34. Then the latter was dug. The stone was placed in the pit, which was filled with mainly sandy soils. Finally head-sized stones were placed round the base of the stone.

Illus 7.77 The area round Stone 34 on 23-25 May 1980 [Film 1980-11-16]

The stone pit cut red brown fibrous clay soil 131 as well, probably, as higher levels which had developed into modern topsoil by 1980. It is not safe to say that soil 131 was the same as any of those soils directly related to the various stages of enclosure. Plough soil 130.1 in the shallow linear depression above 131 did contain a Food Vessel sherd dated to between about 2100 and 1750 BC, but it may have been ancient when it was incorporated so does not help in dating 131. Thus, lacking any direct dating of its own, the stone pit cannot be dated relative to the enclosure or the Ring.

Nevertheless, and even though it has little evidential value, our impression from the height of the packing stones in what was by 1980 modern topsoil was that Stone 34 was probably set up later than ploughing of the second stage enclosure, and perhaps substantially later.

Lastly, it is well to recall that Stone 34 may never have been considered part of the Avenue, and it may have been set for reasons unconnected with it.



Illus 7.78 Plan 80/08 (part) of c.26 May 1980 [NMRS DC38027]

Illus 7.79 Rubble fill 151 and Stone 34 on 27 May 1980 from the west [Film 80.13.10]

7.8 Phase 10c to 10e Burial and ground-working in Areas BIV and BV

The area south and southeast of the chambered cairn was used for deposition of funerary remains, and possibly also soil containing domestic material. It was subsequently ploughed with an ard; indeed judging by the evidence from Areas B and D working-over of the ground and deposition of burial-related material may have alternated. On Area D some of the ard marks penetrated around 0.2m into underlying levels. On Area BV, as on Area D, ground-working, including ploughing, disturbed small deposits of domestic or burial material.

Areas BIVS and BV made up the only area at Calanais with unambiguous remains of a burial deposit. Even the chamber of the cairn lacked these in 1980 and 1981 although organic deposits and fragments of cremated human bone had been removed by Sir James Matheson's workforce in 1857.

7.8.1 The general sequence in BIV and BV

In 1980 an exploratory slot trench was dug within BIV (Illus 7.82 key plan & e.g. Illus 7.87). It cut through several dark layers. A composite section was drawn composed of an upper part provided by the west side of BIV and the west side of the slot trench (Illus 7.82). In 1980 Area BIV was expanded west, south and east and the areas of expansion were called BV. The west section of BV was also drawn.

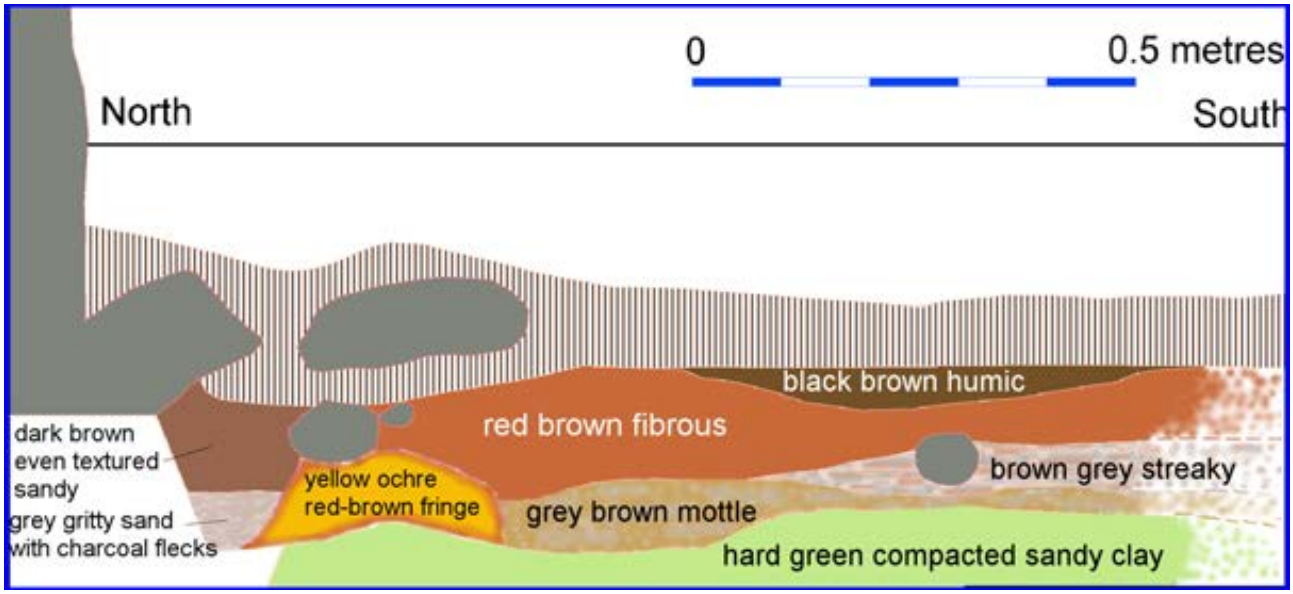
In Illus 7.82 the layers on the 1981 section (and many of those on the 1980 sections) were not given labels. Minor modifications have been made to the labelling on the 1980 sections after careful study of the record of layers on successive plans. Some parts remain over-simplified; the most obvious example is use of the label 134 on the 1980 sections for topsoil as well as for the line of stones running alongside East Row stones 30 and 31 to their north. Illus 7.83 presents an interpretation of the sections. Although it is a major simplification, and the depiction of the cultivation bed to the right is only weakly supported by the recorded evidence, it presents the main stratigraphic blocks in Areas BIV and BV.

7.8.2 Charcoal rich soil139

The preferred interpretation of charcoal-rich soil 139 is that it was associated with damage to the Stage 4 enclosure. It was therefore described and discussed in Chapter 7.6.1 to 7.6.2.

7.8.3 Plough soil 141

Plough soil 141 was first recorded near East Row



Illus 7.80 Section 80/11 Part E, Stone 34 southward along the east side of BI [NMRS DC38031E]

stone 31 in 1980; it was subsequently found along the south side of Area B from East Row Stone 31 to the western baulk near the Ring, filling much of Area BIVS and BV (Illus 8.84). Although it is not certain that all of parts of the soil labelled 141 were of the same date as one another, because ploughing and other ground-working may have been patchy, they were in much the same stratigraphic position as each other.

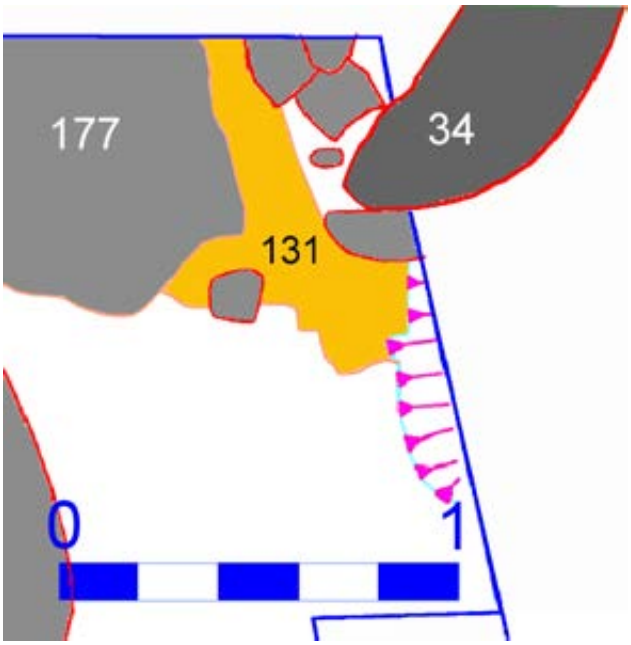
In the upper part of 141 in BIV and BV there were patterns of stones which could be interpreted as forming damaged small enclosures each up to a metre across (Illus 7.84). There was also one candidate for remains of a more formal setting. At a point c. 2.6 m north of the SW corner of the trench (obvious on Illus 7.82 Section 10, and marked A on Illus 7.84) was a 0.3m tall vertically set stone, and to its north a pair of stones one above the other. These appeared to be set near the middle of a cut at least a metre long north-south and 0.3 m deep by the western side of the trench.

The vertical stone and its companions were opposite the southern boundary of the patch of 139 in the 1980 drawing of the west side of BIV (Illus 7.82). They were significantly north of a continuation of the line of East Row stones 31 and 30. It thus seems unlikely to have been connected with the Row. The purpose the stone served is quite unclear; but perhaps it was related to a burial.

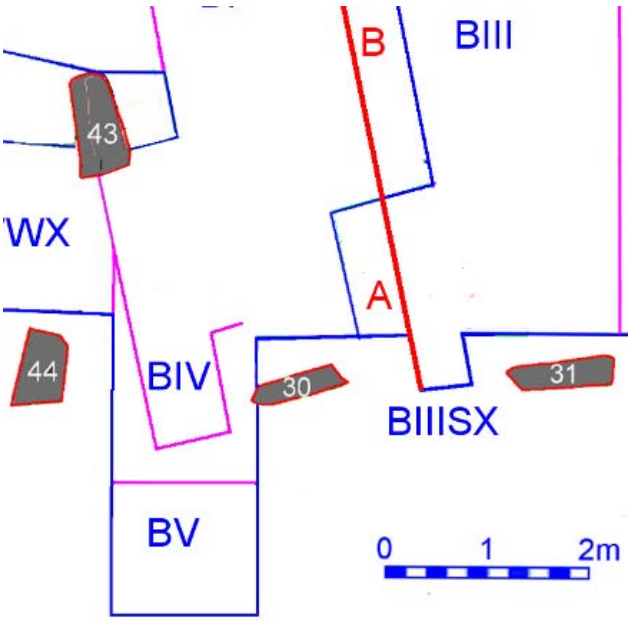
Layer 141 thinned out to the south of BV (Illus 7.85, 7.87) but this may have been more apparent than real in the sense that it became much lighter in colour because the material from which the soil was created by ploughing contained far less comminuted charcoal.

More generally layer 141 became grittier and greener downward. In the north of Area BIV/BV it overlay sandy green clay 812 and 810.1 and in the south it merged down into a disturbed sandy green layer 810 and 812.1 with patches of loam (Illus 7.85 to 7.87). Neither 810 nor 812 was shown on plans or mentioned in the middle of the trench.

Ard marks 194 were broad enough that they might have been cut from not much higher up, perhaps from the top of 141. Black ard marks were also noted in the southwest corner of the area but do not seem to have been planned.



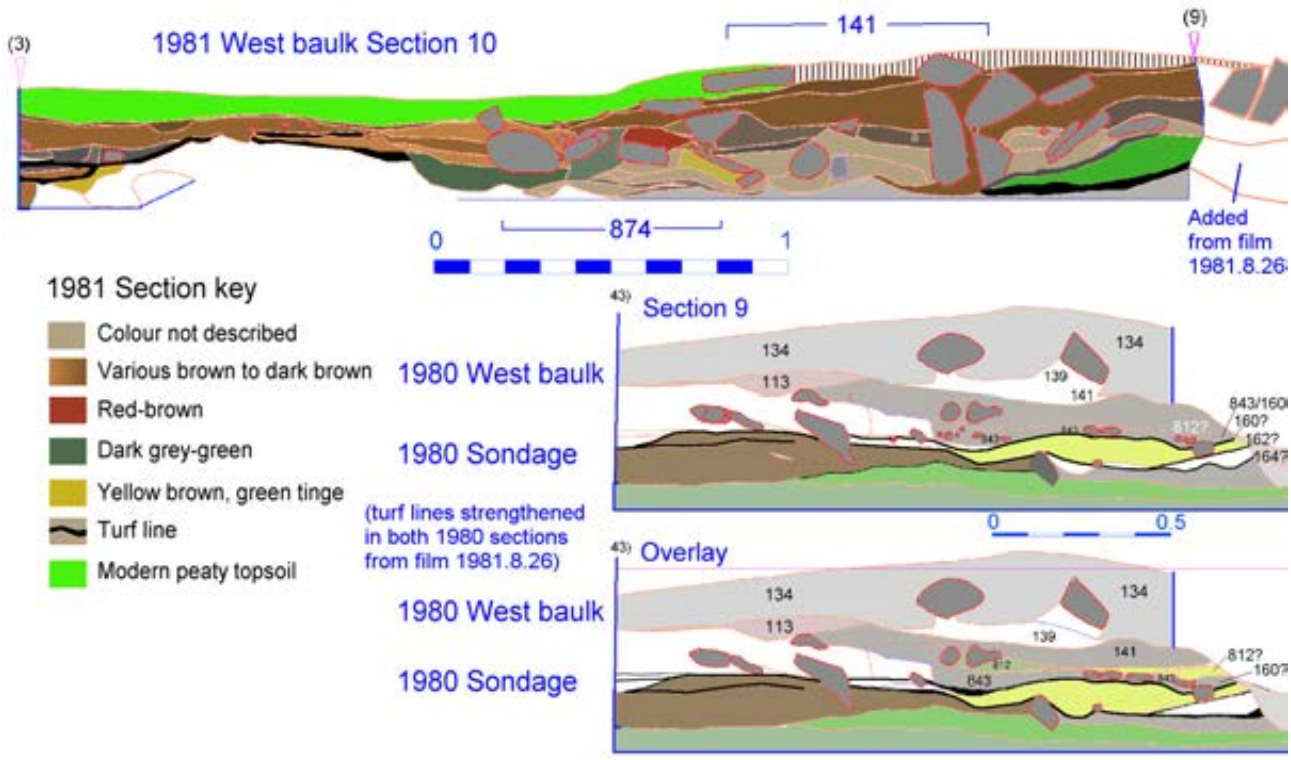
Illus 7.81 Plan 81/53 (part) [NMRS DC38087]



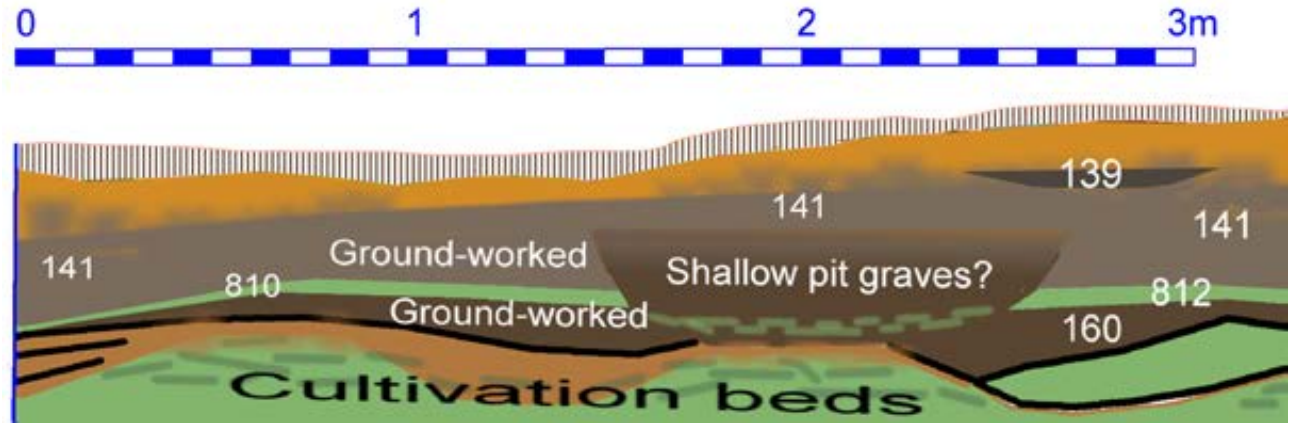
Illus 7.82Key plan

The plough soil thinned out northward. So did the underlying green 812 and the dark layer below that, soil 160. Indeed, 141 and 160 seem almost to have merged in some places north of Stone 30.

Plough soil 141 contained many finds. Pottery was discovered only in the parts of the layer west of East Row Stone 30.



Illus 7.82 The west side of Area BIV in 1980 and of BV in 1981. The sections are at a slight angle to each other as shown in the key plan [NMRS DC38029 and DC38044]



Illus 7.83 Simplified interpretation of Illus 7.82 (vertical scale exaggerated)

10 sherds plus crumbs from large Beaker ASH 42 (Cat 388_392) were assigned to soil 141 but actually came from Context 894 or the interface between 141 and 894 (See plan Illus 7.89, Find spot 135). The large possibly late sherds Cat 752-751 were from the same pot as Cat 756 which came from the underlying disturbed green clay 812 in BVSX; and also from the same pot as Cat 759–761 from Area DI layer 369. The latter underlay the main plough soil (315) on Area D.

Several of these sherds came from just above the egg-shaped depression 813 (discussed again below).

The day book records that there was a tendency for the sherds higher up in 141 to be small and weathered, while those lower down tended to be larger and in discrete groups. Although some of the find-spots were numbered on plans there are few links between those numbers and entries in the Finds Book, so it is currently impossible to be more specific.

Soil 141 also contained lithic artefacts including two quartz barbed-and-tanged arrowheads (Table 7.19).

Table 7.18 Pottery from 141

Cat	Area	Comments
69_76	BVSX	6 sherds, 2 fragments and 2 crumbs from a single E/MN corky pot.
249	BV	A sherd from an E/MN non-corky pot.
265	BVSX	A sherd from a probably E/MN non-corky pot.
266	BVSX	A sherd from an E/MN non-corky pot.
267	BVSX	A sherd with interior and part of rim spalled off from a Hebridean Incised pot.
370	BVSX	A sherd from Early International Beaker ASH 39; conjoins Cat 371.
371	BVSX	A sherd from Early International Beaker ASH 39; conjoins Cat 370.
386	BV	A sherd from large Beaker ASH 42
387	BVSX	A sherd from large Beaker ASH 42
451	BIVSX	A sherd from a thin fine Beaker, undecorated except for a low, gently ridged cordon.
452_456	BIVSX	5 markedly abraded sherds; may well be E/MN pottery, perhaps Hebriden Incised; but could be Beaker.
461	BIVSX	A sherd with the interior spalled off, from a Beaker.
466	BVSX	A sherd from a large, relatively thick-walled domestic Beaker.
469_470	BVSX	Flat base of thin fine Beaker; exterior spalled off.
484	BVSX	2 refitted sherds from a Beaker.
485_487	BVSX	2 sherds, a fragment and crumbs probably from a Beaker.
539	BVSX	A sherd from a Beaker.
540	BVSX	Very small, heavily-abraded sherd probably from a fine Beaker.
544	BIVSX	A sherd from a thin, fine, medium-sized Hebridean incised pot
545_546	BIVSX	A sherd from a thin fine pot; could well be fine Beaker, but can't rule out E/MN date.
607	BVSX	One of three refitted sherds (Cat Nos. 607–609, probably a domestic Beaker
608	BVSX	One of three refitted sherds (Cat Nos. 607–609, probably a domestic Beaker
609	BVSX	One of three refitted sherds (Cat Nos. 607–609, probably a domestic Beaker
610	BVSX	Sherd with exterior spalled off. Could be from a domestic Beaker
693	BV	A sherd from a small, fine, thin-walled Beaker.
750_751	BVSX	2 sherds from either a large domestic Beaker or an E/MN corky pot.
752_755	BVSX	From a very large pot with a distinctive tongue and groove ring joint, a technique known from post-Roman Iron Age 'Plain Style' Hebridean pottery. But the possibility that this is a domestic Beaker cannot be completely ruled out.
869	BVSX	Sherd from a small, thin, fine Beaker.
870	BVSX	Sherd from small, thin fine Beaker.
871	BVSX	Abraded spall from either a fine E/MN corky pot or a fine Beaker

Table 7.19 Lithics from soil 141

Cat	Area	Comments
6	BVSX	A quartz flake.
7	B	3 indeterminate quartz
26	BIII	A quartz flake.
41	BVSX	A flint flake
42	BVSX	1 indeterminate mylonite
43	BVSX	A mylonite flake
44	BVSX	1 indeterminate mylonite
45	BVSX	A quartz flake and 1 indeterminate quartz.
160	B	A mylonite flake
167	B	Medial fragment of quartz macroblade.
218	BVSX	Quartz barbed-and-tanged arrowhead, Green's type Sutton A
219	BVSX	Quartz barbed-and-tanged arrowhead, Green's type Sutton B
220	BV	Mylonite short end-scraper on platform flake

A shaped piece of pumice-type stone (Find 81.394) was not stored or studied with the other lithics.

Two samples from 141 were examined for charcoal but despite its overall abundance it produced no identifiable fragments (Chapter 22: Macroplant).

Like layer 139 soil 141 contained pollen (Samples 2085 and 2086) generally characteristic of Pollen zone CaN-3c, apart from high Compositae lig percentages. Tree pollen values were very low. The non-tree pollen consisted mainly of grasses and heathers. That may imply the nearby presence of pasture and rough grazing at the time 141 was being ploughed. The pollen values for Cruciferae, Ranunculaceae and Compositae lig. were unusually high, but Plantago not particularly so.

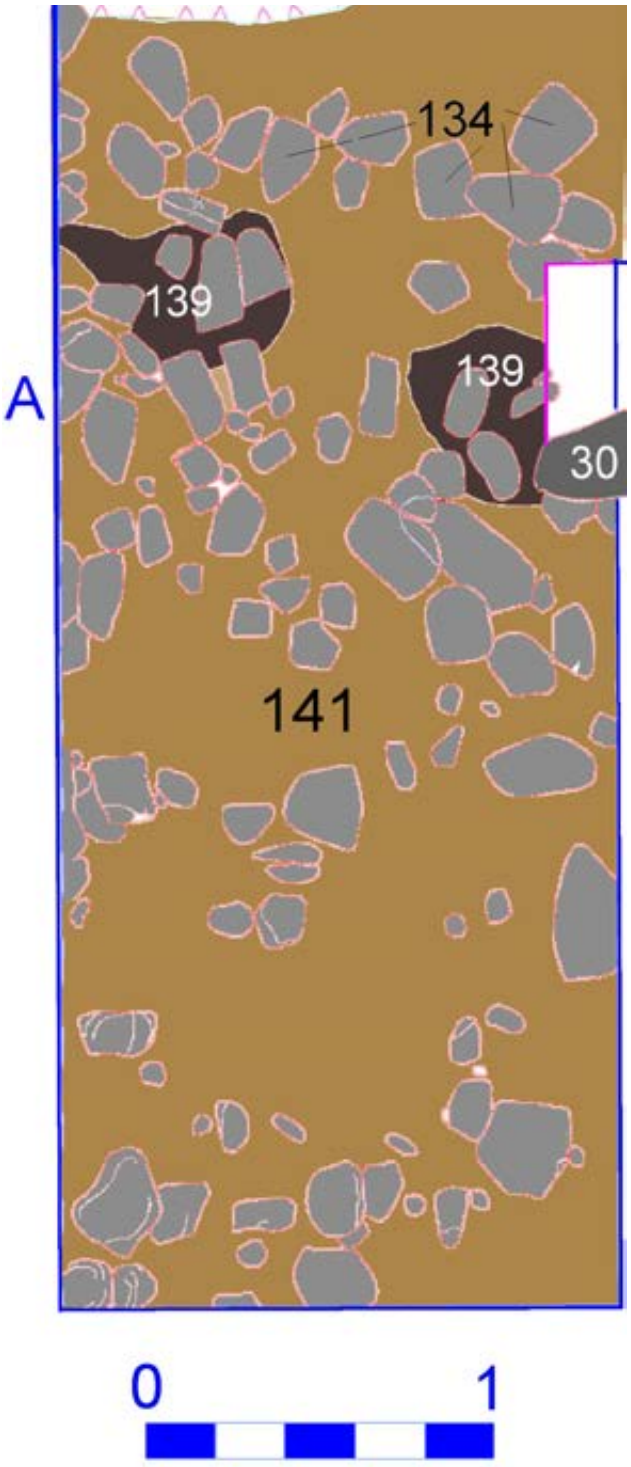
The transition at some time between 1880 and 1520 cal BC from CaN-3b to 3c together with the date of between 1940 and 1690 cal BC from the heather twig charcoal in the overlying layer 139, suggest a date for at least some of the later episodes in the formation of soil 141 between about 1880 and 1690 cal BC.

7.8.4 Interpretation of plough soil 141

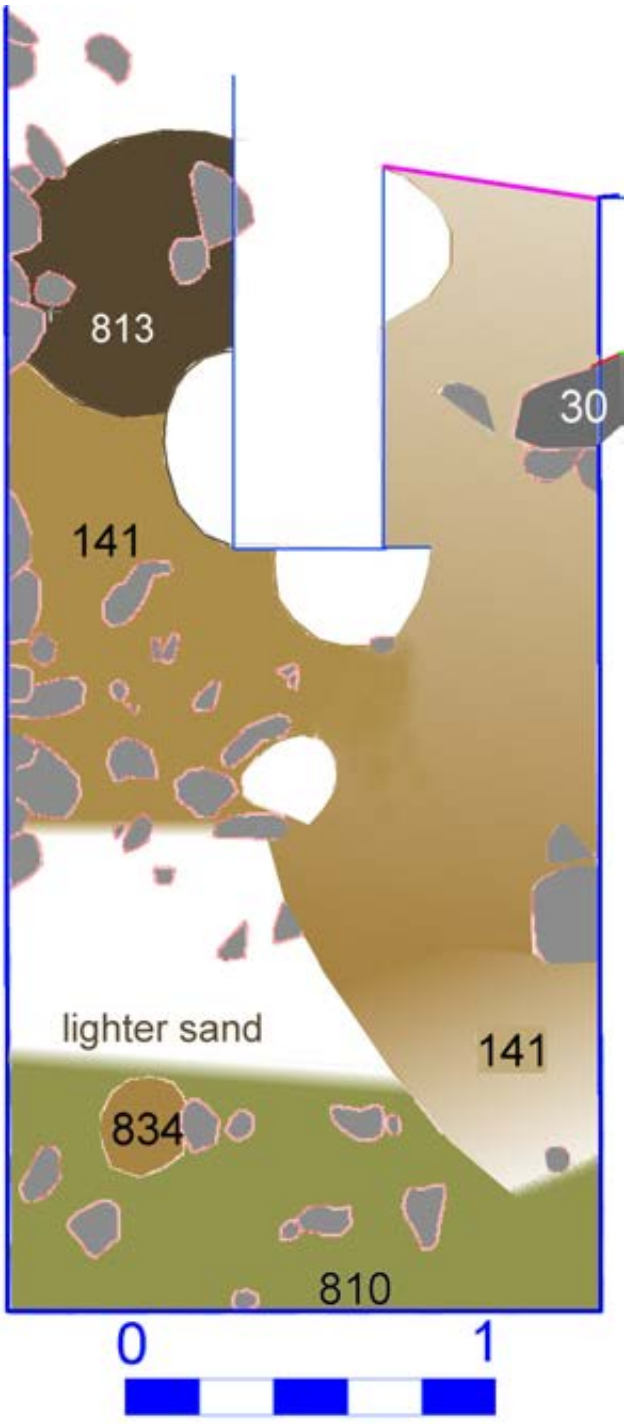
Cosmo Innes' version of the 1857 letter from Sir James Matheson includes a description of the chamber contents. It refers to 'minute fragments of what we suppose to be bones found in the chamber, and a black unctuous substance in which these fragments were contained' (Innes 1860, 112). This raises the possibility that the charcoal-rich deposits in BV were dumped there in 1857. But that does not seem very probable for if they had been it is unlikely that the placements of the stones in charcoal-rich layer 139 and on plough soil 141 would have possessed even the hints of structure that they did. It is unlikely that the heather twig in the deposit 139 on top of the plough soil, by then over 3500 year old, would have survived as well as it did. It is unlikely that ard marks of prehistoric type would have been created in the strata under 141, with the latter merging down into the former. If the disturbed burial below 141 came from the chamber in 1857 it is unlikely that it would have been left unmentioned by Matheson. So this possibility can be rejected.

Soil 141 seems to be a cultivation soil similar to 315 on Area D. Broadly speaking it seems that deposits containing burial or domestic material were placed and spread in this area forming a succession of black features, and that these deposits were worked over with a spade, hoe or ard. Some at least were ploughed, producing ard marks 194 in the south of the trench.

In broad terms plough soil 141 was created over much the same period of time in the late 3rd and the 2nd millennium BC as plough soil 315 in Area D; or at least it contained similar material. The fact that sherds higher in the soil were in general more abraded and small than those lower down suggests that ground-working happened many times. The abundance of Beaker sherds and the presence of parts of Food Vessels (ASH 75) in 813 below 141 and ard marks 194 support the radiocarbon and pollen evidence for ground-working in the first half of the 2nd millennium BC.



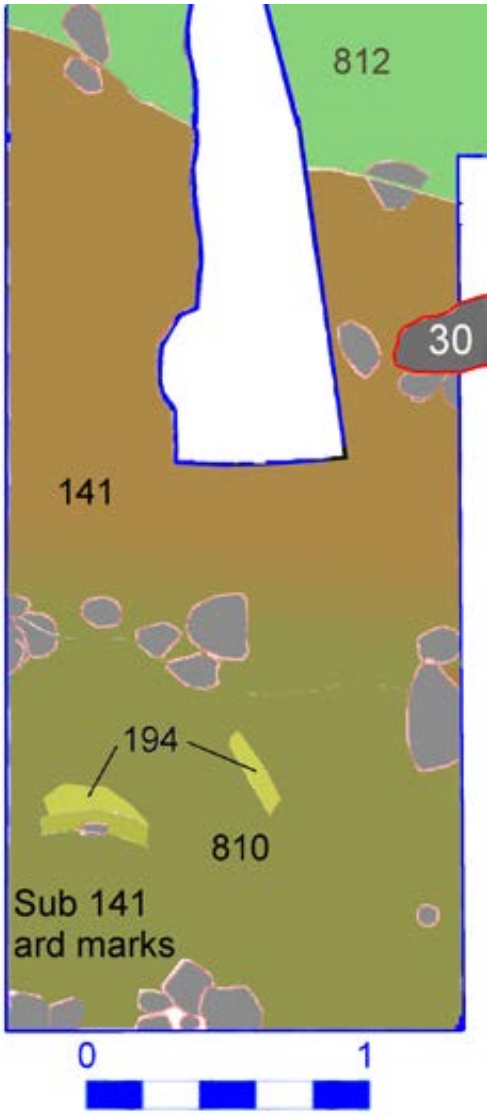
Illus 7.84 Plan 81.16 Clusters of stones on top of soil 141 [NMRS DC38050]



Illus 7.85 Layer 141 partially removed in Area BV on 11 May 1981 [Plan 16A/81 NMRS DC38050]

The frustrating suggestions of small stone enclosures just above it - frustrating because the patterning of the stones was too weak to provide conclusive evidence - hinted at subsequent use of the area for deposition of burial-related or domestic material. The 0.3m tall vertical stone and associated stones, in a cut visible in the west section, partly surrounded by plough soil 141 may have been part of a funerary feature but remain enigmatic (Illus 7.82).

Illus 7.86 Layer 141 in BV from the south in 1981. Stone 44 of the Ring and Stone 30 of the East Row are visible. [Film 81.6.22]



Illus 7.87 Layer 141 partially removed Plan 17/81 with sondage etc added from Plan 18/81 [NMRS DC38051, DC38053]

7.8.5 Scoop 813 in plough soil 141

Illus 7.88 is copied from a marked-up Polaroid taken after re-emptying of the exploratory slot trench dug in 1980, and removal of soil 141. The top edges of the trench and the slot have been outlined in blue.

Under the top part of 141 in the area of the cut by the west baulk was an egg shaped area 813 (Illus 7.88). Its fill was dark blue-grey slightly greasy clay with many iron concretions and abundant pottery. Its west end lay just under the west baulk and it ran somewhat north of east across Area BV at least as far as the edge of the exploratory slot dug in Area BIV in 1980 (Illus 7.88). It lay inside the cut seen in the west baulk section (Illus 7.82). Although its edges were indistinct, it was about 1.2 m long east-west by 0.75 m wide. It contained sherds from diverse pots. It also contained a quartz flake CAT 49, a mylonite fragment (CAT 216) which was probably a rough-out for an arrowhead, and a piece of quartz (CAT 8).

Sherds 394_398, 605_606 and 872-874 were originally assigned to 812 but that was almost certainly an error, given Plan 81.18 (Illus 7.89) and a seemingly immediate correction from 812 to 813 for 872-874 in the Finds Book. The sherds are interpreted as coming from 813.

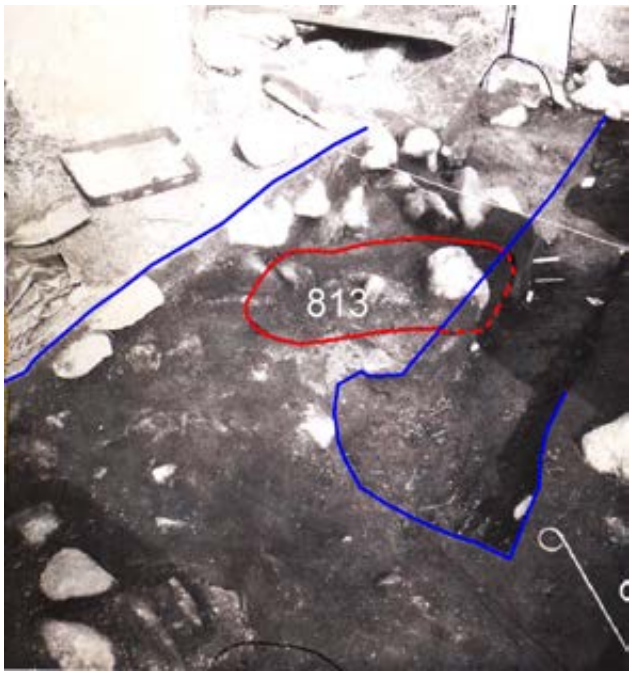
Potsherds Cat 342 and Cat 343 were from an AOC Beaker ASH 37, as was Cat 342 which conjoins with Cat. 350. Beaker sherd Cat 350 was found in layer 160 in BVWX, on the south side of the chambered cairn passage fairly close to scoop 813. Beaker sherd Cat 343 probably conjoins with Cat 346 from disturbed sandy green clay BV 810. A sherd probably from a large domestic Beaker (Cat 555) came from the same pot as Cat. 554 from BIII general soil 117 and Cat 556 from BV 810, and a similar pot, conceivably the same pot, came from DV main plough soil 344 (Cat. Nos. 549–553). Fine Beaker sherd Cat 744 was very similar to Cat. 747 found in a sample from BIII (context not recorded).

Illus 7.89 shows the distribution of finds of pottery assigned to the interface between 141 and underlying features.

Find spot 172 marked a flint flake (CAT 32).

Table 7.20 Pottery from BV 813

Cat	Comments
264	An E/MN non-corky sherd with part of interior spalled off. Plans 18/81, 19/81 and 20/81 and the original finds book conflict and it is conceivable that the sherd came from similar black feature 814 or black layer 160
329	A Hebridean Incised sherd.
342 & 343	2 sherds from thin, fine AOC Beaker assigned to ASH 37.
344_345	2 abraded spalls probably from a fine Beaker
368	A sherd from thin fine Beaker ASH 39
369	A sherd from thin fine Beaker ASH 39
385	A sherd from large Beaker ASH 42
394_398	Four sherds and a fragment from large Beaker ASH 42
399_400	2 rim sherds from a fairly large pot; either Beaker or E/MN non-corky. Parts of both sides spalled off
555	Small abraded sherd probably from a large domestic Beaker.
585_588	4 sherds, 2 refitted and 2 crumbs from Food Vessel ASH 75.
605-606	2 refitted sherds possibly from a 'domestic' Beaker, but unusually hard and an earlier or later date cannot be ruled out.
744	Sherd from a thin, fine Beaker, or just possibly a very fine E/MN pot.
872-874	Two refitted E/MN corky or Beaker sherds



Illus 7.88 Egg-shaped depression 813 in 1981, [Day Book Page 22 Polaroid cleaned up]

The links between sherds in 813 and sherds in BIII (one from general soil 117 and the other from an unrecorded context) are not altogether unexpected given that sherds (Cat 576, 577) of the Food Vessel ASH 75 were found at a similar level in the south extension of BIII, near East Row stone 31. The link between the large domestic Beaker sherds in 813 and those in Area D plough soil 344 seem from the pottery descriptions to be open to question. There were remarkably few other examples of pots with sherds found in both Area B and Area D. That said, the two find-spots were an easy lob away from each other.

The Finds Book had the context of find 81.160 as 812 but the nearby entry for 81.162 in the Finds Book was almost immediately corrected from 812 to 813, and 81.160 is shown as from 813 on Plan 18/81.

Not all of the finds attributed to BVSX 141 were included on the plan (Illus 7.89). Those omitted are listed in Table 7.22.

Table 7.21 Pottery shown on Illus 7.89

Find	Comments
81.135	From the top of feature 894, sherds of Beaker ASH 42; the finds appear to have been re-numbered 81.141 in early post-excavation processing because the finds number 135 had also been used for pot from Area H. The 8 find-spots marked are almost certainly Cat 388-392.
81.136	From dark soil 141 by 894, a quartz barbed and tanged arrowhead of Green's type Sutton A (CAT 218).
81.140	From context 141 according to Finds Book; but pottery not found during specialist pot examination.
81.141	From context 141, the charcoal-rich soil overlying 813. Up to 2 of the sherds of Cat 388-392 (see Find 135 above). Large sherds of a Beaker ASH 42. Also a sherd probably from a domestic Beaker.
81.160	From context 813, 2 refitted sherds from a possible domestic Beaker
81.161	In the Finds Book this is assigned to BIV 867, a patch of black charcoal and iron pan to the north of East Row stone 30. There is an error either in find spot numbering or in the Finds Book
81.162	From green clay 813, either an E/MN non-corky pot or a Beaker.
81.163	A lump of concreted material

Table 7.22 Pottery from BVSX 141 but not shown on Illus 7.89

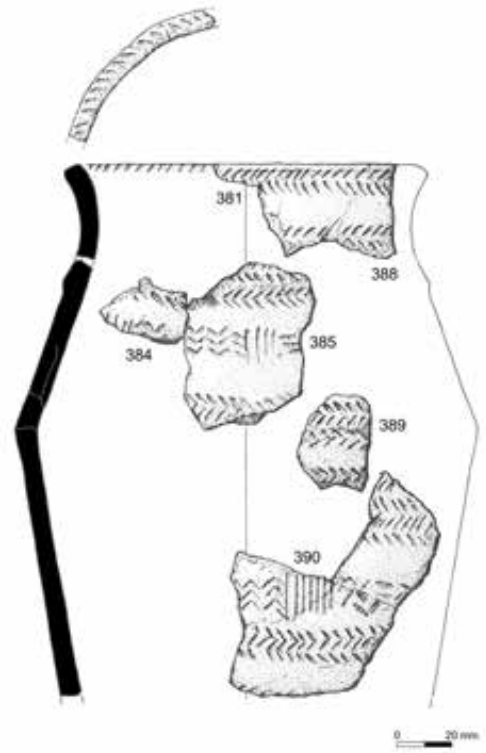
Find	Comment
81.139	A sherd of Beaker ASH 42
81.137, 81.392	2 sherds of a Beaker of Early International type ASH 39 with most of outer face of rim missing.
81.137	3 unclassified small non-corky sherds
81.145	From green clay 812 under 813

7.8.6 Skeletal material in scoop 894/841

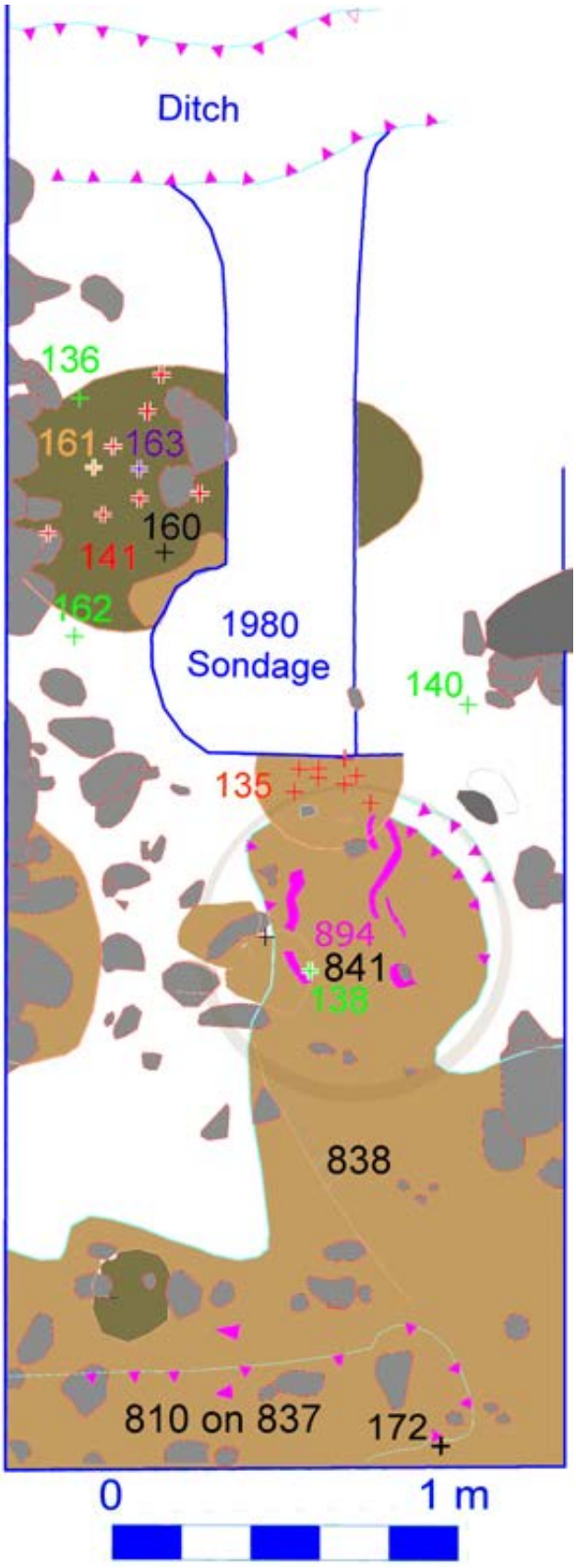
Scoop 841 to the south-south-east of scoop 813 contained decayed bones. On Illus 7.89 its approximate size and position are suggested by a light grey ring added during post-excavation analysis and based on the hachuring at top right and the information that it was about 1m in diameter. It need not have been exactly a circle, so the grey ring is no more than an indication. Indeed, given the patchiness of its fills, including material like that in plough soil 141, it may have been more the combination of a succession of smaller scoops than a large single one.

Just to the south of the 1980 sondage in the uppermost part of rotted stones 843, but spreading into the 1m diameter depression 841 to its south, were remains of a very shallow feature, assigned the label 894 during post-excavation work. During excavation it was thought to have been a disturbed crouched burial; careful cleaning revealed pale shadows of bones, drawn in magenta on Illus 7.89.

Illus 7.90 Recording of features 894 / 841 [Film 1981-13-26]



Illus 7.91 Beaker ASH 42



Illus 7.89 Finds from the level of possible burials [Context Sheet 841, Plans 16-81 and 18-81 NMRS DC38050 and 38052]

Table 7.23 ASH 42 sherds

Cat	Area	Ctxt	
374	BIV	134	2 conjoining (and now refitted) sherds from upper part of belly; one fitted to Cat 375
375_377	BIV	139	3 sherds, 377 a spall and one (Cat 375) refitted to Cat 374) from neck of large Beaker
378_379	BIV	139	2 conjoining spalls (now refitted) plus crumbs from lower part of neck
380	BIV	139	One spall from large Beaker
381	BIV	160.2	Rimsherd Refitted to Cat 388.
382	BIV	814	A sherd from area of neck cordon
384	BIV	867	One sherd; conjoins Cat 385
385	BV	813	One sherd. Conjoins Cat 384.
386	BV	141	One sherd
387	BVSX	141	One sherd
388_392	BVSX	894/141	10 sherds and crumbs most of which were probably originally given a Find Number of 81.135 and renumbered 141 because 135 had already been allocated to a sherd from Area H. Cat 388 refitted Cat 381).
393	BVSX	160.2	One sherd
394_398	BVSX	813	4 sherds and a fragment, including small rimsherd.
401_403	BVSX	837	3 sherds

Contexts 134, 139 and 160.2 were mostly dark soil layers above 813 and 141 near the 1980 sondage; 141 was the plough soil. 814 was a shallow black hole between layers 141 and 812 on the east side of the sondage, 837 was a black-filled slot (probably an upper fill of a trough between cultivation beds) at the south end of the trench.

7.8.7 Discussion of skeletal material from 894/841

The preferred interpretation of the skeletal remains is that they came from a single inhumation in a shallow scoop or in the chambered cairn, subsequently disturbed.

Within this preferred interpretation the sequence (possibly subsequent to original placing of the skeletal material Beaker and the arrowheads in the chambered tomb) was first the digging of a shallow scoop (all or part of context 894 on Illus 7.89) into basal 141, deposition of pot ASH 42 and skeletal material, and (perhaps significantly later) ground-working which reduced the top of the scoop. One sherd was moved during ground-working c. 1.5m southward. Then egg-shaped shallow pit or scoop 813 was dug through plough soil 141. It too may have been used for independent burials or for deposition of material from the chamber but if so no skeletal material survived in it. It was backfilled with the plough soil with sherds of several pots including ASH 42 and one of the barbed and tanged arrowheads. Everything was subsequently disturbed by more ground-working.

This story may be far too simple. But even if the detail is wrong, and even though formal associations cannot be proved, it seems most likely that the rotted skeletal remains, the fine Beaker ASH 42 and the arrowheads were part of a grave group.

The sherds of early Beakers ASH 37 to 39 found in soil 141 and the scoops cut into it may represent other disturbed burials. ASH 38 at least was definitely earlier than the chambered cairn (because a sherd of it was found in the primary cairn material). Details are described and discussed in Chapter 7.12.

7.8.8 Scoop 814

Other shallow features, notably black scoop 814, were found at the base of 141 to the north of Stone 30 cut into a grey-green sandy clay 812. Here, outwith the area of the cut containing charcoal-rich burial material, the plough soil directly overlay 814 and 812 (Illus 7.92, 7.93). A diagram on Context Sheet 814 suggests that, to the east of 814, layer 812 had the character of 810: disturbed with charcoal and potsherds in it (Illus 7.92). The patch has been relabelled 810.1 during post-excavation, to separate the finds in it from those in 810 to the south of BV. Its extent is not shown on Illus 7.93 because it was not individually planned. Scoop 814 was at much the same level as the large scoop or pit 813 but on the other side of the 1980 sondage. It was both cut through and overlain by plough soil 141 and was cut into green sandy clay 812. It contained iron concretions, like a conglomerate. Its upper portion was truncated by the modern drain. It was cut into a material like lower soil 141 with much iron panning, probably the top of soil 192, which itself was probably much the same as underlying soil 160 and probably the source of the fragments of iron pan in its fill (Illus 7.93, 7.94).

Scoop 814 (and the underlying iron-panned material similar to plough soil 141) were cut by the light sandy material round Stone 30. Note that a comparison between Plan 19/81 (Illus 7.93) and 17/81 (Illus 7.87) shows that layer 812 overlay sandy material 844. Details are described and discussed in Chapter 7.12.

The lower portion of 814 is shown on Illus 7.94. The surrounding material at this level was not given a context number, but to its north, west and east it was probably grey sandy area 192 (with linear black features in its top) which feature 846, itself truncated by scoop 814, is recorded as cutting; an annotation on Plan 21/81 records that 192 at a slightly lower level stretched southward from where it is marked on Plan 20/81.

Scoop 814 contained the following sherds.

Table 7.24 Pottery from dark clay 814

By the time 814 was excavated BIV had been expanded east as part of BV. The eastern part of 814 was in Area BI. If the assignations to subarea can be trusted the finds in 814 are listed in Table7.24 from west to east.

A black-grey ashy area 845 with some burnt earth and iron pan was found under it at the edge of Ditch 100. It seems to have been a small pit or scoop. A similar scoop 846, also under 814 and cutting 192 (and quite possibly also higher levels because its top had been truncated by 814) contained 3 sherds.

Table 7.25 Pottery from dark ashy area BIV 846

Cat	Comments
232	Either rim or rim flange from an E/MN non-corky pot.
233	Large E/MN non-corky sherd possibly from same pot as Cat. 234.
234	E/MN non-corky sherd possibly from same pot as Cat. 233.

Scoop 846 also contained a flint flake (CAT 15) and a mylonite flake (CAT 16).

7.8.9 Discussion of Scoop 814 and the small features cut by it.

These had been truncated by ploughing and backfilled with plough soil containing potsherds. It is interesting that 846 contained only E/MN sherds,

given the abundance of Beaker sherds in nearby contexts including 814. It seems likely that they were all cut through early 141 when the latter was not nearly as deep as it finally was - in other words, from the level of near-basal 141. It is of considerable interest that they appear to have cut through a well-developed iron pan because that shows that the latter formed at an early stage of ploughing, thus suggesting that 141 was created over a considerable period of time.

Given that they seem to have been backfilled with the local plough-soil, the small scoops seem best interpreted as having been dug for organic offerings. But some may have included one or more potsherds; their subsequent disturbance makes the evidence ambiguous. They were not the earliest such features in this area. At a stratigraphically lower level a small pit or scoop was found containing a substantial part of a Grooved Ware pot (ASH 61). Details are described and discussed in Chapter 7.14.

7.9 Phase 10a and 10c: Ground-working north and east of the enclosure

The sequence of the narrative between Chapter 7.9 and Chapter 7.13 depends on a choice of interpretation, because the evidence does not completely force the choice of one interpretation of the sequence over others.

The interpretation which led to the current narrative order rests largely on the idea that green clays 810 and 812 in Area BIVS and BV, with early Beaker sherds in them, were laid down before construction of the chambered cairn.

Alternative interpretations are put forward in Appendix 4 and the (ambiguous) evidence is described and discussed in Chapter 7.12. The alternatives include the possibility that dumping of clays 810/812, discussed in 7.12, and building of the East Row, discussed in 7.13, were in fact later than the enclosure discussed in 7.10 and chambered cairn discussed in 7.11.

Illus 7.92 Feature 814 cut into green-grey sandy clay 812 and 810.1, from the WNW; East Row stone 30 is at top right [Film 81.13.25]

7.9.1 General Introduction

This section concerns itself with the ploughing after the Stage 2 embanked enclosure had been abandoned and before the Stage 3 wall-base enclosure was built.

Despite variations stemming from climate divergences and the deepening of soils in the vicinity of the Ring, much the same mechanical, chemical and faunal soil processes were effective in the third and second millennia BC as in modern times (with the exception perhaps of worm activity, found only in some imported modern soils). Later plough soils incorporated earlier ones. Disentangling plough soils of different periods was normally impossible on much of Area B.

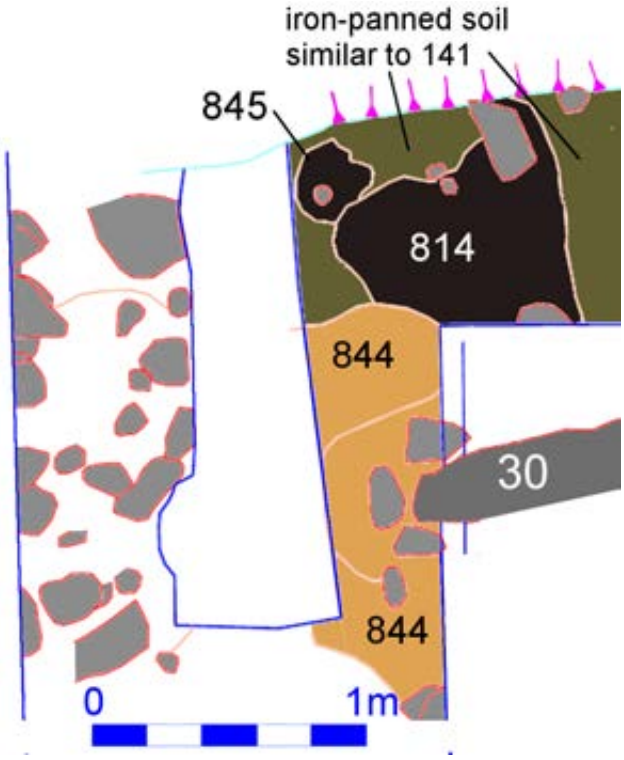
The evidence suggests that much of the area east of the Ring was ploughed after the Stage 2 embanked enclosure had been abandoned and before the wall-base enclosures were set up. Although this was one of the most distinctive ploughing episodes outside BIV and BV, there were both earlier and later episodes of cultivation (and possibly working-over of the ground for other reasons). In BIV and BV one episode, or several episodes, of ground-working resulted in the incorporation of many potsherds in plough soil 141. But over most of Area B such pot-rich deposits did not exist. Thus the same period or periods of ploughing would have been anonymous in most of the area.

Once again it is worth bearing in mind that the evidence which we recovered represents only a small fraction of what actually happened.

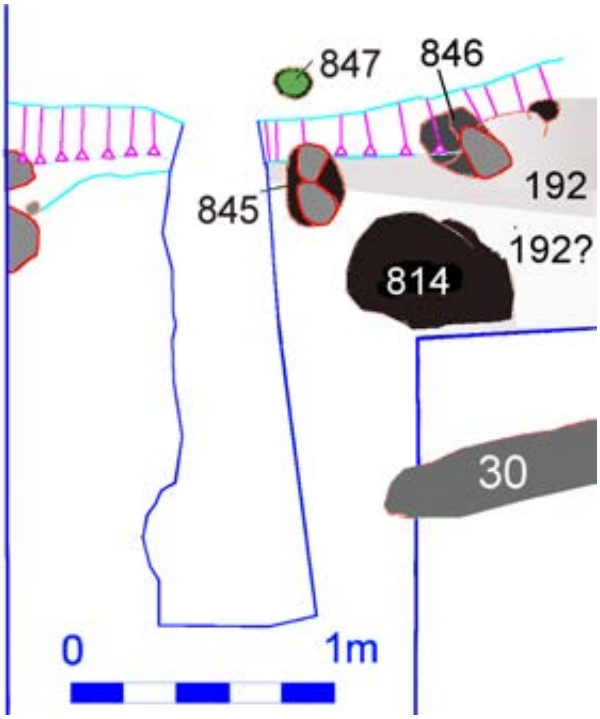
7.9.2 Soil 112 and similar soils

Soil 112 was found throughout Area B except inside the enclosure and in the southern trench BIVS/BV. It was distinguished from the generally higher pre-peat soil 117 by being less fibrous and, where there was an iron pan, being below the pan. Although much of it is interpreted as originating in ploughing down of the Stage 2 enclosure, in many places it was probably ploughed again during many subsequent periods.

Soil 112 contained many small finds probably derived from earlier layers. On the fringes of the enclosure in BI, 112 contained only Neolithic potsherds (Table 7.26).



Illus 7.93 Scoop 814 [Plan 19/81 NMRS DC38053]



Illus 7.94 Lower part of scoop 814 [Plan 20/81 NMRS DC38054 with slot trench added from DC38053]

Table 7.26 Pottery from Area BI pre-peat soil 112

772_777	112	Four sherds and 2 fragments from a fine non-corky pot; could well be E/MN.
778_780	112	A very soft and friable burnt non-corky sherd with 2 fragments plus crumbs . Most likely to be E/MN but too degraded to be diagnostic.

Table 7.27 Pottery from soil 112 in Areas BII and BII/III

Cat	Area	Comments
244	BII	A sherd from an E/MN non-corky pot
309	BII	A sherd from thin fine E/MN Heb Inc bowl ASH 32 with deep horiz incised grooves and diagonal lines below.
310	BII	A burnt; soft and friable sherd From a thin, fine E/MN corky pot
311	BII	A sherd from thin fine E/MN Heb Inc bowl ASH 32 with 5 deep horiz incised grooves.
320	BII	A sherd from a large Heb Inc pot
321_325	BII	A sherd, 4 fragments and crumbs from a thin E/MN Heb Inc pot.
353	BII	A sherd from thin fine low-carinated Early International Beaker ASH 39
598	BII	Small featureless body sherd from a pot of indeterminate date with hard, non-gritty texture.
802	BII	A sherd from an E/MN non-corky pot or a domestic Beaker
803	BII	Not definitely pottery; too abraded to say anything about it.
804	BII	Small, abraded spall; wholly undiagnostic.
805_807	BII	3 sherds from a thin-walled, fine E/MN non-corky pot or a domestic Beaker
578	BIINE	Rimsherd from large Food Vessel ASH 75
579	BIINE	A sherd probably from a 'domestic' Beaker, or less likely from an E/MN non-corky pot
282	BII/III	A sherd from an E/MN Heb Inc pot
327	BII/III	A sherd and a fragment from an E/MN Heb Inc pot. Bag says 'soil, final stones on circular bank'

Table 7.28 Pottery from soil 112 in Area BIII

681_682	BIII	Heavily abraded sherd and fragment from a non-corky pot; could well be E/MN.
683	BIII	A sherd from an E/MN non-corky pot or a domestic Beaker
684_687	BIII	4 burnt and heavily-abraded sherds probably from E/MN non-corky pottery but too degraded to be certain.
814_816	BIII	3 refitted spalls probably from a thin fine Beaker.
817_826	BIII	4 small, mostly featureless spalls. and 6 fragments probably from an E/MN Heb Inc pot.
827	BIII	Heavily abraded spall; could be from an E/MN non-corky pot.

North-east of the enclosure, in Areas BII and BII/III nearly all of the 17 sherds (plus a few fragments) were certainly or probably Neolithic (Table 7.27).

The exceptions were a sherd (Cat 353) from a thin fine low-carinated Early International Beaker ASH 39, some possibly domestic beaker sherds, and, from a sub-area labelled BIINE, a rimsherd (Cat 578) from Food Vessel ASH 75.

In BIII, to the east of the enclosure, the 12 sherds fit the same pattern with one thin fine Beaker sherd amongst an otherwise Neolithic assemblage (Table 7.28)

One abraded Neolithic sherd was found in BIIISX, close to the East Row (Table 7.29).

Table 7.29 Pottery from soil 112 in Area BIIISX

690	BIIISX	Abraded sherd; could be from an E/MN non-corky Heb Inc pot.

Soil 112 also contained pieces of hornfels (81.567), flint (81.68) and quartz (81.525, 81.568).

Clay soil 130 formed the core of the Stage 2 enclosure bank in several places. In BII during removal of the bank it was described as brown fibrous soil with charcoal in its upper part, which on trowelling proved to contain patches of turf and green clay in gritty brown soil. It included turf remnants in BII/III too. Its occurrence in the bank is described and discussed in more detail in Chapter 7.10.

Comparing the Day Book record and various plans and sections it is clear that, elsewhere, it was sometimes indistinguishable from soil 112 or appeared immediately under it. Similar soils, relabelled 130.1 during post-excavation, were found in BIN spread to the north of the bank and filling a shallow linear depression. Less comparable to 112 was soil 131, found mostly in BIN and particularly in a broad shallow depression near the base of Stone 34, was mixed material, red-brown when wet, but when dry it appeared as a fine biscuit coloured silty sand, iron coloured and root-penetrated, and thus less similar to 112. There can be no certainty that it originated in dispersed bank material. The label 131 was also used in BII. Finally a layer on Section 81/07 was labelled 132 and described as a rich brown clay. It was stratigraphically similar to 112/130 (Technical Note 7.9.2).

7.9.3 Discussion of soil 112 and similar soils

Apart from the rimsherd (Cat 578) of Food Vessel ASH 75, which may have been introduced during ploughing, the collection of sherds from soil 112 fits the idea that the bank soil originally contained only Neolithic and very early Beaker sherds.

Except in the bank in BII and BII/III, where 130 included fragments of turf, these red-brown soils 130, 130.1 and possibly 132 consistently occurred at the same level as soil 112 or immediately below it. They are interpreted as being spread-out remains of the Stage 2 enclosure bank.

Soil 112 is interpreted as being more complex in its origins, in places the result of further ground-working of soils like 130, and elsewhere the result of ploughing-in of the turf component of the Stage 3 enclosure wall. It may even have included parts of the turf component of the Stage 4 enclosure wall although that (and indeed parts of the ploughed-down Stage 2 enclosure) may instead have been represented largely by soil 117. It has to be emphasised, however, that the evidence supporting this interpretation is merely indicative, not conclusive.

7.9.4 Ploughing in BIN and BINX

Under soil 117 in the south part of Area BINX there was a grey turf line 806 (Illus 7.95). It was described and discussed in Chapter 7.4.8 in more detail than follows here.

The pollen in turf line 806 correlated possibly with an early stage during zone CaN-3c, which started at some date between 1880 and 1520 cal BC. Pollen from an ard mark cut into layer 806 (Sample 2063) suggests that the turf line was cut by much later ploughing; and it was perhaps that which led to incorporation of 2 conjoining sherds of Food Vessel 75 in soils in the linear depression 130.1 to the north.

It overlay a soil labelled 112? on Section 14/80 (Illus 7.95; Section G on the key map) and perhaps it represents stabilisation of the plough soil associated with primary reduction of the Stage 2 bank.

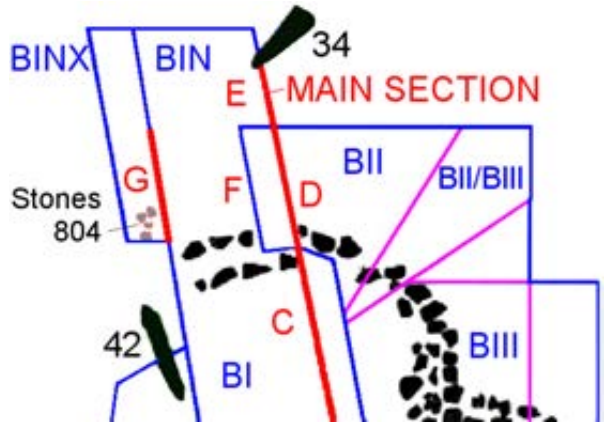
The turf line also overlay brown soil 130.1, interpreted as material ploughed down from the early enclosure bank. Originally labelled 130, it was relabelled 130.1 where it survived in the linear depression running across BIN (Illus 7.95, 7.96) and the same change has been made to the Section 14/80 on Illus 7.95.

In Illus 7.96 the south part of BIN to the right is at a lower stratigraphic level than BINX to the left. Ard marks 809 were found to the south-west of Stone 148 in layer 130.1 at the base of 117, the brown fibrous pre-peat soil.

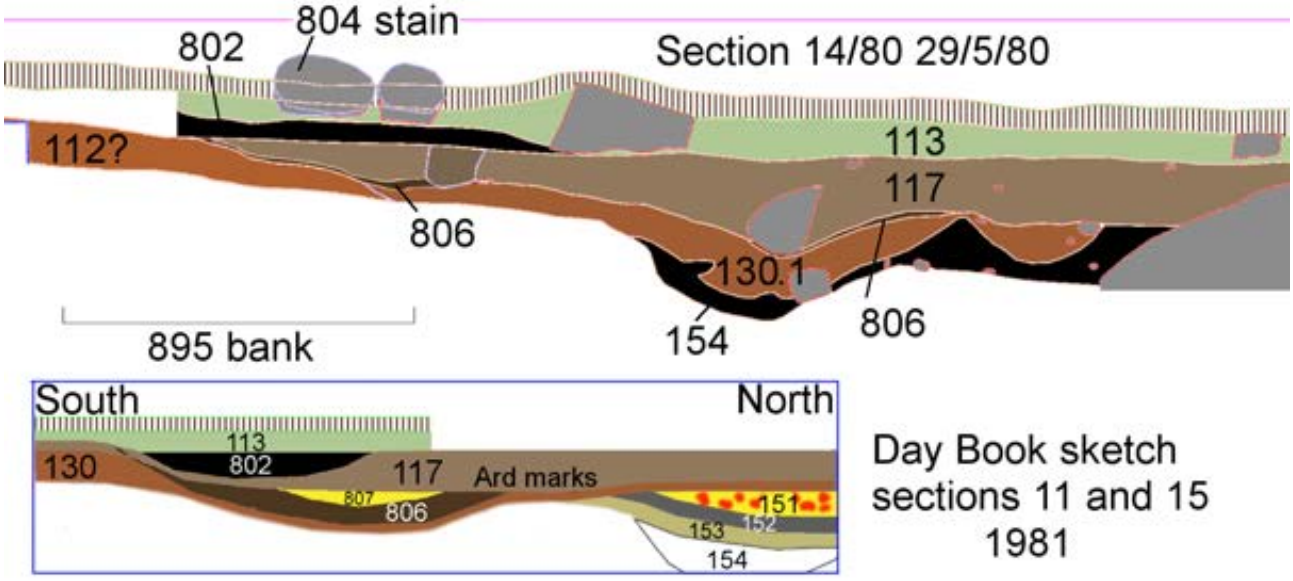
In BIN context 130.1 was fibrous and brown, with a reddish tinge in some places. It produced two sherds from a fine Neolithic cooking pot (Cat 727-728) and two sherds of Food Vessel ASH 75 (Cat 580-581) which provided a terminus post quem for ploughing of the layer.

More ard marks (809) became visible in 130.1 with cleaning (Illus 7.97 to 7.99; Day Book 11). They appeared to cut the overlying turf line 806. It should be noted that the material in BIN between 130.1 and bank 184 on these two plans seems to have been similar to both 130 and general soil development 112 (as Section G Illus 7.95 suggests). It also seems hardly likely that layer 806 (zoned by the pollen in sample 2013 to CaN3c) stopped precisely at the boundary between BIN and BINX but it must have been poorly developed or more truncated than in BINX if it was missed during excavation in 1980.

Ard marks 809 contained pollen attributed to a similar period to that in turf line 806, and they represent ploughing into the turf covering the stabilised ploughed-down bank deposits rather than the original ploughing which levelled the Stage 2 enclosure bank.



Illus 95 Key Plan Sections 14/80 and G



Illus 7.95 Section 14/80 [NMRS DC38034] and Sketch section notionally along the same line G, 6 to 7 May 1981 [Day Book 11 and 15, the latter corrected]

Two pollen samples from ard marks 809 (2023 and 2029) were analysed. Both were assigned to early CaN-3c. Sample 2029 could be compared with sample 2021 and 2030 from the late charcoal rich material 139 near the Ring roughly on the line of the East Row in Areas BIVS and BV. They contained relatively high Pinus values and lacked Cerealia pollen.

The other sample from 809, 2023, had comparatively high tree pollen values (13%), dominated by hazel but with pine pollen relatively abundant (2.2%). Heather (36%) and grass pollen (34%) each represented more than a third of the pollen identified. Cereal pollen was present, together with relatively high Compositae lig. values (3.4%).

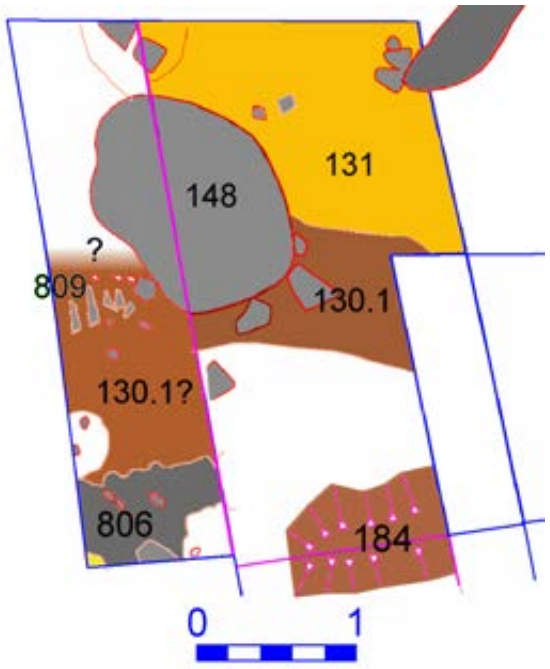
Layer 131 was first observed to the north of layer 130; it was stonier than 130 and stratigraphically earlier. It was similar to it when damp, but when dry it manifested as a fine biscuit coloured silty sand, root-penetrated and coloured by iron. Faint traces of ard marks were found in it near recumbent stone 148 (Illus 7.100). These were probably the bases of ard cuts similar to those visible on Illus 7.96 and 7.97. Clay soil 131 may have been the subsoil of the ground surface which existed immediately prior to building of the Stage 2 enclosure, and its turf may have been removed to build the enclosure bank.

7.9.5 Discussion of the ploughing in BINX and BIN

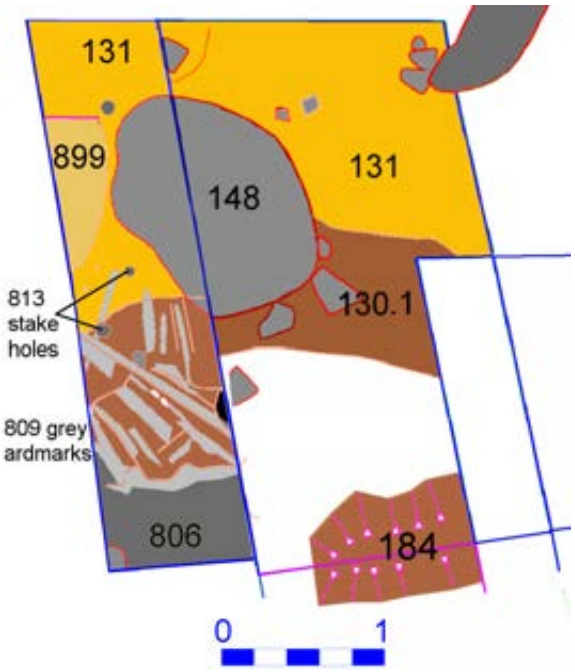
None of the ard marks recorded in BINX seem likely to relate directly to early ploughing-down of the Stage 2 enclosure. Instead they reflect later ploughing which may have involved little further levelling. The pollen in the ard mark samples 809 seems to be sufficiently different from that in turf line 806 to suggest that the former did not simply derive from the latter. So the pollen in the ard marks reflects the period of ploughing.

The pollen characteristics of the two samples from ard marks 809 suggested a date in early zone CaN-3c, which started between 1880 and 1520 cal BC. Some of the ploughing in BINX should belong to around the same period.

In Area BIN Soil 130.1 represents bank material spread by ploughing of the first enclosure bank



Illus 7.96 Plans 51-81 of c 7 May 1981 and 06-80 of 12 May 1980 [NMRS DC38085 and DC38025]



Illus 7.97 Plans 52.81 of 8 May 1981 and 06.80 of 12 May 1980 [NMRS DC38086 and DC38025]

Illus 7.98 Ard marks 809 from the north on 8 May 1981 [Film 81.4.17]

Illus 7.99 Ard marks 809 marked up [Film 81.4.17]

onto a variety of underlying layers, 131, 151 and 155; the variant of 130 forming bank 184 covered yellow clay 150 which may have owed its colour to the protection provided by the ploughed-down bank from weathering and oxidisation. The inclusion of 2 abraded conjoining sherds of a Food Vessel in the depression running across BIN suggests ploughing at some time after 2150 cal BC, judging by the likely date of the Food Vessel (Chapter 18). That leaves open the possibility that soil 130.1 filled the depression a couple of centuries before the date suggested by the pollen in ard marks 809. But given the abrasion of the sherds they may have been lying around in the soil for a long time before the depression was filled; pollen from an ard mark cut into layer 806 (Sample 2063) suggests that the turf line was also cut by much later ploughing.

7.9.6 The upper ard-marks in BII

In BII ard marks were found below pre-peat soil 117, at a lower absolute level than the stones of the Stage 3 enclosure, cut into soil 112 (Illus 7.101). That by hypothesis derived from down-ploughing of the bank of the Stage 2 enclosure.

The upper ard marks in soil 112 ran north-south, and no examples of ard marks running in different directions were seen. They were absent where the Stage 3 wall-base lay. These marks cut patches of turf line (Illus 7.101 12/5/81, not given a separate context label) which may conceivably be of the same date as turf line 806 in BIN, discussed above. If so, the ard marks may be of the same date as ard marks 809 or as the much later ard mark (Sample 2063).

In 1981 ard marks were not recorded in clay soil 130, forming the bank; but in 1980 a record (1980 Day Book summary page 16 and Context Sheet 124; see Illus 7.102) was made of ard marks cutting the bank less than 0.5m to the west.

These ard marks were found in a narrow sondage between the main north-south baulk and the 1981 bank excavation area. They were not formally planned.

The body of the bank was labelled 112 in the 1980 sketch section (Illus 7.102). It might better have been labelled 130; the similarity between 112 and 130 was described in 7.9.2 and discussed in 7.9.3. The 1980 sketch plan and section imply that the ard marks cutting the bank were interpreted as the same as the ard marks cutting green clay 123,

described and discussed below. However both the upper ard-marks in BII (Illus 7.101) and a different set of ard-marks were probably present there.

7.9.7 Discussion of the relationship of the upper ard-marks to the bank in BII

The ard marks recorded in 1980 as cutting the bank go with ploughing of the Stage 2 embanked enclosure (Illus 7.102). It is very tempting to equate them with those excavated in Area BII (Illus 7.101).

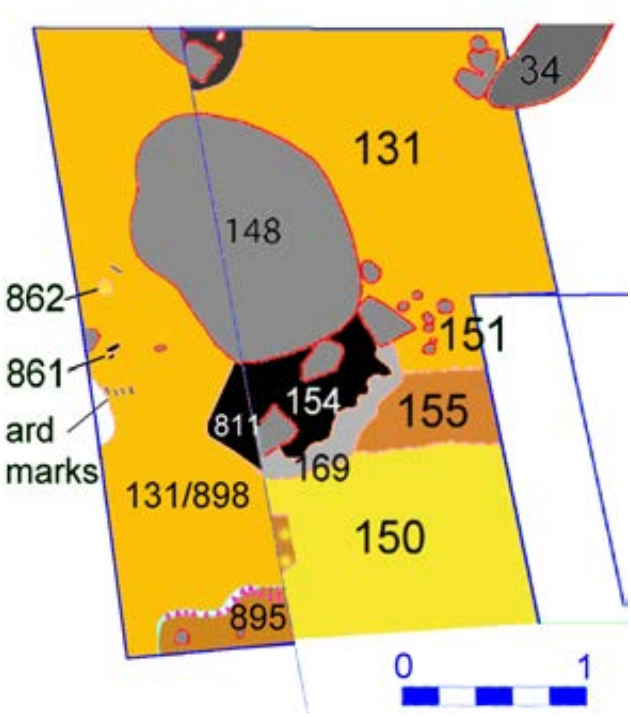
In BII ard marks were not found on the top of the bank or on its inner slope. Those areas had been affected by iron panning and soil-weathering so the absence of evidence is not necessarily evidence of absence, but it does not conflict with that provided by the sketch section 0.5m further west (Illus 7.102). Although the sketch section recorded ard marking on the exterior slope of the bank none was recorded during the meticulous excavation of BII which suggested that ploughing of the area to the north started well north of the crest of the bank.

One interpretation of the fact that they were not recorded where the Stage 3 wall-base lay at a higher level is that they belonged with ploughing contemporary with or later than the Stage 3 wall-based enclosure. However there are other possibilities. Differential subsurface weathering may have removed the difference between ard marks and the matrix into which they were cut in BII. Or given that there were many episodes of ground working in Area B, later people may have reworked clay soil 130 in the bank in BII, removing traces of earlier ard-marks.

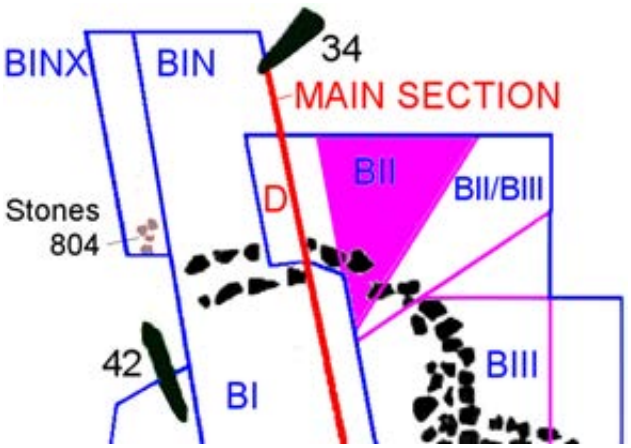
Overall it seems quite likely that there was more than one episode of ploughing of the Stage 2 enclosure bank and the ploughed-down bank material in the area immediately to its north in BII. That, too, was the impression obtained from the evidence in BIN.

7.9.8 Lower ard-marks and the bank in BII

The natural clay in BII was ard marked and disturbed (Illus 7.103). These ard marks ran in various directions, unlike the later ones. That said,



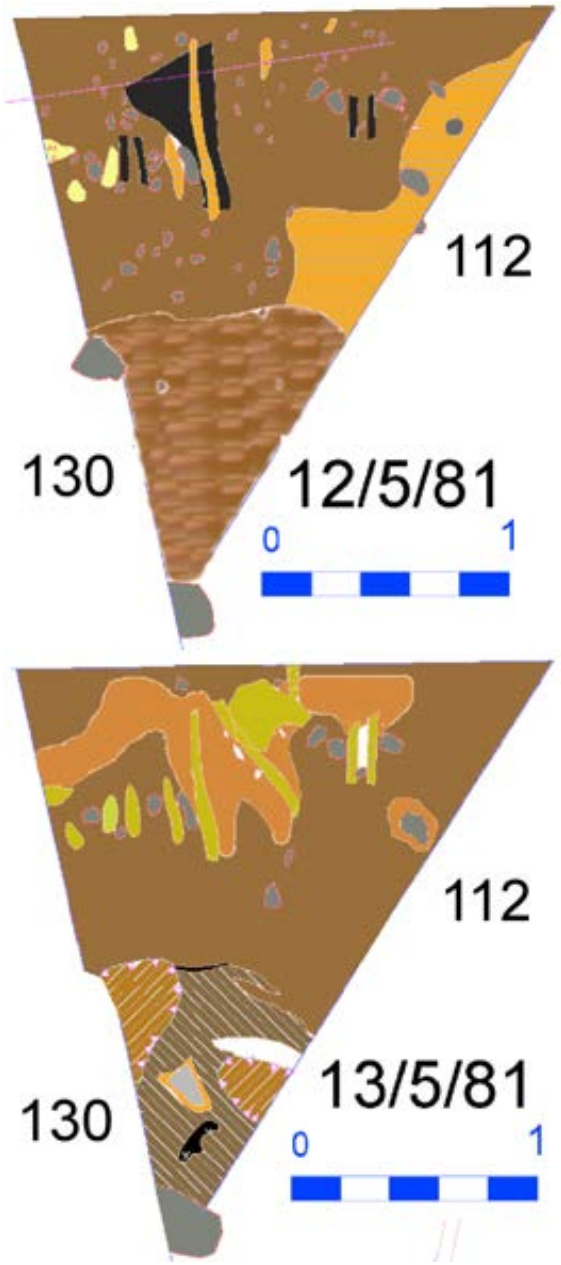
Illus 7.100 BINX Plan 53.81 of mid May 1981 with BINX 50.81 overlay 1 of 6 May 1981 and BIN Plan 50.81 of 6 May 1981 [NMS DC 38087 and DC38084 part]



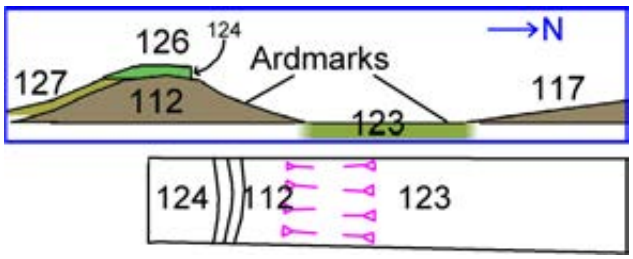
Illus 7.101 Key plan for BII bank excavation

comparing Illus 7.101 with Illus 7.103, some of the north-south marks may have been the bottoms of marks recorded at the higher level.

Near the north end of the trench the surface of layer 123 consisted of mixed orange clay, broken stone, iron pan, and green and brown sand; there were discrete patches of yellow clay. In most of the area greenish sandy clay subsoil was visible.



Illus 7.101 Area BII including ard marks [plans 33/81 & 34b/81 NMRS DC38067 & 38068].



Illus 7.102 BII Sketch section and plan (slot near Section 11 Part D) showing bank and ard marks) [1980 Day Book summary page 16 and Context Sheet 124]

Into it were cut bright blue-green marks which seem to have been the edges of ard marks. The more northerly ard marks tended to be distinguished by a slippery texture and a slightly darker brown-purple colour.

Immediately to the north of the central ridge of the enclosure bank was a long curving strip of brown-purple smooth 'shiny' material about 0.1 m wide; it was explored in a small sondage (Illus 7.103). Similar strips survived in places in the area to the north, seemingly cutting the narrow greenish marks but sometimes outlined by them. These may have been partially formed iron concentrations; but their fill was very similar way to that between pairs of bright green marks, which suggests that they reflected the presence of ard marks.

An ard mark in layer 123, the top of subsoil found in the 1980 exploratory slot trench immediately east of the medial baulk, contained a single piece of Pomoideae sp charcoal (54/80) which was radiocarbon-dated (AA-24956 3580+/-45 BP) to between 2120 and 1770 cal BC.

Many ard marks were found when most of the bank had been removed. The largest one, running from north-east in an arc to the southwest gives the impression that it was avoiding the core of the bank. A small patch of bright grey clay survived in it (Illus 7.104).

A third shorter curving ard may be visible at the bottom right hand (northwest) corner of Illus 7.104, while a dark fairly straight line separating the leftmost two-thirds of the picture from the western third seems to be the edge of an ard mark. Other ard marks, however, probably pre-dated the bank, particularly those west of the iron-encrusted stake hole visible on Illus 7.104. But the possibility that they were the bottom of cuts from a higher level cannot be excluded.

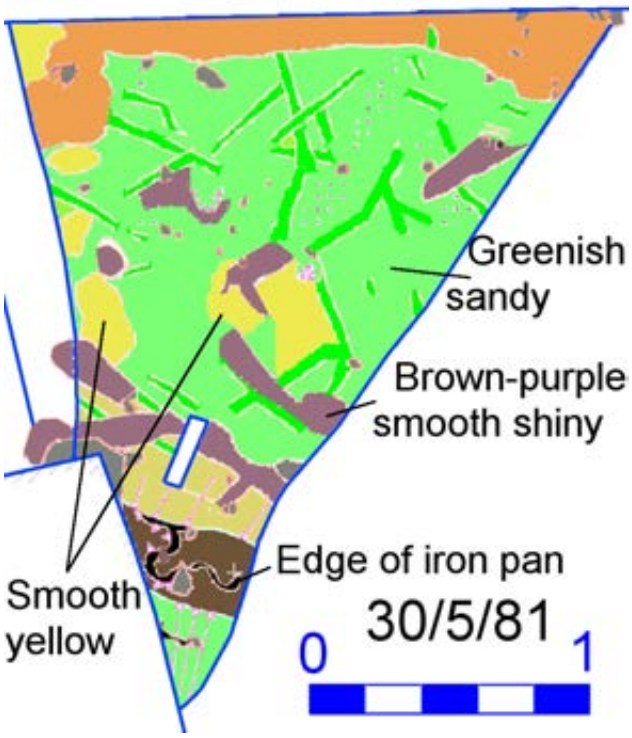
Illus 7.105 taken 4 days later, confirms that the narrow lines were the edges of broader features and that they were more yellow than green; had they truly been bright green it could have been argued that these were glacial or sub-glacial features. However, their status as ard marks seems fairly secure. The change in colour under the bank is a result of differential preservation.

The radiocarbon-date referred to above (AA-24956) came from the 1980 sondage visible to

the right hand side of Illus 7.105, almost certainly from the ard-marked level shown in the main part of the picture..

7.9.9 Discussion of the early plough marks in BII

Leaving to one side the likelihood of later ploughing, discussed in Part 7.3, the ploughing on BII both post-dated and pre-dated the bank. It had been ploughed when the first enclosure was partially levelled and quite possibly yet again during the cultivation which followed abandonment of the third and fourth stage wall-based enclosures. However, the area may also have been cut for turf to build the enclosure walls. The combination of removal and accumulation of soils makes it impossible to estimate soil depth when the pre-enclosure ploughing took place. The ard marks were shallow but fairly broad but the ard may have been held at an angle as if to rip up turf rather than cut deep furrows.



Illus 7.103 Plan 42 of 30 May 1981 [NMRS DC38076]

7.9.10 Discussion of ploughing north of the enclosure between Enclosure Stages 2 and 3

Some at least of this ploughing dates within the first quarter of the 2nd millennium BC. The primary reduction of the bank may however have taken place in the last quarter of the 3rd millennium BC. It reduced the enclosure bank and spread clay northward over a distance of between 1 and 2 metres. It is represented by soils 112 and 130.1 and the various ard marks in 112 and below it.

7.9.11 Ploughing of the bank in BII/III

The bank was at least partly ploughed before the Stage 3 and Stage 4 wall bases were put more or less on top of its remains. The most compelling evidence came from the section of the side of the baulk of Trench BII/III (Illus 7.106).

To the NE of the bank under the stones of the Stage 3 enclosure wall-base the topmost layers were ministry grit 113 in a large patch over soil developments 117 and 112, here sandy yellowish brown (Illus 7.106 and key plan). The stones of the Stage 3 enclosure had been removed before Section 80.13 was drawn, on the mistaken assumption that they were debris from the Stage 4 wall-base. They are shown on the key plan in light grey.

The Stage 4 wall base was set in soil 112, with the base of the more southerly stone set into the top of sandy brown fibrous clay (130). As discussed above, the two layers 112 and 130 were probably originally much the same; where it was labelled 112 it had suffered more chemical weathering and possibly more ploughing. The fill between the facing stones of the wall base here was gritty in layers getting yellower downwards.

After removal of spread bank layer 130 on 13 May 1981 the underlying brown soft sandy clay had ard marks in its top on the more northerly side of the bank (Day Book 25). They show that the bank, formed partly of this brown soft clay but mostly of green-grey clay retrospectively labelled 860 on Section 80.13 (Illus 7.106) had been ploughed before the latest stone wall-base was built for although the ard marks recorded on Section 13/80 were in fact just outside the line of the wall the written record refers to ard marks under the wall-base. It seems more than likely that

Illus 7.104 BII from the north on 25 May 1981 (see 7.160 for broader context) [Film 1981.14.34]

the ploughing took place from the top of layer 130, or even above that in 112.

The ard-marked layer 860 of the bank contained a potsherd and a possible potsherd. They are attributed to building of the enclosure rather than to its ploughing and are listed in Chapter 7.10.

7.10 The Stage 2 and Stage 1 enclosures

7.10.1 Introduction

Illus 7.107 depicts elements of the first and second stage enclosures. The Stage 1 enclosure was formed by stake-holes in BI and the step-change in level curving through BIWX. The stake holes formed a pattern asymmetrical to the Stage 2 enclosure and highly asymmetrical to the Stage 3 enclosure. The southern Stage 1 stake holes were covered by the stub wall of the Stage 4 enclosure by Ring stone 43. The stake-holes cannot have been internal fittings of any of the later enclosures.

The Stage 2 enclosure was formed by an earthen bank and some iron-panned stake holes. It is far from clear to which enclosure some of the eastern stake-holes belonged, and some may have belonged to neither.

In Illus 7.107 (partially spread) bank material 130, 175 and 184 is indicated in the darker buff colour. The pinkish buff shows less well-defined areas of the bank. Stake holes without recorded iron panning are shown in brown. Iron-panned stake holes and iron-panned but more amorphous

Illus 7.105 Ard marks in BII from the north on 29 May 1981 [Film 1981.17.18]

features are in red while a palisade trench in the south and a possibly similar feature in the north are depicted in dark pink.

The central section through the enclosure (Illus 7.108) crossed features of all four stages of enclosure. The baulk which provided this main section was staggered (see Illus 7.107). Parts B and C were drawn from the west and Part D from the east. To provide visual continuity with the next illustration the illustrations of Parts B and C have been flipped north-south. Part A was to the south of the modern ditch which ran east from the entrance of the chambered cairn and is not considered further here. Nor is Part E which lay to the north of the enclosure.

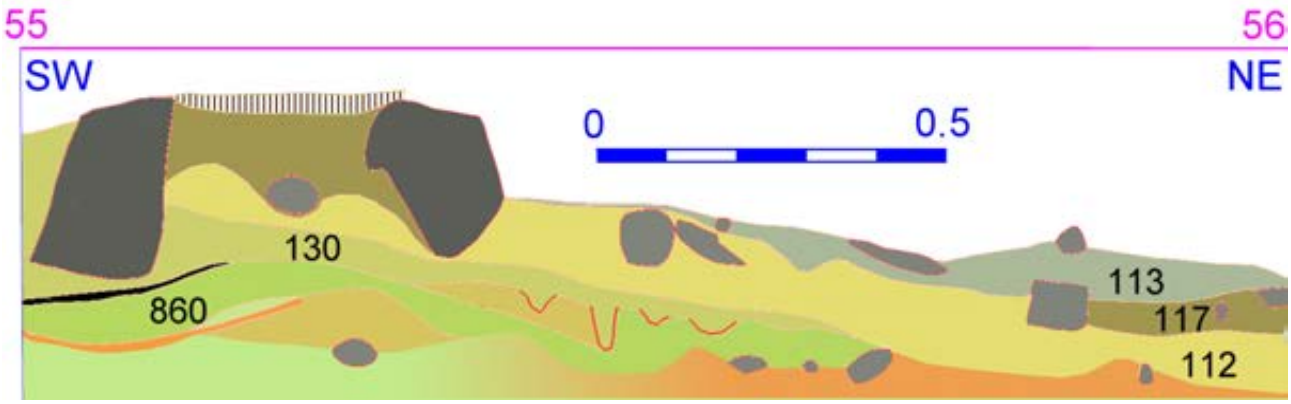
Several parts of the Stage 2 enclosure bank are visible on Illus 7.109. By the nearer ranging rod its rounded top was revealed in a cutting (BII/III) within which it had been sectioned. On the left-hand side of that ranging rod it survived as a stonier raised area before it was interrupted by a broad shallow depression, partially sectioned when the photograph was taken. To the left of the depression (by Part B) a raised area of yellower stony material had been partly removed. But the apparent bank at top left, south of the remains of the stones of the Stage 4 enclosure stub wall-base 133, was in fact a surviving ridge of earlier deposits, not a built structure.

The archaeology of the second stage enclosure will be described from north to south, starting in Area BIN and BINX, top right in Illus 7.109.

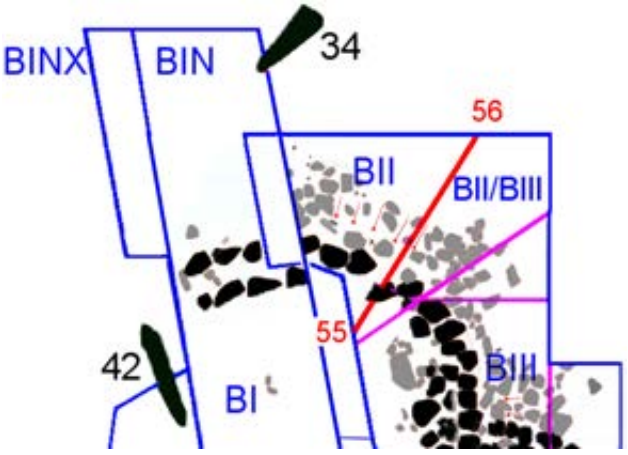
7.10.2 The Stage 2 enclosure bank in BIN, BINX and the northern part of BI

In BIN the 0.3 m high bank was labelled 184 (Illus 7.110). On plan it was recorded only as a series of hachures. It was composed of gritty clay soil, very similar to soils 112 and 130.

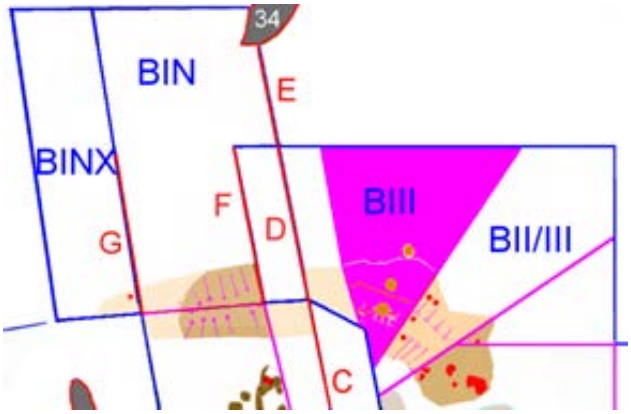
Soil 130.1 filled a depression running across Sub-area BI (Illus 7.110) and was interpreted as material spread from the bank by ploughing. Soil 130.1 contained sherds of two pots.



Illus 7.106 Part of Section 13/80 (55-56), a section through the wall-base and bank in Trench BII: ard marks are outlined in red [NMRS DC38033A].



Illus 7.106 Key Plan Section 80/13 (55-56)



Illus 7.10 Key Plan

Table 30 Sherds from 130.1 in BIN

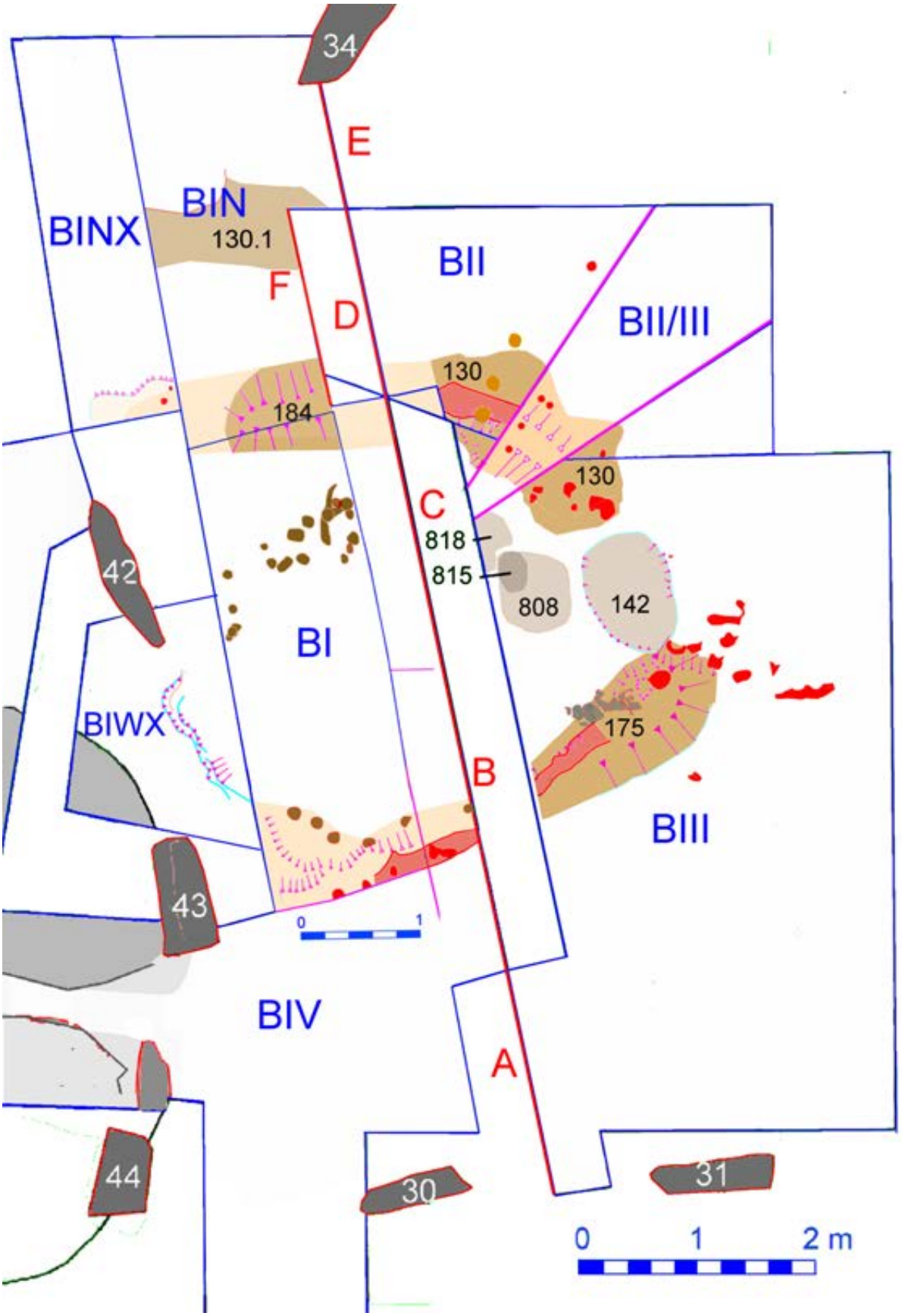
Cat	Comments
580_581	2 refitted sherds from large Food Vessel ASH 75
727_728	2 sherds from a fairly thin-walled, fine E/MN non-corky cooking pot

A sketch of Section G in 1980 depicted a low bank made of red-brown clay soil 130 (Illus 7.111) To its north material ploughed from the bank filled a shallow depression (well south of that shown on Illus 7.110)

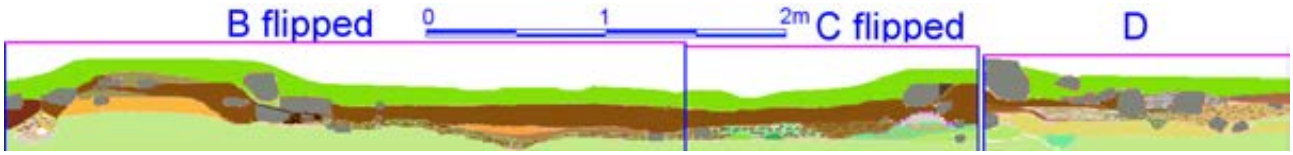
Formal Section 14/80 (not included here; see Illus 7.95) implied that the bank of clay 130 was at 70 mm less of a hump than did the sketch section, and the bank was labelled '112?' rather than '130'; but it did mark that stretch of section as '895 bank'.

On Illus 7.112 the extent of 184 in 1980 has been included (context number in grey) to demonstrate the difference in outline between it and a lower part of the core of the bank. The stratigraphy here consisted of layers of gritty clay, some thin enough that correlating spreads either side of a temporary mini-baulk between BI and BIN was not possible.

In 1981, a low hummock of orange-brown sandy clay 895 was recorded in BINX (Illus 7.112). It was on a different line from 184 in BIN, but like it bank element 895 overlay green to yellow-orange clay 150 with few grits and no stones; it also overlay an iron-panned stake-hole 5 cm across (823).



Illus 7.107 Bank elements from various plans [including NMRS DC 38025, DC38026, DC38060, DC38061, DC38069, DC38080, DC38081, DC38089]



Illus 7.108 Section 11/80 Parts B to D, through the enclosures with Parts B & C flipped to provide a view as if from the east [NMRS DC38031 parts B to D].

Illus 7.109 The bank on 23 May 1980 from the east [Film 1980.11.23]

A 0.2m deep layer of gritty clay 159 was revealed in BI in 1981. It reduced in size with cleaning except to the west where it had an abrupt edge. To its west were medium brown sandy clays (not coloured on Illus 7.112). Layer 159 and these more westerly clays are interpreted as the spread remains of the core of the bank.

The photograph of 22 May (Illus 7.113) was taken two working days before Plan 54 (Illus 7.112) of the hummock in BINX was finished. It appears to show a single slightly lighter area which in BIN probably corresponds to yellow clay 150. It is less clear what it corresponds to in BINX, which is at a slightly higher level. Inside the lighter area of clay is a band of darker patchy soil or clay encompassing bank 184 and the hummock 895, possibly the remains of decayed turfs. It conveys an impression that the bank continued from BIN into BINX.

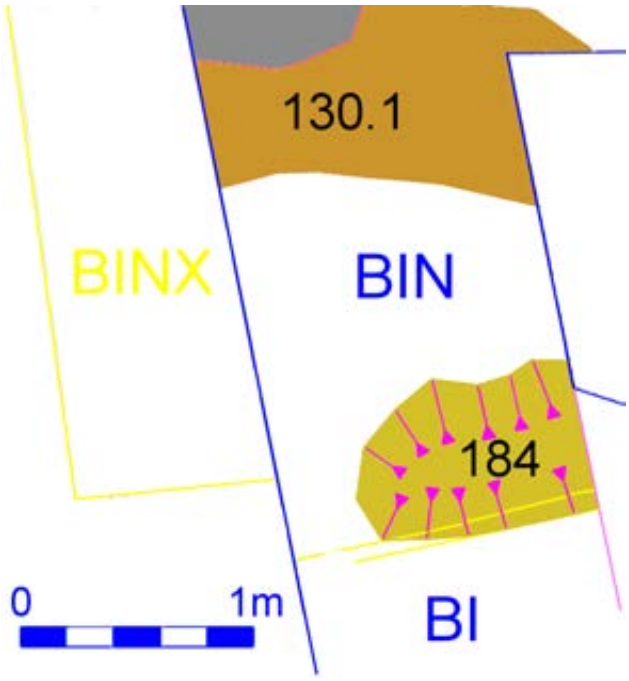
7.10.3 Discussion of the sequence in BINX and BIN

During excavation of BIN in 1980 the bank core 184 appeared to be a terminal. But the discovery of hummock 895 in 1981 suggested that the

bank continued into BINX. The iron-encrusted stake hole 823 under hummock 895 reinforces this interpretation, because it was comparable to stake-holes or post-holes outlined by iron panning elsewhere in the bank (Illus 7.107).

Hummock 895 did stop short of the west side of BINX so even in this interpretation the bank need not have run right up to Ring stone 42.

But it would be dangerous to try to force the evidence too far. The photograph in particular (Illus 7.113) is open to many interpretations. From the detailed excavation of Area BII described above it is clear that there were many small-scale variations in bank makeup. The preferred interpretation is that the remains of bank 184 in BIN had been greatly reduced and spread by ground-working leaving clay spreads 159 in BI and probably also 895 in BINX. Ground working also produced clay layer 130 in BIN and BINX. As described in Chapter 7.9, some of that survived as layer 130.1 in a linear depression crossing BIN about a metre north of the bank.

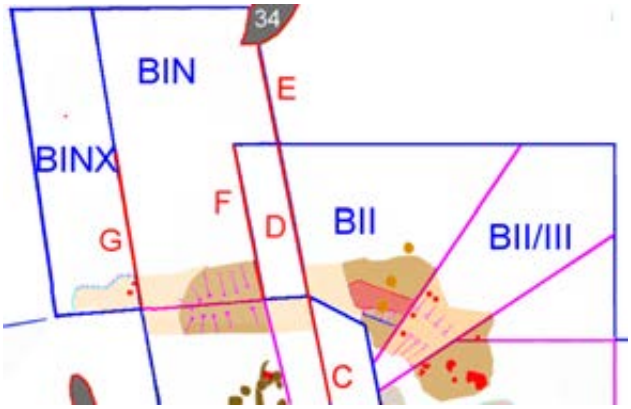


Illus 7.110 Bank 184 in 1980 (Plan 06-80 [NRMS DC38025]

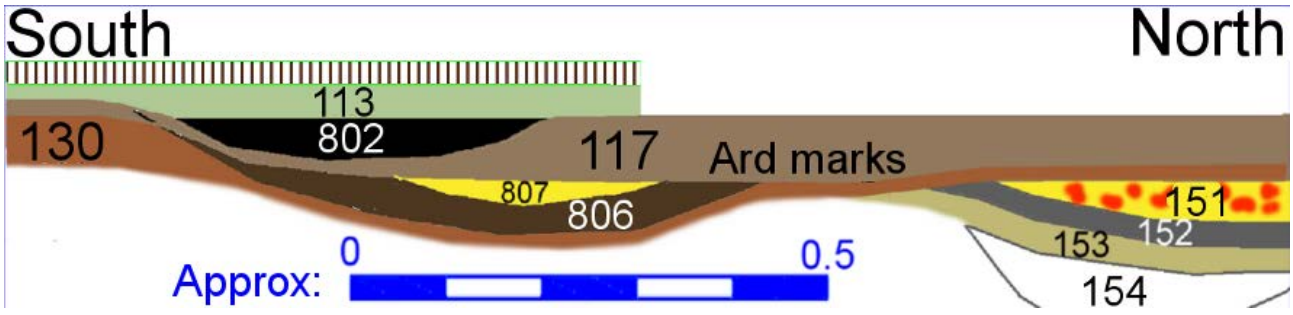
7.10.4 The Stage 2 bank and the features inside it in the northern part of BII and BI: Section 11 Parts D and C

Parts C and D (flipped) of Section 11 on Illus 7.114 were on lines which did not match up perfectly. The succession of layers was broadly the same on Part D as on Part C but more detail of the composition of the bank was recorded.

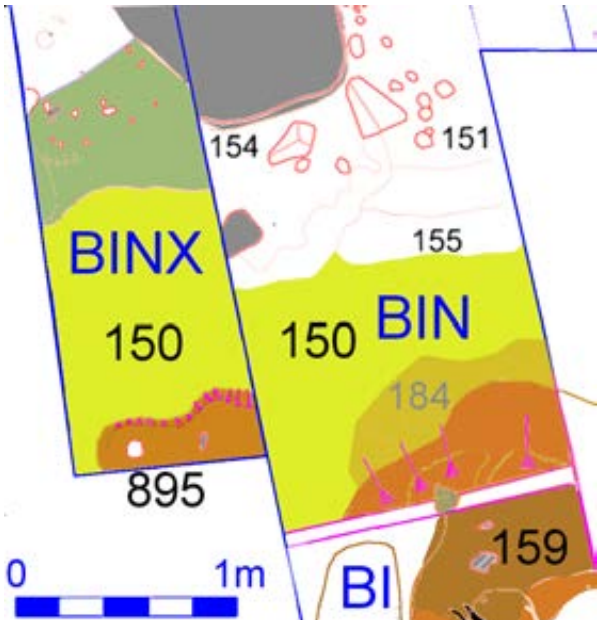
A large rounded stone at a high level in modern soil formed the northern edge of the Stage 4 wall-base 103. A smaller stone on Section C marked the south edge.



Illus 7.110-7.112 Key Plan



Illus 7.111 Sketch Section G of the southern half of the west side of BI [Day Book 11]



Illus 7.112 Bank 184 (Plan 06-80 and 08-80) and soil 159 (Plan 08/80 & Plan 44/81and Bank 895 (Plan 53-81 and 54/81) in 1981 [NRMS DC38025, DC38027, DC38078 and DC38087-8]

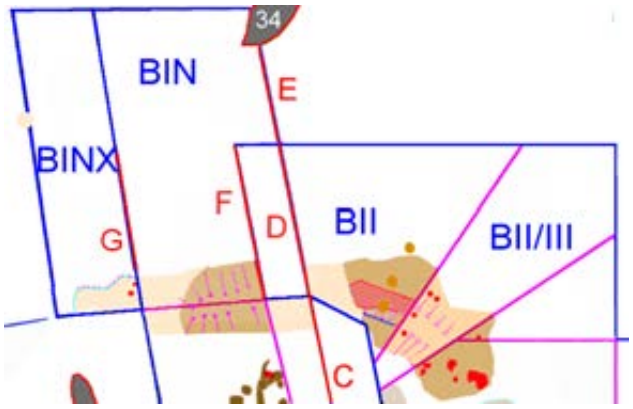
Part C of the section shows the north part of interior and the edge of the northern part of the bank. The turf and underlying brown soil were of much the same thickness as each other, but there were hints of structure in the brown soil, very thin slanting darker lines, one of them up to 0.2 m long and at an angle of about 15 degrees to the horizontal. They may represent incipient iron panning or possibly the upper, plough-modified part of a depression south of the bank filled with a mottled dark and light brown soil.

This had formed or been cut into a 0.1 m thick layer of streaky brown-green clay covering little humps less than 0.1 m wide lying on the green clay natural. Under or forming the lowest part of the bank, was a low (nearly 0.1 m high) mound of mossy-green fine sand. These features should correspond to the various soils planned in this area and described and discussed in Chapter 7.6.

Presumably the boundary between the upper browner and lower greener layers on Illus 7.141 corresponds to the change from upper 836 to lower 836 (See Chapter 7.10.14 Illus 7.164).

Illus 7.113 Bank 184/895 on 22 May 1981 [Film 1981.13.22 part]

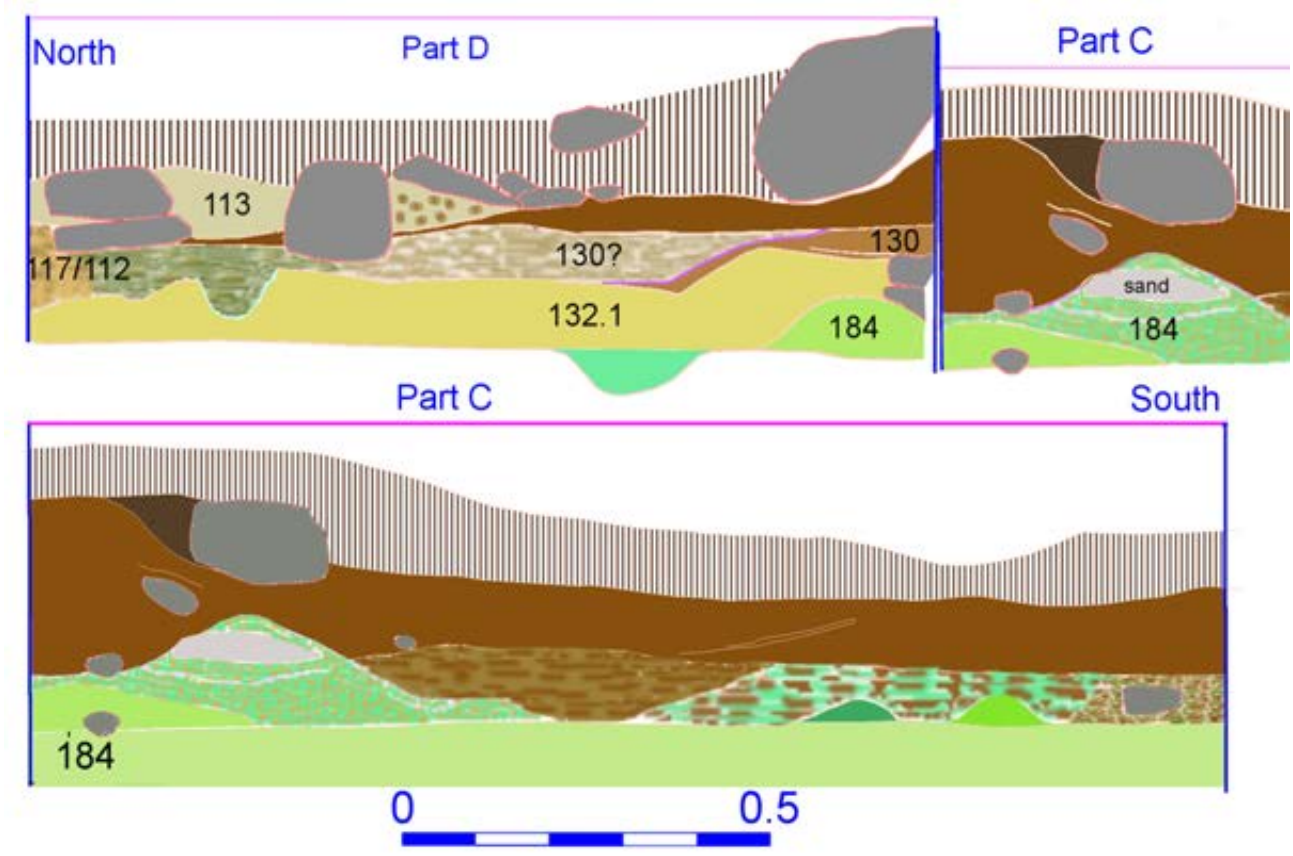
The coincidence of the humps on the subsoil with the northern and southern edges of the upper wall-base raises the question whether the apparent depression between them had been produced by differential soil processes. The excavation of Area BII described below does not conflict with that interpretation; near basal mottled green/brown clay and an iron pan are signs of movement in solution of components of the clays and soils forming the bank.



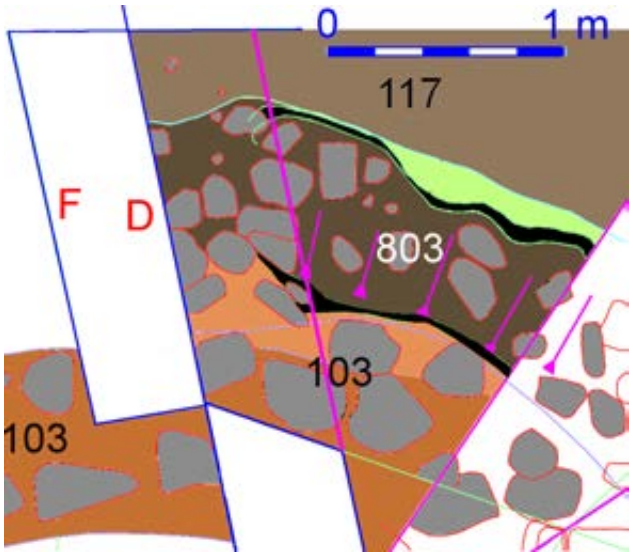
Illus 7.114 Key plan

On Section D (which has been flipped to bring north to the left) brown clay 130 ran for about 0.5 m between the bank and the Stage 3 wall-base, which had sunk into the sandy material. The clay was probably remains of the bank including ploughed-down elements. It seems to have been the soil of turf line 803 (see Chapter 7.4.8).

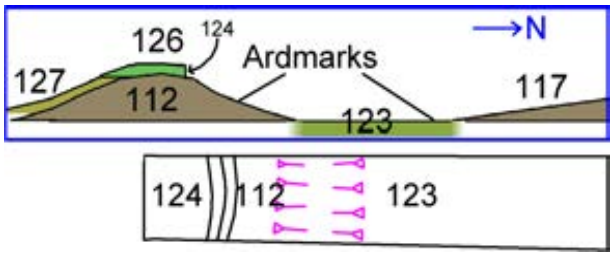
Under the Stage 3 wall-base at a similar stratigraphic level to bank material 130 was a brown gritty clay soil with white particles in it; it was retrospectively labelled '130?' on Illus 114. It was separated from 130 by iron pan on the northern edge of the bank. This soil '130?' varied in its composition north of the bank, seemingly because the third stage wall base and its southern tumble had preserved some of the soil from weathering. Without an obvious stratigraphic break, it changed colour from light brown gritty with light particles above the iron pan to streaky brown-green below the wall base, and back to a fibrous soil mottled light and dark brown north of the wall-base (Illus 7.114). Less than half a metre further north



Illus 7.114 Sections 11/80 D (flipped) and C (the sections are on slightly different lines) [NMRS DC38031D and DC38031C]



Illus 7.115 Extract from Plan 05/80 [NMRS DC38024]



Illus 7.116 Sketch section and plan (slot by Section 11 Part D) showing bank and ard marks) [1980 Day Book summary 16 and Context Sheet 124]

Illus 7.117 Sub-area BII on 9 May 1981 from the west [Film 1981.05.16 part]

it seems to have been broadly equivalent to both soil 117 and soil 112, according to a note on the section drawing.

On this section the layer below 130/112/117 was sandy green-yellow clay 132.1 (the original label, 132, may have been an error for 123, which was the number given to green ard-marked clay found in a sondage by Section D in 1980). It was identified as disturbed natural subsoil.

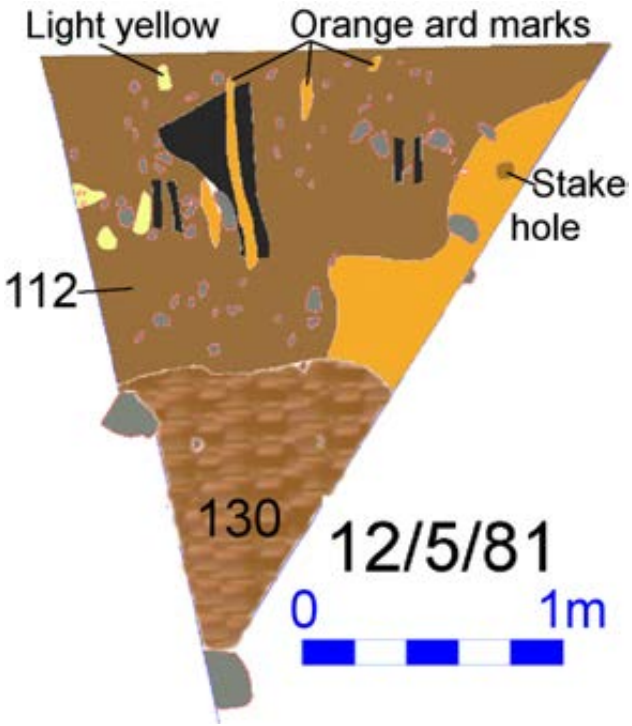
Layer 132.1 had a well developed ard mark cut into its top, surviving in this section most clearly where overlain by the wall-base 102 (Illus 7.114). The ard-marking reflects the multi-period ploughing which partially levelled the Stage 2 bank as described and discussed in Chapter 7.9. The soil through which the ploughing took place was in general labelled 112 north of the enclosure but there it was generally a red-brown clay soil rather than the streaky brown-green clay soil underlying the Stage 3 wall-base stones on Illus 7.114. That difference may reflect the protection provided by the wall-base and if so provides an interesting insight into the original nature of soil 112 before it became, in effect, the subsoil of the late plough soil generally represented by soil 117.

7.10.5 Excavation of the bank in BII

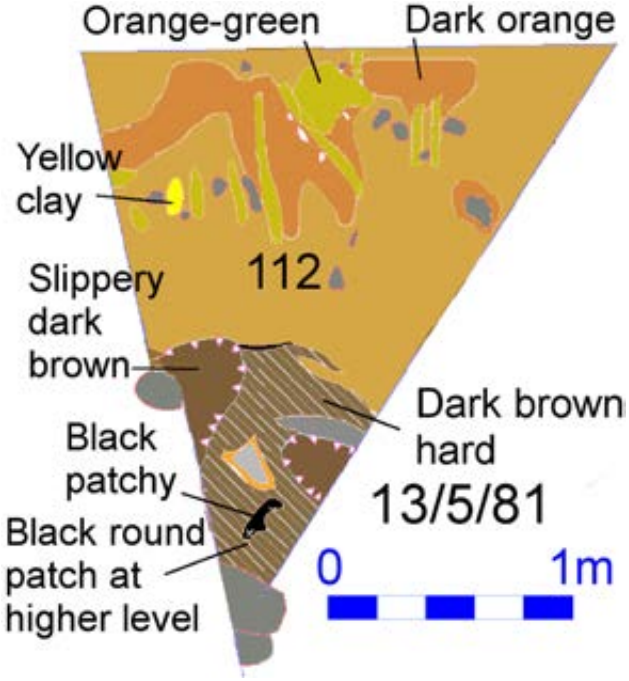
A relatively well-preserved wedge of bank in BII was partially excavated in 1980 and fully excavated in 1981. The slot trench dug in 1980 was a narrow strip on its west side (Illus 7.115, 7.116). The rest was investigated in 1981, as described below.

The latest plan of this area in 1980 showed stones of the Stage 3 enclosure on turf line 803 and Stage 4 enclosure stones on top of bank material (Illus 7.115).

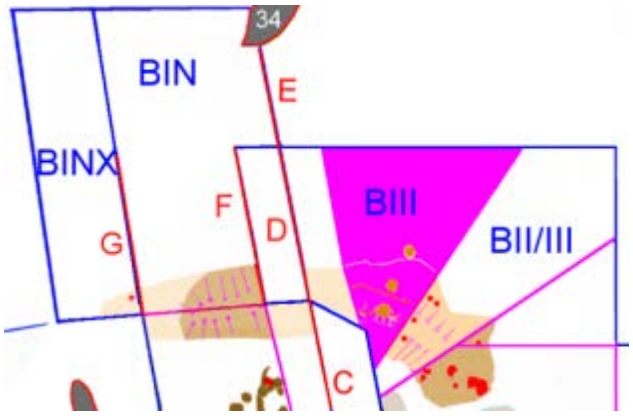
The Stage 4 wall-base 103 lay to the south of the Stage 3 one. The stones of the latter lay on a dark grey greasy grit free layer 803 which was 3 mm thick and had the characteristics of turf lines in other parts of the site. It contained a three small spalls from a possibly Neolithic non-corky pot (Cat 810_812). Truncation to north and south revealed the edge of the turf line (Illus 7.115). Outside it were fragments of gritty greenish-grey material 113, which had overlain both the Stage 3 wall-base; it also overlay soil with similar charac-



Illus 7.118 BII Plan 33/81 extract [NMRS DC38067]



Illus 7.119 BII Plan 34/81 extract and overlay 1 [NMRS DC38068 & overlay]



Illus 7.117 to 7.118 Key plan

teristics to mineral soil 117 locally (7.104, 7.105). In some parts of Area B this gritty material 113 represented a component of rotten stone and in BIN it may, as described above, reflect the former presence of the earlier wall-base.

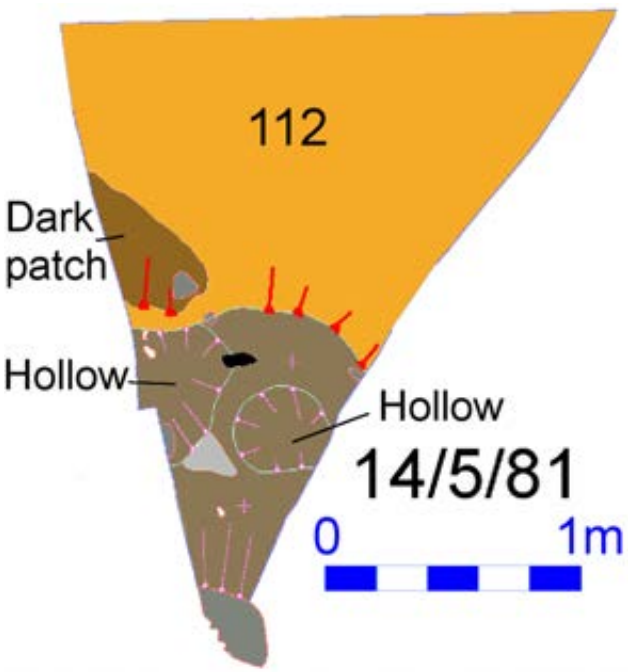
Excavation of the narrow slot by the west baulk of BII in 1980 allowed the drawing of the Day Book sketch section (Illus 7.116) interpreting detail absent from the formal plans and sections. On top of the bank (and only there) was a greasy green layer of fine clay (126). Under it was greasy gritty sandy clay (124) with much charcoal, but seemingly without ard marks. Iron panning appeared below that, including halos of iron pan which seemed to mark stake holes, or roots (127) on the inside slope of the bank. These were the same as 190, 191 and other stake holes.

The green clay 123 found to the north of the bank (Illus 7.116) was the same as that excavated in BII towards the end of the 1981 season and probably the same as 132.1 on Section 11/80D (Illus 7.114).

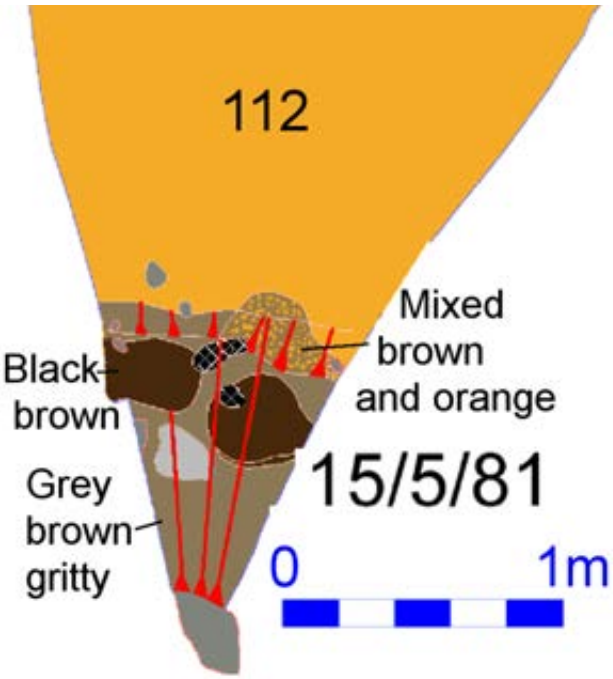
In 1981 Area BII was excavated in very shallow spits during a period of about 21 days. Although features were meticulously planned and there was a multitude of variations in the soils and clays forming the bank few context numbers were assigned to them.

All of the layers of the clay soil north of the old bank were labelled 112 in 1981 even though its colour changed as it was trowelled down (Illus 7.117-7.118).

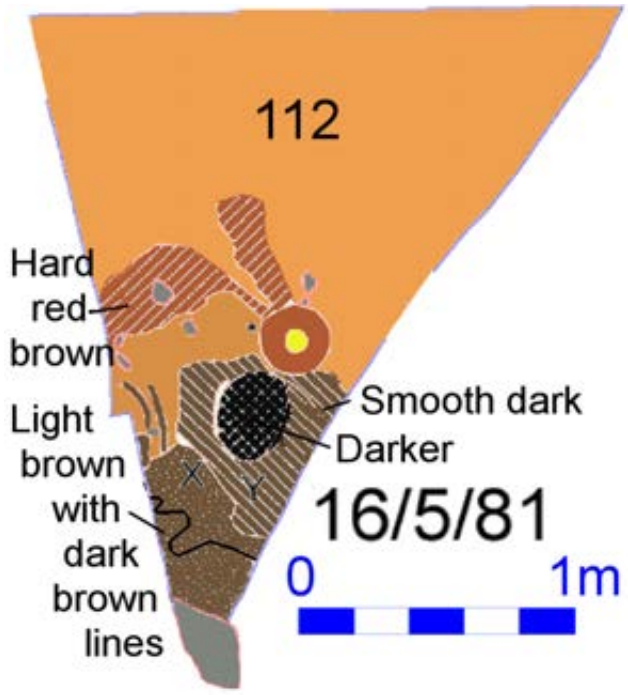
On the northern part of the area the orange brown hard gritty soil (still called 112), contained blacker patches interpreted as ard marks (Illus 7.118).The ard marks stopped along an east-west line some 0.4m north of the northern edge of the



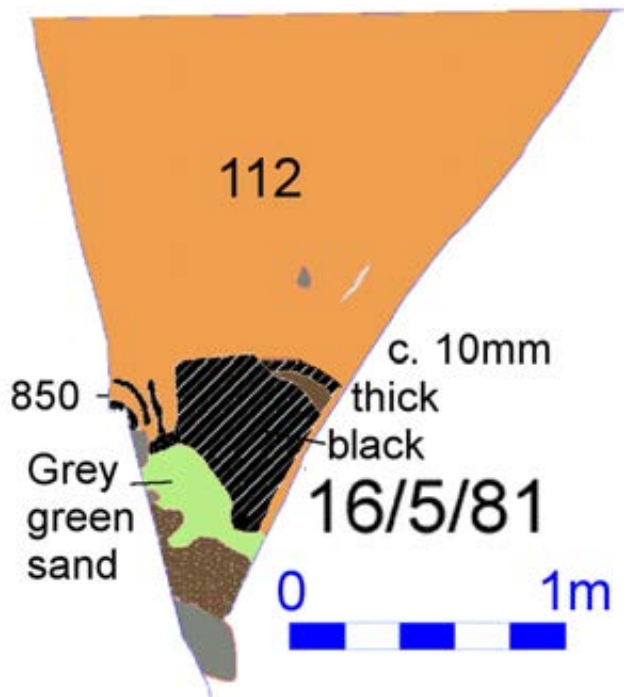
Illus 7.120 BII Plan 35/81 extract [NMRS DC38069]



Illus 7.121 BII Plan 36/81 extract [NMRS DC38070]



Illus 7.122 BII Plan 37/81 [NMRS DC38071]



Illus 7.123 BII Plan 38/81 extract [NMRS DC38072]

bank, sufficiently close to the northern edge of the early wall-base to allow the suggestion that the ard marking succeeded the wall-base. However others were subsequently found under the bank and the final plan of ard marks suggests two stages. To the east was lighter orange clay. A stake hole was recorded but did not seem to have any depth; its interpretation may have been wrong.

At this stage the evidence for the nature of the early enclosure took the form of a fairly homogenous albeit mottled brown fibrous bank (130).

Under the orange and black material in the north of the area the fill of the ard marks was lighter; dark orange areas appeared, showing no particular pattern, along with a small patch of yellow subsoil (Illus 7.119).

Removal of soil 130 in the southern part of the area revealed a dark brown hard soil and black patchy material below it. A black round patch was noted but not planned. Hollows full of 'slippery' brown material appeared. A rotten stone was represented by a patch of grey soil with an orange edge (light grey on Illus 7.119).

Further towelling exposed a hard orange gritty sandy basal layer of the mineral soils in the northern part of the area (Illus 7.120).

It also revealed a clear differentiation corresponding to the edge of the bank (red hachures). The bank area included rotted stones. Below their slippery brown surfaces the brown patches were sticky. They lay in a generally grey-brown gritty bank soil. They probably reflect partially decayed turfs.

The surface of the bank sloped gently down to the north (Illus 7.121).

Some patches of black-brown charcoal-rich soil were also present in the bank, with crumbs of iron pan. The patches increased in size, and then diminished, suggesting that parts of turfs. Underlying them near the edge of the bank was a more orange soil. Other larger areas of smooth dark material perhaps reflect a layer of turfs. The general bank make-up remained brown-grey and gritty.

The bank had a dark brown core with white grits, but in two very thin layers with a black line between them (Illus 7.122). It is not known whether the hardness of these layers reflects incipient iron-panning or the original nature of the make-up.

Black turf line 850, about 1 to 1.5 cm deep, overlay grey-green clay on the side of the bank (Illus 7.123, 7.124). As it was cleared more of the grey-green sand was revealed in the bank. Turf line 850 could have been a layer of cut turfs but if it was not it implies that the bank was a thin turf wall outside which a turf line formed. In this interpretation the turf line was preserved because it was covered by collapsed wall material. On balance, given that it did not extend further north, its interpretation as a laid turf layer is preferred.

It contained two heavily abraded conjoining sherds from a probably E/MN non-corky cooking pot (Cat 679-680).

Outside the bank edge was a dark red-brown strip, to the south of that an orange soil and further south a mixture of smooth dark and brown sandy material (Illus 7.125). Dark smooth lines and blobs continued to appear in the grey-green bank make-up; the southern part of the core of the bank remained a brown gritty soil.

At least one ard mark was recorded in the grey-green clay underlying the turf line 850 and the clay north of the bank was therefore probably the equivalent of 112 or 132.1 further west (Illus 7.114, 7.125).

In the north of BII further removal of thin layers of orange clay soil started to reveal what seemed to be the natural green clay in the north of the area; no ard-marks were visible (Illus 7.126).

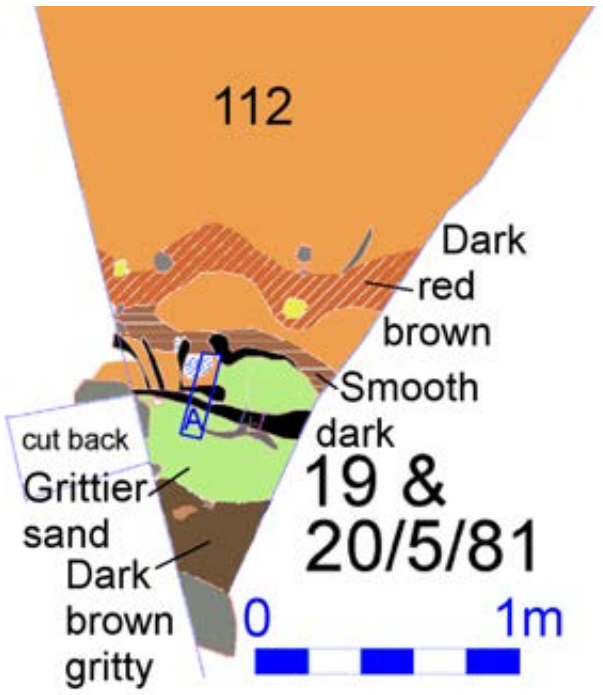
The edge of the bank was difficult to define. A shallow box section was cut to a depth of a centimetre or so, revealing underlying orange soil. By now it seemed clear that some layers of the bank had been constructed of turfs which had (presumably subsequently) been affected by iron-panning, while other layers were composed of green subsoil

In Illus 7.126 the bank components remained much as before but in different configurations: a grey-green sandy material with blobs and lines of smooth black soil, reflecting either turf make-up or the later ploughing or both. The main change was in the southern part of the bank core where a layer of greenish sandy material overlay grey sand.

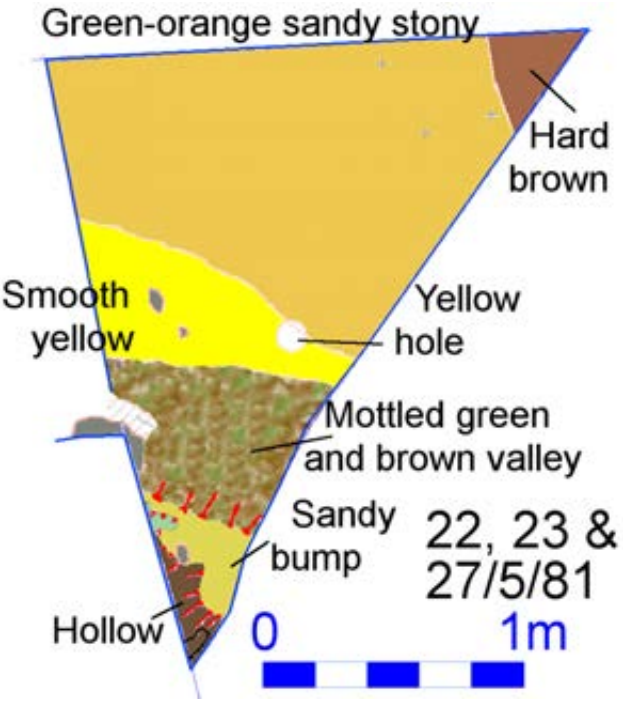
The green-orange sandy stony soil in the upper half of Illus 7.127 probably reflected in-situ oxidisation although it may also have contained some iron which had percolated down from higher

Illus 7.124 Turf line 850 on 18 May 1981 [Film 1981.10.9]

Illus 7.126 BII Plan 40/81 extract [NMRS DC38074]



Illus 7.125 BII Plan 39/81 extract [NMRS DC38073]



Illus 7.127 BII Plan 41/81 extract [NMRS DC38075]

strata. In the extreme NE of the trench, well outside the bank, was a patch of hard brown soil which may have been a remnant of a turf, given it was probably less than 20mm thick.

The stratigraphy of the bank had become less complex. South of the green-orange sandy soil which covered most of the trench was a thin layer of bright yellow smooth clay, and further south again was a depression full of relatively soft mottled green-brown material (Illus 7.127). It corresponds to the hollow visible at the junction of the central baulk parts C and D (Illus 7.114). To the south again was a raised sandy bump dropping away on the SW under the remnants of a hard brown gritty soil.

By 30/5/81 most of the area had been reduced to (disturbed) natural clay (Illus 7.128). Under the orange clay soil in the north of the area the clay was extremely hard biscuity green/orange sandy soil containing broken orange stone and what was at the time thought to be smashed pottery. The supposed pottery fragments turned out to be pieces of iron pan.

More generally the area north of the bank was covered by greenish patchy sandy clay in which were many bright blue-green and shiny purple-brown linear marks and discrete patches of yellow clay (Illus 7.128). They were described and discussed in Chapter 7-7: Pre-enclosure ground-working.

The central feature of the bank was a roughly 0.5 m wide dark brown gritty sandy iron-panned area; green sand had started to appear south of the ridge; humps of green sand were the lowest layers on section 80/11 (Illus 7.128).

Excavation and detailed planning of Area BII seem to have ended on 30 May 1981; a photograph of 3 June (Illus 7.129) shows circular iron formations to the right of the ranging rod, corresponding to the iron pan edge on Illus 7.128.

7.10.6 Discussion of the bank in BII

The longitudinal stripes in the lower bank makeup (Illus 7.125, 7.126) and the depression between raised areas (Illus 7.127, 7.128) may reflect the position of a palisade slot as suggested on Illus 7.107, the reconstructed plan of the Stage 2 enclosure bank and on the various key plans, although the appearance of a slot could alternatively have been formed by low ridges laid down to mark the edges of the bank.

The various iron-panned stake holes (if it be accepted that they were not root-holes) were too few to form a pattern. They suggest that the bank was built of turfs reinforced by vertical poles, in which case the construction could have been quite tall and certainly more than the surviving height of about a third of a metre.

This topic will be discussed again after consideration of the evidence from other parts of the enclosure.

7.10.7 The Stage 2 bank in BII/BIII

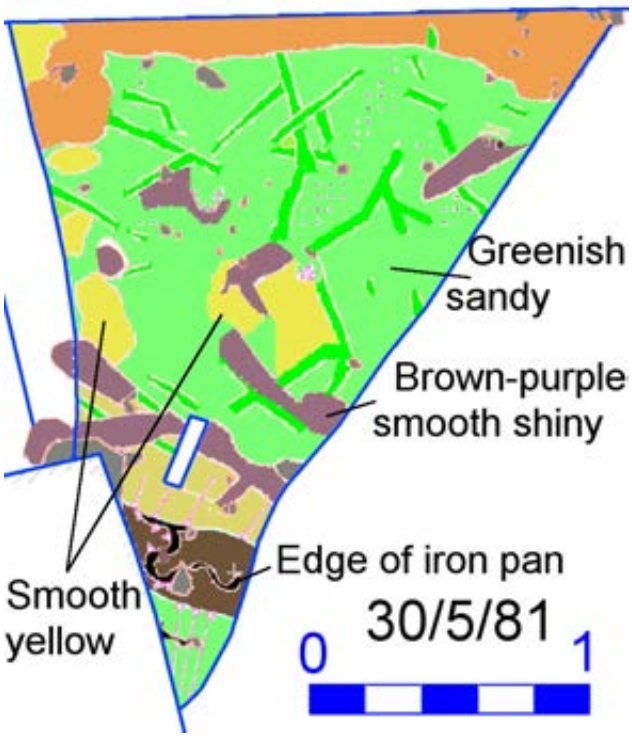
Illus 7.130 shows sectioning of the bank from the south-west. It can be seen in a broader context in Illus 7.109 in Chapter 7.10.1. The mini-section there does not seem to have been drawn, but the main sections 55-56 and 12-13 were (Illus 7.131, 7.132). Curiously, however, in neither of the main sections was the bank drawn as a distinctive hump like that visible in Illus 7.130.

On its inside flank was an iron-concreted hole. The hole may have been a root hole although other examples were interpreted as stake holes and that is a more likely interpretation for this.

As described in 7.9.11 the bank was at least partly ploughed before the Stage 3 and Stage 4 wall bases were created. The brown fibrous clay 130 of BII, which was plough-spread from the bank in this part, produced two small potsherds and a fragment of another. Elsewhere in Area B it produced two more sherds (Table 7.31).

Table 7.31 Pottery from layer 130

Cat	Area	Comments
55	B	2 refitted sherds from a fairly large E/MN possibly Hebridean incised pot.
63	BII	Possibly Hebridean incised corky sherd and fragment, interior spalled off.
809	BII	Abraded spall, possibly E/MN non-corky.



Illus 7.128 BII Plan 42/81 extract [NMRS DC38076]

Illus 7.129 Circular iron formations (to the right of the ranging rod) in BII from the east on 3 June 1981 [1981.19.6]

Table 7.32 Pottery from clay 860 in the bank in BII

Cat	Comments
62	A sherd from a thin-walled, fine E/MN corky pot.
813	Heavily abraded sherd from an exceptionally thin pot of indeterminate type or possibly a piece of soft stone.

The bank was formed mostly of green-grey clay retrospectively labelled 860 on Section 80.13 (Illus 7.131). On top of 860 was drawn what looks like a turf line, possibly 850 given the evidence recorded in the neighbouring Area BII. Layer 860 of the bank contained a potsherd and a possible potsherd (Table 7.32).

Layer 860 was separated by a thin layer of iron pan from an underlying mound of soft mottled brown to yellow clay about 0.3 m a10.6cross. Iron pan had worked its way into small holes creating 'pipe-ends' in the surface (Illus 7.130). They did not form a neat plan and we suspected that they might be evidence for roots rather than stake holes but decided that they were probably the latter because of the numerous other examples found associated with the bank elsewhere, as described below.

It is only by comparing the photograph of the bank section (Illus 7.130 and, more clearly, 7.129) with the drawn section that the latter can be interpreted. The SW edge of the bank visible on the photograph seems to have been the SW edge of the brown material under 860 and a layer of iron pan. The NE side seems to have been approximately the NE edge of the green material under the ard marks. So the bank was about 0.8 m across; but how much of the NE part of that was actually material ploughed down from the bank is hinted at only by the underlying layer. The base layer of the section was clay, soft green mottled with yellow where it had probably been protected by the bank and orange where it probably had not.

The original section drawing has been flipped on Illus 7.132 to bring south-west to the left (the interior of the enclosure).

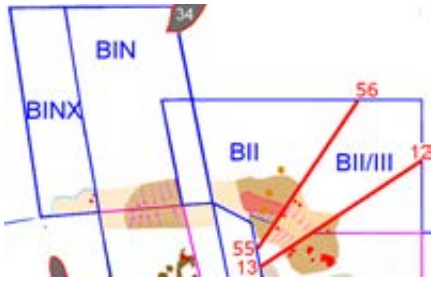
The northeast end of the section was just under the shallow peat outside the area cleared by Matheson's workforce in 1857. The modern surface has been added to the section drawing from the contour plan. Because of the approximations involved in this, its precise relationship to the stones of the Stage 4 enclosure shown on the bank may be slightly wrong; the tops of the stones may have been visible from the modern surface.

The section crossed the end of the Stage 2 enclosure bank just north of its entrance hollows. The early bank, here labelled 130, lay partly under and partly inside the Stage 4 wall-base 103, and

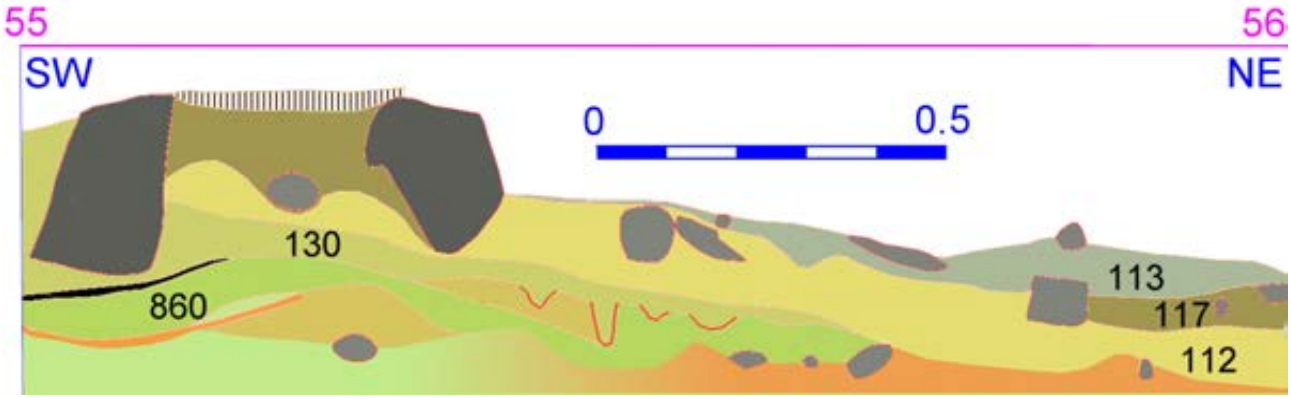
the damaged Stage 3 wall-base lay further to the north-east in soil labelled 117 above a slight local dip in the soil filled with clay soil labelled 112 (Illus 7.132). Elsewhere on Area B soils labelled 112 seem to have been a plough soil associated with levelling of the early bank 130; soil 117 was usually seen as a form of 112 modified in part by later ploughing and in part by natural soil processes. However, the layers labelled 112 and 117 on Section 03/81 (12-13) are hard to interpret that simply.

The section drawing gives the impression that the core of the bank was at the extreme Southwest and the Stage 2 enclosure bank had been spread down to the northeast forming layer 130. But the photographs of sectioning of the bank in this area (Illus 7.129 and particularly Illus 7.109) clearly show the bank heading for the area under the two Stage 4 enclosure stones on the surface. That fits the plans, too. The simplest way to bring these three pieces of evidence into accord is to recognise that the bank core shown in the photograph and on plan was in fact the hump of mottled material below 130 on Illus 7.132, not the hump at the left-hand end of the section.

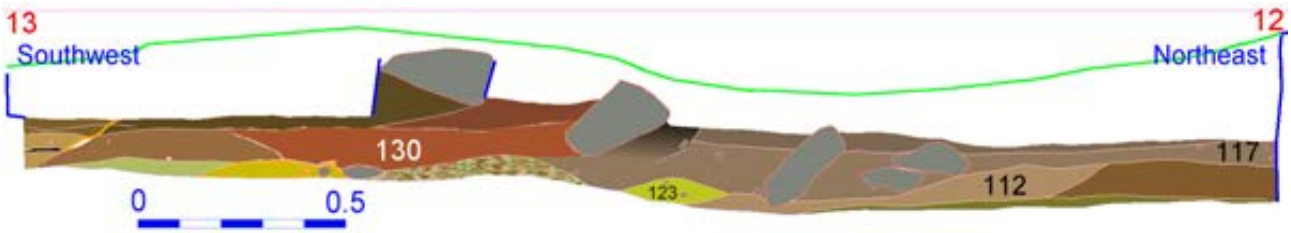
Illus 7.130 The bank in BII/III from the south-west [Film 1980.10.4]



Illus 7.131 to7.132 Key Plan



Illus 7.131 Part of Section 80.13 (55-56), a section through the wall-base and bank in Trench BII: ard marks are outlined in red [NMRS DC38033A]



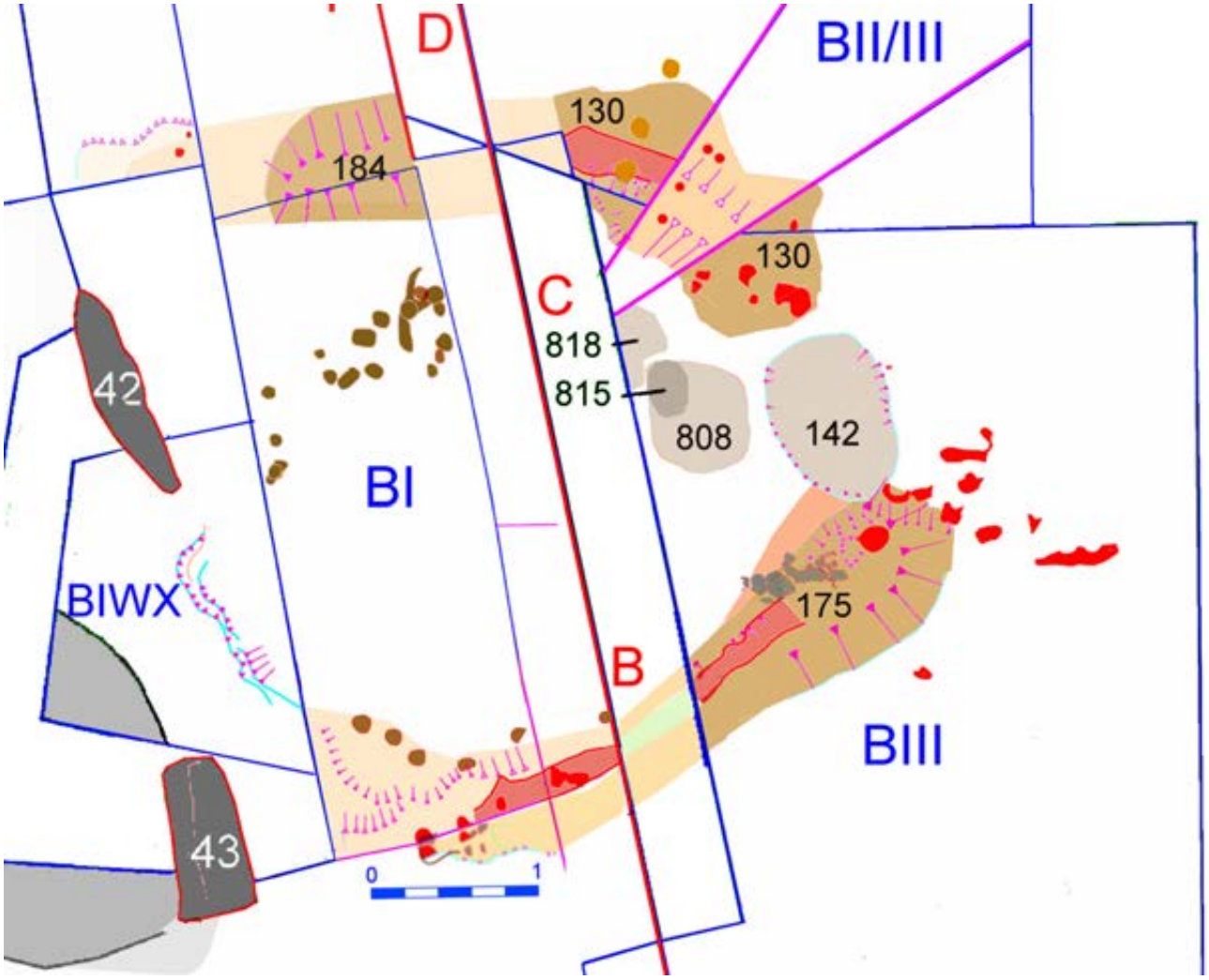
Illus 7.132 BII/III South-east section 03/81 [NMRS DC38037 flipped; modern surface added from contour survey Part 7.1, Illus 7.2]

The gentle drop of about 0.1m over a distance of around a metre in the lowest strata on Illus 7.132 from south-west to north-east, followed by a slight rise, may reflect the prior presence of cultivation beds in this area. The section would have cut across them at a very shallow angle, perhaps around 10 to 15 degrees, and the dip may have been the trough between two beds. However, a possibly more likely explanation is that the edge of the Stage 3 entranceway was close by (see key plan for Illus 7.130); in that interpretation the stones ascribed to the Stage 3 enclosure had tumbled down from the north. That might well explain why they appeared to be in soil 117.

7.10.8 The Stage 2 bank, the entrance depressions and other features in northern BIII

Once soils 117 and 112 had been removed from Area BIII a broad depression 142 sat in an expanse of orange clays with patchy iron panning (Illus 7.134, 135).

On the north side of 142 (to the right in Illus 7.135) was a patch of brown fibrous clay 130 with some stones which was similar in texture, colour and stratigraphic position to layer 130 in Sub-area BII (Illus 7.134). The three large stones visible to the right of the picture are high on the triangular unexcavated area which at that time separated BIII from BII/III to the north.



Illus 7.133 Plan of the Stage 2 depressions

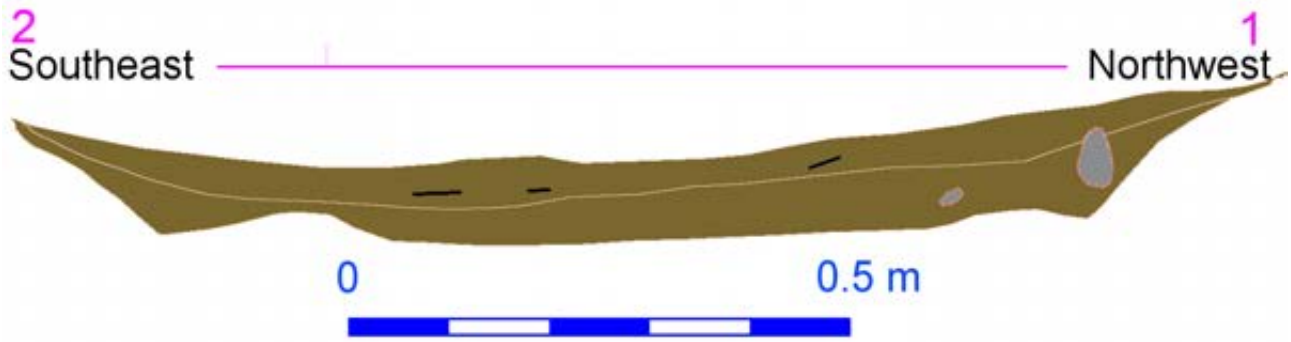
Illus 7.134 Depression 142 and bank terminal 130 from the east around 19May 1980 [Film 1980.9.6 part]

Illus 7.135 Depression 142 and bank terminal 130 from the east on 21 May 1980 [Film1980.10.5]

Illus 7.135 provides a broader view a few days later when darker soils stretched to the central baulk of Area B. Once again the terminal of the Stage 2 bank can be seen to the left as a patch of red-brown soil, though less clearly than on Illus 134.

On section 10/80 (Illus 7.136) the depression was about 1.3 m across and 0.25 m deep, with steep sides and a flat bottom 0.9 m across. The thin lenses of darker material within it may have been silt layers which formed in puddles, while an intermittent thin black surface half way up the fill may represent a temporary stabilisation surface (Illus 7.137).

Finds from the fill of depression 142 included a mylonite flake (CAT 27) and a quartz arrowhead (CAT 209), along with fragments of pottery (Table 7.33).



Illus 7.136 Section 10/80 across depression 142 in 1980 [NMRS DC38030-D]

Illus 7.137 Depression 142 section Film 1980-10-28

With the first trowelling of the 1981 season depression 808 appeared (Illus 7.138). Comparison of Plan 08/80, Plan 26/81 and its overlay (Illus 137 to 139) strongly suggest that the upper parts of 808 were later than 142

First noticed under the north edge of the fill of the depression 142, but probably originally cutting it, was a root hole 182 (not illustrated). It lay under tumble from the Stage 4 wall-base and it may represent a plant which grew through the tumble after the wall-base had become dilapidated.

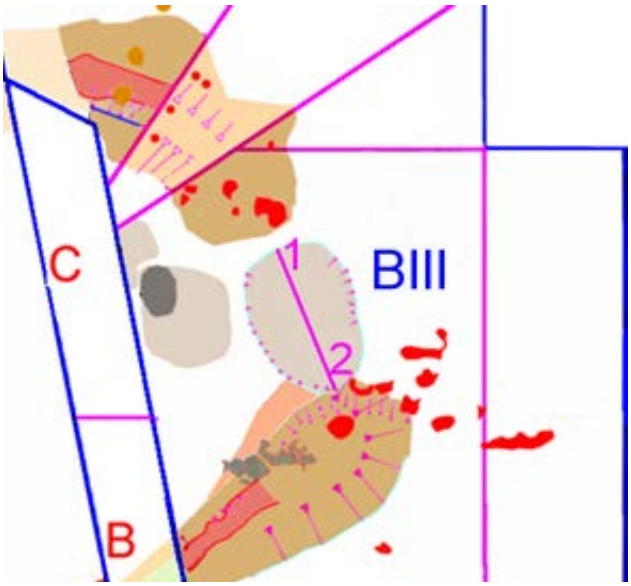
In gritty silt 808 flat stones formed an area of paving up to 0.4 m long (Illus 7.139). It sloped up from the exterior of the entrance. A small pit was cut into the southern extremity of 808 (Illus 7.140). If it held a post it would have stuck up in the middle of the entrance. But it did not have a post-pipe and it seems more likely to have been dug for some other purpose.

As layer 808 was trowelled away its extent reduced (Illus 7.140, 7.141). A shallow truncated feature 815 was found once the top parts of 808 had been removed. It contained a sherd from a small thin-walled E/MN non-corky pot, possibly a cup (Cat 12), an E/MN non-corky sherd (Cat 13) and an E/MN corky rim sherd (Cat 11 ASH 5), along with a mylonite short-end scraper (CAT 211).

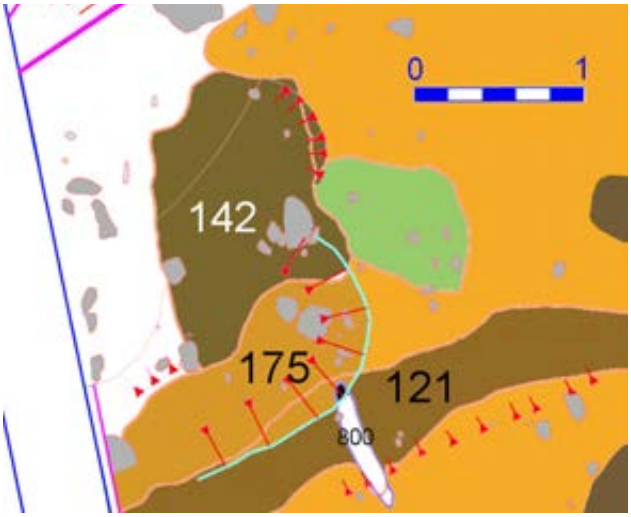
Inside the enclosure in BIII depression 808 gave way to mottled green clay. The label 142 was used for the green mottled clay, probably wrongly, in the sense that the clay had nothing to do with depression 142. A strip of gritty green material, wrongly labelled 808 on Plan 27 overlay 2 (Illus 7.143) separated the mottled green clay from an area of red-brown clay to the north. The gritty green material seems highly unlikely to be the same as the fill of depression 808.

To the east, outside the line of the Stage 2 enclosure, there was an area which was much darker brown when wet. It was probably another shallow patch of silts in an erosion hollow (Illus 7.141).

The end of the northern part of the bank was still visible as a patch of grey gritty material (labelled 130 although most material labelled 130 was reddish brown), while to the south of the entrance to the Stage 2 enclosure in the same position as Bank 175 lay reddish brown fibrous material (Illus 7.141).



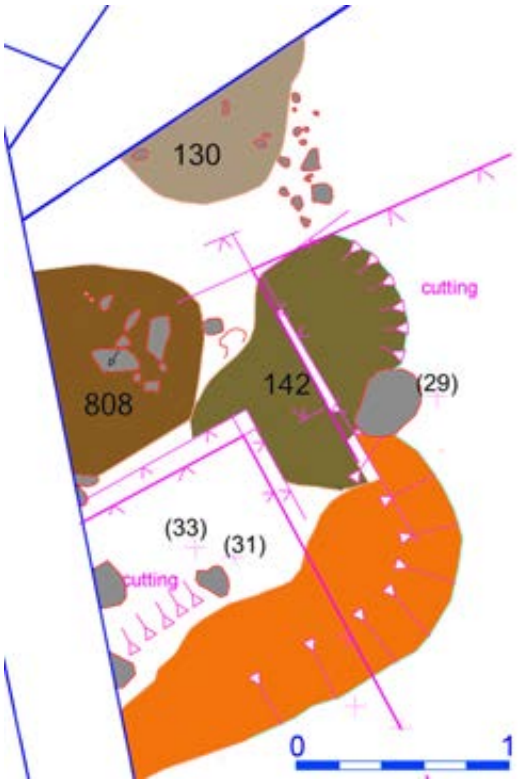
Key plan for Illus 7.137 Section 10/80



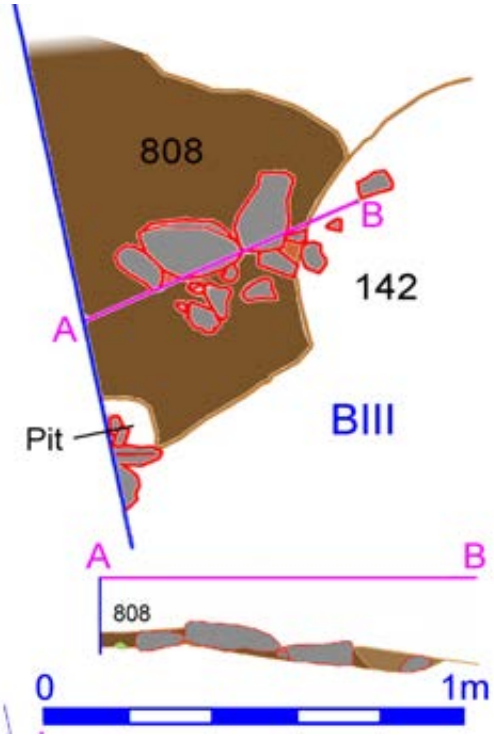
Illus 7.138 Area BIII; depression 142, bank 175 and linear depression 121 in 1980 [based on Plans 06/80, 07/80 & 08/80 NMRS DC38025-7]

Table 7.33 Pottery from Depression 142 in BIII

Cat	Comments
771	A small sherd from a probably small fine Beaker.
829_831	Two abraded E/MN non corky spalls and sherd - could even be Beaker
832	A small, heavily-abraded soft sherd, probably burnt, from a thin, fairly fine pot. Too abraded to be diagnostic.



Illus 7.139 The northern part of the same area at the start of the 1981 season after 26/81 on 08/80 [NMRS DC 38060 on DC38027]



Illus 7.140 Hollow 808 Plan 26/81 overlay 2 & Plan 33/81 attached to Context sheet 808

The strip of green gritty material wrongly labelled 808 and a strip of mottled green clay of the east of the southern bank may reflect the troughs of underlying cultivation beds. That will be considered further in Chapter 7.19.

Along with the mottled green strip was a variety of shallow patches of clay some of which seem to have been the bases of pits, the tops of which had presumably been removed by the ploughing which produced layer 112.

Under the red brown clay appeared another shallow feature (818) in which a barbed and tanged arrowhead (CAT 210) was found.

At this level very little of the northern bank terminal survived. There were two patches of iron pan, and around them were black linear streaks. A mottled brown and black clay feature lay just south of where the terminal had been and seems most likely to have been a clay-filled erosion hollow (Illus 7.143).

More cleaning revealed iron-enriched stake holes and other iron-rich patches below and by the terminal (Illus 7.144).

In the northeast of Area BII/ III a shallow pit 143 had been found in 1980; it measured 0.6m long the baulk. It was interpreted as a possible tree-hole (Chapter 7.2.7 Illus 7.20). In 1981 it was drawn as measuring 0.75m along the baulk, and was crossed by what seemed to be two ard marks (Illus 7.144).

By hypothesis these were visible here only because the fill of the pit was a different colour and texture from the spotty mid-brown layer (a version of 112) through which the pit was cut.

7.10.9 Discussion of the entrance depressions and other features in northern BIII

In the preferred interpretation 142 and 808 were silted-up wear-hollows at the entrance to the Stage 2 and Stage 3 enclosures east of the Ring and the rough paving in 808 was intended to fill a wet area. Other broad shallow features in and outside the enclosure probably also reflect wear and filling-up (Illus 7.134). Smaller features, however, seem to have been pits in some of which fragments of artefacts were deposited.

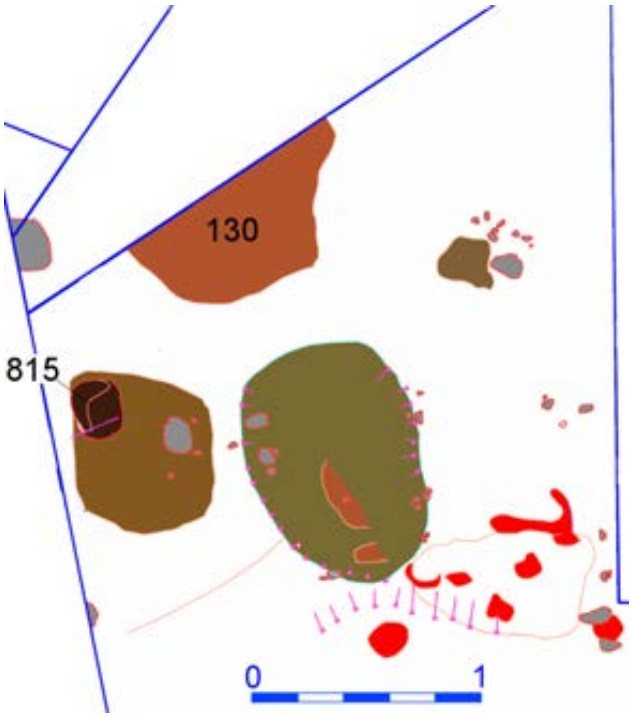
Apart from the apparent overlap of one patch of mottled brown and black clay with the bank terminal the pattern fits an interpretation that they were associated with use of the entrance to the Stage 2 enclosure. The one apparent exception, the mottled brown and black patch on Plan 27/81 overlay 2, lay beneath the edge of the (spread) terminal and it was later than one of the iron-enriched stake-holes on Plan 28/81 (Illus 7.145). But it seems most likely that it had been an early patch of silting in the entrance beside the terminal and was subsequently covered by material eroded from the bank.

Although the Stage 3 entrance was in the same general area the identifiable Stage 3 deposits were higher than the top of the depressions so the latter probably did not go with that stage.

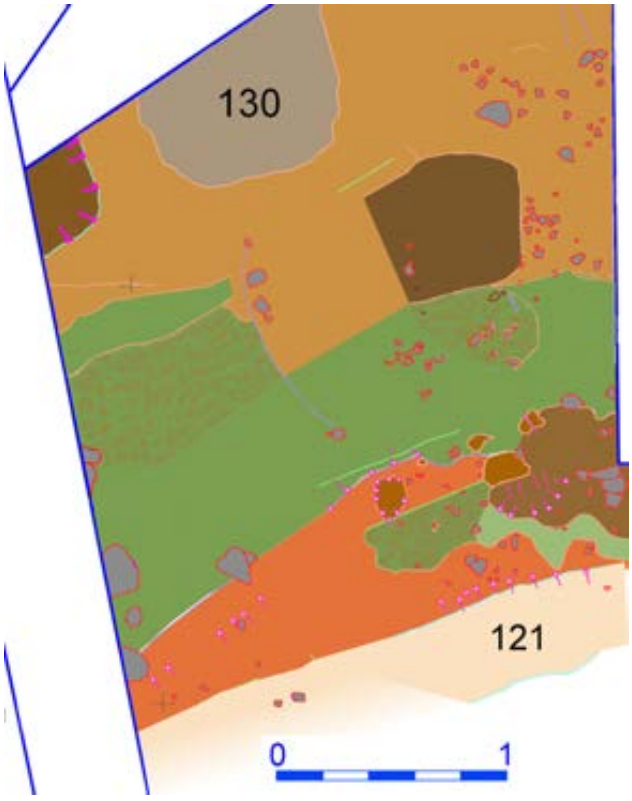
Depression 808 reflects 'interior' wear rather than being a true entrance deposit. It may have removed any traces of the stake-holes of the Stage 1 enclosure, or the latter may not have extended this far east.

The presence of two barbed and tanged arrowheads, one from the main fill of depression 142 and the other from patch 818 can be interpreted in various ways, partly because we did not record how they lay in the ground. However, pit 818 was possibly similar to other small intrusions including the pit at the south end of depression 808 and pit 815, which contained a sherd from a small thin-walled E/MN non-corky pot, possibly a cup (Cat 12), an E/MN non-corky sherd (Cat 13) and an E/MN corky rim sherd (Cat 11 ASH 5), and a mylonite short-end scraper (CAT 211). These small pits can be interpreted as dug for deposition of fragments of artefacts. It is worth recalling the several small patches of clay inside and outside the entrance, interpreted as possibly the bottom of small pits the tops of which had been lost to ploughing. Perhaps organic offerings were also deposited.

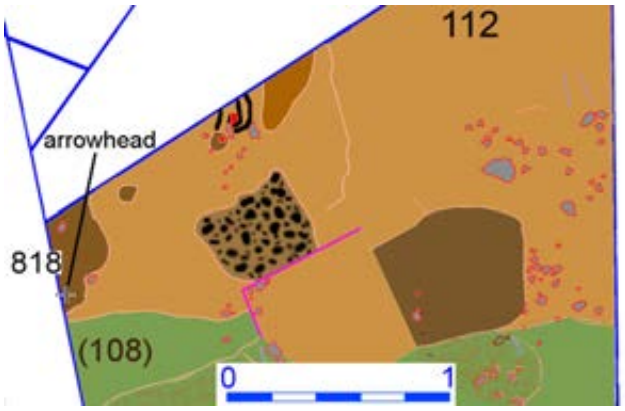
No pit was noticed when the arrowhead in silty depression 142 was found. Several interpretations are feasible. Although it is formally open I shall ignore the possibility that it had been dropped long before the depression formed; it seems too great a coincidence. Perhaps the arrowhead was dropped during use of the entrance and incorpo-



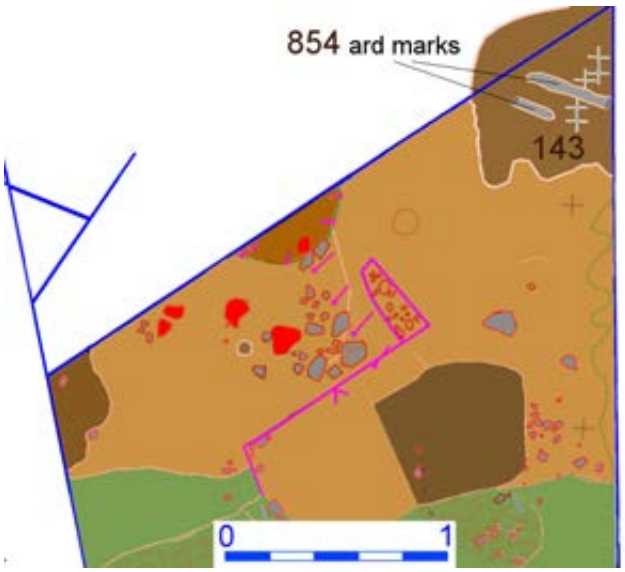
Illus 7.141 Plans 33 and 34 [NMRS DC38067-8]



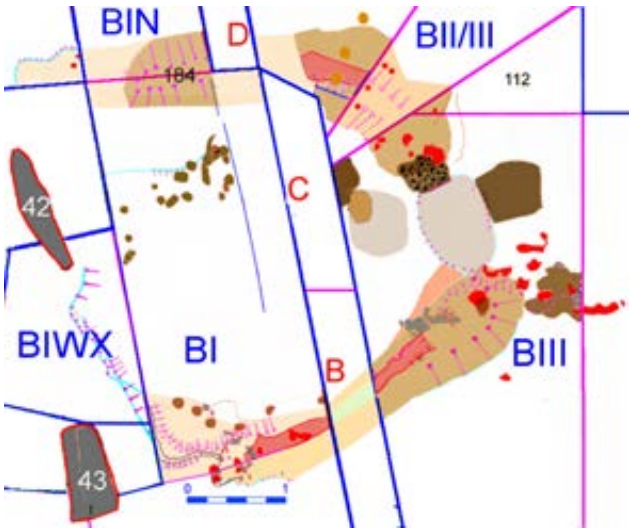
Illus 7.142 Plan 27/81 plus Overlay 1 on Plan 08/80 [DC38061]



Illus 7.143 Plan 27/81 plus Overlay 1 and 2 on Plan 08/80 [NMRS DC38061]



Illus 7.144 Plan 28/81 on Plan 27/81 [NMRS DC38062 on DC38061]



Illus 7.145 Composite plan of patches near the entrance to the Stage 2 enclosure

rated in the muddy patch almost by chance. But given the other small pits containing artefacts the arrowhead may have been put in a small pit or scrape which was subsequently churned into the silts. Overall, the preferred interpretation is that all the artefacts in this area were offerings which had been put in small pits.

7.10.10 Bank 175, the southern terminal of the Stage 2 enclosure bank in BIII and vertical stones 118.

Minor variations in the orientation of depictions of baulks and temporary section lines make interpretation of the relationships between some records difficult. Compromises were required in fitting plans together (Technical Note 7.10.10). Near the main section dividing BI from BIII the upper part of Bank 175 was composed of dark soils (although less dark than those in depression 142) above cobbly iron-penetrated clay and grit (Illus 7.146). A small piece of rotten sandstone (81.185), not a normal component of the local geology, was found in soil 112 where it merged with the bank.

On Illus 7.146 the bank material is between the ranging rod and depression 142, the latter identifiable by its darker fill. The key plan summarises its interpreted shape (as does Illus 7.107) but later ploughing had spread it, making its edges hard to trace.

In Illus 7.147 the section of the bank includes part of linear depression 121 to the right and depression 142 to the left. Strong iron pans are visible both on it and on Illus 7.148. No context numbers were included on the drawn section but a vertical stone, part of 118, can be seen near the centre above iron-stained and concreted sand. To either side of it was soft silty sand; the concreted version probably reflects drainage through the stone-filled slot above it.

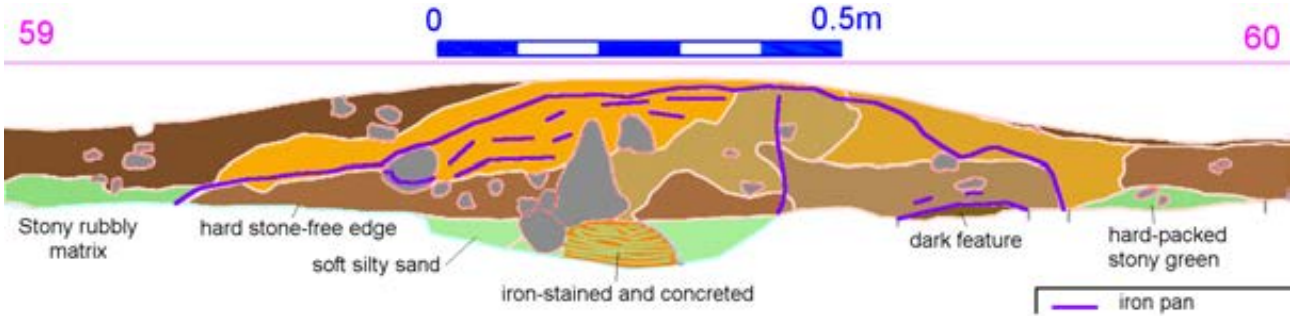
At about a metre wide Bank 175 was broader than the bank core in the northern part of the enclosure. Perhaps that was because it was, at this point, a terminal alongside the entrance-way; or conceivably it had been higher so had spread more.

A line of stones in a narrow slot in BIII was given a separate context number, 118, during

post-excavation (Illus 7.147, 7.148). Even after minor compromises in fitting plans together the depiction of small vertical stones 118 on Plan 12/80 did not line up neatly with the depiction of the palisade slot 185/876 further west on Plan 43/81 (Technical Note 7.10.10). Yet the rest of the record treats them as part of a single (admittedly complex) set of closely related features. The line of stones ran more exactly east-west than palisade slot 185/876. Stone-filled slot 118 appeared to be contemporary with or later than slot 185 (Illus 7.147-Illus 7.149).

Further to the west, in BI, the equivalent slot 876 stood against the north side of the bank; but

Illus 7.146 The top of Bank 175 from the east on 17 May 1980 [Film 1980.9-4]



Illus 7.147 Section 12/80 (58-59) showing Bank 175 in BIII [NMRS DC 38032]

Illus 7.148 The lower part of Bank 175 and the stone-filled slot 118 in the exploratory trench east of the west baulk of Area BIII, from the south-west on 30 May 1980 [Film 1980.15.4]

in Section 59-60 the stones were near-central to it ((Illus 7.147-7.149). The fill around them was heavily iron-stained and concreted.

Once the stones had been removed parts of two pits filled with slightly redder clay were visible in plan, 0.3 m apart centre to centre (Illus 7.150). The photographic label is on one feature and the other is to its right about two label-widths away. The line of stones was immediately to the right of the left-most feature.

Towards the end of 1981 season sections were cut across the area below Bank 175 and the palisade slot. The latter may be visible as a blue-green slot in the northern part of Section 32 to 33. It should also have been visible at the north end of Section 30 to 31, but perhaps it and its context had been removed before the section was drawn. The drawn part of Section 28-29 was shorter than its section line on Illus 7.152. Although a bowl-shaped feature about 0.1m across and filled with

bluish green clay was recorded in it, it was probably an ard mark rather than part of the palisade slot.

The associated plan (Illus 7.152) shows the multiplicity of shallow features crossed by the section lines. They seem to represent either ploughing or the bases of cultivation troughs. Indeed the large number of features all trending at much the same angle as each other, at this level and at higher levels, tends to support the idea that cultivation beds and troughs of Phase 5 influenced the orientation of linear features in Area B for many centuries.

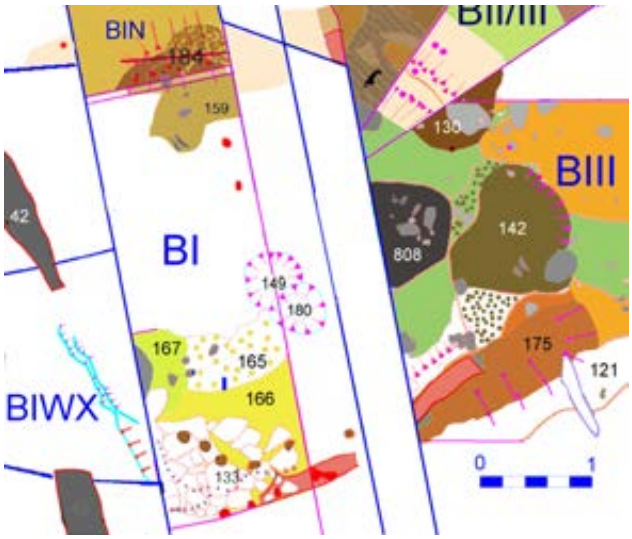
7.10.11 The bank and palisade slot in BI

The evidence for the palisade slot's existence on Section 11/80 Part B on the west side of the central baulk was ambiguous (Illus 7.153). But overlaying the main plan and section shows that slot 185/876 should have been behind the clump of stones. That explanation for the absence of the palisade slot from the section drawing fits quite well with its expression elsewhere in BI: at the edge of a change in height with raised ground to its west and a scooped area to its east.

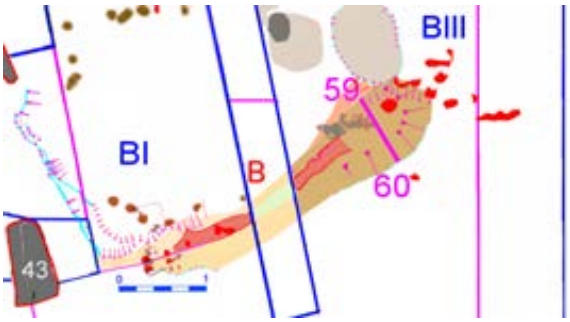
But it is not at all clear what the clump of stones itself represented (Illus 7.153-7.154). The stones seem to pre-date the soil fills of the enclosure (Illus 7.153) but it is conceivable they were in a later feature cut into the north side of the bank.

The bank sat on green sandy clay natural (Illus 7.153). Its lowest level was a mound of iron stained hard sandy clay. It is conceivable that this was not material placed in this position but a protected hump of a soil which overlay the green natural clay. After all, that was what was found further west near Ring stone 43. However, it was interpreted as part of the built bank, a continuation of bank 175 to the east in BIII. The iron staining in its lowest level suggests that the overlying layers originally contained abundant organic material, perhaps a turf wall.

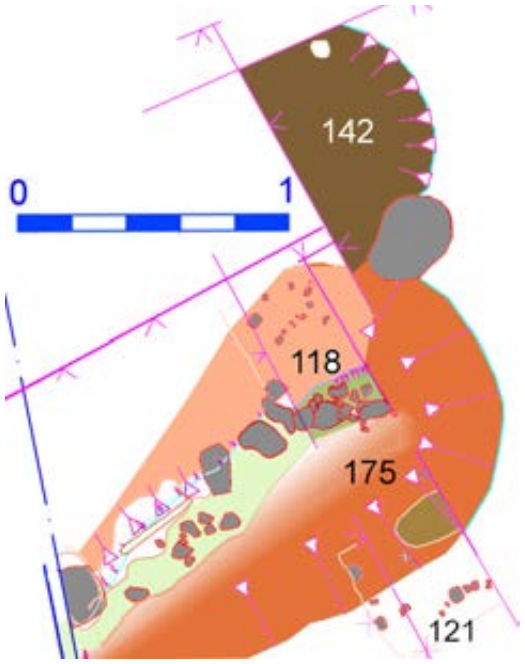
Above the southern half of the hard sandy clay, was a lens of soil which was visually and texturally like the widespread upper mineral soil 117. Neither the lower nor the upper part of the bank here showed direct evidence of ploughing in the form of ard marks, but the lens of soil was probably the remnants of a plough soil. Presumably the turf



Key plan for Illus 7.147 and 148; the section line is approximate

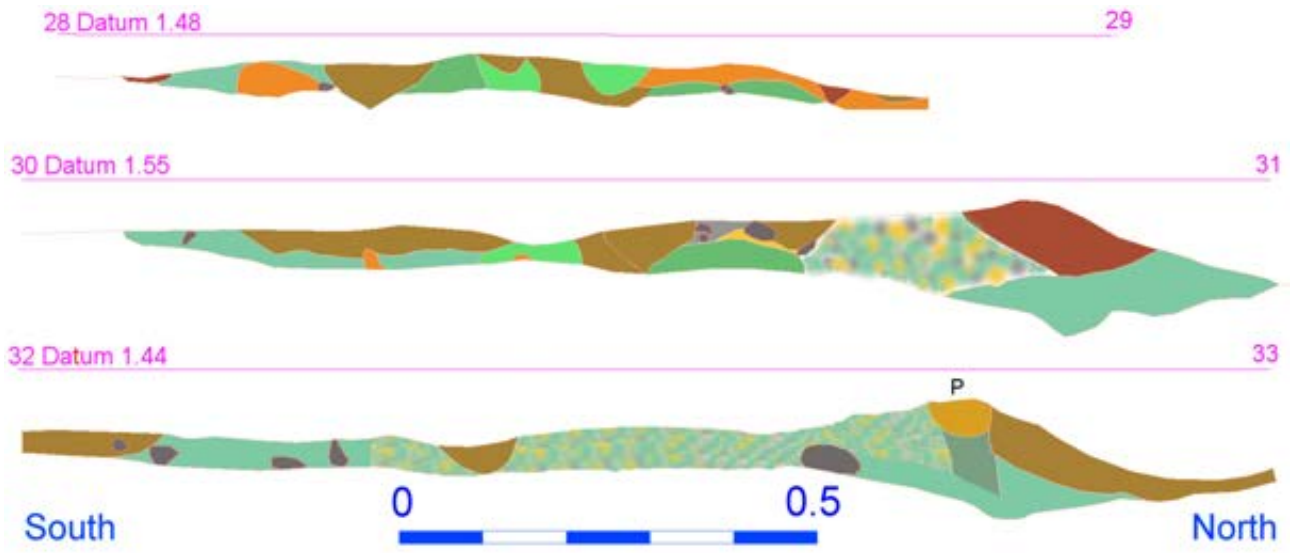


7.148 Key plan Section 59-60

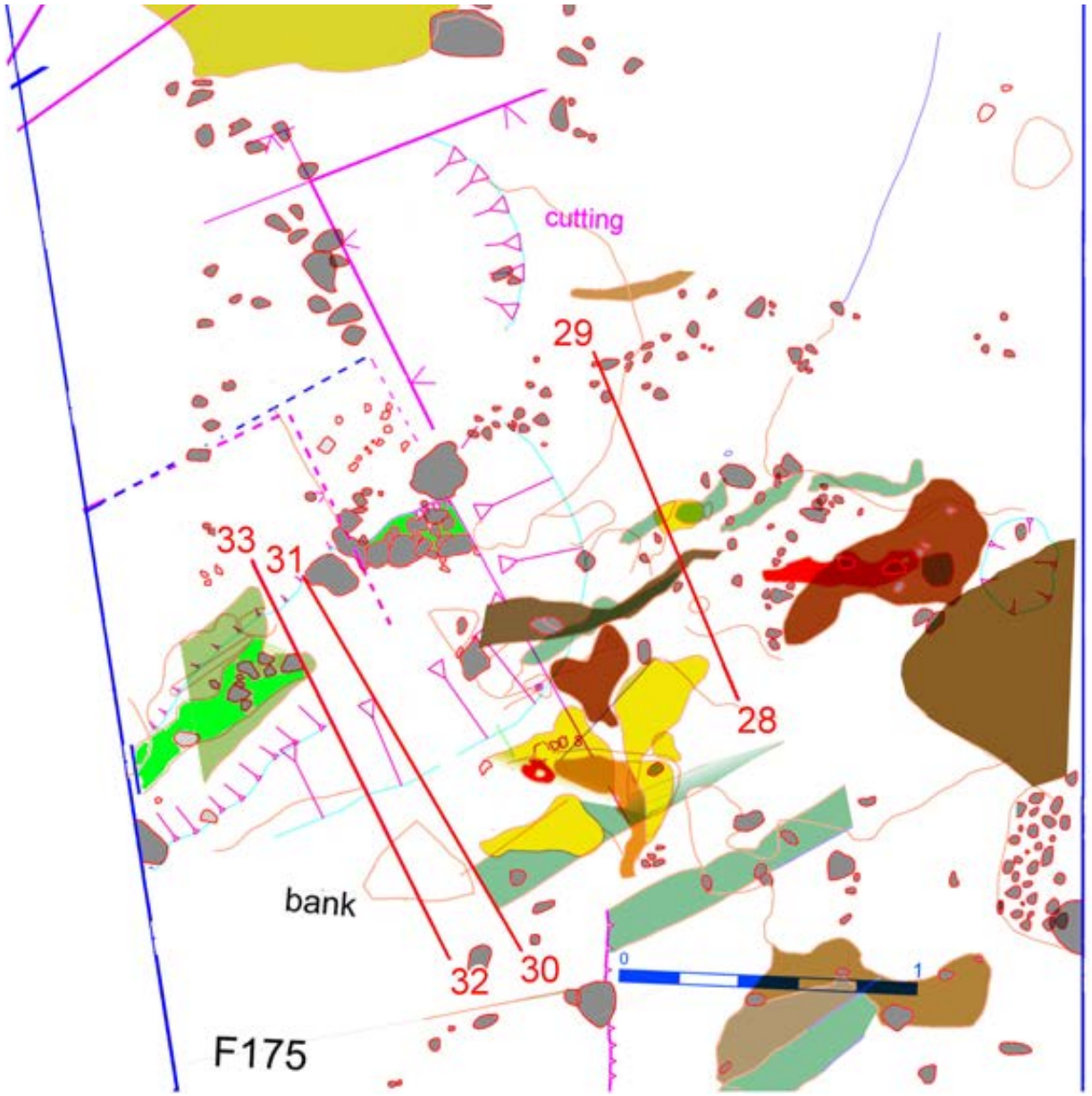


Illus 7.149 Plan 12/80 Stones 118 in bank 175 [DC38032 on DC38027]

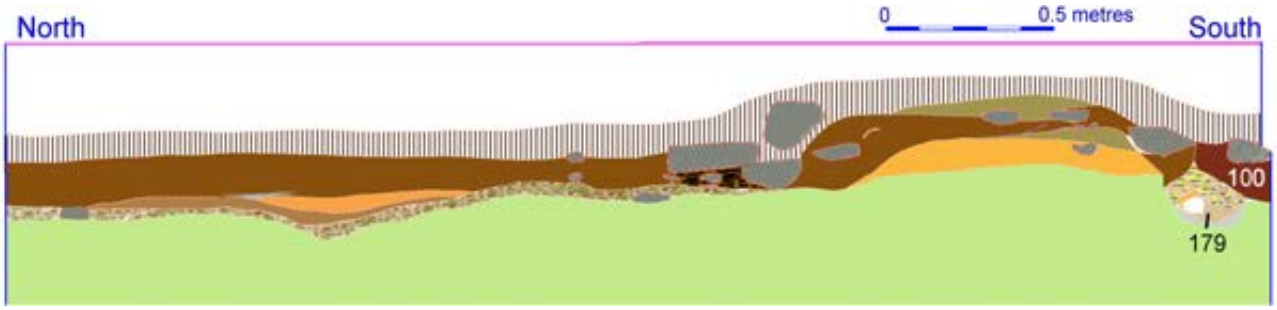
Illus 7.150 The slot through bank 175 after removal of stones 118 [Film 1980.15.9]



Illus 7.151 Sections 23A (28-29), 23B (30-31) and 23C (32-33) across the area below Bank 175 and the palisade [NMRS DC38057 A-C]



Illus 7.152 Plan of Section lines 28-29, 30-31 and 32-33 across the area below Bank 175 and the palisade [NMRS DC38065 and 38066]



Illus 7.153 Section 11/80 Part B showing the southern bank and part of the interior of the enclosure [NMRS DC38031B]

and modern topsoil was also a modified version of the pre-peat plough soil. The black humus-rich material below the slab behind 144 on Illus 7.153 may have been preserved only by the overlying slab and gives a hint of an original interior surface near the northern edge of the bank.

Posthole 144 to the left of the stones on Illus 7.154 was interpreted as part of the Stage 1 enclosure and is described and discussed below.

Posthole 179 immediately to the south of the bank on Illus 7.153 was interpreted as probably fairly modern and it was described and discussed in Chapter 7.2.9.

As with Section 11/80 it is not clear whether the block of strata depicted on Section 26-27 (Illus 7.155, 7.156) was a built bank or a ridge of earlier strata surviving between the ditch (just beyond the left end of the section) and the palisade slot (just beyond the right end of the section).

The lack of alternating turf lines and clay layers of the kind seen further west, and the 0.2m long flat slab under the light brown sandy clay in the middle of the bank, suggest that it was at least in part a built feature. The iron panned feature and small vertical stone at the north end of the section no doubt served the same function as the stone-filled slot in BIII; subsequent excavation revealed the continuation of slot 876 between the former and the latter (Illus 7.156).

Illus 7.156 combines the information described above for BIII and the eastern part of BI with that described below for the western part of BI. As described in Technical Note 7.18.7 some of the plans forming it were imperfectly registered and the precise orientation of some features is probably depicted imperfectly.

In and under Bank 175, and to its west, shown in green in Illus 7.162, was a palisade slot The fills were mostly light grey-green clay. The two palisade slot elements 876 in Area BI and 185 in Area BIII are in the slightly darker grey-green, as is the clay in the slot for stones 118. A slightly lighter green has been used to join up the various elements of the palisade slot.

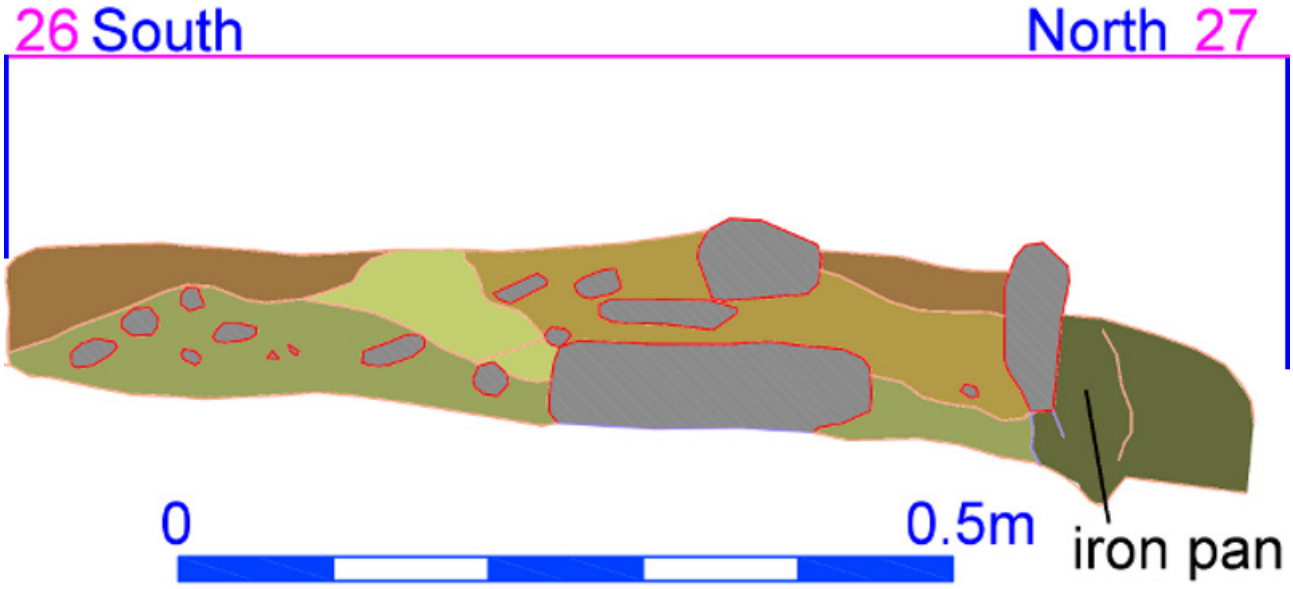
Bank 175 is shown in rusty brown in Area BIII. A lighter red, almost pink, shows its greatest spread to the northwest. Some iron-encrusted stake holes and other iron-encrusted features are shown in red. Brown-filled stake-holes interpreted as definitely belonging to the Stage 1 stake-defined enclosure have been omitted, as have some iron-encrusted stake holes recorded at a higher level along with the eastward extension of bank.

To recap, the slot was associated with small vertical slabs at its east end and along Section line 26-27 (Illus 7.148, Illus 7.155, 7.156). Elsewhere it appeared to be stone-free. Iron panning was not noticed as particularly strong in the eastern part of the slot but was present in Bank 175 (Illus 7.147).

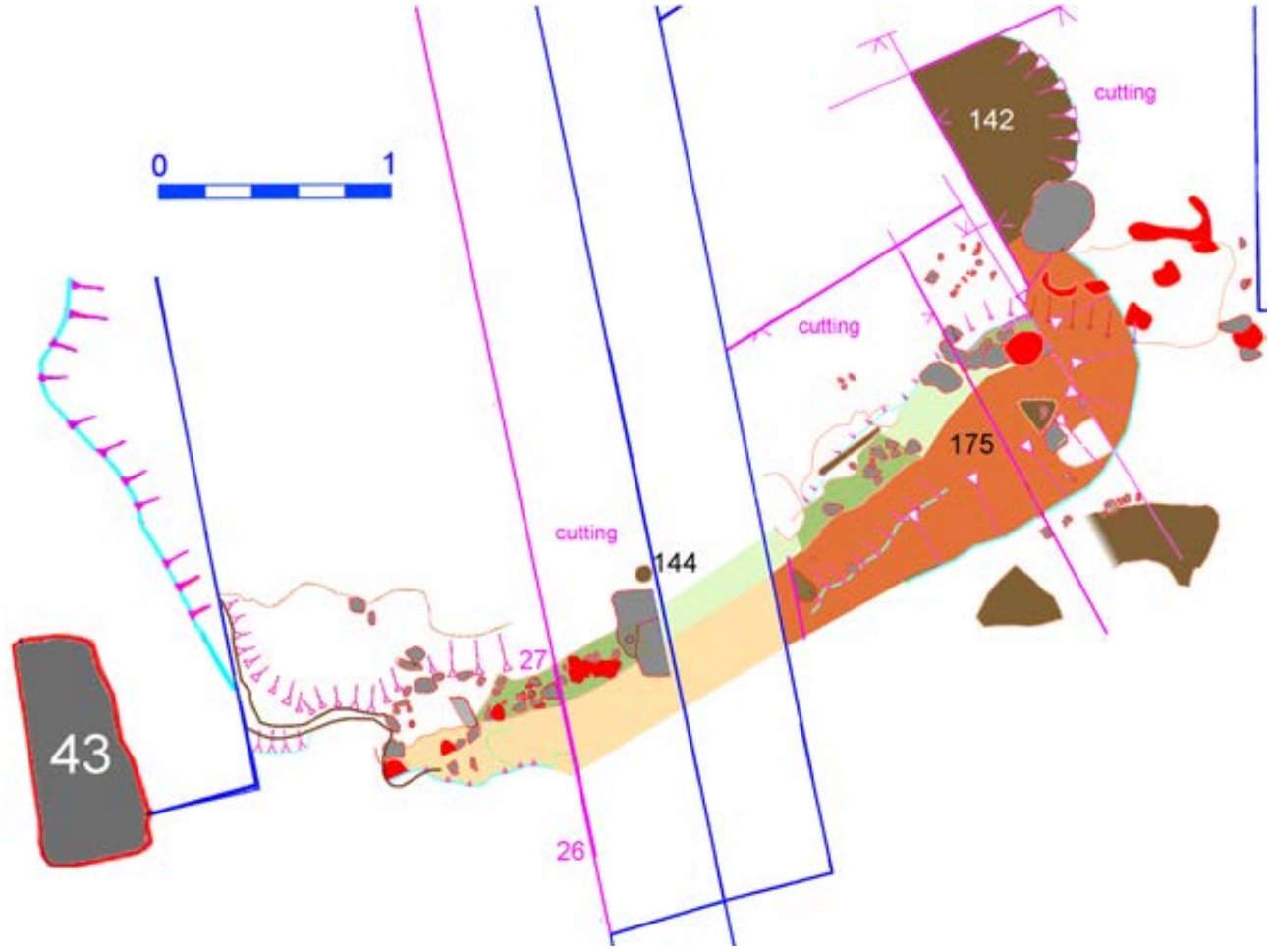
Further to the west, however, iron-panning was strong and it concentrated particularly in a set of small stake holes (Illus 7.156-7.158).

In 1981, towards the end of excavation, Slot 876 was traced to about 1.5 m from Ring stone 43. For much of its length it incorporated iron-stained stake holes (Illus 7.157 to 7.159). They

Illus 7.154 Central baulk from the west showing the stone cluster and part of the bank as in Illus 7.153 [Film 1980.12.8 part;]



Illus 7.155 Section through south bank in BI



Illus 7.156 Palisade slot and other Stage 2 enclosure features [NMRS DC38067 on DC38065 on DC38081 on DC38077 on DC38032 on DC38027]

Illus 7.157 Detail of iron-encrusted stake holes 896 and slot 876 on 1 June 1981 [Film 1981.17.35]

Illus 7.158 The palisade slot running to turf lines 162 and 164 near the base of Ring stone 43 and iron-encrusted stake-holes [Film 1981.17.34]

Illus 7.159 Stones 133 at the base of Ring stone 43 from the east [Film 1980.10.2]

Illus 7.160 The clays under 133 on 13 May 1981 from the north-east [Film 1981.7.25]

were similar to iron-encrusted features 185, 859, 823, 190 in Area BII and 191 in Area BII/3. Their distribution suggests that they are unlikely to have been caused by tree roots.

The iron encrusted casts of the stake holes stuck up several centimetres above the level to which the level of the interior had been excavated (Illus 7.157, 7.158). The palisade slot was explicitly recorded in the Day Book as underlying the turf lines 162 and 164 at the base of Ring Stone 43 and Illus 7.157 and 7.158 show turf line 162 curving over the line of the palisade slot. The edges of the turf lines are shown on Illus 156 where they had been cut away.

7.10.12 Discussion of the relationship of the palisade slot to turf lines 162 and 164

Thus Illus 7.157 and 7.158 appear to show that the upper turf line dipped down over the remains of the palisade slot. Superficially it looks very much as if the slot cut away the earlier turf line but not the later. But the photograph clearly reflects fairly vigorous cleaning beyond the flap of turf (compare Illus 7.158 with Illus 7.160). Also the ground appears to have been cut away when the stones of the Phase 4 enclosure were emplaced (Illus 7.159, 7.160). Lastly, the recognition during post-excavation analysis of the likelihood of their having been an earlier phase (Phase 1) of enclosure suggests that the main scooping out of the enclosure may have happened before the palisade slot was cut.

Perhaps the slot actually stopped at the flap of turf, which had curled over or formed over (that is to say grown over) the side of the scoop of the Phase 1 enclosure. A modern example of this phenomenon can be seen on Illustration 12.6 in Chapter 12.1.6, which shows the west section through the cairn on Area H.

There is thus somewhat more ambiguity about the idea that the slot was earlier than the upper turf line than is apparent at first glance.

The surrounding contexts must also be taken into account when exploring what really happened when the slot was cut into the strata here. The ridge visible on Illus 7.159 was not a built bank. It was a remnant of ground left between the ditch running from the entrance to the chambered cairn passage and the scoop of the interior of the enclosure. When overlying wall-base 133 was first cleaned up in 1980 nearly all of it lay on a surface below the level of the ground to its south (Illus 7.159). In other words it lay mostly in the interior of the enclosure.

When the wall-base was removed on 12 May 1981 it revealed discoloured clay, iron-rich and stony against the edge of the scooped-out interior of the enclosure, with the turf lines at a higher absolute level to the south (Illus 7.160). The photograph shows detail of the iron encrustations including knobs and roundels much the same size as the iron encrusted stake holes discovered at a lower level later in 1981. They seem to stop or turn to the right (northwest) at the little promontory on which subsequent cleaning would reveal the upper turf line curling over. As will be described and discussed below in Chapter 7.10.15 the initial cutting down of the interior of the enclosure is associable with the Stage 1 stake-built structure. By the west baulk it was probably cut from about 0.2m along the ranging rod from the south. The subsequent scalloping away of clay near the south end of the ranging rod may have been linked to placing of wall-base 133 of the Stage 4 enclosure (Illus 7.159, 7.160).

The features visible on Illus 7.160 at the change in level were probably parts of the top of the palisade slot and had it not been for the ubiquity of the iron panning in the area we would have recognised it at this level.

But such retrospective reinterpretation has to be regarded with some suspicion. The original interpretation (now non-preferred) is based on the statement in the Day Book that the palisade slot underlay both turf lines. If despite the arguments presented here future excavation proves that the Day Book record was correct it will necessitate a very significant change in interpretation of the slot, because if it was under the earlier of the two turf lines then it was very probably earlier than the Ring. Further to the east, in BIII, if the slot was not related to the enclosure (for after all bank 175 was both amorphous and complex,) it might have been a free-standing fence, although it does not seem to have any correspondence to features found at a pre-Ring level on Area D inside the Ring.

The preferred interpretation is that the palisade slot was part of the Stage 2 enclosure and that despite appearances it cut both turf line 162 and 164. Thus it was later than the Ring and earlier than the cairn.

7.10.13 Discussion of the southern part of the Stage 2 enclosure bank and the palisade slot

The absence of the built bank in the south-western part of BI near the Ring is difficult to explain. Presumably one factor was that there was no ploughing here, perhaps because of the presence of an entrance to the Ring and subsequently to the chambered cairn passage. Turf lines 162 and 164, interpreted as the post-Ring and pre-Ring ground surfaces, survived, partly cut away by the enclosure.

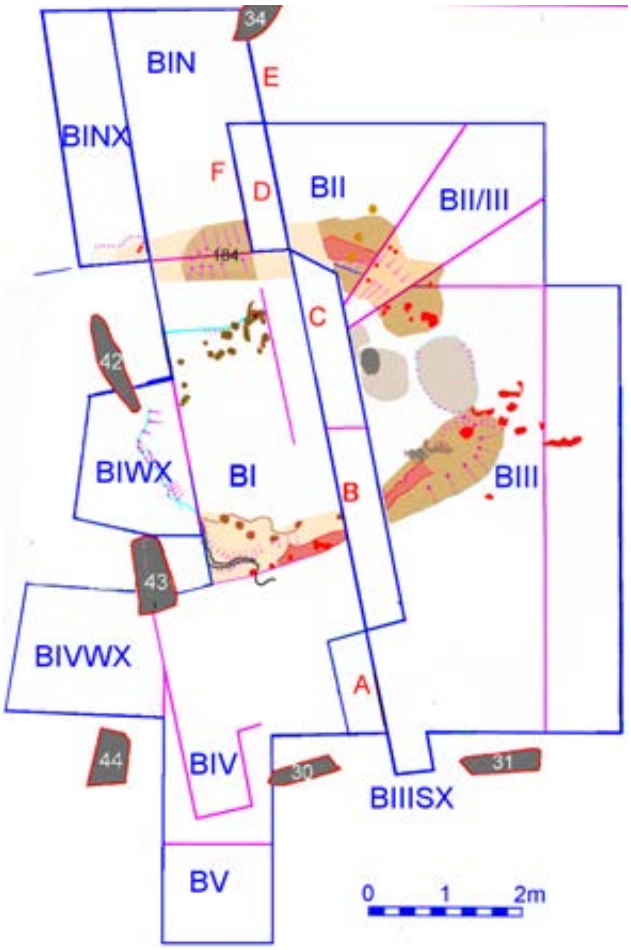
Bank 175 may have been the remains of the terminal of a timber and turf wall. It may have been lined on the inside by a panel of vertical stakes and horizontal laths. There was no evidence for the height of this structure. If the Stage 2 enclosure was roofed the rafters were presumably supported by a low revetted bank. The interior of the second stage enclosure was slightly over 3m across. If the roof sloped at 45˚ the building might have been about 1.5m plus the height of the bank tall at the centre - say between 1.7 and 2.0 tall; in most parts of the enclosure people would have had to stoop, squat or sit, if it were roofed.

7.10.14 Discussion of the Stage 2 enclosure

The second stage enclosure measured slightly less than 3.1m across internally north-south but the spreading of its bank makes that estimate an approximation. It measured about 3.9m east-west from the scalloped edge between Ring stones 42 and 43 to the centre of the main erosion hollow 142 in its entranceway.

The Stage 2 entrance was about 1.1m wide so it was noticeably wider than a normal modern house door.

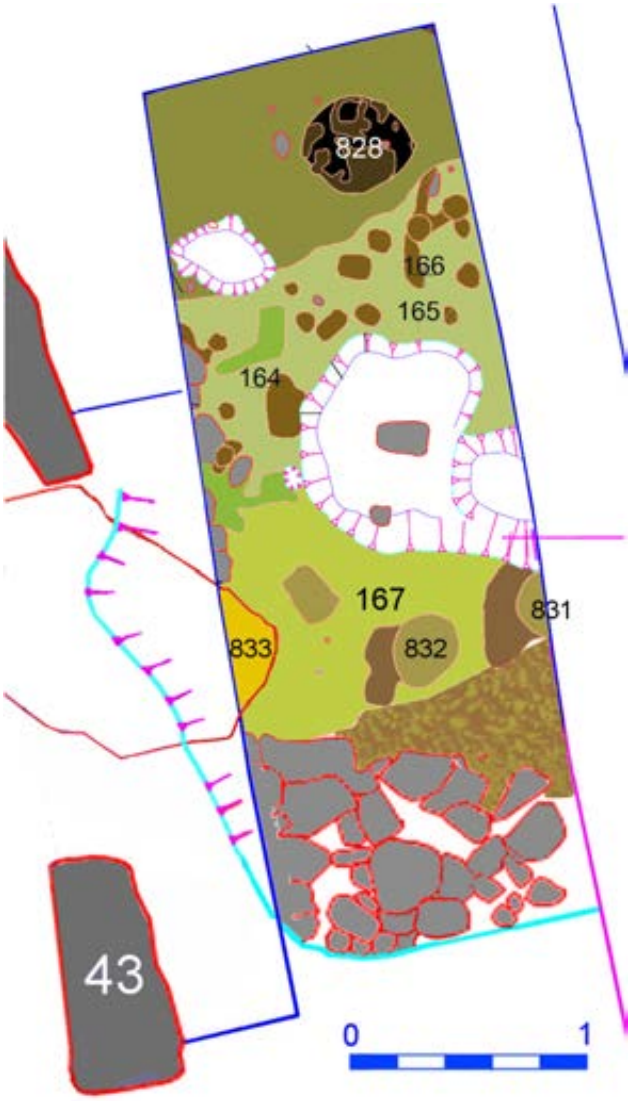
Broad shallow depression 142 and nearby shallow depressions including 818 and 808 and a darker patch 815 probably resulted from erosion by foot traffic and subsequent patching or silting.



Illus 7.161 The embanked second stage enclosure with Stage 1 enclosure stake-holes

In the southwest, between the central baulk and Ring stone 43, the bank seems to have merged into the ridge created by erosion to the south and scooping of the enclosure to the north. The posts in the palisade slot there appear to have revetted the higher ground to the south.

In the north the sequence on BII can be interpreted as starting with the laying out of the centre of the bank with linear piles of turf, soil and green sandy clay, followed by dumping of various clays, their differing colours suggesting slightly differing origins, to form a base originally less than a metre wide. The area between piles of clay was filled with green and brown clay. Slightly higher up, turf formed a component of the bank, revealed by a succession of east-west strips of clays of different colours. They included an area of dark smooth humic material with a soil very like 112



Illus 7.162 Plan 46/81 of 12 May including the lower part of 836 and features in it [NMRS DC38080]

underneath it. This humic material and soil may have originated as a coherent layer of turfs used in construction of the bank.

This enclosure was demolished and ploughed over, spreading bank material 130 and creating a plough soil which formed part of plough soil 112.

The finds assemblages from enclosure contexts were very small so they do not provide a secure guide to dating. That said they do make stratigraphic sense. Details are listed in Appendix 2.

Bank makeup included only Early/Middle Neolithic sherds, one a possible Hebridean incised sherd. They had presumably been in soil and turf used to build the bank.

Central pit 149, which might be of this stage, contained a possible fine beaker sherd (Cat 677); but it must be emphasised that the pit could have gone with any stage of enclosure (although it is unlikely that it went with the first) and the sherd showed signs of marked abrasion (wear category 3) so was probably residual.

Entrance silts included two barbed and tanged arrowheads (CAT 209, 210), a sherd of a fine beaker (Cat 771) and three other sherds (Cat 829-831).

The conjoining Food Vessel sherds (Cat 580_581) in bank-like material 130.1 in the depression a metre or more north of the enclosure wall suggest ploughing of spread bank material in the early second millennium BC.

7.10.15 The Stage 1 Enclosure

In the north of the enclosure removal of the brown upper layer of clay soil 836 revealed a greenish-brown layer, given the same label. In it were numerous small round features (Illus 7.162). They were interpreted as stake holes.

To their north, under mixed gritty sand and clay 159 was the lower part of clay soil 835, at this level greenish brown. In it was a black patch of loamy soil 828 lying in a very shallow saucer about 0.4m across. Under 828 were circular khaki patches 829 (100mm in diameter) and 830 (60mm in diameter)

Feature 828 may conceivably have been bits of patchy turf line surviving only because it was in a depression. There is no sign of it on Section 11/80 Part C which was 0.7m away (Chapter 7.10.4 Illus 7.114). But the greenish brown clay in which it lay may correspond broadly to the top of a layer of material under spread clay soil from Stage 2 enclosure bank 184 (Illus 7.162).

Five similar stake holes were found in the south of the enclosure a few days later (marked 'P' on Illus 7.163).

Removal of the Stage 4 enclosure stones from the south end of the enclosure revealed the underlying clays. The photo of 13 May (Illus 7.164) also shows the small pit 832 and the discolouration 833 under the fallen slab on the far baulk to the right, recorded on Plan 46/81 (Illus 7.162).

However the post or stake holes shown on plan 48/81 of 16 May 1981 (Illus 7.163) are not visible and nor are the small stones shown on that plan. Also the next photograph of this area (Illus 7.165) taken on 15th (or possibly 16th) May 1981 does show the small stones but the post or stake holes on the plan are not visible. Thus both photographs are earlier than discovery of the stake holes.

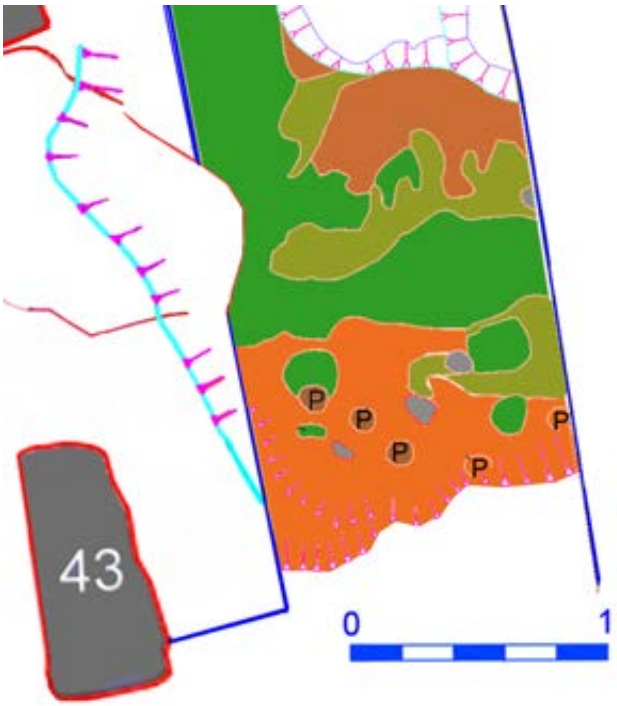
The stake-holes were not iron-panned, in contrast to the stake holes in the palisade slot. Their vertical stratigraphic relationship to the iron-rich stake holes in the palisade slot just to their south is not recorded. But the iron-rich casts of the palisade-slot stake holes seem to have stuck up above the horizontal level of the five non-panned stake-holes (Illus 7.158).

The latter could however be compared with posthole or stake-hole 144 near the middle baulk. They were of a similar size although none of them had any packing stones. Posthole or post-pipe 144 was 11 mm in diameter and 8 mm deep inside a wider ring of staining 16 mm in diameter, with a single packing stone (Illus 7.154, 7.167). It too was to the north of slot 876, with its iron-stained stake-holes which appeared the following year, running west from near the central baulk (Illus 7.166).

The stake-holes provide evidence for a separate enclosure stage, Stage 1, recognised during post-excavation work. The southern examples (Plan 48 Illus 7.163, 7.166) appear to have been very shallow. They were invisible in layers at only a small absolute height above them. Similarly the northern examples were very shallow and do not seem to have been excavated separately from layer 836. They had been invisible in its upper part, either because they had not been there, or because there was too little contrast between their fills and the upper part of clay soil 836 or because their traces had been removed by ground-working. It was perhaps the latter which led to incorporation of a Food Vessel sherd (Cat 567) in soil 836 (but see Technical Note 7.6.8 for problems in recording the context of this sherd).

7.10.16 Discussion of the Stage 1 enclosures

The stake holes formed a pattern asymmetrical to the Stage 2 enclosure (Illus 7.168) and highly



Illus 7.163 Plan 48/81 the southern part of the interior on 16 May including the stake holes [NMRS DC38080]

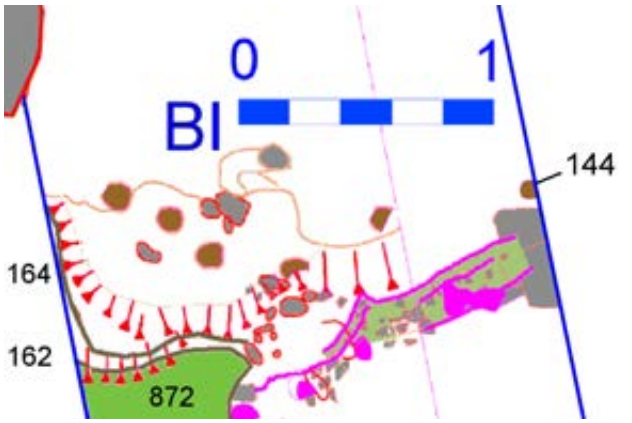
asymmetrical to the Stage 3 enclosure. The southern Stage 1 stake holes were covered by the stub wall of the Stage 4 enclosure by Ring stone 43. The stake-holes cannot have been internal fittings of any of the later enclosures. So taken in conjunction with the scalloped edge of the enclosure to the west, they define a Stage 1 enclosure.

Because of the lack of evidence for the Stage 1 enclosure in BIII there is not enough unambiguous evidence to reconstruct the overall shape of the Stage 1 enclosure. It may have been circular, or bag-shaped like one of the enclosures on the green clay platform under the cairn. If it was not circular and some of the iron-rich stake-holes and features around the entrance to the Stage 2 enclosure in fact went with the Stage 1 enclosure the latter might have had a main axis running slightly north of east and just under 4m long. If so it could have been very similar in size and shape to the smaller and probably later of the timber-built enclosures on the green clay platform under the cairn (Illus 7.169).

The match is far from perfect and it is not suggested that the Stage 1 enclosure necessarily had the exact shape of the pre-cairn one. But their

Illus 7.164 The southern part of the enclosure from the east on 13 May [Film 1981.7.23]

Illus 7.165 ▲ The southern part of the enclosure from the northwest on 15 or 16 May 1981 [Film 1981-9-18]



Illus 7.166 Posthole 144, Stage 1 stake holes, and slot 876 with its iron-encrusted stake-holes

Illus 7.167 ▸ Posthole 144 from the east [Film 1980.10.27]

broad resemblance gives credibility to the idea that the Stage 1 enclosure was built at the same time as the chambered cairn and its function was to allow the practices followed in the pre-cairn enclosure to continue, albeit outside the Ring. and Stage 2.

7.11 Phase 8 The chambered cairn

7.11.1 Introduction

The cairn was investigated in two small extensions, BIVWX covering the dilapidated passage and BIWX containing a massive slab and the edge of the cairn. Excavation of another massive slab, on the boundary between BIN and BINX, is reported here because it was similar to the one in BIWX (Illus 7.170).

7.11.2 BIVWX: the cairn passage

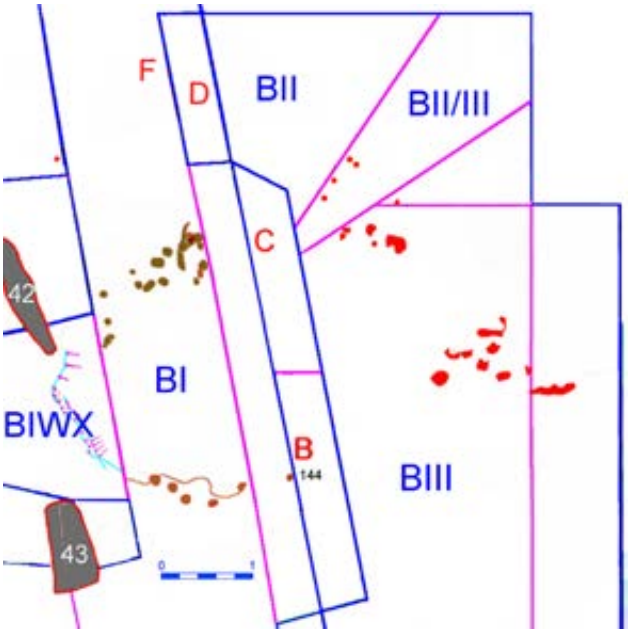
Area BIVWX, between Ring Stones 43 and 44, covered the passage of the chambered tomb, a small part of the interior of the chamber and the area immediately to the east of the passage. It was opened on 16 May, nearly half way through the 1981 excavation (Day Book 35).

The eastern part of the south wall was in disarray, and most of it proved to have been rebuilt; but the north wall survived to several courses except at its easternmost end.

Between the walls the top of the drain (100) was filled with soft humic loam and roots along with loose stones (Illus 7.173). The topsoil near Ring Stone 43 contained three pieces of fine pottery with grooves, according to the Day Book; the original finds book has "sherd, grooved from Vic Drain 19?.5.81" and the Finds List has "19/5/81 Grooved Ware - from Victorian Drain", but this sherd is not in the pottery catalogue.

At no stage of planning and removal of the loose stones did they give the impression that they were the result of a purposeful attempt to block the passage. They looked like tumble from the loose outer cairn (Illus 171-7.173).

The loose stones and soil covered a 4-5 cm thick layer of green silty sand (826), lying both in the passage and in the central gulley. The sand tailed out towards the chamber. A gritty component of



Illus 7.168 The Stage 1 enclosure and iron-panned features of ambiguous date on Plans 46/81 to 48/81 [NMRS DC38080 to 38082]

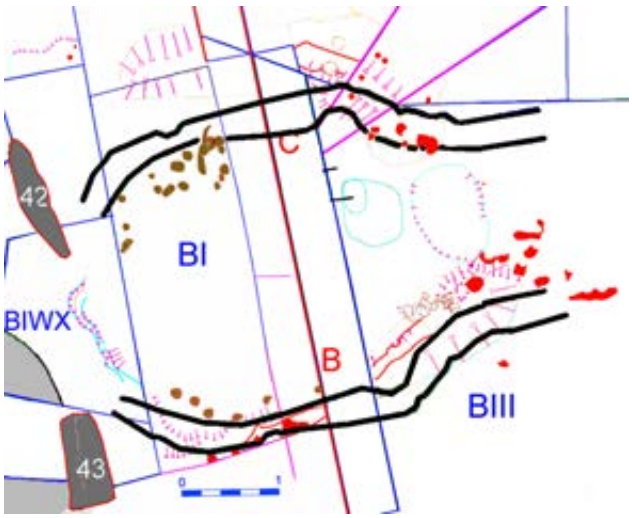
826 may have been added quite recently to help stabilise the passage floor. Erosion had worn the base of the gulley to a level below the bottom of the wall-stones, through various layers into undisturbed natural green clay. It was 0.22 m wide at its bottom and at one stage appeared to cut through a ridge or bank across the entrance, although further cleaning suggested that this was illusory (Day Book 41, 45).

In the east part of the passage green clay 875 underlay green sand 826. Neither sand nor clay produced any finds.

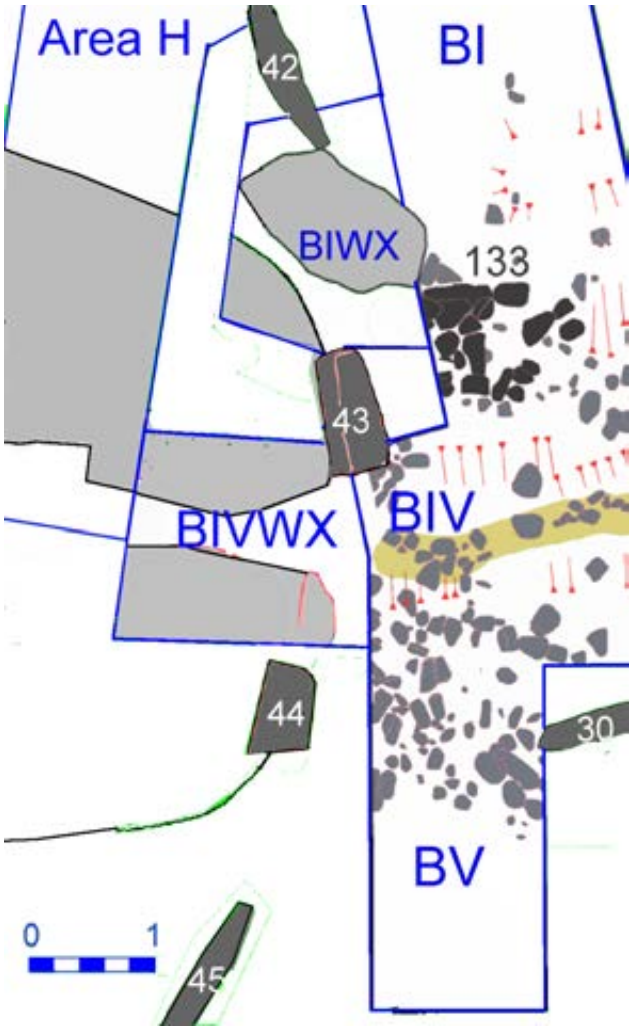
7.11.3 The north passage wall

The north side wall of the passage was built in two parts. Near the chamber it formed the core cairn (usually called the 'chamber wall' on Areas D and H). Between the core cairn and Ring stone 43 its finish was much less regular, although both parts were built of large slabs and blocks of stone (Illus 7.174, 7.175).

Comparing Illus 7.175 and 7.176, stones 2 and 3, on top of cairn stone 4, had been removed for safety reasons before the photograph forming Illus 7.175 was taken, and cairn stones 10 and 13 are not numbered



Illus 7.169 Overlay of reconstructed outline of the small enclosure under the cairn on a plan of the Stage 1 (and more faintly the Stage 2) enclosures



Illus 7.170 The cairn in Area B

The largest part of the north wall was the well-built core cairn; stones 2 to 4 and 24 formed part of its east side. It was integral with the chamber east wall which ran north to meet the north chamber wall. The latter was sectioned in Area H and the core cairn and the layers immediately below it in Area H and BIVWX were similar to one another. It comprised three layers of laid large above a very large basal stone. Above these was a much more jumbled and incomplete layer of slabs, of which stone 6 was apparently in situ, suggesting that an originally taller wall-face had been disturbed at and above this level. A thin fine Hebridean Incised sherd was recorded as coming from the bottom course of stones of the wall (Cat 316).

All facing stones of the outer cairn passage above the basal layer had disappeared or been displaced. A large stone (labelled 1 on the illustrations) had slumped forward and was hanging out of the section. Its true cross-section is shown on Illus 7.176.

The gap between it and Ring stone 43 had been filled with stones and firm dark soil. Stacked stones brought the general level up to that of the upper large stones of the core cairn. Below the stacked stones was a black gritty charcoal rich humic material (879). No artefacts were found in the outer cairn.

Black-grey greasy clay with charcoal 791 in a disturbed part of the outer cairn or stone hole, or a fragment of turf line near the base of Stone 43, included an E/MN non-corky sherd (Cat 248).

The facing stones of the inner passage wall were removed on 30 May 1981, with the stones numbered for reconstruction. Behind the wall-face the inner core cairn was nearly 1.4 m wide with its south-east corner 0.6 to 0.7 m from Stone 43.

The fills of the upper part of the core cairn were broadly similar to those on Area H, with two main fills, the upper light loose humus and the lower fine compacted dark brown/green sand with some charcoal, grits and red ochre coloured flecks (Illus 7.179 - 7.181). The fills of the outer cairn were generically similar but specifically different from those of the core cairn. The upper fill of the outer cairn was light compact loam with grits, which overlay a 12.5 cm thick layer of dark green greasy gritty clay with large grits and charcoal.

The core cairn fills overlay the outer cairn fills, suggesting that there had been slumping towards the east. The black gritty charcoal rich humic material (879) below the stacked stones visible in the section by Ring stone 43 overlay a patch of firm gritty greasy grey clay (878), interpreted as a shallow pit. The latter contained an E/MN corky sherd (Cat 67) along with eroded indeterminate pieces of pottery (not catalogued), and what was thought to be a piece of burnt bone (699/81).

Layer 872, the green clay above the pair of turf lines outside the passage, came to an abrupt end at its edge.

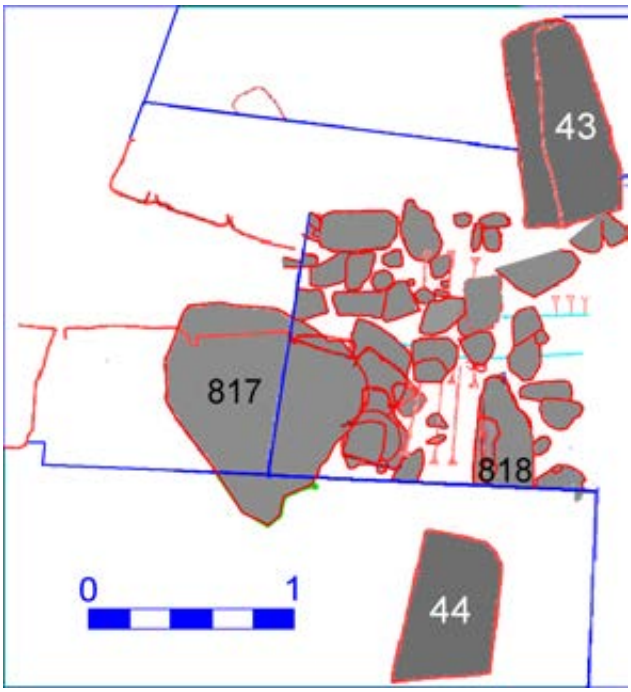
Under 878 was a small patch of black-grey greasy clay with charcoal, interpreted as a cast of a stone. It contained a fragment of fuel ash slag and an E/MN non-corky sherd (Cat 248).

7.11.4 Discussion of the north passage wall

The inner cairn was solidly built and survived well to a height between 0.45 and 0.5m. It was originally at least 0.55 m tall. It was very similar to the chamber wall on Area H.

It was not clear whether the outer cairn had originally been poorly built or whether it had been robbed and then poorly rebuilt. The evidence from Sub-area BIWX tended to support the latter idea. In Area H the cairn had been robbed and rebuilt; that interpretation fits what we saw in BIVWX and BIWX and it is therefore preferred here too.

Pit 878 may have been the equivalent of Pit 859 on the other side of the passage, a pit supporting a facade slab. The passage may have been flanked by thin vertical slabs before dilapidation of the outer cairn. Its stratigraphic position was identical in that it was set into green mottled clay 872 above a turf line 162. Two packing stones seemed to lie in it. There are two main weakness in this suggestion. One is the asymmetrical positioning of it and pit 859 relative to the Ring stones (Illus 7.183). The other is that Pit 859 included pottery judged most likely to date to the middle of the 1st millennium AD. The pit is mentioned in Chapter 7.2.4 and described and discussed in more detail in Chapter 7.11.5 and 7.11.6. The pottery is described and discussed in more detail in Chapter 18.8 The Pottery Assemblage.



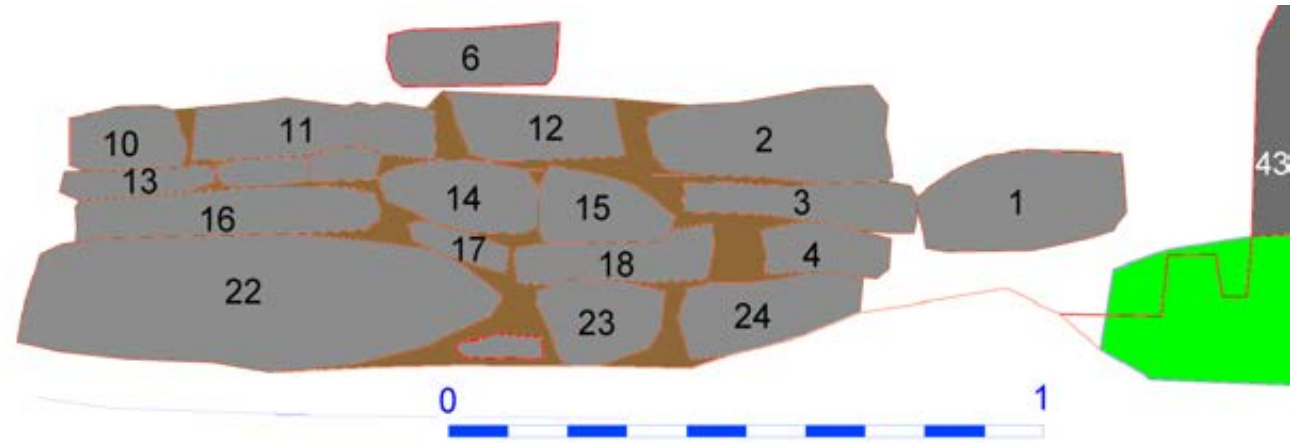
Illus 7.171 Loose stones in the passage [Plan 71/81 of 16 May 1981 and 74/81 of 18 May 1981 NMRS DC38105 and DC38108 on outline of passage]

Illus 7.172 Loose stones in the passage from the west on 18 May [Film 1981.10.2]

Illus 7.173 Area B4WX on 19 May 1981 after clearance of most of the rubble from the passage floor [Film 1981.11.26]

Illus 7.174 The north side of the passage near Ring stone 43 before removal of outermost stones [Film 1981.10.35]

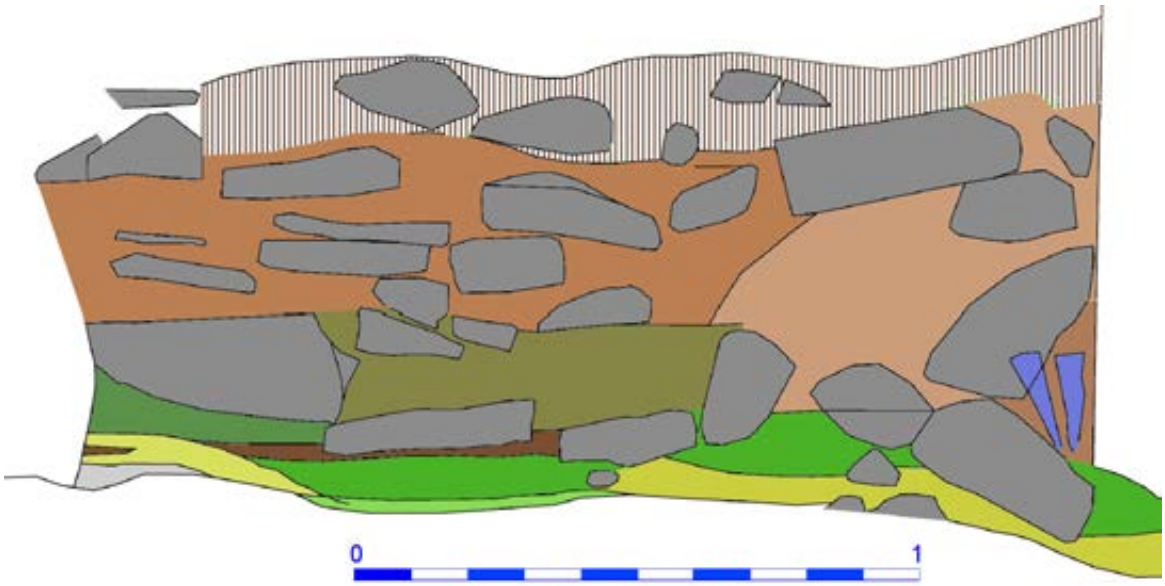
Illus 7.175 The facing stones of the north side of the passage on 27 May 1981 [based on Film 1981.16.35]



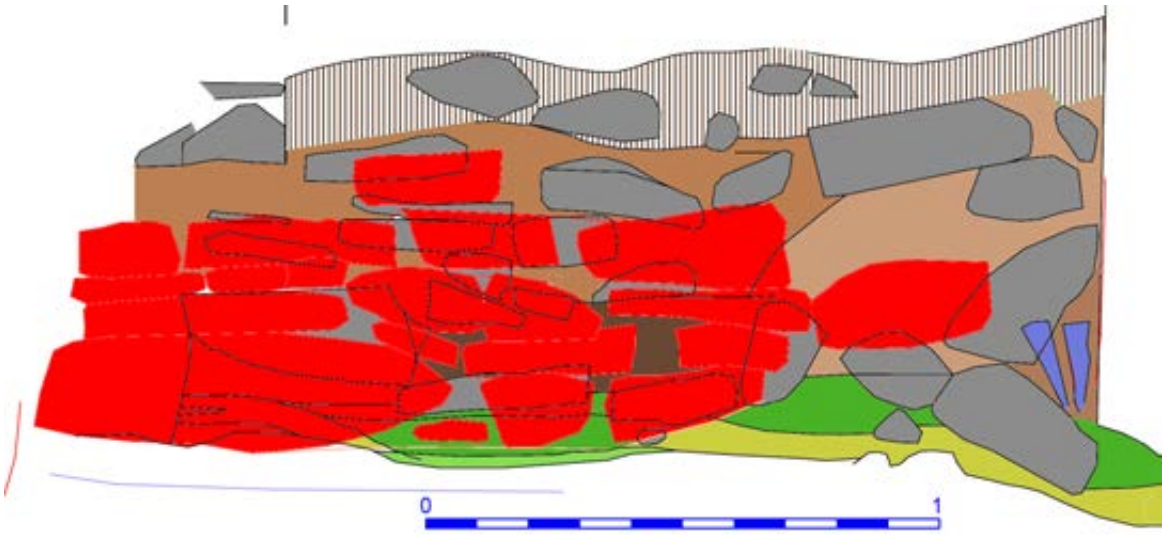
Illus 7.176 The facing stones numbered for reconstruction [Section 8/81 NMRS DC38042]

Illus 7.177 Detail of the fill between cairn stone 1 and Ring stone 43 [Film 1981.16.24]

Illus 7.178 Facing stones removal [Film 1981.18.9]

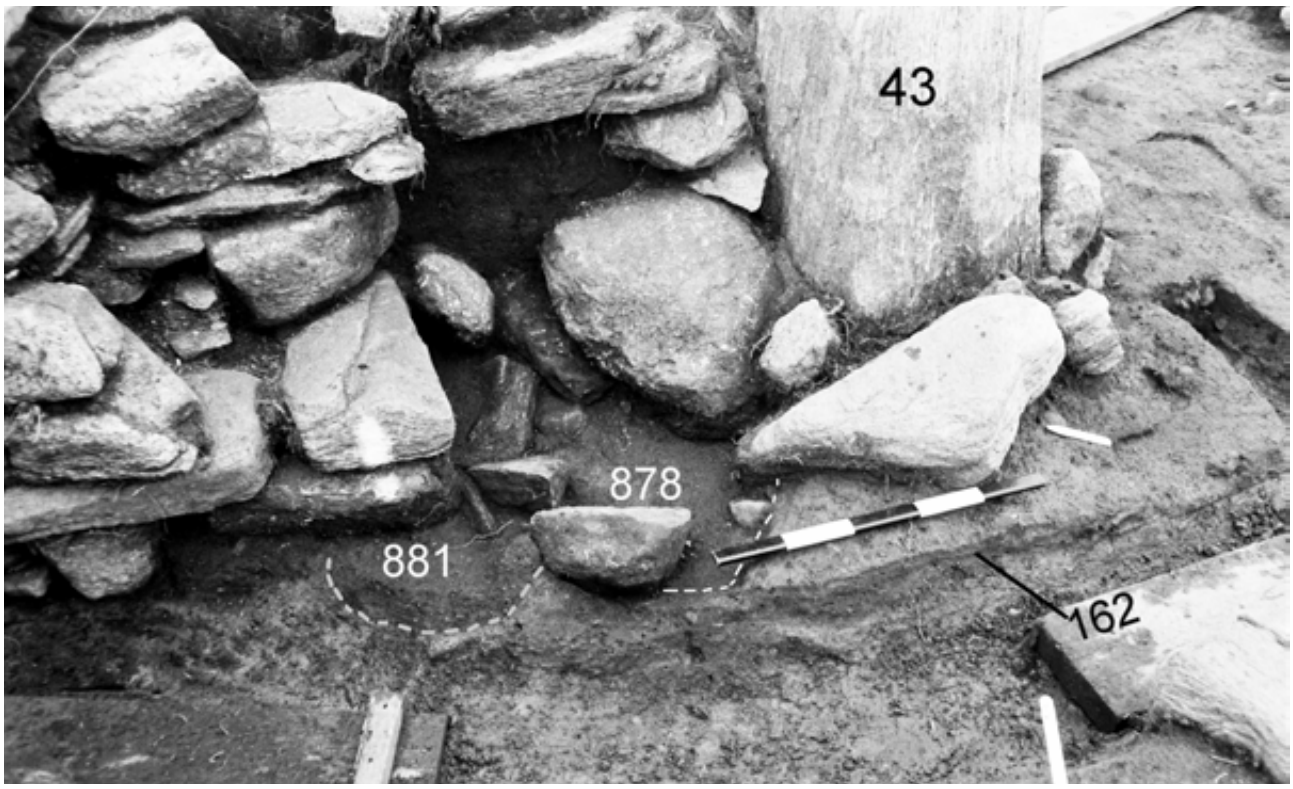


Illus 7.179 ection 9/81 of the cairn behind the passage facing stones [NMRS DC38043]

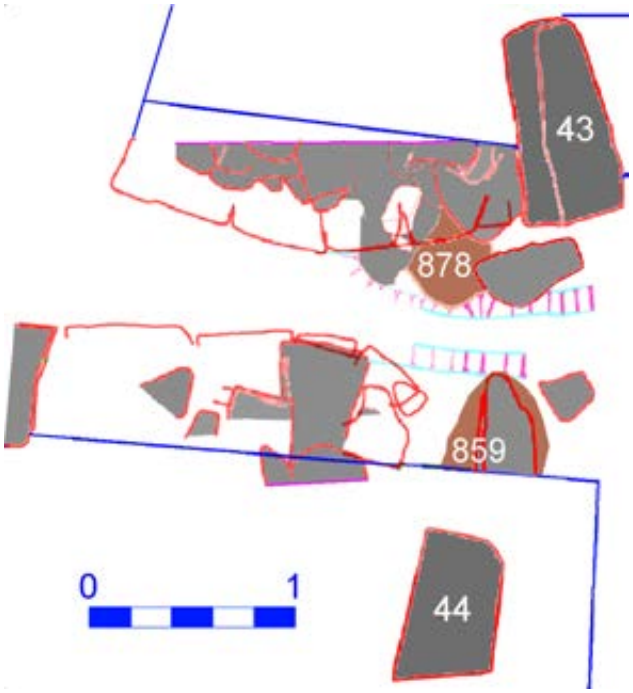


Illus 7.180 The facing stones overlaid in red on the cairn behind

Illus 7.181 The north side of the passage after removal of most facing stones and some inner stones [Film 81.21.3]



Illus 7.182 Feature 878, a pit for a kerb stone or the cast of a paving slab. Turf line 162 and part of layer 881 are also marked [Film 1981.16.25]



Illus 7.183 Pits 859 and 878 [elements of Plans 76, 78 and 80 NMRS DC38110, 38112 and 38114]

Illus 7.184 Stone 817 lying on the south side of the passage, taken from the west on 18 May 1981. [Film 1981.10.2]

7.11.5 The south passage wall

A particularly large stone (817) lay on the tumbled stones of the cairn above the south side of the passage. It measured slightly over a metre east-west and was more than 0.9 m wide. It may previously have been a roofing stone, either for the passage or for part of the chamber (Illus 7.184). It was removed on 28 May 1981 because it had become insecure (Day book 65). What initially seemed to be a solidly built part of the cairn survived partially under slab 817 (Illus 7.174 - 7.175). In fact all but one of facing stones had been displaced (Day Book 74).

Under the large slab at the west end of the south wall was a piece of Victorian pottery (Illus 7.185 - 7.186).

At the east end of the south wall, outside the core cairn, the facing stones had been removed down to a few jumbled stones lying in black humic material, sloping up to the south (Illus 7.187). In short, none of the detail of the stone positions can be regarded as original. Given Sharbau's depiction of the west end of the south passage wall as well-preserved, the wall may have fallen down or become dangerous at some time in the second half of the 19th century and been partially reconstructed.

Between the presumed original east end of the passage and Stone 44 to the south, a slab (188) had been set upright; it was found broken and leaning to the east. As it survived, it was L-shaped in elevation with the top of its northerly, lower part set at ground level. It is visible towards the bottom left of Illus 7.187 but is clearer (but less well related to its surroundings) in Illus 7.188.

Further excavation showed that it had been shattered into several pieces. It was set in a shallow pit (859) along with another stone which also sloped down to the east (Illus 7.188, 78.189). This smaller stone looked almost like a packing stone and it is conceivable that a wooden plank or stone upright had been set up at the mouth of the passage in Pit 859, wedged between that stone and stone 188, which might explain why the top of Pit 859 came so close to the modern surface; but there was no other evidence to support that speculation.

Pit 859 was cut into green redeposited clay 161, equivalent to 872 on the other side of the passage. The pit fill included much rotted stone along with brown humic soil, charcoal and fragments of pottery. At its base was charcoal-rich greasy grey material. The sherds were in Pit 859 were very diverse.

Table 7.34 Pottery from Pit 859

Cat	Comments
4	E/MN corky rim sherd from ASH 2c with interior spalled off and abraded.
5	Featureless, unclassified, abraded E/MN corky body sherd
308	Abraded sherd from a large Hebridean Incised jar ASH 31.
422	Rim sherd from a large 'domestic' Beaker ASH 48 with seashell, decoration.
423_424	Rim sherd and conjoined spall from 'domestic' Beaker ASH 48.
450	Rim sherd from Beaker ASH 49a
602	Sherd from hard non-gritty large pot; with part of interior spalled off possibly plain 'domestic' Beaker (undecorated), although the fabric is harder than that seen on other Calanais Beaker pottery and it could be much later.
603_604	Two refitted sherds from same pot as Cat 602.
614_615	An abraded sherd and fragment reminiscent of 1st millennium AD, pre-Viking Plain Style pottery from the Hebrides.
863_864	Two burnt and heavily-abraded fragments and a crumb from an indeterminate type of pot.
865_867	Three featureless spalls and a crumb possibly E/MN non-corky or Beaker.

Pit 859 also contained pollen (sample 2050) characteristic of zone CaN-3ii, a time when pas-

toralism had come to dominate over agriculture. That pollen zone ended sometime between about 2560 and 2200 cal BC.

Once slab 188 and the fill of 859 had been removed a series of faint parallel lines (880), superficially similar to ard marks, appeared in the surface of the orange-green clay 161 under 859 (Illus 7.191-7.192). They were interpreted as vertical slab impressions.

Turf lines 162 and the lower 164 were visible in the side of the gulley in the foreground of Illus 7.192. In between them was the light even-textured sandy clay 849. High in the baulk immediately southwest of Pit 859 was a pair of flat slabs one above the other (189) which formed part of the cairn on the south side of the passage. Given the amount of disturbance of this part of the cairn the other stones visible on the photograph may not have been in their original positions.

7.11.6 Discussion of the south passage wall

Because none of the wall-stones of the passage were necessarily in their original positions there is little to say except the obvious: they do not provide a secure guide to the original wall line, nor to the width of the passage. Nevertheless, like the north wall it curved rather than running straight and it is possible therefore that the passage was narrower in its middle than at either end.

Pit 859 appears to have supported a slab which had subsequently been smashed, perhaps during an attempt to remove it. The linear marks in the pit are interpreted as left by vertical packing slabs and the facade stone itself.

The sherds in the pit may have included ancestral material because Hebridean ware should be much earlier than insular Beakers; but the larger coarse sherds may have been selected as packing material. If the pollen in Pit 859 was contemporary with its filling the pit can be dated to between 2400 and 2200 cal BC, because the cairn must date to after 2400 cal BC and pollen zone CaN-3aii ended by at latest 2200 cal BC. The facade or flankers may thus have been original or added later.

But one pair of sherds from the pit (Cat 614-5) was very likely from a Plain Style pot of AD 6th to 10th century date (Chapter 18.8 The Pottery Assemblage). The broken slab cannot have been set up before the middle of the 1st millennium AD. Other pottery of this style was found at Calanais. People seem to have been collecting distinctive sherds from around about (other sherds of the shell-decorated Beaker ASH 48 were found mostly in the robbed cairn on Area D, for instance). It seems very likely that those who set up the slab were manipulating the cairn.

That leaves two options for the date of its setting up.

It may have been set up in the first millennium AD. Peat started continuous growth near the end of the East alignment about a thousand years earlier, and if the Ring was largely peat-free its growth must have been prevented there. That is credible. But their reason for setting up the slab is completely opaque.

The other possible date is after peat clearance in 1857. The cairn on Area D was certainly being dug into at that time. Perhaps the idea was to block the passage because it was thought to be in a dangerous state after Lady Matheson's viewing platform above it had been created.

Although the latter explanation is probably simpler than the former, and thus to be preferred, it does not provide any light on the reason for the presence of Plain Style pottery. There is, of course, a currently faint chance that future discoveries will allow the 'very probably Viking Iron Age' pot to be reclassified as domestic Beaker. But for the moment the enigma of its incorporation in the stone-hole around the time that the cairn was being robbed remains just that.

7.11.7 The cairn slot in BIWX

Under the slot dug to erect the late kerb stone on Area BIWX was a gully 858. Gully 858 was cut into the green clay 892 under the cairn (Illus 7.193-7.194). It curved more than it would have done if it was designed to hold the kerb slab. It was and is interpreted as a gulley defining the green clay platform.

The later slots in Illus 7.193 and 7.194 related to the massive kerb slab subsequently erected at the edge of the secondary cairn of the chambered

Illus 7.185 The base of the south core cairn at the end of May 1981 [Film 1981.17.31]

cairn. There was no sign here of an early cairn kerb like that found in Areas D and H.

7.11.8 Discussion of the gully bounding the green clay in BIWX

Gully 858 is interpreted as a cut for an edging to the green clay under the cairn and earlier than the latter. It may have been contemporaneous with a slot cut in green clay in the passage. It may also be a better preserved version of a slot which lay nearly under the cairn edge on Area D. It is discussed in Chapter 7.15 along with the green clay platform.

7.11.9 Discussion of the cairn in Area B

Once again it is worth emphasising the great length of time, a period of at least one and a half millennia, during which the chambered cairn stood before it was covered by peat. Excavation in Area B revealed evidence for only a small proportion of the activities related to its use.

It did establish that the chambered cairn sat on a layer of green clay. However the precise relationship between the primary outer cairn and Ring stone 43 was ambiguous in Area BIWX where only slumped cairn material was revealed. Ring Stone 42 and the primary cairn were separate. Overall, the evidence did not conflict with that from Area H and the simplest explanation for what we saw was cairn-robbing dilapidation and subsequent reconfiguration when the kerb-stone was erected.

The cairn in BIVWX originally consisted of an inner well-built element forming the chamber and inner passage wall and an outer, less well-built cairn element filling an approximately 0.65m gap between the end of the inner wall and Ring stone 43. The fact that this gap was left suggests that there was a specific reason for keeping the wall about 1.4m wide. This raises the issue of whether the chamber wall stood independent of the outer cairn for a significant period. There was no conclusive evidence either way in Area B. It is tempting to speculate that the outer cairn was added because the upper part of the wall had started to

collapse eastward (Illus 7.179, 7.181). But the collapse of the upper part of the wall may instead have occurred when the cairn was robbed; that is a more natural interpretation of the profile behind the wall-face.

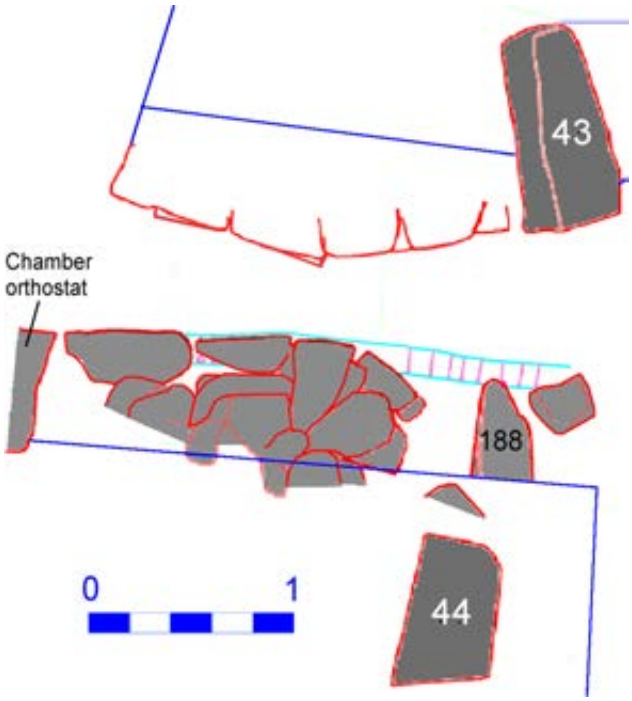
At the base of Ring Stone 43 on the north side of the passage there were several large stones which looked as if they should be packing stones. If that was their original function, they had been heaved out at some stage and then thrown back, perhaps when it became necessary to fill the gap between the cairn and Stone 43 (Day Book 85). Or perhaps those who set up the slab in pit 859 on the other side of the passage, or those who subsequently smashed it, may have been responsible for this disturbance.

The south passage wall had been almost entirely re-laid in the Victorian period. Its precise original form could not be established. It was between 0.6 and 0.65m wide at the base of its walls, although its north wall appears to have curved slightly, expanding a little towards the chamber and towards the entrance (Illus 7.195). Glass fragments under the westernmost basal stone of the passage show that disturbance affected even the basal stones of the wall and that they had been re-set.

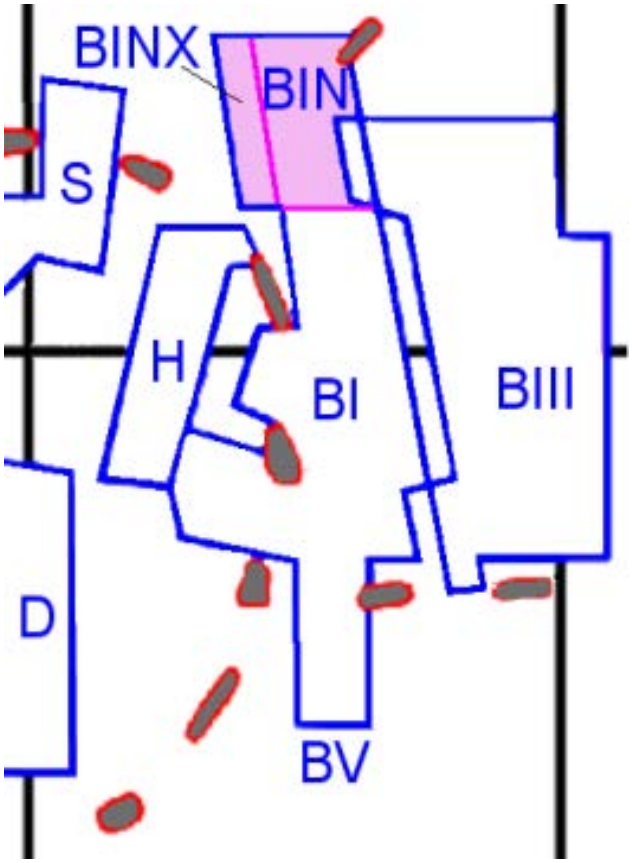
One mystery discussed in Chapter 4: Introduction to the Fieldwork is the contrast between what we discovered in 1981 and what Sharbau recorded in 1857 or shortly afterwards (Illus 7.196). In his sketch the west end of the south passage wall was vertical and composed of roughly coursed stones although it tailed downward to the east. Perhaps the west part of the wall collapsed during or before building of the viewing platform for Lady Matheson's Path; or maybe emptying out of rubble in the passage left the wall-face unstable.

Between Ring stones 42 and 43 the secondary cairn was bounded by a massive slab. It ran north-west from Ring stone 43. It and the slots which supported it at various times were described and discussed in Chapter 7.5. There was a gap of about 0.6m between the edge of the cairn and Ring stone 42, so no precise relationship could be established.

The best interpretation of the evidence from Area BIWX is that the slab there was secondary. Independent evidence from Area H just to the

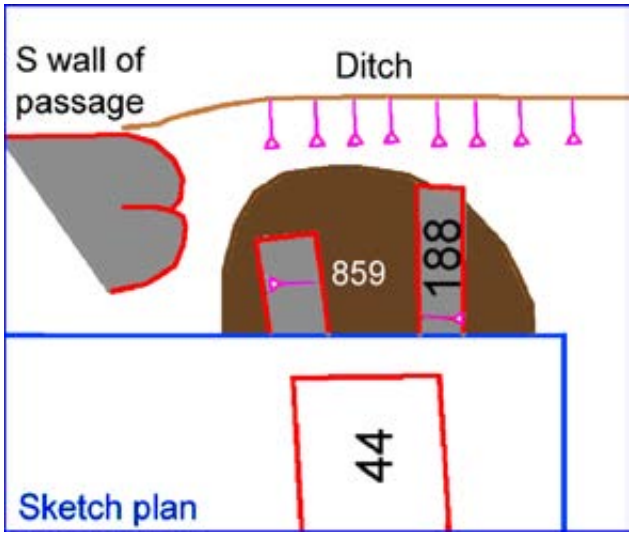


Illus 7.186 South wall stones e [Plan 77 over Plan 78 NMRS DC38111 and DC38112]



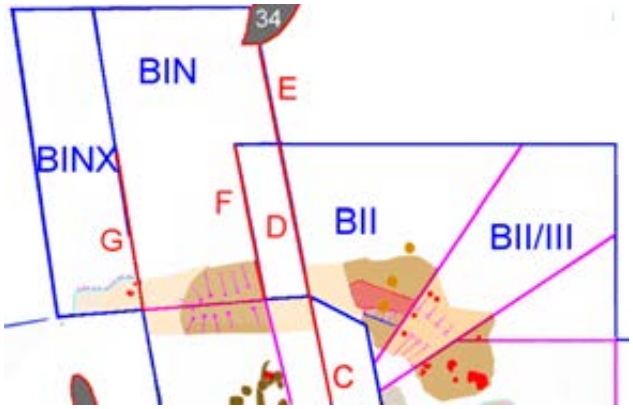
Key Plan BIN & BINX

Illus 7.187 The passage from the east on19 May 1981 [Film 1981.11.26]



Illus 7.189 Sketch plan of Pit 859 [Day Book 44]

Illus 7.188 The shattered slab 188 from the northwest on 19 May 1981 [Film B&W 1981.10.36]



Key plan Section 14/80 and sketch section G

Illus 7.190 Pit 859 emptied [Film 81.20.33]

west shows that a similar but upright slab was secondary to a kerb built of horizontal slabs, but on Area B there were no traces of an earlier kerb. Thus BIWX contained no evidence relating directly to the primary cairn.

The possibility that the slab was originally a roofing stone for the chamber or passage is discussed in Chapter 24: Discussion and Conclusions.

7.11.10 Prone Stone 148 and Pit 154 in BIN and BINX

A massive prone slab (148) was found between the Ring and outlying Stone 34 to its north-east. It lay partially under thin peat and topsoil to the west-south-west of Stone 34. It was very similar to the large kerb stone in Area H and the prone stone between Ring stones 42 and 43 in Area B.

The pit had been covered by soil development 117. Once topsoil had been removed a band of grey-green gritty material (113) ran across the site in a slight depression. The general soil development 117 had removed the original tops of other layers further north.

Under it was a series of coarse rubbly soils the uppermost of which (131) was most prevalent in the north part of the area (Illus 7.197-7.198). Red-brown when damp, it appeared as fine biscuit coloured silty sand, iron coloured and root-penetrated when dry. It was notable for the stones in it which seem to dip towards and into a depression round the base of Stone 34. It contained six small sherds, five small unclassified non-corky body sherds (81.186; not seen during specialist studies), five EM/N corky or Beaker sherds (Cat 797-801) and an E/MN corky sherd (Cat 729).

Set into a linear depression in sandy clay layer 131 was a band of gritty brown soil 130.1 with patches of turf and green clay, very like that composing part of the Phase 2 enclosure bank further south on Area B (Illus 7.198).

In 1981 a wider band of soil 130.1 was found in BINX to the west (Illus 7.198). In its surface were many ard marks. The implication is that 130.1 was a plough soil which originally stretched from the ploughed-down Stage 2 enclosure bank (184) to the depression, and that in BIN it had been modified by the later ploughing which created pre-peat soil 117 or had been removed along with 117 during our excavation (Illus 7.197, 7.198).

On Illus 7.199 prone stone 148 can be seen to the right of the top half of the photograph, which was taken after removal of layer 130.1 from the depression. The darker area south of the recumbent slab is the top of the pit. The layers exposed are shown on Illus 7.202.

Alongside the pit the northern part of the linear depression was filled with mottled yellow stony clay 151. A shallow layer of 151 also covered an area north of the depression (Illus 7.202). A truncated rusty stained layer 155 which may have been no more than an incipient iron pan lay on its southern flank. The relationship of the pit to rubbly clay 151 was ambiguous; it seemed to cut 151 but one of the pit fills, a black greasy layer 152, was recorded as seeming to underlie 151.

In BINX fill 820/821? seems to have filled a shallow continuation of the linear depression westward.

A patch of turf line 168 and its underlying grey soil 169 also formed part of the south upper fills of 154. Layers 152 and 168 were thought to be part of turf line 806, dipping down into the top of the pit and they are thus numbered on Section 14-80 (Illus 7.204).

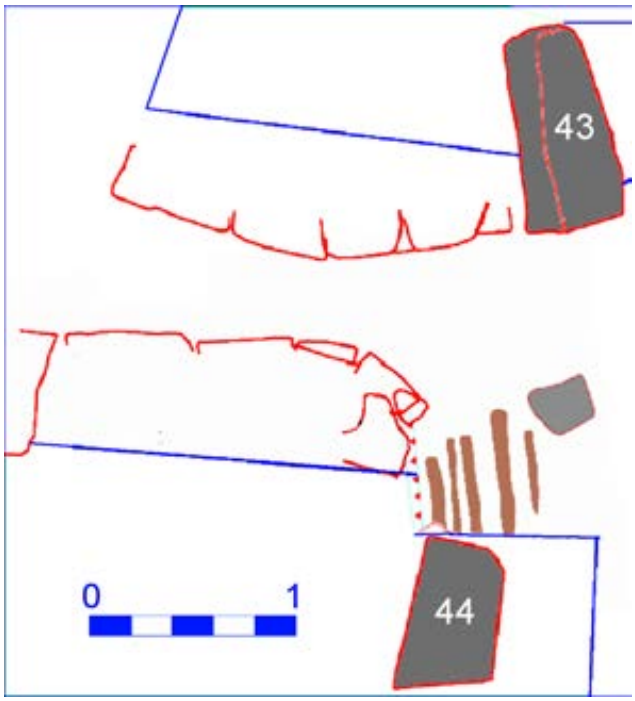
Also in the top of the pit was a thin black layer 145, described as an undulating skin of fine greasy material below 117. Layer 145 was possibly a bifurcation of layer 152/806, labelled 806 on Illus 7.204.

A patch of black material (811) found in BINX may also have been part of turf line 152. It underlay the ard marks 809 and layers 130 and 131 (although the Context Sheet for 811 has it underlying 151which must be a mistake).

The lowest fill of the pit was a turf including part of its black organic-rich top and a larger underlying mass of grey soil which covered the whole of the base of the pit (Illus 7.205; sketch on Context sheet 154).

Pit 154 contained a small E/MN non-corky sherd (Cat 238).

Removal of the rubbly mixed clay and sand in the north part of Area BINX revealed an uninterrupted cohesive pale green hard layer of subsoil (Illus 7.205). The southern part of BIN and BINX



Illus 7.191 Linear marks 880 in Pit 859 on 27 May 81; [part of plan 77 NMRS DC38111 on outline of passage]

Illus 7.192 Linear marks 880 in Pit 859 and turf lines on 29 May 1981 [Film 1981.16.38]

was composed almost entirely of clay 150, at this level a mottled orangey yellow-green in colour. In it was an approximately east-west strip of dark brown smooth clay (822). Like the overlying layer 155 it lay on the southern flank of the depression and was cut by Pit 154 (Illus 7.205).

7.11.11 Discussion of prone slab 148, pit 154 and the linear depression

The stratigraphy of the pit seems to represent excavation followed fairly rapidly by partial filling with turfs and clay followed by establishment of one or more turf lines, followed by more clay filling (Illus 7.204).

The top fill 130.1 of the linear depression running across Area BIN covered the pit and contained a Food Vessel sherd. The lower fills of the depression were cut by the pit. So the depression had largely filled up before the pit was dug and then further ploughing brought fill 130.1 into both the depression and the top of the pit.

The number of finds from soil 131 in which the top fill of the depression was first seen, far more than in other strata in BIN, makes it tempting to compare it to plough soils 141 in BV and 315 in Area D.

The original linear depression was probably not part of an early agricultural system (Chapter 7.19.9). Where it reached the central baulk of Area B on Section F it was of negligible depth. Perhaps it was natural rather than artificial.

The alternative explanations considered for its existence were that the pit had been dug to explore the stone, that the stone had been upright but had fallen, and that the stone had been purposefully buried. The latter possibility was precluded by the stratigraphy. Nor could the pit and stone have been remains of a fallen standing stone because the stone itself was firmly set in the natural till. Because the pit was found only at the south end of the stone it seems highly likely that the pit was exploratory.

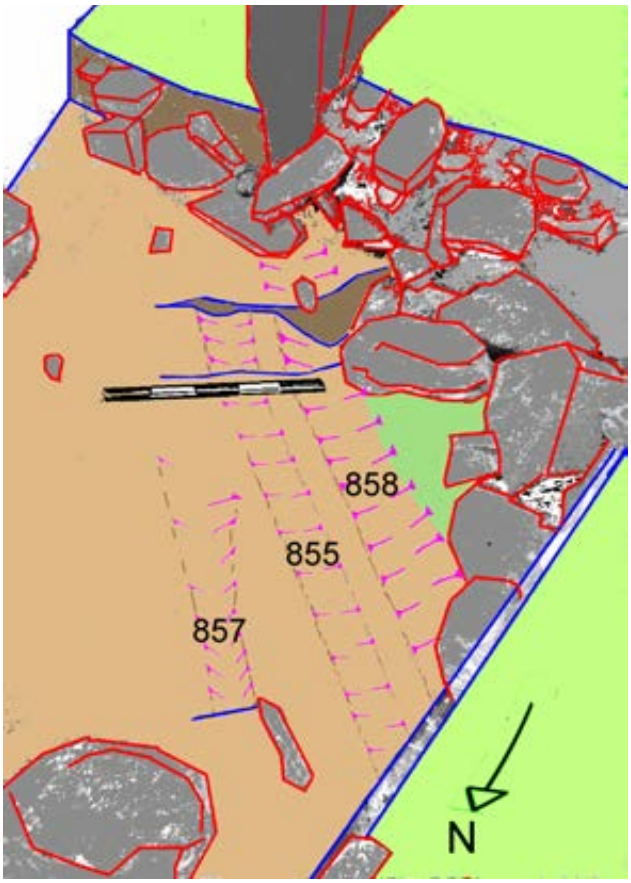
The next problem is chronological. The top fill of the linear depression overlying the pit contained a sherd from a Food Vessel. Ploughing of 151 around it, earlier than the ploughing which led to deposition of 130.1, had produced fine clay

soil, 131 thought from the number of finds in it to be roughly the same as (at least one period of) the ploughing which produced deep soils in BV and Area D. The pit was probably cut the pre-ploughing layer 151, which makes it somewhat more likely that digging of the pit took place before rather than after before the start of the 2nd millennium BC. But the evidence is chronologically vague.

The stone was similar to those used as massive kerb slabs (probably significantly later in date than the pit) so the pit was probably not dug at the time the secondary kerb was built. But those kerb slabs are interpreted as having been first used for capping the chamber and only subsequently used to define the refurbished cairn. Perhaps slab 148 was explored as a possible capstone for the primary chambered cairn.

Or it could have been investigated as a potential Ring, Avenue or Row stone. The attempt may have been abandoned rapidly because the stone did not have the character desired for the Ring, for the Avenue or for the Rows.

There is nothing much to prefer one explanation above another. The ambiguous and vague evidence for dating the pit suggests it was closer in time to the cairn than to the Ring. The chronology of the East Row places it too at around that time. But in the end the idea that the stone was explored as a possible capstone for the cairn is preferred, which is why it has been described and discussed at this stage. But any further excavation in this area should give some priority to establishing a more objective dating of the pit.



Illus 7.193 View of slots in Area BIWX from the north [Based on Day Book and Film 1981.12.14]

Illus 7.194 Sectioning slots 855 and 858 on 21 May 1981 [Film 1981.12.31]

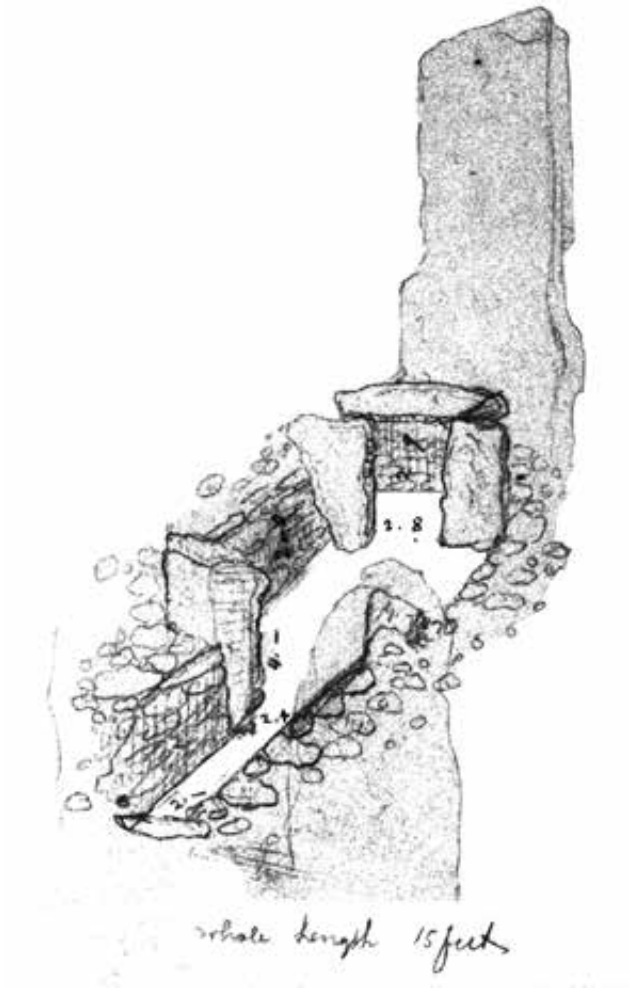
7.12 Phase 7b Grey-green sandy layers in BIVS and BV

Under plough soil 141 and the various scoops in the south and north of BIVS/BV were green sandy clays with brown soils and rotten stones between them (Illus 7.206).

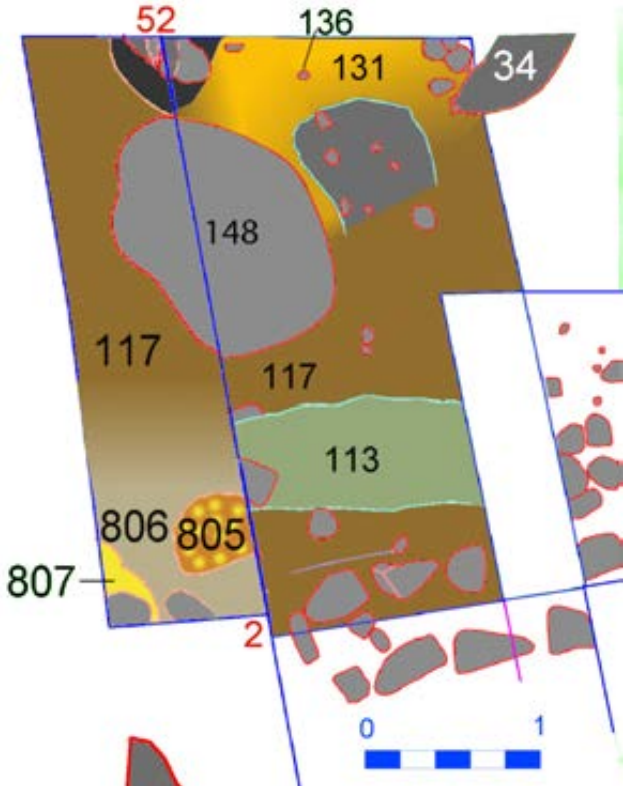
7.12.1 Green sandy layers in the south of BV

In the south part of Area BV, plough soil 141 developed downward into a disturbed greenish sandy layer BVSX 810. Its top contained many indistinct ard marks (194), with whiter fill in a brown matrix and vice-versa. In the south some turf sods, and a pit (834) with glass fragments were found under the surface of 810; they reflect modern intrusions unrecognised in the overlying layers. Layer 810 contained 19 potsherds.

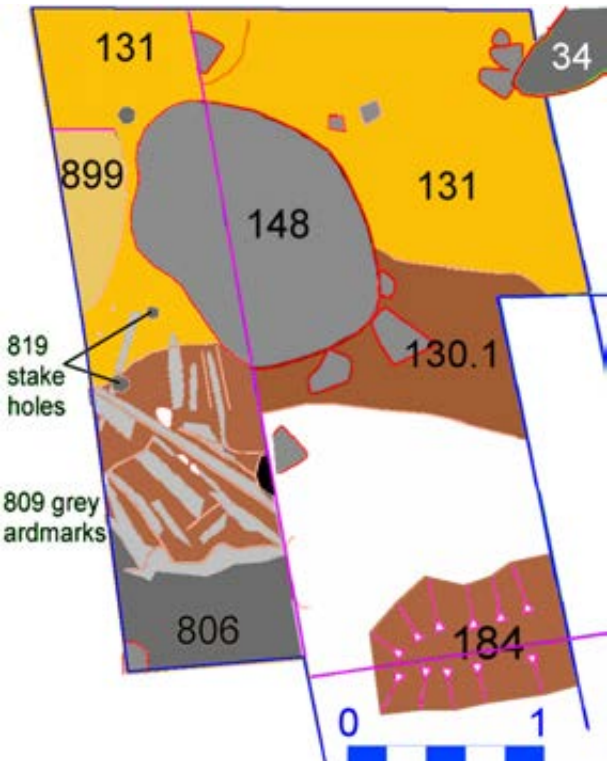
Illus 7.195 The basal layers of the chamber passage from the east [Film 1981.17.31]



Illus 7.196 Sharbau's sketch of the chamber and passage shortly after peat clearance in 1857



Illus 7.197 Plan 05-80 BIN and the BINX part of plan 50-81 of 6 May 1981 [NMRS DC38024 and DC38084]



Illus 7.198 Layers on Plan 06/80 of 12 May1980 in BIN and 1981 in BINX [NMRS DC38025 and DC38086]

Table 7.35 Pottery from BV 810

Cat	Comments
250_256	7 sherds probably all from a fine E/MN non-corky pot.
257	A sherd from a fine E/MN non-corky pot, not necessarily the same pot as Cat nos. 250–256
258_263	6 sherds, four of which are spalls from a fine E/MN non-corky pot, thicker than Cat nos 250–256 and 257;
346	A sherd from same AOC Beaker ASH 37 as Cat 342 and 343; probably conjoins with Cat 343 (81.396) but joint surface too abraded to be certain (or to allow refitting).
347	Rim-and-neck sherd from AOC Beaker ASH 38.
538	A sherd from the same possibly 'domestic' Beaker as Cat. 537 found in BV soil 117.
556	A sherd probably from a 'domestic 'Beaker. Same pot as Cat Nos 554 from BIII 117 general pre-peat soil and Cat 555 from BV 813 black scoop, and similar to Cat. Nos. 549–553 from DV 344 plough soil.
737	A sherd from an E/MN corky pot, broken and abraded along ring joint and with most of the exterior spalled/abraded off.

Several pieces of lithic debitage, three flint flakes (CAT 32, 33 and 34), a mylonite flake (CAT 35), two quartz flakes (CAT 36 and 37) and 4 pieces of quartz (CAT 37) also came from BV 810

Although the main spread of green sandy layer 812 was in the north of the trench, the label was also given to similar material in BVSX, presumably mixed into the similar but even more disturbed material 810. BVSX 812 has been relabelled 812.1 during post-excavation work. It contained significant amounts of pottery.

BVSX 812.1 also had a mylonite flake (CAT 48).

Table 7.36 Pottery from BVSX 812.1

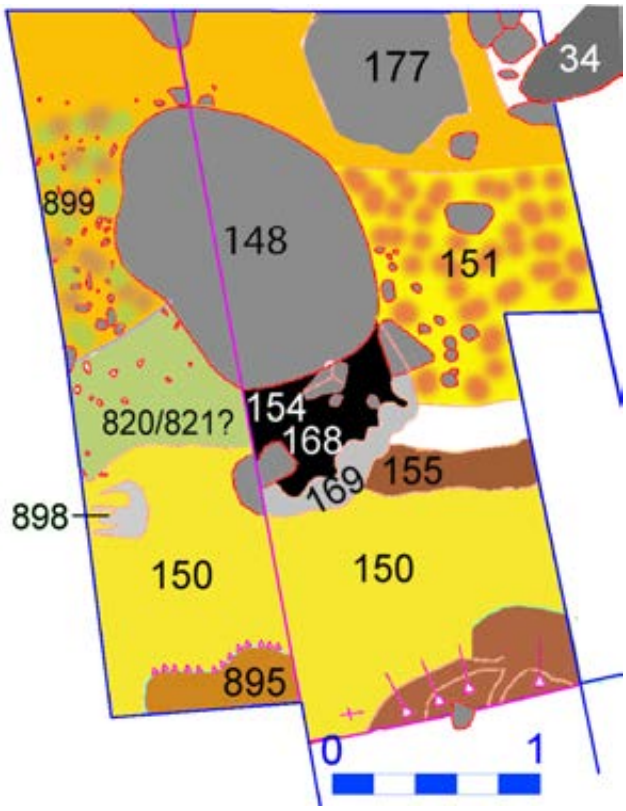
Cat	Comments
287	Hebridean incised rim sherd.
288_293	3 spalls, 3 spalled fragments & crumbs from one Hebridean incised pot.
307	Hebridean incised rim sherd with much of exterior spalled off.
349	A heavily abraded spall from Beaker ASH 38. Most of interior abraded.
699_703	4 featureless spalls.
704	A sherd from a fine Beaker or an E/MN non-corky pot.
705	A sherd from a large probably E/MN corky pot. with most of interior spalled off.
756_757	A sherd from a large domestic beaker or a much later pot. From same pot as Cat. 752–755 from BVSX 141 and Cat 759–761 from DI 369.
878	A large fragment spalled off from one side probably from an E/MN non-corky pot but just possibly from a domestic Beaker.
880	Heavily abraded sherd possibly from a E/MN pot but too small and abraded to be diagnostic
881_883	Abraded body sherd and 2 refitted frags probably from a fine Beaker.
884_894	5 small sherds, 6 fragments and crumbs probably from a fine or domestic Beaker. Largest sherd: has much of exterior spalled off. Cannot rule out the possibility that it's E/MN non-corky pottery.
895	Spall, probably from a fine or domestic Beaker

Thus these southern layers contained E/MN pottery including several Hebridean incised sherds, early international Beaker sherds and 'domestic' Beaker sherds, some fine and some coarse.

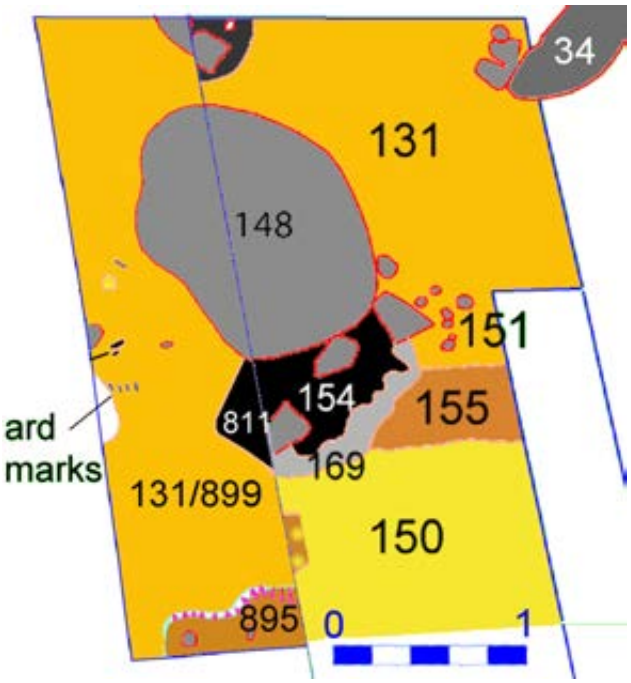
Illus 7.199 General view at level of Plan 08/80 of 24 May 1980 [Film 1980.11.23]

Illus 7.201 Area BIN from the west with Pit 154 partially emptied and Area BII in the background on 9 May 1981 [Film 1981 5.16 part]

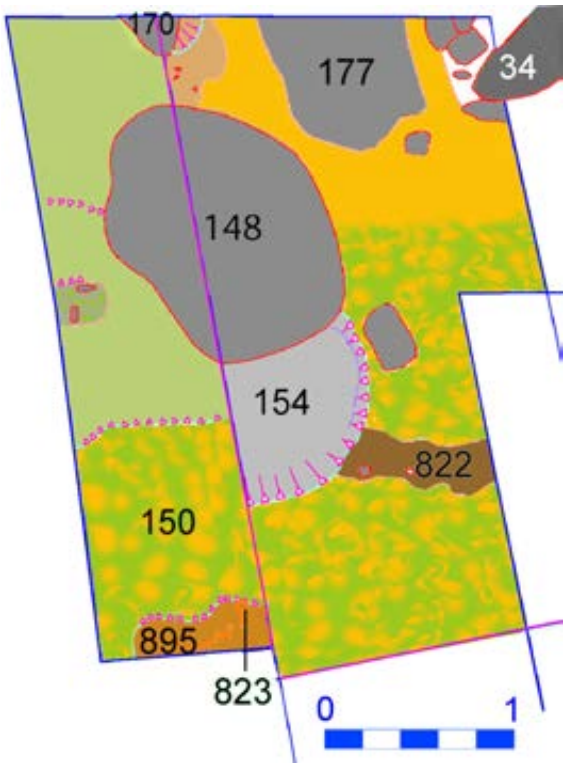
Illus 7.200 Pit 154 on 27 May 1980 [Film 80.12.33]



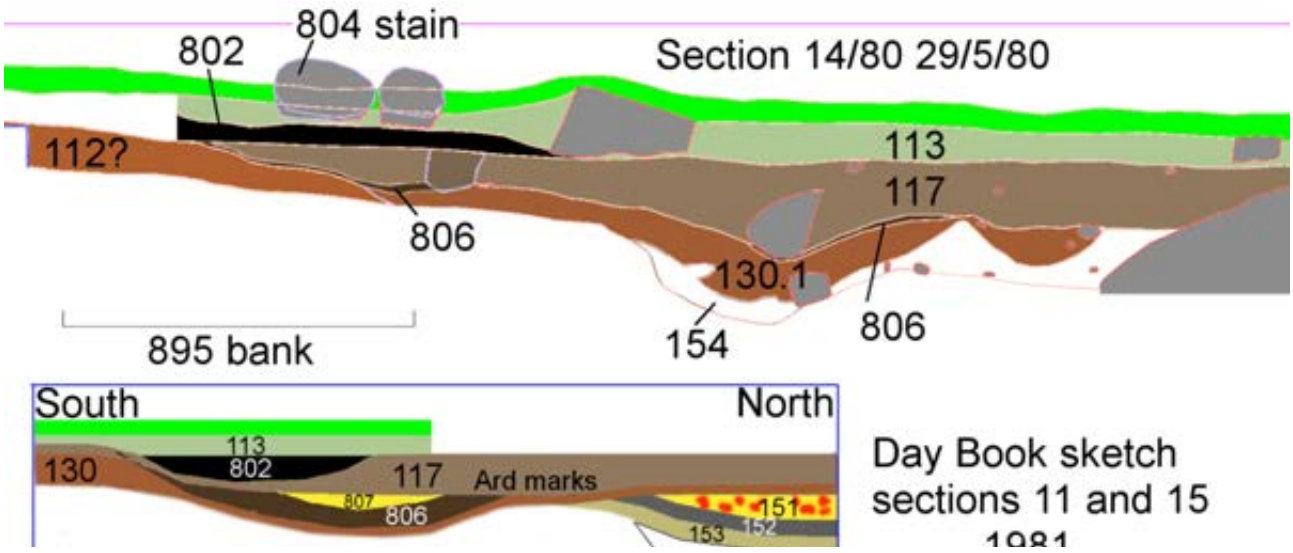
Illus 7.202 Plans 08/80 of 24 May 1980 and 54/81 of 25 May 1981 [NMRS DC38027 and DC38088]



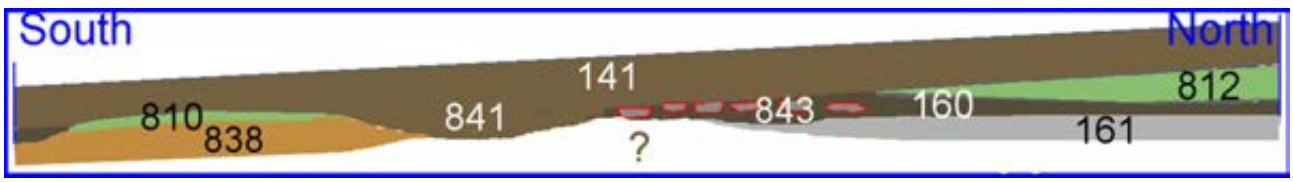
Illus 7.203 Plans 50/81 overlay and 53/81; layers in pit 154 [NMRS DC38084 overlay & DC38087]



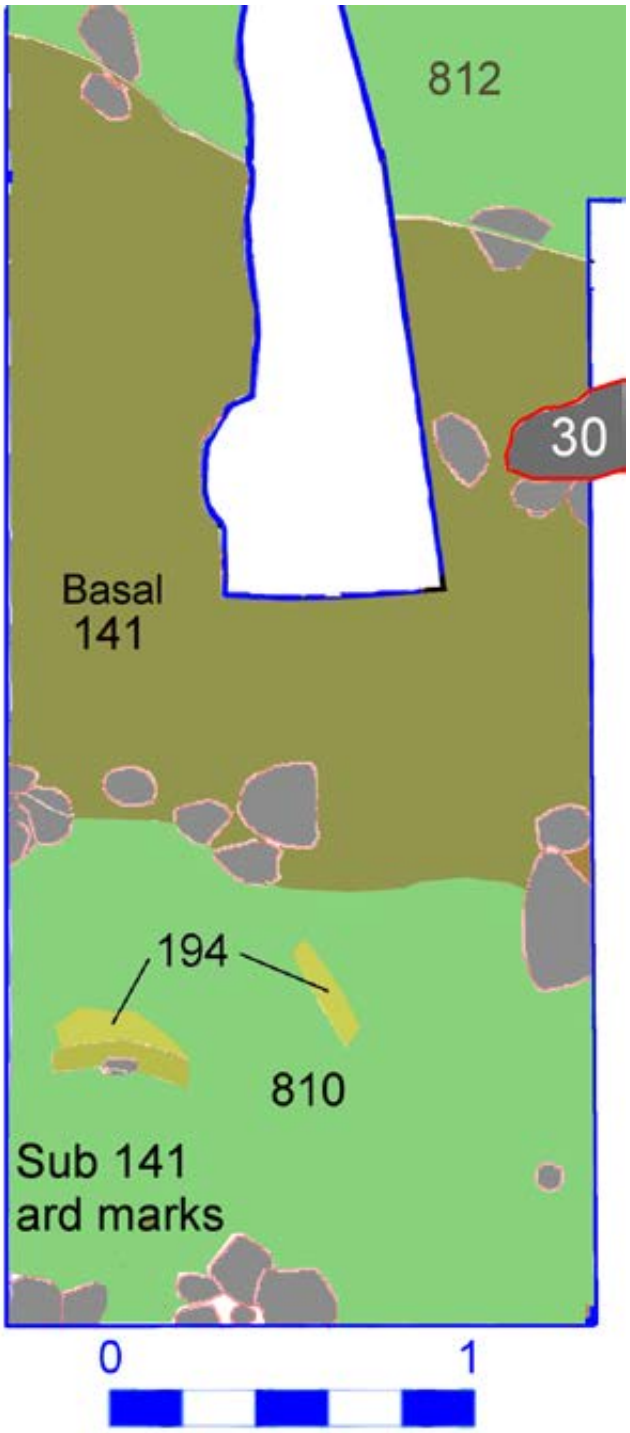
Illus 7.205 Plans 57/81 and 58/81 [NMRS DC38091 and DC38092]



Illus 7.204 Section 14/80 [NMRS DC38034] and sketch section G, 6 to 7 May 1981 [Day Book 11 and 15, the latter corrected



Illus 7.206 Sketch of relationship of charcoal-free and charcoal-rich layers (not to scale)



Illus 7.207 Green sandy clay layers 810 and 812 (based on Plan 17/81 NMRS DC38051]

The exception is Cat 756_757, which typologically seems most likely to be from a post-Roman Iron Age 'Plain Style' Hebridean pot. Another sherd of this pot came from the overlying plough soil 141 and yet another from 369, a layer below plough soil 315 near the cairn on Area D. It is conceivable that these were in unrecorded intrusions (of the type of pit 834 which was not understood until modern glass was found in it) but on the face of it there is a conflict between the attribution of the potsherds and the stratigraphy..

7.12.2 Grey-green sandy layers in the northern part of BV

Layer 812 in the northern part of the trench, in BIVSX and BV, was a sandy green layer spread across the trench just south of the ditch (Illus 7.206, 7.207). It first appeared while soil 141 was being removed. In section the relationship of 810 and 812 to the overlying soil 141 and an underlying dark soil 160 / 192 was not always clear because 810 and 812 were absent in the middle of the trench (Illus 7.206). Perhaps ground-working, the cutting of 813 and 841 and associated activities had removed it. Perhaps it had never been there, although a spread of silty green clay 842 lay between 810 and 812, at a slightly lower stratigraphic level, with a few flat rotten stones. Its extent was not planned. Green clay 812 contained several pieces of pottery.

Table 7.37 Pottery from green sandy material BV 812

Cat	Comments
367	A sherd from Early International Beaker ASH 39
745	Small, much abraded sherd (most probably fine Beaker.
746	Fragment of tip of an E/MN rim flange, with incised diagonal lines on its top
875_877	3 small, heavily-abraded sherds; could be fine E/MN non-corky or fine Beaker
879	A sherd probably from a fine domestic Beaker but can't wholly rule out possibility that it's E/MN

The following pot sherds were recorded in the finds book as from Area BI context 810; they were relabelled 810.1 during post-excavation to distin-

guish them from those found in the south of BV, several metres away.

Table 7.38 Pottery from disturbed green sandy patch BI 810.1 in 812, or from clay soil 836 in the northern part of the enclosure

Cat	Comments.
294	A Hebridean incised sherd
567	Shoulder-neck-belly sherd from large Food Vessel ASH 75.
784	Abraded belly spall from an E/MN non-corky cooking pot or a 'domestic' Beaker.

However, yet another record, annotation on Plan 46/81, suggests that these three sherds were from layer 836 in the northern part of the enclosure. That attribution has some problems, discussed in Chapter 7.10, but is as credible as attribution to green clay 810.1. If it is correct there is no reason to suppose that the label 810 was used for deposits in BI and the finds from green clays have a less complicated complexion.

The pollen values in sample 2054 from 812 suggested a date in CaN-3a when tree pollen was very sparse and the non-tree pollen was contributed largely by grasses. Values for heather were low. This sub-zone started sometime between 2980 and 2500 cal BC. It ended between 2560 and 2200 cal BC.

7.12.3 Discussion of the grey-green sandy clay layers

Layers 810 and 812 underlay plough soil 141. The matrix of 141 was probably formed partly from them. A few of the finds in them may have been in unrecognised ard marks and other intrusions. These layers lacked sherds from ASH 42, the insular Beaker probably associable with a burial redeposited during the formation of plough soil 141; nor did they include any other specifically late types of beaker. The only two Beaker sherds which were not diagnostically early or anonymous (Cat 538 and 556, Illus 18.21) had stab decoration, not very common at Calanais.

Thus, as with the green clay in BVS, the assemblage may have been an early Beaker one apart from the residual Neolithic sherds, and a possibly intrusive possibly 6th century AD sherd (Cat 756_757) in the southern part of the trench. The Food Vessel sherd (Cat 567) was either in disturbed clay 810.1 in Area BI to the north of East Row stone 30, in which case it was presumably intrusive, or it was completely unconnected with the green clays, as an annotation on Plan 46/81 implies.

The source of the sandy green material which was the only significant component of layers 810, (810.1), 812 and 812.1 is not immediately obvious. Layers 812 and 810.1 in the north of the trench overlay ground-worked soil 160, discussed below. Layer 812 also overlay an iron-panned soil similar to 141, presumably actually 160. That in turn overlay light green compacted clay 161 interpreted as possibly contemporary with the green clay platform. This means that the green sandy material 810.1 and 812 was later than building of the green clay platform although it could have been related to its use or repair.

The immediate source of clay 810 and 812 is discussed below in Chapter 7.12.5 in relationship to the early Beaker sherds found in them. Further discussion will be found at Chapter 7.13.4 in the context of the strata related to erection of East Row Stone 30 and in Appendix 4.

7.12.4 Early Beakers

Table 7.39 Contexts in which Early International Beaker ASH 39 was found

Cat	Area	Ctxt	Comments
354	BI	107	A sherd from the upper neck.
355	BI	117	A sherd from the neck
353	BII	112	Small carination sherd
362_363	BIWX	9999	A sherd and a fragment from the splaying neck terminating at rim; most of E spalled off
364	BNW	9999	A rim sherd with much of the interior spalled off.
366	BV	117	A sherd from the upper neck.
367	BV	812	A sherd from the neck
368	BV	813	A sherd from the lower neck, carination and upper belly.
369	BV	813	Neck sherd with light, shallow spalling of exterior.
370	BVSX	141	Relatively large sherd from neck, carination & belly. Conjoins with, and now refitted to, Cat 371
371	BVSX	141	Neck sherd Conjoins with, and now refitted to, Cat 370

In BV and BVSX two sherds of ASH 39 were found in pit or scoop 813. Two came from the plough soil 141 which both over and underlay pit 813. One was recorded as from green silty sand material 812.

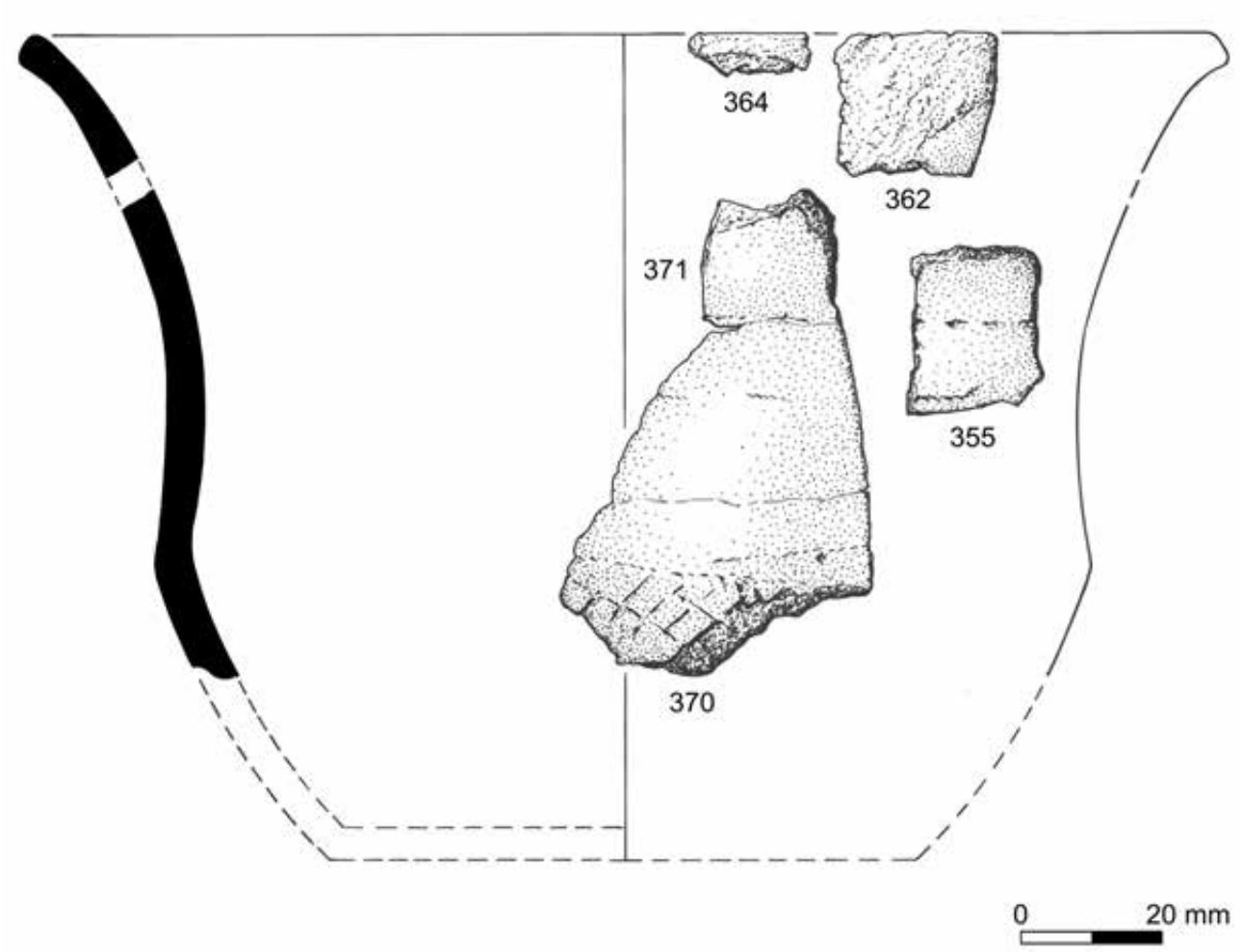
Several sherds of ASH 39 came from further north in BI, one from topsoil 107, two from the prevalent plough soil 117 and two from its lower facies 112. Its apparently wide distribution has to be seen from the perspective that all of these except 812 were late contexts associated with ploughing and none was more than a casual lob away from the others (see Chapters 7.12.5 & 18.7.3 for distribution maps). It is easy to imagine that the sherds were found during ground-working, picked up, examined and thrown away.

Large sherds of two other early Beakers were found, for the most part in BV.

Table 7.40 Sherds from AOC Beaker ASH 37

Cat	Area	Ctxt	Comments
346	BV	810	A sherd of AOC Beaker ASH 37 which probably conjoins with Cat 343 (81.396) but joint surface too abraded to be certain.
342	BV	813	A sherd of AOC Beaker ASH 37 which conjoins with Cat. 350, but joint surface too abraded to allow secure refitting.
343	BV	813	A sherd of AOC Beaker ASH 37 which probably conjoins with Cat 346 (81.179) but joint surface too abraded to be certain (or to allow refitting).
350	BVWX	160	A heavily abraded sherd of AOC Beaker ASH 37 which conjoins with Cat 342; previously assigned to ASH 38.

ASH 37 was a large fine vessel with all-over cord decoration and a simple splayed rim about 180mm in diameter. All of the sherds were heavily abraded. One sherd came from the green sandy disturbed clay 810 in the south end of BV. An-



Illus 7.208 Early International Beaker ASH 39 (see Chapter 18 Illus 18.15 for larger scale reproduction)

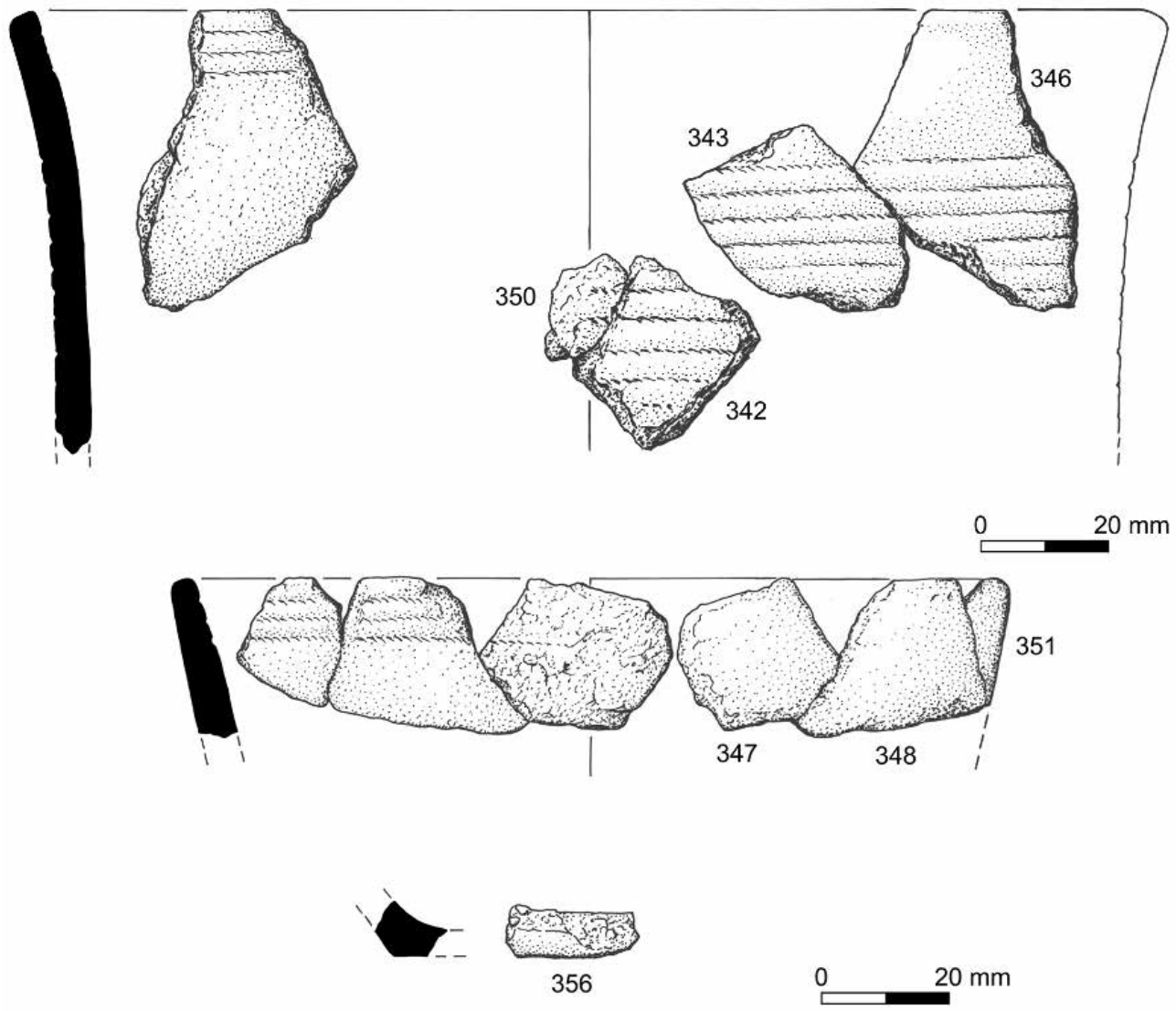
other came from a small spread of early soil 160 revealed in the passage of the chambered cairn. The other two came from scoop 813.

ASH 38 was a fine vessel with all-over cord decoration and a simple splayed rim about 130 mm in diameter. All of the sherds were abraded, most of them heavily. One sherd came from the green sandy disturbed clay 810 and another from less disturbed clay 812.1, both in the south end of BV. Another came from the upper pre-peat plough soil in BV. Two small sherds came from an area of burnt clay and stones in the body of the primary chambered cairn.

Another tiny sherd possibly from an AOC Beaker (Cat 372; ASH 40) was found in Area D

In David Clarke's Beaker typology (1970), ASH 37 and 38 fall into his 'All Over Cord-impressed' (AOC) category, and ASH 39 into his 'European' (E) category. According to Lanting & van der Waals' stepwise Beaker typochronology (1972), they would all fall within steps 1–2. According to Humphrey Case's scheme (2004), all belong in his 'Group D'. And according to the latest typochronology, by Stuart Needham (2005), all will have been 'Low-Carinated Beakers'. All four classification schemes agree that these are early styles with a wide, international distribution (Sheridan Chapter 18.7.1). It seems likely that the Calanais international-style Beakers date to the third quarter of the third millennium possibly as early as the 25th century BC (Sheridan Chapter 18.7.4).7.12.5 Discussion of the overall distribution and stratigraphy of the early Beakers

It is clear that none of the early Beaker sherds was in a primary position. It is also clear that green sandy layers 810 and 812 were not freshly



Illus 7.209 AOC Beakers ASH 37 and ASH 38 (see Chapter 18 Illus 18.13, 18.14 for larger scale reproduction)

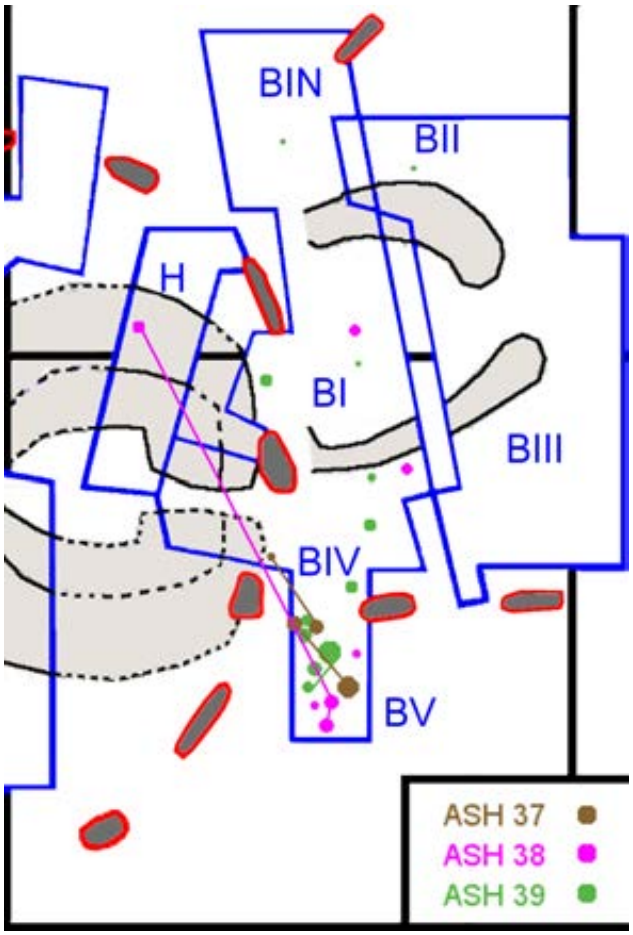
dug from subsoil, because although largely free of organics and charcoal they contained many pot-sherds, both Neolithic and Beaker.
Taking into account the pair of conjoined sherds in Area H, and the abraded state of the sherds, the possible explanations for the observed stratigraphy seem to be:

1. the taphonomies of the vessels may have been different from one another, with ASH 38 in particular coming to Calanais in domestic soils. An origin of that kind seems likely for an early Beaker sherd ASH 40 (found on Area D);

2. some or all of the sherds might originally have come from one or more disturbed graves; there is adequate space for graves east, south and west of BV; that opens up the possibility that the clay derived from disturbance of early beaker graves in the digging of pits for the stones of the East Row; the latter is described in Chapter 7.13.

3. the clay and many of the associated finds might have come from scooping out the area of the Stage 1 or Stage 2 enclosure.

4. some or all might originally have been deposited in the light timber structure on the green clay platform; the occurrence of possible fine and 'domestic' Beaker sherds in the fills of slots of the



Illus 7.210 Distribution of early AOC and International Beakers ASH 37-39

timber structure under the cairn does reinforce the chronological and cultural feasibility of this interpretation.;

5. ASH 37 and ASH 39 might originally have been with primary burials in the chambered cairn, subsequently cleaned out before dark deposits could accumulate in the chamber. ASH 38 cannot have been.

6. And, of course, the green clay may have been dug from an area which was not included in our excavation.

7. The problem with all of these ideas is that they do not explain why otherwise fairly clean layers of green sandy clay contained so many and so diverse a collection of potsherds.

The two small highly abraded sherds of ASH 38 from the body of the primary cairn tend to favour the idea of its importation in soils from domestic contexts because that is the preferred explanation for the other (mostly E/MN) small sherds found in and under cairn make-up.

If a simple single explanation is to be preferred, the idea that ASH 37, 38 and 39 accompanied depositions of human remains in graves (outside our excavation area) is my (marginally) preferred interpretation. But Sheridan points out, whatever the details, their deposition respected a by then ancient sacred place (Sheridan Chapter 18.7.4), and pending further excavation that is their indisputable significance.

Table 7.41 Sherds from AOC Beaker ASH 38

Cat	Area	Ctxt	Comments
347	BV	810	A heavily abraded sherd from AOC Beaker ASH 38 with much of the rim and interior spalled. Conjoins (loosely) with Cat 348 (81.619)
349	BVSX	812.1	A heavily abraded spall from AOC Beaker ASH 38 with most of the interior abraded off.
348	BVSX	837	A somewhat abraded sherd from AOC Beaker ASH 38. Conjoins with Cat 351_352 and (loosely) with Cat 347.
351_352	HII	736	2 heavily abraded sherds from ASH 38.
846	BV	117	A fairly heavily abraded sherd of AOC Beaker ASH 38

7.13 Phase 7b East Row stones 30 and 31

7.13.1 Introduction

The excavation of Area B touched on Stone 30 of the East Row and came close to Stone 31 (Illus 7.211). The stone hole of the former was explored in BIVS and BV while deposits close to the latter were investigated in BIII and BIIISX (Illus 7.211).

7.13.2 Layers overlying the pit of East Row Stone 30 and those possibly contemporaneous with its setting-up

At the base of plough soil 141 in the middle of the trench, a saucer-shaped scoop 841, partially filled with soil 141, had cut old ground surfaces underlying 160 (Illus 7.212).

Green clay 842 in the west of the trench lay below plough soil 141 and a cluster of stones in greasy brown to black soil 874 which produced a small abraded sherd probably from a fairly fine Beaker (Cat 862). It overlay rotten stones 843 and ground-worked dark soil 160 (described further in 7.14.1). It was similar to grey-green sandy fine material 810 and 812, interleaved elsewhere between 141 and 160 but stratigraphically slightly earlier. Further south was material (838) originating from a ridge of brown fibrous soil which was probably the remnant of an early cultivation bed spread by later ploughing. In sharp contrast to the overlying layers there were no finds from 842 (and a sample 2223 produced no charred plant remains).

Under 842 and the last remnants of 141 were rotted stones 843. To the south was a layer labelled 160 during excavation. There is no absolute need for this layer to have been identical to layer 160 in the north of the trench, although it was in a very similar stratigraphic position, and it has been renumbered 160.4 during post-excavation work (Illus 7.213). It produced no finds.

7.13.3 The pit for East Row stone 30

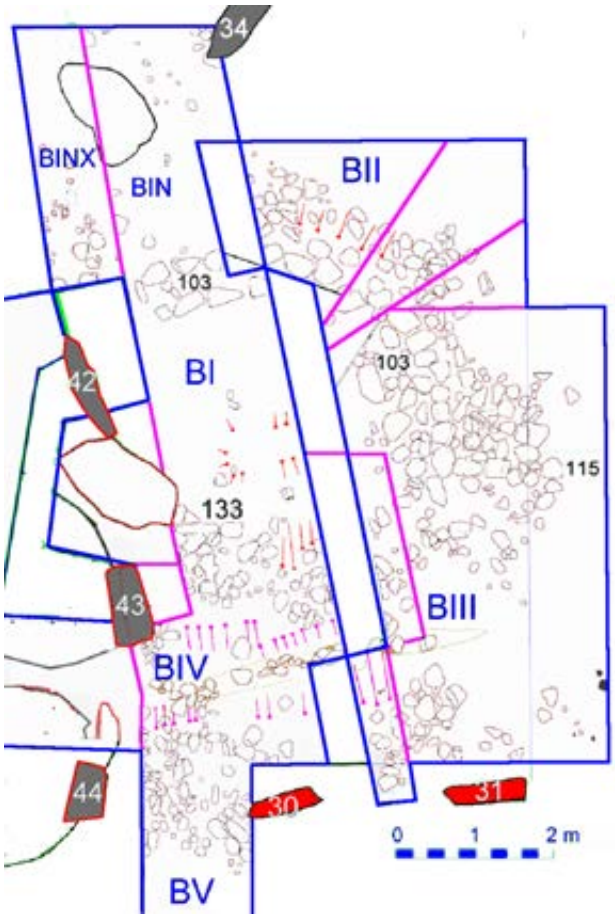
Below 141 in the eastern part of Area BV, around the base of Row Stone 30, was an area of burning with charcoal and a few small flat stones, at much the same level as grey-green sandy silty clay 842 (Illus 7.212). The northern part of this feature was not recorded. It may have been an upper part of layer 844 (Illus 7.213). A comparison between Plan 19/81 (Illus 7.213) and 17/81 (Illus 7.207) shows that layer 812 overlay sandy material 844.

Layer 844 was a thin patch of light brown mottled clay and fine sand which measured about 1.2 m north-south and extended at least 0.7 m west from the east baulk. It was more sandy north of East Row stone 30 and more clayey to its south. It produced no finds. The edge of a somewhat wider feature than the pit for the orthostat was faintly visible in this layer (Illus 7.213).

Layer 844 cut the dark soil with rotted stone 843 and soil 160. It was sealed only by 141, a plough soil, and the 'burnt earth' immediately above it.

The nature of the inner part of 844 is obscure. A photograph (Illus 7.214-215) appears to show what was planned on Illus 7.213. Photographs can be highly misleading and the side of the exploratory trench was probably not cleaned for this photograph but it does appear to confirm Plan 19/81. Also, there is a clear impression in the side of the 1980 sondage of a V-shaped cut coinciding with a change in soil on the surface of the main trench on both plan and photograph. That cut was definitely outwith the feature interpreted as the stone pit on subsequent plans (Illus 7.213-7.215).

Removal of 844 revealed a few stones in a grey gritty patch extending 0.1 m west of Stone 30 and 0.15 m to north and south (Illus 7.216). It produced no finds. The positions of Stone 30 is inaccurately depicted relative to the stone and two stone sockets hatched grey and to the grey layers on Plan 21 (Illus 7.216; see Technical Note 7.13.3). In fact the more northerly socket probably corresponded to the middle stone shown in Illus 7.213 and the more southerly one probably corresponded to the southern stone. Comparison with Illus 215 allows correction. The plan seems to show the top of the inner feature retreating back towards East Row stone 30. Apart from that the grey features are difficult to relate to the rest of the record because the plan did not include a context number for the large area of clay surrounding the



Illus 7.211 Stones 30 and 31 on master plan of Area B

inner grey feature (which does not seem to correspond exactly to the stone pit). The outer grey clay should have been 161, the redeposited subsoil of soil 160 (Sketch Section Illus 7.206).

The sketch view of 23 May (Illus 7.203) cross-referred on Day Book page 49 to photograph 1981.13.26 (Illus 7.200-201) shows a slightly simplified version of Plan 21. The feature at the base of Stone 30 seems to be the top of the stone hole.

Because there was no evidence for the intrusive cut full of grey clay or the pit itself having been cut from a higher level than soil 160 the existence of the cut does not change the relative stratigraphy of the stone pit to the black layers including rotted stones 843. It does introduce a new element of complexity. But again the dangers of interpreting stratigraphy from photographs are obvious and the problems described here can only be resolved by fresh excavation.

The outer part of the 'non-stone-hole' element of the grey clay extended further west under the ground-worked soil 160 and can be regarded as its subsoil 161 (Illus 7.216). Elsewhere 161 was light green). Small scoops filled with dark material, 863 to 865 on Illus 7.216, were cut into it. Other features were cut into it further north and they are described and discussed in Chapter 7.16.

The sections of the small test trench coloured yellow in Illus 7.218 do not seem to have been drawn. In plan East Row stone 30 measures 0.8m east-west and 0.2m north-south at modern ground level. The rim of the stone pit was about 0.4 m from the edges of the stone, judging by the section in Illus 7.205. The pit will have been about 1.6m long east-west and 1m north-south. It was at least 0.4m deep. It was backfilled with clay and head-sized packing stones.

In the drawn section (Illus 7.219) the material through which the stone hole was cut was even-textured sandy clay, not at all like natural. Topsoil overlay a dark brown soil with charcoal flecks which overlay a lighter brown soil with charcoal flecks. Presumably the dark brown soil was 141. It was a little strange that it was not distinguished from the fill of the pit.

Illus 207 (read in conjunction with Illus 206) provides a different impression from the drawn section. It looks as if there was a clear break at the bottom of 141 and above the pit fill, with soil 141 at this point containing many fine white grits and the underlying fill smooth and darker than the material through which the pit was cut. That makes complete sense. The Day Book (page 61) records that black layers could be seen in the baulk, truncated, with soil 141 persisting over them. It is not clear from the photograph or drawn section which charcoal layers were truncated by what, but the reference may be to those found in the sides of depression 841 to the south, described and discussed in Chapter 7.14.2.

7.13.4 Discussion of Stone 30 and interpretation of the layers around it including sandy green clays 810 and 812

The stone hole was earlier than plough soil 141 and green clay 812. It was later than soil 160.

That ties it down to a time after Beakers had been brought into the Calanais area. Beaker sherds from 160 are listed in Chapter 7.14.1. As described and discussed later (Chapter 7.16.1) a Grooved Ware vessel (ASH 61) was in a pit cut into slightly earlier levels. All this makes it likely (the evidence is not decisive) that East Row Stone 30 was set up during use of the Ring; but this evidence does not define whether this was before or after the chambered cairn had been built.

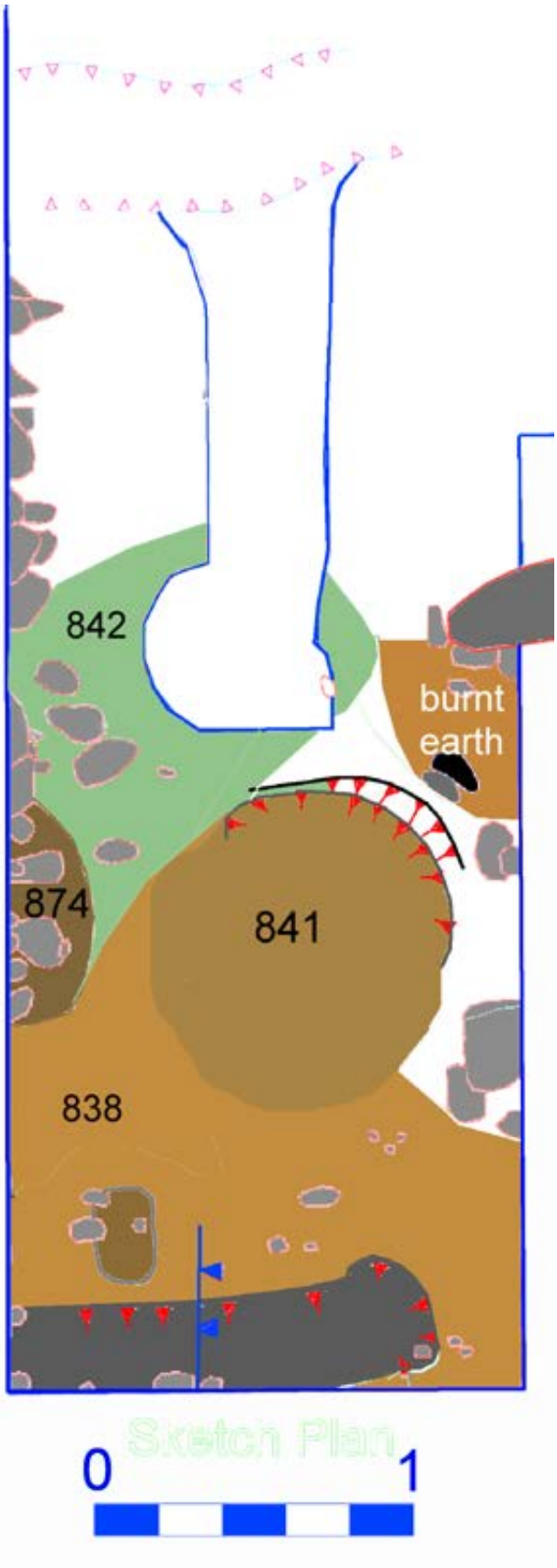
Mottled light brown clay and fine sand 844 round the base of Stone 30 was, like the green clays 810, 812 and 842 almost immediately under plough soil 141. The packers for the stone stuck up slightly above the level of soil 160 but there were no other hints of any slight mound originally covering the packing stones.

The patch of burnt earth on 844 was not completely planned but it was the highest surviving distinctive pit fill. Indeed it does provide an impression that this was the true top of the pit and that, by coincidence, higher materials which when ploughed formed plough soil 141, had been altered but the pit fills had not.

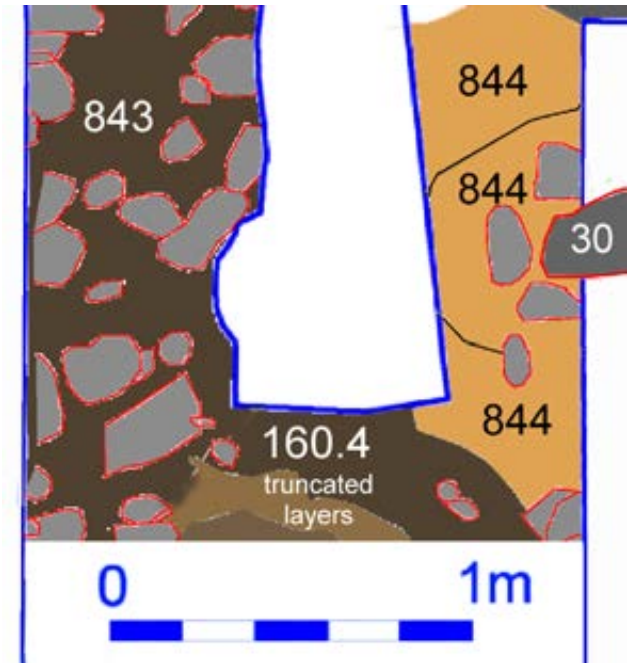
The pit may have been dug into a larger earlier feature filled with grey sand. If so, that earlier feature was cut into 161, the subsoil of dark soil 160, and it was probably also cut through the latter.

Green clays 810 and 812 were described in Chapter 7.12.1 and 2. The immediate source of clay 810 and 812 was discussed in Chapter 7.12.5 in the context of the early Beaker sherds found in them. Layer 812 overlay 160 and on purely stratigraphic grounds it might have been composed of spare clay from the pit; and although 810 did not overlie 160 directly it was at a very similar stratigraphic level overall. But the abundance of finds from them is difficult to explain if they were freshly dug from natural clay; while if the stone hole was dug through an earlier feature filled with grey and brown material (containing pottery, for argument's sake) then layers 810 and 812 would not have been green. So a different origin for the green sandy clay layers has to be preferred.

Clay 842 was stratigraphically slightly earlier than green sandy clay 812 and contained no finds. It is conceivable that it was part of the spoil from the stone pit or the hypothesised underlying feature.



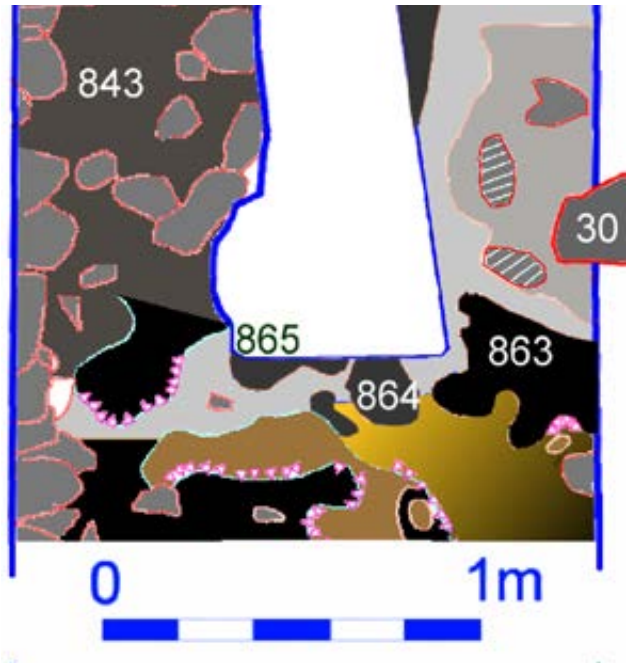
Illus 7.212 Sketch plan of 14 May 1981 (Day Book 29) superposed on Plan 18 of 14 May [NMRS DC38052]



Illus 7.213 Extract from Plan 19/81, of and later than 15 May [NMRS DC38053 part]

Illus 7.214 The pit of Stone 30 from the west on 22 May 1981 [Film 1981.13.26 part]

Illus 7.215 Detail of the pit from Illus 7.200 [Film 1981.13.26]



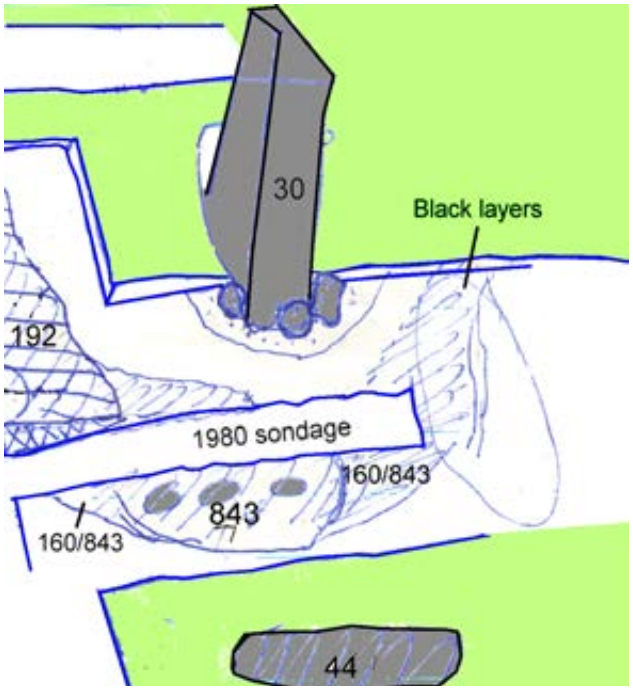
Illus 7.216 Extract from Plan 21 of c. 22 May 1981 (socket stones inaccurately depicted) [NMRS DC38055]

The rotted stones 843 recorded mostly on the other side of the trench were intermingled with soil 160. Their state cannot easily be explained by leaching down of organic acids from the overlying scoop 813 because silty grey-green clay 842 sealed the stones. Perhaps they were dumped from somewhere where they had already been damaged.

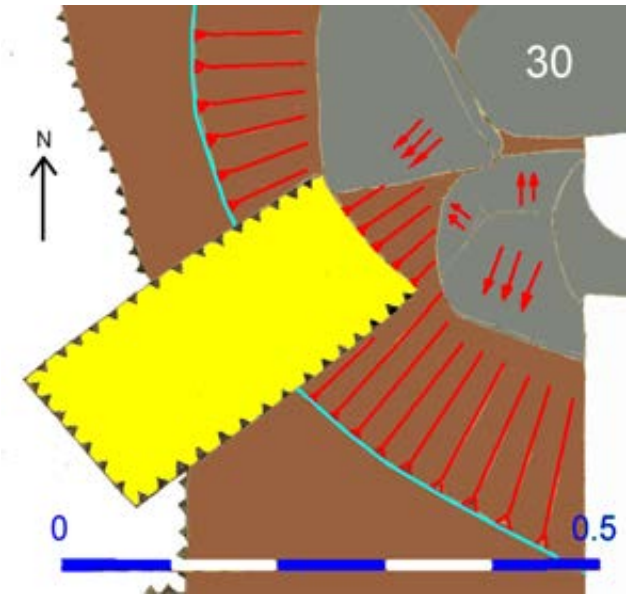
7.13.5 East Row Stone 31 in Area B3

On Illus 7.222 the shadow of East Row Stone 31 (and a tiny bit of its base) can be seen on the grass near the foreground stones.

The stratigraphy near East Row stone 31 had been preserved better than that of most of BIII, probably by stones BIII 116, which were at the level of soil BIII 117. Lying above pre-peat soil 117 there was a small patch of burnt turf and charred material 140, very close to the bottom of modern turf. It may have been the equivalent of layer 139 in Sub-area BV further west. Ploughing represented by the underlying charcoal-rich soil BIII 141 was almost certainly responsible for some truncation of underlying layers, although no ard marks were noticed in this area. No finds were recorded from 141 in BIII.



Illus 7.217 Part of sketch view of 23 May 1981 [Day Book 49]



Illus 7.218 Plan of a quarter-section of the upper parts of the stone-hole for Stone 30 [Plan 81.14 of 28 May 80 bound in Day Book 60-61]

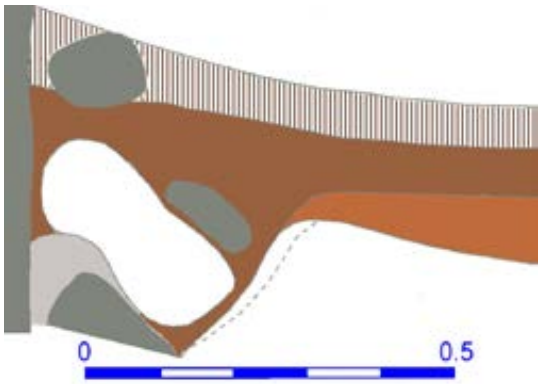
Under 141 Layer 160.1, varying from grey-brown sandy with charcoal and pot to dark brown and gritty nearer Stone 31, contained two pot-sherds, a flanged rimsherd from a Hebridean incised pot (Cat 285, ASH 24) and a heavily abraded spall from an E/MN non-corky pot (Cat 286). It also produced a flint flake (CAT 46) and a quartz flake (CAT 47).

Near Stone 31 under layer BIII 160 was a smooth black turf line (157 Illus 7.223-7.224). It abutted the stones at the base of the standing stone.

A small trench was dug to record Section 80/13 (58-57 on Illus 7.226) in 1980. It is visible on a photograph taken on 11 May 1981 (Illus 7.225).

The plan in Illus 7.226 maps turf line 157 before all of it had been revealed. Section 57-58 shows that it ran up to the stones round the base of East Row stone 31.

Lying on turf line 157 was a patch of yellow gritty clay (181) which was presumably cast up from a nearby cut into natural. It was similar to patches of clay found further west and attributed to cleaning out of the ditch. To the north on Section 48-49 turf line 157 was cut as it approached the modern drain 100. In the northern half of



Illus 7.219 Section along the east side of BV through the upper parts of the stone-hole for Stone 30 [Section 81.15, bound in Day Book pages 60-61]

Illus 7.220 The pit on 27 May 1981 [Film 1981.16.11]

Illus 7.221 Detail of Illus 206 [Film 1981.16.11part]

section 58-57 turf line 157 covered a small area of soft grey fine sand with charcoal flecks and dark-yellowish-brown speckled soil (Illus 7.226).

The brown soil below charcoal patch 172 was recorded on the context sheet for 172 as Soil 117, which identification is supported by Section 48-49 across similar material c.1.5m further west. That is important because (a) consideration Section 48-49 might suggest it was 160) and (b) none of the layers in Section 57-58 were given context labels (although the turf line was named as context 157 in the section title).

Near the stones round the base of Stone 31 a smooth dark brown soil and lumps of bright yellow clay, mottled with pure green clay, filled a depression under turf line 157 (Illus 7.226 Section 57-58). At first it looks as if they might have been backfills of a shallow ramp for erection of Stone 31, filled in alongside the packers for the orthostat (Illus 7.226 Section 57-58).

The ramp, if that is what it was, was cut into the yellow-brown soil under turf line 157. But the identity of the yellow-brown soil is ambiguous. The drawn section title ends "... West section from 112 level" which would naturally suggest that soil 112 lay above turf line 157. But if the soil above turf line 157 was 117, then either the title was inconsistent (credible because 112 and 117 were often difficult to distinguish) or the yellow-brown soil below the turf line may have been thought of as soil 112. Soils given the same number in Area BII and BII/III were associable with ploughing down of the Stage 2 enclosure.

If the yellow-brown soil had been 112 then the pit for Stone 31 would have been cut through it after the Stage 2 enclosure had been ploughed down. But soils labelled 112 were usually described as reddish brown, not yellowish-brown, and the evidence from the other section (48-49) suggests that the deposits were thought to be of an earlier date than that of the enclosure. Nevertheless if there is excavation in this area the possibility should be tested.

7.13.6 Discussion of East Row stone 31 and the layers round it

One crucial question is whether the stones round the base of Stone 31 were packers in its pit or loose stones added later. The probability is that they were packers given the upright stone in Section 57-58, and if so it seems likely that the pit was cut through turf-line 157 (and quite possibly through layers above it before they were subsumed into late plough soil 117 and modern topsoil).

On Section 48-49 a dark brown gritty soil labelled 160 truncated turf line 157. The layer below turf line 157 was labelled 163. In BIV/BV further to the west, beyond Stone 30, the sequence was (according to most records), as follows.

160: a thin dark soil into which the pit for Stone 30 had been cut.

1. 161: Light green compacted clay with rusty or humic mottle.

2. 162: a turf line, thought to have grown on clay spoil from Ring-stone pits and to underlie the green clay platform inside the Ring

3. 849: grey soil

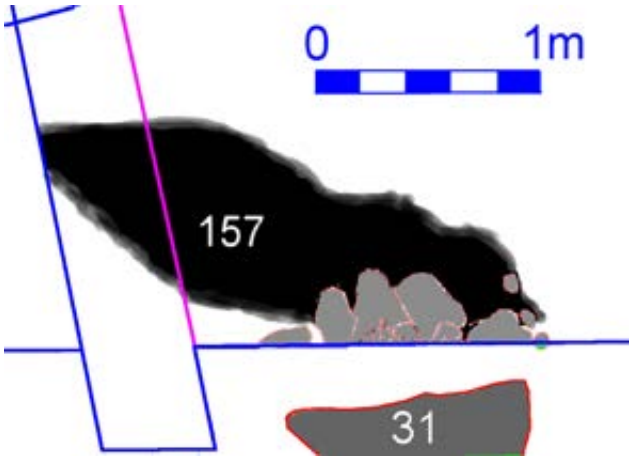
4. 164: turf line, thought to be that on which the Ring was erected

5. 163 grey soil

Of course, given the manipulation of clay around the Ring the sequence there might well be more complex than near East Row stone 31. But the suggestion in the original Section 48-49

Illus 7.222 The area north of the east row from the east on 23 May 1980 [Film 1980.11.21 part]

Illus 7.223 Area BIII showing the black turf line 157 near East Row Stone 31 c 27 May 1980 [Film 80.10.34]



Illus 7.224 OGS 157 near East Row Stone 31 from Context sheet and Day Book 2 May 1981

labelling of the grey soil below turf line 157 as soil 163 is that 157 was the same as 164. If so, turf line 157 was the same as that on which the Ring was erected. The implication is that the East Row might have been set up at much the same time as the Ring.

A minority set of records places 163 between turf line 164 and162; if the onsite correlation of the soil below turf line 157 with 163 is accepted and if the minority set of records for 163 were preferred, turf line 157 would be the equivalent of turf line 162, thought to have grown on clay spoil from Ring-stone pits and to underlie the green clay platform inside the Ring.

Another possibility, perhaps the likeliest of all to be correct if 163 there is accepted as the same as 163 near the Ring, is that turf 164 had continued to grow near East Row stone 31 through the period during which activities near the Ring led to clay being dumped on turf line 164 and the subsequent growth of turf line 162 - and maybe that growth continued even later near Stone 31 than it did near the Ring where turf line 162 was covered by clay 161. That interpretation would in effect make it impossible to correlate 157 with any particular more short-lived turf line near the Ring. That means that the timing of the erection of Stone 31 cannot be compared fruitfully with that of the Ring stones.

But the preferred interpretation is that East Row Stone 31 was set up through soil 160. Soil 160 truncated both turf line 157

Whichever sequence is correct, it is tempting to suppose that the mottled brown-green sandy clay towards the bottom of the south part of Section 11 Part A (48-49) was (rather than being soil 112)

remains of a cultivation bed, in which case the green clays at the base of the short section 58-57 might be parts of the same bed. But that is a suggestion based on the detection of cultivation beds elsewhere, not independent strong evidence for their existence here.

Other interpretations are possible and they are listed in Technical Note 7.13.6. They depend on long distance correlations between soils. Resolving the uncertainties requires further excavation.

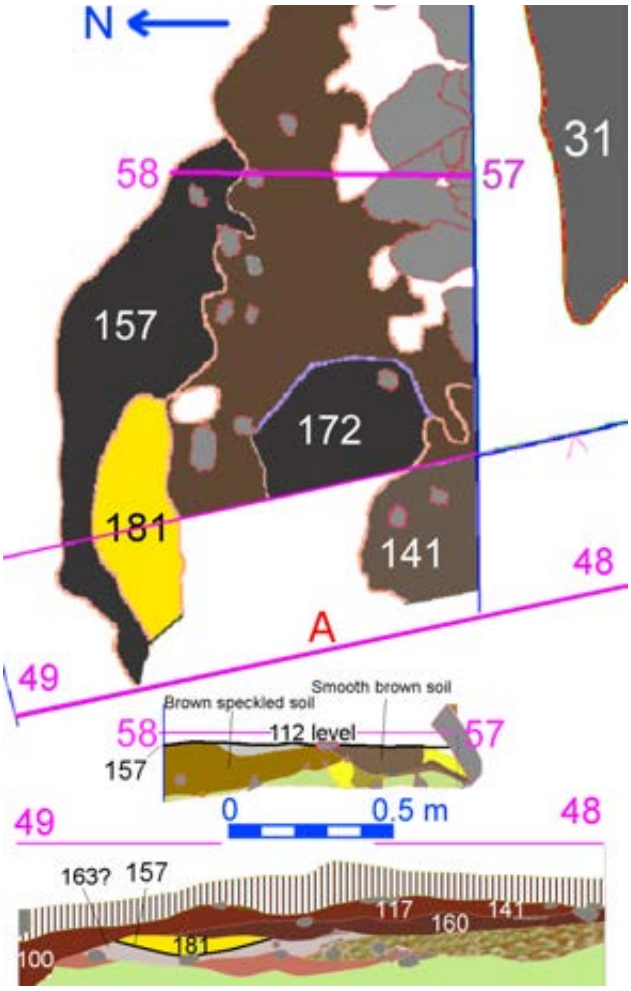
7.13.7 Discussion of Stones 30 and 31

East Row stone 30 was set up before ploughing represented by plough soil 141. However plough soil 141 is interpreted as long lived, alternating with a succession of burial deposits. The favoured interpretation of the stratigraphy of East Row stone 30 is that it was later than soil 161 and probably later than soil 160, and roughly contemporary with green sandy clay 842, which in turn was slightly earlier than green sandy clays 810 and 812. Its date is interpreted as lying sometime around 2300 cal BC, although the pollen and radiocarbon-dating evidence provides only a looser bracket of about 2400 to 1690 cal BC.

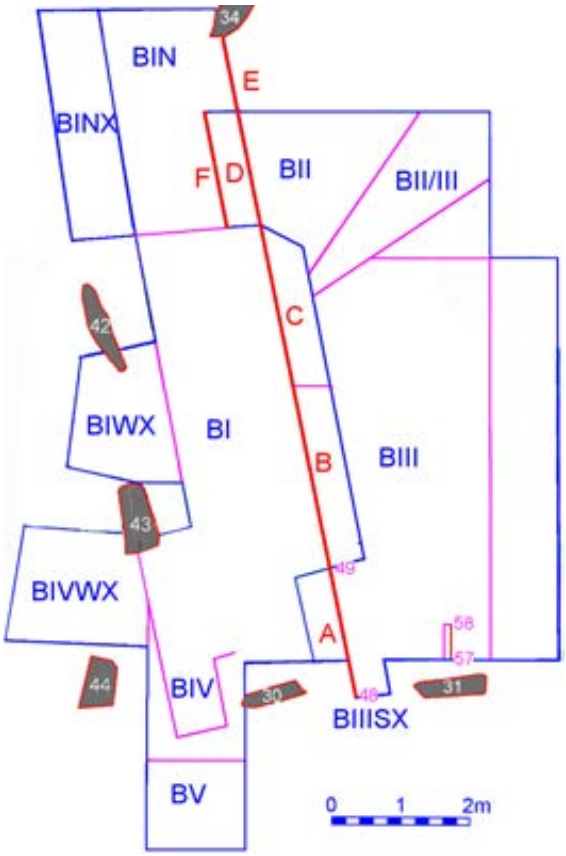
The favoured interpretation of the stratigraphy round Stone 31 of the East Row is that it was erected after a turf line 157 had formed and been covered by at least a little clay and soil. That turf line was cut by dark soil 160, and although it cannot be proved on the evidence so far available it seems likely that the stone-pit was actually cut through 160. If soil 160 near East Row Stone 31 was of the same date as soil 160 near East Row Stone 30 (2 or 3m away) then the stratigraphies of erection of the two standing stones were very similar.

While it was not possible to prove conclusively either that East Row stones were set up together or that they were of significantly different dates, my impression is that they were set up at broadly the same time as each other. Given the vast difference between archaeological time and social time this means only that the stones could all have been erected over a few days, or that they could have been erected over a few generations, or anything in between. As a working hypothesis however at least the inner part of the East Row was built sometime

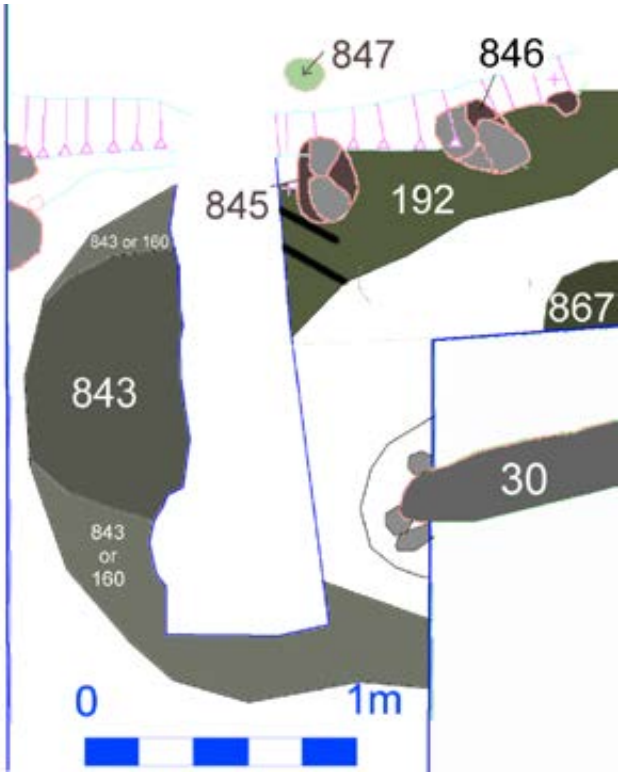
Illus 7.225 Area BIII digitally manipulated to lighten the shadow of East Row stone 31 [Film 1981-6-3]



Illus 7.226 Layers near Stone 31 on 24 May 1980 on Plan 80/08 [NMRS DC38027 part], Section 80/13 (58-57) flipped [NMRS DC 38033-B] Main N-S Section 11 Part A (48-49) flipped [DC38031-A]



Key Plan for Illus 7.226



Illus 7.227 Sketch plan of extent of layer 192 and 843 or 160 [Day Book page 49 of 23 May 81]

around 2300 cal BC over a fairly short period. In a sense independent of this, I suspect (without any convincing evidence to support the idea) that erection of the East Row was contemporary with use of the light timber structures under the chambered cairn.

One puzzle in the area of the East Row was the thickness of soil above the upper well-developed turf lines (162 near Stone 30 and 157 near Stone 31). Clay or soil or both must have been spread on them because they (partially) survived subsequent ploughing. Near Stone 30 it could be explained by dumping of material associated with funerary deposits. Near Stone 31 it could be linked to the (hypothesised) spreading of material from turf elements of one or more of the successive enclosure walls.

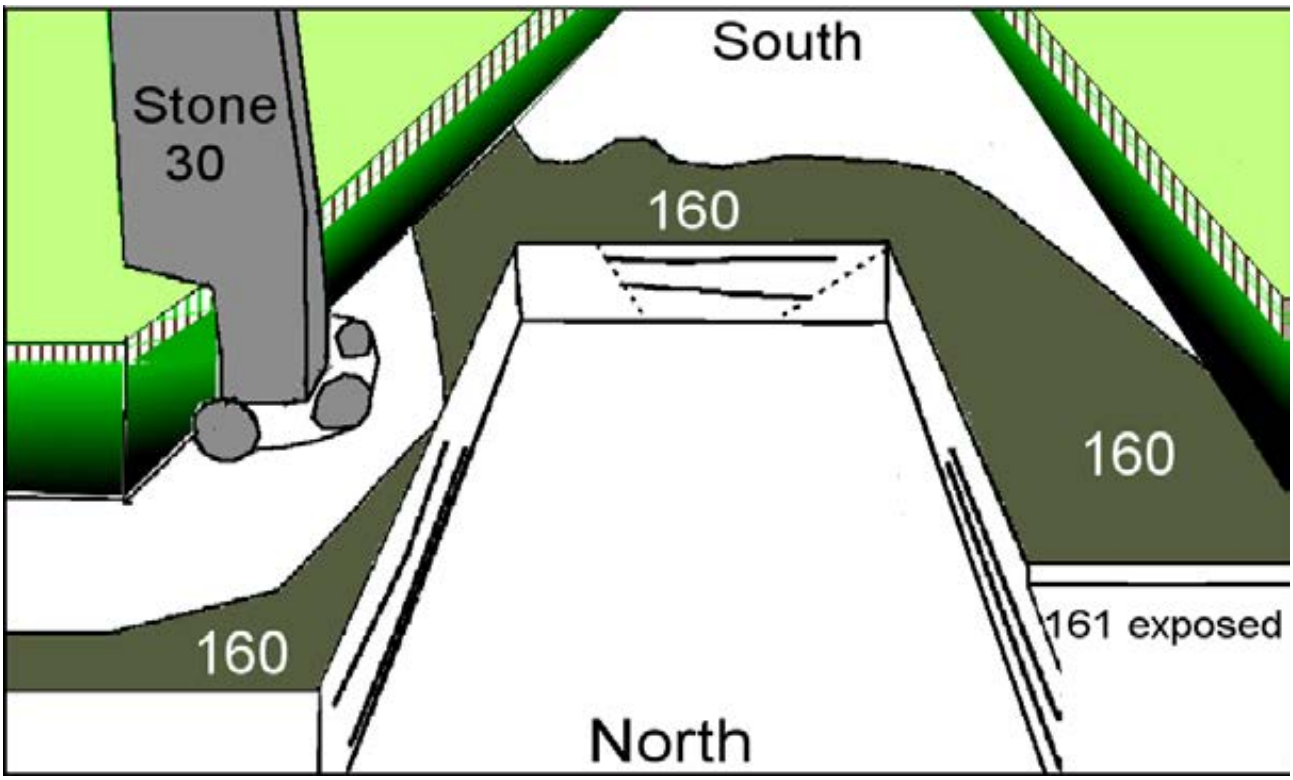
Further excavation is needed if there is to be any hope of clarification of the relative dates of erection of East Row stones 30 and 31 and the various events affecting the enclosures. It might also resolve other points; there was a suggestion of an earlier cut under the pit for Stone 30 and a round-bottomed depression running west from near Stone 31. The latter may have been related to the cultivation bed system thought to underlie Sub-area BV and definition of, or proof of the non-existence of, cultivation beds would help clarify other features in Area B.

7.14 Phase 6 Pre-Stone 30 ground-working

Below green sandy clay 812 and 810.1 was a generally thin dark soil 160. The label 160 was used for various layers (Technical Note 7.14.1).

7.14.1 Dark soil 160, soil 192 and rotted stones 843

Below the brown-black gritty late ploughing level (141) and the sandy green material 812, was a layer of dark charcoal rich soil 160. A sketch plan (Illus 7.227) showed its surviving extent. It had been cut by later features and by the 1980 sondage. An area of silty grey-green clay 842 (See Chapter 7.14.3) was found above rotten stones 843 which were at the same level as 160. There were no finds from 842 and 843.



Illus 7.228 Diagram showing schematic extent of layer 160 and related layers [Day Book page 55 sketch of 25 May 81]

Illus 7.229 Rotten stones 843 [Film 81.8.26]

Illus 7.228, redrawn from a slightly later diagram in the Day Book, shows a more schematic distribution of soil 160. It and the context sheet for 192 suggest that soil 192, although it may have had an independent prior existence, was part of 160. There were no finds from soil 192.

Finds from 160 included the following potsherds.

Table 7.42 Pottery from 160 in BV

Cat	Comments
694	What may be a spall with the interior surface lost; if not thin enough to be fine Beaker but rather and identification as Beaker is tentative.
695_696	Two abraded sherds and a crumb from a thin-walled pot; either thin E/MN or Beaker (probably domestic)
758	An abraded sherd, too small to be diagnostic. Could be from a domestic Beaker but possibly somewhat later.

Table 7.43 Pottery from 160.3 in BIVWX

Cat	Comments
350	A heavily abraded sherd from AOC Beaker ASH 37 (previously assigned to ASH 38)
697	A featureless spall
393	A sherd of Beaker ASH 42
698	A small, abraded sherd from thin-walled, probably fairly small pot, most likely Beaker – possibly thin domestic Beaker
611	A sherd from a small, fairly thin-walled fine-gritty pot.. Slightly grittier than the grittiest definite domestic Beaker but possibly related.
612	A featureless abraded sherd possibly from a gritty domestic Beaker.

The sherds from the main spread of soil 160 were all abraded and rather undiagnostic though they seemed possibly related to Beakers. Lithics from 160 were 81.530, 81.551 and 81.569 quartz from BV, and 81.553 quartz from BIV. A rather larger assemblage of sherds came from very similar and probably identical soil 160.3 which was found immediately south of the modern ditch, just inside and outside the passage. Layers were thin and shallow here and soil 160.3 was not well-sealed. It was close to the pit 859 with its large and highly varied ciollection of sherds, including some of the first millennium AD.

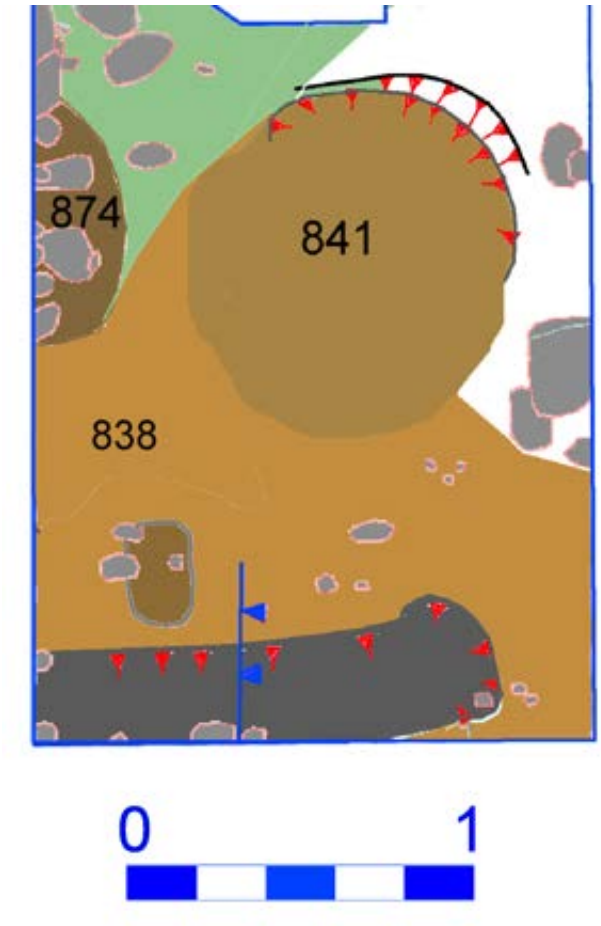
The sherds in 160.3 were much abraded. One definitely came from the Beaker ASH 42; another came from AOC Beaker ASH 37 (7.195) but the others may have come from domestic Beakers.

Soil 192 which underlay 812 to the north of Stone 30 was described as an assembly of black linear features with much iron pan and broken pot, which after trowelling reduced to a grey sandy area (Illus 7.227). The so-called pot turned out to be fragments of hard black clay, perhaps fragments of a turf line. It was thought on stratigraphic grounds to be the basically the same as soil 160. Black streaks, perhaps ard marks, suggest that the ploughing associated with 141 had disturbed it.

In it was a black-grey ashy patch 845 round an angular stone, and also a patch of charcoal-rich grey sandy material 846 (Illus 7.227). Patches 845 and 846 partly underlay a larger black hole 814 cut into the overlying layer 810.1 and truncated by the modern ditch and thought to have been possibly similar to black silts and rotted stones 843. Patch 846 produced three sherds, one a non-corky E/MN rim sherd (Cat 232; ASH 16) and the other two from large fine E/MN non-corky pots (Cat 233 and 234). It also produced two pieces of pine charcoal (sample 2247).

Soil 160 in the west side of BV mingled with a layer of silt and rotted stones 843 (Illus 7.229). The stones in 843 seemed to line the bottom eastern side of a shallowly sloping cut. They were found to either side of the base of scoop 813 There were no finds from 843.

In the north-western part of the trench 160 overlay a 3cm thick layer of light green compacted clay 161 with rusty or humus-rich mottle.



Illus 7.230 Depression 841 on Sketch Plan Day Book 29 overlaid on Plan 81.18, both of 14 May 1981 [NMRS DC38052]

Illus 7.231 Depression 841 from the south on 14 May 1981 [Film 1981.8.30]

Illus 7.232 Patches of turf line in BIWX from the east c. 30 May 1981[File 1981.17.24]

To the north of Stone 30 a patch of black charcoal 867 with some iron pan was first noticed at the base of layer 160 but was probably intrusive (Illus 7.227). It contained a sherd (Cat 384) from the fine decorated beaker ASH 42.

On the north side of the ridge 838, which was probably the ploughed down remains of a cultivation bed, greenish sandy soil 810 overlay a shallow 1 m wide saucer shaped depression (841). Illus 7.230 shows the situation when the last of 141 and 810 had removed from the area of this southerly depression.

Its upper fill was like 141 although it is clear that the underlying soil 160 had spread over into it. On stratigraphic grounds linking the main part of its fill to 160 (and, given the stones in its fill, to the layer of rotted stones 843) makes more sense than linking it to 141 because the greenish sandy material 810 which separated 141 from 160 in the southern part of the area overlay part of the depression.

When emptied the edges of depression 841 revealed a series of turf lines in its side, suggesting that 841 was a scoop into earlier levels rather than the fill of a much earlier hollow (Illus 7.231).

7.14.2 Discussion of layers 160 and the rotted stones 843

In the eastern part of BIV/BV where all layers tended to thin out the differences between 160 and other dark fills, especially the overlying plough soil 141, were difficult to see except where green sandy clay 812 intervened. It was also hard to maintain a stratigraphic distinction between it and the soils in depression 841 (described below) and between it and the rotted stones and silt in depression 843. Layer 160 was not demonstrably a plough soil but may have been ground-worked.

Layer 192, into which it merged, showed the effects of ploughing but at least some of those effects seem likely to have been due to the ploughing which helped form soil 141.

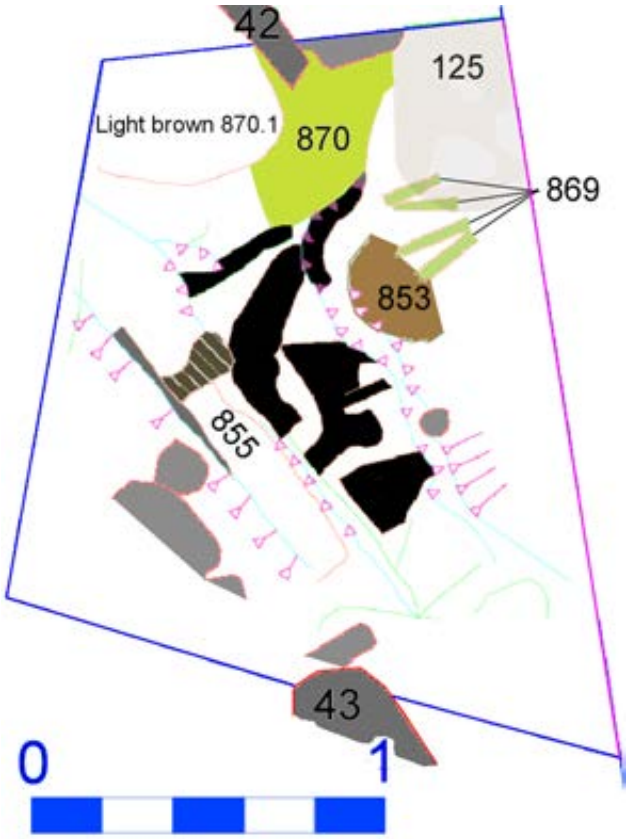
It seems quite possible that the northern part of 160 included a disturbed old ground surface, and that there and elsewhere light green compact clay 161, with its rusty or humic mottle, was its immediate subsoil.

Rotted stones like those in 843 were fairly common at Calanais, for instance on the margins of the cairn in Area D (Chapter 9), but it is difficult to assign any particular significance to their state. They may have been burnt, for the colour of 843 suggested a high charcoal component in the silts even though 843 produced no identifiable charcoal lumps. That might have accelerated their decay. But perhaps the state of the stones was due to a high concentration of organic acids from deposition of bodies or weeds cleared from nearby ploughed areas or both. But silty green clay 842 immediately overlay parts of 843 and might have been expected to turn orange if affected by oxidising processes. That said there was abundant iron-panning in the layers above 843 which may signal the presence of humic acids. These speculations can only be tested if the area under the west baulk of Area BV is excavated.

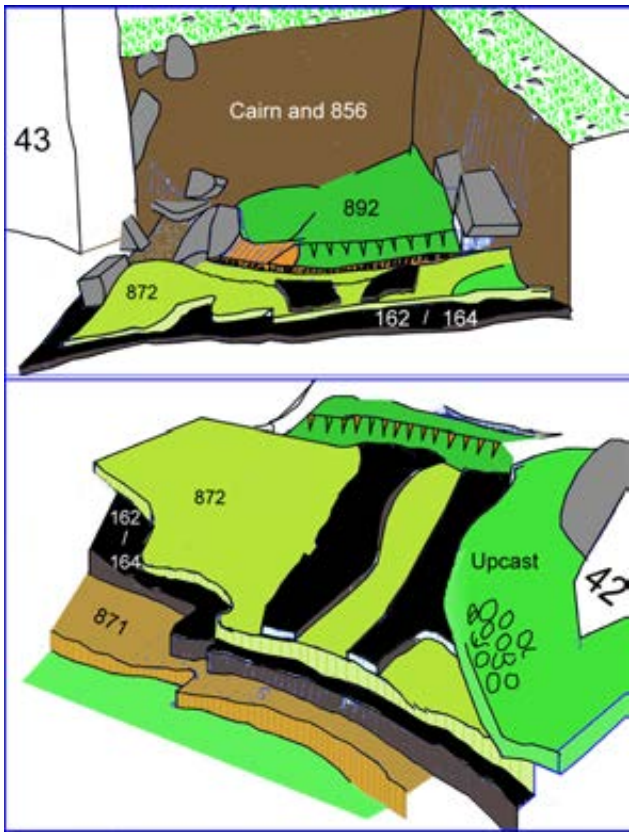
It seems likely that 160.3 pre-dated the chambered cairn, for the turf line in the passage cannot have formed when the passage was roofed, although as noted above disturbance in this area meant that it could not be proved absolutely that the material was really the same as that forming 160 in the main part of BIV/BV.

7.14.3 A turf line in BIWX

In Area BIWX a turf line above clay 872 was probably contemporary with soil 160. A pattern of green and black stripes was initially interpreted as the result of ard marking (Illus 232-7.234). However the pattern was shallow and that explanation was probably incorrect. Admittedly it was at the same level as the ploughing through soil 160 in BIV and BV. But overall the preferred interpretation is that the turf line had been damaged by much later manipulation of the massive kerb stone.



Illus 7.233 Plan 81/66 of patches of turf line in BIWX on 30 May 1981 [NMRS DC38100]



Illus 7.234 Sketch diagrams of layers in BIWX on 30 May 1981 [Day Book 70]

Illus 7.235 The slots in the green clay platform in Areas H (to the left) and BIVWX on 1 June 1981 [Film 1981.18.8]

Illus 7.236 The section under the north passage wall near the end of excavation in June 1981 [Film 1981-21-3]

Rubbly green clay upcast overlying it near the base of Ring stone 42 (Illus 7.234) was thus roughly in the same stratigraphic position as the areas of green sandy clay in BIV and BV.

7.14.4 Discussion of the turf line in BIWX

The upcast cannot have been an original clay mound round the base of Ring stone 42, nor a pit fill.

The turf line brings back the question whether there was a turf line associated with soil 160 in Areas BIV and BV. There were signs there of ploughing and bits of turf in the top of underlying features so there may well have been.

7.15 The green clay platform under the cairn on Area B

On Area B the green clay platform under the cairn was investigated in BIWX (including the fallen kerb slab) and BIVWX (the passage). The term 'green clay platform' is used for convenience; in truth it seems to have been a levelling layer consisting only in part of green clay. In BIVWX the platform had been eroded away by wear in centre of the passage, as illustrated in Chapter 7.2.4 (Illus 7.9). After that had been cleaned up by removal of rubble and dark soil, the facing stones on the north side of the passage were removed.

7.15.1 Superficial features above the green clay platform in BIVWX

Illus 7.235 and 7.236 show several, mostly small features in BIVWX, the former a week before and the latter immediately before the end of excavation. One of these (883) was interpreted, with reference to the same slot in Area H, as a slot running nearly parallel to the passage wall. Its further edge was never seen; it was under parts of the cairn which were not removed during excavation.

To the left (west) on Illus 2.235 is part of Area H where the north edge of the slot can be seen, cut into green clay and in turn cut by the chamber. To centre and right is Area BIVWX with the cairn and underlying features. A few shallow pits are visible as dark patches; Slot 883 was between them and the section face.

Below the green clay 161/872 by Ring stone 43 (to right on Illus 7.235 and 7.236) two turf lines had been cut through by the modern ditch 100. These could be linked to turf lines outwith the cairn in B1WX, although frustratingly not to the drawn section (Illus 7.239). Area BIWX is visible at top right beyond Stone 43.

In addition a pit (889) roughly 0.7m across and 0.3m deep was found in the centre of the passage. In Illus 7.221 it had already been backfilled.

7.15.2 Superficial features in the passage

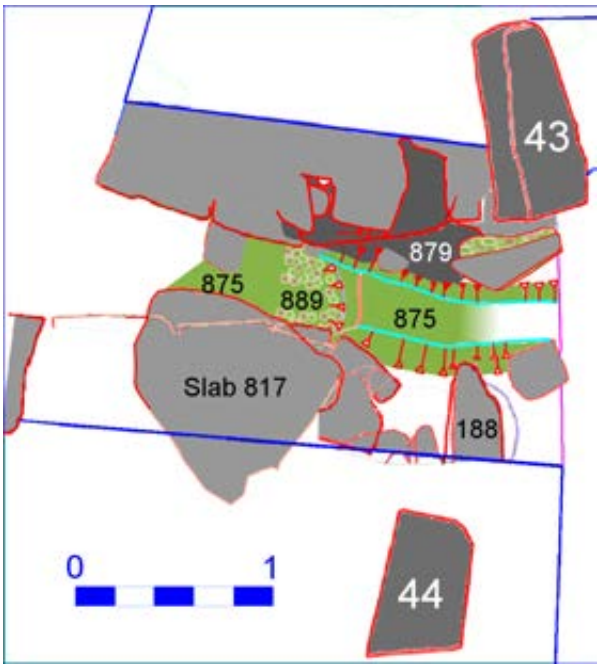
In the west part of the passage near the chamber the passage floor was a lumpy version of green clay 875 which appeared to be redeposited subsoil (Illus 7.223, 7.224).

Near Ring stone 43 a thin layer of gritty dark material 879 underlay the outer cairn stones. It covered a shallow pit with firm gritty grey greasy clay in it (878). As detailed in Chapter 7.8 the latter was interpreted as possibly having supported a vertical slab flanking the north side of the passage entrance. It would have corresponded to Pit 859 and the slab to 188 (Illus 7.223).

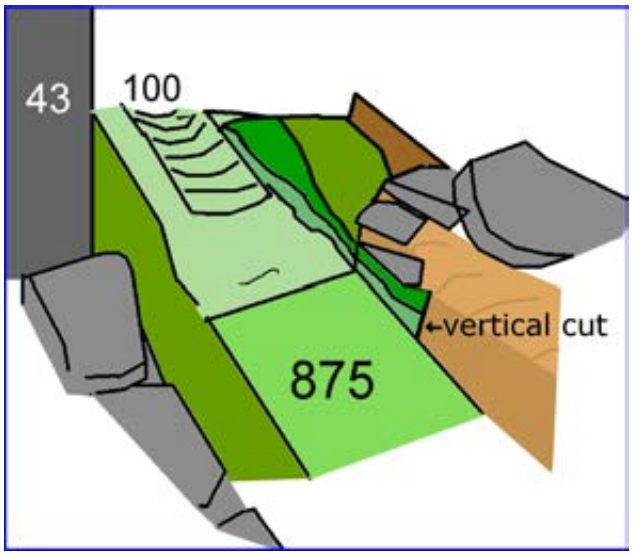
Near or at the entrance to the passage, underlying dark green silt with grits 826, there was a vertical east-west cut separating probably natural green clay to the east from passage floor material 875. It appeared after the green clay passage floor layer 875 had been cleaned twice (Illus 7.224, Day Book 59, 67). It defined the edge of a shallow 0.6m wide feature (886) which ran diagonally across the passage (Context Sheet 886). A thin layer of grey charcoal-flecked material 884 appeared under it (Day Book 74). In places it was cut into natural clay, and the fills of its western part overlay pit 889. The turf lines visible near Ring stone 43 were absent both in the cut and to its west (Day Book 59).

There had been a narrow erosion gulley for most of the length of the passage (Illus 7.237, 7.238). The cut lay mostly within the clay forming the passage floor although it also seems to have cut natural clay in places. It was interpreted as a shallow pit but it may have corresponded to no more than a repair where the floor had become eroded.

Under the south passage wall (that is to say under where it had once been) one or more turf



Illus 7.237 Plans 75 of 20 May 1981 and 76 of 25-7 May 1981 [NMRS DC38109 and DC38110 on outline of passage]



Illus 7.238 Sketch diagram of vertical cut near entrance, looking east [Day Book 59]

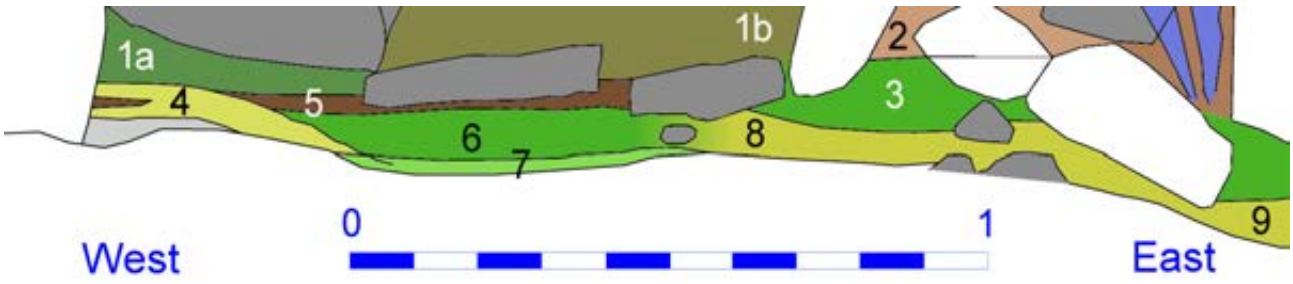
lines was visible cut away vertically in the side of the erosion gully (Illus 7.238; Day Book 59 of 26 May 1981). At least one of them dipped down to the west and the vertical cut may have corresponded with the edge of a cut in the passage floor separating the clays near the entrance from late fill 875 (Day Book 74 of 1 June 1981).

On the sketch drawing in the Day Book (Illus 238), however, it seems to have been further to the west.

The nature of these features is somewhat opaque. The most prominent turf line could have been 162, earlier than the green clay platform. What little masonry of the south wall passage survived lay directly upon 162 (Day Book 85). If that attribution was correct there was no green clay 161 or green clay platform on the south side of the passage at this point, despite its thickness further east near the passage entrance. It is worth noting at this point that there were no unambiguous remains of the green clay platform nearby in Area D, to the south of the chamber.

7.15.3 Discussion of the superficial features in the passage

The superficial features in the passage included two rectilinear dividing lines, that shown on Illus 7.238 and one to the west side of the underlying Pit 889 (Illus 7.237). They were all shallow and may reflect neat repairs to rectangular areas of the passage floor. If this interpretation is correct the repairs may have been done in the late Victorian or Edwardian period and if in the former then possibly along with repairs to the south passage wall, for all of the basal stones of the latter were displaced apart from one.



Illus 7.239 Part of Section 81/9 showing the layers beneath the cairn. [NMRS DC38043]

7.15.4 Features under the superficial layers in the passage

The passage wall stones had pressed down into the top of layer 5 (Illus 7.239). Section 81/9 is a drawing of what lay behind them. Fill 1a of the wall, under the large stone at the west (chamber) end, was dark green fine loamy sandy clay with some grits and charcoal. Further east the lowest infill of the core cairn (1b) was dark brown-green fine compacted sand with some charcoal, seemingly a variant of (1a).

Under layer 1a were surviving layers of the green clay platform and earlier strata. Layer 4 was yellowish gritty clay with a dark brown lens in it. Below that again was grey gritty clay. They will be described and discussed in detail in Chapter 7.15.14.

Further east under layer 1 were the fills 5, 6 and 7 of an intrusion. Layer 5, a dark greasy gritty layer, overlay green, greasy gritty charcoal-rich clay (6) which overlay a layer of soft pine-green to yellow sandy clay (7).

Layer 8, yellow to khaki clay with grits and charcoal and essentially the same as layer 4 mainly underlay the outer cairn. Layers 4 and 8 were almost certainly the equivalent of the green clay platform elsewhere.

Layer 2, the upper fill of the outer cairn, was a 0.5m deep volume of light compact loam with grits. The bottom cairn fill (layer 3) was slightly over 0.1 m deep and consisted of dark green greasy gritty clay with charcoal.

The intrusion (with fills 5, 6 and 7) had a well-defined west end and a much less well-defined east end. The relationship of layers 3 and 8 to those to the west was obscured by a pair of stones, and the drawn section shows no division between it and them. So it is not clear from the section alone whether layer 3 was similar to layer 1a or better considered as a variant of layer 5.

The simplest explanation for what the section record presents, taking into account what was found in Area H only a short distance to the west (Illus 7.235), is that slot 883 curved in from the west (Area H) from 'behind layer 4 of the green clay platform, finished curving, and then ran at a slight angle inward to the section, becoming obscured by layer 8 of the green clay platform. The three layers in the slot can then be seen as variants of the three layers in the slot on Area H (Chapter 12.6.4).

The nature of the eastern end of green gritty greasy clay 3 and yellow clay 9 was unclear. On the section the easternmost fill (9) is described as gritty sandy clay. It seems quite likely that 8 and 9 were part of the green clay platform although at 0.15m in combined depth it would have been deeper than elsewhere. In this interpretation at least one packing stone for Ring Stone 43 had been disturbed when the green clay platform was created and lay on layer 9, which may have dipped into the gap left in the socket (Illus 7.235-7.239).

Frustratingly the several shallow pits or dark clay spreads on the south side of the slot prevented us from firmly linking the basal clays of the drawn section to the sequence of turf lines and clay layers outside the Ring. But the yellowish clay 8 and 9 of the green clay platform and the contemporary clay 161/892 outside it were at the same level as one another. If that is right the green clay platform was stratigraphically later than turf lines 164 and 162, interpreted respectively as the turf through which the Ring stone pits were dug and the turf line which formed on spare soil from the pits.

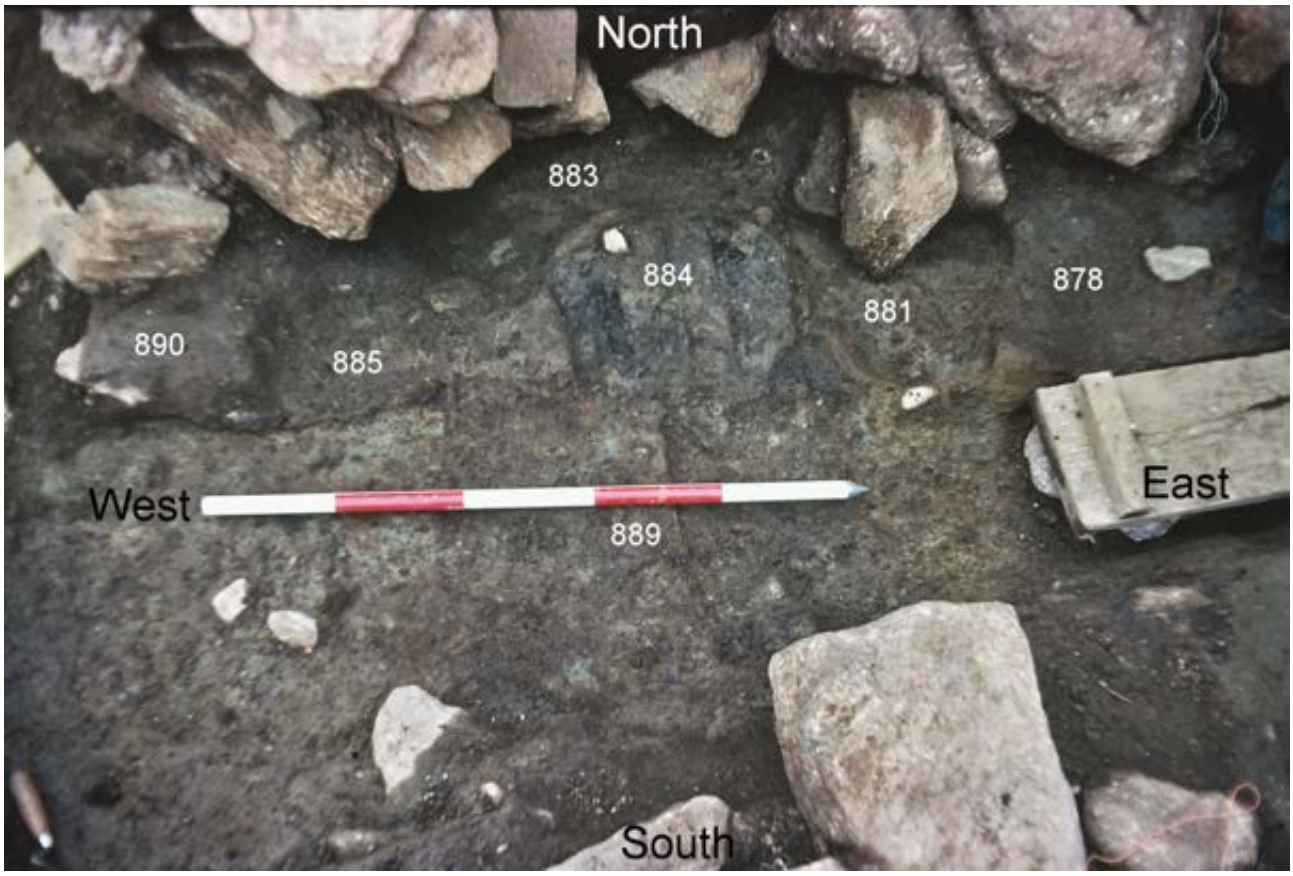
Although it was possible to establish the relative stratigraphy of some of the patches of clay under the north wall of the passage they seemed for the most part to abut their neighbours Before discussing detail it will be useful to give a summary of the discoveries. The features can be resolved into the following (See Illus 7.240 to 7.242), from the latest to the earliest:

1. mostly dark patches near to Ring stone 43 including 879 and 891;

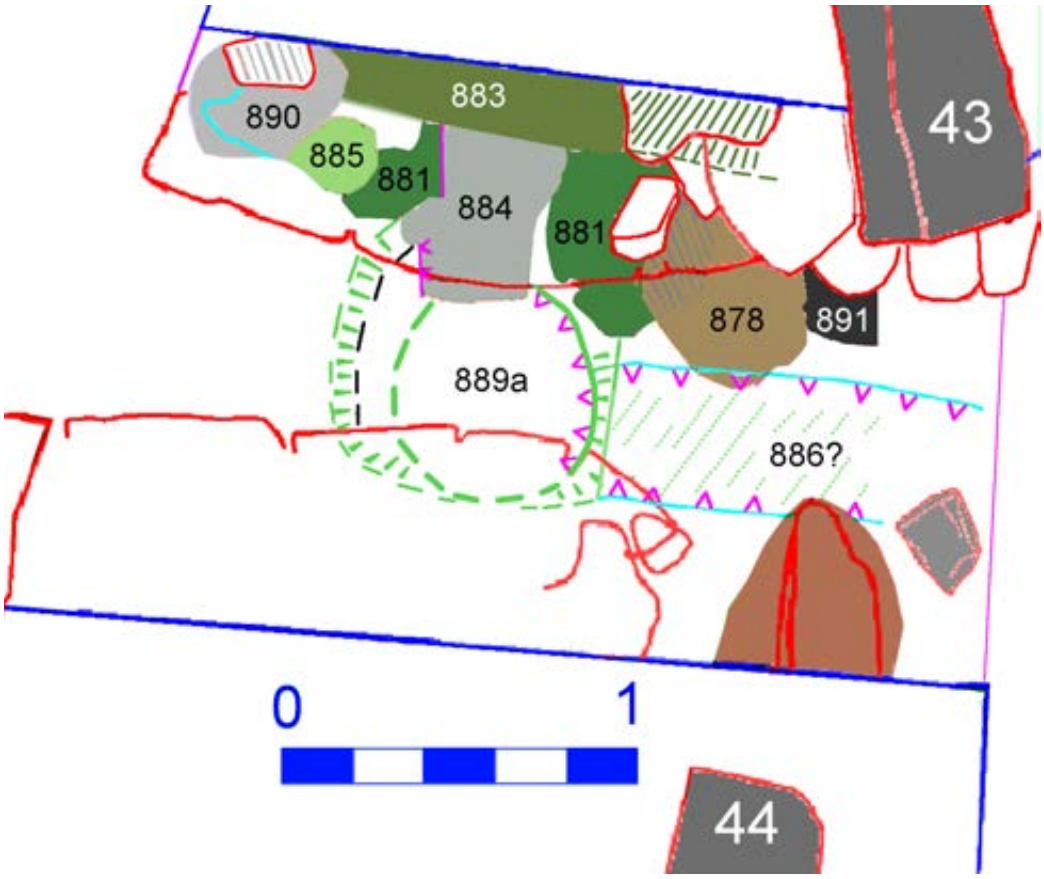
2. pit 878 near Stone 43, recorded as being similar to the pit 859 on the south side of the passage;

3. the cairn stones and the clay on which they were based

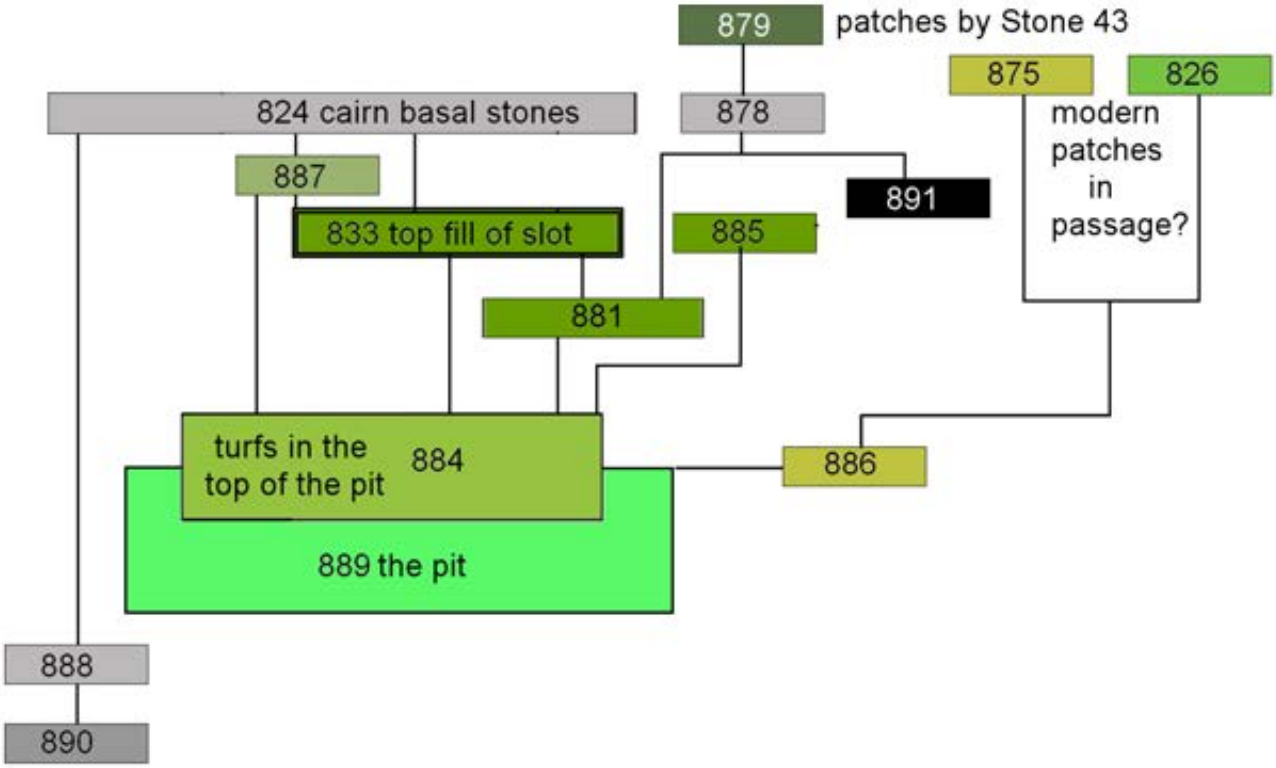
4. patches in the passage including 826 and 875, perhaps reflecting modern repairs (not discussed here)



Illus 7.240 Slot top fill 883, related features and pit fill 884 all to the north of Pit 889 [based on Film 1981.19.9]



◂ **Illus 7.241** Composite plan of features in the passage based on plans 76 to 82 and, for Pit 889, sections 11 and 13 [NMRS DC38111 to 38116, DC38045 and DC38047]. Further information came from Day Book 76-7, and B&W Films 1981.18.23 and 1981.19.6]



Illus 7.242 The relationships of the features to each other

5. slot 883 bounding the inner part of the green clay platform or, from a different perspective, bounding an entranceway to a (pre-cairn) 'room' in its centre;

6. small pits or scrapes along the sides of the entranceway mostly filled with similar dark green material to that in the top of the slot, including 881 and 885;

7. a deep pit 889 and fills including 884 dipping into it, and perhaps 886 which seemed to lie partly between 884 and 889;

8. surviving fragments of the green clay platform and strata under it including 888 and 890.

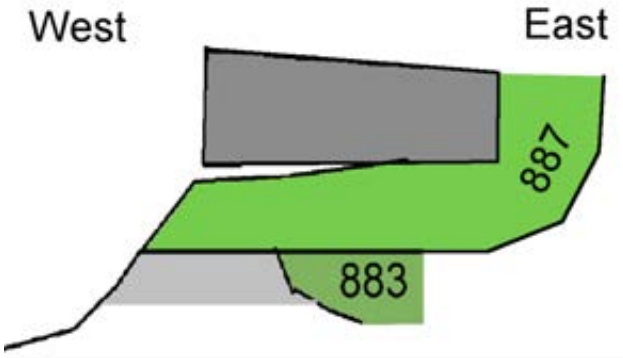
9. basal cairn clay 887

7.15 5 Basal cairn clay 887

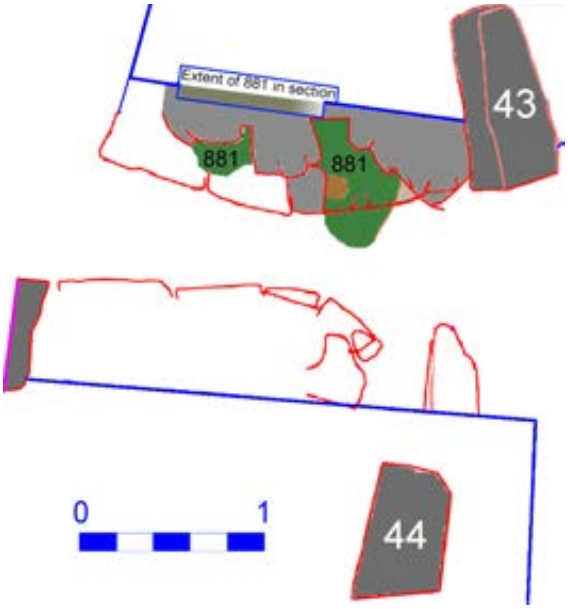
At the west end of the passage, near the chamber, the basal stones of the core cairn on the north side of the passage sat amongst a fine greenish grit-free clay 887 (Illus 7.243). It was probably layer 1a on the main section (Illus 7.239). It ran along the passage, interrupted by sundry pockets of rich dark brown loam. It was finer and more even-textured than the upper fill of slot 883 and was interpreted as bedding for the basal layer of stones. It produced 3 heavily abraded conjoining body sherds of E/MN corky type (Cat 842-844).

7.15.6 Slot 883

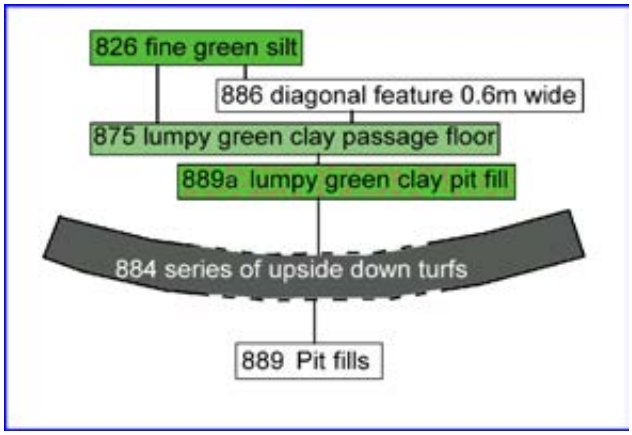
As described above, the pit-like appearance of the slot on section (Illus 7.239) was due to the visible part being where the slot turned from running southeast to running almost eastward. The top fill near the west end of Section 81/9, was below the basal cairn fill, dark green clay 1a, probably the same as layer 887 (Illus 7.239, 243). The top fill was a 50mm deep layer of dark grey-green gritty greasy clay with charcoal, cremated bone and pieces of vermillion or red ochre (5). It overlay two fills, green, greasy gritty charcoal-rich clay (6) above a layer of soft pine-green to yellow sandy clay (7).



Illus 7.243 Layers near the west end of the passage [Sketch Section, Context Sheet 824, modified]



Illus 7.244 Extent of layer 881 from Plans 78-80 of 29-30 May 1981 [NMRS DC38112-DC38114]



Illus 7.245 Stratigraphic diagram of layers above Pit 889a [Context Sheet 889]

Thereafter it ran about 0.5 almost parallel to the later passage wall before disappearing behind layer 8, through which it had been cut (Illus 7.239-7.241).

At its east end the slot underlay some of the flat stones which had at one stage been interpreted as packers for Ring stone 43, but in fact these were loose and disturbed and were interpreted as belonged with construction of the outer cairn (Day Book 85). The importance of the observation lies in its showing that the slot probably did extend (nearly) as far east as the Ring stone.

No artefacts were recovered from slot 883. Three pollen samples were taken (2009, 2011 and 2020). The samples reflect mainly grassland vegetation straight after the clearance of birch wood in the middle of CaN-3a (see Chapter 21: Palaeoenvironment).. Sample 2020 should possibly be placed somewhat later in time than the others, during zone CaN-3aii which started sometime between 2770 and 2360 cal BC and ended sometime between 2560 and 2200 cal BC.

Slot 883 also produced three pieces of what were thought to be cremated bone, 623/81, 697/81 and 497/81. A piece of hazel charcoal (sample 2020) produced a radiocarbon date (SUERC-11607 4490 +/-35 BP of 3350 to 3030 cal BC while a charred hazel nut shell produced a date (SUERC-11606 4455+/-35) of 3340 to 3010 cal BC.

7.15.7 Discussion of Slot 883

The three fills of Slot 883 were broadly comparable to those in Slot 773 found below the chamber wall on Area H to the west-north-west. Slot 773 generally contained fills 772 over 778 over 730.

The top fill 772 in the east part of the slot was a patch of dark grey peat-like material 772 spilling onto the green clay platform. Hard by the east baulk it was a brown loose fibrous clay loam.

The middle layer 778 was mainly humic rich clay containing hazel nut shells and charcoal (Illus 12.89, 12.90). It also included slightly gritty, humic rich clay with ochre and small flecks of charcoal. It was thus similar to the top fill on BIVWX.

The lowest fill 730 was usually grey-brown with a slight green tinge, charcoal-rich sandy clay with

a component of small sub-angular stones It contained several potsherds.

The fills all varied along the length of the slot and the fact that the top fill on BIVWX was most similar to the middle fill on H suggests that filling took place over a period of at most a few hours.

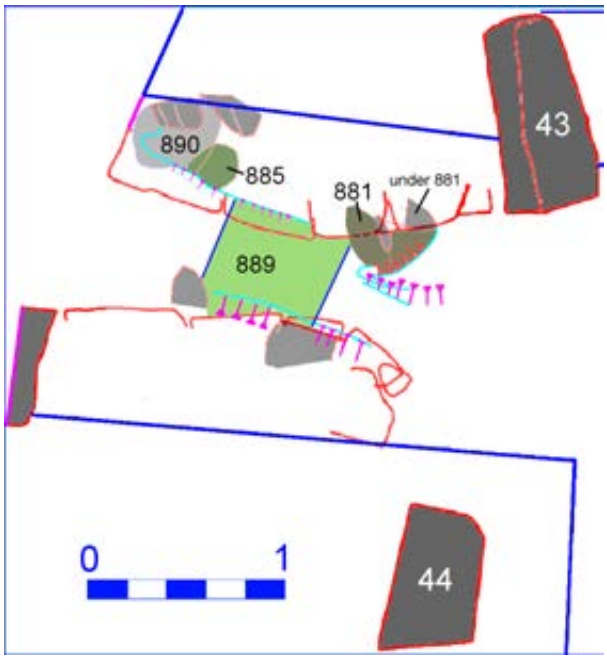
The upper fill of the curving slot 858 bounding the green clay platform in BIWX was black greasy clay soil rich in charcoal. So it was different again from the slot fills on H and BIVWX. Because it formed the outer boundary of the outer part of the green clay platform its history may have been somewhat different from that of the inner slot. That is the implication of the relationship of the inner and outer slots 913 and 915 found at much the same stratigraphic level on Area D.

The charred material in slot 883 produced similar dates to those from similar material from the slot on Area H. They were significantly earlier than a date of 2900 to 2620 cal BC for a birch charcoal sample (AA-24964 4185+/-45 BP) in green clay 398 under the cairn in Area D (see Chapter 23 Radiocarbon Dates). Thus the charred material and other debris in the slots must have derived from much older on- or off-site deposits. Variations between the pollen samples could suggest a heterogeneous origin, which fits in well with the interpretation that the slot contained much old material. The samples may have contained pollen of the period when the slot was filled (after the Ring stones were erected but before the cairn was built) and also remnants of pollen from a pre-Ring period of activity in the late 4th millennium cal BC suggested by the radiocarbon dates (Technical Note 7.15.7).

Overall the pollen suggests a date between about 2770 cal BC (the earliest date at which CaN-3aii might have started) and 2200 cal BC (the latest date at which it might have finished). The preferred interpretation is that the pollen fairly reflects the period of slot-filling and other evidence refines that to a date probably in the 3rd quarter of the 3rd millennium BC.

7.15.8 Feature 881

The fill of feature 881 was recorded as being very similar to the top fill of slot 883. Indeed although



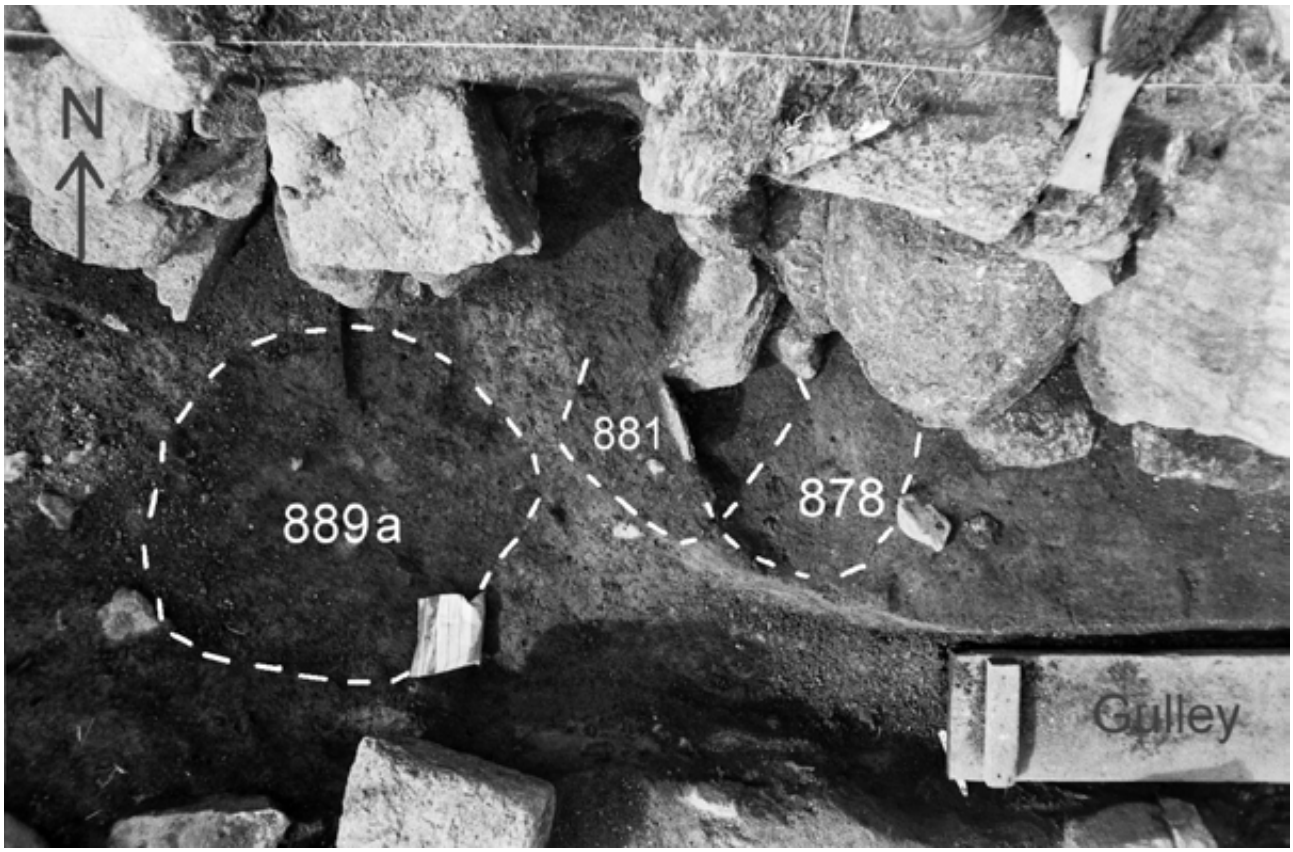
Illus 7.246 The upper fill 889a of Pit 889 from Plan 81, modified from Day Book 76-7 [NMRS DC38115 on outline of passage]

the latter was recorded as overlying 881 Plan 80/81 appears to show it overlying 883 (Illus 7.244). The feature may have consisted of two separate deposits. Its eastern part first appeared under the shallow feature 878 near Ring stone 43. It was recorded as having a very rectilinear appearance despite the fact that plans show it as curving. Its junction with 883 was very straight (Day Book 74). It had small stones set in it, slanting down to the west. It was dark green but lighter coloured than clay patch 878, and grittier with many large pieces of broken stone, charcoal, cremated bone and flecks of vermillion or red ochre were found, along with degraded pottery (Day Book 67, 73). Two of the three sherds came from a not particularly fine gently carinated E/MN pot and were possibly burnt (Cat 245-246). The other came from a thin fine E/MN cooking pot (Cat 247).

Within 881 was a small patch of brown loamy clay 882. There were no artefacts from 882. A sample (2022) contained pollen characteristic of CaN-3ai, somewhat earlier than the pollen from slot 883.

7.15.9 Feature 885

The fill of feature 885 was a light grey ashy charcoal-flecked fine material similar to some of that



Illus 7.247 Top of 889 from above from the south on 1 June 1981 [Film 1981.18.18]

Illus 7.248 Top of 884 and 889 from above from the south on 3 June 1981 [Film 1981.19.11]

from 884. Although shown as a rounded scrape or pit on some plans it was subsequently reinterpreted as part of a more coherent dark green layer which is discussed below. Layer 885 was dark green and very similar to 881 at the other end of the passage. Feature 885 produced two small body sherds, one from either an E/MN non-corky pot or from a domestic Beaker (Cat 735) and the other probably from a thin fine Beaker (Cat 736).

7.15.10 Discussion of the minor features in the passage

The minor features seem to represent fills in scrapes or superficial depressions along the side of Slot 883. They do not seem to have been casts of paving stones, although that explanation cannot be completely rejected.

Feature 881 was probably a spread fill of slot 883. There is a hint from the pottery in it that, like Slot 883, the deposit included ancestral material.

It is conceivable that the shallow feature 878 near Ring Stone 43 was the cast of a paving slab set into green clay upcast 872, but none of the other minor features is best explained in this way. There was therefore no evidence that the passage floor had ever been paved. The possible slab cast 878 was stratigraphically high enough and near enough to the passage entrance that it may have had a function specific to it.

Clay layer 887 must have been later than the green clay platform, because it overlay slot 883; dark brown clay was used on Area H in a stratigraphically identical position. The excavation of these features was not completed. There should be remnants of them under the rebuilt passage wall.

7.15.11 Turf and clay 884 and Pit 889

Partly under clay patch 881 was a complex set of layers. The topmost included green lumps of clay with some brownish mottling (Illus 7.240- 7.242, 7.245). The label 889a was assigned to this layer during post-excavation to distinguish it from the lower fills of the pit (889). Layer 884 consisting of green clay and grey and black materials underlay the lumpy clay; it was probably composed of turfs dumped in the top of Pit 889.

The pit, at the level where its green fill first appeared (889a), had sharp straight edges (Illus 7.246). At a slightly lower level its eastern side was rounded (Illus 7.247). As described above the straight edges may have reflected much later repairs to the passage floor. Another possible interpretation, that the pit had a plank cover, is discussed below.

When first described on 1 June the fill of layer 884 was characterised as grey silty with green lumps. It was cut by the slot 883 (and overlain by the eastern part of 881). Further to the west was a similar light grey ashy charcoal flecked fine material 888 under 885.

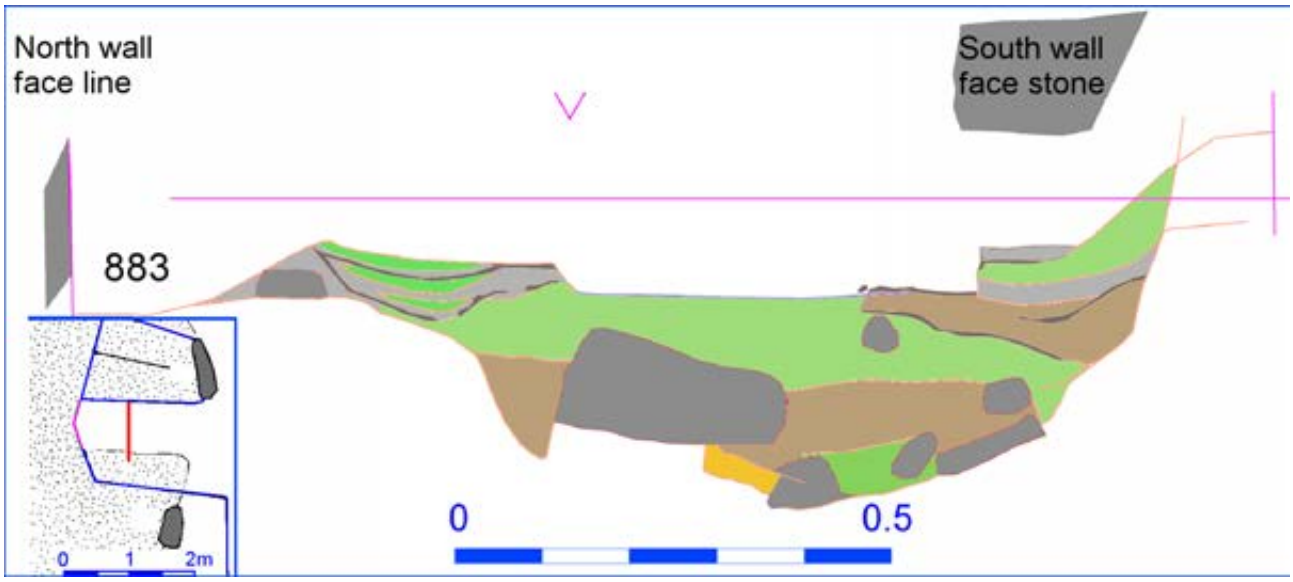
Below the surface of 884 blue-black edges showed in its predominantly pale grey fill (Illus 7.248). Mixed material 884 included two black layers with pure green between them. There was some doubt about their continuity but the lower at least dipped into and under the top fill 889a (Illus 7.249).

Sections 13 and 11 (Illus 7.235-7.236) show the fills 889 and 884. Fill 889a had been removed earlier.

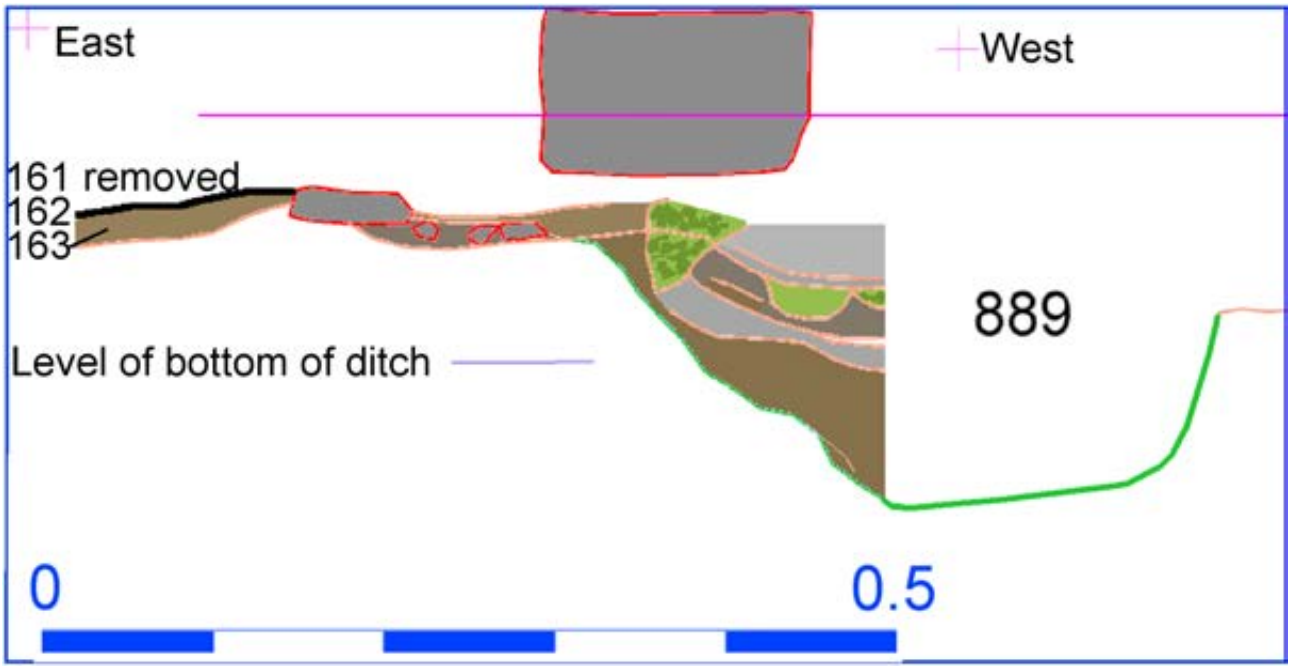
Table 7.44 Layers in turf fills 884

Green	Like natural
Grey thin coherent	Leached subsoil layer
Black coherent	Turf line
Green lens	Like natural
Grey coherent layer	Subsoil - turf line missing
Green lens	Like natural
Grey patchy	Parts of turf subsoil
Black patchy	Parts of turf line
Mottled green gritty sand with green lumps of subsoil	Main lower fill of pit

In detail the sequence of the layers in 884 from top to bottom appears to be the opposite of that which would be expected for turfs the right way up. They included at least three black layers with about 5 mm of grey gritty sandy material above each layer. These layers were therefore up-



Illus 7.249 Section N-S (across the passage) of layer 884 and Pit 889 [Section13/81 NMRS DC38047]



Illus 7.250 Section 11/81 of Pit 889 by the south side of the passage [NMRS DC38045]

side-down turfs used to fill the top of the pit (Illus 7.249).

Below 884 was a 0.6 m wide patch of redeposited green clay lumps (886) within redeposited green clay and overlying ashy grey-brown sand. The layers forming 884 may represent turfs used to seal the pit. Their variegated character, with the turf lines separated in some places by bright green clay and in others by fine grey gritty sand suggests that they were cut from a variety of areas around the Ring.

Pit 889 as finally revealed measured 0.75 by 0.7 m at the top, and had a variegated fill including lumps of fresh green clay and about 3 larger stones (Illus 7.251-7.252). The latter sat on flattish stones which sloped with the bowl of the bottom of the

hole upwards, underlain by and also within soft fine gritless green clay with several 4 - 5 cm wide stones. Above it was soft brown sandy clay and above that a gritty grey-green open material with occasional patches of black.

Pit 889 produced one small body sherd of an E/MN non-corky pot or domestic Beaker (Cat 841) and part of the collared rim of a Hebridean incised ware pot (Cat 283). It also produced several pieces of quartz, CAT 9, 499/81 (not found during specialist analysis) and CAT 10, along with a quartz blade 498/81 (not found during specialist analysis) and a quartz flake (CAT 11). A sample (2070) from 889 produced pollen at the start of CaN-3aii, like most of that in slot 883, although not quite as late as the latest pollen sample there.

7.15.12 Layers cut by Pit 889

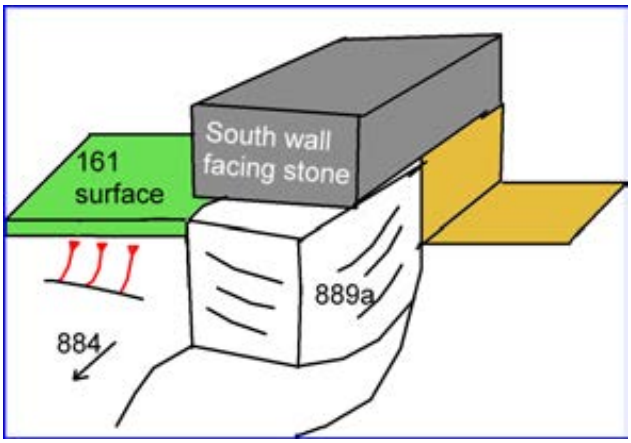
The pit backfill on the north side of the passage was certainly earlier than the fills of slot 883 and the wall; but its stratigraphic relationship to the green clay platform on the north side of the passage was, strictly speaking, ambiguous because erosion, repairs, slot 883 and associated small features had removed the green platform clay where it would otherwise either have overlain the pit or been cut by it.

On the south side of the passage to the south-east of 889, under the basal cairn stones, there was a layer of redeposited green clay which was cut by 884 and 889. It appeared to be the same as green clay under a turf line to the west of 884 and 889 (Day Book 79). The green clay, labelled 161, extended under the wall. To its north and west, in the cut away side of the passage, was yellow-orange rough clay (Illus 7.253; Day Book 82). As the green clay was removed it became much thicker towards the south baulk, and more mottled brown.

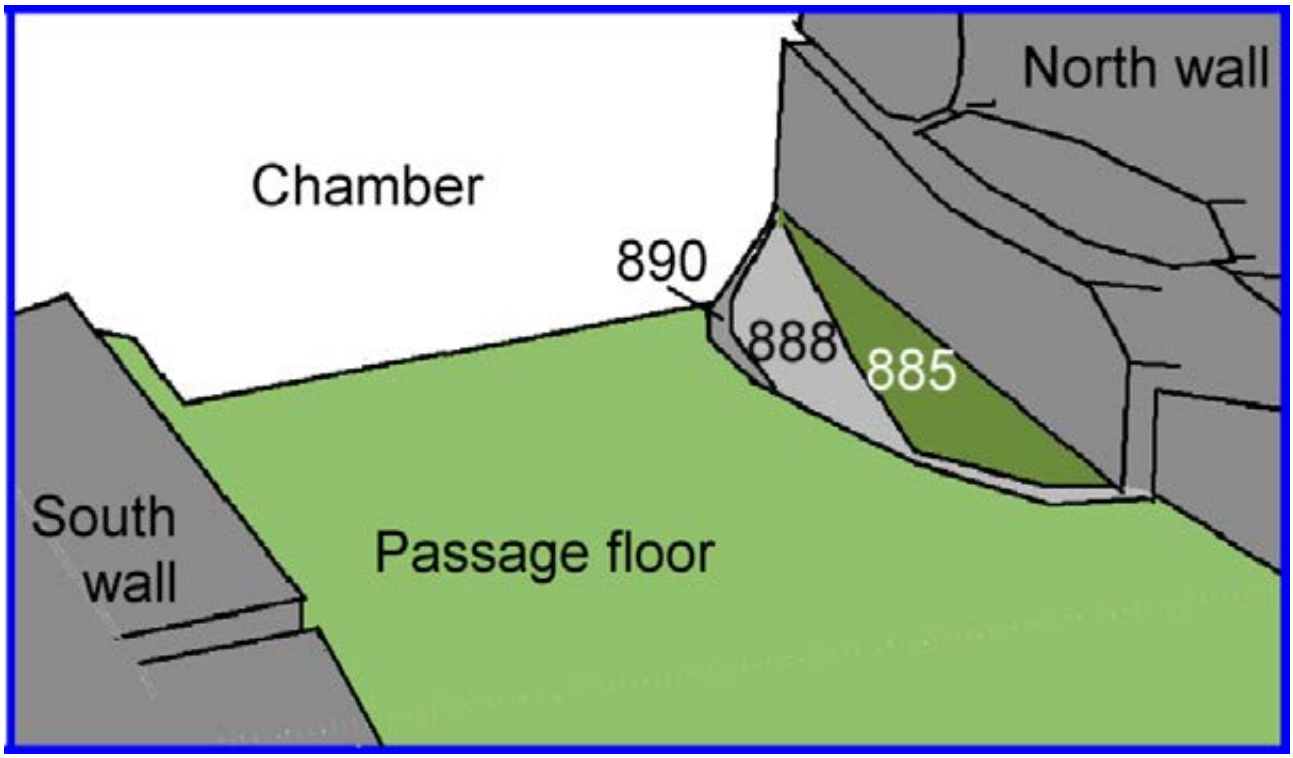
If the green clay labelled 161 here seems to have been part of the green clay platform and it was also stratigraphically related to the green clay 161 to the east of the cairn. This is important because it resolves the question of the relative date of the pit and the green clay platform. The pit cut the clay platform. But slot 883 and related features were later than the pit.

Illus 7.251 Stones at the base of Pit 889, green clay upper fill 889a and upside down turfs 884 from the north on 5 June 1981 [Film 1981.19.28]

Illus 7.252 Stones at the base of Pit 889, green clay upper fill 889a and upside down turfs 884 from the west on 5 May 1981 [Film 1981.19.29]



Illus 7.253 Pit 889 under the south passage wall [Day Book 82]

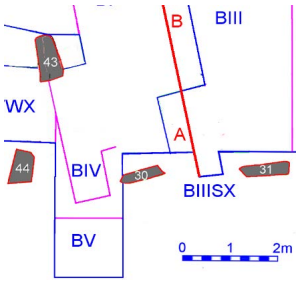


Illus 7.254 Features under the west end stone of the passage north wall [Context Sheet 888]

7.15.13 Discussion of Pit 889

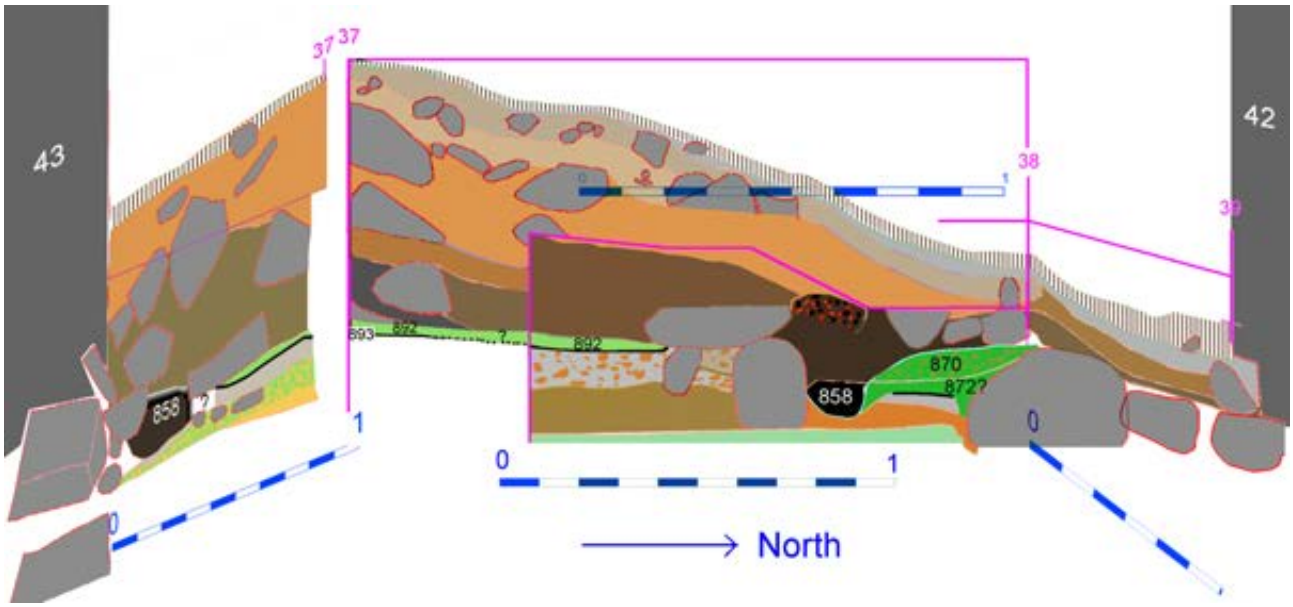
It seems likely that the pit was swiftly refilled after its digging, judging by the fresh appearance of its fills. Its topmost layers consisted of turves, at least most of them upside down. There was no sign of a post-pipe, or of a standing stone socket.

Its lower fill is difficult to explain. It is possible that the pit temporarily held a vertical stone or timber and that its packing stones were purposefully kicked into the bottom of the void left when the stone or timber was removed. But while there was nothing to preclude that interpretation there was nothing to support it. Alternatively it may have been dug for some votive purpose. It is even possible that it was covered with planks and played some part in rituals associated with use of the platform prior to the structure defined by slot 883; in this interpretation the rectilinear shape of the upper fill of the pit is called in aid as the edge of embedded planks. But this interpretation may be thought fanciful and the straight eastern edge to layer 889a may instead represent a repair to the passage floor. The lumpy green clay 875 in the passage may have been a later repair.



Illus 7.254 Key Plan

Illus 7.255 The surviving layers at the corner of BIVWX and Area H [Film 1981.19.19] and sketch section [Day Book 81]



Illus 7.256 Sections 68 and 69 (part) of green clay 892 below the cairn [NMRS DC38102, DC38103 (part) and DC38103 Overlay 2]

Illus 7.257 North part of green clay 892 over black turf line 893 and its underlying grey soil 893a. Slot 858 is by the photographic scale [Film 81.21.20]

Illus 7.258 South part of groove 858 (left of the photographic scale) at the edge of green clay 892 [Film 1981.21.21]

7.15.14 Platform layer fragments 888 and 890

To the west of slot 883 in Section 81/9 (Illus 7.239), and therefore probably under its south side, was a sequence of clays, yellowish gritty clay (4) with a lens of dark loam in it overlying a grey gritty clay which was not numbered on the section.

Under feature 885 (a shallow feature with a fill quite like that in Slot 883) a knob of stratification had been preserved at the junction between the passage and the chamber walls (Illus 7.254-7.255).

In Illus 7.255 Area H is to the left and BIVWX to the right, with in the background a plank in the modern ditch in the passage; the lower diagram interprets the wedge of strata. Grey clay 888 overlay a band of yellow clay over a dark grey layer 890. Contexts 888 and 890 contained no artefacts.

7.15.15 Discussion of Layers 888 and 890

Too little survived for detailed interpretation but basically the strata survived as an island between the slot and the eroded floor of the passage. The grey clay soil 888 was probably the same as a near-basal soil found in Areas H, BIV and BIWX.

The dark grey layer 890 may have been the equivalent of the earliest flat cultivation soils on Areas B and H, possibly corresponding to flat-

tening of cultivation beds. That suggests that prior to construction of the green clay platform the stratification here was much the same as the widespread sequence of early soils. However if this explanation is correct the absence of the equally widespread early turf lines requires explanation and only further excavation can resolve that problem.

7.15.16 The green platform in BIWX.

Illus 7.256 shows the second overlay of the Section 37-38 on top of the previous two drawings, and the details of the green clay platform have been extrapolated (see Chapter 7.17.10 below).

In BIWX curving slot 858 with black greasy charcoal rich fill bounded greenish-yellow clay platform 892 under the cairn. The platform had polygonal cracks in it. It overlay a velvety black turf line (893) and its underlying grey soil (893a). There were no finds from these layers.

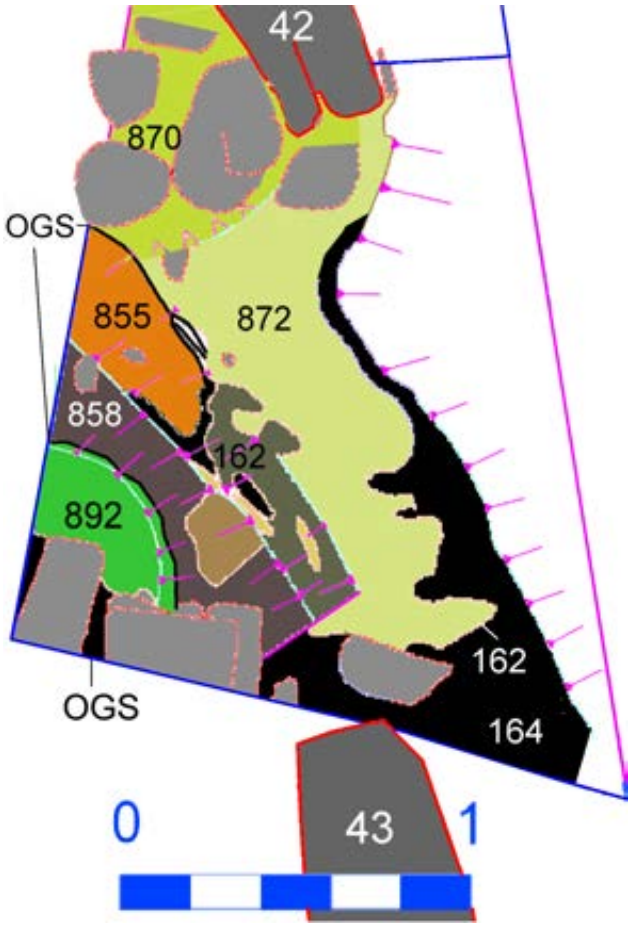
The profile of slot 858 was rounded; its width varied from about 0.2m to about 0.3m and it was about 0.2m deep. It was not clear whether it was an open gully or originally held wooden structural elements. Its recorded profile against the clay suggested the former (Illus 7.256-7.258) and its fill contained no evidence for posts; but much of its fill, which might have provided evidence one way or the other had been cut away by a later slot (see Chapter 7.5.2 above).

The slot truncated the relationship of the platform and underlying layers to gritty clay soil layers 872 and 871 and to the turf lines on the main part of Area BIWX. The OGS shown on Plan 67/81 overlying the slot in the south of the trench survived as traces of grey (Illus 7.258).

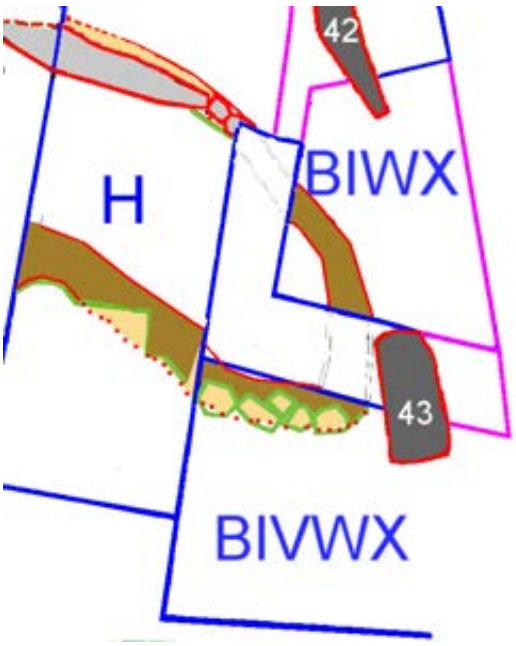
The large expanse of turf line to the east was mostly the lowest one in this area, 164, but the higher turf line 162 was separated from it by a thin band of clay and was visible in section under clay 872 (Illus 7.259; see Chapter 7.17.7 below).

7.15.17 Discussion of the green clay platform in BIWX

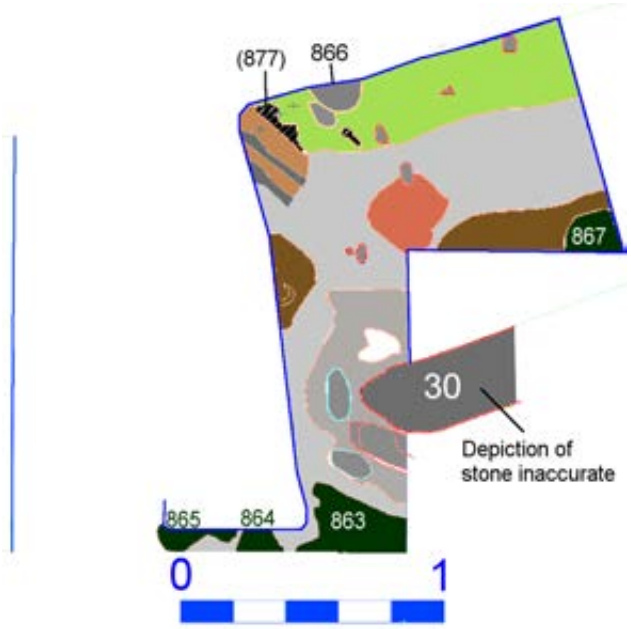
Despite the limited area exposed, the platform in BIWX revealed characteristics also seen on Area



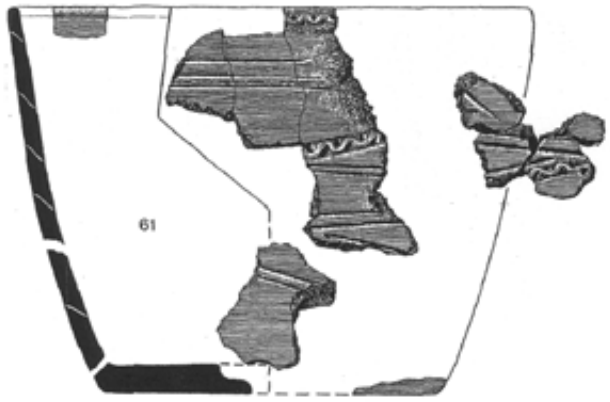
Illus 7.259 Plan 67/81 Green clay 892 below the cairn, bounding slot 858, redeposited subsoil 892 and turf line 162 [NMRS DC38101]



Illus 7.260 Partial reconstruction of slots (definite brown, less definite yellow- brown)



Illus 7.261 Plan 21/81 Ard marks and dark patches 866 and 877 to the north and dark patches 863 to 865 in the south [NMRS DC38055]



Illus 7.262 Grooved Ware pot ASH 61

H. It had a polygonal cracking pattern on its surface and traces of a turf line. It overlay a strong turf line with grey clay soil underneath. However no impressions of overlying cairn stones were seen.

The slot bounding it was about 0.2m deep and varied in width up to perhaps as much as 0.4m but probably less (it had been much damaged by later slots designed to hold the secondary massive kerb slab). There was no exact equivalent on Area H but the slot for the kerb slab there may have destroyed a similar feature.

Although clay 872 was separated from the platform by the slot it was the same as light green compacted clay 161 further south which was interpreted as being of the same date as the platform. That makes good sense of the stratigraphy in BIWX.

7.15.18 Discussion of the green clay platform in BIVWX and BIWX

Slot 883 lay well inside the final line of the passage wall face and the preferred interpretation from the evidence in Areas D, H and B taken together is that the slots represented a slight timber structure or structures which stood on a area levelled up with green clay between the central monolith and the east side of the Ring.

Illus 7.260 suggests a (simplified) full plan of the slots in Areas B and H. In fact the outer slot found in BIWX and that beside the passage in BIVWX and in Area H need not have joined up. It is conceivable that they belonged to two different phases because on Area D te corresponding slots seemed likely to be of different dates from one another.

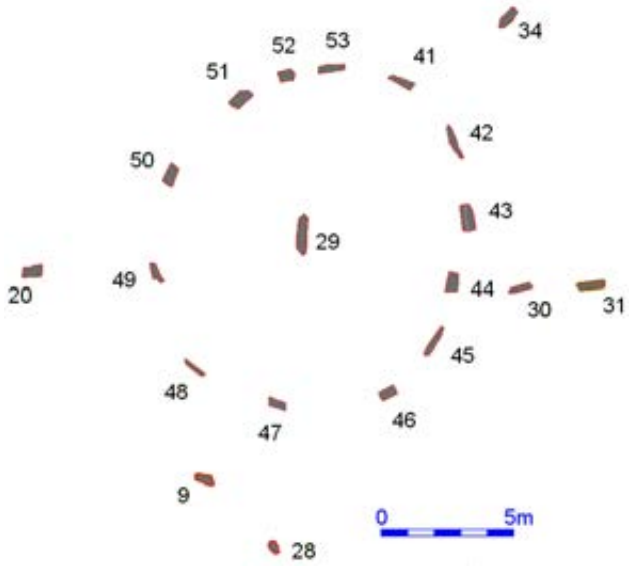
The various possible uses of the structure are discussed in Chapter 24 Discussion and Conclusions. The discussion here is therefore brief. The inner timber structure could have had a primary purpose as a burial place or ossuary, or it could have been used in cult practises or in a host of other ways. It is possible (although there is no evidence for or against it) that early deposits in it included Grooved Ware ASH 61, or possibly some of the very early Beakers.

The slot was very probably filled after Beakers had been brought to Calanais. The probable fine Beaker sherd (Cat 736) from Feature 885 in BIVWX along with the identification of a similarly interpreted sherd from the slot on Area H, together with a definite early Beaker sherd in context 736 of the cairn on H mean that there is a strong case for saying that the platform was closed and the cairn was built after Beakers had been brought to the area.

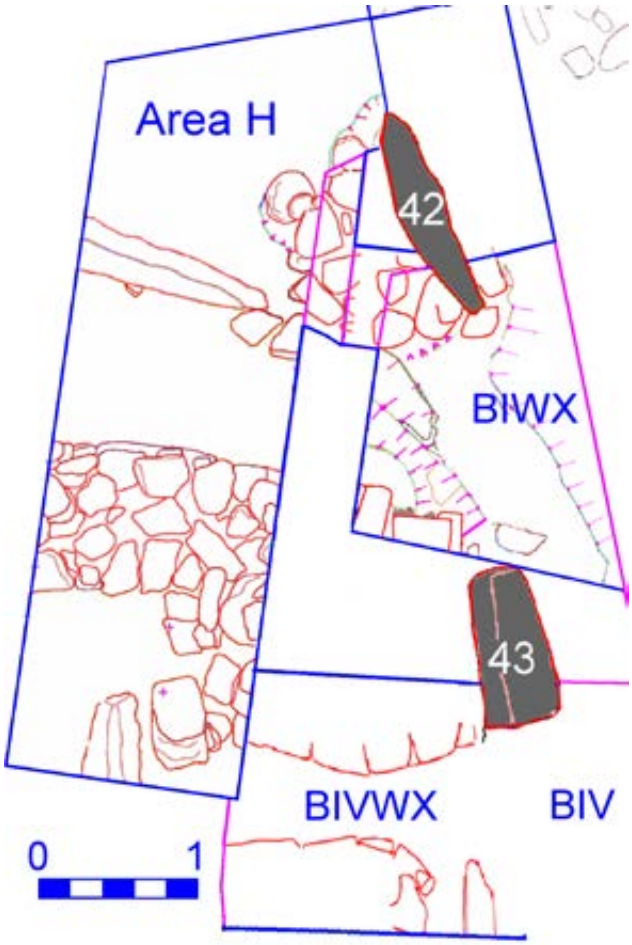
The discovery of much older Phase 3 anthropogenic charcoal in the slot fill, and similarly older pottery in the minor feature fills is of considera-

Illus 7.263 Features 863, 864 and 865 by the south end of the 1980 sondage (at the extreme right of the picture) on 26 May 1981; Features 863 and 864 have been emptied [Film 81.15.7]

Illus 7.264 Ring Stones 42 and 43 from the east-north-east in May 1980 [CAL BR-3-16]



Illus 7.265 Plan of the Ring



Illus 7.266 Areas BIWX, BIV and BIVWX with Area H to the left.

ble interest. The problem is not that there are no explanations for whence it came (and why it was used), but that there are too many possibilities. I shall consider just four.

The material could be that brought earlier to Calanais and used for levelling up. It could have been incorporated almost by chance; soil to fill the slots could have been dug up from a place which happened to contain old charcoal. But the layering of the three fills provides an argument for a more explicitly symbolic intent.

1. It could have been sourced in the relics of an earlier local settlement because it would then close the platform structures and also relate the overlying cairn to the local ancestors.

2. It could have been sourced from a few important places, in this case perhaps to create a link between the chambered cairn (which was built after the slot had been filled) and the most important of those who had lived in the area many generations earlier.

3. Lastly, it could have been brought in small amounts from near and far, perhaps by many different groups or individuals.

4. The small features overlying the slot could have been scrapes in which offerings were deposited. They could have been the casts of removed slabs, but by and large smallish flat-faced thin stone slabs were rare at Calanais so this interpretation seems unlikely to be correct. It is impossible to assess the possibility that wooden paving slabs had been used.

Pit 889, filled with stones, clay and turf, was later than the green clay platform but it was filled before slot 883 was cut. It may have been an isolated feature on the platform. It provided no evidence that it had been used to support a post or standing stone. Perhaps it was used for liquid offerings. The small body sherd of an E/MN non-corky pot or domestic Beaker (Cat 841) and part of the collared rim of a Hebridean incised ware pot (Cat 283) were the only anthropogenic material recorded in it and they may have been chance

inclusions. A similar pit was found on Area D and both pits are discussed in Chapter 24: Discussion and Conclusions where a few more abstract possibilities are considered, such as the pit's being a 'symbolic barrier'.

7.16 Features wholly or partly below soil 160

Several small features were found at various levels below soils 160 and 192 in BIV and BV. Those to the north of Stone 30 will be described first, then those to its south.

7.16.1 Small pits 866 and 877 and Grooved Ware vessel ASH 61

North of Stone 30 two small scrapes or pits 866 and 877 were found once ashy area 845 had been removed (Illus 7.261). They contained numerous potsherds, all with medium or marked abrasion. Pit 866 contained three sherds from Grooved Ware vessel ASH and a heavily abraded sherd of E/MN corky type. However most of the Grooved Ware pot came from another nearby grey pit or scrape 877 and it seems likely that the sherds of ASH 61 in 866 had derived from 877. Pit 877 also included both earlier and probably later sherds (Table 7.45). Two of the latter were of ambiguous type but the other was thought most likely to come from a domestic Beaker.

Several other finds of pottery were made in the soils near this pit or scrape but although assigned temporary numbers on Plan 81.21 overlay 2 those numbers cannot be linked securely to final finds numbers.

Two stake holes were recorded on the north side of the ditch. Stake hole 173 was under layer 160. It was 6cms in diameter and 14 cm deep with a grey gritty fill; it produced an E/MN corky rim spall (Cat 54). Stake hole 174 was 6 to 8 cm in diameter and had a similar fill. It was much truncated by the ditch.

Table 7.45 Finds from features 866 and 877

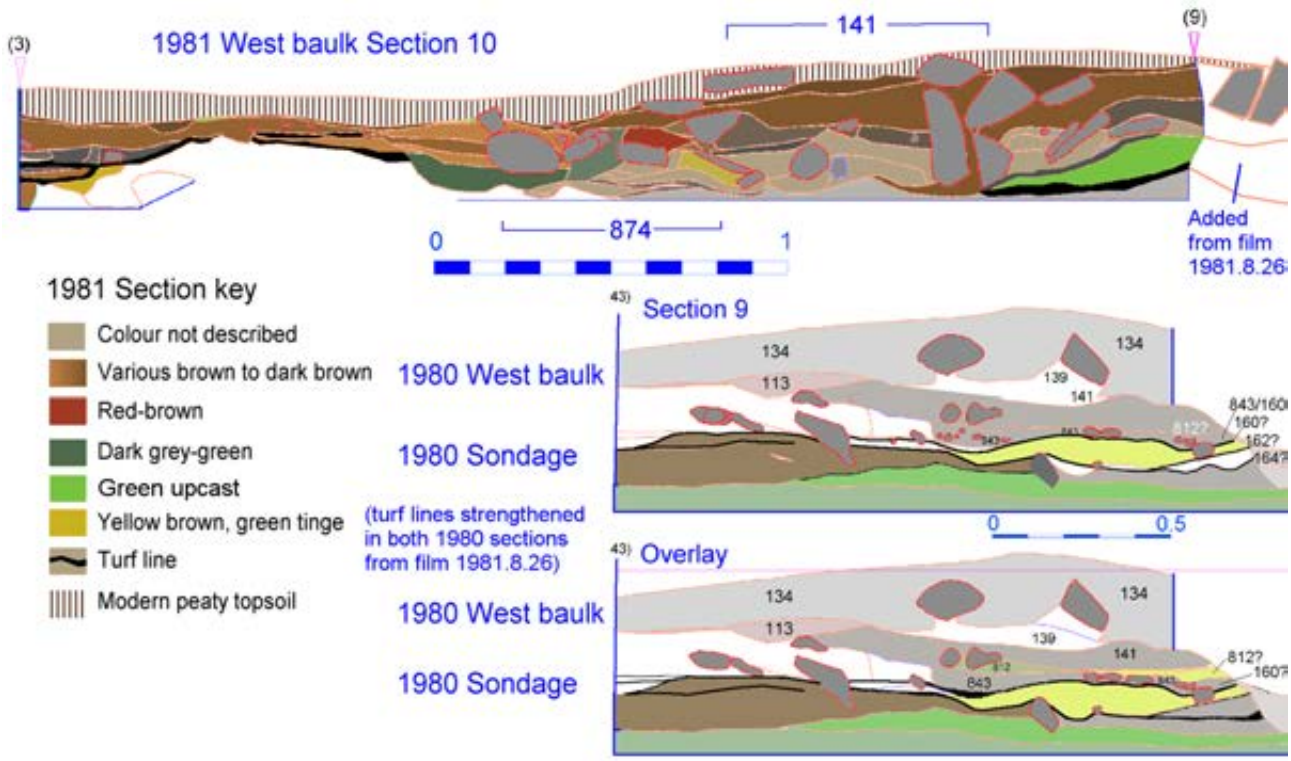
Cat	Ctxt	Comments
66	866	A heavily abraded E/MN corky sherd.
496	877	A probably E/MN non-corky sherd, definitely not from the Grooved Ware pot.
14	877	A sherd from a large fine E/MN corky pot.
489_491	866	Three sherds of Grooved Ware Vessel ASH 61
492_495	877	Four sherds from Grooved Ware Vessel ASH 61
497_514	877	Eighteen sherds from Grooved Ware Vessel ASH 61 with some abrasion to the external surface on upper part of body. Found 27.5.81
515_519	877	Five sherds from Grooved Ware Vessel ASH 61.
521	877	A body sherd from Grooved Ware Vessel ASH 61
520	877	A sherd most probably from a fairly large 'domestic' Beaker.
733_734	877	Two burnt sherds both too small to be diagnostic; either E/MN corky or domestic Beaker.

7.16.2 Features south of Stone 30

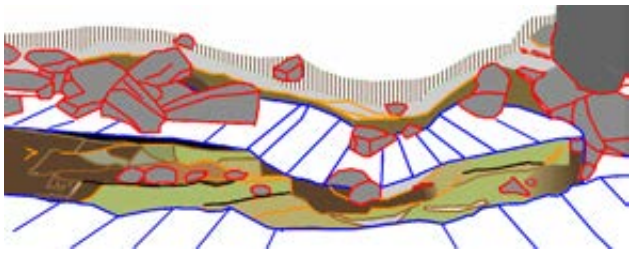
Once the remnants of soil 160 had been removed, patches of charcoal-rich material (863, 864 and 865) were found near to the end of the 1980 sondage to the south-west of Stone 30 (Illus 7.261, 7.263). They were shallow and ranged in a line across the trench. Pit 863 contained two conjoining rim sherds from a Beaker (Cat 409; ASH 45a). Pit 865 contained a very hard non-corky sherd, unlikely to have come from a Beaker and possibly either earlier or much later (Cat 688).

Illus 7.267 The slot trench cut across layers in BIV from the east on 26 May 1980 [Film 1980-12-13]

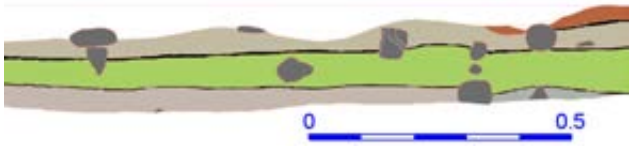
Illus 7.268 The west side of the slot trench in BIVS, with rest of trench excavated to level of rotted stones 843, showing turf lines 162 and 164 [Film 1981.8.26]



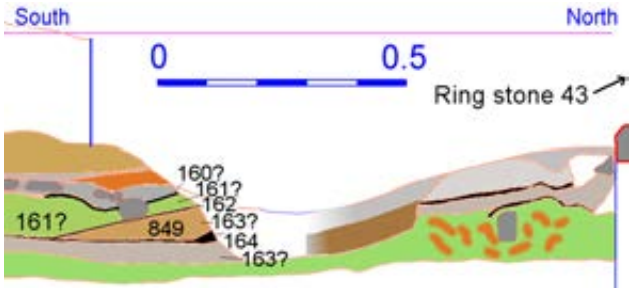
Illus 7.269 Sections of BIV and BV in 1980 and 1981



Illus 7.270 Interpretation of Illus 7.267 and 269



Illus 7.271 Section 81/04 of the north side of the ditch in early May 1981 [NMRS DC38038]



Illus 7.272 Section 80/09 overlay, after Illus 7.252 to 7.256 [NMRS DC38029-overlay]

Their stratigraphic relationship to the superficially similar patches 845 to 847 in the north end of Area BV is ambiguous because they were just east of the recorded spread of green clay 842 and not actually in scoop 841; plough soil 141 and dark layer 160 were difficult to distinguish in this part of the trench, where there were abundant patches of what seemed to be broken-up turfs (Illus 7.263). These will be discussed again in Chapter 7.15.

7.16.3 Discussion of features wholly or partly below 160

The purpose of scoop 841 is obscure. Given that it was similar in size and shape to crouched burial 894 it too may have been a burial, but neither smears of rotted bone nor artefacts were found in it.

The indications are that dark layer 160 and the light green compact clay 161 with a rusty or humic mottle underlying it, contemporary with the green clay platform, formed a 'busy' surface layer for a long time. Their existence must also reflect importation of clay and soil, although that could have been from local sources; deposition of soil-rich offerings in small piles may have been much more common than the digging of scrapes or pits.

Time constraints meant that clay 161 was not explored extensively in plan in Area BIV and BV, but although no finds were recorded from it that was maybe not due entirely to the limited amount of exploration which took place. The preferred explanation for its presence, since it was stratigraphically identical to clay 872 further north is that it was contemporary with the pre-cairn green clay platform inside the Ring (Chapter 7.11). Grey hole 877 seems to have been later than 161 although no direct relationship was recorded.

The area in the northern part of the trench seems to have been used for deposition of organic and inorganic material in small pits or scrapes. If soil 160 was, as argued above, earlier than building of the cairn then some of these small features may have been dug when the timber structure on the green clay platform was in use. The other small pits south of 1980 sondage were in a broadly similar stratigraphic position suggesting that the zone used for these purposes covered a few square metres south-east of the cairn entrance.

However, scrapes or pits 866 and 877 which contained between them all of the recovered sherds of the grooved ware pot ASH 61 were earlier, despite the possibly domestic Beaker sherd from 877. The Beaker would provide a terminus post quem for re-deposition of ASH 61, probably considerably after 2500 cal BC, were it not for the fairly strong possibility that it was introduced by ploughing (Illus 7.261).

At Calanais Pit 877 was later than two turf lines 862 and 864, discussed in subsequent chapters, which seem to have grown respectively on the surface through which pits for the Ring were cut and on spoil left over from re-filling the stone-pits. The deposition of pot ASH 61 can thus be assigned to a pre-cairn period of use of the Ring. It thus seems possible that the Grooved Ware vessel was originally displayed or used in the timber structure on the green clay platform.

The wide spread in Britain of similar vessels in 3rd millennium contexts is described and discussed by Sheridan in Chapter 18: The Pottery Assemblage. It is also considered in Chapter 24: Discussion and Conclusions.

7.17 The Ring on Area B

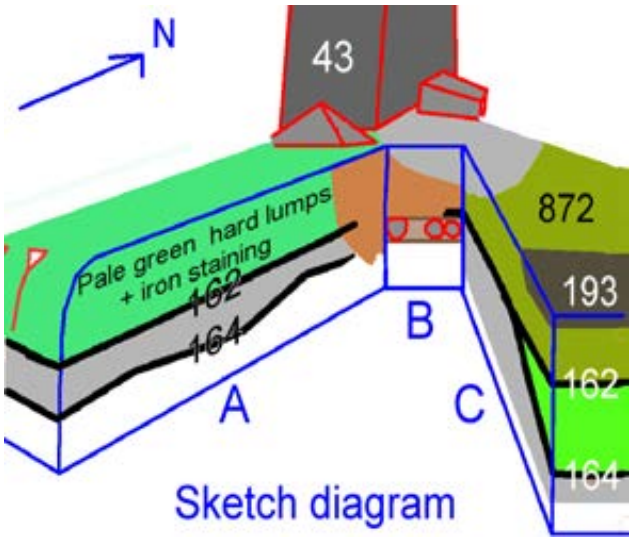
7.17.1 Introduction to Ring stones 42 and 43

Area B included parts of the pits dug for Ring stones 42 and 43 (Illus 7.264-7.265). Turf lines and thin clay layers provided a link between the stone pits and other features, although the usual reservations about the stratigraphic coherence of turf lines must apply.

In 1980 a local reference sequence was established in BIV and the clay ridge 101 immediately east of Ring stone 43, between BI and BIV. The stratigraphy of these layers there will be described first, then their relationship to the pit for Ring stone 43, followed by the stratigraphy of the layers in Area BIWX and their relationship to the pit for Ring stone 42.

7.17.2 Prevalent turf lines and Ring stone 43 in BIV

In 1980 a slot trench was cut across the ditch in BIV (Illus 7.267-7.270).In Illus 7.270 the near-horizontal areas separating the two parts of the section on the photograph and section drawings have been coloured white. The ditch cut through all the earlier strata. At the right



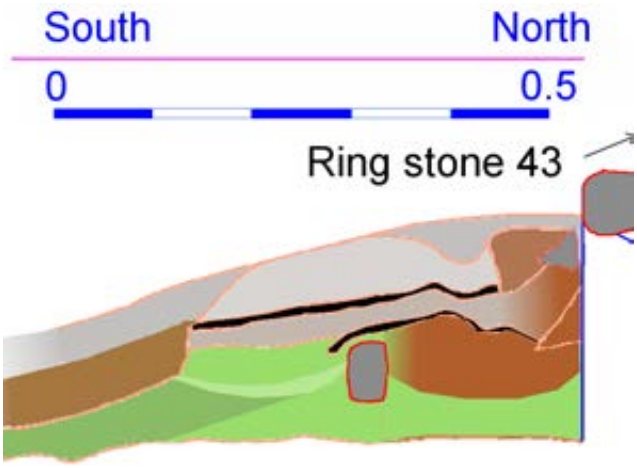
Illus 7.273 Diagram of strata in and around the sondage near the base of Ring Stone 43 [Day Book 48]

Illus 7.274 The sondage and the ridge 101 on 26 May 1980 [Film 1980.12.23]

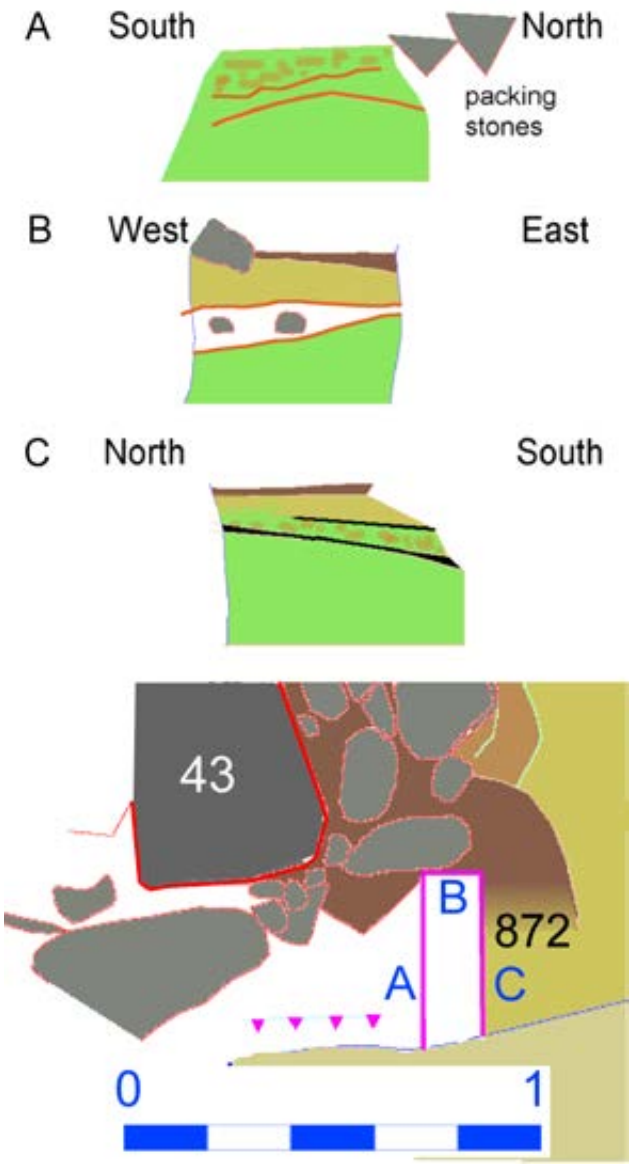
Illus 7.275 Turf lines and clay layers immediately east of Ring stone 43; the stones at the base of the Ring stone are visible at the top of the photo). [Film 1981.17.34]

Illus 7.276 Ring Stone 43 from the south towards the end of excavation [Film 1981.20.21]

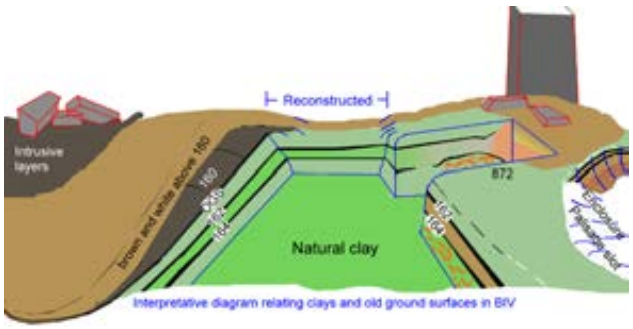
Illus 7.277 Detail of Section A of the slot trench near Stone 43 in 1980 [Film 1980.12.16]



Illus 7.278 BIV Section 80/09 showing an interpretation of Illus 7.277[NMRS DC38029]



Illus 7.279 Plan and 'schematic sections' 21/81 of the area of the bank 101 near Ring stone 43 [NMRS DC38055 part]



Illus 7.280 Reconstruction of turf lines under 161/872 in BIV based largely on Section 1980/9, illustrating the interpretation

hand end of the upper part of the section in the background brown soil and stones rose towards Ring stone 43 overlying yellow-green clay in the foreground.

From the slot trench eastward the turf lines and clay layers on the south side of the ditch ran almost horizontally for over a metre (Illus 7.271). The original labelling has been omitted because it is confusing.

The formal section drawing 80/09 of the west side of the slot with an overlay to it (Illus 7.272) illustrates the break in stratigraphy caused by the ditch, and both adds and omits some detail visible in Illus 7.269. It has to be said that it was difficult during post-excavation work to correlate the sections, photographs and labels. The 1981 section had very few labels. There is therefore some ambiguity behind the proffered interpretations. In the written record the sequence light green clay 161, turf line 162, orange-grey-loose light brown clay 849, turf line 164 was established. On Section 1981/9 however the material between turf lines 162 and 163 was described as 'green upcast' (Illus 7.269, 7.272). Label 163, for a grey to ashy grey soil, seems to have been applied at different times to soils both above and below turf line 164; in Illus 7.272 it has been labelled as if corresponding to 849; but the label 163 was little used and in practice it introduces little confusion except near East Row stone 31, as discussed in Chapter 7.13.6.

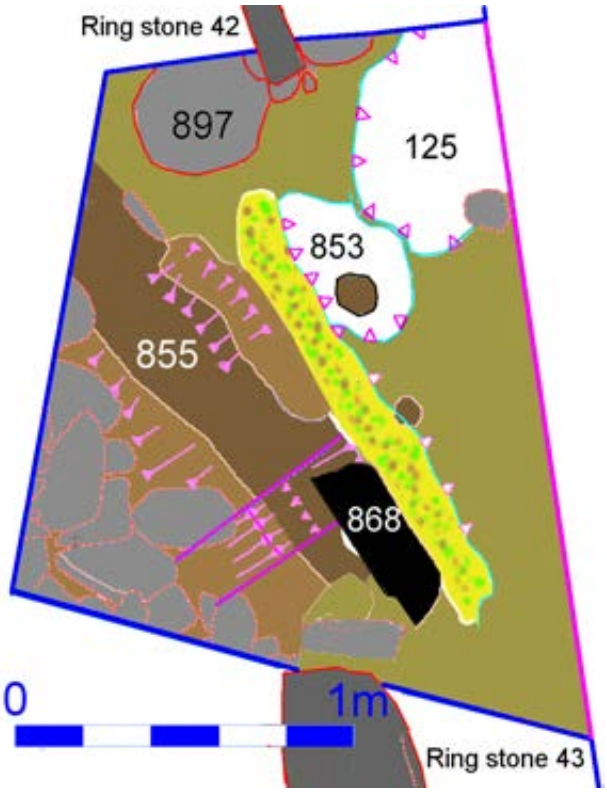
On the north side of the ditch the general sequence was the same. A diagram of 22 May 1981 (Illus 7.273; Day Book 48) shows the sections A, B and C of the northern part of the slot trench recorded in 1981. On Section C, which had been cleaned back slightly from its 1980 line, two turf lines were shown as running together much as 162 and 164 had done on the south side of the ditch, but so to speak in the opposite direction.

The top green clay layer to the east of the slot trench was labelled 872. The clay above turf line 162 to the west consisted of pale green hard lumps with iron staining, reminiscent of the material in the passage. Between turf lines 162 and 164 to the west was grey soft sand. Sections A and B will be discussed in connection with the pit for Ring stone 43, although it is worth noting here that the top turf line 162 ran into the area of red-brown

sandy clay near Stone 43, suggesting that the red colour may have been caused by post-depositional change. From the east on Sections C and B a single turf line ran partly over a band of rubbly gritty material near Ring stone 43. The material between the eastern turf lines was green clay, unlike 849 on the opposite side of the ditch, which was loose light brown even-textured sand.

These sections will be discussed again in the context of the pit for Ring stone 43.

Khaki gritty clay 872 on the north side of the ditch was stratigraphically the same as 161 on the south side. Layer 872 went round the stones at the base of Ring stone 43 (Day Book 59, 26 May 81). It extended right across the front of Stone 43 and into the area of BIWX to its north. It contained an abraded sherd of probably E/MN non-corky pottery (Cat 868). The same label was given to green clay on the south side of the passage (Day Book 63, 27 May 81) where it overlay turf line 162.



Illus 7.281 Plan 65/81 on Plan 64/81 [NMRS DC38099 on DC38098]

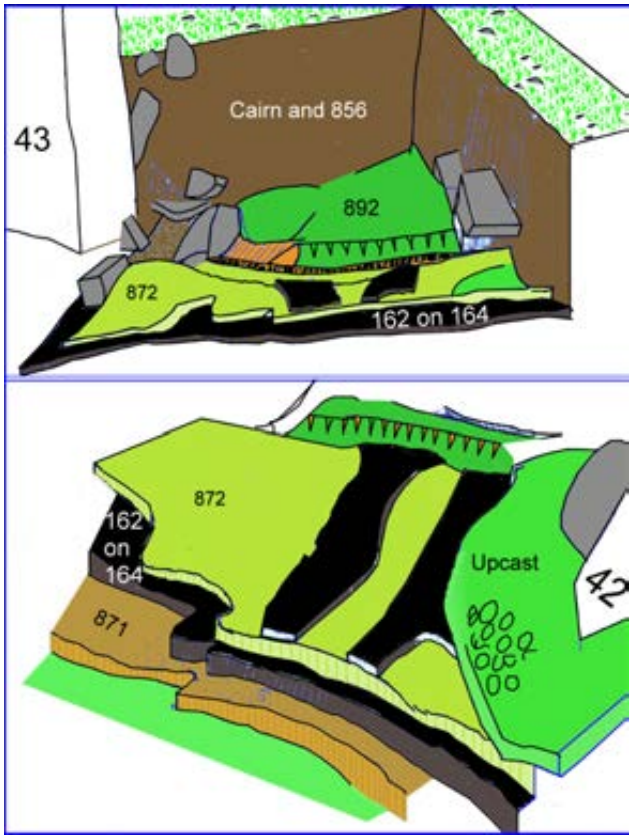
7.17.3 The turf lines and the pit for Ring stone 43

Once most of 872 had been cleaned from the ridge to the north of the ditch the turf lines were seen in plan. Illus 7.275 shows that the upper turf line 162, ran up to the loose stones by Ring Stone 43. The soil amongst the supposed packing stones was a little darker than, and at a higher level than, the turf line. Immediately south of it in the foreground of Illus 7.275 two turf lines 162 and 164 separated by a skim of clay were visible in the cleaned side of the scoop for the enclosure. The upper surface had a thin leached layer of green-grey clay immediately beneath it. Below the lower one was a thick iron-stained clay.

It seems fairly clear that the upper turf line was later than filling of the Ring stone pit.

At this point it is worth recalling that the preferred interpretation is that the palisade slot was part of the Stage 2 enclosure and that despite appearances it cut both turf line 162 and 164 (Chapter 7.10.13). Stratigraphically it should be earlier than the cairn.

The turf lines were recorded on the west side of the 1980 exploratory slot (Illus 7.277, 7.278). In the area of Stone 43 the lower clays became



Illus 7.282 Sketch diagrams of the relationships of the strata in B1WX [Day Book page 70, 30 May 81]

darker, and Illus 7.277 shows that they did so in a diffuse way. Above this clay the most obvious turf line seemed to bifurcate, the upper level rising sharply over browner clay, although this was not the interpretation when the section was drawn (Illus 7.278, 7.279).

The preferred interpretation is based as much on the photograph as on the drawn section. The lower turf line had been raggedly cut by the pit and parts of it dipped down over the pit edge (Technical Note 7.17.3). The fill of the pit incorporated these ragged bits of turf, and formed a low clay mound. That implies that the loose stones round the base of Ring stone 43 were added later.

On Illus 278 (extracted from 1980 Section 9) colours were not shown; drawn lines (pink, with black for turf lines) have not been altered but colours have been added, stylising the colours from the photograph above.

The schematic sections drawn in 1981, and discussed above in the context of turf lines 162 and 164, are not very helpful because turf lines were drawn with the same convention as divisions between strata. Section A on Illus 7.279 was a drawing of the same section as the lower part of Section 80/09 (Illus 7.278), perhaps cleaned back somewhat, but it showed turf lines as simple boundaries.

Section B included a band of rubble (shown white Illus 7.279), just as the sketch drawing in the Day Book did (Illus 272); but again and in contrast to the Day Book sketch it showed simple boundaries between layers rather than turf lines. Give the conventions used in Section A that is not to be trusted.

Only a very oblique view of Section B is available, in a photograph focussed on Section A (Illus 7.277). It neither confirms nor contradicts the schematic section.

On Section C, the eastern side of the sondage, the turf lines were labelled as 'black layers'. They were turf lines 162 and 164 separated by green mottled clay, and the lower turf line sat on green sandy clay with iron stains. In contrast to the sketch diagram the two turf lines did not join one another and the top one faded out or was lost in brown material. It looks as if it had been truncated. Above this upper surface was khaki gritty material 872 and above that again a patch of dark brown charcoal-rich material which also lay amongst the stones round the base of Ring stone 43.

The implication of the record is that the northwest corner of the slot trench just impinged on the pit for Stone 43, about 0.15m from the orthostat, and that allows an interpretation reached on the basis of Illus 7.277 and 7.278: the stone pit was cut through the lower turf line 164, and 162 had developed on top of a thin layer of spoil covering part of the true top of the pit.

Illus 7.283 Turf lines 162 and 164 and remains of slab impressions 125 and 853 with turf lines in their sides, from the east on 26 May 1981 [Film 1981.15.02]

7.17.4 Discussion of the thin clay and turf line sequences north and south of the ditch and their relationship to the pit for Ring stone 43.

The exposures in the north and south sides of the ditch were well under a metre apart. Observations here and elsewhere demonstrated that turf lines could merge or separate even within such short distances so it is technically unsafe to say that the sequences were identical. Nevertheless, they were so similar that the interpretation shown in Illus 7.280 is credible.

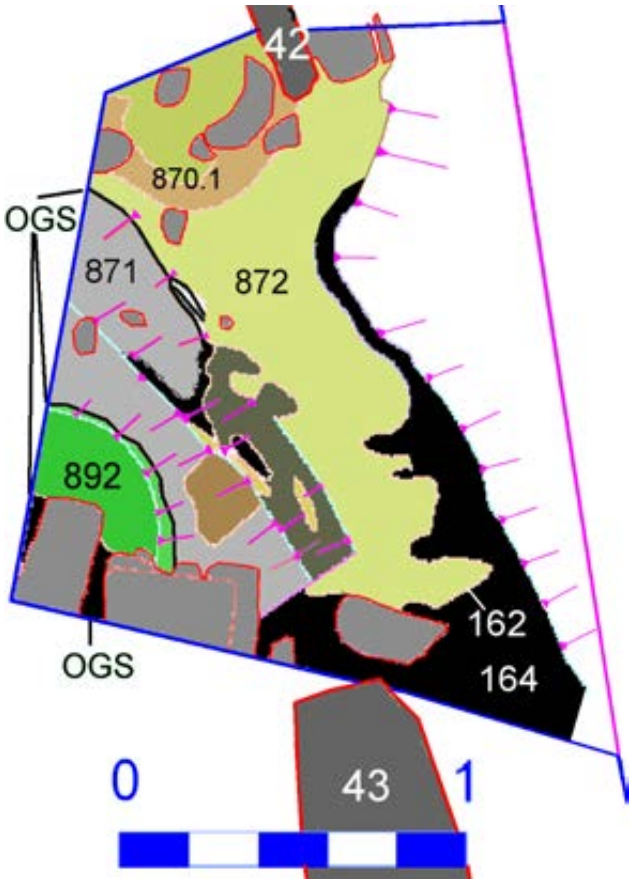
Clays 872 and 161 are interpreted as associated with manipulation of clay used for the construction of the green clay platform under the cairn. The clay between the two turf lines was probably spread spoil from the Ring stone pits. The upper turf line 162 formed on it. The lower turf line 164 was the ground surface when the pit for Ring stone 43 was dug.

The gingery brown colour of the clays at the north end of the slot visible on the photograph in Illus 7.277 is difficult to explain. It appears to have been to some extent independent of layers so it almost certainly reflects mobilisation of iron. At Calanais that often seems to have been a result of superincumbent organic rich layers. Here the discolouration looked as if it was fairly local but it may have been related to the iron panning slightly further to the north in the scooped enclosure. Perhaps it was caused by rain-water running down through turfs. An alternative hypothesis is that people regularly deposited organic liquids or solids by Stone 43.

The distance of 0.15m between the edge of the stone-pit and the Ring stone is comparable to the distance between the north end of Ring stone 42 and the end of its stone pit. That implies respectable precision in pit excavation. It provides a hint that the stones may have been erected by the same people, and therefore within a fairly short time-frame.

7.17.5 A slab and possible slab impressions in B1WX

The interior of the enclosure east of the Ring had been scooped out to a depth of 0.1 to 0.2m leaving a raised area between Ring stones 42 and 43

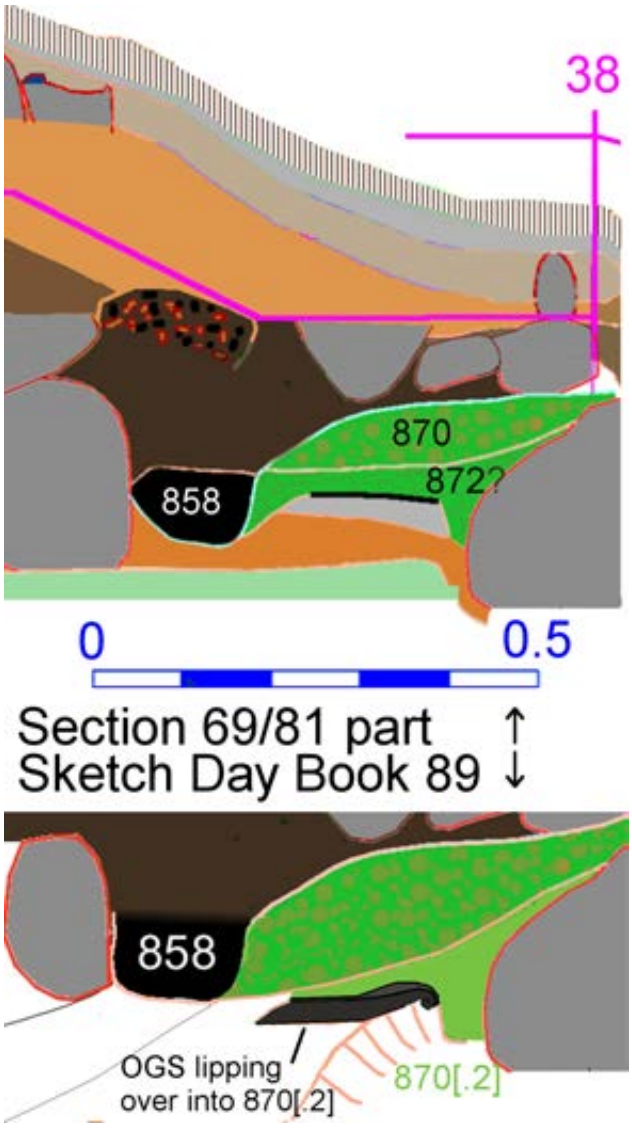


Illus 7.284 Plan 67/81 of BIWX with slot fills removed showing layer 871 [NMRS DC38101]

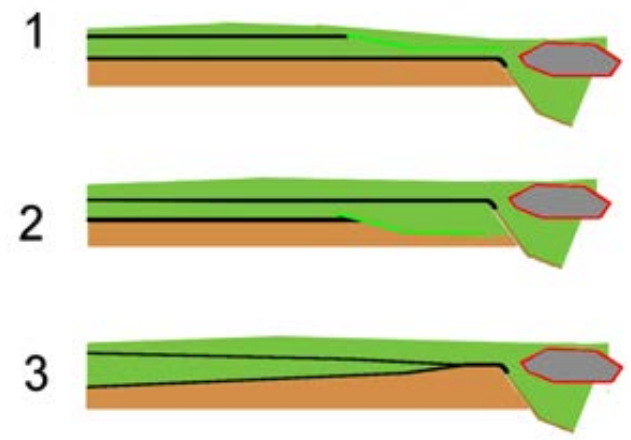
(Illus 7.282, 7.283). The slot bounding the green clay platform had cut it off from the stratigraphy under the cairn to the west. The stones round the base of Ring stone 43 appeared to lie above the pit rather than in it. To their left, as described below, survived a pair of turf lines, 162 above 164, separated by a thin clay layer.

At the base of Ring stone 42 was a slab 897 (Illus 7.281). It cut and abutted the turf line here, recorded as turf line 162 (but see below). It also abutted the local green clay, either 870 or 872, above the turf line.

Under the upper soils on BIWX were two depressions 125 and 853 (Illus 7.281). They were filled with darker material. Depression 125 was interpreted as the cast of a 'paving slab' laid near the base of Stone 42. Its base was at the level of 871, the early clay soil under the local turf lines and it also clay 170 nearer the Ring stone. Near its base feature 125 contained a cluster of small flat slabs (not shown) which may have fallen into



Illus 7.285 Turf line dipping into pit of Ring stone 42 [Section 69/81 part and Day Book 89]



Illus 7.286 Turf line diagram

the depression left when the slab was removed. Its fill also contained two abraded sherds (Cat 564 and 565) from Food Vessel ASH 75 which must have fallen into it when the slab was removed. Ard-marks 869 were found under the fill. The only layers overlying it were of post-1857 date.

Feature 125 ran into the enclosure scoop to the east, where it was first excavated in 1980. The scoop of the enclosure was cut away after clay 872 had been laid down.

Depression 853 was also interpreted as the cast of a slab. It penetrated green clay layer 872 and lumpy green clay 870 round the base of Ring stone 42; it also cut the upper turf line 162 and the basal clay 871; so must also have cut turf line 164 which may at his point have grown without pause into the period of growth of turf line 162.

7.17.6 Discussion of the possible slab impressions in BIWX

The Day Book records doubts about whether green clay 872 (above the turf lines) was laid round the slabs, or whether whoever placed the slabs here cut holes for them into underlying strata. Since the bases of the holes or casts were in clay 871, underlying both turf lines, the putative slabs could in principle, if they were placed and strata grew up round them, have been laid on the pre-Ring soil surface before turf line 164 started to form. In that case ard marks 869 might have been pre-Ring too. At another extreme, it is not completely impossible that the slabs were put in holes cut through green clay 872 above both turf lines. The green clay into which they were cut could easily have been squeezed back to fit neatly around them. Given those possibilities they might instead, of course, have been paving slabs associated with Ring stone 42, associable with the clay between turf lines 164 and 162 but in placements cut though 164.

Slab 125 was both set into the western raised area of the enclosures and stuck out into the scoop area. It seems odd, if it were a paving slab and already in place, that it would be left there (as it seems to have been judging by the Food Vessel sherd in the fill of its cast). If it was a block rather than a slab, as Illus 7.281 might suggest, it (and by extension also 853) might have been 'furniture'

at the back of the enclosure, facing the entrance. Or they may have supported timbers for an enclosure roof. If so, feature 868 might have had the same history. But interesting though those ideas are there is insufficient evidence to support them.

The casts of the slabs, if that is what they were, underlay the fallen massive kerb slab 122. However, the only soil/clay fills above them were post-1857 and their fills included material indistinguishable from that which had come from the robbed cairn. All that can be said about removal is that filling in of the cast of the (hypothetical) paving slab in 125 took place after Food Vessels had come into use in the area.

7.17.7 Turf lines in B1WX

Two turf lines 162 and 164 had been found near the entrance to the chambered tomb and to its north and south. The day book suggests fairly strongly that there was only one coherent turf line in BIWX although a higher turf line partially survived. The favoured interpretation is that it had been torn when the massive kerb slab was manipulated, leaving strips of turf (Illus 7.282). A less likely explanation for it, but the one preferred during excavation, is that it had been damaged by ploughing.

The sketch diagrams are too simple. It is clear from photographs that there were two turf lines where one was labelled. So 162 and 164 continued across BIWX with a thin skim of clay between them and Illus 7.282 has been relabelled accordingly..

In Area BI, probably near Ring stone 43 to the north of the passage, the lower turf line 164 produced four pieces of pottery.

Table 7.46 Pottery from turf line 164

Cat	Comments
243	An abraded E/MN non corky sherd
313_314	Two abraded sherds from a fine Hebridean Incised pot ASH 34.
317	An abraded sherd from a Hebridean Incised pot

The final full formal plan of BIWX (Plan 67/81, Illus 7.284) showed the turf lines. As with the sketches (Illus 7.282) Plan 67/81 showed only one main turf line at the eastern edge of the raised part of the enclosure, although the upper turf line was present between it and 872 (compare Illus 7.282 and 7.283). The plan has been relabelled accordingly.

In addition to the main sheet of turf line a turf line was exposed in the south part of the eastern slot 855, as shown in dark grey on Illus 7.284. It is not clear whether this was 162, 164 or another otherwise unrecorded turf line.

Near Stone 42 clay 872 was overlain by a thicker block of mottled green yellow lumpy clay (870) which formed a low mound southwest of Ring stone 42 (Illus 7.284, 7.285). As described below (7.15.9) the same number was used for clay in this area at a lower level. One of these clays produced 2 conjoining Hebridean Incised sherds (Cat 315).

Just to the north of slot 858 (which was cut from above and surrounded the green clay platform) a small block of turf line and its subsoil survived (Illus 7.285). The turf line was very probably 164, the crucial point being that it and its ashy-grey immediate subsoil overlay khaki to orange clay soil 871. Green clay over it was labelled '872?' on Section 69.81, but it was described as consisting of green lumps; that makes the clay sound much more like 870.

Turf line 164 lipped down into the pit for Stone 42 (Illus 7.285; Day Book 89, 91). Although this was originally interpreted as showing that the turf line had gron down into the pit it looks instead as if the cut for the pit was ragged and a small flap of the turf line had folded down over its edge. A modern example of this phenomenon can be seen on Illustration 12.6 in Chapter 12.1.6, which shows the west section through the cairn on Area H. Subsequent photography, described below, (Illus 7.291) confirms that the cut was for the pit for Ring stone 42.

7.17.8 Discussion of the turf lines

There are three possible interpretations for what was seen (see Illus 7.286).

1. One is that the upper turf line 162 had been removed near Stone 42, perhaps during the activities which led to placement of clay 870.

2. Another interpretation is that at some stage the lower turf line was scalped away before the upper turf line covered the clay revealed by the scalping.

3. A third is that the two turf lines merged that is to say the grassy mossy land surface which eventually became the lower turf line elsewhere remained clay-free until long after grassy mossy turf (which eventually formed the upper turf line) had grown over clay on top of the earlier turf line elsewhere.

The description of the turf line and the layers immediately above and below it on Section 69/81 confirms that the second explanation can be excluded. It is impossible to be absolutely sure which of possibility 1 or 3 was correct. But possibility 1, that turf line 162, having grown on spread spoil from the Ring stone pit was removed during whatever activities led to clay 870 being put in place, seems to fit the local stratigraphy better. So the first possibility seems most likely to be correct. In other words, the pit for Ring stone 42 was cut through turf line 164 and turf line 162 formed over clay spread on top of turf line 164. Subsequently turf line 162 was removed locally perhaps when clay 870 was laid down. Indeed the existence of clay 870 complicates judgement of what happened here and the matter will be returned to during description and discussion of the clays immediately round the Ring stone.

7.17.9 Clays over and in the pit for Ring stone 42

A certain economy in use of labels seems to have been employed in labelling the clays round Ring stone 42. The label 870 was used for green rubbly clay at much the same level as clay 872. It was also used for a light brown clay around a core of green clay, slightly harder and darker than most of the general upper green clay 872 (labelled 870.1 on Illus 7.284) and for yellowish-green clay in the pit for Ring stone 42 (which will be referred to as 870.2 as on Illus 7.285). Perhaps the three were indeed variations of clay dumped here in one operation. But as planned, the brown and green clay 870 was not symmetrically placed with respect to Ring stone 42 (Illus 7.284, 7.290). It was therefore not part of the pit for the Ring stone but a later feature.

The section and sketch view on Illus 7.285 strongly suggest that clay 870 was earlier than the green clay platform because it was cut from well above by the slot 858 which bounded the green clay platform. Despite the tentative labelling of the rubbly clay above the turf line on Section 69 as '872?' it seems far more likely to be a variant of 870.

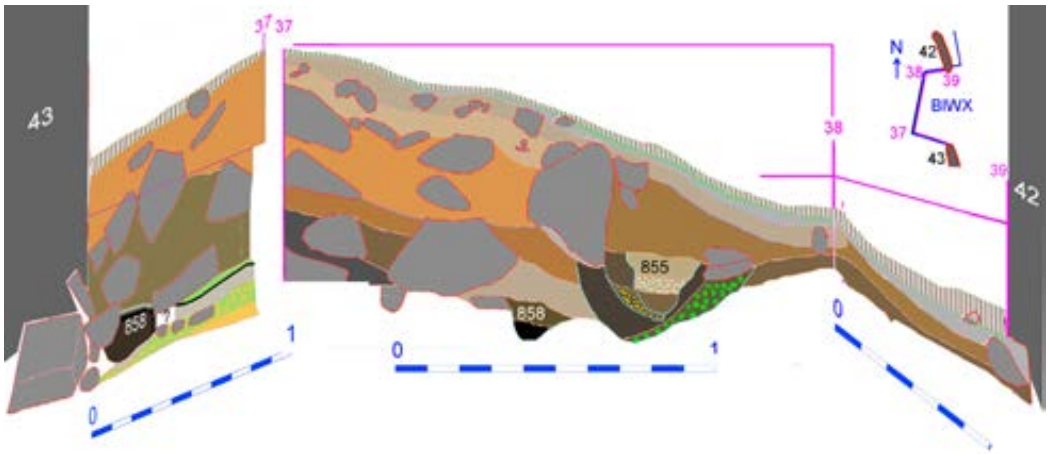
7.17.10 Strata between the green clay platform and Ring stone 42

Three drawings of the west section of BIWX were made as it was cleaned back (Illus 7.287-289). In the first the end of the slots for the base of the late massive kerb stone are prominent features north of the gulley separating the green clay platform from the rest of BIWX. The green clay platform was masked by dark greasy soil with charcoal fragments, the remnants of cairn collapse.

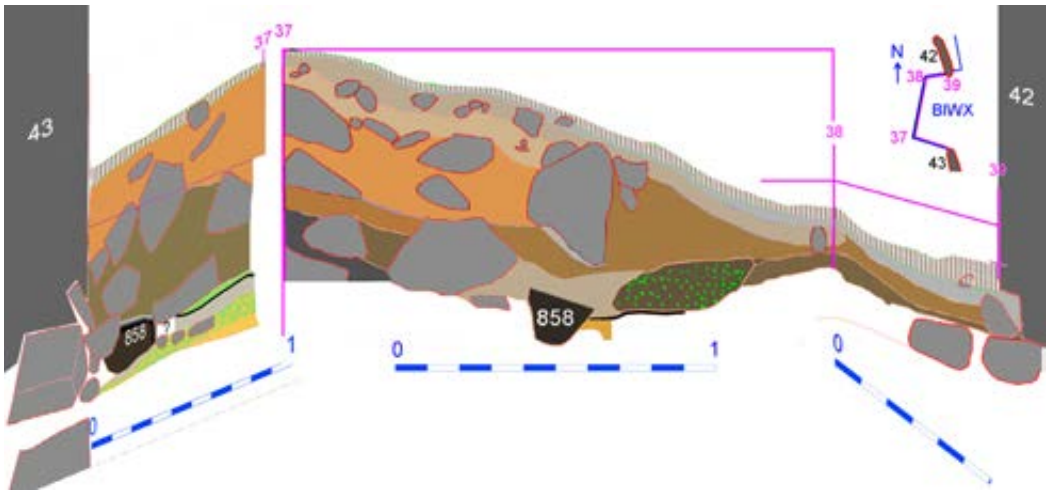
The first overlay added only a new position for slot 858, a turf line to its north, a wodge of mottled clay and boulders. The two boulders shown on the overlay were recorded as 'in the upcast' near the base of Ring Stone 42.

The second overlay did not cover all of area of Section 37-38 and its margins are outlined in magenta. Some attempt has been made to smooth out differences between the main section and the overlay, particularly by changing colour conventions, and, with the help of photographs, joining up of the two parts of the green clay platform in the south (Technical Note 7.17.6). According to labelling on the overlay slot 858 bounding the green clay platform had two fills in its northern part, a lower black fill and a higher fill including black-brown grit and loam with red ochre flecks and charcoal. The description of the upper fill is reminiscent of that of the slot 883 in the passage. But it is not clear where its true top was.

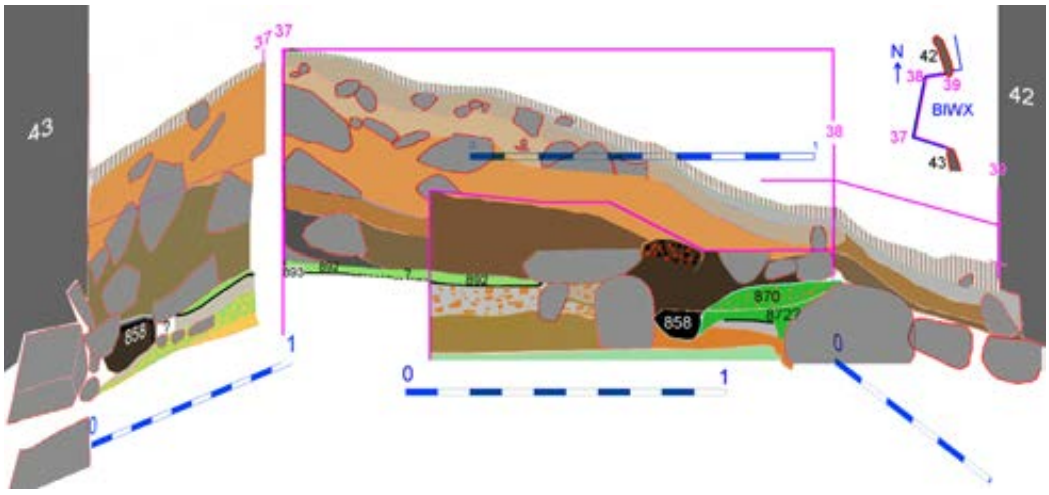
Green clay 872, the green clay covering upper turf line 162, should be at much the same level



◂Illus 7.287 Section 81/68 and 69 [NMRS DC38102 and DC38103]



◂ Illus 7.288 Section 69/81, and overlay 1 with elements of Overlay 2 in the south of Section 37-38 [NMRS DC38102 and DC38103]



◂ Illus 7.289 Section 69/81, and Overlay 2 in the south of Section 37-38 [NMRS DC38102 and DC38103]

as green clay platform 892. The turf line to the north of slot 858 was not given a label on the section. Instead it was compared to part of the green clay platform sequence: green clay over a lens of black above ashy-grey fine sandy material. The layer under that was 871, here orange soft sand. As described above the turf line was most likely turf line 164.

Plan 69 of 9 June introduces a complication. It showed a small paving slab 897 - apparently smaller than the slab marked 897 on Plan 66 of 30 May - cheek by jowl with Ring stone 42 at a slightly higher level than a line of boulders. It seems most likely that the label 897 was used for two different slabs. This lower slab and the boulders were in light brown clay 870.1 which was not a fill of the pit for the Ring stone because it was set asymmetrically to it (Illus 290).

This feature flay in the gap between the stone and the structure on the green clay platform bounded by slot 858. However its original form and purpose are completely opaque.

7.17.11 The pit for Ring stone 42

The photograph in Illus 7.291, taken after removal of a narrow baulk between Areas B and H, was sullied by shadows. It has been manipulated digitally to reduce their effect. The main remaining visual artefact is a (visually) 0.3m wide band running diagonally down to the right from the left hand corner of the scale. It mimics a very shallow exploratory trench. Once recognised it can easily be ignored.

On the photograph the light green-grey clay round the base of the stone is partly the remains of green rubbly clay 870 and partly the yellow-green fill 870.2 of the pit. Illus 292 shows that the pit itself was less extensive. It was sub-rectangular in shape. The two photographs show that the remaining boulders were in the top of the Ring stone pit (Illus 7.291 7.293).

The lower part of the dark area in the baulk on Illus 7.293 just beyond the scale was slot 858, but its upper portion was probably something else (Illus 7.291, 7.292).

7.17.12 An aside on the secondary kerb in Areas B and H

On Illus 7.291 and Illus 7.292 one of the large slabs forming the secondary cairn kerb between Area B and Area H is partly visible at the end of the baulk. The base of a slot for the secondary kerb slab in Area B is also visible in 7.291, ending at the rounded boulder at the corner of the baulk. There was no sign of a kerb stone linking the two. Could it have been the large slab 897 which lay on rubbly green clay mound 870 SW of Ring stone 42 (Illus 7.290)?

7.17.13 Discussion of the Ring stones in Area B

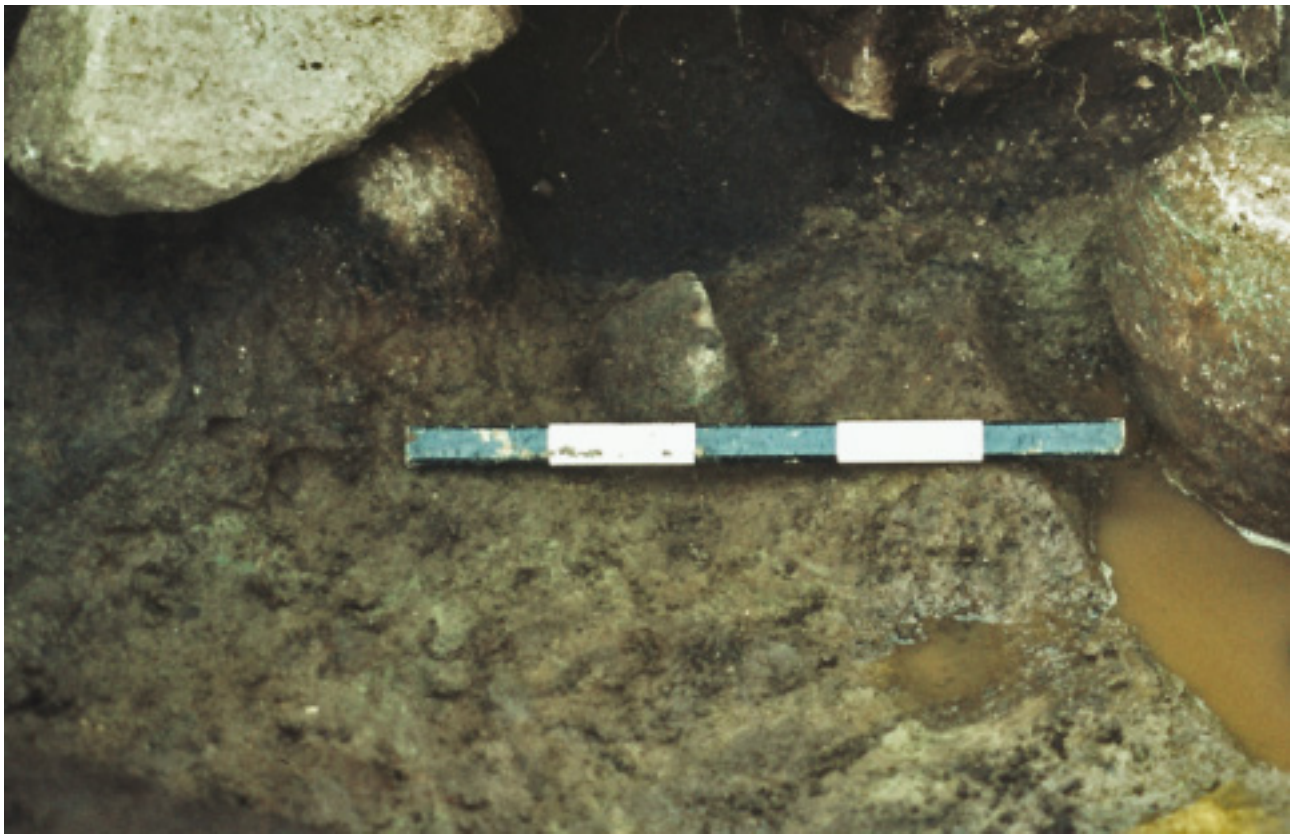
The preferred interpretation of the evidence from Area B is that the pits for Ring stones 42 and 43 were both dug through turf line 164. That need not mean that the two stones were necessarily erected in the same few days as each other; turf lines are dynamic entities. But it does suggest that the stones were not erected at vastly different times. That land surface contained abraded Hebridean incised sherds, another of which became incorporated in green clay 870 at the base of Stone 42. There is however no evidence that the sherds were fresh at the time and they may have been relics from earlier agricultural activities. Admittedly the only sherd found in soil 871 below 164 was plain E/MN corky (Cat 176) but not much soil was excavated.

In the early 1980s the general consensus was that stone circles, even when parts of multi-period monuments, had each been planned as coherent structures and that they were erected over a short period. Subsequently it has been proposed by Richards that each stone might have been put up as a display of the wealth or power of an individual in ceremonies involving the local community or communities. Richards' suggestion forces consideration of the possibility that erection of a complete Ring might take generations. But the simplicity, small size and fairly coherent plan of the Ring itself suggest a plan mostly implemented over a short period. Ring Stone 52 is an obvious exception, probably added to the Ring as an afterthought (Illus 7.265).

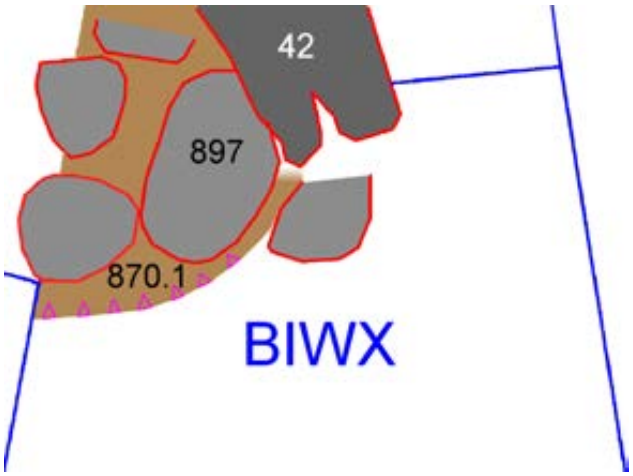
The stones may have been sourced locally (Richards 2007). After a bit of practice it is really not all that difficult or time consuming for a group of say two dozen hardy people to erect a four or five metre long stone (time estimates are described in Chapter 24: Discussion and Conclusions). Although the duration of the whole operation may have depended on the time it took to obtain suitable stones, even if they came from the very local outcrop, it was probably feasible for the local population to put all 13 of the Ring stones up in one season. So the time it actually took may have depended entirely on customs and beliefs.

As described below charcoal in khaki to orange clay soil 871 included a piece dated between 2880 and 2580 cal BC. An early date in this range is preferred because the Ring at Calanais seems to have features in common with that at Stones of Stenness in Orkney. Perhaps the Ring was set up around 2850 cal BC. The subject is explored in

Illus 7.291 Stone 42, clay 870 over its pit, the slot of the cairn and in the background Area H from the east on 7/8 June 1981 [Film 1981.21.7 part enhanced]



Illus 7.292 The stones at the base of Ring stone 42 from the north-east [Film 1981.21.17]



Illus 7.290 Plan 69/81 Stones by Ring stone 42 [NMRS DC 38013 2b part]

detail in Chapter 24 Discussion and Conclusions.

7.18 Possible pre-Ring ard marks

7.18.1 Pre-Ring ploughing in Area BIWX

Layer 871 in BIWX was a plough soil and exceptionally some early ard marks were preserved in its surface. Illus 7.294 includes strata at different stratigraphic levels. Amongst them are casts of presumed paving stones, 125 and 853 which were based in early plough soil 871. Ard marks 869 appeared at the bottom of cast 125. They had a grey sandy fill. The contrast between them and the yellow sandy to orange gritty clay 871 into which they were cut had presumably been preserved by the overlying stone.

Soil 871 was truncated by the scoop of the enclosure. It did not contain any other obvious ard marks but it had the feel, as it was trowelled down, of a well-cultivated soil with no grits or stones. In it was a spread of charcoal which looked as if it had originated in a small local fire and had been disturbed by hoeing or some other form of cultivation. A piece of birch charcoal from the charcoal spread produced a radiocarbon age (AA-24959 4140+/-45 BP) corresponding to a date between 2880 and 2580 cal BC. That suggests that the Ring was set up after 2880 cal BC. Soil 871 contained an abraded probably E/MN non-corky sherd (Cat 676).

7.18.2 Discussion of pre-Ring ardmarks in BIWX

Ard marks 869 do not seem to have affected turf line 164 a little further to the south and should pre-date it, suggesting a period of ground-working earlier than the Ring. The marks were thin and shallow and they may represent scarification rather than ploughing. It is conceivable that that work was done in preparation for building the Ring but since it did not appear to affect turf line 164 that is unlikely.

The lack of visible ard marks elsewhere in 871 provides a lesson: where not protected by an impervious cover ard marks did not survive.

7.18.3 Possible early ploughing in BIN and BINX

A set of ard marks (898) in BINX cut clay 150 which may have been equivalent to ard-marked subsoil 123 in BII further to the east. A piece of Pomoideae sp charcoal (sample 54/80) from an ard mark cut into green clay 123 produced a radiocarbon age (AA-24956 3580+/-45 BP) representing a date between 2120 and 1770 cal BC.

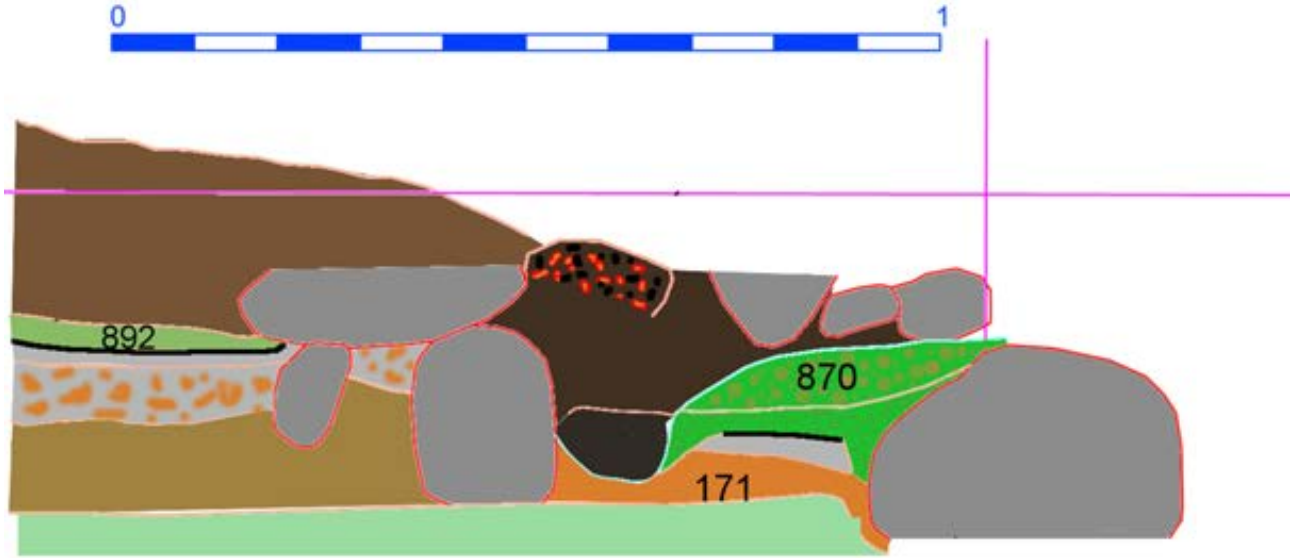
However at a slightly lower level small stones in gritty charcoal rich clay 899 lined up in a way which suggested ploughing (Illus 7.295).

7.18.4 Discussion of the lower ard marks in BINX

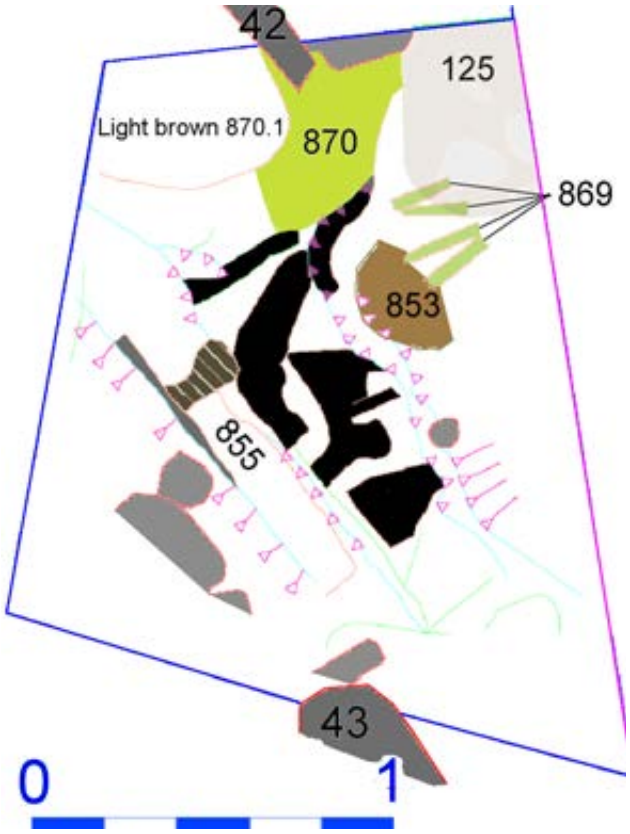
The hints of ploughing in layer 899 may of course have belonged to the same phase of ploughing as ard marks 898; but they could have included pre-Ring cultivation.

7.18.5 Possible early plough marks in Area BII

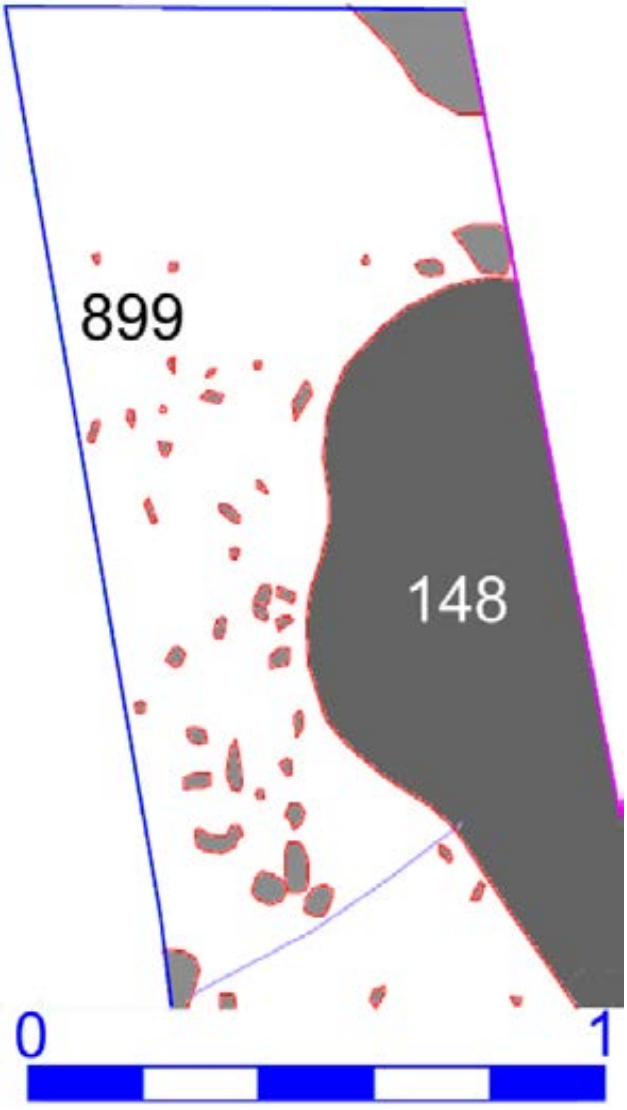
In BII the natural clay was ard marked and disturbed (Illus 7.296). Near the north end of the trench the surface consisted of mixed orange clay, broken stone, iron pan, and green and brown sand; there were discrete patches of yellow clay. Most of the area displayed greenish sandy clay into which were cut bright blue-green marks which seem to have been the edges of ard marks. The more northerly ard marks tended to be distinguished by a slippery texture and a slightly darker brown-purple on the mixed green-orange clay.



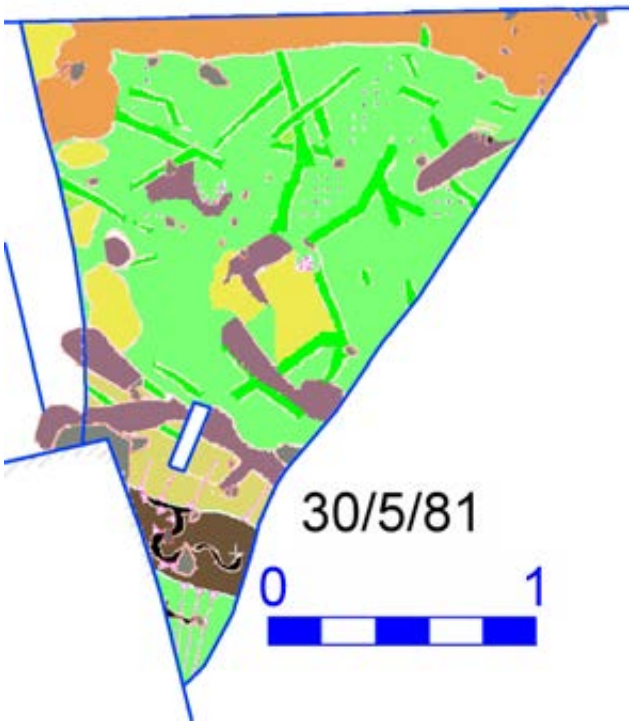
Illus 7.293 Overlay 2 of Section 69 including some of the features visible in Illus 7.291-292



▲ **Illus 7.294** Plan 66 showing ard marks 196 and 869 [NMRS DC38100]



▸ **Illus 7.295** Detail from Plan 54/81 [NMRS DC38088]



Illus 7.296 Plan 42 of 30 May 1981 [NMRS DC38076]

Illus 7.297 Plans 31 (part) and 32/81 Three section lines are shown, 28-9, 30-31 and 32-33 [NMRS DC38065 and NMRS DC38066]

The same level in the 1980 sondage by the main baulk (layer 123) produced a pot spall, either E/MN corky or possibly domestic Beaker (Cat 731), and a puzzling sherd, either from a Beaker or an E/MN non-corky pot (Cat 732). They may have come from ard marks or the disturbed top of the level so could be intrusive.

The ard marks seem in general to have been up to c. 0.1m broad; where a much thinner line was found it was sometimes clear that it was the boundary between an ard mark and surrounding plough soil.

Near the northern edge of the bank was a long curving strip of brown-purple smooth 'shiny' material about 0.1 m wide; it was explored in a small sondage. Similar strips survived in places in the area to the north, seemingly cutting the narrow greenish marks but sometimes outlined by them. These may have been partially formed iron concentrations; but their fill was very similar way to that between pairs of bright green marks, which suggests that they were the results of cultivation.

Some ard-marks in BII were later than the enclosure bank. A single piece of Pomoideae sp charcoal (54/80) from an ard mark cut into green clay 123 was radiocarbon-dated (AA-24956 3580+/-45 BP) to between 2120 and 1770 cal BC. But others seem to have pre-dated the bank.

7.18.6 Discussion of possibly early plough marks in BII

Although the ard marks in BII have been described as if some of them might have been early the possibility that the marks apparently below the bank were the bottom of cuts from a higher level cannot be excluded; some of the ploughing on BII certainly post-dated the bank.

The ard marks were shallow and fairly broad; the ard may have been held at an angle as if to rip up turf rather than cut deep furrows. The area may have been cut for turf to build the enclosure walls. The combination of removal and accumulation of soils makes it impossible to estimate soil depth when the pre-enclosure ploughing took place. Thus the possibility of pre-Ring ploughing in BII can neither be excluded nor proved.

7.18.7 Possible early plough marks in BIII

Plan 32/81 shows the features visible after the last cleaning down of Area BIII (Illus 7.297; see Technical Note 7.18.7). The zones in white and light orange near the bottom left of Area BIII were not cleaned; the base of the general soil development 112/117 remained in them.

One clear ard mark had survived at a fairly high level, cutting linear depression 121. Otherwise the general soil development 112/117 and similar earlier soil processes seem to have homogenised all the layers above the bank of the enclosure, the entrance depression 142, linear depression 121 and the subsoil (see Part 7.3).

Slight traces of ploughing survived east of the enclosure in modified subsoil. They are shown in light brown on Illus 7.297. They were about 0.1 to 0.15m broad, shallow and faded away at their ends. They were probably spaced at about 0.2m centre to centre. They ran at an angle of east-northeast by west-southwest.

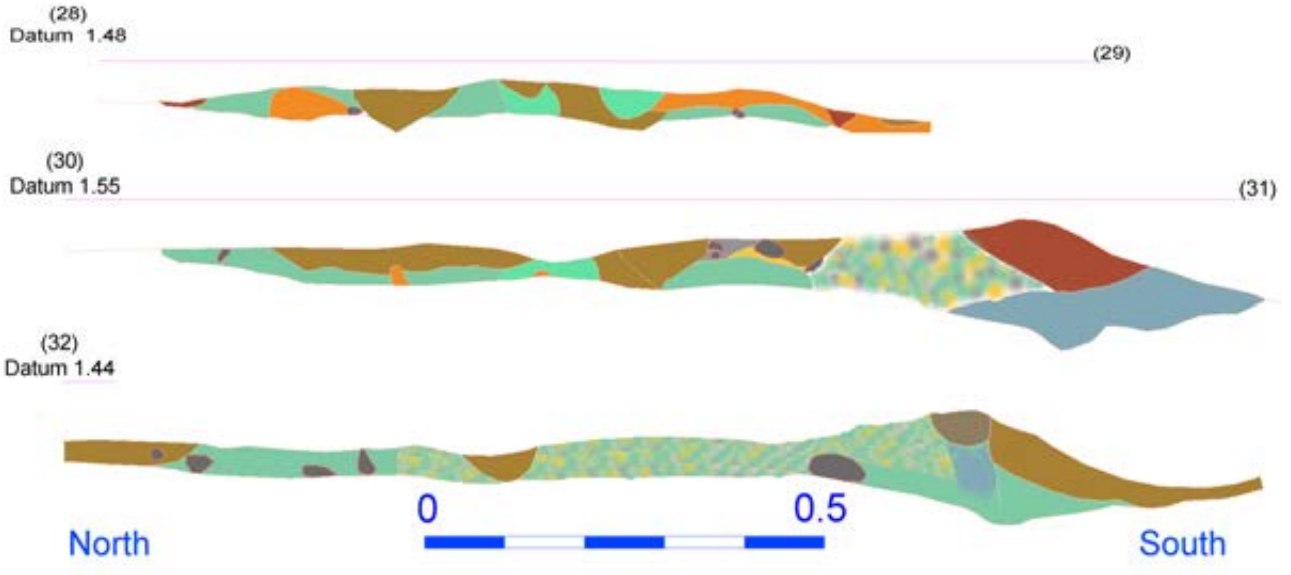
The features revealed by the last cleaning of Area BIII also included possible ard marks shown as thin green features on Illus 7.297. They ran for the most part in the same direction as the brown ard marks. They were much narrower but the visible marks may actually have been the divisions between ard marks and the surrounding clay, as on Area BII That seems more likely than that they were parts of the palisade slot to the left of Section 32-33 on Illus 297.

Three shallow sections were drawn along the lines marked 28-9, 30-31 and 32-33 on Illus 7.297.

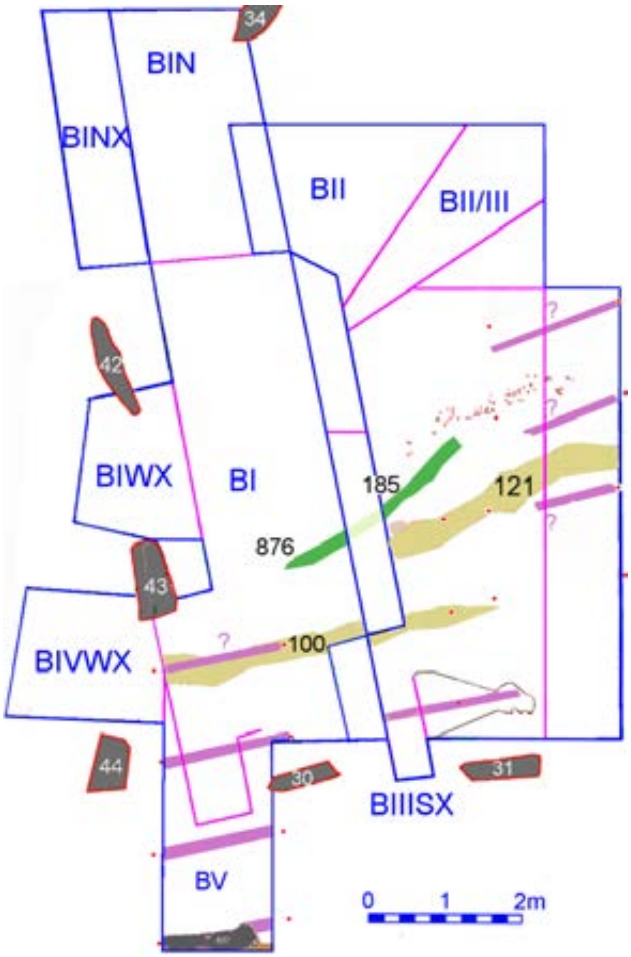
The sections are somewhat ambiguous. The double brown feature in the middle of Section 30-31 is faintly reminiscent of the 0.3m wide double-slot palisade trench near the central baulk (Chapter 7.10.10). But it does not line up with anything on Plan 31 or 32 (Illus 7.297). Section 28-29 has nothing reminiscent of the double palisade slot but the blue-green round bottomed feature cutting one of the brown ones on Section 28-29 looks a bit like part of the palisade. Equally it might well be an ard mark. On balance these sections probably showed ard marks, up to 80mm deep, rather than a palisade slot.

7.18.8 Discussion of the possible ploughing on BIII

In some cases the ard marks cut into brown-orange material and were filled with greenish material and in other cases vice-versa. It has to be suspected, even if the interpretation of the thin green lines offered above is wrong, that there were other relics of ploughing present where the ard marks were the same colour as the soil around them.



Illus 7.298 Sections across plough marks and possible palisade slot in Area BIII [Plan 23/81 NMRS DC38057



7.299 Reconstruction model of the troughs between cultivation beds

Dating the plough marks in BIII is extremely difficult. It may be that the reason why the broad ard marks were detected only east of the enclosure bank is that they were relics of later ploughing which took place when some depth of the bank survived. In the area of the surviving bank their cuts may have been entirely at a higher level in the stony orange bank material.

Some of the ploughing described here may have been associated with partial levelling of early cultivation beds; the latter are discussed in Ch. 7.19. The argument here, assuming ploughing in several directions as on BII, is that some ard cuts may have cut deeper over the position of troughs between the cultivation beds. Certainly their orientation was the same as that suggested for the cultivation beds.

7.19 Early cultivation beds and other early features

7.19.1 Introduction

Excavation of Area B was not completed. The lowest levels were only partially explored and it was not possible to arrange a third season of excavation. The features which suggested cultivation beds separated by troughs were disturbed so much by later activities that it is difficult to establish a confident interpretation. Nevertheless some features fairly ascribable to cultivation beds did survive.

On Illus 7.299 troughs between cultivation beds are indicated in purple. The red dots used to keep spacing consistent are shown semi-independently. The spacing is about 1.3m, based on linear features in BV and other factors described below. The trough line by East Row Stone 31 has some archaeological support. The three lines in the northeast are more speculative, failing to match up neatly with the relevant red dots or any of the other linear features shown: ditch 100, linear feature 121, the palisade slot going with the Stage 2 enclosure and the rubbly ridge to its north.

The clearest evidence was found in BV, the southernmost trench (Illus 7.300). There was a little, tantalising evidence in BII and BII/III. The possibly evidence from BIII was also frustrating, and much complicated by features which might have been the remains of cultivation beds or ard marks or entranceway banks

7.19.2 An overall view of the evidence from Sub-areas BIV/BV

The lower strata of the west side of Area BIV were recorded on Section 9 in 1980 and those of BV on Section 10 in 1981. The sections are at a slight angle to each other as shown in the key plan. An intrusion had removed the earlier layers from the middle of BV Section 10.

In Illus 7.283 the upper row consists of 3 copies of the southern third of Section 10. Laid out as it is, with a 1.33m spacing of the copies, it provides a model against which the idea of cultivation beds can be tested. Below that are copies of the sections. Colour is used for the strata which might be part

of cultivation beds, and for stones. The beds are earlier than the burials in this area, and earlier than strata which might go with use of the Ring. Later strata have been whitened out apart from turf lines.

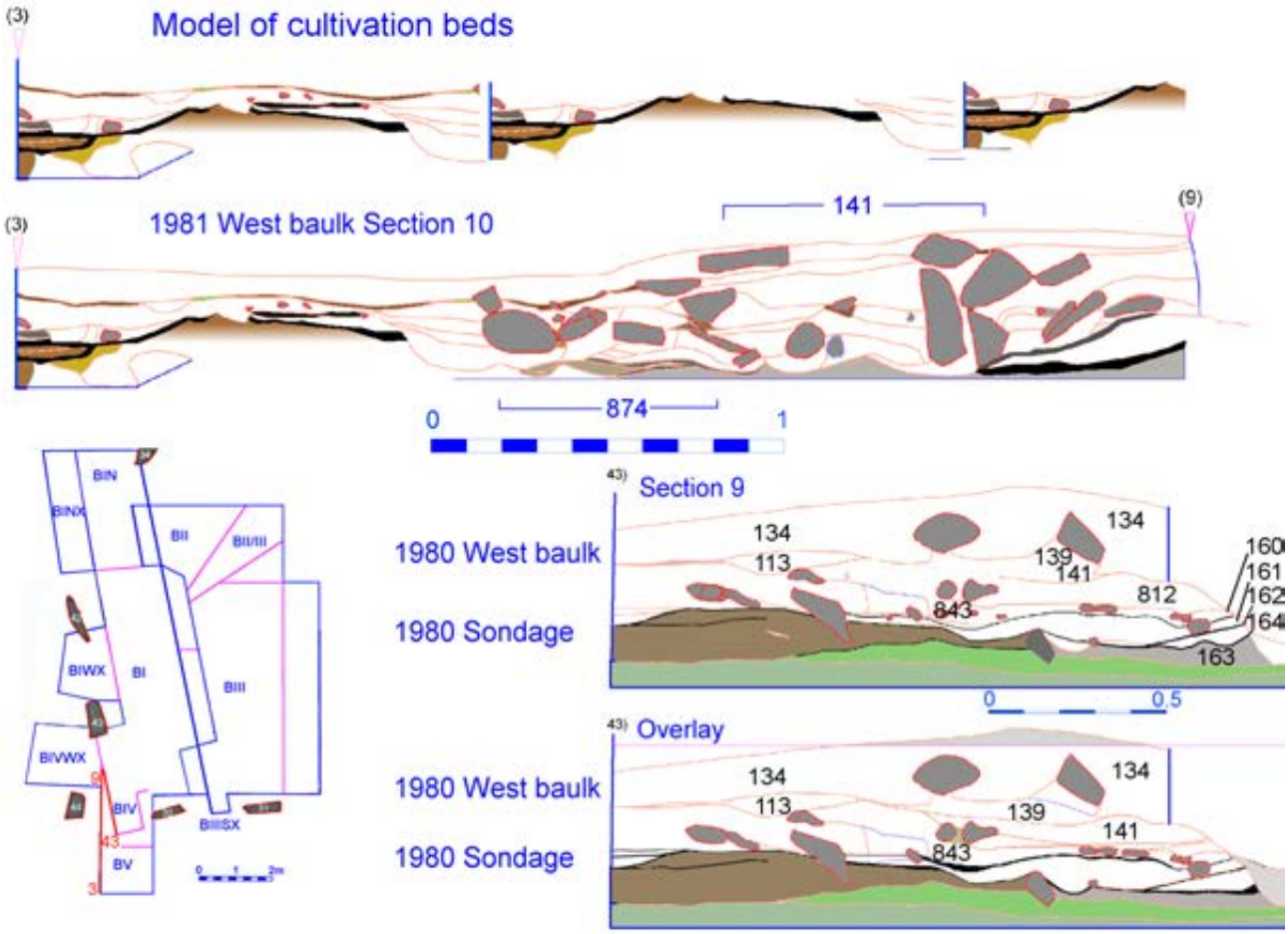
The most convincing candidate parts of the postulated agricultural system were in the southern third of the trench, where there was a definite trough with a low ridge to its north and then another feature in section which may have been a trough. However, on Areas C and D what I have called troughs seem to have been little more than paths. More significant troughs may have existed only when cleaned out

The central part of Section 10 reflected the presence of intrusions; but both Section 9 and its overlay show a hump of brown clay soil which might be a second cultivation bed. To its north again on Section 10 there was a general rise in the lowest grey soil before the ditch intervened. The same is true to a lesser extent on Section 9.

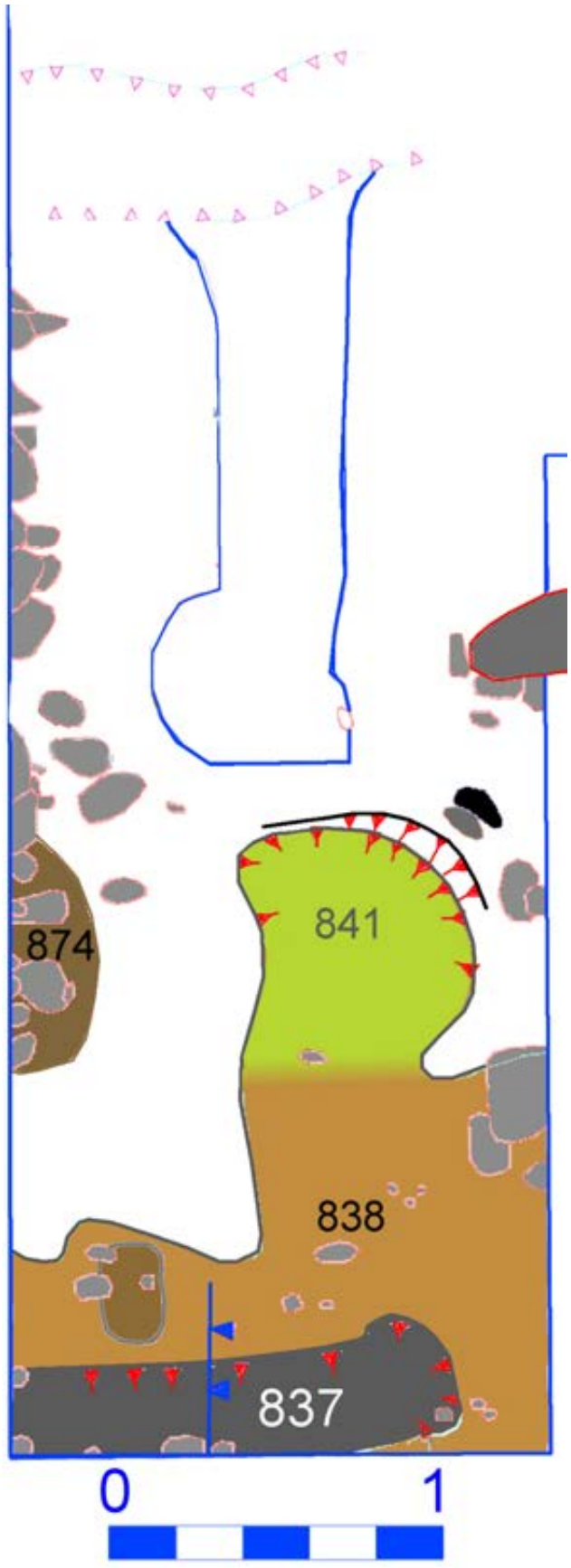
Taken together, the sections can be interpreted as representing cultivation ridges at intervals of about 1.3m running roughly east-west. But it is important to remember that the supposed beds here were much thicker than on Areas C and D, slightly more than 0.1m tall rather than significantly less.

7.19.3 A trough 837 and cultivation bed 838 at the south end of Area BV

At the south end of BV clearance of plough soil 141, of the late 3rd and early 2nd millennia BC, and soil 160, thought to be contemporary with use of the Ring before the chambered cairn was built, revealed a ridge of light brown fibrous clay (838) running across the Area (Illus 7.301). Partly



Illus 7.300 Model of cultivation beds in Areas BIV and BV [NMRS DC38029 and NMRS DC38044].



Illus 7.301 Plan 18-81 [NMRS DC38052]

under the south baulk was a 0.12m deep slot 837 filled with a succession of soils (Illus 7.301-7.303). It is not clear whether it too was overlain by soil 160, which may instead have been removed by the ploughing which created plough soil 141. The plan (Illus 7.301) appears to define the edge of one of the lower fills and shows the slot as about 0.3 m wide at its east end where it curved slightly to the north.

However the planned slot fill was only the topmost fill of a trough probably about 0.6 m wide judging by its section (Illus 7.303, 7.304). It had clearly filled up intermittently. Its base was filled with reddish brown gritty clay overlain by a turf line. Above that was mixed brown and grey gritty soil overlain by another turf line. The topmost fill was ashy grey soft soil with some charcoal and no grits. Some rotten stones lay in the upper and middle layer.

The trough contained several finds linking its fills to the plough soil 141 above which contained similar sherds.

Table 7.47 Pottery from 837

Cat	Comments
406	A sherd from a Beaker (ASH 44a).
857_861	5 spalls from a Beaker (ASH 48).
348	A sherd from a Beaker (ASH 38).
401_403	3 sherds from a Beaker (ASH 42).

Of these Beaker ASH 38 was probably notably early, perhaps dating to the 3rd quarter of the 3rd millennium. Three of the other sherds, from Beaker ASH 42, were originally deposited with a burial further north during the period that plough soil 141 was in use. The other two sherds were from domestic Beakers. The spalls from ASH 48 are a surprising occurrence here. Most of the other sherds of this pot were found in highly disturbed parts of the cairn on Area D, and one sherd was found in an enigmatic feature at the east end of the passage along with pottery thought to date to the 1st millennium AD (Chapter 7.3; Chapter 18.7.7 The Pottery Assemblage).

The lithic assemblage consisted of a flint flake (CAT 38), a short-end scraper on a platform flake (CAT 217), two indeterminate pieces of mylonite (CAT 39) and an indeterminate piece of mylonite with 3 pieces of quartz (CAT 40).

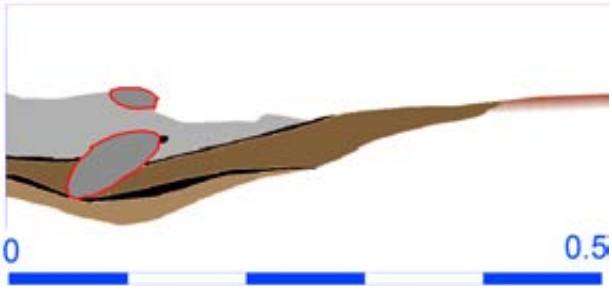
The various layers in the trough were not given separate context numbers. It is impossible to say exactly which strata the finds came from. It seems likely that all of them came from the uppermost stratum with charcoal or the middle layer with its mixed brown and grey soils rather than the red-brown sand below the lower turf line.

7.19.4 Discussion of the trough and possible cultivation bed

The candidate cultivation bed 838 was left largely unexcavated. It was made of material variously described as light brown fibrous and reddish brown gritty. It is somewhat reminiscent of cultivation bed 388 in Area D (Chapter 9.9.19), although that, if it continued across into Area B, would have been the next cultivation bed to the north from 838. There were no finds from 838.

The lowest, primary fill of the trough was similar to reddish brown gritty material on the low ridge 838 to its north and had probably come from it. It was covered by a turf line demonstrating a period of stability. The middle brown fill presumably reflects ploughing on the ridge which did not extend to the trough, given that the turf line survived. That was followed by another period of stability. The top fill was ashy grey, gritless and soft. That sort of soil was normally found on Area B under a well developed old ground surface or a thin dark soil. Soil 160 is a reasonable contender for being that thin dark soil (and indeed at several points in Area B layer 160 was thought possibly to include a damaged turf line). The plough marks visible at the base of plough soil 141; the latter contained similar sherds to 837, suggest that the inferred turf line or thin soil was removed by ploughing 141. More generally bits of the insular beaker were found in several contexts in BIV and BV including the soil amongst the upper stone scatter 134, charcoal-rich soil 139, plough soil 141, green sandy layer 812 and a small hole 814 cut into it, the charcoal rich layer 160 and a scrape or shallow hole 867 cut into it. Sherds of early AOC beaker type came from 160 and 810.

Illus 7.302 Trough 837 beyond ridge 838 [Film 1981.15.9]

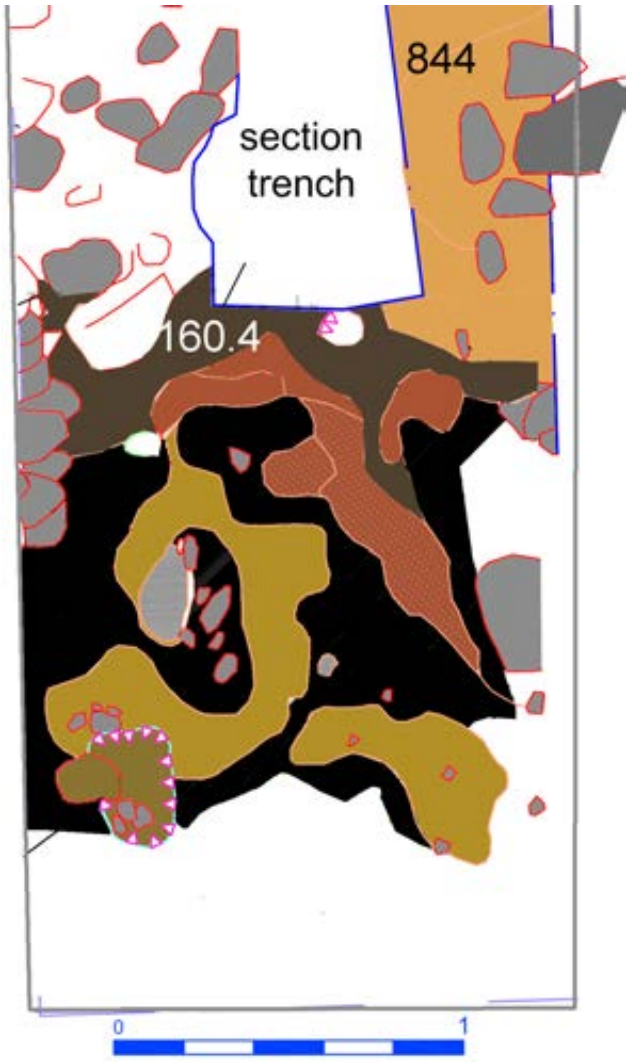


Illus 7.303 Section across trough 837 [NMRS DC38040]

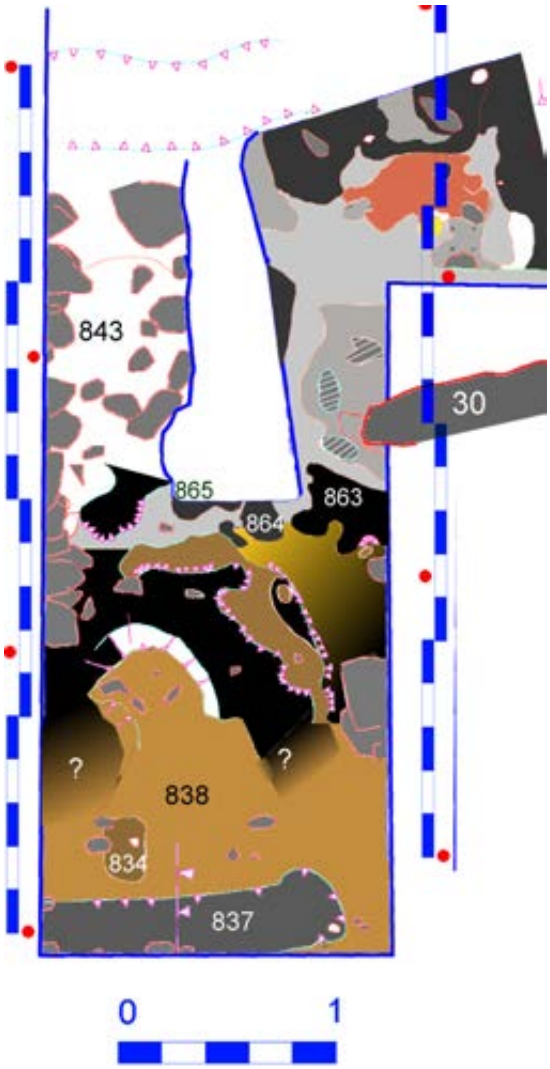
Illus 7.304 Trough 837 from the east on 14 May 1981 [Film 1981.8.29]

7.19.5 An alternative interpretation for the trough

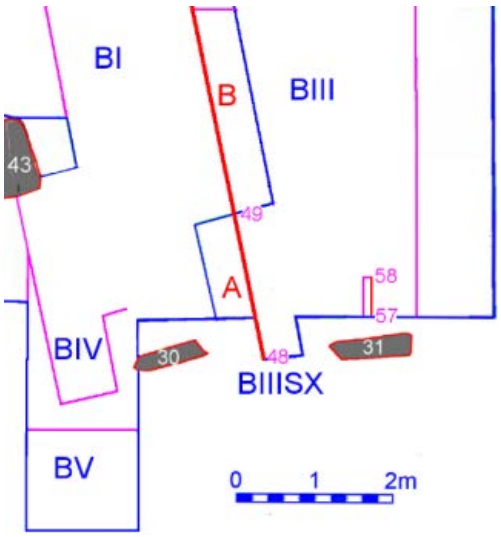
On Area D there was a curving portion of a ditch 921 of an earlier date than the cultivation beds



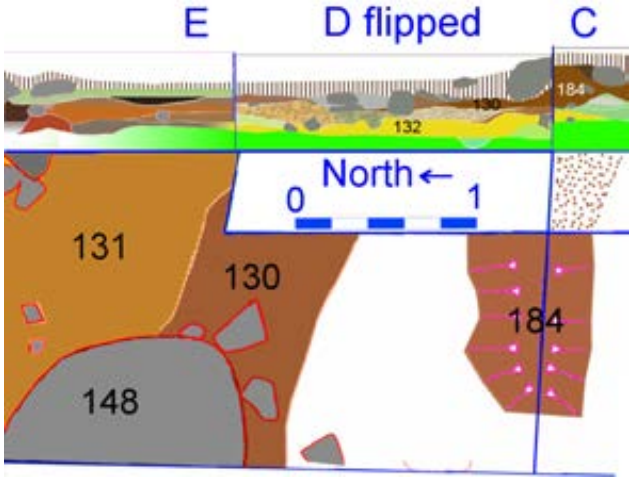
Illus 7.305 Plan 25/81 showing remnants of 160 and other turf lines overlying ridge 838 to the south of Area BV [NMRS DC38059 and DC38053]



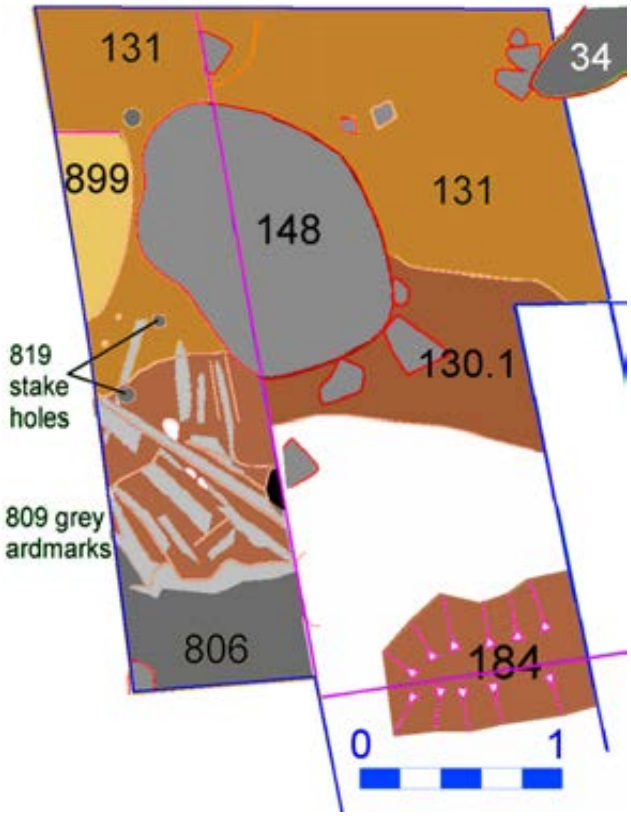
Illus 7.306 Plan 21-81 with elements of 18-81 & 19-81 [NMRS DC38055, 38052 & 38053]



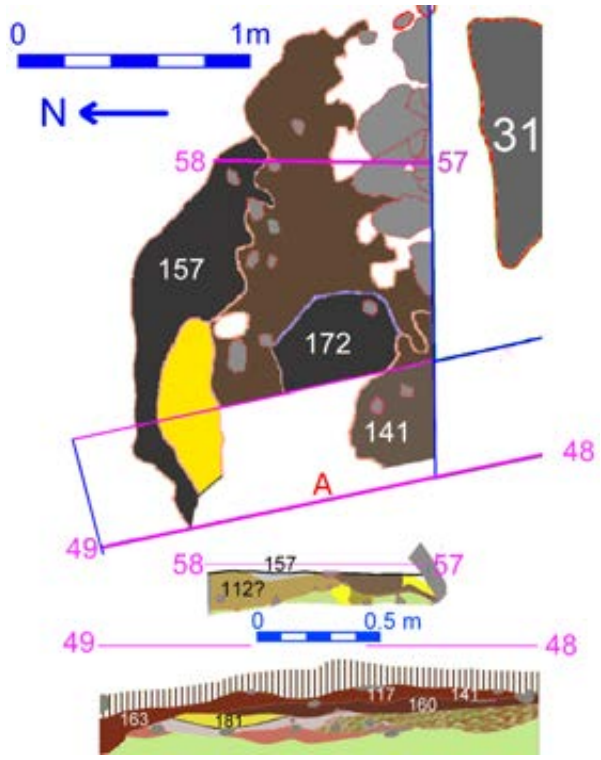
Key Plan Illus 7.309



Illus 7.308 The central baulk Section 09/80 parts E and D with Plan 06/80 [NMRS DC 38029 and DC38025]



Illus 7.307 Layers on Plan 06/80 12 May1980 in BIN and Plan 52/81 in BINX [NMRS DC38025 and DC38086]



Illus 7.309 Layers near Stone 31 on 24 May 1980.

there (Chapter 9.10.3). If that ditch was part of the end of a long building or enclosure stretching eastward the trough in BV could have been part of it. The idea is illustrated in Chapter 24: Discussion and Conclusions. Its interpretation as a cultivation trough is however preferred, firstly because its primary fill was similar to the makeup of the bed of gritty material 838 immediately to its north, and secondly because although cultivation bed 388 in Area D was quite similar to ridge 838 it conspicuously overlay Ditch 921 and cannot have been part of an early embanked enclosure (Chapter 9.3.18) so provides no support for the idea.

7.19.6 The middle third of BV

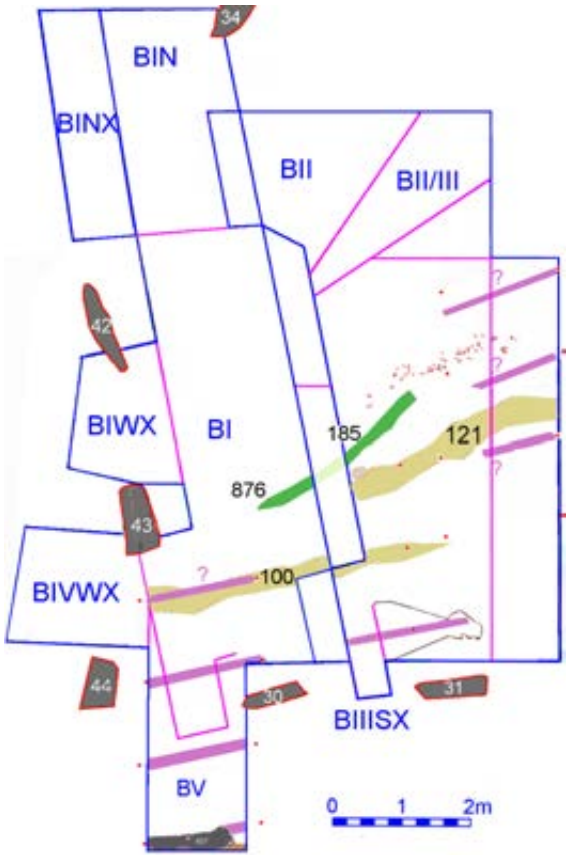
The area north of ridge 838 in the middle third of BV was not excavated to the same low stratigraphic level as was the south part of the trench. There was a large depression 841 there overlying the area where a trough and the southern part of the middle cultivation bed would have been (7.301). A complex mosaic of black and brown features survived (Illus 7.305). In several places at least two turf lines were present.

Please note that Plan 25 (Illus 7.305) preceded Plan 21 (Illus 7.306) despite their plan numbers. The topmost layers including the ground-worked soil 160 filled an irregular depression. As they were removed ridge 838 to the south became clearer (Illus 7.306). The turf lines seemed to lie in a broad depression running across the trench at an angle of very roughly 15 degrees.

7.19.7 Discussion of the middle part of BV

During excavation the upper fill of the depression was correlated with layer 160. It is tempting therefore to correlate the underlying turf lines with 162 and 164 to the north. However that correlation is dangerous. The complexity of the turf lines may reflect many small spreads of clay and soil which were colonised by grasses and mosses to form new very local turf lines.

That said, there is a rough pattern visible on the plan, reflecting the possible ridge seen in the sections (Illus 7.300) and possibly running under where East Row stone 30 was later erected.



Illus 7.310 Reconstruction model of the troughs between cultivation beds

Illus 7.312 Area B from the west c 26 May 1980 showing possible roughly east-west ridging [1980 Film 1980.12.9]

Illus 7.311 Area B from the east 15 May 1980 showing roughly east-west ridging [Film 1980-9-1]

The darker areas between it and ridge 838 to the south may be fills preserved from later ploughing 141 because they lay in a depression between the cultivation beds. The turf lines need not be by any means as early as the postulated agricultural system but instead grew over a partially levelled system and thus the breadth of the area in which .the darker soils survived is greater than that of the original trough.

7.19.8 The northern third of BV and BIV

Under the lowest turf line 164 as it started to rise was grey soil 163 and under that again green compacted sandy clay thought to be the natural subsoil (Illus 7.300). The grey soil 163 might have been part of a third cultivation bed. North of that point the modern ditch cut through all earlier strata.

7.19.9 Interpretation of the early strata in BIV/BV

The interpretations above allow or even encourage the idea of early cultivation beds to be applied to this area but do not prove conclusively that there was an early agricultural system here of the kind postulated.

The composite plan forming Illus 7.306 has elements dating from 14 May (in particular the southern quarter) to 25th May. Vertical scales have been added to either side with red dots spaced 1.33m apart, as on the model (Illus 7.300) for that is a good spacing for hoe-worked cultivation beds (if the 'troughs' were paths from which the beds were worked) and roughly the centre to centre spacing calculated for the beds in Area D. The red dots on the right have been set further north to reflect a fairly likely orientation for the beds. If however the bed represented by ridge 838 was the same as Bed 1 on Area D then the orientation away from east-west may have been slightly steeper (Chapter 24.6.1)

The depression 841 (Illus 7.301) in which several of the dark layers sat was approximately centred on the line between the second pair of red dots northward. The East Row would be on the second cultivation bed. The ditch running from the mouth of the passage would lie a little south of the centre of the fourth trough.

None of this is proof that the cultivation bed system existed here but neither is it in conflict with the idea; and at least it could explain why the East Row was aligned in the way it was.

If the hypothesis is wrong, then the ridge 388 and trough 387 at the south end of Area BV require some other interpretation. One apparent possibility, that the trough was the continuation of a very early ditch found on Area D, has been rejected above. Could ridge 838 have been part of a freestanding bank? On Area D there was a similar ridge (388). It trended in roughly the same direction as suggested for 838 in Area BV. But it was offset north-south by more than a metre and could only have been part of a bank with 838 if the bank were irregular. Nevertheless it is conceivable that a bank was drawn across the broad ridge on which the Calanais stone setting stands before the Ring was set up. It might have delineated the northern edge of an early sacred area associated with the natural rock outcrop Cnoc an Tursa.

But the preferred interpretation is that the ridge and trough were remains of an early cultivation bed and associated trough.

7.19.10 The linear depression in BIN

Area BIN was between the enclosure and Stone 34, which was offset from the east row of the Avenue. Area BINX was a westward extension of the trench to allow investigation of a prone stone 148.

Under the general soil development 117 was a series of coarse rubbly soils the uppermost of which (131) was most prevalent in the north part of the area (Illus 7.307). Red-brown when damp, it appeared as fine biscuit coloured silty sand, iron coloured and root-penetrated when dry. Set into 131 was a band of gritty brown soil 130.1 with patches of turf and green clay, very like that composing part of the enclosure bank elsewhere on Area B (Illus 7.307). To its north was the general layer of mixed sandy clay and stones 131.

Below fill 130.1 in the linear depression were a few thin layers of clay. The linear depression was shown to have originated earlier than an exploratory pit at the south end of the prone stone. The pit is tentatively interpreted as reflecting an attempt to explore the slab at the time when the chambered cairn was built. That does not mean that the depression need have been especially early in the

sequence, but it does suggest that it might have been earlier than the chambered cairn.

Section F did not include the lower strata above natural. It showed no sign of the depression in what was drawn. The slightly more distant Section D has been used in Illus 308. It included a slight depression in roughly the right place to be a continuation of that under 130.1, but hardly enough to notice (Illus 7.308). Any significant dip corresponding to the linear depression seems to have run out by this point suggesting that the depression did not continue eastward.

7.19.11 Discussion of the linear depression in BIN

The linear depression containing layer 130 may not have continued to the east. It was at a very different angle to cultivation beds in Areas C and D. Despite the lack of an explanation for its existence there was nothing to suggest that it lay between two cultivation beds. Indeed, there was no evidence for cultivation beds in BIN.

7.19.12 Early features in the area east of the enclosure in BIII

Three classes of evidence are considered here. The first consists of the linear features in the top of natural clay. The second is what seems to have been a linear depression near East Row stone 31. The third comprises some poorly defined and poorly understood ridges.

The ard marking in this area was discussed in Chapter 7.18.7 (Illus 7.297 and 7.298). The broad marks shown in brown on Illus 7.297 were too close together to be the last remnants of a single system of troughs. The sections on Illus 7.298 do not show any trace of cultivation beds (although to be fair they were at a level below that at which beds could be expected to show). The only hint at this level that there may have been cultivation beds there is the general trend of nearly all of the linear features. It was about 25 degrees north of east, within the variations in angle of cultivation beds interpreted on Area D and C but about 5 to 10 degrees different from the likely trend of the possible cultivation beds in Area BV.

There is nothing about the natural topography of Calanais which might explain the trend. But although the plan (Illus 297) and sections (Illus 298) do not conflict with the idea of cultivation beds they cannot on their own provide convincing independent evidence for their existence here.

Illus 7.295 is the same as Illus 7.226 in Chapter 7.13.5 where the features shown were described in some detail. There was a shallow depression in Section 48-49. Judging by the spread of the dark brown soil on the plan it ran a little north of east and south of west and the brown soil had been an upper fill. This linear depression fits with the pattern of cultivation troughs hypothesised in BV, particularly fitting the idea that the East Row sat on, and its orientation was defined by, the cultivation bed corresponding to Bed 2 in Area D.

If Illus 7.313 reflects reality it produces the following points.

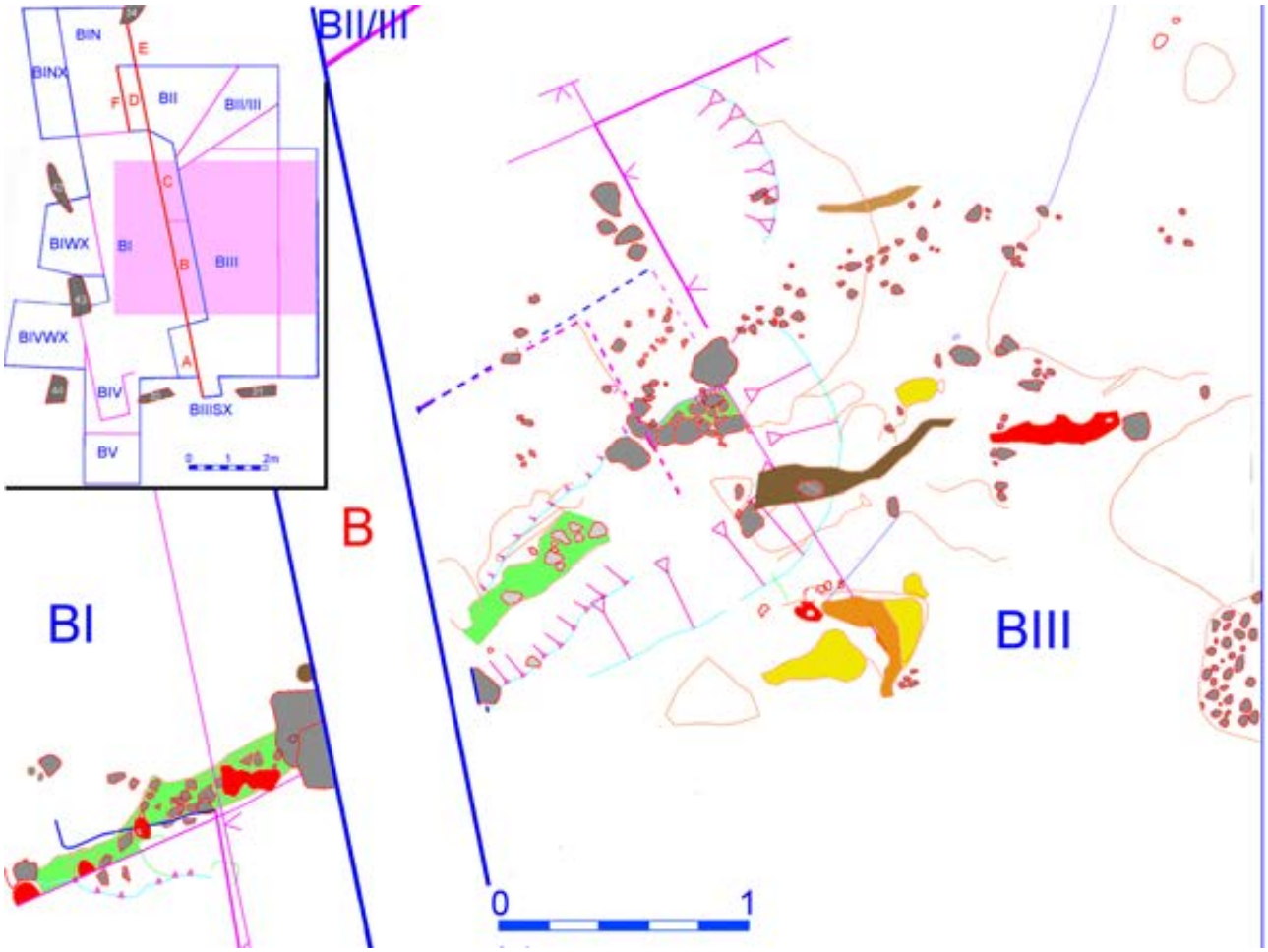
1. Depression 121 which was irregular (as might be expected if it was a path to the chambered tomb skirting round the enclosure) lay partly over a trough between two cultivation beds but not completely;

2. Ditch 100 may have formed along a cultivation trough;

3. the palisade slot was mostly cut into the side of a cultivation bed;

4. the East Row was on an old cultivation bed, and it was more exactly aligned than the position of Stone 31 might suggest, for the stone was south of the line between Stone 30 and Stone 32. So the cultivation bed may have helped to determine its line.

Overall the evidence suggests that there probably was an early cultivation bed system in at least the southern half of Area B with the important proviso that the orientation and placing of some of the troughs on Illus 7.310 is approximate. But the ridges in the northern part of Area BIII may have been the fragmentary remains of an entrance arrangement for the Stage 2 enclosure, or even, although there was no other suggestion of such a



Illus 7.313 Plan 31-81 and 43-81 Subsoil marks in BIII including the rubbly feature running east by east-north-east on the northern side of the palisade trench [NMRS DC38065 & DC38077]

structure, part of an early double bank enclosing the southernmost part of the broad natural ridge occupied by the stone setting.

7.19.13 Ridges in BIII

On Area BIII ill-defined ridges survived in the later soil developments (Illus 7.311, 7.312). They ran at much the same angle as the ard marks found cut into the underlying natural clay. These banks may have been cultivation beds, much damaged by building of the enclosure, but they may have been, or may also have been, later banks related to the entrance of the Phase 2 or Phase 3 enclosures.

On Illus 7.311 the slight remains of a possible middle ridge lies to the left of the ranging rod and a possible northern ridge to the right

On Illus 7.311 taken from the west a week and a half later the northern ridge has been sectioned revealing a smooth rounded profile.

On Illus 7.313 the palisade is shown in green. Other coloured features are interpreted as ard marks or as subsoil alterations caused by the prior presence of features in the soils above the natural. One of the rubbly features on Illus 311 and 312 is revealed by a linear cluster of small stones about 0.3m wide and more than 2m long running east by east-north-east about 0.2m to the north of the palisade trench. This feature was present throughout the profile from the subsoil interface to the top of the pre-peat soil. The other possible ridges were not planned but may have been similar.

The orientation of the rubbly feature is, like that of so many linear features on Area B, very similar to the orientation of the cultivation beds on Area D and Area C. However it does not match the

pattern of cultivation beds if the latter was regular (Illus 7.310).

7.19.14 Discussion of the ridges in BIII east of the enclosure

The ridges in BIII remain an enigma. Maybe some of them did relate to entrance arrangements; the rubbly ridge which was planned would have run east by east-north-eastward from the end of bank terminal 175 south of the entrance of the Stage 2 enclosure. So the entrance may have been where it was because of the prior existence of low banks to either side of the northernmost purple line on Illus 7.313. Or perhaps the striping of the land affected subsequent buildings subliminally.

Given that the rubbly features did seem so early and so persistent, is there any chance that they had a natural origin? Could they have been periglacial features? Or could the ridge have been the remains of an early bank cutting off the end of the long ridge on which Calanais sits, enclosing Cnoc an Tursa? Those ideas can only be tested by new evidence from new excavation.

7.20 Summary

Appendix 2 contains an account of excavation progress, a summary of discoveries and a list of surviving archaeology on Area B.

8. Area C

Illus 8.1 Area C and East Row stone 33 from near the Ring on 2 May 1980 [Film 1980.1.15]

8.1 Introduction

Area C lay just outside the area then owned by the Secretary of State. With the kind permission of the crofter, Mr Morrison, and the owners, Carloway Estates, excavation took place in 1980. It was supervised by Annemarie Gibson.

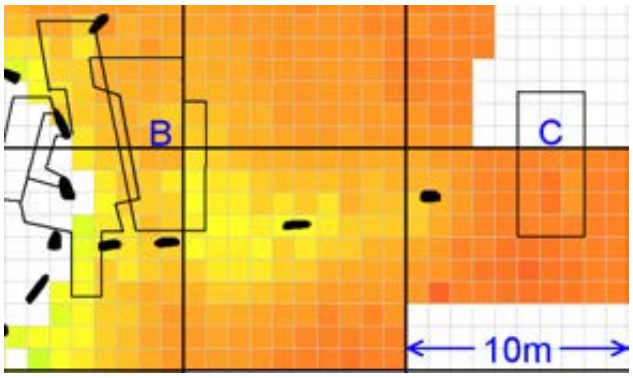
The air photograph of 1955 (Illus 8.2 on which the stones have been enhanced digitally) shows the Ring at bottom left with the East Row running up from it. The light-coloured circular areas to its south-east may have been created by tethering a browsing animal with a long rope. Long broad cultivation beds created by piling up peat and soil are visible to the right. Although it is difficult to be certain, the area to the east-north-east of the East Row seems to have included some drainage ditches but no cultivation beds.

Between about 1860 and 1980 four stones stood in the East Row (Illus 8.2). Another stone at the east end of the East Row had been recorded by Worsaae in 1846. Although he had no room for it on his plan he recorded it in his marginal notes (see Chapter 3.3). In 1857 Palmer also seems to have shown a fifth stone (see Chapter 3.7). Gerald and Margaret Ponting located the fallen stone in 1978 by probing through the overlying peat (Ponting and Ponting 1979 Appendix A).

8.1.1 General aims

The main intention in Area C was simple: to see whether the stone located by probing was a fallen standing stone and, if so, whether there was a stone hole near it. A subsidiary intention was to record and interpret any other features in the area.

Illus 8.2 The East Row area from the west on 16 July 1955 [NMRS CUP 85]



Illus 8.3 Resistivity results for the East Row

8.1.2 Resistivity survey

Illus 8.3 shows results of the 1 m probe spacing resistivity survey of 1979 (see Chapter 5). Hues have been chose to maximise the visibility of the variations in readings near the fallen monolith in Area C, shown to the east. The plot shows that there was only a faint change in readings around its position. This was probably because the 1 m spacing of the probes and the east-west direction of the readings were unsuited to detecting a stone of this size lying north-south fairly close to the surface. The fallen monolith would not have been recognised without prior knowledge of its existence.

8.1.3 The layout

Area C was laid out around the stone detected by Gerald and Margaret Ponting. It was oriented to the National Grid and measured 6.5 m N-S by 3m E-W. After peat had been removed and the stone had been recorded it was lifted out of the trench to allow excavation of underlying features. Excavation of Area C was not completed; when work finished there remained a layer or layers of cultivation soil above natural.

8.1.4 Context numbers

Context numbers were in the range 200 to 299.

8.2 Victorian and earlier post-medieval activities

8.2.1 Peat

Beneath the mainly 40mm thick turf (200) was 0.6 to 0.8 m of peat. It was initially divided into three units, fibrous peat (201A), semi-fibrous (201B) and semi-amorphous (201C). The upper peat contained 4 pieces of leather shoe, two sherds of china, and a "snail's front door". It was interpreted as of 19th to 20th century date.

Vertical cracks were abundant after drying as were minor variations in the peat.

Major variations in peat layers were subsequently recorded (Illus 8.4, 8.6). The uppermost fibrous peat 201A, a dark reddish brown, had been cut by a drainage ditch which had filled up with topsoil (Illus 8.4). It is conceivable that this corresponds to a slight change in vegetation on the air photograph. The thinness of the soil over peat 201 makes it unlikely that there was a Victorian cultivation bed here. Pasture improvement after peat had grown afresh over the area provides a better explanation, particularly given the evidence from the air photograph of controlled grazing nearby.

Fibrous peat 201A was sampled in Box 5 of a Kubiena box column in the floating baulk left over the fallen standing stone (Illus 8.5, 8.6). Its top 2cm probably reflected the recent vegetation in the Calanais area. The 6cm of 201A upward

from the 8cm level in Box 5 included a decline in cereals followed by a sharp increase in heather.

Below that, semi-fibrous peat 201B was the same colour as 201A but contained black discontinuous bands. Along the line of the section it survived only in the south. It was sampled in Box 4 of the Kubiena box column. It s lowest levels recorded a marked increase in cereal pollen and a decline in tree pollen. It was assigned to pollen zone CaN-3e which started sometime between 920 and 260 cal BC and ended sometime between 560 BC and cal AD 85 (Chapter 21: Palaeoenvironment).

The lowest level of peat, 201C, was divided into sub-levels 201c, 201cx and 201cy. 201c was amorphous with a slight green tinge and a greasy feel. 201cx was similar but had a blue-black shade. 201cy had a slightly grey tinge. The profile of 201C suggested that it had originally been thicker, because a square hump nearly 2m from the south end of the area showed that it had been cut for peat at least once.

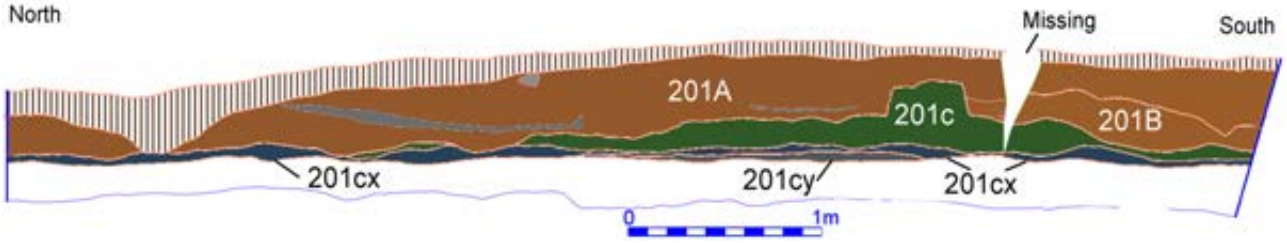
Humic acid obtained in 1980 from a sample (Call80/54/244) of the basal peat was dated to between 1050 and 400 cal BC (GU-1403 2640+/-110) Pollen analysis of another sample (275) showed that it fitted in zone CaN-3e.

A temporary increase in the tree pollen percentages in the underlying 2 cm deep transition zone from gritty soil to peat was sampled in Boxes 3 and 4 of the Kubiena box column. It could possibly be compared with zone CaN-3d in CN-1 column, perhaps starting between 1070 and 420 cal BC and ending between 920 and 260 BC.

8.2.2 Discussion of the peat

The peat may have been about 1.5 m deep at one time, like the peat by the Ring and avenue recorded by antiquaries in the 19th century, although in this area it had been cut both before and after 1857. There is nothing in the profile to suggest that the area was cultivated after peat cutting, making the suggestion that it was used for pasture even more likely to be correct. 201A and 201B clearly grew after cutting of down to the level of 201C (Illus 8.4) and we interpreted them in 1980 as pre-modern re-growth. The cultivation bed system that was practised up to pre-modern times could have contributed to the presence of Cerealia pollen in the top 2cm of peat. Given the date for the start of peat growth it seems much less likely to represent analytically possible alternative period CaN4 which in the CN1 column at Leobag, starting sometime between 560 cal BC and cal AD 90. The modern artefacts in 201A are also an argument against this interpretation, although not a conclusive one because their vertical position was not precisely recorded.

Two peat samples from sub-zone 3e in Leobag CN1 produced ages of: 2440+/-112 (GU-1289) and 2355+/- 110 BP (GU-1170). Perhaps because of the large errors attached to the dates the Calanais Area C date is not significantly different from them when the three are considered as a group. The base of the peat in the Kubiena box samples from Area C contained pollen showing a temporary increase in the tree pollen percentages and a sharp increase in heather which could possibly be compared with zone CaN-3d in the CN-1 column, ending between 920 and 260 BC. It seems likely that peat growth actually started at the transition from CaN-3d to CaN-3e. If that is correct then peat started growing in an uncontrolled way at Calanais between 920 cal BC (the earliest limit for the end of CaN-3d) and 400 cal BC (the latest limit for the radiocarbon date).



Illus 8.4 The peat layers [NMRS DC38124 part)

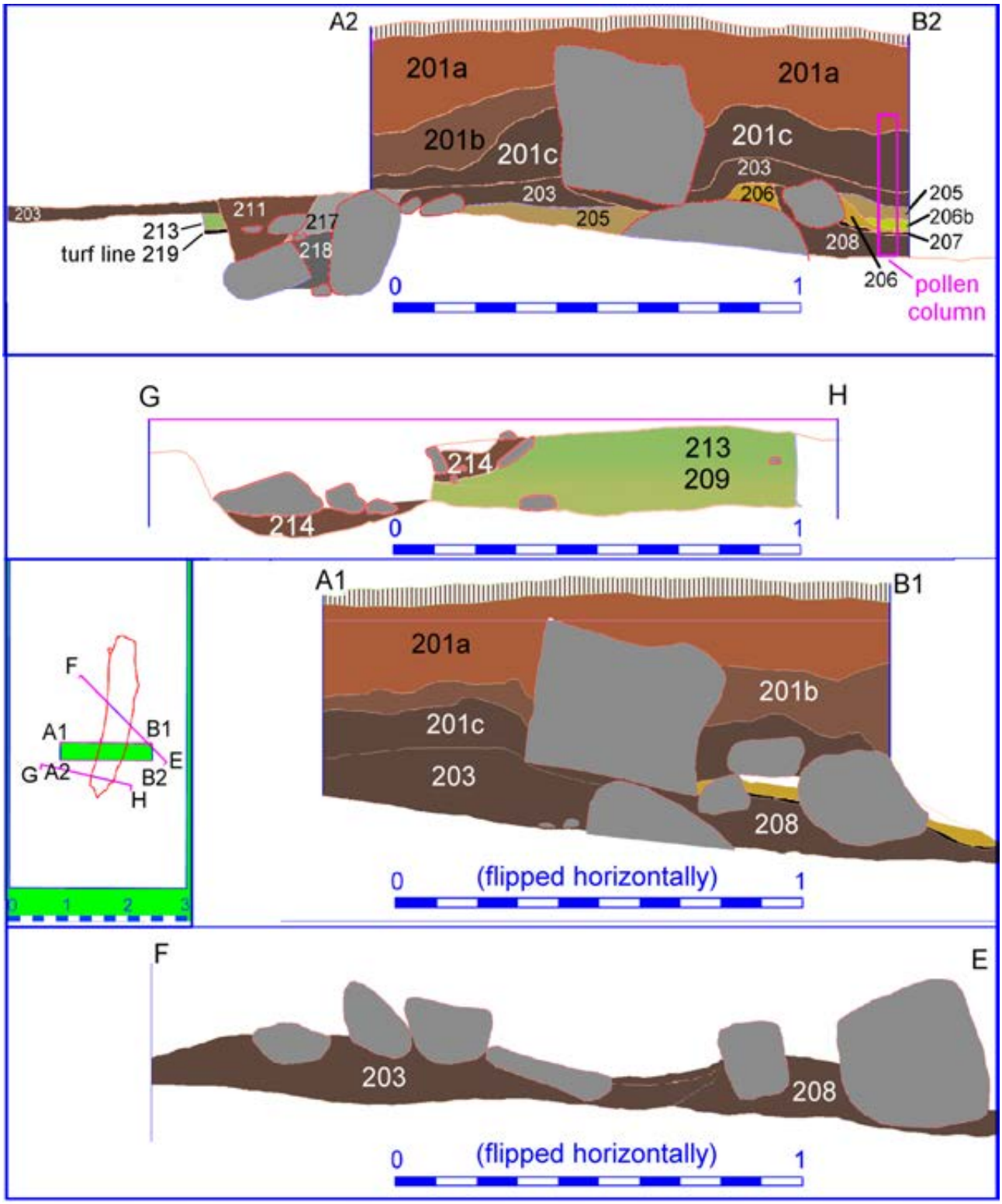
Illus 8.5 Stone 33A from the north-east, with mineral soil 203 around it, on 2 May 1980. The base of Stone 33 is visible beyond the fence [Film 1980.2.10]

The pollen evidence suggests that some peat cutting at Calanais took place in prehistory; but it would be interesting to compare the pollen spectra with those in more recent levels at Calanais Fields and CN2 at Calanais Leobag to see whether there are equally good matches with pre-modern levels.
8.2.3 The fallen monolith

The fallen monolith, Stone 33A, was 2.77 m long. It lay oriented roughly north-south under the top of the semi-fibrous recent peat and with the lower part of its side in amorphous peat (Illus 8.5, 8.6). Its original base was to the south. Its surface was decaying and a small lump ((0.14 by 0.11m) had broken off the southern end of the stone. The lump was found lying in the peat. There was 0.12m of peat (201c) under the southern end of the monolith, separated from it by a small void about 0.1m deep; the void decreased in depth gradually to a point 1.5 m from the north end of the stone. The peat was 0.1 m deep at the northern end of the stone. Sections across the middle of the stone, however, show that locally it had penetrated almost to the bottom of the amorphous peat and had pushed some of it down into the underlying soil 203 which here was much softer than elsewhere. Local bulging suggested that the green-tinged peat 201c had been forced up to either side of the prone stone when or after it reached the position in which it was found (Section A2-B2, Illus 8.6).

The section on the upper panel of Illus 8.6 includes a fragment of the stratigraphy through which the stone pit was cut. Soil 203 overlay discoloured natural greenish clay soil 213 deposited on turf line 219.

On section line G to H (the side of the sondage in Illus 8.7) the turf line was absent. The sondage outside the pit cut only greenish clay soil layer 213 and below that greenish -yellow brown hard compact mineral soil 209. This will be discussed below in the context of early cultivation and in particular the cultivation bed system which provided the evidence for the earliest human activity around Area C.



Illus 8.6 Sections: South face of central baulk A2-B2 [NMRS DC38127], north face of central baulk A1-B1 [DC38119A] and E-F north-east face [DC38119C] and G-H [DC38125D]

Illus 8.7 The sondage (Section G-H on Illus 8.6) cut through Pit 212 and 213/209 [Film 1980.13.2]

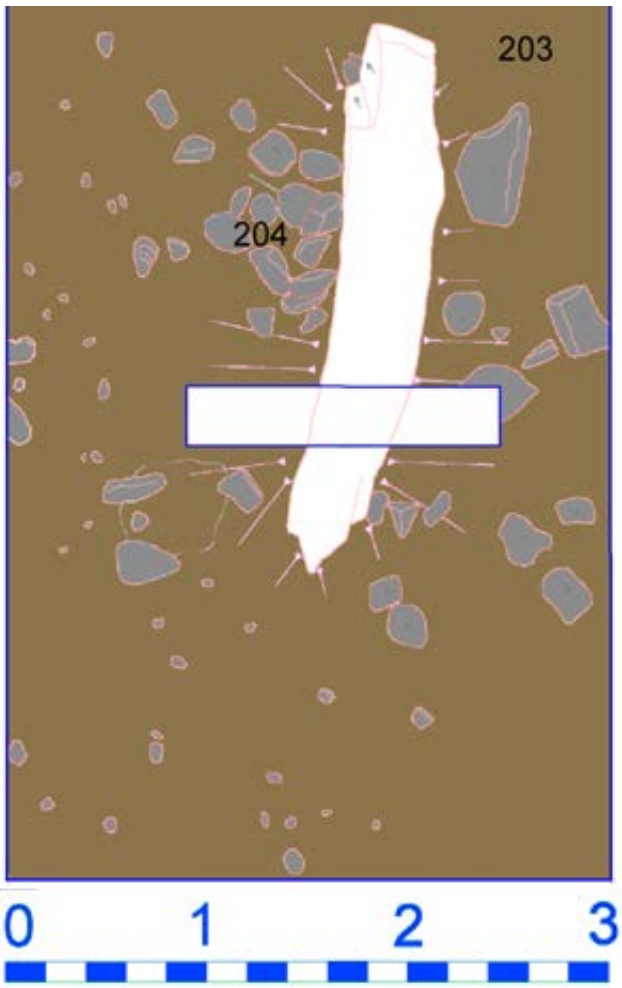
8.2.4 Soil 203/205 underlying the peat

The top part of mineral soil 203 lay directly under peat 201c. As described above the transition to peat growth probably took place between 920 and 400 cal BC near the end of CaN-3d (still a fairly wet period judging by plants growing at Calanais Leobag) when the few birch and alder trees growing locally to Calanais Leobag, were abruptly lost. Heather was abundant. Charcoal fragments are not recorded from a time between 920-260 cal BC and 780-120 cal BC. Dry grassland started to spread.

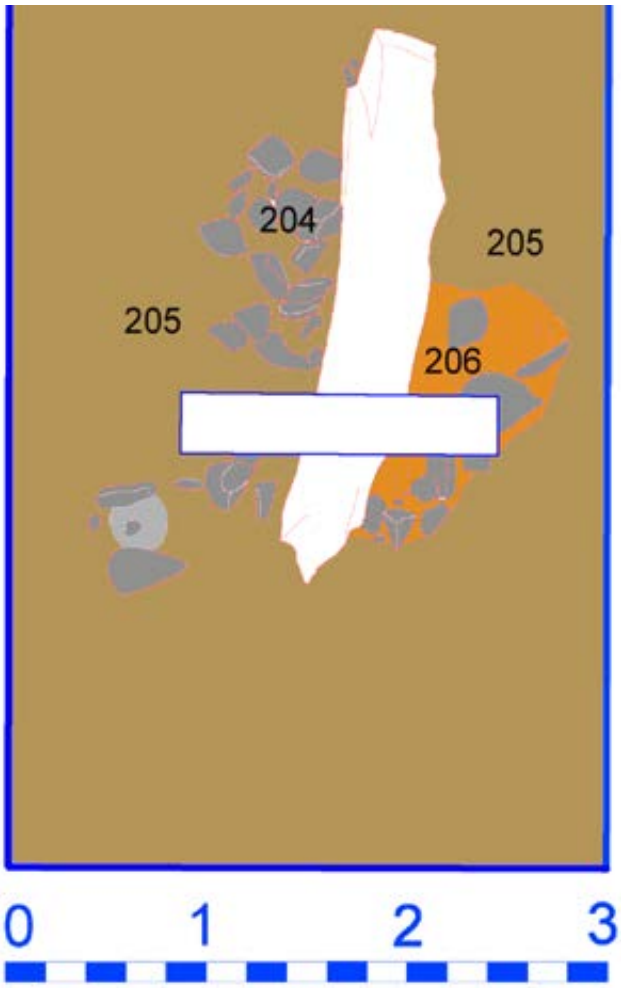
Although the top half of soil 203 was sampled in Box 3 of the Kubiena box profile, the loss during storage of the underlying Box 2 made interpretation of the pollen in lower 203 and 205 impossible. However, cereal pollen was absent near the top of 203, and it seems likely that it corresponded to a period when the area was surrounded by pasture.

Soil 203 was 4 to 5 cm deep, had a high humic content and contained fragments of decayed stone and quartz chips. When dry it was medium brown, but when wet it could look almost black. Where it covered the small cairn of stones 204 it had a higher humic content than elsewhere. Soil 203 contained a chert flake (58/80).

A compact mineral soil 205 underlay 203. It had a slightly lower humic content. There was no sharp division between them; a possible ard mark 222 was noted in 205. Soil 205 overlay a greenish, yellow brown hard compacted mineral layer 209, except under the mound described below where possible turfs 206b and possible turf line 207 intervened.



Illus 8.8 Cairn 204 on 3 May 1980 [Plan 1 NMRS DC38117 part]



Illus 8.9 The top of capping 206 (small stones have been omitted from soil 205) [Plan 2 NMRS DC38118 part]

8.3 Mounds of stones and soils

Stones and soils including 203 formed part of a long low mound, where the monolith lay. They suggest that the immediate area of the fallen stone was used for agriculture (and perhaps pasture) leading to gradual stone clearance although, as described below, movement of the stone after its discovery during peat cutting in the 19th century or earlier complicated interpretation.

8.3.1 Stones 204 west of the monolith

Around the monolith, large stones 204 were set under and in soil 203 (Illus 8.6-8). On average they measured about 0.15 by 0.15 m; the largest was 0.63 by 0.35m. They were concentrated to the west of the monolith where some of them were heaped against its side. Here the soil between the stones had a high peat content and was often very soft and sometimes vacuous. In the basal soil 209 there were soil changes suggesting the presence of a roughly circular feature corresponding in area to the mound.

8.3.2 Eastern stones 204 and stones and clay 206

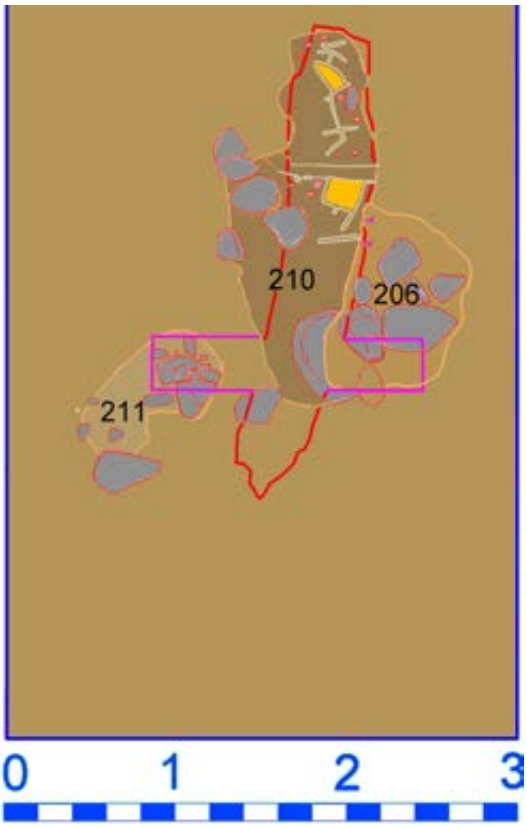
The eastern stones at the level of 204 sat under and by the fallen monolith and were set in the slightly clayey peat mound 208 and capped by orange/brown humic rich clay 206 (, 8.10 8.9).

In the top of clay 206, were two sub-rectangular patches of greenish-yellow clay 206b (Illus 8.11). They were probably the bases of turfs.

Illus 8.10 Mounded humic clay 206 over and among stones 204 by the monolith 3 May 1980 [Film 1980.3.20]

Illus 8.11 Possible turfs 206B in layer 206 [Film 1980.7.19]

Illus 8.12 Turf line 207 under mounded soil 206 [Film 1980.8.8 part]



Illus 8.13 The extent of the lower part of soil 206 and mineral layer 210. The positions of the monolith and temporary baulk are outlined in red [Plan 7 NMRS DC38123 part]

Illus 8.14 Cairn 223 [Film 1980.4.7]

8.3.3 Turf line 207 and organic mound 208

Clay 206 sat on a thin blue-black possible decayed turf line 207, which itself overlay a slightly clayey soft greasy black mound 208 (Illus 8.12; Section A2-B2 on Illus 8.6). Although described as peaty in the Day Book, this greasy black material may have been composed of some other highly organic material. It overlay mineral soil 209 (which elsewhere underlay soil 205). In mound 208 were five small wall sherds with indistinct close-set oval impressions in rows (Cat 558-562 ASH 74). These probably came from a Food Vessel (see Ch 18.8).

8.3.4 Soil 210

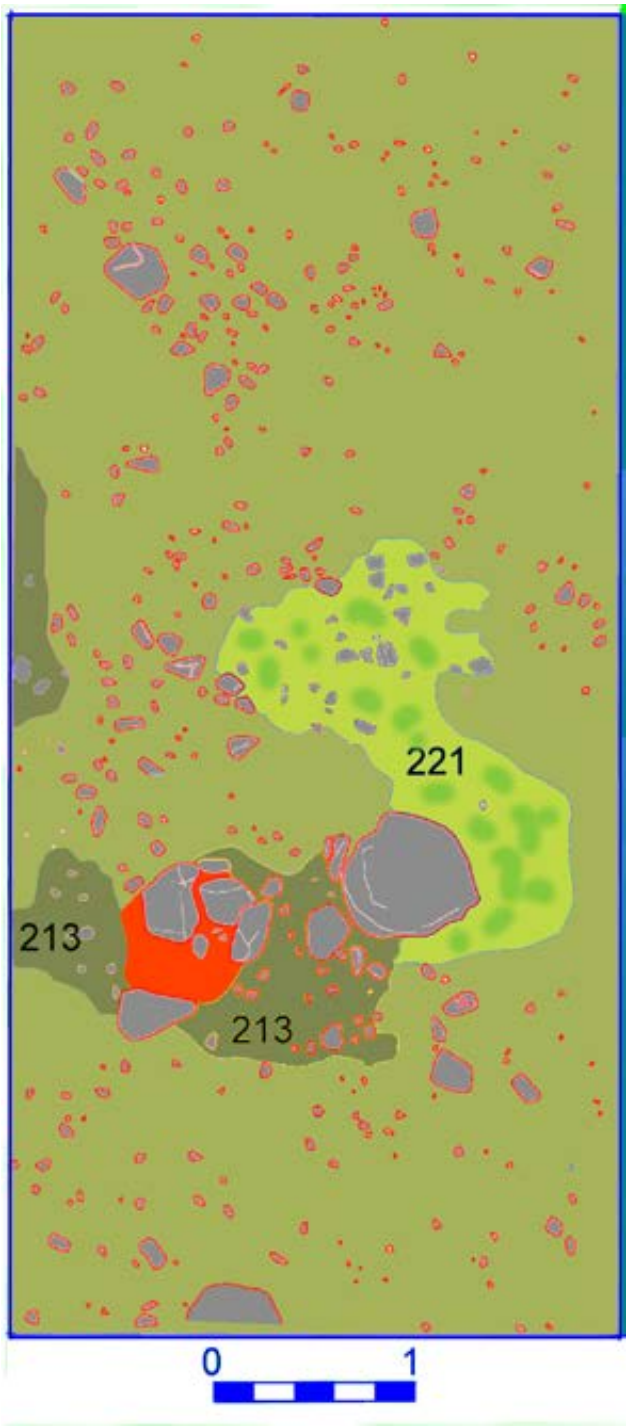
Under the fallen standing stone and apparently roughly contemporary with the mineral soil 203/205 was a compressed mineral soil 210 with outlines of what may have been turfs. It was probably compacted after the monolith was put in the position in which we found it; it is not clear that it was truly distinct from 203/205.

A cairn of small stones (223) on the west side of the monolith was mixed with soil 203/205 (Illus 8.14). It does not seem to have been planned in full although some of the stones were included on Plan 7 (Illus 8.13). It and soil 210 lay over a soil (221) local to the mound area, which extended under the area of the eastern mound and in turn lay over, or more probably formed a variant of, the greenish, yellow brown hard compact mineral layer 209 which underlay most of the area.

To the west of the mounds were other patches (213) of what may have been discoloured but otherwise little modified natural on top of soil 209. They may be evidence for mounds of material which had been ploughed out during the formation of plough soil 203/205.

8.3.5 Discussion of the mounds

The western mounds looked like clearance cairns. As discussed in Chapter 24: Discussion and Conclusions the width of the linear raised area on which the fallen standing stone lay was greater than that of most of the (earlier) cultivation beds at Calanais. It may have formed a boundary between cultivation areas, or possibly the presence of the East Row on an original cultivation bed



Illus 8.15 Patches of discoloured clay [Plan 12 NMRS DC38128]

had led to its omission from further ploughing. If so its use for dumping stones and weeds would be explained.

The eastern mound looked hardly more impressive than a small clearance cairn. It was sampled in Kubiena box 1 (35 to 28 cm). It contained a relatively large amount of Plantago and Cerealia-type pollen. The preferred archaeological interpretation is that it was a decayed mound of weeds and stones with attached soil. If that is correct then the pollen in the mound perfectly represented the surrounding vegetation at the time it formed in CaN-3aii, when agriculture and cattle breeding were practiced, following a period in which agriculture predominated. The transition to CaN-3aii probably dated to sometime between 2770 and 2360 cal BC. In 206b, the turf-like clay, Ericaceae pollen increased strongly, suggesting the environment at the transition of zone CaN-3a to CaN-3b, dated to between 2560 and 2200 cal BC in the CN3 column at Leobag.

The mound contained a small cluster of worn (wear group 3) sherds of pottery probably from a Food Vessel (Cat 558_562; ASH 74) which could date to anywhere between about 2100 and 1700 BC (see Chapter 18.8). The palynological dating of the mound to before the start of this period reduces the likelihood that the sherds had been in a cultivation soil and were collected and placed in the mound with weeds, which was the preferred explanation when the pottery was thought to be of an earlier type. Another possibility was that it was a token burial; bone did not survive well at Calanais. The deposit was not tested for phosphates.

8.4 The stone pit and socket

8.4.1 Description of the stone-pit and socket

Socket 211 contained three layers, humus rich sandy clay (216) over brown silty sandy clay (217) over very dark grey slightly greenish greasy clay (218) (Illus 8.17). Less than a metre west of the base of the fallen monolith was a shallow socket hole (211) in a pit (212).

The pit and socket first appeared in soil 205. In Illus 8.18 it is visible as a roughly circular grey area against a browner background

Illus 8.18 and Illus 8.19 correspond roughly to the plans in Illus 8.13 and 8.15.

The surrounding pit 212 measured about 0.8 m by 0.8m by 0.32 m deep. Inside it were well preserved remains of the packing stones (224) which had chocked the monolith. On the south edge of

the pit was a packing stone which had been dislodged when the stone fell northward (Illus 8.20).

The match between the foot of the fallen monolith and the packers seemed excellent from visual inspection and measurements. Most of the packers were left in place because it was envisaged that re-erection might prove possible (see Chapter 8.6).

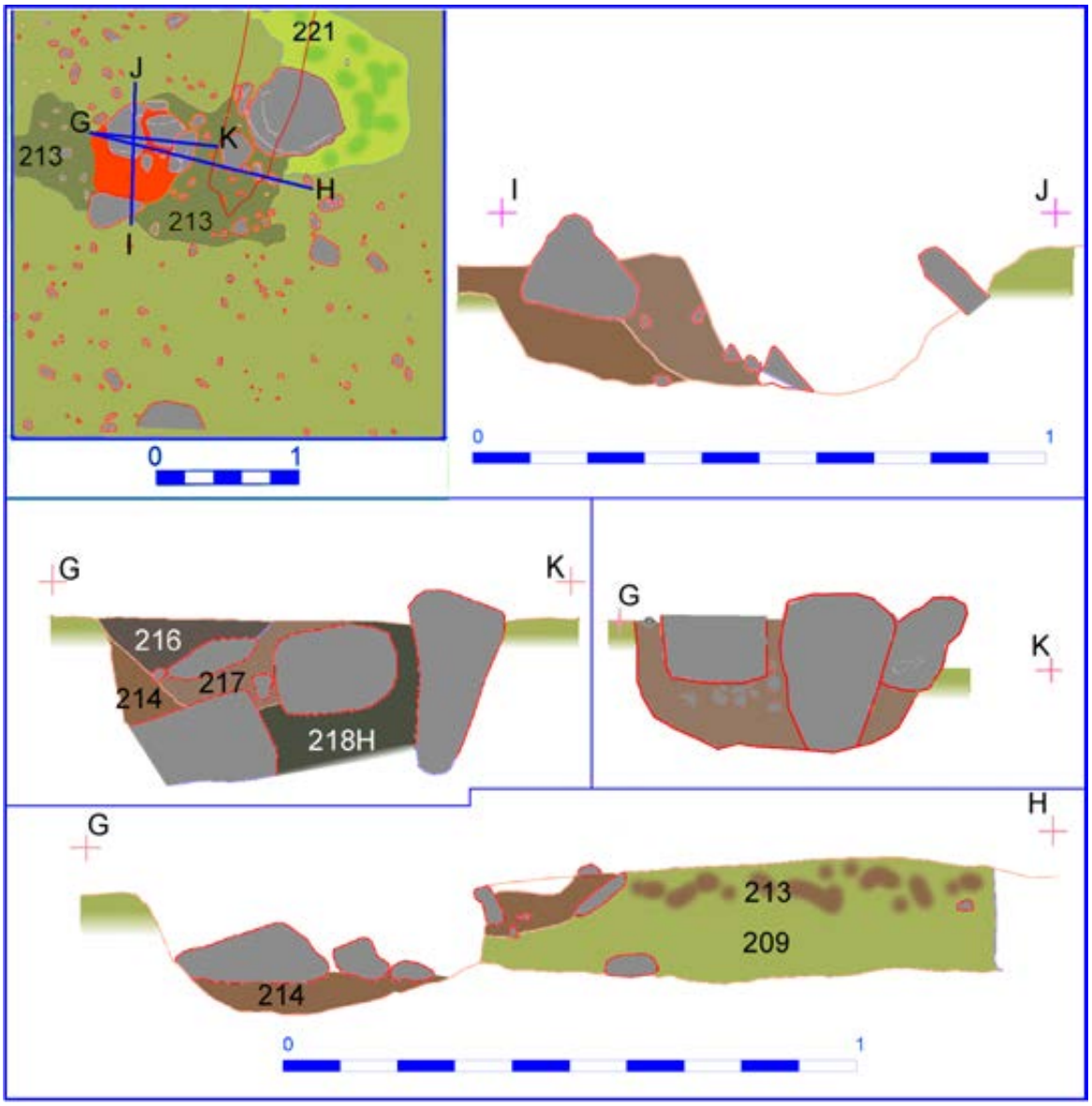
8.4.2 Discussion of the stone pit and socket

There was no evidence to suggest when the stone was erected. There was only a little for when it fell. The stone socket did not contain any peat, which suggests that the area was free of peat when the monolith fell. That means it must have fallen before peat started to cover the site for there was no period between the time when peat started to grow and the present day that it was absent. Its fall thus dates to before 920 to 400 cal BC (See Chapter 8.2.2) when peat growth initiated.

The pit was not seen in the upper part 203 of soil 203/205 despite the fact that we were looking for a possible stone hole. It was however visible in the lower part 205 of that soil, albeit only as a slight colour difference (Illus 8.18). This suggests that it had fallen considerably before peat covered the area and that there had been time for the stone hole to fill up and for soil processes (or ground working) to remove most traces of its difference from the surrounding soil before it was covered by peat.

It was clear during excavation that the stone had fallen or been dumped onto the top of the thin black basal amorphous peat. Yet the mounds of pre-peat material stuck through the black peat in places, and at the south end there was a void between the fallen monolith and the peat. Therefore the monolith reached the position in which it was located not long after the local peat had been almost completely cut away. Further, the south end of the stone was half a metre away from where its socket was located in 1980. The simplest explanation is that the stone was discovered towards the very end of local peat cutting where it had long

Illus 8.16 In the foreground the basal cairn and, to the left of the low baulk, stone pit 212 partially emptied on 16 May 1980, from the east [Film 1980.8.8]



Illus 8.17 Sections across the pit 212 and socket 211 [NMRS DC 38125]

Illus 8.18 The south end of Stone 33A and the top of socket 211 from the west on 9 May 1980 [Film 1980.6.4]

Illus 8.19 The socket partially emptied around 20 May 1980 [Film 1980.9.13]

Illus 8.20 Stone pit 212 partially emptied on 22 May 1980, from the west [Film 1980.10.13]

since fallen, and was moved - perhaps just rolled over and shifted a metre or so to see what was underneath it.

8.5 Early soils and possible cultivation beds

8.5.1 A possible cultivation system and other features

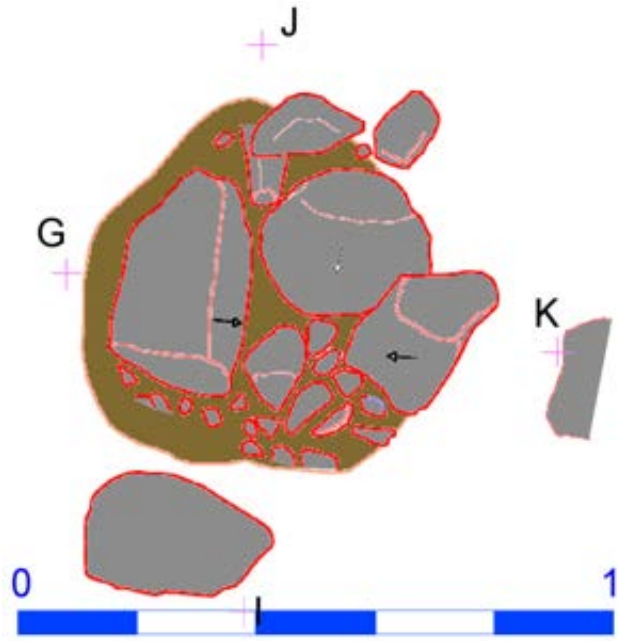
A slot trench was cut along the east side of the trench to allow the section to be drawn (Illus 8.22). It revealed an undulating interface between soil 205 and soil 209. No plan of the features visible in the top of soil 209 was made. They were recorded in the photographs on Illus 8.23 and they are interpreted below.

To make up for the lack of a final plan the perspective tool of the graphics program GIMP 2.6.12 was used to rectify the excavation details on the last photograph of (most of) Area C (Illus 8.24, 8.25). Trial and error demonstrated that to reduce inaccurate stretching of the photograph it was best to first warp a simplified version of Plan 12 (Illus 8.15) to fit the photograph, copy the resulting composite image, and fit it to back to the simplified plan. The match is slightly imperfect (on Illus 8.25 elements of Plan 12 can be seen as light blue outlines slightly out of place by the stone pit and stones) but not enough to cause problems.

Nevertheless, judging by the relationship of pan elements on the image there is some over-stretching of the top of the rectified photo. Before further excavation in this area is planned the photo should be rectified using software designed to rectify oblique air photographs.

Two interpretations are presented; one has the linear features as the troughs between cultivation beds while the other is more cautious (Illus 8.26).

In the interpretation of the linear features as parts of a cultivation system, beds ran roughly east-west separated by irregular strips of somewhat less stony soil, perhaps corresponding to silts in the top of troughs separating the beds. There were four possible troughs. They are shown on the left hand side of Illus 8.26 and they are marked



Illus 8.21 The pit and packers [NMRS DC 38125)

with white spots in the photographs on Illus 8.23.

The right-hand panel was drawn from the rectified photograph (Illus 8.25). The circular feature could be seen as a small ring ditch but may instead be alterations to the soil caused by a subsequent mound 204 (Illus 8.8).

Comparison of the two interpretations suggests that they need not contradict one another. Taken together they imply that there may be substantially more archaeological evidence for features of several periods than we recognised at the time. Amongst them may be cultivation beds and troughs (or perhaps paths between beds rather than dug features). Clearly only further excavation can test these possibilities. However description and discussion will proceed on the basis that there were cultivation beds present.

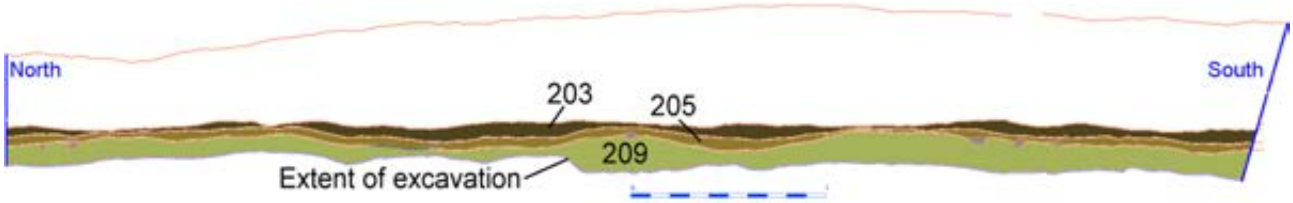
The difference in height between the top of the beds and top of the troughs was under 0.1 m and the 'wavelength' varied between 1.4 and 1.6 m. The cultivation bed in which the stone hole is cut (light olive-grey on Illus 8.26) appeared to be significantly broader than the others. Perhaps instead it marked a division between cultivated areas.

In this bed, about 60mm under the top of the compact mineral layer 209, immediately to the west of the stone-pit, was a turf line (219) under what looked like redeposited soil 213 (see Illus 8.6 Section A2-B2). But a sondage (Illus 8.21 G-H, Illus 8.25)) cut through the side of Pit 212 and greenish-brown soils 213/209 to the east did not reveal the turf line below 213.

8.5.2 Discussion of the cultivation beds

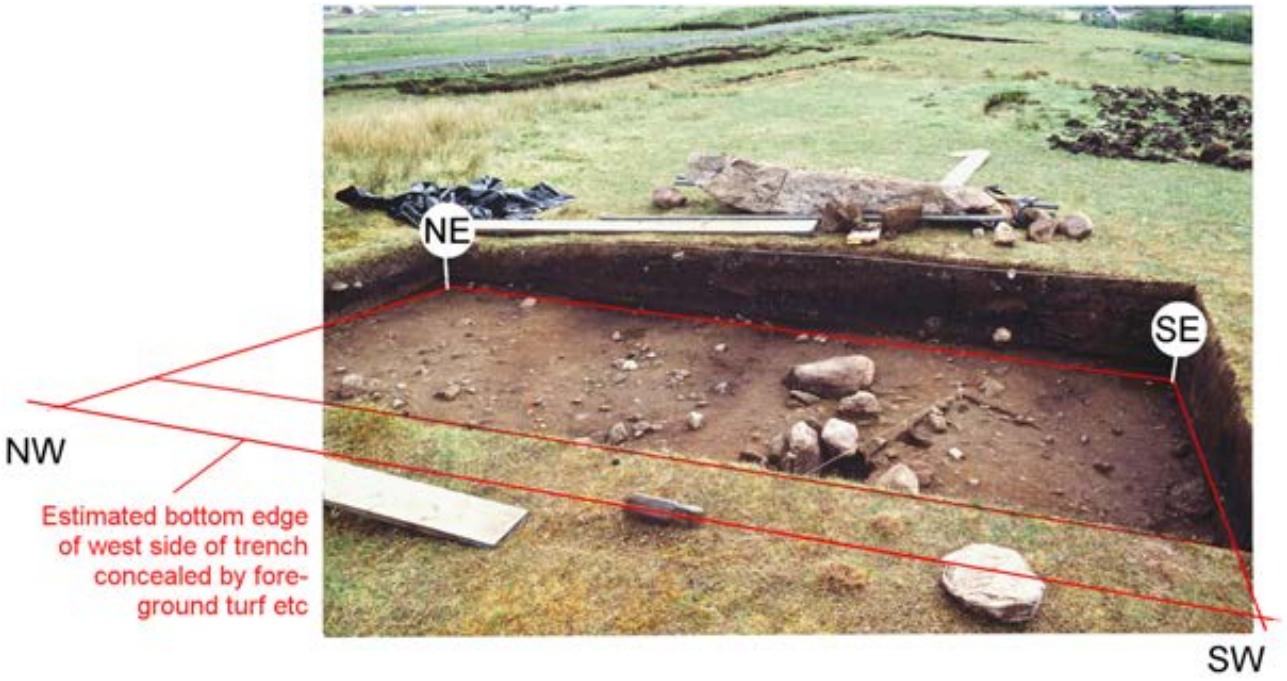
The small patch of turf line 219 identified at a depth of about 60 mm immediately west of the pit probably does not indicate a widespread turf line under a cultivation bed. Cultivation beds elsewhere at Calanais consistently lacked underlying turf lines. Perhaps the turf line was a sign of intermittent silting up of the trough, as seen at the south end of BV. It may be that it was not found to the east of the pit because the sondage there (visible on (Illus 8.25) did not cut a trough, which is what the photograph suggests. Indeed so little was seen of turf line 219 that it may have been a turf used to build up the bed, as seen in DII; or the fill of an unrecognised feature.

Mound 208 with a possible funerary deposit containing pottery lay above the beds, suggesting that they dated before 1700 cal BC, the latest likely date for these probably Food Vessel sherds. Similar cultivation beds were found on Areas B, D and H in and to the east of the Ring. Only one bed and trough was fully excavated, on Area DII. Pollen and stratigraphy suggested that it belonged



Illus 8.22 The soils overlying possible cultivation beds in the east baulk [NMRS DC38124 part)

Illus 8.23 A possible cultivation bed system [Film 1980-12-20, 13.19 and 13.20]



Illus 8.24 Rectification of photograph 1980.12.20

just after the start of Pollen zone CaN-3a and just after c. 3000 cal BC.

The cultivation beds at Calanais (if that is what the features in Area C were) were earlier than peat growth initiation between 920 and 400 cal BC. This date span, which combines radiocarbon and pollen zone information, can be compared and contrasted with the dates from basal peat over a cultivation bed system at Calanais Fields on relatively low lying ground southwest of the Calanais stone setting (Flitcroft and Johnson; Johnson et al forthcoming). There, basal peat from Trench 14 produced an age of 2222+/-37 BP (OxA-10091), and basal peat from Trench 5 produced an age of 2380+/-37 BP (OxA-10120). They calibrate to 760 to 380 cal BC, and 390 to 180 cal BC, respectively.

The rest of the probable cultivation-bed system at Calanais is discussed in Chapter 24: Discussion.

8.6 Re-erection of Stone 33a

During excavation the stone was lifted from Area C and laid down on nearby peat.

During the period that it lay near Area C I assessed how easy it was to move. I was then 34 years old, of average height, generally fit but without unusual upper body strength. I found that I could roll it without much effort, even without levers. I could lift it a little at one end or the other. So it could have been erected originally by a very small number of people without any mechanical aids, although a few ropes and levers would have been helpful.

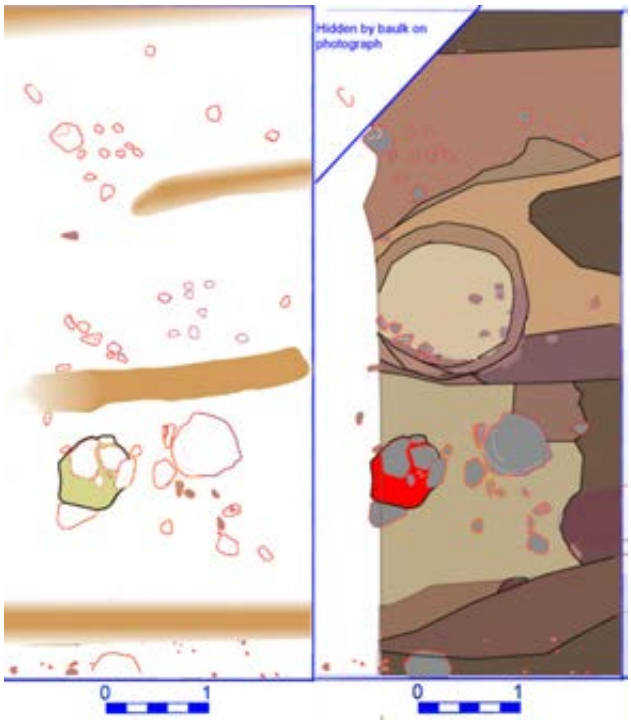
Carloway Estates and Mr Morrison, the crofter, kindly agreed in 1982 that the Secretary of State could acquire a parcel of land including Area C. Excavation had shown that the packers in the stone pit and that foot of the fallen monolith matched each other. Arrangements were made for its re-erection. On 20 July 1982 it was set up in its original socket.

The match between the socket stones and the foot of the stone was amazingly good, and there can be no doubt that the stone now stands, to within a few millimetres, in the same three-dimensional position and with the same orientation as it had stood before it fell.

Re-erection was recorded and broadcast by the BBC, and an account was published in 1983 (Magnusson 1983; Ashmore 1983).

Illus 8.25 Rectified photograph

Illus 8.27 Moving Stone 33a in July 1982 [Film 1982.33A.48]



Illus 8.26 Possible features on Illus 8.24

Illus 8.28 The foot of the stone descending towards the socket in 1982 [Film 33A-16]

Illus 8.29 The foot of the stone matching the socket stones exactly after a little rotation and adjustment of its horizontal position [Film 1982.33A.29]

Illus 8.30 Stone 33A re-erected, from the east [Film 1982.33A.12]

9. Area D

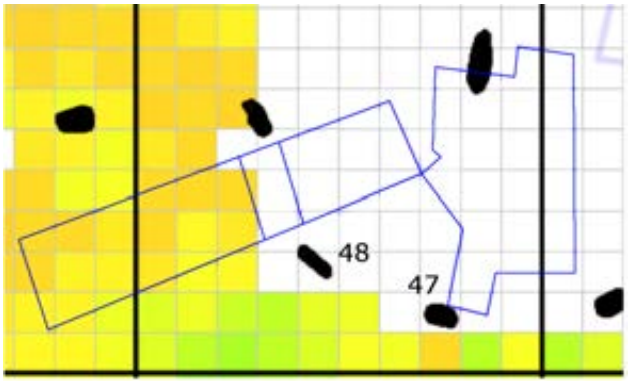
Illus 9.1 Laying out Area DI, from the south on 3 May 1980 [Film 1980.2.19]

9.1 Introduction

The excavation of Area D was supervised by Mrs L Linge in 1980 and by Miss J Comrie in 1981. The areas inside the Ring were not completely bottomed. It was not possible to arrange a third season of excavation, because of the workload within the Inspectorate of Ancient Monuments.

9.1.1 General aims

The presence of the built-up section of Lady Matheson's Path was intriguing for the possibilities it offered in understanding Victorian attitudes to Calanais. Excavation of the area also offered the opportunity to test the relationship between the central monolith and the cairn. It also allowed an examination of an area close to the Ring but without obvious disturbance. It promised an opportunity to see whether there were hidden phases of activity.



Illus 9.2 Resistivity survey

9.1.2 Resistivity survey

Illustration 9.2 shows the results of resistivity survey undertaken in August 1979, with probes at 1m intervals, as described in Chapter 5: Resistivity Survey. The hues have been adjusted to maximise local differences. The resistivity survey excluded

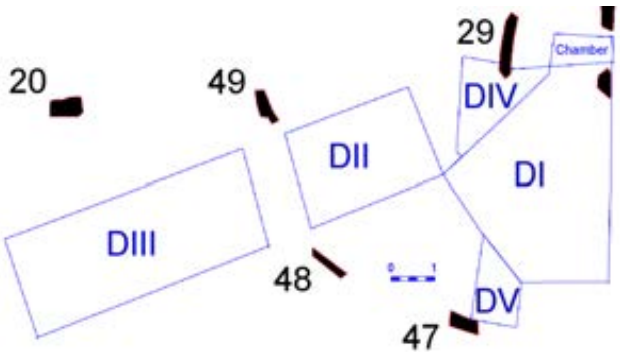
the area inside the ring. No doubt partly because the probe spacing was so wide the survey did not reveal much of interest except that there is a fair likelihood that rock or stones lie near the surface southwest of Ring stone 48 and that there is a feature of some kind south of Ring stone 47.

9.1.3 The layout of Area D and progress of excavation

Sub-area DI approximately covered the innermost half of the SSW octant of the Ring (Illus 9.3). Its east side provided a section through Lady Matheson's Path and the prehistoric layers underneath it. It was intended to allow exploration of the cairn and the area to its south while avoiding the Ring and central monolith.

Two trenches were laid out westward from DI in 1980. DII was the part within the Ring and DIII was the part outside the Ring. We opened Area DIII mainly to view a large expanse of relatively undisturbed subsoil to guide excavation in other areas. A subsidiary desire was to test the possibility of features concentric to the Ring. DIII included a stony area noted during the 1979 resistivity survey where Maclagan had suggested that there might once have been a standing stone (Chapter 3: Previous Studies Illus 3.41). Area DII, inside the Ring, was intended to link areas DI and DIII.

The pre-excavation topography suggested the presence or erstwhile presence of mounds round the bases of Ring Stones 48 and 49. A baulk with its east side running between the proximate corners of the standing stones was left between DII and DIII. It provided a section and minimised the possibility of weakening the standing stones' packing.



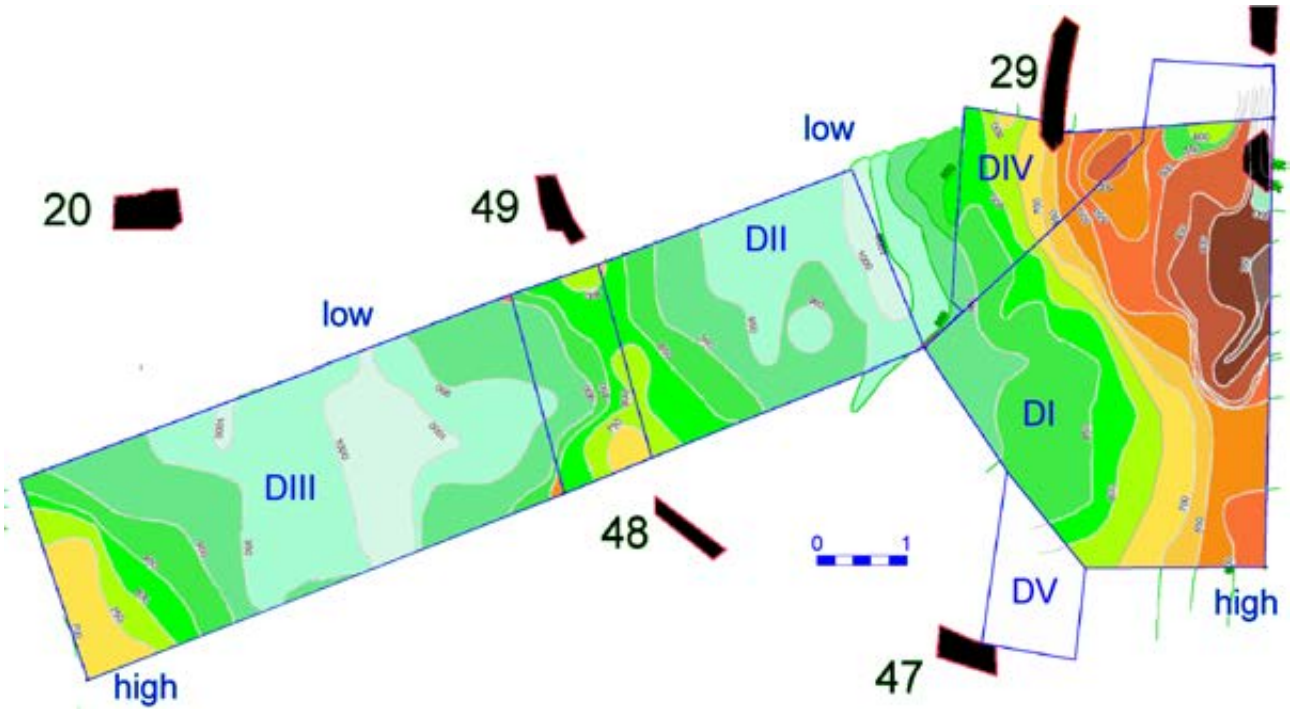
Illus 9.3 Final layout of areas with area numbers [NMRS CSD WDD14]

In 1981 the main area DI was extended into the chamber of the cairn and complemented by a small area, DIV, opened mainly to clarify the relationship of the cairn to the central monolith and to improve the understanding of the relationships between layers in DII and those in DI. A baulk between it and the main Area DI was maintained during the early stages of its excavation in 1981 but once the uppermost layers corresponding to the main period of damage to the chambered cairn had been excavated the baulk was removed to allow the layers in DI and DIV to be excavated together.

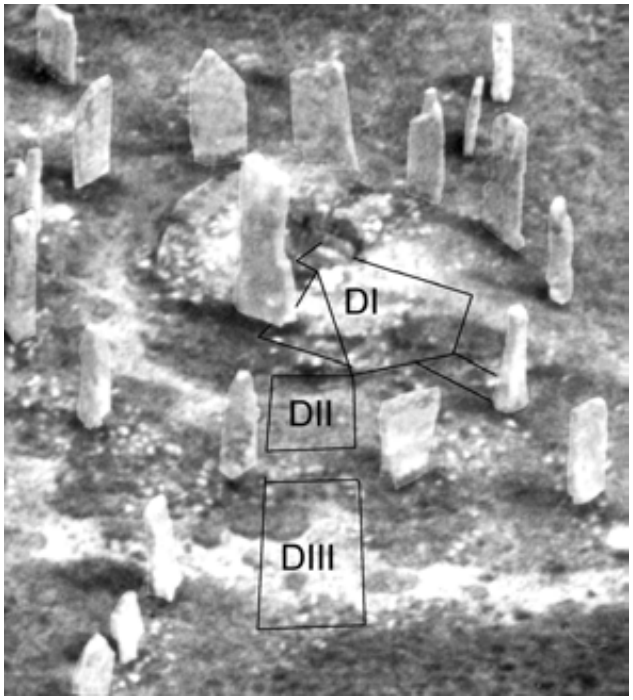
Area DI was extended southward by opening Area DV. The hope was that the layers in DI could be related to the socket of Ring stone 47, and any mound round its base, although that hope was realised only in a most general way. DV conjoined DI and no baulk was maintained between them.

The lower layers in Area DI were difficult to excavate, to record and to interpret. Under a plough soil with abundant pottery and charcoal, associated with dilapidation of the cairn, the area contained numerous thin layers, many of which had been truncated in prehistory. They included black turf lines with thin underlying green to light grey clays. In the area of the cairn and monolith thin layers of clean clay had been deposited on turf more than once and it was hard to work out the relationship between spatially separate sets of black and green/grey layers.

The time taken to remove the cairn of the chambered cairn in the northern part of the site meant that the lower levels in the southern part of the area were excavated ahead of sequence. But even in that southern part, the green natural clay was reached only in narrow sondages. In most of the main trench, DI, about 0.1 m of basal layers remained unexcavated. There seem to have been three or four cultivation beds with a wavelength of about 1.5m. They overlaid part of a curving ditch. Only an incomplete story is possible for this and any other features preceding the cultivation beds.



Illus 9.4 Pre-excavation contour survey at 50 mm intervals [NMRS DC38130 on working drawing CSD WDD14]



Illus 9.5 Extract from NMRS CUP RA35 of 16 July 1955, taken from the west

9.1.4 Context numbering

Context numbers were initially in the range 300 to 399, and when those ran out, numbers 900 to 999 were assigned, of which numbers 900 to 944 were used. The numbers were shared in sequence between the various subdivisions of the site. For instance, the topsoil in DI was numbered 301 but immediately succeeding numbers were used in DII and DIII and the second context in DI was numbered 308.

9.1.5 Contour survey

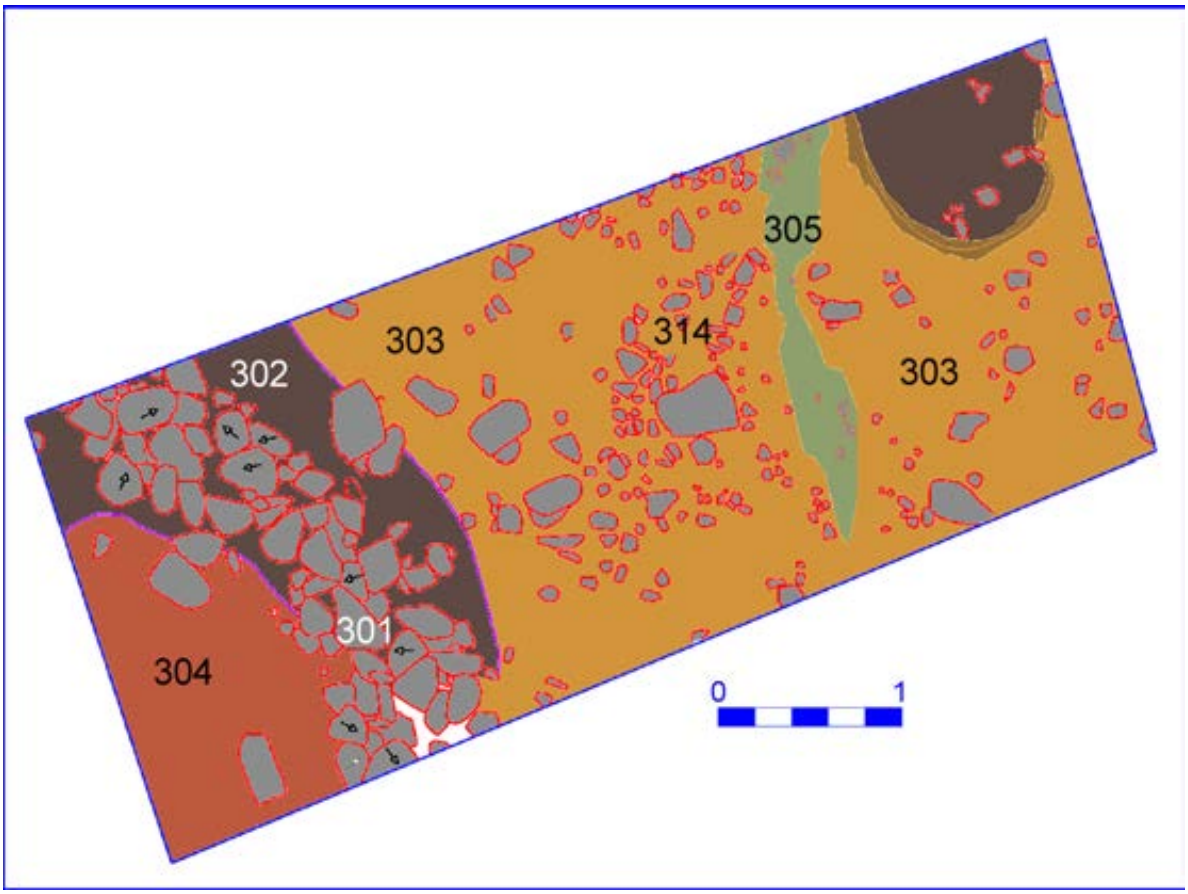
Illus 9.4 shows the contour survey superimposed on the final layout of areas; heights are below local datum. Blues and greens signify low areas and brown to dark grey denotes high ones. The survey shows the raised area of the cairn to the right and a ridge between Ring stones 49 and 48. The rise at the west end of Area DIII was associated with the edge of peat left in 1857 (Illus 9.2 and 9.5).

9.2 Phase 18: Victorian and later activities

9.2.1 Introduction

Relevant documentary sources for Victorian peat cutting and other activities are discussed in Chapter 4: Introduction to the fieldwork. They suggest

Illus 9.6 DIII after removal of turf [Film 1980 BR-1-9]



Illus 9.7 Area DIII Features revealed after removal of topsoil and the upper layer of peat 302 [Plan 4 NMRS DC38132]

Illus 9.8 Stones 301 to the left and 314 to the right [Film 1980.5.5]

that Area D was completely covered with peat until 1857. Judging from the sources the peat formed a mound up to 1.5 metres tall near the central monolith. The area stripped in 1857 formed a rough circle round the Ring with extensions along the rows and avenue. The tip of Area DIII was set at the angle in peat-cutting between the circular area and the south side of the extension along the west row.

The stones in Illus 9.5 have been digitally enhanced and the outline of Area D is shown. The photograph shows that in 1955 the turf had been eroded over much of Area DIII and the cairn in DI. Topsoil finds in Area D included assorted glass 195/80, 627/81 and 628/81, china 196/80 and a George IV ½d 625/81. Less diagnostic finds included worked stone 531/81, quartz 600/81 and quartz chips 603/81 and 611/81. A piece of pot 248/81 was not included in the catalogue of prehistoric pottery. During removal of backfilled topsoil in 1981 more quartz was found (515/81, 565/81 and 572/81) along with a piece of flint 482/81 and a piece of Hebridean incised ware (Cat 330 ASH 36).

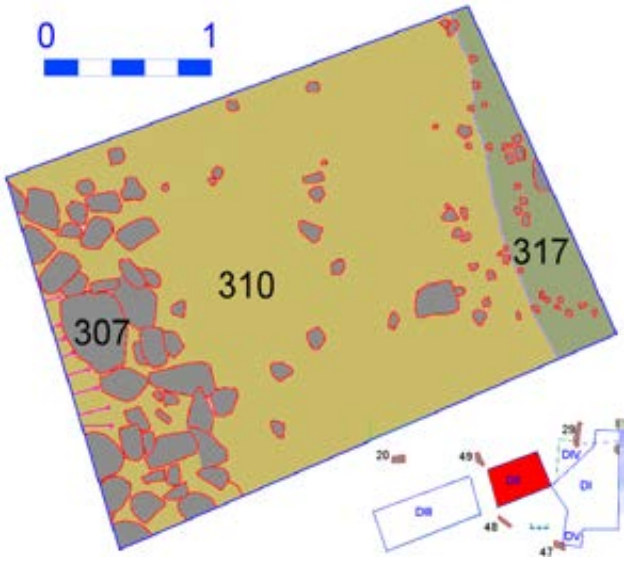
Victorian and later activities will be discussed from DIII in the west through DII to the small area DIV west of the monolith. Description and discussion then turn to Area DI which contained evidence for Victorian repairs, landscaping and creation of a raised path for visitors coming up from Callanish Farm. Disturbances in DV, near Ring stone 47, will be described last.

9.2.2 Victorian and later activities in DIII

In Area DIII the general layer below topsoil was a gingery brown gritty soil 303 (Illus 9.6-9.7). It contained 3 small E/MN non-corky spalls (Cat 971-973). Over the soil in the middle part of DIII was a thin patch of cobbling 314 (Illus 9.5). It contained no finds. There was also a band of quarry dust (305), probably representing a later repair; it contained a piece of glass (80.212) and some charcoal (80.213). The dark patch of turf visible near the northeast corner of DIII (Illus 9.5) coincided with an area of darker soil at the level soil 303 (Illus 9.7).

A 0.3m depth of peat 302 survived at the west end of Area DIII just beyond the area cleared of peat in 1857; a corresponding change in height

Illus 9.9 Layers immediately below topsoil [Plan 5 NMRS CSD-DC38133]



Illus 9.10 Yellow brown clay 310 under stones 307 on 16 May 1980 [Film 1980.8.2]

was visible on the ground (Illus 9.6, 9.8).Where peat survived elsewhere it was much thinner, thickening slightly where it filled hollows and scoops.

Under the surface peat was a shallow peaty hollow, about 0.8 m wide and at most 0.11 m deep (Illus 9.7).In it was a curving unstructured heap of loose stones 301 (Illus 9.7, 9.8). Amongst the stones in the peat were a flint flake (CAT 106), a fresh tooth, a piece of presumably recent cut wood and a glass shard.

9.2.3 Discussion of the features in DIII

As argued in Chapter 4: Introduction to the fieldwork there does not seem to have been any post-1857 cultivation in Area DIII. The uppermost features in DIII thus reflect only the peat clearance, erosion by the feet of visitors, tidying-up and repairs.

The air photograph of 1955 (Illus 9.5) suggests that little turf survived in DIII at that date. The one large patch of turf visible in the photograph left traces on the underlying soil 303 (Illus 9.7). Thus the topsoil found in 1980 may have been imported as part of post-1955 soft landscaping.

The band of stones 301 at the west end of the area, lying loosely in and on the peaty scoop coincided with an angle in the 1857 peat-cutting edge between the circular area and the West Row peat extension. The facts that the stones lined the edge of the 1857 clearance and lay in and overlay peat suggest that the band of stones was created in or after 1857. The modern finds in it could have worked their way through gaps between the stones at any time when turf did not cover them, so do not provide a secure date. The only known problem with this interpretation is that the south end of the peaty scoop and stone pile curved slightly westward. This suggests the possibility that they were in part a disturbed prehistoric structure. An alternative explanation is that there was some irregularity in clearance of the shallow peat at this point in 1857.

The stony area 314 half way along DIII was interpreted as a cobbled path; it seems likely to reflect an attempt to ameliorate erosion.

The peaty stone-filled scoop 301 and cobbling 314 each coincided with a softer area of the natural clay. Perhaps it was the presence of the upper features which led to those variations.

9.2.4 Victorian and later activities in DII

The topsoil (300) in Area DII was rooty and greyish-black and had formed after clearance of peat from the area. A twig, cut at both ends, and four pieces of quartz were found in it. At the east end of the area there was a spread of grey green quarry dust (317). It was part of a patch which occurred also in the nearby corner of Area DI. A band of small stones (307) lay partly within the modern topsoil between Ring Stones 47 and 48. The stones were not firmly set and had no coherent structure.

Under the topsoil over most of the area was a very mottled clay soil (310). It varied from soft brownish-yellow clay in the south to grey brown in the north where it was less clayey and slightly harder (Illus 9.9). Where it had been somewhat protected by the stones at the west edge of the trench it was darker brown (Illus 9.10). Soil 310 produced four small E/MN non-corky or Beaker sherds (Cat 961-962, 963-964).

9.2.5 Discussion of the features in DII

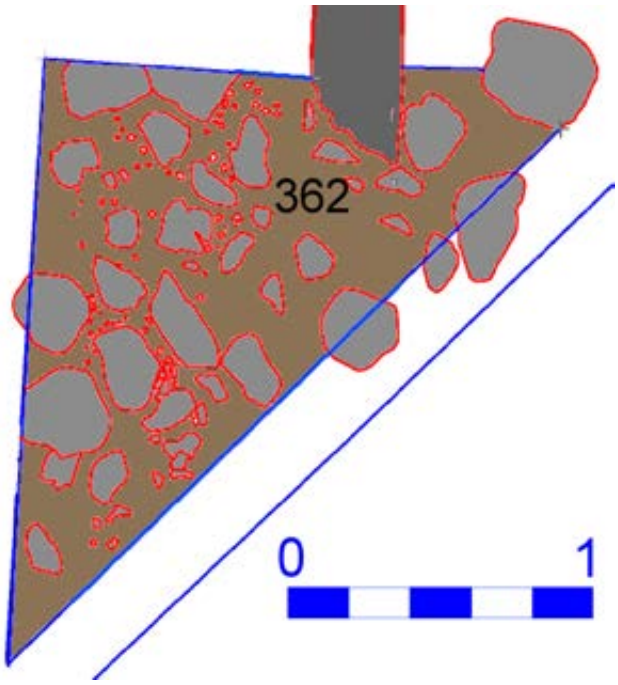
Almost certainly quarry dust 317 was laid down to counter erosion from visitors' feet and stones 307 at the west end of DII were put there during Victorian or later tidying up.

The topsoil and possibly also the upper part of clay 310 may have been imported during Victorian landscaping. Thus layer 310 may correspond to layer 362 in Area DIV and layer 308 in Area DI. More generally soil 310 was the subsoil of the modern topsoil. Thus it may not have been a laid layer but the result of downward migration of iron and organic material concealing original differences between layers of various dates.

9.2.6 Victorian and later activity south-west of the central monolith in DIV

The uppermost layer of stones (363) in the west part of DIV was embedded in topsoil and, in the east part, in a dark brown gritty clay soil (362) with abundant charcoal (Illus 9.11, 9.12). Soil 362 also filled the spaces between the next layer of stones on and by the cairn. It was about 0.15m deep in the eastern part of DIV. It tapered down to less than 30mm towards the south-west corner of the trench. In Illus 9.13 and 9.14 lines of stones apparently formed revetments near the edge of the thicker part of soil 362 at the base of the central monolith.

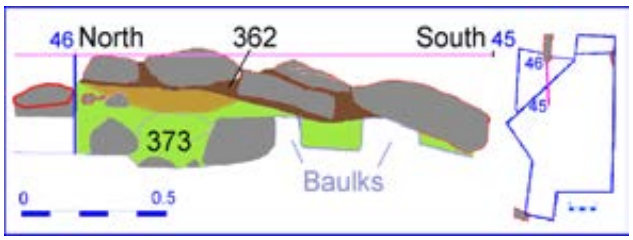
The finds from soil 362 were quartz and chert flakes 556/81, 557/81, 558/81, 559/81, 562/81, 563/81, 581/81, 583/81, flint and chert 476/81, 555/81, burnt flint 560/81, hornfels 561/81, a small pebble 547/81 and glass 645/81). No pottery was found. The pollen from 362 (sample 2083) was assigned to the CaN-3b-3c transition, dated



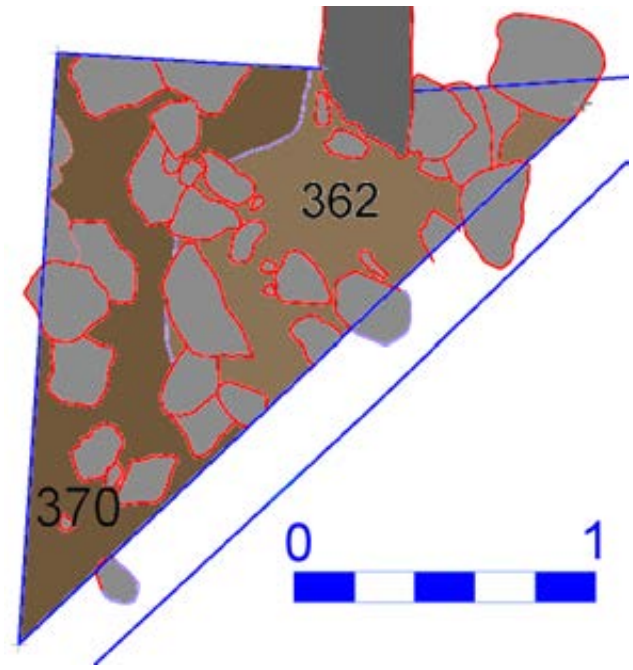
Illus 9.11 The uppermost layer of stones (363) after clearance of topsoil on 8 May 1981 [Plan 39 NMRS DC 38171]

Illus 9.12 Area DIV, to the left, from the south on 9 May 1981 after clearance of topsoil and upper stones 363. The standing stone is the central monolith 29 [Film 1981-5-7 rectified and cropped]

Illus 9.13 DIV in the foreground on 11 May 1981; the standing stone to the left is central monolith 29 [Film 1981.6.18 (part]



Illus 9.14 Stones, soil and clay south of the Monolith [Section 80 NMRS DC38212]



Illus 9.15 Stones 368 at the level of 362 and 370 on 12 May 1981 [Plan 46 NMRS DC38178]

to between 1880 and 1520 cal BC, not reflecting the disturbance demonstrated by the glass.

In Illus 9.12 DIV is at a more recent level than DI. The Victorian high kerb is represented in DIV by one or two stones amongst the upper level of cairn stones 368.

South of the central monolith, soil 362 overlay the orange-stained top of clay 373 (Illus 9.14).

Over much of the rest of Area DIV it overlay dark brown clay 370 with abundant charcoal (Illus 9.15). Clay 370 contained a small indeterminate sherd Cat 974, a flint flake CAT 121, a mylonite flake CAT 31, a quartz flake CAT 122 and 2 pieces of quartz CAT 123.

9.2.7 Discussion of activities in Area DIV

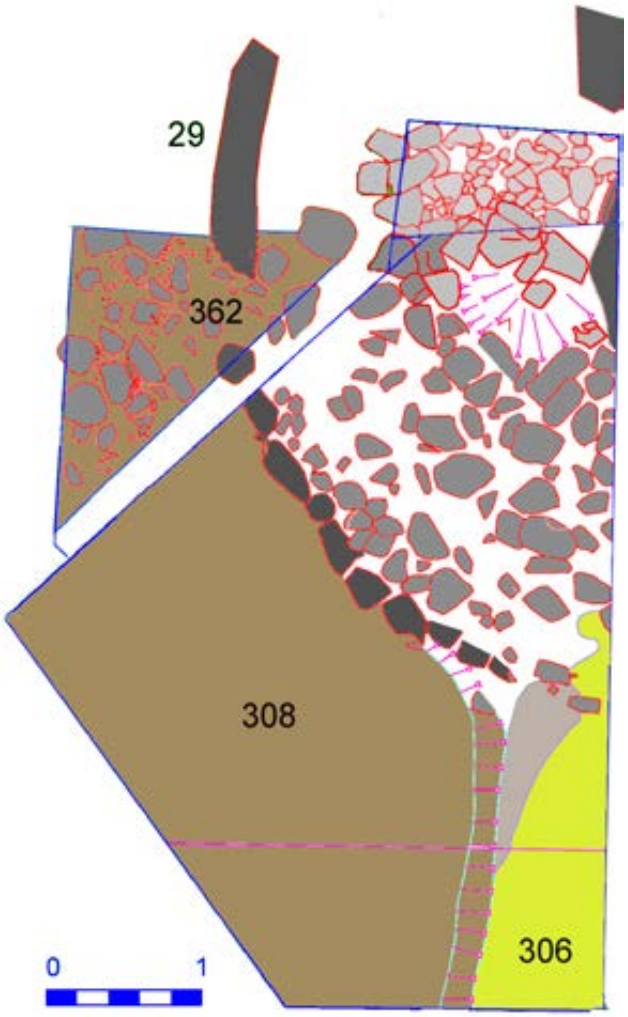
During the 1857 clearance, peat may have been removed right down to the clay at the base of the monolith and to the surviving kerb stones of the original cairn. Possibly the living turf was thrown back onto the bare surface. That does seem to the practise today during domestic peat cutting. But soil 362 probably represents tidying up. Plan 46 (Illus 9.14) gives the impression that a light stone revetment was built and soil 362 was piled inside it before soil was spread more thinly over the whole of Area DIV. That interpretation makes it functional equivalent to the Victorian or later layer 308 in DI. However some possible ard marks were noted at the base of 362 so it may be that it was merely manipulated in-situ during the Victorian period.

Clay 370 may have been approximately equivalent to plough soil 315 which covered much of Area DI outside the cairn.

Given the large number of lithic finds in soil 362 the absence of pottery is odd. It raises a suspicion that any pottery sherds that it had contained were collected manually in the 19th century and taken elsewhere. To a less striking extent the same was true of the underlying soil 370, however, and perhaps the lack of pottery in 362 reflects only its rarity in underlying levels.

9.2.8 Area DI. Lady Matheson's Path and soil 308

Lady Matheson's Path ran from a gate in the dry-stone wall at the south end of the area in state care



Illus 9.16 The Victorian cairn and high kerb, Lady Matheson's Path and soils 308 and 362 [Plans 3, 29, 39 and 46 NMRS DC 38131, DC38160, DC38171 and 38178]

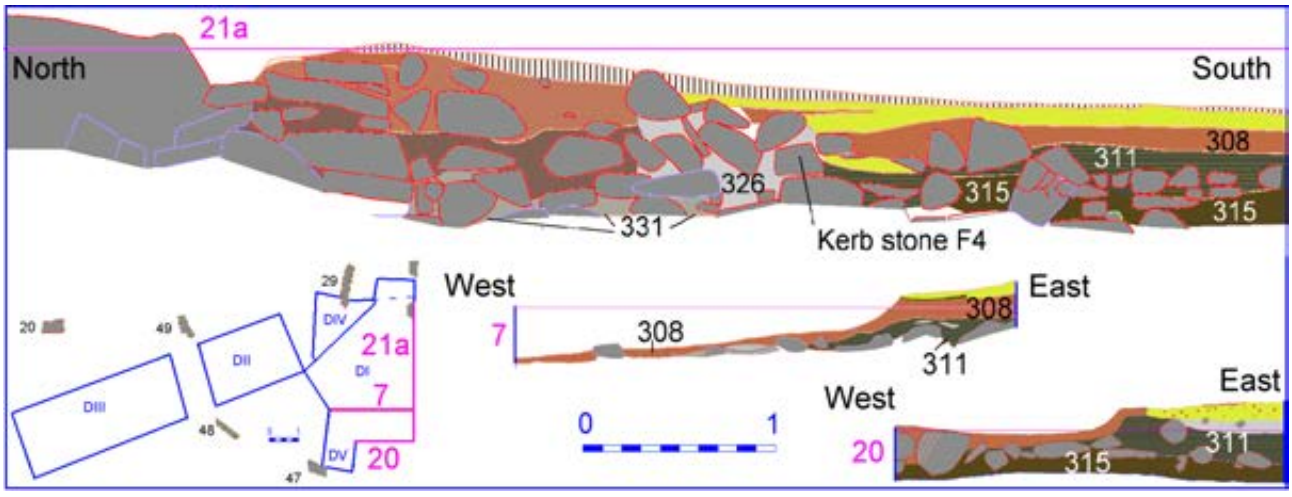
to the cairn. In its southern portion it seems to have been informal. From somewhat north of the middle of the South Row peat was left to form a raised path (see Chapter 4: Introduction to the fieldwork and Chapter 10: Area E). Inside the Ring it was made of stones, peat and gritty clay. It stood about 0.2 to 0.3m above the area outside the cairn and with the adjacent parts of the cairn it formed a stance from which the chamber could be viewed (Illus 9.16).

The present path surface was formed by shallow turf overlying yellow/green material (306) (Illus 9.16 to 9.21). Below that again was a layer of greyish-brown gritty soil 308. Layer 308 spilled westward over the side of the path. It contained a piece of quartz 80.37 and a piece of china pottery 80.209.

Under 308 in the area of the path was a thin band of laid peat. The peat formed a ridge on the west side of the path, as if it had been worn away except at its edge (Section 20 Illus 9.17). To the east of the ridge, below the yellow/green material 306, was a 0.05 m thick layer of grey material flecked with white grains.

Section 21a (Illus 9.17) shows that immediately outside the upper kerb stone of the Victorian cairn, below soil 308, there was a lens of yellow clay like that forming the top layer of Lady Matheson's Path.

Below the yellow clay surface level was a layer of reddish-yellow to grey-brown gritty clay (308).



Illus 9.17 Section 21a, Section 20 and Section 7 (flipped left to right) through Lady Matheson's Path in Area DI [NMRS DC38149, DC38135 and DC38148]

Illus 9.18 Lady Matheson's Path in SE corner of DI, showing the baulk sections above stones 319 [Film 1980 Gen 05]

Illus 9.19 Stone platform 319 half revealed by Section 7 [Film 1980 BR-1-13]

In the southeast part of Area DI it covered a layer of peat turfs (311) with grey cindery inclusions which in turn overlay a layer of large stones 319 to the west of the main path (Illus 9.17-9.18). Gritty clay 308 spilled down to form a thin layer covering all of sub-area DI south of the cairn (Illus 9.16).

9.2.9 Discussion of Lady Matheson's Path

The similarity of the yellow clays in the lower and upper levels of the path suggests that it was a single-period construction, apart perhaps from superficial turf and grit. During construction, before the surface of yellow clay was added, clay 308 was spread over the path and the area to its west.

Laid peat turfs 311 must have been part of the path's construction. The underlying boulders 319, however, spread well west of the path and merit separate discussion (Illus 9.19).

9.2.10 A stone platform

The layer of large stones 319 is for convenience referred to as a 'stone platform' although that is a purely descriptive term and should not be taken to imply any particular function. The gaps between the stones were filled with peat forming part of peat turfs 311, and it was overlain by grey-brown gritty soil 308 (with intervening layers under the Path) (Illus 9.18, 9.19). Although labelled as a platform here, it was composed of tumbled stones and did not have any discernible structure, apart from a fairly neat western edge (Illus 9.20, 9.21). In addition, with the eye of faith, Illus 9.20 and 9.21 seem to show an internal division between sparser stones to the west and more closely spaced stones under the Path.

North of the somewhat sparser western part of the platform, just outside the Victorian cairn kerb, there was a relatively stone-free area of darker soil beneath layer 308 (Illus 9.20-9.22). Thus there was a real gap between the Victorian cairn and the platform. It may be that the northern patch of soil 315 on the main section 21A (Illus 9.17) corresponds to a break between platform and cairn under the path too, but if so it was covered by at least one layer of stones (Illus 9.21).

During excavation we noted that the area next to the platform, albeit fairly free-draining, could become waterlogged for several hours (Illus 9.23). The platform may have acted as a sponge and caused this, or it may have been placed here to provide a dry standing because the phenomenon pre-existed it.

9.2.11 Discussion of the platform

The platform certainly post-dated the prehistoric plough soil 315 and it was immediately overlain by a layer 311 of cut peat turfs forming part of the base for Lady Matheson's Path. There was no visible natural peat formation below the peat turfs. If it was created mainly as a base for Lady Matheson's Path the platform may have been extended over the charcoal-rich prehistoric plough soil 315 to ameliorate the slope between the path and its surroundings and to counter water-logging alongside the path. That would have improved access to the rest of the area of the Ring.

WIt was not possible to exclude the possibility that some of its lower stones were put in place before peat covered Calanais. It will be suggested below that plough soil 315 was the result of ground-working an area also used for token deposits of burial-related material, some possibly outlined by stones robbed from the cairn. Subsequently there was ploughing probably for cereal cultivation. During this the stones from the burial-related settings may have been dumped to one side, forming the base of the platform. But the platform was too high for all of it to have been directly related to those processes.

That could lead to speculation that the platform was a subsidiary prehistoric cairn. But the preferred interpretation is that the platform was almost entirely a Victorian creation, composed of loose stones from the surface revealed by peat stripping. But it needs to be tested more vigorously than current evidence allows.

9.2.12 The Victorian cairn

There are no early drawings or photographs of the cairn body, nor of its kerb. The general mass of the upper part of the cairn (to the west of the intrusion described below) consisted of loose grey gritty soil with scattered large stones. It was fairly unstructured with no real distinction between the chamber wall and the outer cairn. It had a fairly poorly built kerb (Illus 9.24-9.26).

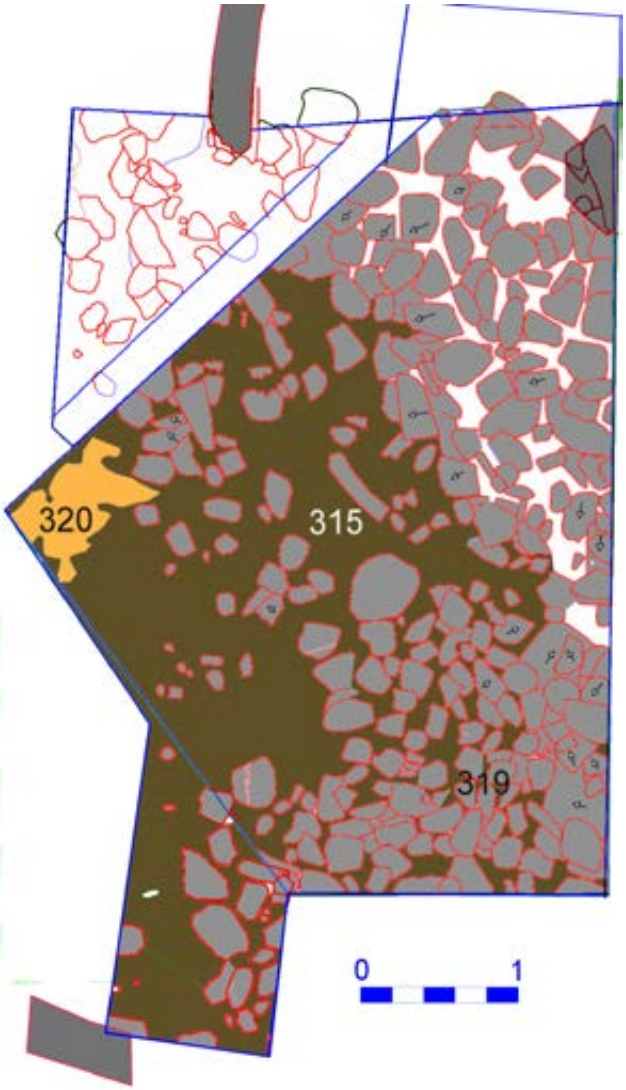
The cairn and kerb visible in Illus 9.24 proved to be a Victorian construction. That there was a primary kerb and division between inner and outer parts of the cairn was demonstrated at lower levels.

The soil of the cairn contained a variety of finds. In its upper level 318.1 were slate 80.211, glass 80.210, bits of quartz 80.66 and 80.146-149, and a quartz arrowhead (80.49) in loose fill behind a Victorian kerb stone. No pottery was recorded from it.

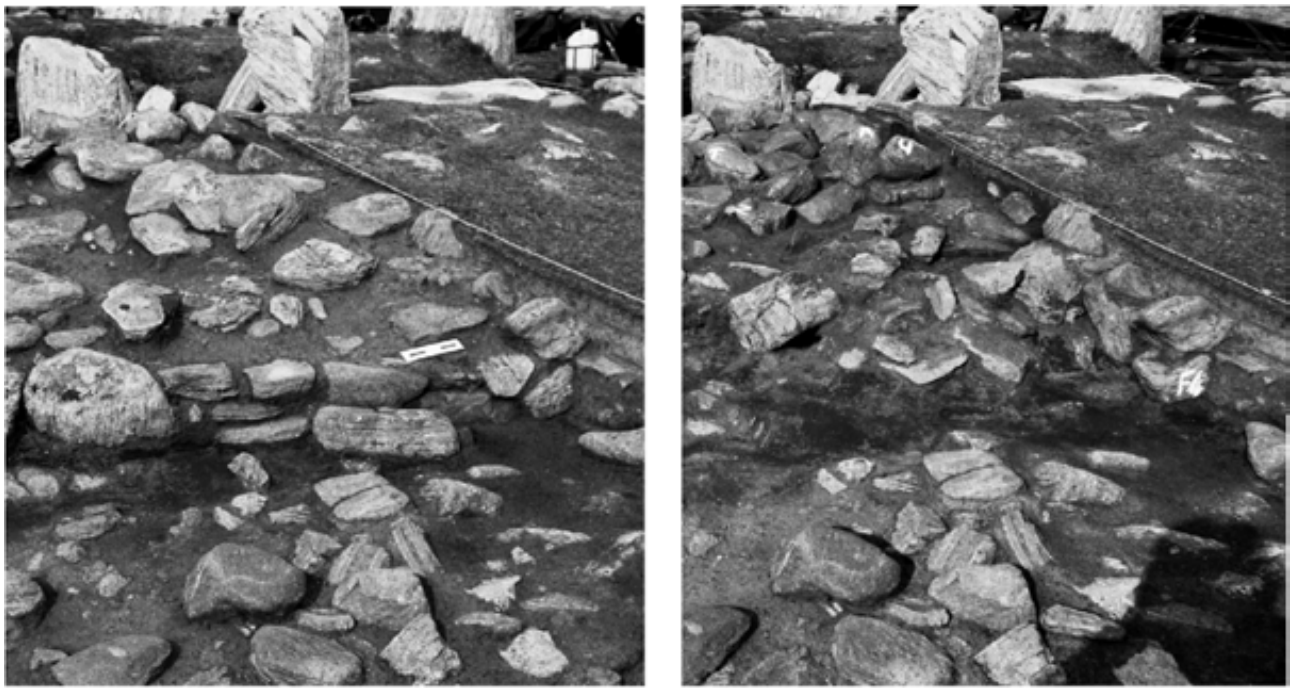
The upper kerb stones in the west rested on a Victorian shelf with a hard packed greasy soil 381-2 behind them. In Illus 9.28 the cut for the Victorian kerb is at the level of the scale. The photographic tablet sits on clay thrown up from the cut. No finds were recorded from 318.2.

The cut probably represented a second phase of Victorian activity, more evidence for which is

Illus 9.20 Stone platform 319 [Film 1980.8.15 rectified]



Illus 9.21 Stone platform 319 [Plans 12, 26 and 46 NMRS DC38140, DC38154 and DC38174]



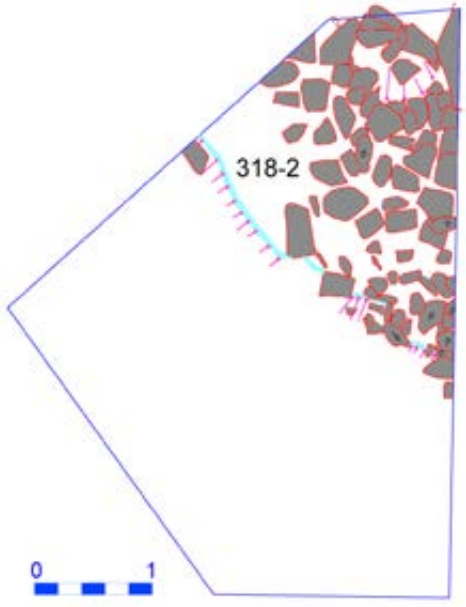
Illus 9.22 Layer 308 between the cairn and the possible late prehistoric platform before and after removal of the high kerb [Film 1980.4.26 and 4.29]

Illus 9.23 Water at the base of the trench below the Path after heavy rain [Film 1981.20.28]

Illus 9.24 The Victorian cairn and the high kerb, from the south [Film 1980.4.27]

Illus 9.25 The Victorian high kerb, platform 319 and a longitudinal section through Lady Matheson's Path from the south-west on 12 May 1980 [Film 1980.6.15]

Illus 9.26 The Victorian kerb (and cairn and chamber fill) [Plans 10, 29 and 39 NMRS DC38138, DC38160 and DC38171]



Illus 9.27 Plan 11 showing in cyan the back of the shelf [NMRS DC381389]

discussed below. Under and behind layer 318.2 in the western portion of the cairn a loose brown soil 318.3 lay between the stones for a considerable depth. It contained several pieces of pottery.

It also contained a quartz flake and 2 pieces of quartz CAT 78, a flint flake CAT 79 and worked stone 170/80 (not in Lithics catalogue).

Table 9.1 Pottery from 318.3

Cat	Comments
334_338	Three sherds, two fragments and crumbs, all friable spalls probably from a Hebridean Incised pot although it could conceivably be Beaker.
420	A sherd from Beaker ASH 47.
421	A sherd from Beaker ASH 47.
459	A sherd from Beaker ASH 51
709	A sherd from a large E/MN corky pot or a domestic Beaker.
618	A sherd from large probably Hebridean Incised pot with hard, very gritty fabric; most of exterior abraded off.
619	A sherd probably from a fine Hebridean Incised bowl.

Under the cut a few possibly prehistoric kerb stones were found (Illus 9.29-9.30). The surviving kerb stones were set on edge within or abutted by the prehistoric plough soil 315. By and partially over these stones were up to 50mm deep pockets of grey silty material 326 (Illus 9.30). Some of their fills were fine and silty while others were much grittier and they merged imperceptibly with the plough soil 315 (Day Book 27-29). As described below, similar material in an intrusion in the eastern part of the cairn was also labelled 326.

A fourth layer of cairn fill 318.4, a hard packed, slightly greasy grey soil with charcoal flecks, filled the western part of the cairn (Illus 9.32). In it were found three pieces of quartz CAT 75, 76 and 77, the latter a flake. Although described as containing some pottery (Day book 165) none was

Illus 9.28 The shelf for the Victorian kerb from the south on 11 May 1980 [Film 1980.6.17]

Illus 9.29 The shelf and grey gritty material 326 on 23 May 1980 [Film 1980.11.18]

assigned to it in the finds book and it seems likely that any sherds were at its interface with 318.3 and recorded as from the latter.

9.2.13 A Victorian intrusion and kerb

In the portion of the cairn under Lady Matheson's Path, there were signs of intrusive material in an area of about 1.5 square metres abutting the east baulk.

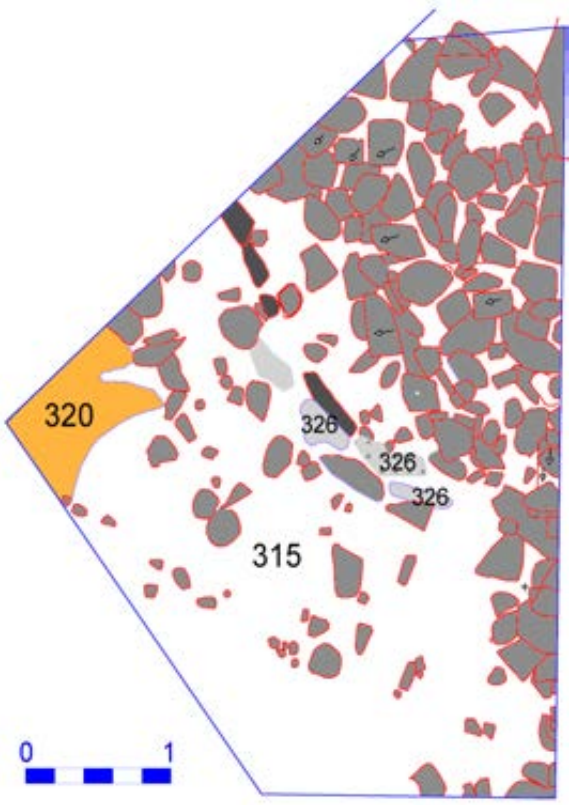
At its north end the intrusion cut through the cairn. It incorporated grey gritty material 326 in a block 0.8 m deep and 1 m across from north to south (Section 21A Illus 9.17). At one point this material lay in a drift over the kerb (Day Book 33).

Table 9.2 Pottery from 326 and 326.1

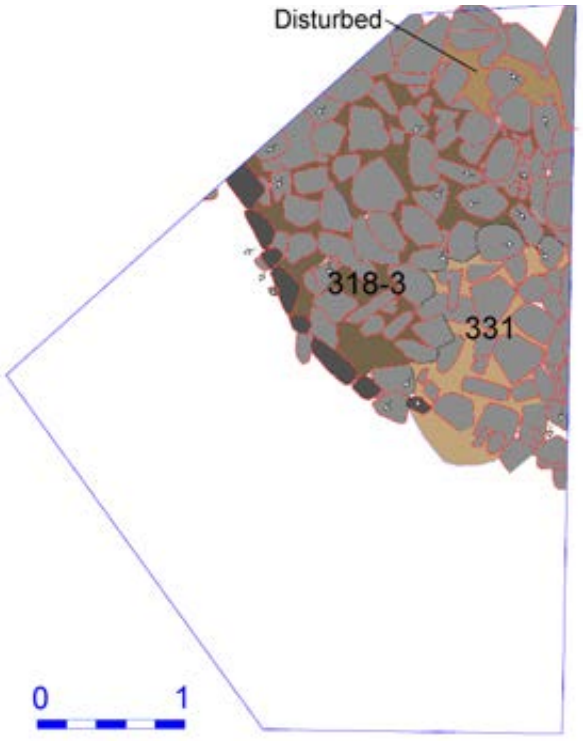
Cat	Ctxt	Comments
425	326.1	A sherd of Beaker ASH 48
432_437	326	6 sherds of Beaker ASH 48
438	326	A sherd of Beaker ASH 48
439_449	326	10 sherds and a fragment of beaker ASH 48
711	326	2 conjoining sherds forming a large spall, most probably from an E/MN non-corky pot

A quartz flake CAT 81 and a piece of quartz CAT 166 were also found in 326.

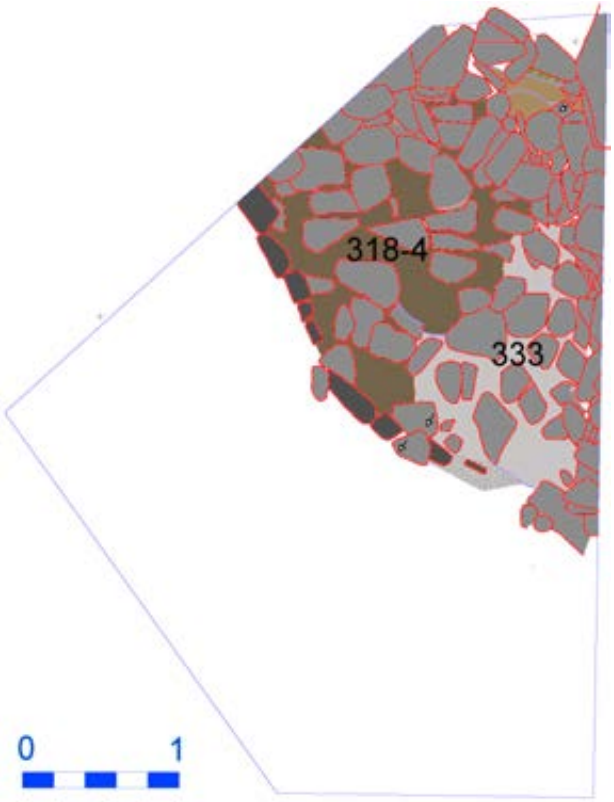
Apart from Cat 711 all of the sherds in 326 came from a cardium-impressed beaker ASH 48). One of them (Cat 425) came from the surface of one of the pockets 326.1 of the grey gritty material outside the kerb (Illus 9.30). The distribution of this pot is distinctive. Apart from the 19 pieces in 326, five sherds and a fragment came from plough soil 315 and 3 pieces, two conjoining, came from the socket 859 of the facade stone at the entrance to the chambered cairn passage in Area BIVWX. All of the sherds from plough soil 315 were found on the same day apart from one (Cat 431) found subsequently and recorded as 'dragged in a plough furrow'. The only structural context amongst these was the facade stone socket in Area B. It is very tempting to see this as a pot originally deposited in the passage near its



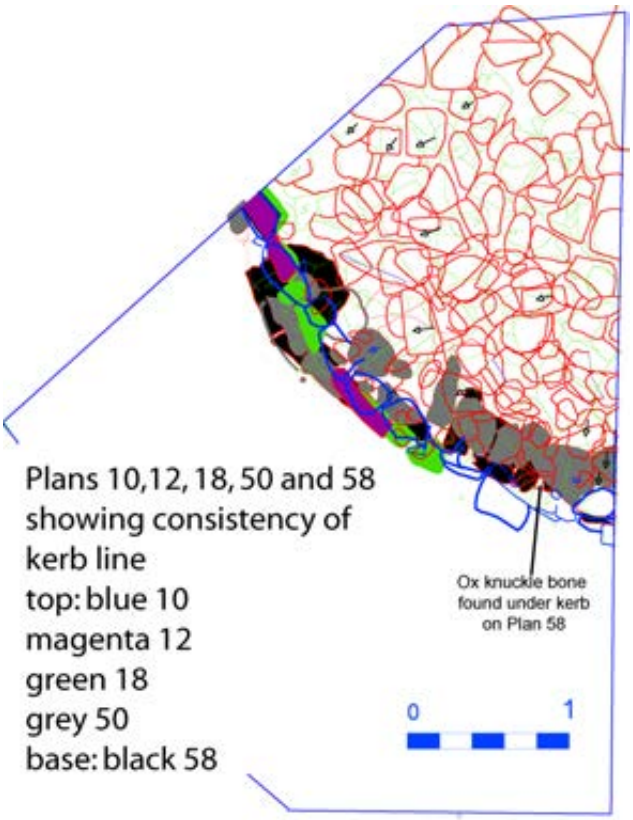
Illus 9.30 The lower stones of the kerb in dark grey at the end of the 1980 season [Plan 13, NMRS DC38141]



Illus 9.31 Intrusive grey clods 331, early kerb stones, and layer 318-3 [Plan 18 NMRS DC38146]



Illus 9.32 Intrusive layer 333 and layer 318-4 [Plan 19 NMRS DC38147]



Illus 9.33 Overlay of selected plans of the kerb showing the ox bone found at its bottom near the east baulk

entrance, then broken, with some sherds used in the pit packing and others dumped near the kerb of the chambered cairn. Thereafter as the cairn became dilapidated the sherds were disturbed during ploughing and cairn-robbing; many of them were subsequently dug up in the Victorian period before being thrown with backfill onto the cairn.

Below 326 was a 0.1 m deep layer of clods of loose grey humic soil 331 and stones. Two pieces of quartz CAT 84 and CAT 85, the latter a flake, were assigned both to it and layer 318; 313 was at the same level as 318.3(Illus 9.31).

The pollen from layer 331 included a small amount of pine, with abundant heather and 27 to 30% grass. Cereal pollen was present, with occurrences of Plantago lanceolata, Ranunculaceae and Compositae. It ws thought possibly to belong in CaN-3a but perhaps a match with a much later zone in the CN2 column at Callanish Leobag or in the pollen columns from Calanais Fields should be explored.

The stones and dirty clay (318-4) in the western part of the cairn appeared to be later than grey greasy clay 333 at the bottom of the intrusion to the east (Illus 9.32). Clay 333 produced a piece of charcoal 81.226 and an indeterminate, conceivably domestic Beaker sherd, Cat 927.

The Victorian kerb followed the prehistoric line fairly closely (Illus 9.33). Where it bounded the intrusive material near the east baulk its upper part was of a completely different character to that further to the west. Its upper part was built of laid slabs rather than boulders (Illus 9.34). It was perhaps set a little forward of the prehistoric kerb. While the last remnants of the kerb fronting the intrusion were being removed a well preserved ox knuckle bone was found in black soil at the same level as 318 (Illus 9.33). The soil sat behind the higher of the two rounded kerb stones at the east end of the kerb in the photograph of 20 May 1981 (9.35).

In Illus 9.35 the partially structured cairn stones visible on the photograph towards the back sat on top of the prehistoric chamber wall. In Illus 9.36, a slightly modified extract from Illus 9.35, an apparent stub wall (B) coming out of the east baulk behind the kerb sat in the area of Victorian disturbance and had the grey humic clods

Illus 9.34 The kerb fronting the Victorian intrusion on 12 May 1980 [Film 1980.6.15 part]

Illus 9.35 The prehistoric kerb on 20 May 1981 with Victorian material remaining on the chamber wall [Film 1981.12.23]

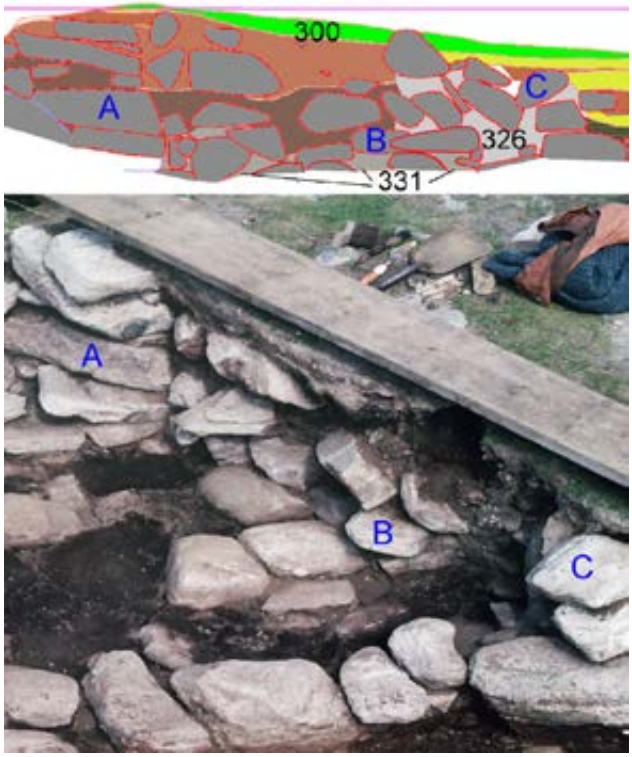
331 round and under it. . The section is an extract from the main east section 21A. The chamber wall is labelled A on both section and photograph; the stub wall is labelled B and the line of both the Victorian and prehistoric kerb is labelled C.

Section 21B running southwest-northeast through the western upper part of the cairn at the level of 318-2 illustrates the way in which the cairn was disturbed or rebuilt, or both, in the Victorian period (Illus 9.37). A Victorian kerb stone sat in a cut filled with 308 above a prehistoric kerb stone. Inside the kerb layer 318-2 to 318-4 merged into one another and Victorian cairn stones overlay prehistoric ones. Here the plough soil 315 was very thin; indeed by the section to the south the underlying orange clay 320 directly underlay the Victorian landscaping layer 308. Patches of the plough soil survived just outside the kerb.

9.2.14 Discussion of the Victorian cairn and kerb

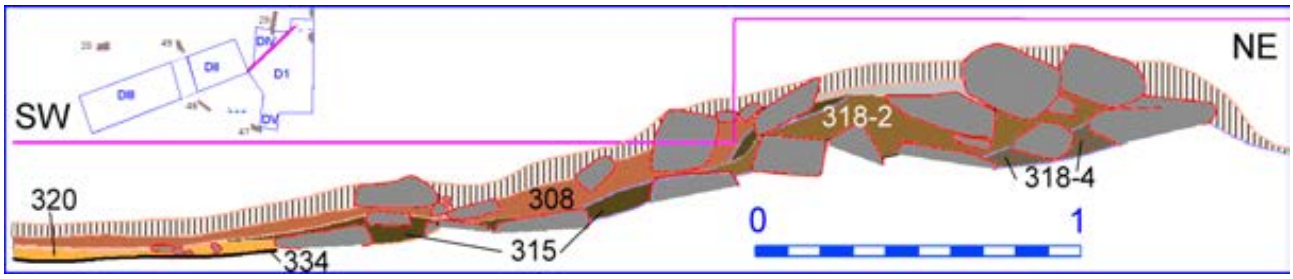
The ox bone was too large to have been brought there by a burrowing animal; its presence proves that the entire slab-built kerb here had been put in place in fairly modern times, presumably about the time that Lady Matheson's Path was constructed (assuming that it was not put there during our excavation as a practical joke).

There must have been two phases of Victorian activity. Otherwise, how could the intrusive materials, grey gritty 326, grey clods 331 and grey clay 333 appear to be in an intrusion into cairn material 381-1 which was itself of Victorian date judging by the finds in it?

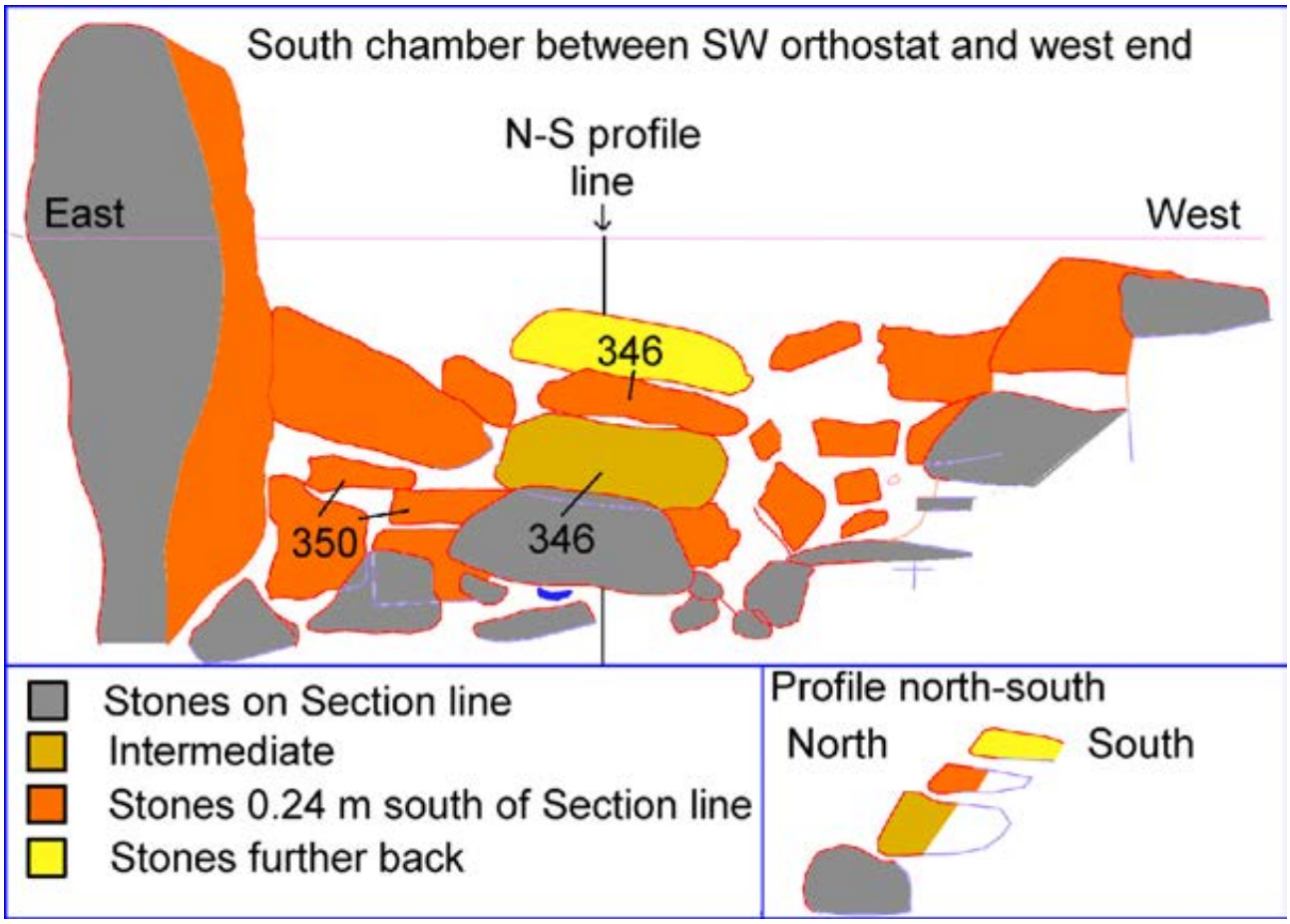


Illus 9.36 The relationship of the stub wall to core cairn and kerb

The cairn must have been built up after 1857 but before the kerb and Lady Matheson's Path were built. Perhaps the chamber wall was also rebuilt at this time. When it was decided to create



Illus 9.37 Section 21B through the western part of the cairn in 1980 [NMRS DC38150]



Illus 9.38 Recently displaced stones in the south wall 5 May 1981 [Section 30 NMRS DC38161]

the Path, it was also decided to recreate the kerb. A cut corresponding to the intrusion was made into the cairn under the future position of the Path to find an original kerb line. Once the kerb had been located, a narrow trench was dug outside its line to find the rest. Layer 318-1 may be material thrown up from the cut onto the cairn. The patches of grey material 326 outside the kerb probably reflect removal of stones lying in the old plough soil. The material in 326 probably had a mixed origin, but the pollen in it may largely reflect Victorian township farming in a landscape with a large component of rough pasture, some improved pasture and some cereal growing.

A cut was made into the cairn material to provide a base for the Victorian kerb. Where the cairn was to be covered by Lady Matheson's Path the kerb was rebuilt with neat slabs. The rest of the kerb was reconstructed with rounded boulders (Illus 9.34). Perhaps the stub wall was built before the original kerb-line was explored or perhaps it was built at this time to provide additional strength.

Illus 9.39 Chamber wall and tumble on floor 5 May 1981 [Film 1981.3.8]

The original exploratory cut was filled with stones and the intrusive material described above.

9.2.15 Damage to the chamber

The chamber south wall had been damaged before 1980, reputedly by 'French tourists'. There was a hollow in the top of the cairn near the chamber. A stack of four wall-stones (346) appears to have fallen and been rebuilt, and other nearby stones appear to have collapsed or been moved. The face had been rebuilt with the base of the stack set forward over 0.2 m from the general line of the wall face and its top set further back (Illus 9.38).

The photograph of 5 May 1981 was taken after we had removed the four stones of the modern stack (Illus 9.39). Some of the tumbled stones on the chamber floor were flat and looked as if they might originally have been wall stones.

Modern disturbance at the base of the south-west chamber orthostat was demonstrated by green glass in the packing (367) at the northern end of its base (Illus 9.40). This packing was set into the middle layer of tumble 351. It is not clear whether the packing was shoved under the stone while it was in its original position, or whether the orthostat had fallen down and been re-erected.

9.2.16 Discussion of the damage

Damage to the chamber and inner core cairn in Area D, or at least alterations to them, may have taken place at several times. As described below, the back end of the chamber seems originally to have been rounded, but the descriptions made shortly after it was cleared of peat suggest that the end was by then square (Introduction to the fieldwork Chapter 4). Therefore it is possible that a non-structural square end was added during the building in the third or second millennium BC. But it remains possible that it was modified immediately after the chamber was cleared of peat, although the balance of the evidence weighs against that.

Other changes may have taken place when or after the outer cairn was robbed and a clay component at its edges ploughed. Although the ancient

and recent damage increased the difficulty of saying how much of the upper part of the chamber wall was original and how much had already been rebuilt prior to, or at the same time as, the construction of Lady Matheson's Path, my gut feeling is that the chamber wall had been damaged and quietly repaired several times between 1857 and 1980.

9.2.17 Damage to the chamber and chamber wall

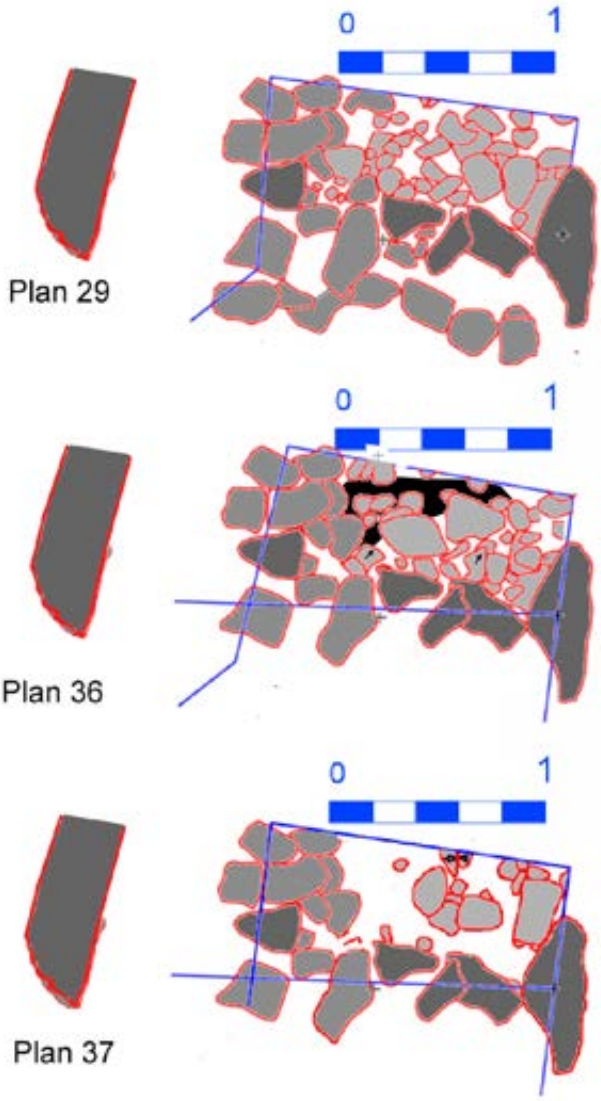
The surface of the south-west part of the chamber was worn turf. It included part of a wooden implement handle and other modern material. Clearance of earth revealed stones, interpreted as tumble.

The tumble was excavated in three layers (351.1-351.3). The top layer (351.1) was slightly thicker near the wall. There was a deposit of black friable clay (364) amongst the stones of the middle layer 351.2 (Plan 36), with no artefacts in it. The bottom layer 351.3 was restricted to the centre of the chamber (Plan 37). There was no obvious pattern to the tumble (Illus 9.41). Finds comprised glazed pot (81.634), china (81.655) and glass (81.644 and 81.655).

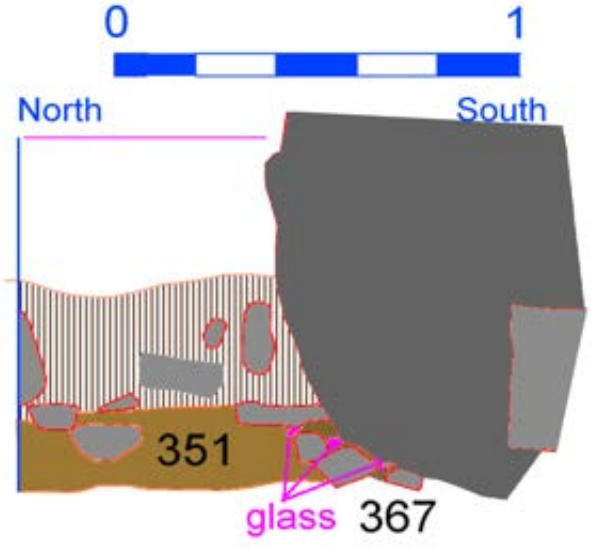
The west end wall of the chamber was stepped back towards the monolith (Illus 9.43 Section 12-30). The stones resting on the clay sloping up to the back of the chamber appeared to be in modern positions and were removed with the tumble.

More generally the clay at the base of the chamber was dished down from the walls (Illus 9.43). Under the chamber wall face was a layer of friable dark brown clay 356 (Technical note 9.2.17). The clay contained two sherds of pottery (81.98), and two pieces of quartz (274/81). Neither pottery nor quartz was located during preparation of the catalogues.

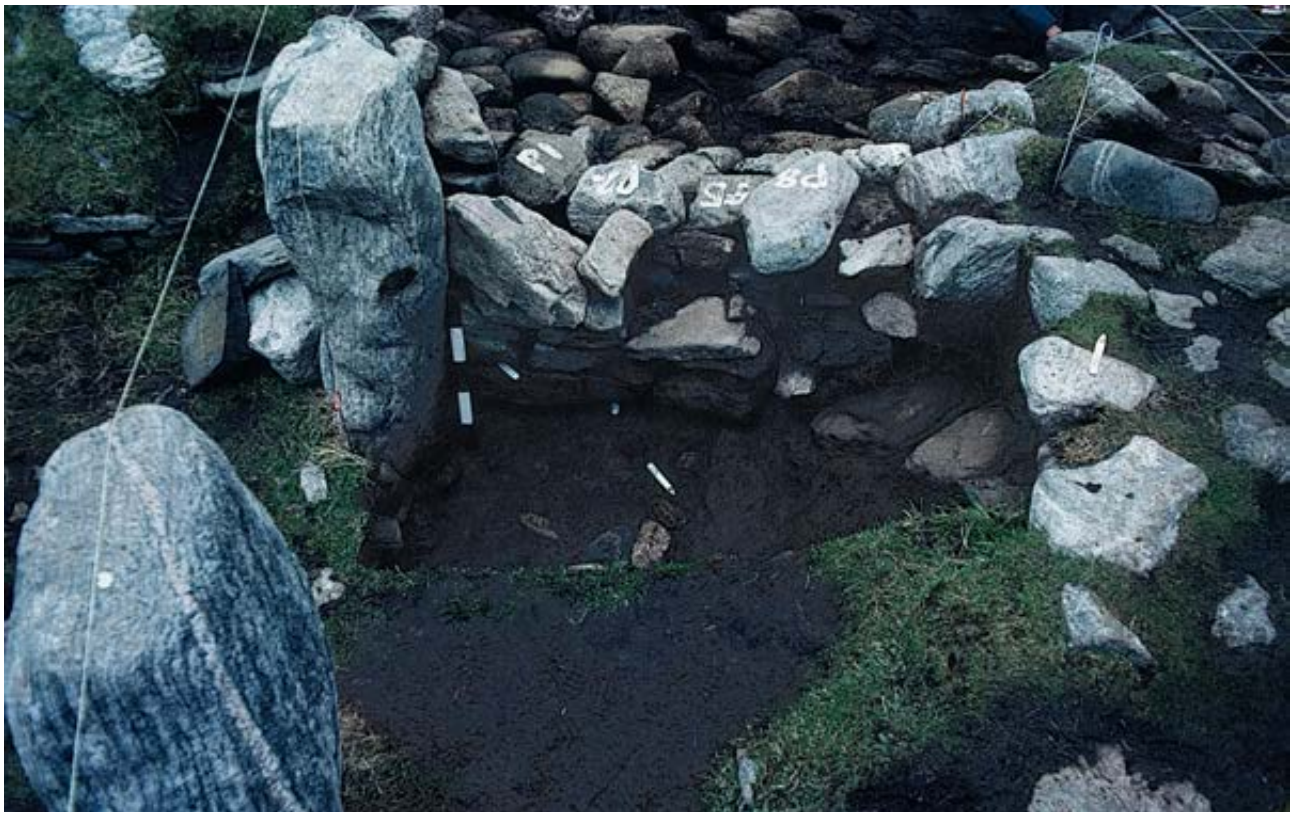
The gaps amongst the stones forming the west end of the chamber were filled with dark brown friable clay 361 containing some peat (as well as some charcoal, a quartz flake and a piece of quartz (CAT 90)).



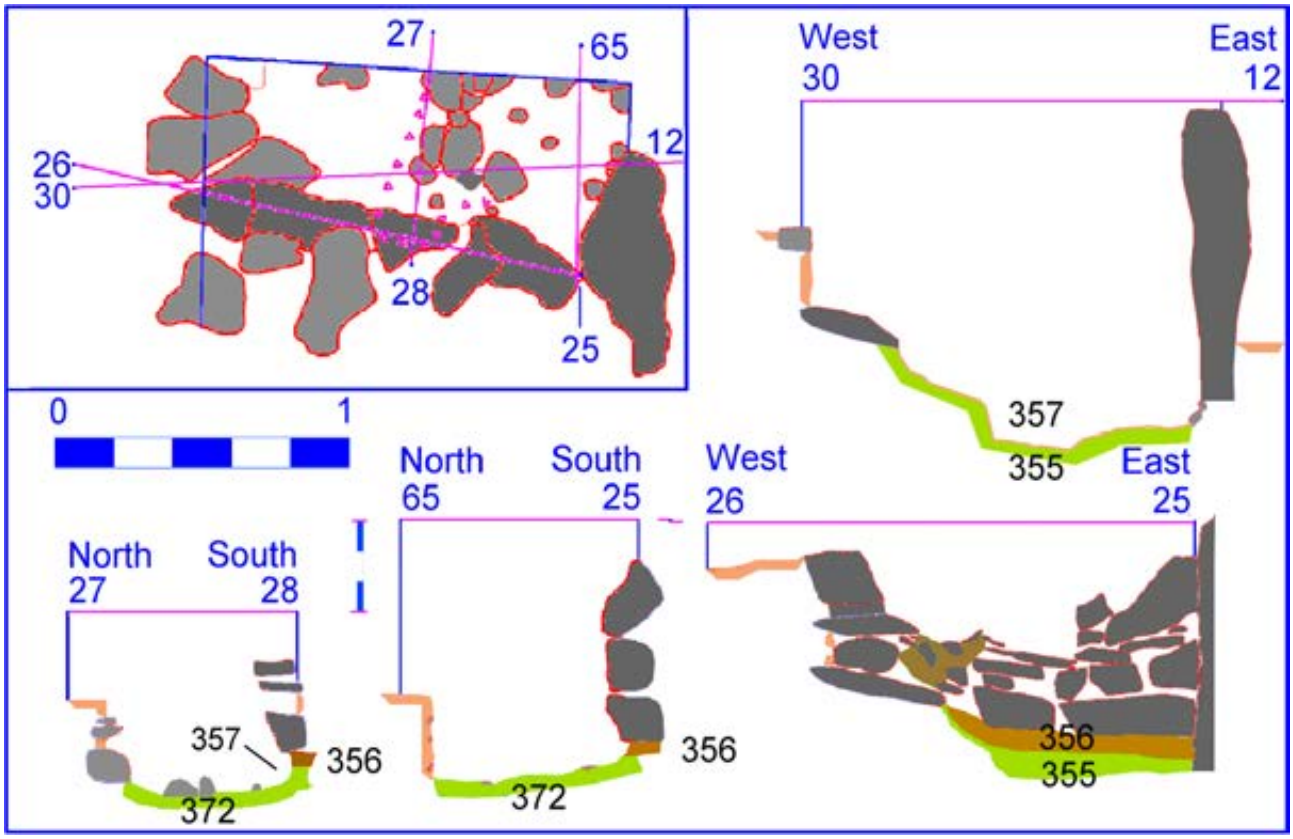
Illus 9.40 Section 97B showing the position of green glass under the south-west chamber orthostat [NMRS DC38230]



▸ **Illus 9.41** Tumble in the chamber on 5 May 1981; wall stones are darker grey. [Plan 29 NMRS DC38160, Plan 36 NMRS DC38168 and Plan 37 NMRS DC38169]



Illus 9.42 The chamber from the north on 8 May 1981 [Film 1981.4.34]



Illus 9.43 The chamber on 11 May 1981, Plan 42 [NMRS DC38174] with at top right Section 47 [NMRS 38179] reversed, and at bottom, from left to right, Sections 44A [NMRS DC38176], 44B NMRS DC38176 and, on 13 May, Section 43 [NMRS DC38175] reversed

Under the tumble in the chamber was a patchy layer of loose brown clay (364). Under that was compact green-yellow-grey sandy clay (355) with lines of black humic material in it. It contained a piece of quartz (CAT 22). Stratigraphically, green-yellow-grey sandy clay 355 which formed the bottom fill of the chamber itself was quite distinct from green clay 398, on which the basal stones of the wall rested, and appeared to have been redeposited rather than in-situ natural.

Running across the basal fill 355 was a shallow slot 357 (Illus 9.45). It had a fill of loose stones over loose brown-black humic clay 364. Amongst the stones were a piece of peat and what was recorded as 3 fragments of pottery (81.244 not found and 81.703, the bag for which contained only leaf or other plant matter during preparation of the pottery catalogue). It seems to have been modern, judging by its looseness and the piece of peat in it. The brown-black clay at its bottom appears to have silted through the loose stone fill.

Under green clay 355, the bottom of the chamber consisted of green clay with a few stones (372), thought to be the natural undisturbed clay (Illus 9.46, 9.47).

9.2.18 Discussion of the chamber

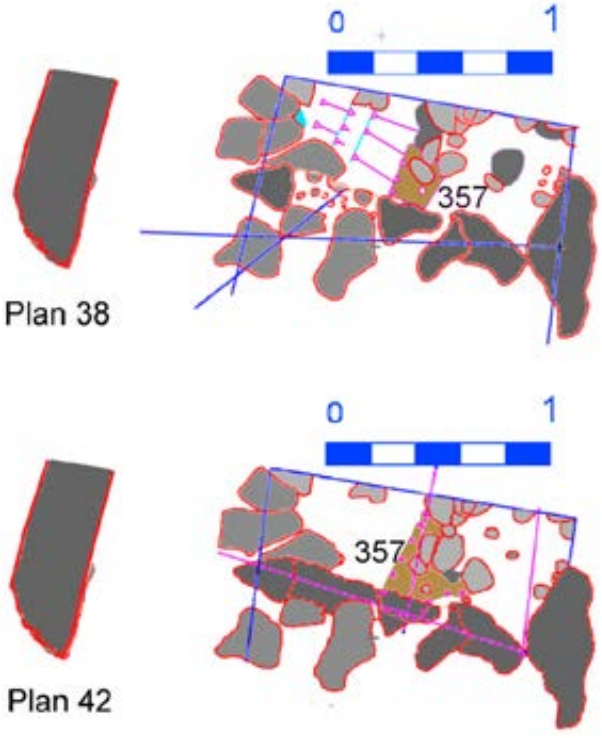
No indentations from paving stones were seen in the chamber floor. It may have consisted of clay 355. Ancient wear may not have been the main reason for its dished profile. Some of it may have been removed with black greasy chamber deposits in 1857 and some of it may have been worn away subsequently by the feet of visitors before tumble covered it. The shallow slot in the sediments at the bottom of the hollow was of Victorian or later date. It is conceivable that it was a cast of the 'lintel' stone shown on Sharbau's sketch (see Chapter 4 Introduction to the fieldwork).

9.2.19 Victorian and later activities in DV near Ring stone 47

Running across Area DIV from south-east to north-west at a high level was a linear depression 343 with a complex series of fills (Illus 9.48).

It was about 0.35 metres wide and in its up-

Illus 9.44 The chamber wall from the north with cairn in background 11 May 1981 [Film 1981.6.20 part, rectified]



Illus 9.45 he chamber on 9 and 11 May 1981 [Plan 38 NMRS DC38170 and Plan 42 NMRS DC38174]

Illus 9.46 Basal clay in the chamber from the north on 13 May 1981 [Film 1981.7.7]

permost part it was cut (or more probably worn) into the base of the mound round Stone 47. Grey quarry dust and stones (345) from modern repairs filled its top; small finds included part of a clay pipe 71/81). The grey quarry dust extended over a large area to the north and west. The lower part of the depression was somewhat straighter though of a similar width.

In the lower part of this depression was mid brown clay 353 with fibrous roots which lined the north-east side of the depression, and orange gritty clay (341) which filled the south-west part (Illus 9.48). Although recorded in the Day Book (page 255) as overlain by 340 the plan and sections do not show this; instead it seems to have been covered by the grey quarry dust 345 representing modern repairs in the western half of the northern part of the area.

9.2.20 Discussion of DV

Given that 340 rose in a mound to the south-west, and was brown and greasy, it may have lipped over the filled depression because of trampling by visitors. Overall it seems almost certain that the linear feature 343 was a track which people had worn with their feet during the period since peat was stripped from the area.

9.2.21 Summary of Victorian and later activity in Area D

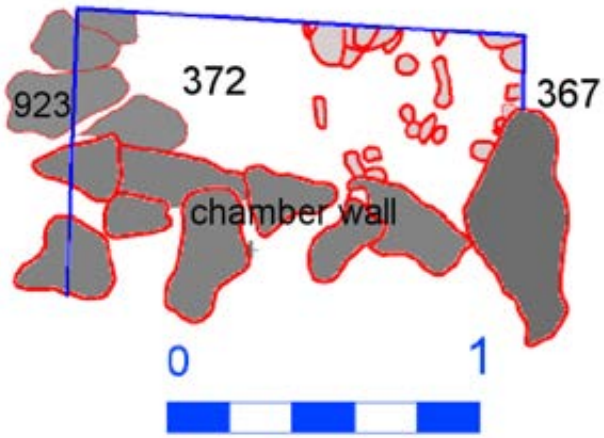
The south part of the cairn seems to have been almost completely demolished before it was cleared of peat in 1857. The extent of Victorian restoration can be pinned down fairly precisely. Stone and earth were used to build up the cairn body. Then just before Lady Matheson's Path was built the original kerb was located by digging a sondage and following its line. A new boulder kerb was based on a ledge cut into the cairn outside the area of the Path, but the part under the Path was rebuilt as a neat slab wall and stones and clods of earth and gritty material were put in behind it. Finally the Path was built up with peat turfs and grit. The area was possibly landscaped with a layer of soil during

path-building, but it seems likely that there was also a recent phase of turf laying which covered the erosion scars visible in air photographs of 1955.

The chamber wall was probably damaged more than once; it bore little resemblance in 1980 to what Sharbau had sketched in 1857. The latest severe damage occurred in the late 1970s when part of the wall collapsed and was apparently rebuilt by visiting tourists.

There remains a suspicion that there was a prepeat rubble platform south of the cairn, but it may have been mostly or even entirely a purely Victorian creation. If so, it suggests much removal of surface stones from the area of the Ring.

The Victorian activities attributable to Sir James Matheson's workmen are difficult to reconcile with Sir James Matheson's description of discovery of the chamber (see Chapters 2 and 4). Their work is also difficult to distinguish from the 19th and early 20th century activities of the Ministry of Public Buildings and Works Ancient Monuments Division, predecessors to Historic Scotland. However, apart from soft landscaping and no doubt frequent minor repairs to eroding areas and unstable stonework my impression is that the works of Sir James' employees were treated by their successors with the same respect as the works of those who built and used the setting of stones and the chambered cairn.

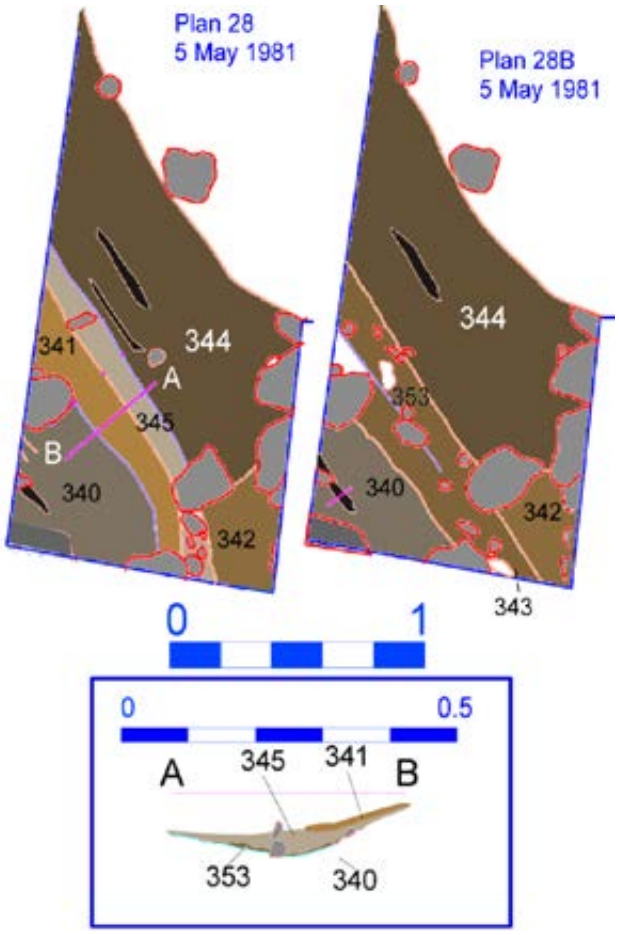


Illus 9.47 The chamber, plan dated 21 May 1981 but at same stage as Illus 9.46 of 13 May above [Plan 64 NMRS DC38196]

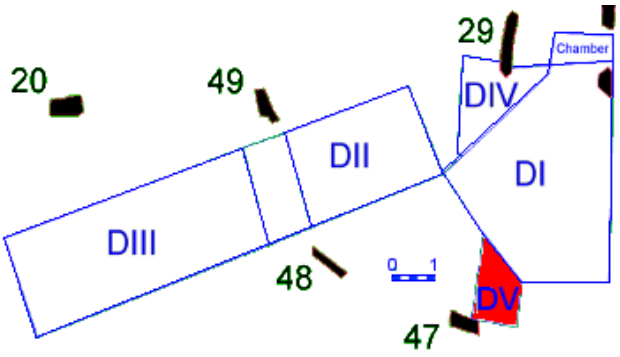
9.3 Phases 10 to 15: Plough soils and other layers above the upper prevalent turf line

9.3.1 Introduction to the plough soils and underlying soils

The archaeology in Area DIII outside the Ring was not very informative, consisting mostly of what seemed to be a shallow plough soil. The levels in DII were more complex partly because of the former presence of what seems to have been a cultivation bed and partly because of the presence of a diachronic turf line. The levels in DI (and the neighbouring DIV and DV) were complex. While removing the plough soil it was all too easy to mistake the tops of shallow pits for the tops of low dumps, and vice versa. The underlying turf line was composite and in places undulating;



Illus 9.48 Linear depression 343 in DV [Plans 28 and 28B NMRS DC DC38159]



Key plan for DV

elsewhere it had been truncated. The plough soil contained much charcoal and pottery including beaker sherds. At least some of the ground-working episodes involved use of an ard. Where ard marks contained abundant charcoal they could be distinguished from the predominantly brown clays into which they were cut, but no doubt many others were not seen. This succession probably represents repeated use of the area for ritual deposits interspersed with ground-working during the later 3rd and earlier 2nd millennia BC. The evidence for this was not only abundant charcoal, pottery fragments and lithics. The lower clays and soils were patchy, in a way that suggested individual dumps of material, and there were several small pits and stone features.

The descriptions start with DIII and work their way east and then south.

9.3.2 Plough soils etc in DIII

Under the topsoil on DIII was a patchy ginger brown gritty soil (303). It did not appear in either section and its edges were vague. It contained three small E/MN non-corky or Beaker body sherds (Cat 971-973). Soil 303 merged sideways and downward into yellow-brown clay soil 309, which covered the middle and eastern parts of the trench and underlay the features at its west end (Illus 9.49).

Soil 309 was up to 0.2m deep. Its surface was fairly level except at the west end where it had been cut by the shallow peaty scoop but its base was irregular. It contained a piece of Hebridean incised ware (Cat 341) and a Beaker sherd, possibly from an AOC Beaker (Cat 372 ASH 40).

9.3.3 Discussion of plough soils in DIII

Soil 309 was similar to the slightly redder 304, 310 and 329 in DII. Although no ard marks were noted in DIII it may have resulted from ploughing like that in DII and DI but without inclusion of the charcoal rich material ascribed to ritual deposits there. Alternatively, judging by the characteristics of the admittedly small amount of pottery in the soil, ploughing may have taken place only during the period before the green clay platform was constructed inside the Ring. The irregular base of soil 309 may reflect variations in the underlying natural clay. They will be discussed in Chapter 9.6 with evidence for early cultivation.

DIII lacked turf lines like those found in the other areas, suggesting that no layers of clay were dumped on the land west of the Ring.

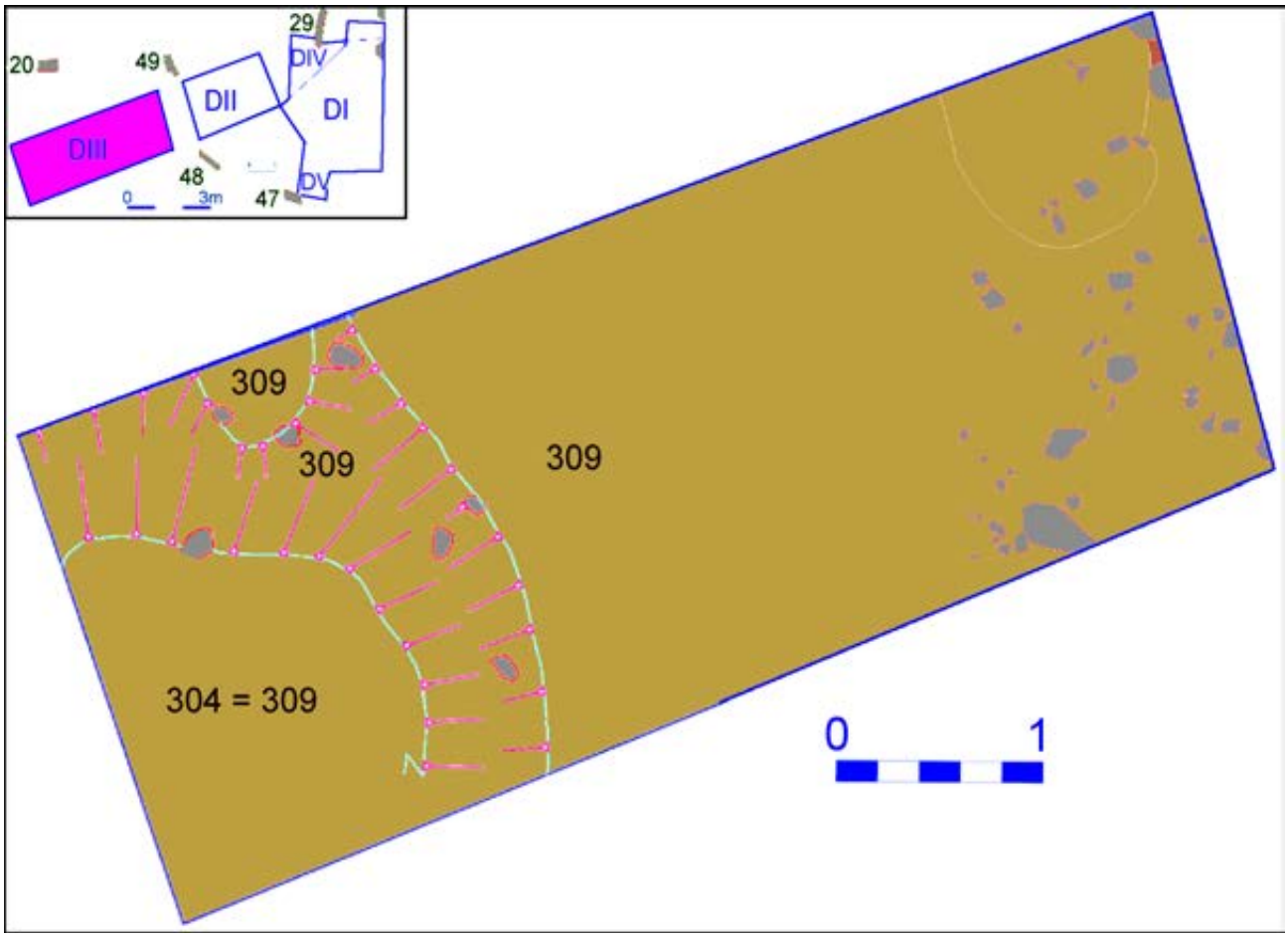
9.3.4 Plough soils etc in DII

Plan 9 (Illus 9.50) shows Area DII in 1980 after most of yellow-brown clay 310 had been trowelled off. Under it in the west were turf lines and in the east clayey soil (Illus 9.50).

A dark greasy brown layer survived under the band of stones between Ring stones 48 and 49 (Illus 9.49 inset, 9.50. It was first described as peat-rich and initially labelled 313; but it was subsequently shown to be part of composite soil layer 316.

It was labelled as such on Plan 9 (Illus 9.50). It was flecked with smears of tiny degraded potsherds, and it contained several sherds, all but one (Cat 589) small and heavily abraded.

Below 310 in the northern and western parts of the area lay a turf line 316a and an associated mineral soil 316. It was at its thickest in the extreme southwest of the area where the ground appeared to rise somewhat, as if over a mound near or at the base of Ring Stone 48. Below 316a in the southwest lay a silty stone-free grey material and under that a gritty brown soil streaked with charcoal (316); this sequence including the turf line was 30 to 50 mm thick (Illus 9.50). Layer 316 may have extended into Area DIV to the east, judging by a finds record, although the layer was not separately recorded as surviving there.



Illus 9.49 Area DIII Features revealed after removal upper features [Plan 8 on 4 NMRS DC38136 on DC38132]

Layer 316 in DIV also contained a piece of quartz (CAT 108)).

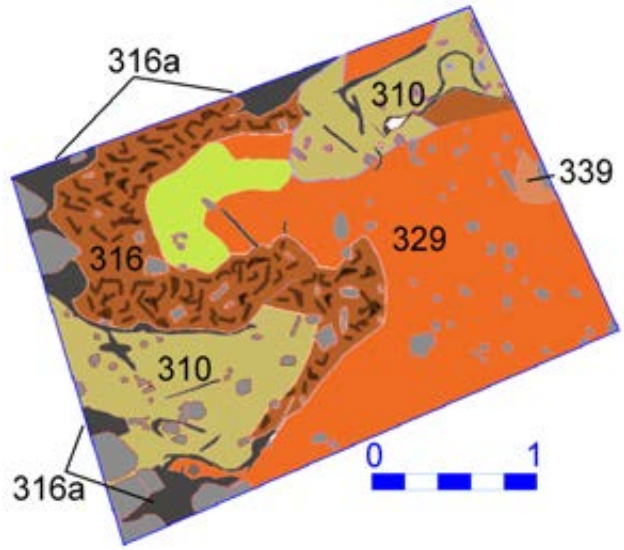
In the south-eastern part of the area was a gingery brown clay soil 329. It contained 10 pieces of quartz (81.571), presumably all natural since not referred to in the lithics catalogue. Where turf lines were absent clay 329 was difficult to distinguish from some of the varieties of clay 310. In section they could not be separated at all except where a turf line intervened. Between the mineral soil of 316 and clay soil 329 was a thin layer of yellow clay which appeared in a small trial trench in 1980 (Illus 9.50-9.53). It overlay a lower turf line 316b more fully explored in 1981. Various dark lines appeared in the area at the base of 310, but in 1980 it was not possible to say whether they were all edges of truncated turf lines or whether some of them were plough marks. A patch of light orange mineral clay (339) extended into the east section. It was subsequently shown to be the top

Table 9.3 Pottery from 313

Cat	Comments
589	A sherd from Food Vessel ASH 75
715	Small abraded sherd probably from an E/MN corky cooking pot; exterior spalled off.
965	Small abraded sherd with its inner face missing, possibly from a Beaker but can't rule out possibility of its being E/MN non-corky
966	A small spall, either E/MN non-corky or Beaker.
967	A small spall either E/MN non-corky or Beaker. from the same pot pot as Cat 966.
968	A small spall either E/MN non-corky or Beaker. from the same pot pot as Cat 966.
969_970	2 featureless undiagnostic spalls,

Table 9.4 Pottery from mineral soil 316

Cat	Area	Comment
124	DII	An E/MN corky sherd.
1109	DIV	An indeterminate fragment.



Illus 9.50 Layers revealed after removal of most of clay soil 310 [Plan 9 NMRS CSD38137]

Illus 9.51 Photograph of DII taken from the west on 2 May 1981 showing the remains of the trial trench [Film 81.2.6]

of a clay hump (Illus 9.50-9.53).

Plan 31 (Illus 9.52) was made after first cleaning in 1981 had removed the last remnants of soil 310 (Technical Note 9.3.4). Some areas of the clay soil 329 and some areas of the black turf line 316a had also been removed, but at the same time more had appeared under 329 in the middle of the area, and more of the yellow clay 337 was visible under 316a in the north-west part of DII.

Subsequent excavation was conducted largely by repeated cleaning. The layers were thin and undulating. Although every attempt was made to remove later strata before earlier ones, determining the relative stratigraphy of different layers was often impossible before much of their contents had been removed. As yellow clay 337 was being removed ribbons of black greasy clay appeared at various levels. The general impression was that they were the fills of ard marks running in an east-west direction, although their precise characteristics were not recorded.

Illus 9.53 shows the area after removal of the upper turf line 316a. Clay 337 underlay 316a and overlay 316b. Under turf line 316a in the south-west corner of the trench was a small patch of gingery orange clay 336 (Illus 9.52), presumably contemporary with 337.

Clay 336 contained a beaker sherd with a rounded upright rim (Cat 404 ASH 43), a burnt quartz single-platform core CAT 231, two quartz flakes CAT 102 and a piece of quartz (CAT 103), and also some charcoal 81.684.

Soil 329 at the horizontal level shown in Illus 9.52 lay on top of what turned out to be a furrow in an early cultivation system. The fills below 329 are discussed in Chapter 9.6.

9.3.5 Discussion of the plough soils in DII

Yellow-brown clay 310 was interpreted as possibly the result of Victorian landscaping, like 308 on Area DI. However soil processes may have made its lower levels indistinguishable from the clay on which it was laid and the original junction between 310 and 329 was impossible to define.

The Food Vessel sherd in the soil 313 under loose stones between the Ring stones was similar to sherds found in 18 different contexts around the Ring. Some of these contexts were later than rebuilding of the cairn in the 2nd millennium BC. Its occurrence so far from other pieces of the same pot is hard to explain.

Turf line 316a was not the same as the uppermost turf line identified in plan on DI (365 in the south and 334 in the north), for it was at a

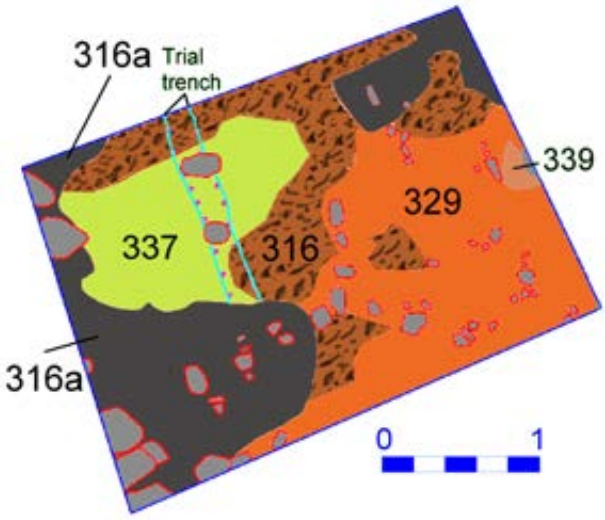
stratigraphically higher level. In Area DI 365 and 334 covered strata in which there was no beaker pottery at all, despite their abundance above the turf line. Indeed the only identifiable piece of pottery found below it was an E/MN non corky sherd (Cat 123) from turf line 914. In DII, by way of contrast, the uppermost turf line 316a covered patches of soil with beaker pottery.

Ginger brown soil 329 in DII was probably the same as ginger brown layer 320 in DI (Illus 9.54). During analysis of Kubiena box samples for pollen a possible turf line was identified on top of 320. Along with a turf line seen only in the main section (see 9.3.6) it is the best candidate on DI for a turf line of the same period as 316a. It was assigned to pollen sub-zone CaN-3b. That subzone started after the main period of building at Calanais at some time between 2560 and 2200 cal BC and ended sometime between 1880 and 1520 cal BC. Because some pits first noticed below ginger clay 320 had pollen assigned to CaN-3c in them it seems likely that 320 had been altered by soil processes after the pits were dug. The same may have been true of ginger-brown soil 329.

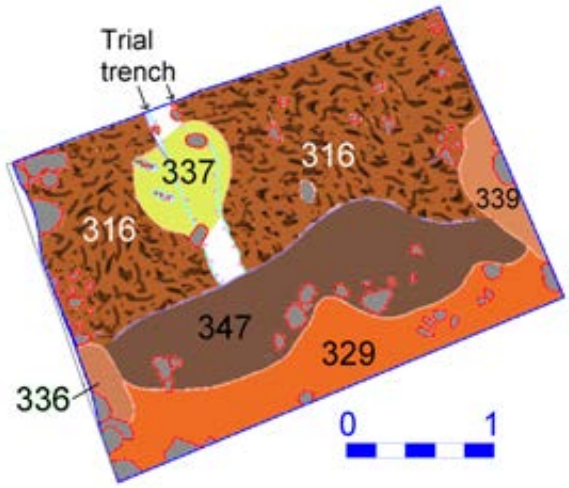
9.3.6 The plough soils in Area D1, DIV and DV

Plough soil 315 in DI was at the same level as layer 370 in DIV and layer 344 in DV. It lay under the stone platform. It impinged on the dilapidated cairn (Illus 9.55). It was a brown clay soil with abundant charcoal, not entirely uniform but without any discernable pattern to its variations. Stray stones were found in it while others seemed to form patterns. (Illus 9.55, 9.57) Where it was not covered by the stone platform, it and its analogues in DIV and DV lay immediately below soil 308 and its variants, thought to represent Victorian and later soft landscaping.

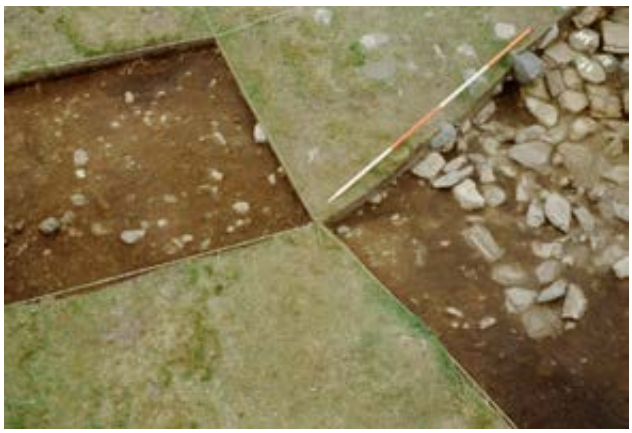
Most of the plough soil in the middle of Area DI was probably more than 0.2m deep. Its precise depth was not recorded everywhere, but on the south baulk section it was 0.1 to 0.15m thick. On the main north-south section (Illus 9.55) it varied from roughly 0.15 to 0.25m thick. It was quite thin in the westernmost angle of the trench (Illus 9.55) where the main underlying layer of ginger soil 320 appeared first during cleaning, and



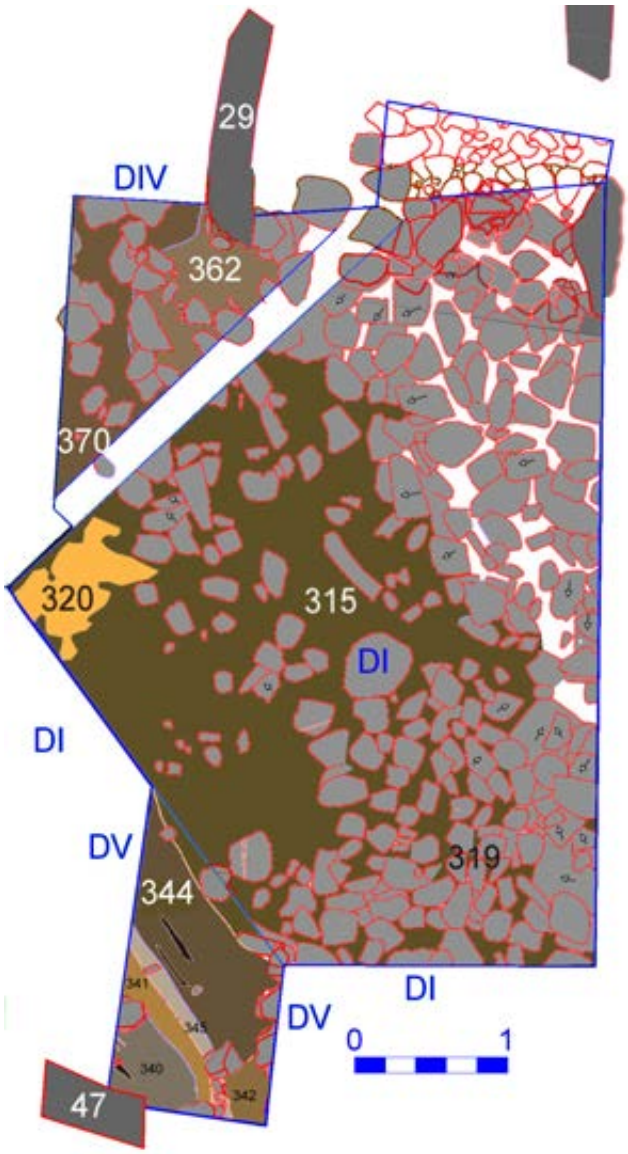
Illus 9.52 Plan 31 of 4 May 1981 [NMRS DC38162]



Illus 9.53 Plan 31b of 4/5 May 1981 [NMRS DC38163]



Illus 9.54 Junction of DII and DI on 26 May 1980 [Film 1980.11.35]



Illus 9.55 Plough soils 315 and 344 [Plans 12 and 28 NMRS DC38141 and DC38160]

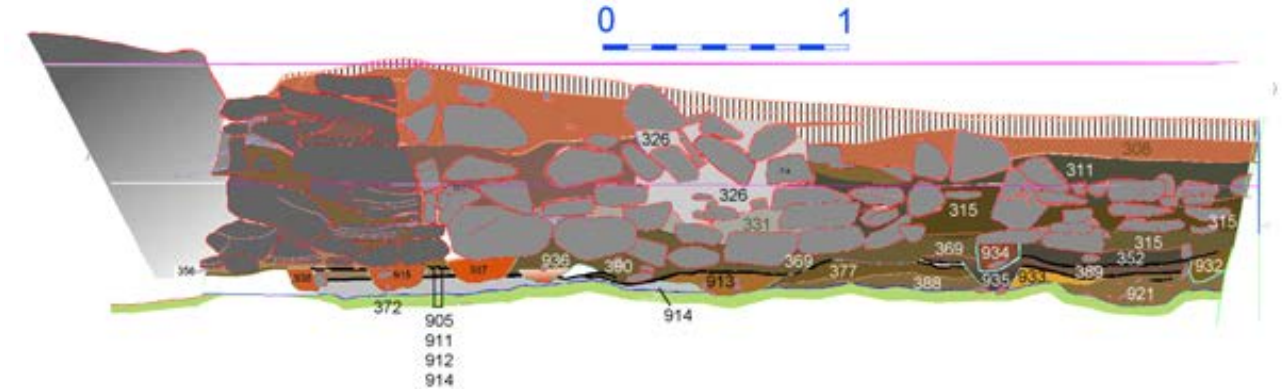
its analogue 344 hardly covered the strata at the base of Ring stone 47 to the south.

In the north it was found amongst disturbed stones of the cairn (Illus 9.55-9.57). For the most part it overlay ginger brown clay 320. In the south-east the plough soil overlay, black, slightly sandy clay 352. This layer developed into a series of small features outside the limit of cairn.

On the main north-south section clay 352 was separated from the underlying 389 by a turf line (Illus 9.56). Because 389 overlay or was upcast onto turf line 365 this suggests that it was a high turf line, well above turf lines 365 and 334. It was not noticed anywhere in plan in Area DI. Careful analysis of a Kubiena box sample of the south baulk section revealed a turf line at a similar stratigraphic level. As discussed above, it is conceivable that it was related to turf line 316a in DII.

On the south baulk above 352 was chocolate brown soil 377, which occurred elsewhere as a layer under the main old turf lines but also as patches on top of it, presumably as spoil from digging pits. Ard marks were recorded at the base of the plough soil, initially in the south-east where it overlay clay 377. They were not visible in 315 elsewhere (except in the special case of Pit 321) but appeared in the underlying layer 320. They are discussed in detail below.

There were 39 individual finds of pot from soil 315, some including several sherds (Table 9.5). A piece of quartz 80.158 from the base of 315 was not included in the catalogue. The plough soil also produced what may have been a piece of iron concretion (80.90).



Illus 9.56 The main section under Lady Matheson's Path. [Sections 21A and 62 NMRS DC338149 and DC 38194]

Illus 9.57 Plough soil 315 during its removal in 1980 [Film 1980-GEN-5]

Illus 9.58 Feature 321 [Film 1980-GEN-4]

Three radiocarbon dates were obtained from single pieces of charcoal.

Soil 315 was sampled in the top 5cm of Kubiena Box 7 taken from the south baulk (see Chapter 21: Palaeoenvironment). As remarked above, a turf line (or at least a humus-rich band of material) lay between the plough soil and the underlying layer 320, although it was not noticed during excavation. In the pre-plough soil levels - mainly layer 320 - birch had declined sharply from previous values, while grasses increased strongly and cereal-type pollen was present. Towards the end of this phase grasses dropped to values around 40% and in plough soil 315 the heather pollen increased again to values around 30% and birch increased a little. The pollen spectrum from 315 was characteristic of late pollen zone 3b to zone 3c, and probably dated to the first half of the 2nd millennium BC.

Only one spot sample from 315 was analysed for pollen. Tree pollen values were low and dominated by hazel-type pollen (see Chapter 21: Palaeoenvironment). The non-arboreal pollen was dominated by grasses, with heather pollen relatively low. Cereal pollen was absent, and there were few Compositae. The zonation of the spot sample to CaN-3b, which probably started in the third quarter of the 3rd millennium BC and ended in the second quarter of the 2nd millennium BC) contrasted slightly with that from the Kubiena box but variations within a plough soil cutting earlier layers can be expected.

By the SW part of the cairn, there was a localised patch (328) of grey silty material in the general ploughing layer (Plan 16, not illustrated here), which contained no artefacts. It measured about 0.4 m by 0.25 m and was very shallow. It was interpreted as a variation in the plough soil, and perhaps ploughing had partially destroyed a small pit or scrape dug between episodes of ploughing, because it did not persist to the base of 315.

In Area DV the plough soil was numbered 344 but was otherwise the same as soil 315 (Illus 9.57).

All of the sherds were abraded. There were no lithic artefacts recorded from this soil.

Two radiocarbon dates were obtained from single pieces of charcoal.

A few possibly individual burial-related features occurred in soil 315. They will be described and discussed in subsequent sections.

In DIV, south of the central monolith, dark brown compact clay (370) covered most of the area (Plans 46 and 48 Illus 9.14, 9.66). The clay was initially noticed as a dark greasy fill to the west of a line of stones (380) bisecting the area in a NW to SE direction and interpreted in Part 9.2 as possibly a Victorian revetment created during landscaping. It extended over much of the trench to the west of yellow-brown or orange-stained clay 373, abutting and underlying the cairn kerb. Clay 370 contained several lithic pieces.

It also produced a small indeterminate potsherd (Cat 974).

9.3.7 Discussion of the plough soil

Given that the plough soil mostly lay above a well defined gingery layer 320 with, in places, a vestigial turf line above it and its equivalent layer 950,

Table 9.5 Pottery from soil 315

Cat	Comments
10	A well-preserved E/MN corky rim sherd (ASH 4).
15	Two fairly well-preserved E/MN corky rim sherds, and crumbs (ASH 7a).
77_81	Three conjoining pieces and 2 closely related pieces of an abraded E/MN non-corky sherd.
82	A sherd from an E/MN minimally corky pot; but some Beakers from 315 had a similar fabric.
83_92	6 sherds, 4 fragments and crumbs probably all from one E/MN corky pot.
270_272	A sherd, 2 fragments and crumbs from an E/MN corky pot.
273_276	4 sherds from a large, relatively thick-walled E/MN non-corky pot/s.
331	A Hebridean Incised sherd.
332	A Hebridean Incised sherd.
333	A Hebridean Incised sherd.
413	A sherd from a beaker (ASH 45a or ASH 46).
414	A thin fine Beaker sherd (ASH 46).
415	A thin, fine Beaker sherd (ASH 46).
416	A fairly thin, fine Beaker sherd slightly reminiscent of some Hebridean Incised sherds
417_418	Two sherds of Beaker ASH 47.
419	A sherd of Beaker ASH 47
426_427	2 small abraded sherds from Beaker as described in Appendix, Entry 3. One has 2 lines of shell-edge impressions
428_429	A sherd and a fragment of Beaker ASH 48.
430	A sherd of Beaker ASH 48
431	A sherd of Beaker ASH 48
460	4 refitted sherds from a thin, fine Beaker (ASH 52a).
471	A sherd from a fairly fine, fairly small Beaker (ASH 57).
547_548	2 refitted sherds from 'domestic' Beaker (ASH 70).
616	A sherd from a large probably E/MN non-corky pot.
617	A sherd from a large E/MN non-corky or Hebridean Incised pot.
706	Two spalls, two fragments and 2 crumbs from a fairly large pot, most probably a Beaker cooking pot.
707_708	2 small abraded sherds, with exterior spalled off; perhaps more likely to be minimally corky E/MN than Beaker.
748	A sherd from a thin fine Beaker.
896	Small, heavily-abraded sherd probably from a small fine Beaker.
897	Small sherd probably from a small thin fine Beaker.
898	A heavily abraded sherd most likely to be from a fine Beaker.
899	An abraded sherd from a fine or domestic Beaker, or a fine, non-corky E/MN pot.
900	A spall from a Hebridean Incised pot.
901_909	5 indeterminate spalls, 4 fragments and crumbs possibly from more than one pot; several heavily burnt.
910	A small abraded sherd probably from a fine or domestic Beaker but can't rule out possibility of it being E/MN non-corky.
911	An indeterminate spall.
912	A small spall from Food Vessel ASH 75.
913	A sherd from a domestic Beaker or E/MN non-corky pot.
914_915	Two heavily burnt undiagnostic spalls.
916	Spall from E/MN corky pot.
917	An abraded sherd probably from a fine or domestic Beaker.
918_919	Two spalls, probably from one or two fine Beaker/s.
920_921	2 small markedly hard pieces, not definitely pottery.
472	Two conjoining sherds from a small fine thin-walled Beaker (ASH 58).

Table 9.6 Lithics from soil 315

Cat	Comments
61	A piece of quartz
62	A piece of flint
63	A quartz flake
64	A piece of quartz
65	2 quartz chips
66	A quartz flake
67	A piece of quartz
68	A piece of quartz
69	A flint flake
70	A quartz flake
71	A piece of quartz
72	A flint flake
222	A fragment of a mylonite side-scraper on a platform flake
223	A fragment of a possible arrowhead rough-out
224	A mylonite short end-scraper on platform flake
225	A fragmented quartz short end-scraper on a platform flake
226	A side-scraper on a quartz chunk

Table 9.7 Radiocarbon dates from soil 315

Code	Sample
AA-24960	hazel
AA-24961	birch
SUERC-11590	pine

Table 9.9 Radiocarbon dates from soil 344

Code	Sample	2 sigma
SUERC-11591	pine	2490 to 2290 cal BC
AA-24962	birch	2030 to 1750 cal BC

and that 320 itself lay above a well preserved turf line (334 in the north and 365 in the south) the plough soil must have formed largely from material imported to the area after layer 320 formed. Between layer 320 and the underlying turf line were many individual small patches of clay; they and ginger brown layer 320 will be described and discussed in detail later.

The preferred interpretation, argued in detail below, is that the charcoal and pottery came partly from ploughing up of clay brought in from other places and partly from a long succession of small ritual deposits in the area.

The terminus post quem for cessation of ploughing came from radiocarbon-dating of a piece of birch charcoal in soil 344 in Area DV. The dates from 344 were younger than any of the dates from the main area of plough soil 315. It is possible that ploughing near Ring stone 47 did not start as early as that in 315, although there seems to me to be a greater likelihood that only chance prevented similar late dates being measured for 315. Some ploughing may have taken place many centuries later than the latest charcoal, judging by the pollen evidence.

The dates linked in fairly well with the pottery from Calanais. The hazel, probably dating to between 2910 and 2630 cal BC, may be of much the same calendar date as the grooved ware and so may the birch which probably dated to between 2860 and 2470 cal BC. It is slightly odd that there was no definite grooved ware from 315 or 344 particularly since there was a sherd probably in the Grooved Ware tradition (Cat 524) from Pit 321 near the base of 315. However, the plough soil did not occur under the cairn, or the underlying green clay platform, which is thought to have been built after 2400 cal BC. Nor was it found under the clays placed below the cairn. Therefore this earlier charcoal in the plough soil was older than its formation, and so probably was the piece of pottery in grooved-ware tradition. It may have derived from deposits similar to clay 369 (described and discussed below) which seems to have been imported.

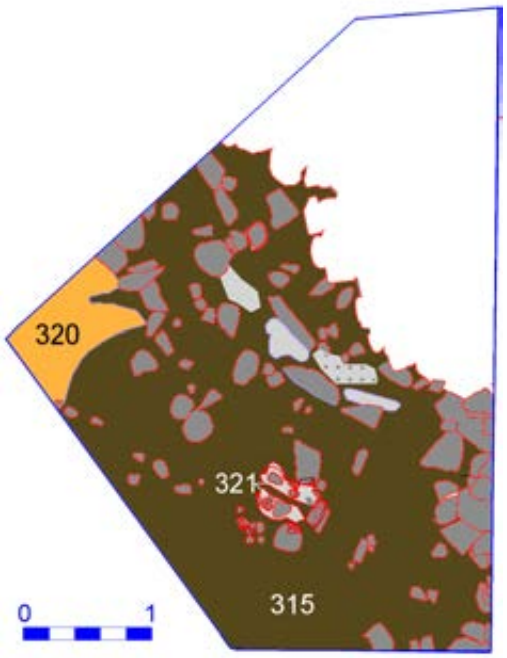
The pine charcoal, probably dating to between 2580 and 2340 cal BC, could go with pottery in

Table 9.8 Pottery from soil 344

Cat	Comments
125_128	4 spalls, heavily abraded, from an E£/MN pot
467	2 refitted sherds from a Beaker (ASH 53b or possibly ASH 53a rather than ASH 54).
549_553	5 refitted sherds from a large pot most likely to be 'domestic' Beaker,
716	An abraded spall probably from an E/MN corky pot.
983	A spall from a fine E/MN non-corky pot or a Beaker.

Table 9.10 Lithics from clay 370

Cat	Comments
121	flint flake
31	mylonite flake
122	quartz flake
123	2 pieces of quartz



Illus 9.59 An ard mark cutting Pit 321 [Plans 13 and 14A NMRS DC38141 and DC38142A]

any one of several traditions. The younger of the two ages in soil 344 suggested a date between 2030 and 1750 cal BC when beaker pottery was fairly widespread in Britain. These pieces of charcoal should post-date cairn-building.

It seems likely that layer 320 was in part the result of later soil processes because pits first noticed below it contained pollen characteristic of a later period.

Many small ritual deposits of clay and soil might have been made. But there are several possible non-ritual sources for the material which contributed to plough soil 315.

1. It is conceivable that some of its bulk was clay derived from the pits dug for the Ring stones. However a calculation of the volume of clay which might have been produced when the pits for central monolith and Ring stones were dug suggests that it would have been insufficient to add more than a few centimetres of clay (see Chapter 24 Discussion). It might have formed the material between two turf lines below 320.

2. Imported clay and soil might have been spread on the area. As described below some contexts at the base of soil 315 produced surprisingly early dates suggesting that the material in them had been brought in from elsewhere.

3. it is possible that the cairn make-up originally contained a considerable amount of clay or soil. It did so in Area H where the original cairn was better preserved. If so, it might well have been pulled down onto Area DI when stones were removed.

4. Lastly, manure and soil improvers might have been added. That is an imponderable because we did not carry out any formal soil analysis.

5. It is unlikely that any of these sources in isolation provided enough material to account for the up to 0.25m depth of the plough soil. But it does seem likely that some or all of them, along with (hypothetical) ritual deposits provided the material for plough soil 315.

Further aspects of the ground-working will be discussed after a description of the ard marking.

9.3.8 Pit 321 and possible ritual deposition

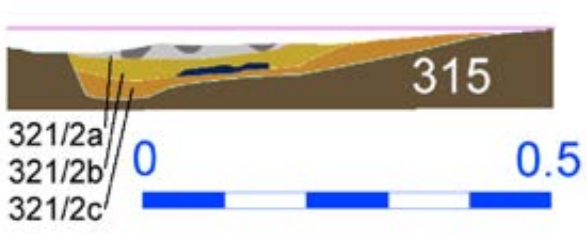
At one point ard marks appeared at a relatively high level. A pit or stone-cast (321/322) was found in the lower part of the plough soil (Illus 9.58 to 9.60). It must have been created between episodes of ploughing or ground working because 315 occurred both below and above it.

Illus 9.59 shows the pit fills crossed by an ard mark which in plan separated features originally numbered 321 and 322. These subsequently proved to be a single pit, and three ard marks were identified in section (Illus 9.60).

The pit was outlined by a gritty, slightly orange sandy material with a ring of grey silt inside. A cluster of stones lay around its east side. The uppermost fill 321/2a was grey silt. 321/2b was a gritty brownish yellow soil and 321/2c was grit-free brown sandy silt. Between 321/2b and 321/2c was a lens of charcoal. Fill 321.2 of the pit contained at least 20 sherds of pottery.

Table 9.11 Pottery from Pit 321

923	A heavily abraded sherd from large, E/MN non-corky pot or domestic Beaker.
536	A sherd from small, fine Beaker ASH 65
924_926	3 spalls of fairly fine E/MN non-corky pot or Beaker
524	A sherd from a thin-walled gritty pot. with decoration reminiscent of Grooved Ware pot ASH 61. Could be Grooved Ware or Beaker.
525_530	4 sherds, 2 fragments and crumbs, mostly spalls, possibly from the same probably E/MN corky pot as Cat 93-113 and Cat 531-533.
531_533	Spalls, one a sherd and the other 2 fragments . possibly from the same probably E/MN corky pot as Cat 93-113 and Cat 525-530.
93_113	14 sherds, 7 fragments and crumbs possibly from the same probably E/MN corky pot as Cat 531-533 and Cat 525-530



Illus 9.60 Section of hollow 321/2 [Section 14B NMRS DC38142B]

It also contained flint flakes (80.110 and 80.194), a flint chip (80.112) and a piece of quartz (80.114). None showed any special features.

9.3.9 Discussion of Pit 321

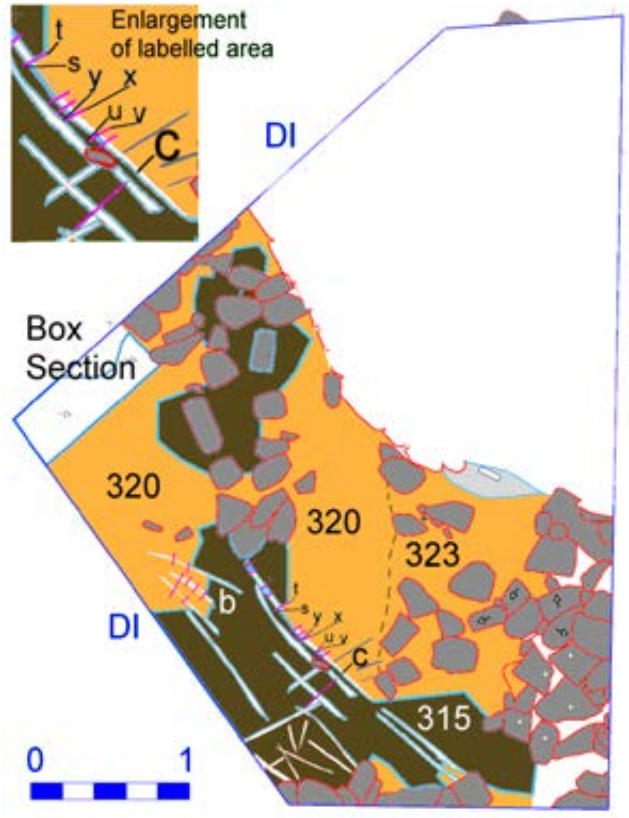
The preferred interpretation during excavation was that the pit was created by removal of a stone during ploughing and was subsequently filled with material different from the plough soil 315. Pit 321 may instead have been a shallow pit. Either way that material must have been placed rather than ploughed back into it, because the fills were distinctly different from the plough soil. The amount of pottery in the small volume of the pit suggests its purposeful use to bury soils containing bits of broken artefacts.

9.3.10 Ard marking

Basically most detected plough marks contained charcoal or carried material from soil 315 into the clay below it or vice-versa; but undoubtedly many more were restricted to layer 315 and never seen during excavation. One was noticed in plough soil 344. Others may have disappeared through working of the ground after it was ploughed.

The exceptions to the general rule that ard marks appeared only at the base of the plough soil were the three ard marks visible on the section of feature 321/2 and described above (Illus 9.60). They were asymmetrical. Clearer examples of ploughing with an asymmetrical ard or with a symmetrical ard held at an angle are described below.

On Plan 19 (Illus 9.61) an area at the base of plough soil 315 noted in 1980 as reddish-brown and gritty was assigned the temporary context



Illus 9.61 Ard marks on Plan 19 of 1980 at base of 315, with an addition (label '369?') from Plan 34 of 1981 [NMRS DC38147 and 38166]

number 332. On the basis of Plan 34 of 1981 it may have been a mix of 320 and an underlying soil 369; it was stratigraphically equivalent to clay 320.

It was quite notable that the top of the thin ginger coloured clay 320 did not show many ard marks in the 1980 season, although they showed clearly in the basal remains of plough soil 315 at the south end of the trench (Illus 9.61, 9.63). They should have stood out, for once 320 had been trowelled over several times in 1981 they appeared in abundance (Illus 9.66). The likeliest explanation is that the uniform ginger colour of clay 320 was in part at least the product of post-ploughing soil chemistry which had affected the topmost part more than the lower levels.

All but one of the ard marks detected in 1980 trended NW / SE, roughly parallel to the more westerly part of the cairn kerb in DI. The longest ard mark ('c' on Illus 9.61) was discontinuous but overall nearly 3 m long. Two gaps divided it into sections between 0.8 and 1.1 m long. The bottom of this ard mark was sectioned where it cut layer 320.

Another ard mark to its SW seems to be continuous and was at least 2.2 m long, while another between it and ard mark 'c' was over 1.5 m long (Illus 9.66).

A section was cut across these two ard marks (near 'b' on Illus 9.61); b1 was the more northerly mark. Judging by the difference between Plan 19 and earlier plans some of the top of the marks may have been cleaned away before the section was drawn. Four of the five sections were asymmetrical but section x-y of ard mark 'c' (Illus 9.64) was fairly symmetrical. It is not possible to say whether the ard blade itself was symmetrical or asymmetrical, or the ard was usually held at a slight angle to the vertical.

In Illus 9.66 the ard marks shown on various plans are colour coded.

Table 9.12 Colour coding of ard marks

1980 Plans 16-17	Green
1980 Plan 18	Orange
1980 Plan 19	light grey
1981 Plan 34	Dark grey
1981 Plan 33 (Area DV)	Black

One short ard mark near the west corner of DI ran at an angle of about 70 degrees to the other ard marks. Parallel to it, further west, was what at first sight seemed to be another ard mark. However, subsequent excavation showed this to be part of an undulating turf line (334) which dipped sharply down to the SE.

In Sub-area DV, opened in 1981 near Ring stone 47, the ard marks were mostly parallel to those on the main area (Illus 9.66, 9.67). One ard mark was noticed in plough soil 344 and there were abundant ard marks underneath it (Illus 9.66) cutting into the tops of clay layers 359, 366 and the brown clay mound 340 round the base of Ring Stone 47 (Illus 9.67).

A pollen sample (2077) from an ard mark in 359, suggested that it had formed during pol-

Illus 9.62 Ard marks cut into in last remnants of plough soil 315; most of DI shows layer 320, from the west-south-west on 21 May 1980 [Film 1980.10.21]

len zone CaN-3c where both Ericaceae and Gramineae were high and the Pinus curve declined under 1%. It implies a date after 1880 cal BC (and perhaps very much later, for CaN-3c ended at some time between 1070 and 420 cal BC) for ploughing. Given how close it was to the surface this is entirely credible. That said, as described above, pollen samples from Soil 315 contained earlier assemblages characteristic of Zone 3a and around the transition from Zone 3a to 3b.

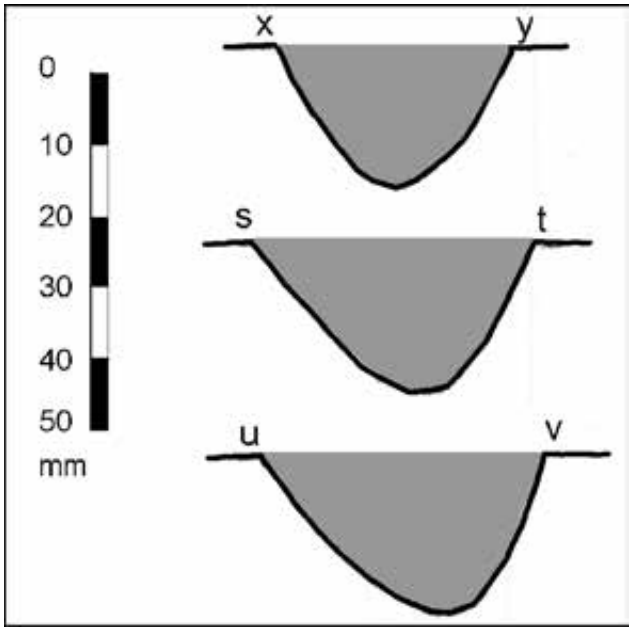
One of the ard marks was found less than 5 cm from the base of Ring stone 47, running at an angle of 40 degrees to its face. This ard mark was highly asymmetrical suggesting that the ard had been held with its shaft leaning sharply away from the Ring stone (Illus 9.67). The ard itself seems to have had an almost square end, as does the ard which created one of the marks seen in the south baulk section of DI (Illus 9.68). A small stone, about 50 mm broad and somewhat longer, seems to have fallen back partly into the ard mark.

Immediately south of the cairn the ard marks seemed to respect clusters of large stones below the base of the plough soil. This probably reflects the simple fact that there were so many stones that the ard had to be lifted; but it must also be born in mind that ard marks would have been very hard to see in the clay amongst the stones during excavation.

Several of the ard marks cutting layer 320 under the plough soil ran at a slight angle to the trend-line of the longer ard marks first recorded. One new ard mark in the western portion of the area ran at a shallow angle to the main trend, almost as if the direction of ploughing had changed to follow the circumference of the cairn about 1.2 m to its NE.

The south baulk section is shown in Illus 9.68a, 9.68b and 9.69. It should be noted that the label 950 has been added to Illus 9.68a during post-excavation, and also that (Illus 68b) shows the section redrawn from photographs and from

Ilus 9.63 Detail of ard marks [Film 1980.10.19]



Illus 9.64 Sections across ard mark 'c' from the level of the top of clay 320 (see Plan 19 Illus 9.61) [1980 Day Book 38]

soil descriptions for Kubiena box samples taken during sampling for pollen

Five ard marks appear on it, each marked with 'A' on Illus 9.68. The two to the east were markedly asymmetrical, and looked as if they ran roughly north-south, more or less at right-angles to the baulk. A few ard marks on Plan 19 ran in roughly the same direction. The three ard mark sections to the west looked as if they reflected ploughing at a shallow angle to the section, like some of the shorter ones shown on Plan 19 (Illus 9.61).

A probable ard mark is shown on Plan 55 (Illus 9.75). It cut the top of a ridge of greyish soil 388 which underlay turf lines 334 and 365 where they had been truncated, presumably by ploughing. It was shallower than some of the ard marks recorded at higher levels and that suggests that it belongs with them rather than with an earlier episode of ploughing.

Near the central monolith the basal remains of soil 362 and the underlying 373 were ard-marked suggesting that at least the bottom element of 362 was part of a plough soil (Illus 9.66). No ard-marks were recorded in clay 370, but some faint marks may have been created by an ard.

Two ard marks running roughly east west and at least one running north-south were found in Area DIV near the central monolith (Illus 9.66, 9.70). The photograph (Illus 9.70) also shows what with the eye of faith may be two more east-west ard marks north of those planned, and what may be east-west ard marks in soil 370, just by the south baulk. If so 370 may, even if it was like 368 inside the cairn nearby, be the stratigraphic equivalent of basal soil 315, or 320, or perhaps both.

9.3.11 Discussion of the ard marks

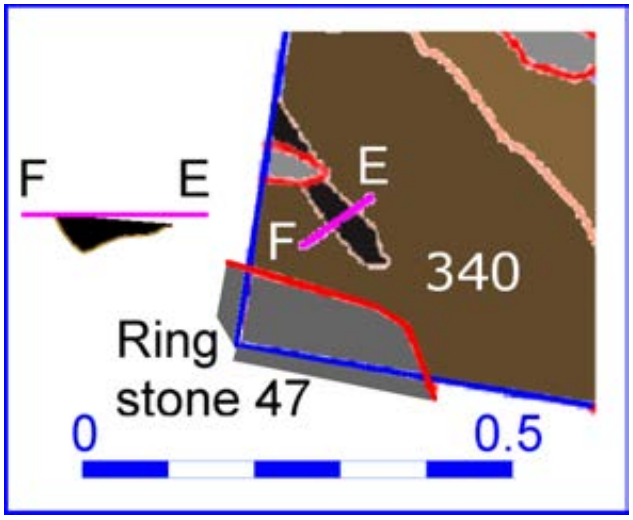
As described above the depth of the plough soil 315 on the south baulk section (Illus 9.68) was 10 to 15 cms. On the main section (Illus 9.54) it varied from roughly 15 to 25 cms. The ard marks cut 2 to 5 cms into the underlying layer. If they cut the ground vertically the ard blades themselves will have been around 0.2 to 0.3 m long from where they were hafted to their tip. If they cut it at an angle of 45 degrees they will have been about 0.3 to 0.4 m long. Presumably they were made of wood,

because no stone examples were found at Calanais, and their lengths will have diminished with use.

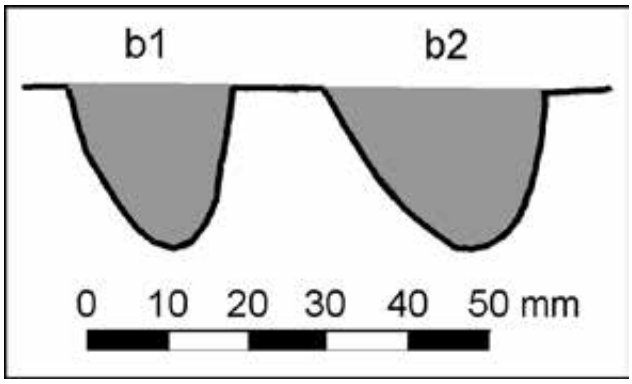
The evidence demands that there were several different episodes of ploughing. The ard marking over Feature 321 must be of a later date than the basal ard-marking. Illus 9.66 with ard marks running in different directions also suggests several different periods.

The latest radiocarbon date from plough soil 344 is indistinguishable from a date from Area B from a piece of charcoal in an ard mark which cut the natural clay (123). That does not prove that some ploughing on Area DV was contemporaneous with some on B. But it does slightly increase the likelihood that, at least in its later stages, the ploughing south of the cairn was part of a much wider phenomenon.

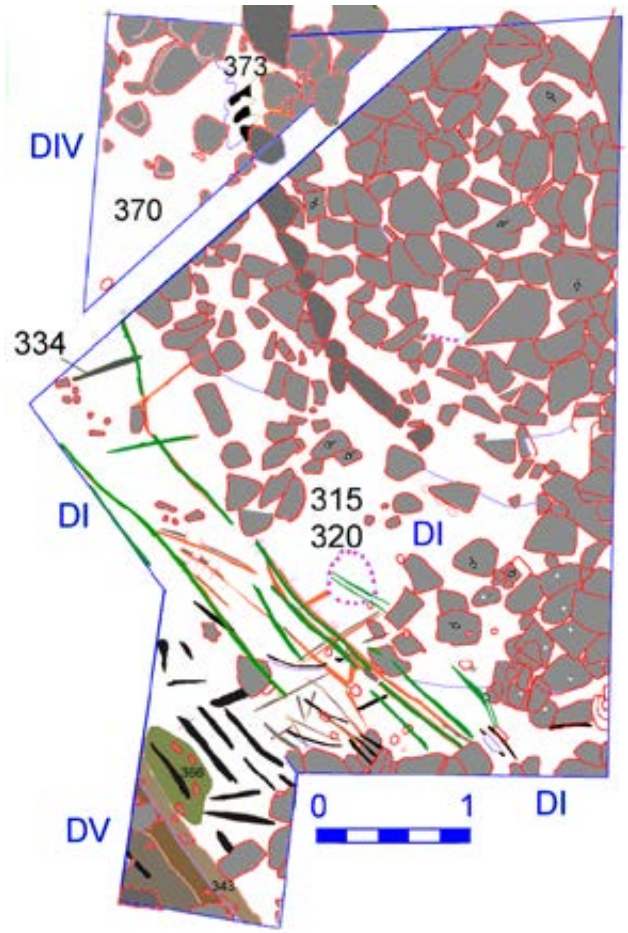
The evidence discussed above demonstrated that ploughing ran very close to standing stones. On Area DV it approached Ring stone 47 to within 0.1m. On Area DIV the ard marks ran close to the central monolith. It was as if the orthostats had been ignored until the ard had to be lifted or leant over to avoid them. I originally thought that the proximity of the ard marks to standing stones meant that they were unlikely to represent ploughing simply for cereal cultivation, but I have now experienced the almost fetishist regard that some farmers have for exploiting every bit of their land. Also, the intention may have been to get rid of weeds at the base of the stone. Thus the prox-



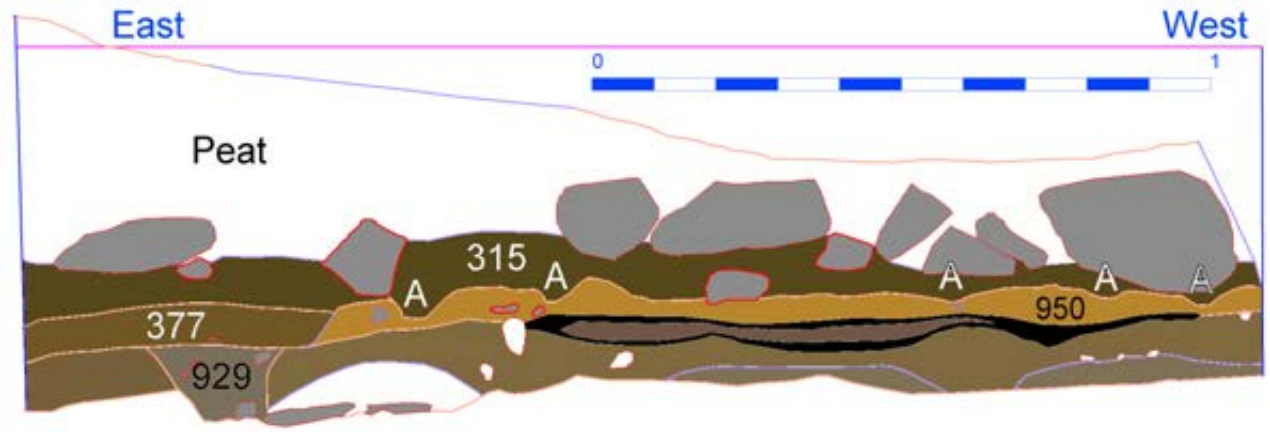
Illus 9.67 Ard mark close to Ring stone 47 in Sub-aea DV [NMRS DC38159]



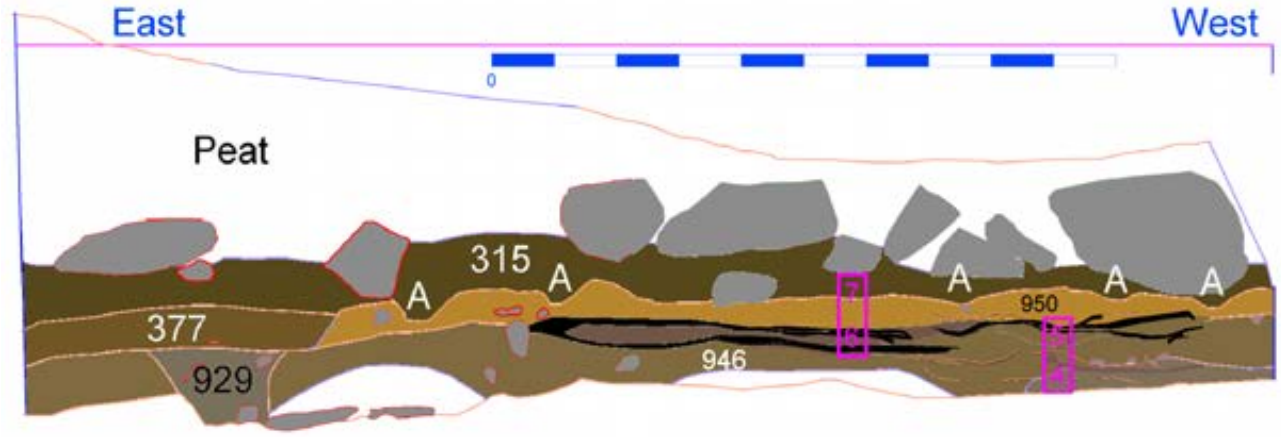
Illus 9.65 Sections across ard mark 'b' from the level of the top of clay 320 (see Plan 19 Illus 9.61) [1980 Day Book 38]



Illus 9.66 Plough marks in the base of 315 and top of 320 [Plans 16-19, 24 and 34 in DI, Plan 48 in DIV and Plan 33 in DV; NMRS DC38144 - DC38147, DC38155, DC38166, DC38180 and DC38165]



Illus 9.68a The south baulk at right angles to the main section [Section 105 NMRS DC38239)



Illus 9.68b The south baulk section with detail re-drawn from photographs taken during pollen sampling and the Kubiena pollen sampling boxes shown

imity of ard marks to standing stones cannot be used to demonstrate that the ploughing was not for cultivation.

Soil 315 was clearly a very mixed layer and it would be rash to suppose the pollen from a single spot sample and a small area by the south baulk were fully representative of its variety. The abundance of ard marks on different lines suggests several episodes of ploughing, so if cereals had been grown their pollen should have been ploughed into the soil during all ploughings after the first. The absence of cereal pollen from the spot sample does suggest that at least some of the ploughing was not for cereal cultivation.

An alternative explanation is that the ground was worked over for some ritual purpose, possibly with hand tools from time to time, but definitely at least a few times with an ard. Specks of pot were seen in several contexts, as if sherds had almost completely disintegrated. If small deposits of soil and artefacts were being added to satisfy some ritual need, perhaps they were worked over fairly regularly to integrate them with the earth. Perhaps the ploughing was an act of closure for the deposits.

Seed-bed preparation (and possibly also ritual closure) will have involved several different processes. The ard may have been used to break up the soil and turf but other tools would have been used to harrow it. In Miranda do Douro Museum (Portugal) I have seen an early late pre-modern harrow made of microliths embedded in heavy wooden planks. It is possible that those who ploughed at Calanais used a combination of a wooden matrix and quartz pebbles for a similar purpose. Perhaps

Illus 9.69 The ard marks and other layers recorded in Illus 9.68 [Film 1981.21.27]

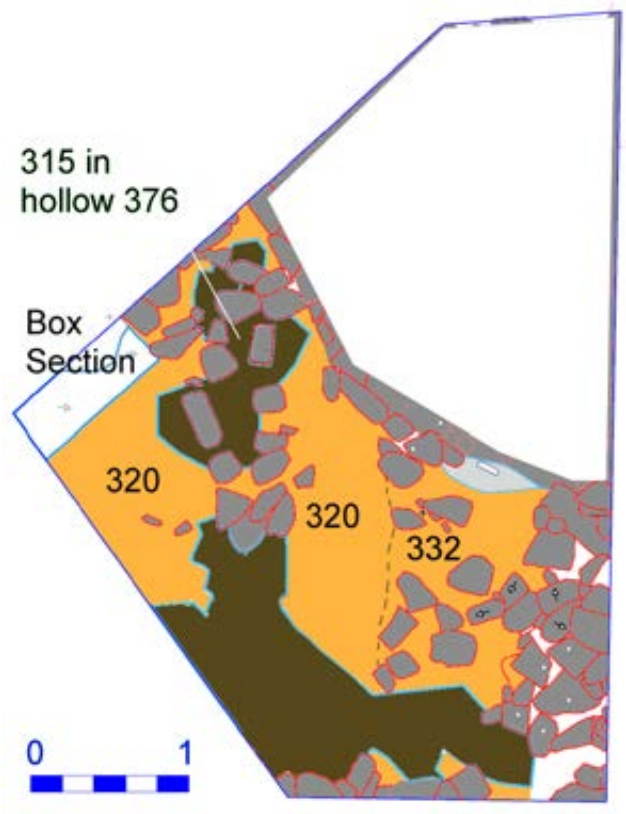
Illus 9.70 Ard marks close to the central monolith in DIV from the northwest on 13 May 1981 [Film 1981.7.27]

we should have been even more assiduous than we were in collecting pieces of quartz.

9.3.12 Layers 320, 332 and 950

At the end of the 1980 season the area south of the cairn was occupied by ginger brown clay 320 and the remnants of plough soil 315. Clay 320 was visible at the level of the surviving top of the original kerb and underlay the Victorian kerb line. It seemed to tail off towards the prehistoric kerb (Technical Note 9.3.12a).

Gingery clay 320 contained four potsherds of which two were diagnostic.



Illus 9.71 Clay 320 at the end of the 1980 season with ard marks omitted Plan 19 (part) [NMRS DC38147]

Table 9.13 Pottery from clay 320

Cat	Comments
298_299	Two conjoining sherds from a large Hebridean Incised pot ASH 27a.
596	A rim of a type known from E/MN deep carinated jars, usually of Hebridean Incised ware, but grittier, and the eversion of the rim is reminiscent of that seen on some Hebridean Iron Age pottery, although not as markedly kinked.
710	A sherd probably from an E/MN cooking pot
922	A very small sherd most probably from a fine Beaker.

No lithic artefacts were found.

Clay 332 was wetter than 320 and heavily smeared with charcoal. It may have been in origin a mixture of the top of the underlying clay soil 369 and soil 315. But like the gingery colour of 320 the similar but slightly more reddish brown colour of 332 reflected post-ploughing soil processes. It is also possible, albeit fairly unlikely, that its difference from 320 was due in whole or part to Victorian activity in this area (Technical Note 9.3.12b). It contained a conjoining pair of Beaker rim sherds and another sherd possibly from the same small fine pot (Cat 457-458, ASH 50).

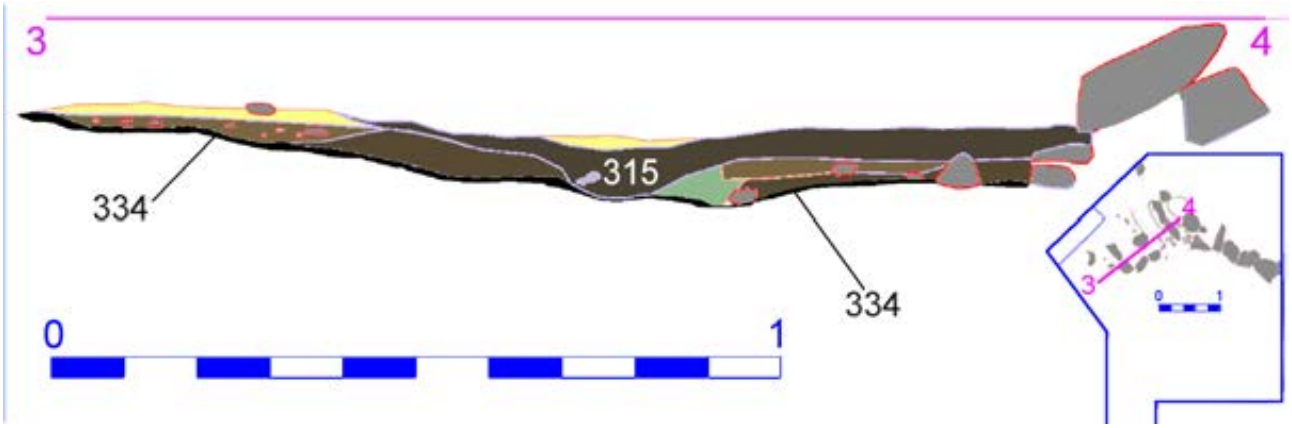
By the west baulk gingery clay 320 appeared immediately above the uppermost prevalent turf line 334. Over most of the southern half of DI it overlay the equivalent turf line 365, but separated in places from it by patches of brown and black material, discussed below. In the easternmost part of the trench it did not appear in the main baulk section 62 (Illus 9.76).

Further west on the south baulk section a humus-rich grit 950 was in a very similar position and was probably the same as 320. It was about 5cm thick (Illus 9.68b, Illus 76). A turf line (or at least a humus-rich band of material) appeared to be lie between plough soil 315 and the underlying layer 950, although it was not noticed above 320 during excavation.

9.3.13 Discussion of Layers 320, 332, and 950

As noted above there was some evidence for a weak turf line above layer 320. That suggests that it lay open to the air for at least a few years. If the preferred interpretation of its date is correct the cairn had not yet been built and the eastern part of the Ring had been levelled up with clay from a variety of sources. One may have been originally green clay spread when the green clay platform was built.

The ginger brown colour of clay layer 320 was the result of soil processes such as oxidisation of ferrous compounds, so its seeming uniformity when excavated may have been greater than its



Illus 9.72 Section 50 of 15 May 1981 diagonally across Hollow 376 [NMRS DC 38182]

uniformity when laid. The invisibility of the tops of ard marks subsequently revealed by trowelling shows that those processes operated after ploughing had started in the overlying soil 315.

Evidence from Area H independently suggests that there was a period during which green clay spoil was stored before it was spread out to form the platform there. Layer 320 may have been an approximate equivalent of the platform clay. The piece of probable fine beaker Cat 922 (Table 9.13) could have been laid down in the clay if the Beaker was a very early one, but it seems more likely that it was in an undetected ard mark.

The pollen-zoning of the underlying turf lines suggests that they formed at some date between 2560 cal BC and 2200 cal BC (when the transition from CaN-3a to CaN-3b took place at Leobag) and if the preferred interpretation of the relationship of 950 and 320 is correct it implies that clay 320 was spread in the area of the Ring sometime after 2560 cal BC. Given the likely earliest date for the subsequent cairn of around 2400 cal BC (because of probable Beaker sherds in a slot under the cairn and an early beaker near-rim sherd well-stratified in its make-up on Area H) that is not incredible. The pollen evidence and the interpretation are discussed in more detail below in the context of the underlying cultivation beds and also in Chapter 21: Palaeoenvironment.

The preferred interpretation of clay 320 is that it was part of a purposefully laid layer of approximately the same date as the platform under the cairn. It was modified subsequently by soil processes, which meant that its top and the tops of patches of other clay at the same level had become gingery orange by the time they were excavated. That soil process may have been complete before peat covered the place, although it might conceivably have started up again after peat was cleared from the place.

9.3.14 Hollow 376 and its southward extension

There was a hollow 376 in the north-western part of the area outside the cairn where plough soil 315 survived surrounded by layer 320 (Illus 9.71, 9.72). The disposition of stones round part of it suggested a built feature; it was thought possibly to be a roughly square hearth until excavation revealed no signs of burning. The stones could alternatively be seen as defining a space up to 2m long and 0.5m wide lining the northern part of the linear hollow, but the northernmost stones may have been tumble from the cairn. It may be better to see it as only about 1.5m long north-south.

The original labelling of layers on Section 50 (Illus 9.72) presents problems (Technical note 9.3.14). The top layer was probably identical to plough soil 315 and the base of the depression was defined by turf line 334. But the original labelling of the other layers suggested that they were identical to layers under turf line 334.

The upper soil in the hollow, indistinguishable from the plough soil, contained the potsherds listed in Table 9.14 along with 3 quartz flakes, a piece of quartz(CAT 97 and 98) and 3 pieces of quartz not included in the catalogue (81.529). The

potsherds and quartz do not form a primary closed assemblage because of the nature of the plough soil which filled the upper levels of the hollow.

Plan 19 (Illus 9.71) and section 50 (Illus 9.72) show is that there was a linear hollow in the surface under 315 running south from the depression. Its projected line southward would have met Ring stone 47.

Table 9.14 Pottery from upper soil of hollow 376

Cat	Comment
122	An E/MN corky sherd with its interior face spalled off.
595	A sherd of indeterminate type.
714	Heavily abraded, burnt sherd from fairly small E/MN corky pot or a domestic Beaker.
765	A sherd probably from a domestic Beaker.
766	Abraded spall from an E/MN corky pot or, less likely, a domestic Beaker.

9.3.15 Discussion of Hollow 376 and its southward extension

The stones lining the northern part of the linear hollow probably once defined a space about 1.5m long and 0.5m wide. The disposition of some of them could alternatively be seen as emphasising an almost square area about 0.5m across.

It seems likely that this hollow existed before ploughing started because its base was lined with turf line 344. The line of the hollow extended northward runs just to the west of the central monolith, avoiding the cairn. Extended southward it would have run towards a point just to the east of Ring stone 47 at the south end of Area DV. It may represent a persistently used track across the western part of the ring from north to south. Although it is tempting to suppose that it was part of a track between the Avenue and the South Row, the dates of path, avenue and row are too uncertain to allow demonstration that that was so.

The hollow was used for some sort of ritual deposition, perhaps more than once. Its lower fills were sufficiently like those of layers underlying the turf line that they may reflect disturbances of the latter, and thus might be spoil from pit-digging nearby.

9.3.16 Clay layers small pits and dumps of clay below 320 and above turf line 334/365

Elsewhere plough soil 315 and the underlying ginger-brown gritty layer 320 merged into each other irregularly. On Plan 19, the last 1980 plan, layer 320 was still partly covered by a thin skim of the overlying layer 315. In the eastern part of the area, when Plan 19 was drawn, the soil was difficult to distinguish from 320 and it was assigned a temporary label 332 and annotated as reddish brown and gritty. Judging by the occurrence of the underlying soil 369 in this area on Plan 34 of 1981 (Illus 9.74) the reddish brown gritty soil 369 was at the same absolute level as the bottom of 320. Other variants of 315 were detected in this area, including a slightly grittier patch (327) under the south-eastern part of the area where the stone platform 319 was subsequently built; no artefacts were found in it.

As discussed above, dark brown soil 369 occupied the eastern area south of the cairn. Plan 34 is an overlay omitting detail to the west (Illus 9.74). It and Plan 40 of DV were drawn, and the photograph (Illus 9.73) was taken, on the same day. Soil 369 had appeared more or less where the wet patch of 320 had survived at the end of the 1980 season (Illus 9.74). It contained many large fragments of charcoal.

The pottery assemblage contrasts with that in the plough soil above, because the latter included many highly decorated beaker sherds. Layer 332 which can be seen as an interface between plough soil 315 and 369 contained a beaker rim sherd (80.159 ASH 50) which while not closely datable probably belonged around or after 2000 BC (Chapter 18: The Pottery Assemblage). It includes a find of 3 sherds from a domestic Beaker or much later, possibly 1st millennium AD pot. Although the sherds could conceivably have entered the context during Victorian disturbance the spot was

probably under deep peat in the 1st millennium BC. Stratigraphically it is more likely that they came from a Beaker.

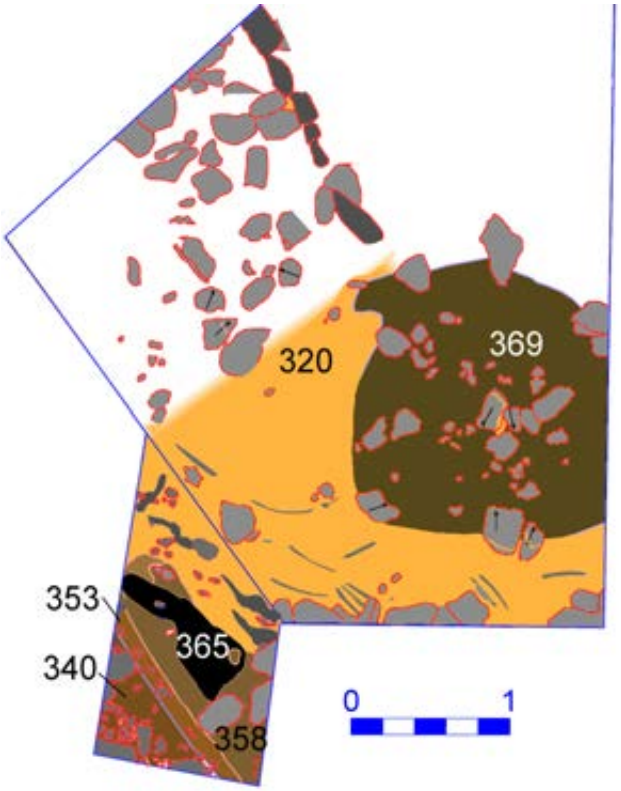
Four radiocarbon dates were obtained from single pieces of charcoal.

Soil 369 produced many potsherds.

Table 9.15 Pottery from layer 369

Cat	Comment
30_38	7 sherds, 2 fragments and several crumbs from an E/MN corky pot ASH 9.
39_43	4 sherds and a fragment from an E/MN corky pot ASH 9.
117	A spalled sherd from an E/MN corky pot
118	A sherd from an E/MN non-corky pot
119	A spalled sherd from an E/MN corky pot
222	A sherd from an E/MN non-corky pot ASH 13.
339	A Hebridean Incised sherd
712	A small sherd from an E/MN non corky cooking pot or domestic Beaker
713	Small abraded spall; probably from an E/MN non-corky pot
759_761	3 sherds from a domestic Beaker or much later, possibly 1st millennium AD pot
762_764	2 sherds, a fragment and crumbs of an indeterminate pot
935	A small abraded spall; indeterminate but could be E/MN or Beaker
936_938	3 tiny heavily abraded possibly burnt indeterminate fragments.
939	A sherd probably from a small thin fine Beaker
940_944	5 sherds from a probably E/MN corky pot,

Illus 9.73 The soils on Area DI on 9 May 1981 with dark soil 369 near top right and hollow and square stone setting 376 at top left [Film 1981.5.5]



Illus 9.74 Plan 34 of DI and Plan 40 of DV both of 9 May 1981 showing soils 320 and 369 [NMRS DC38166 and DC 38172]

Soil 369 also contained several lithic pieces.

Table 9.16 Lithics from layer 369

Cat	Comment
163	A quartz flake
91	A quartz flake
92	2 pieces of quartz
93	2 pieces of quartz
94	A quartz chip

Table 9.17 The radiocarbon dates from context 369

Code	Sample	2 sigma date
SUERC-11597	pine	3360 to 3030 cal BC
SUERC-11599	alder	3350 to 3020 cal BC
SUERC-11598	hazel	3100 to 2910 cal BC
AA-24963	birch	2880 to 2570 cal BC

The youngest date is comparable to the two oldest dates from the overlying soil 315. It seems likely that 369 was a disturbed remnant of deposits contemporary with or slightly earlier than 320, particularly since the overlying layer 332 was thought to be a variant of 320, albeit perhaps affected by Victorian activities.

This soil 369 underlay the Victorian kerb in the area of the Victorian intrusion, and appeared to both overlay and underlie the prehistoric kerb (Section 62 Illus 9.55). Its top may have been disturbed by Victorian activities and the fact that its upper part overlay the prehistoric kerb probably did not reflect its original relationship. There is no reason why it should not have been earlier than the cairn.

The soil overlay (patches of clay on) turf line 365 which was had pollen characteristic of a period between 2560 and 2200 cal BC. That suggests that the carbon and pottery in 369 was residual.

Illus 9.75 is intended to allow a quick visual impression of the layers below 320 and 369 as the area was trowelled repeatedly. The layers above the turf lines were various shades of brown to black and the plans simplify those colours.

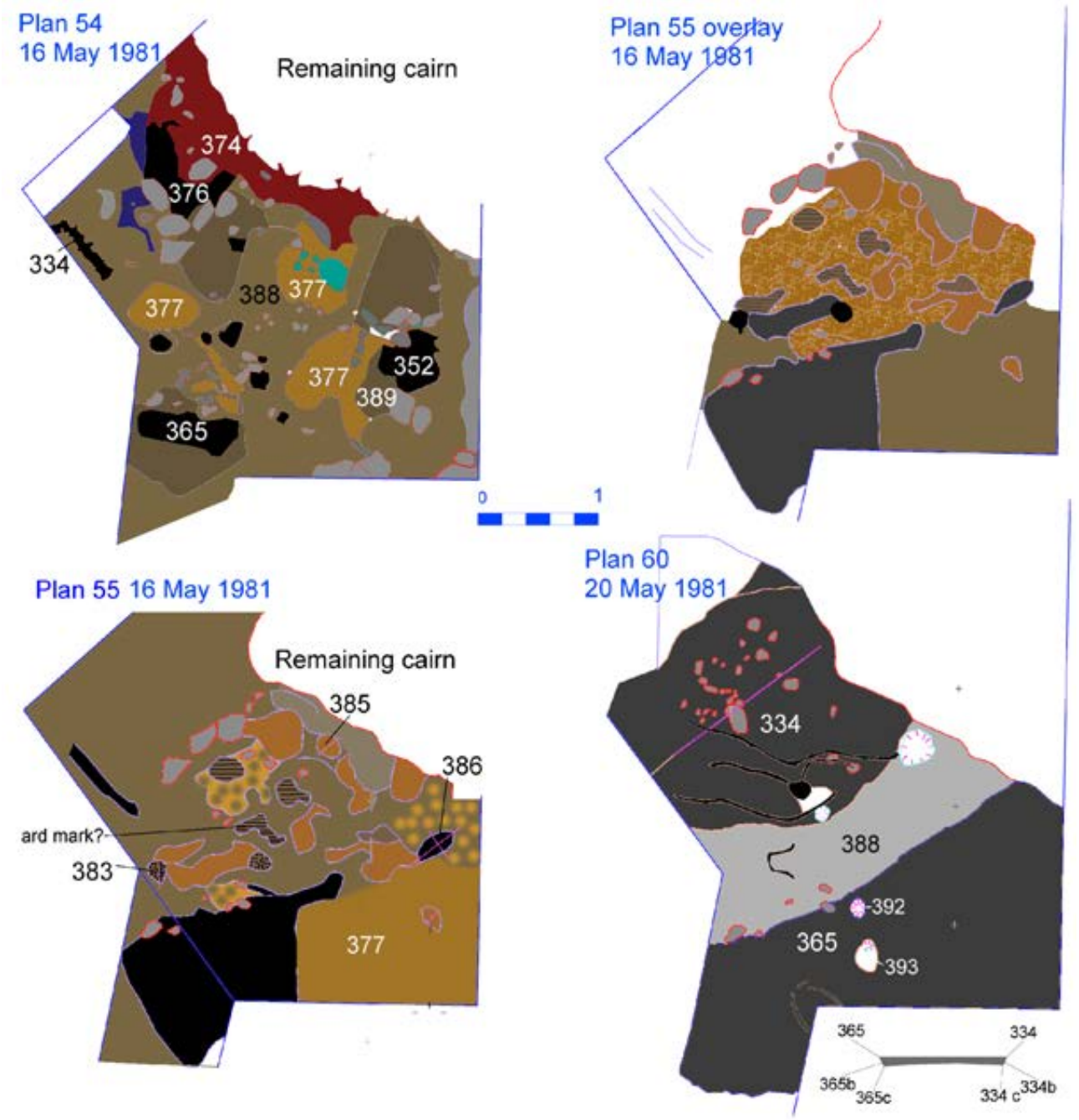
The sequence is top left, bottom left, top right and bottom right. Individual plans apart from the first will be repeated in the text as the description continues. The plans include layers of different date from one another and document the gradual uncovering of the underlying turf lines 334 and 365 and a ridge of earlier gritty grey soil (388).

To understand these layers the interpretation of the layers under the turf lines may be helpful. Essentially, they are seen as representing shallow cultivation beds which had been partially levelled before the Ring was erected, and an earlier curving ditch. The beds probably had a wave length of roughly 1.5 m and were orientated approximately east by north-east. A cultivation bed (Bed 1) ran at a slight angle through the southern side of Area DI. The top of Bed 2 was represented by the gritty clay (388) in the centre of the area (Plan 60 Illus 9.75).

The vertical scale in Illus 9.76 has been slightly exaggerated for legibility.

The turf lines on the sections (Illus 9.76) cannot be interpreted simply as the composite old turf line 365 which covered much of the area south of the cairn. As discussed above there was a slight turf line above layer 950 in the south section and a turf line at the same level seems to have survived above layer 389 on the east section (Illus 9.76). That layer was mottled black/brown clay in a rectangular area of accumulated humic debris interpreted as from an underlying structural feature extending north-south. It was at the same absolute level as clay 377 in both the east and the south sections. Here the significant point is that the turf line was at this point different from turf line 365 which extended over much of the area south of the cairn (Illus 9.75).

Under the plough soil in the south-east part of DI was a black slightly sandy clay (352) which appears from Section 62 and 105 (Illus 76) to have formed a layer above this later turf line, at about the same absolute level as clay 369. As it was excavated it developed into a series of pockets sand-



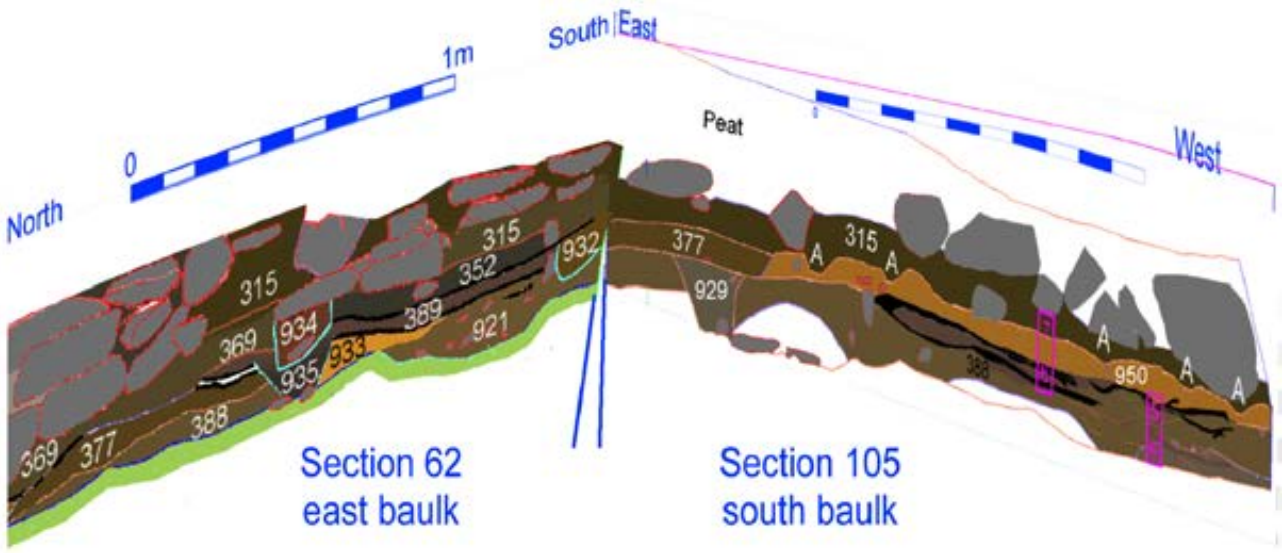
Illus 9.75 Plans 54 to 60 of 16 to 20 May 1981 [NMRS DC38186 DC38187A DC38187 overlay and DC 38192]

wiched between stones. These depressions were about 5 mm deep. Plan 54 shows that the pockets of black clay 352 overlay a roughly rectangular area of artefact-free mottled black-brown clay 389. That in turn overlay large patches of chocolate coloured clay 377 (Illus 9.75).

The pottery from clay 352 was all of early type.

Layer 352 also included 2 pieces of quartz (CAT 86, 550/81). A piece of hazel charcoal produced an age (SUERC-11611; 4450+/-35 BP) suggesting a date between 3340 and 2930 cal BC, distinctly earlier than the dates associated with the building of the Ring and cairn and very similar to the older two dates from layer 369 and those from dirty clay layer 360 under the cairn.

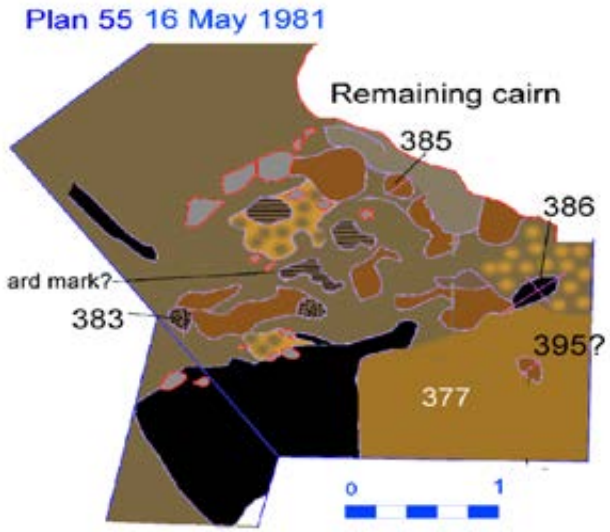
A patch of black clay labelled 376 with charcoal and turf line, just outside the cairn kerb about a metre east from the west corner of the trench, was the last remnants of material in the linear hollow 376 discussed above.



Illus 9.76 The east and south baulk sections [NMRS 38194 and 38239]

Table 9.18 Pottery from layer 352

Cat	Comment
16	From thin fine E/MN corky pot ASH 7a
114_115	2 abraded sherds from a relatively thick E/MN corky pot.
116	A sherd from an E/MN corky pot
928_931	3 heavily bunt and abraded spalls, a fragment and crumbs of an undiagnostic but possibly E/MN pot.



Illus 9.77 Soils south of the cairn on 16 May 1981 [NMRS DC38187]

Table 9.19 Pottery from layer 374

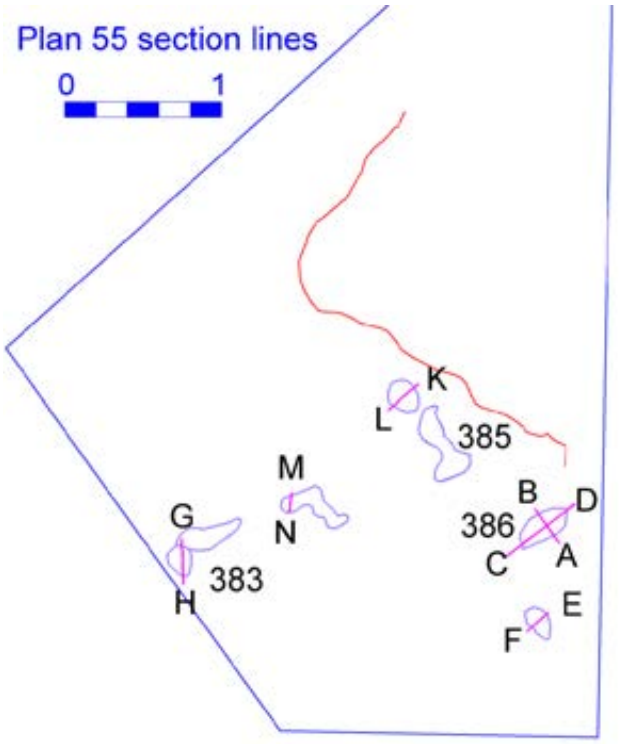
Cat	Comment
120	A sherd from a thin, fine E/MN corky pot.
121	A sherd from a thin, fine E/MN corky pot, possibly the same as Cat 120.
340	An abraded spall from a fine Hebridean Incised or E/MN non-corky pot.
622	A large sherd and crumbs from , an indeterminate large cooking pot or domestic Beaker or later vessel
623	A sherd probably from an E/MN corky pot.
624	A sherd possibly from an E/MN corky pot.
625	Small, heavily-abraded and possibly burnt sherd probably from an E/MN corky pot.
945	An undiagnostic sherd
946_952	Two small spalls, 5 fragments and crumbs; undiagnostic.
953	A sherd most likely to be from a domestic Beaker.

During cataloguing a bag labelled as containing a Hebridean potsherd 81.301 was found to be empty. Black clay 374 also included a flint chip (CAT 95) and a flint flake (CAT 96).

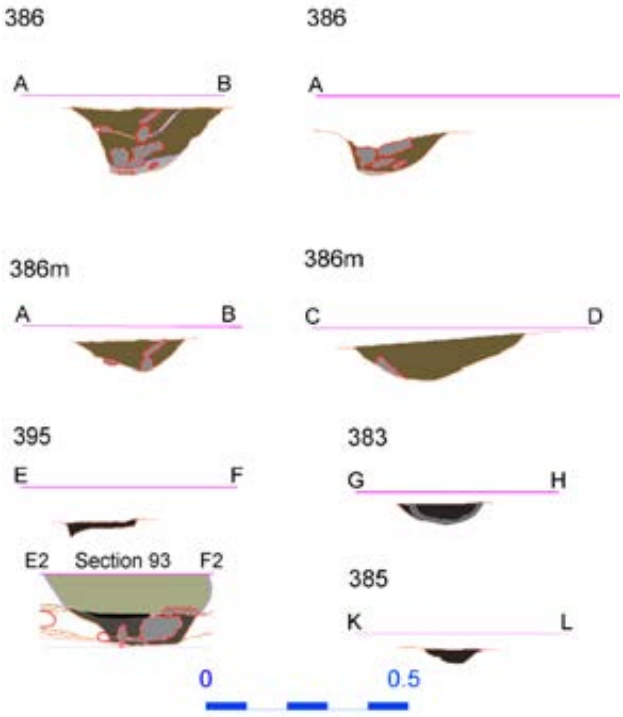
Material from the top of cultivation bed 2, originally underlying the turf line, is indicated on Plan 54 by the first appearance of gritty clay (388) in the centre of the area, but it seems to have been upcast rather than the bed itself judging by Plan 55 overlay (Illus 9.75). In the SW extremity of the trench near DV a patch of the turf line 365 appeared in an area of black clay with charcoal. It may have lain on the south flank of cultivation Bed 2.

Plan 55 of 16 May 1981 shows colour changes and features in the area south of the cairn after removal of the black slightly sandy clay 352 and other high layers (Illus 9.77). The south-east of the area was covered with chocolate brown silty clay 377. Intrusions 932 and 934, subsequently noticed in the east baulk section (Illus 9.76) were not recorded, probably because they were too close to it. This clay contained a small abraded body sherd most probably from a fine Beaker. (CAT 954) and a few pieces of quartz not included in the catalogue (81.361, 81.516). The pollen from it (sample 2087) was distinctively different from that in the plough soil and other layers above. Tree pollen was (for Calanais) abundant, forming 11.2%, of the total. Non-tree pollen was dominated by grasses (47%). It included some cereal pollen. It was assigned to early in pollen zone CaN-3ai which started sometime between 2980 and 2500 cal BC and lasted until between 2770 and 2360 cal BC.

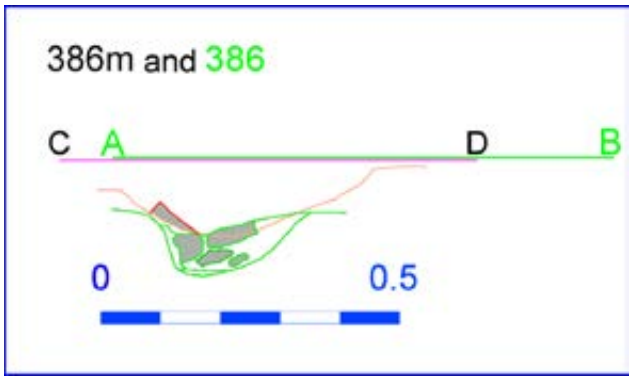
Cultivation beds had been formed towards the start of CaN-3ai. As described in Chapter 9.9 clay similar to 377 but below the turf line appeared to lie in the trough between two cultivation beds in the south-western part of DI. But the smear of clay 377 in the south-eastern part of the area south of the cairn overlay the turf line. The pollen assemblage in 377 was earlier than that in turf line 365 which was zoned to the transition between CaN-3a and 3b and thus dated to sometime between 2560 and 2200 cal BC. Thus the clay in the south-eastern part of DI may have been cast up over the turf from underlying clays either on or between cultivation beds.



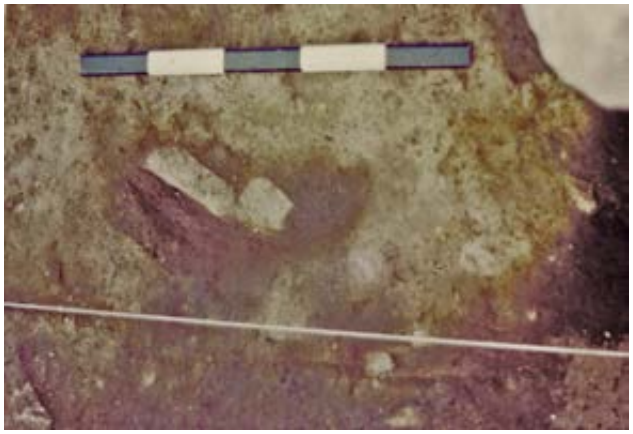
Illus 9.78 Section lines of features on Illus 9.79 [NMRS DC38187]



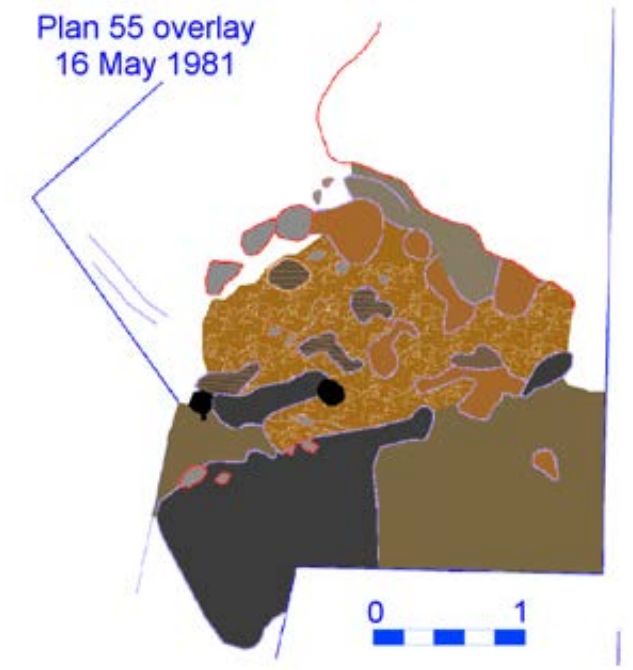
Illus 9.79 Sections of small features planned on Illus 9.78 [NMRS DC38187]



Illus 9.80 Resolving the ambiguity in recording of Pit 386



Illus 9.81 Pit 383 [Film 1981.10.4]



Illus 9.82 Soils south of the cairn on 16 May 1981 [NMRS DC38187 overlay]

Several small pits were detected at this level (Illus 9.78-9.79).

In Illus 9.79 the sections 386 and 386m are records of the same pit. There is a note (Day Book 194) that feature 386 had "an outside perimeter of a black halo", and this may have led to the discovery that the feature was larger than first supposed, and to the second drawing, perhaps on a slightly different line. They are combined in Illus 9.80

Pit 386 was thus quite substantial compared to the others at this level. In section it was about 0.3 m wide NW/SE by 0.4 m NE/SW. It was cut through clay 377 and contained an upper and a lower fill. The upper fill was loose dark brown clay and on plan 55 it is shown as about 0.2m wide by 0.4 m long. The fill was described as similar to that forming layer 369, brown-black earth with many large fragments of charcoal. Indeed it may have been cut through all or part of 369, if it was not noticed until the latter had been removed. So it was perhaps originally more than 0.3 m deep

According to a note on the section its outside perimeter showed large smears of bright orange clay lining the pit and it appeared during excavation to be full of sherds of black pottery with, at a lower level, green-grey pottery; but none was recorded as a find and they were almost certainly fragments of a black turf line and underlying green-grey soil. The pit contained a piece of quartz 81.359, not in the catalogue.

Pit 386 may have been a posthole, with the stones reflecting a collapsed post-pipe and the upper clay filling the space left by collapse of the packing. If so the post may have been about 0.2m in diameter. Assuming that about a fifth of it was buried, it may have been about 1.2 m tall. However, nothing on the recorded sections forces this interpretation. The presence in the upper levels of abundant large pieces of charcoal may reflect inclusion of material from a cremation pyre. In this latter interpretation, the cremation took place somewhere else. It is of course conceivable that both interpretations have some truth in them, and the pit was a token burial with a marker post.

Pit 383 was bowl shaped and filled with black clay heavily impregnated with charcoal (Illus 9.81). Around it, or lining its edges, was a halo of black humic clay varying between 5 and 10

cm from the edge of the feature. According to the Day Book (page 195) it contained many fragments of pottery, but none was recorded as a find and it seems likely that these were fragments of turf line like those in Pit 386. Therefore Pit 383 is interpreted as similar to 386, with a content of material from a cremation pyre but here without any evidence for a marker post.

A shallow feature 385 was filled with black greasy clay impregnated with charcoal; a shallow linear mark to its south-east may have been an ard or spade mark (Illus 9.77). They were cut into a patch of brown greasy clay with black lenses. 385 produced a small sherd probably from a fine Beaker (Cat 955) and a totally exhausted quartz bipolar core (CAT 228). The pollen assemblage in a sample (2024) was comparable to that from pollen phase CaN-3c which started sometime between 1880 and 1520 cal BC reinforcing the interpretation of 385 as an ard or spade mark.

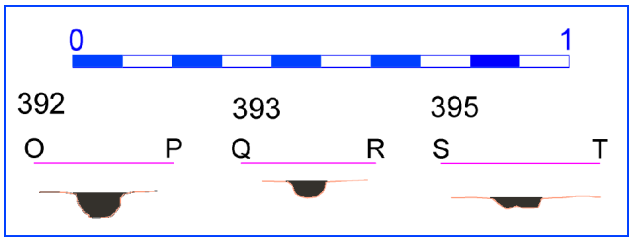
Another ard mark was sectioned (M-N on Illus 9.78). It was very similar to other fairly symmetrical ard marks discussed above.

Pit 395, which is presumably the feature sectioned from E to F, was cut through 377. When first sectioned it was interpreted as a turf or the fill of a removed stone rather than a pit. It did not contain any artefacts. It or a feature immediately under it was sectioned in a subsequent cut through the underlying ditch (921). There it was as substantial as Pit 386. Its fills appeared to reflect the layers through which it had been cut.

Illus 9.82 shows the centre of the area occupied by greasy brown mottled clay, with chocolate brown silty clay (377) occupying much of the south part of the trench; Judging by the section (Illus 9.76) it lay stratigraphically below the upper part of black greasy turf line 365 but above the lower part.

In Area DV near Ring stone 47 a patch of turf line 365 was covered by a hump of brown-green gritty clay with fibrous roots and many stone chips (366) (Illus 9.83). It was similar in composition to 388 on DI but stratigraphically later. It may in fact have been material from the truncated ridge which had been thrown on top of the turf line and if so it suggests that the ridge was levelled by hand rather than by ploughing at about the same time as other deposits were first placed on the turf line.

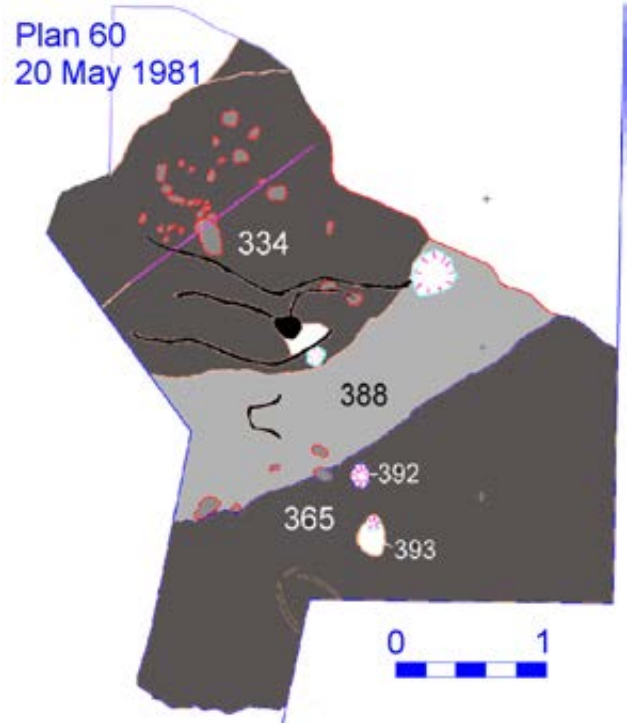
Illus 9.83 Gritty clay 366 overlying 365 and 388 on 9 May 1981, from the north [Film 1981.5.8]



Illus 9.84 Pits 392, 393 and 395 [NMRS DC 38187]

Two small pits 392 and 393 were, according to the text record, first seen under OGS 365 as circular areas of black charcoal-impregnated clay; but they were recorded on Plan 60 of the turf line (Illus 9.85).

Pit 392 was round, 10 cm in diameter and 10 cm deep. It contained a quartz chip (81.368). A pollen sample (2032) which contained some cereal



Illus 9.85 Soils south of the cairn on 20 May 1981 [NMRS DC38192]

pollen and an unusually high percentage (7%) of Potentilla pollen was ascribed to CaN-3c, starting at some time between 1880 and 1520 cal BC. Pit 393 was oval, 20 cm long by 10 cm wide and 10 cm deep. It too contained a piece of quartz (81.593). The fills of 392 and 393 were similar in colour to the turf line. They must have been cut through the turf line and the plan record is preferred to the text record.

Pits 932 and 934/935 were noticed only when the east baulk section was drawn (Illus 9.76). Pit 932 at the southeast corner of the trench was about 0.12 deep and over 0.15m wide. It seems to have been sealed by the late turf line above clay 389 Pit 934/935 may have been a single feature or two pits coincidentally one above the other. Between them they were about 0.25m deep. Pit 934 seems to have consisted of a feature 0.16m wide in a pit c. 0.23m wide. Pit 935 cut through layer 369 and a large flat slab overlay it in section. If the lower pit contained a post, as seems possible

Illus 9.86 Turf lines from the north-west with 334 in the foreground, 365 in the background and soil 388 between them on from the north on 19 May 1981. A temporary baulk sat on top of part of 334. The stones to the left are part of the cairn kerb. [Film 1981.11.21]

from its depiction, it is conceivable that 935 was inserted into its top once the post had decayed.

9.3.17 Discussion of layers 369, 352, the pits and deposits

It seems likely that soil 369 was brought from elsewhere. The two earlier dates from 369 appear to link its source with that of clay used to fill a slot on Area H under the cairn. The slot provided an even more unambiguous example of introduction of by then old material.

As described above, loose black sandy clay 352 underlying 369 in the south-east corner of Area DI produced a similarly early age, along with pot-sherds exclusively of E/MN type.

Unlike the small dumps of soil discussed below, and the material in the pits considered above, the material forming 369 seems through the quantity and variety of the artefacts in it more likely to have had a domestic than a funerary origin. I shall discuss the significance of this in Chapter 24: Discussion.

Most of the pits and deposits were detected only in the clays and soils below the ginger brown layer 320 or the darker layer 369. It must be remembered however that the top of layer 320 was probably altered by soil processes which might have obliterated any sign of pits cutting through it. These deposits appear to be pre-beaker, or at least earlier than decorated insular beakers. At least one of them (Pit 386) may have been marked by a post (or two if 934 was also a posthole). The pottery in them did include what may have been fragments of domestic beaker but equally they could have come from neolithic wares.

However the pollen in some of the seemingly lowest pits was comparable to sub-zone CaN-3c at Calanais Leobag, which should date after 1880 BC. Even if this date is spuriously late it does indicate that some pits were intrusive and perhaps their tops had been lost to the soil processes which helped create layer 320 and the ploughing which had affected 369. Pit 395, seen only in section, does seem to have cut 369. Indeed, because there local variations in the plough soil both in plan and vertically, and because the top of Pit 321/2 was above the base of the soil, the deposition of remains and digging of shallow pits must have continued after ploughing started.

The most intriguing feature was stone setting 376. It sat in a pre-existing oval dip in the turf line 334. It looked as if it had originally been square, although in another interpretation of the evidence it may have been part of an elongated stone lining to the hollow. The stratigraphy in this area was truncated and it was not possible to say whether its fills were earlier than or contemporary with the chambered cairn (the turf lining the bottom of the hollow in which it sat was almost certainly earlier) but it may have been a small burial enclosure or a secondary repository for burial material.

The loose black clay 352 shown on plan 54 (Illus 9.75) was not seen in plan elsewhere on the area. It was however visible in the southern end of the main section (Illus 9.76). It and the underlying 389, described as forming a rectangular area may conceivably have been the residues of a cremation or a burial deposit.

Judging by the sherds from decorated beakers and the dates for pieces of charcoal in plough soil 315 it looks as if deposits continued to be made in the area over a long period. There may have been several contributory sources of the material which was ploughed; but ploughing was probably interspersed with deposition of clay or soil with charcoal and artefacts.

An alternative explanation to gradual deposition is that much of the pottery and charcoal in plough soil 315 was taken from primary deposits elsewhere and dumped in the area in one fell swoop. However, the interpretation preferred here does take account of the various pits and the stone setting and thus it provides a coherent story which seems to me to explain better the wide variation in the dates of charcoal, styles of pottery and pollen assemblages than a single event of pottery and charcoal deposition.

Sufficiently many large stone occurred both at the base of and in the plough soil to suggest that dilapidation of the cairn was a gradual process. Perhaps people deposited stones from the cairn on top of or round small mounds of debris from the postulated ritual deposits. The use of a large stone to cap deposits in Feature 321 which itself was possibly a stone-cast is, if the interpretation is correct, an example of this sort of activity.

The preferred interpretation is thus that the area was used for digging of small pits and ritual deposition of material from a variety of original contexts. The closest part of the cairn became more and more dilapidated as time went on, perhaps as stones were removed to mark deposits. It was ritually ploughed, or worked over by hand, perhaps to merge dumped material into the plough soil. Dumping and digging of pits continued between episodes of ploughing, probably for generations. Probably as a result of a change in use of the area to agriculture some stones were also removed from the plough soil to make ploughing easier (or possibly to destroy their function as markers). Still others may well have been removed in the post-peat period and dumped to form the stone platform 319

9.3.18 The prevalent turf line 365/ 334

Strictly speaking the prevalent turf line is described out of sequence here. The chambered cairn sat above it, as did some of the features under the cairn. However it seems important to include its description here to provide a better context for the features described above.

Plan 60 of 20 May 1981 (Illus 9.85) shows two sheets of black humic greasy clay, 334 in the NW of the trench and 365 in the south. When trowelled their upper surfaces had an almost velvety texture. They have been coloured a lighter grey on Illus 9.85 than in previous plans to emphasise the black edges of sloping turf lines which demonstrate that 334 was diachronic. These were exposed not only in 334 but to a lesser and unrecorded extent also in 365 (I have a clear recollection of trowelling them and that is perhaps a lesson that excavation directors should not interfere with their site supervisor's methodical uncovering of the strata). The turf lines were at first thought to represent distinctly different litter surface truncated by level ploughing, but they could be seen as mainly a primary undulating surface and a partial second surface which merged with the primary surface in places, like the irregular turf lines visible on Section 62 of the main baulk (Illus 9.56).

They lay either side of gritty soil 388 which was interpreted as Bed 2 (Illus 9.85, 9.86).

Turf line 365 produced two sherds, eithr E/ MN non-corky or Beaker (Cat 933-934). Three samples from turf line 365 were analysed for pollen (2065, 2073, 2069, 2039 and 2072) and one from 334 (2075). They produced similar results to one another, except that the sample from 334 contained somewhat more Coryloid and plantago pollen than those from 365. None of them contained much tree pollen (c. 10%), about half of which was from birch. Pine pollen was more abundant than before or after. Hazel-type pollen was also comparatively abundant. Heather (Ericaceae) pollen values were high, while grass pollen varied between 23 and 30%. Cereal pollen was absent. Plantago lanceolata, Ranunculaceae & Compositae lig. were present. This assemblage implied a pollen zonation at the transition from CaN-3a to 3b dating sometime between 2560 and 2200 cal BC, although sample 2039 from the lower part of the sequence of turf lines was slightly earlier than the other samples and assigned to just before the end of zone CaN-3a.

A potsherd was recorded as from turf line 365, and when the assemblage was originally studied it was left unclassified but by the time of the final study it was no longer present in the bag (81.318).

9.3.19 Discussion of the prevalent turf line 334 and 365

Judging by its pollen zonation at least one of the turf lines was present at some time in the period 2560 to 2200 cal BC. It may have started to form somewhat earlier although not before about 2770 cal BC (the earliest likely date for the start of Pollen zone CaN-3aii). The upper turf line may well have continued to grow after the cairn was built, so the cairn does not provide a terminus ante quem for cessation of its growth.

The pollen implies that cereal cultivation had ceased in the neighbourhood when this turf line was exposed to the air, and heather and grass predominated locally. Clumps of birch and some hazel grew not far away. Yet further away there were some pine trees. The underlying cultivation beds can be assigned to early in CaN-3ai and the earlier part of the turf line was probably the grassland on which the Ring was set up. The later part

of the turf line may have started to form before the cairn was built, although the pollen evidence was not conclusive; it probably continued to form after that.

9.3.20 Turf line in DIV

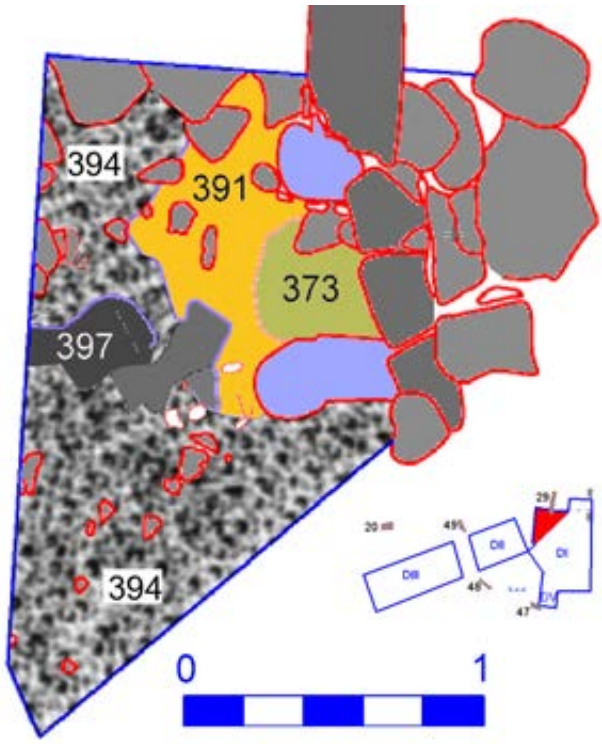
In the area to the south and west of the central monolith clays 391, 375 and 382 overlay black greasy clay streaked with grey clay (394). Clay 975 had pollen characteristic of CaN-3b in it, suggesting deposition sometime after 2560 to 2200 cal BC and before 1900 to 1600 cal BC.

Clay 375 contained an E/MN potsherd (Cat 17 ASH 7b) and two E/MN probably corky sherds (Cat 1104-1105). The turf line element of 394 was best preserved in the southern part of the area, covered in places with a grey gritty component (also labelled 394). That component was probably the mineral soil of an overlying turf line, perhaps corresponding to 316b in Area DII. It incorporated a patch of black greasy material which covered an irregular area of about 0.7 by 0.3 metres and seems more likely to be the remnants of turfs than of rotted or removed stones. Under the turf line element of 394 was its silty grey subsoil (904).

9.3.21 Discussion of the local sequence in Area D

The interpretation of the local sequence is that a turf line formed over earlier soils including material from cultivation beds. The Ring was probably set up through this turf line, which reformed over spreads of clay spoil from the pits dug for the orthostats. Thereafter ritual deposits were from time to time placed in the area. Then clay was spread over the area. Some deposits contained by then old fragments of artefacts and charcoal. Soil processes smoothed out variations in the top of this layer, and a turf line formed which had disappeared from most of Area DI by the time we excavated. Subsequently more ritual deposits were made in the area, some in small pits and stone settings, while material also accumulated from other sources during dilapidation of the cairn.

Looking at the putative ritual deposits as a whole, at least one was associated with a small



Illus 9.87 Black greasy layer 394 and clay halos 397 22 May 1981 [Plan 65 NMRS DC38197]

stone setting, and at least one with a post. Others were in pits. Stones were taken from the cairn, perhaps to mark the deposits.

At some stage ploughing with an ard started; but some ritual material was still deposited. These activities continued until at least pollen zone CaN-3c (which started sometime between 1880 and 1520 cal BC). During this period dilapidation of the cairn probably continued.

9.4 Phase 8: The chambered cairn in Area D

9.4.1 Introduction to the chambered cairn

This section focuses on the prehistoric levels of the chambered cairn. The excavation evidence for Victorian jiggery-pokery in this part of the cairn was described in Part 9.2, Victorian and later activities.

In Chapter 9.3 the prevalent turf line south of the cairn was described partly out of sequence, for the cairn was above its earlier manifestations, although it may have continued to grow outside the cairn after the latter was built.

9.4.2 The original kerb in Area DI

At the beginning of the 1981 season most of Area D1 was still covered by a thin layer of plough soil 315 (Illus 9.88). The tops of some kerbstones were visible on Plan 34 of 9 May 1981, drawn 8 days later, when nearly all of the plough soil had been removed (Illus 9.89). There they appear more irregular than on later plans. They increased in size downward as the basal fills of the cairn and the soil outside were cleaned away. By 20 May most of the early kerb had appeared (Illus 9.90).

Illus 9.90 provides a good introduction to the basic features of the prehistoric cairn as they were subsequently revealed. The outer part of the cairn was bounded by a well-built kerb. The inner chamber wall base defined a rounded west end to the chamber.

The latter is partly visible on Illus 9.90 as neat courses of slabs under Victorian rebuilding. A stub wall can be seen on the photograph near the east baulk inside the kerb (see also Illus 9.35-36). It was restricted to an area of deep Victorian disturbance and was thus probably of Victorian date.

Near the monolith excavation showed that the basal kerb stones were set on a dirty version of yellow green clay 373. The label 373 was also used for green clay which underlay an earlier platform of slabs round the base of the monolith. The labels were changed to 373.1 and 373.2 respectively during post-excavation work

In the foreground of Illus 9.90 the remains of the diachronic turf lines, to left 344 and right 365, are separated by gritty material 388. The black material behind the kerb is a palimpsest of various features. The eastern part of the kerb (Illus 9.90, 9.91) was set on brown soil above a turf line 905 and in places on the grey silty material which formed its subsoil.

The south and west part of the original kerb consisted of two straight lines (Illus 9.91; Technical Note 9.4.2). The part nearest the central monolith included four slabs, and the other segment included at least six. The longest stone was about

Illus 9.88 The early kerb starting to appear from the south on 1 May 1981 [Film 1981.1.18]

0.4 m long and the shortest less than 0.1 m long. These nearly straight lines suggest that the south-west part of the kerb was polygonal, although higher courses may have rounded off the corners.

9.4.3 Basal fills of the cairn

Under cairn fill 318-4, outside the chamber wall, the stones of the cairn sat in orange-brown greasy clay with stone chips (360). It was packed into the gaps between the basal stones of the cairn, and contained three pieces of pottery.

Table 9.20 Pottery from layer 360

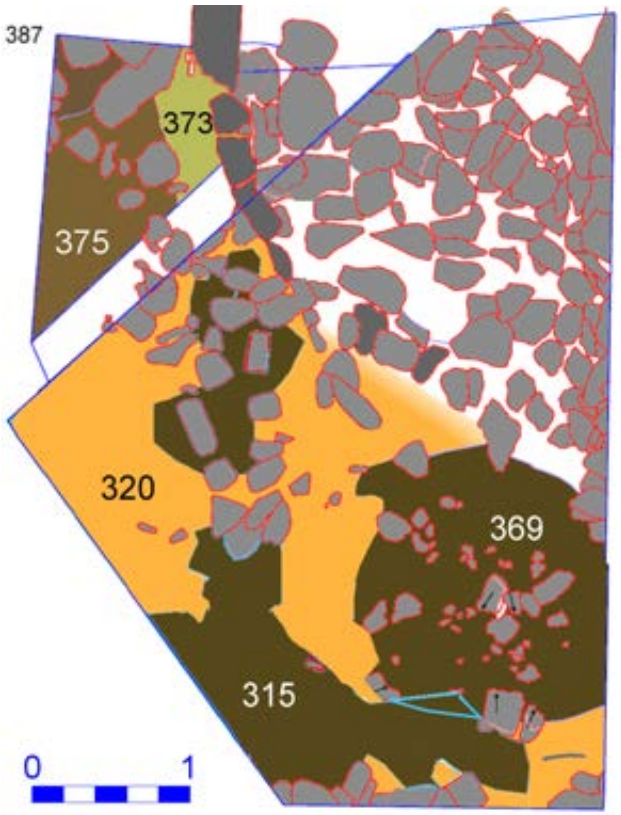
Cat	Comments
620	Sherd with most of exterior spalled off from a large probably E/MN non-corky pot.
621	Sherd with most of exterior spalled off from a large E/MN non-corky or Hebridean Incised pot.
932	A sherd from a thin fine Beaker.

Table 9.21 Lithics from layer 360

Cat	Comments
89	Indeterminate quartz debitage
88	A flint chip (debitage)

In addition quartz lumps 81.336 and 81.339, and two possibly chert lumps (81.584) were recorded in the Finds Book. A piece of iron pan (81.339) was also found. A piece of wood from the context was recorded in the Finds Book (81.257). It was interpreted as a modern intrusion, perhaps related to Victorian activity.

Eight samples from the brown greasy clay were analysed for their pollen (2042, 2043, 2045, 2052, 2056, 2057, 2010 and 2041). Most of the samples correlated with zone CaN3aii, which started sometime between 2770 and 2360 cal BC, judging by dates from pollen column CN3 at Leobag.



Illus 9.89 Plans DI 19 of 1980, Plan 34 of 9 May 1981 and DIV Plan 52 of 15 May 1981. [NMRS DC38147, DC38166 and DC38184]

Samples 2010 and sample 2041 differed appreciable from the others. Sample 2010 had so much grass pollen in it that comparisons were difficult, but it may have belonged in the same pollen zone. Sample 2041 possibly lay somewhat earlier in time because hazel-type pollen was relatively abundant, which was characteristic of CaN-3ai (starting at some time between 2980 and 2510 cal BC and ending sometime between about 2780 and 2360 cal BC). As described below samples from under the chamber wall also contained mid to late CaN-3a pollen.

Although no charcoal samples were submitted for dating from context 360 in 1997, because it contained a piece of putatively modern wood suggesting a modern disturbance, two samples were submitted in 2006. A piece of alder charcoal produced an age (SUERC-11596 4495+/-35) suggesting a date between 3360 and 3030 cal BC while a piece of pine charcoal produced an age (SUERC-11592 4465+/-35) suggesting a date

Illus 9.90 Early kerb and chamber wall 20 May 1981 looking north [Film 1981.12.23]

between 3340 and 3020 cal BC. The ages were statistically indistinguishable from one another. However, as discussed below these dates reflect material in the source of clay used for the packing, judging by similar dates from contexts which should be coeval and which overlay strata producing younger dates.

Below 360 the second layer of stones from the bottom was set in a black charcoal-rich layer (390). No artefacts were found in context 390 and its precise nature is not clear; but near the monolith the layer sat directly on top of green clay 373/398.

Where green clay 398 was absent to the east, the basal stones between the chamber wall and the kerb lay on a grey layer rather than black clay 390. Remnants of orange-brown greasy clay 360 were recorded as lying in their sockets and some of the pollen samples came from these remnants (Day Book 167). As described in Chapter 9.4.7 a thin brown clay layer 356 underlay the basal stones of the chamber wall by the east baulk section and stratigraphically it was equivalent to 360 or 390.

9.4.4 Discussion of the fills of the cairn and the layers under the cairn

Apart from the kerb and inner chamber wall the cairn stones in Area D were far less well-laid than those on Area H on the north side of the cairn. Even the probably largely undisturbed basal layer was not well built. Perhaps, despite its fine basal kerb and the good construction of the basal layers of the chamber wall the southern part of the cairn had less care lavished on it than the northern part. Asymmetry in cairn construction has been documented elsewhere in Scotland and its implications will be discussed in Chapter 24: Discussion and Conclusions.

The cairn seems to have been reduced to near its basal layers before ploughing stopped in this area, and the bottom of Victorian disturbance may have included greasy orange-brown clay 360. Layer 361 of the chamber wall, thought to be roughly equivalent to 360, included a piece of peat in friable brown soil interpreted as washed down from above, and this should also reflect Victorian disturbance.

The dates from basal layer 360 provide a terminus post-quem for the cairn much earlier than its construction, its pollen zonation and the fine Beaker sherd in it. The preferred interpretation of layer 360, is that it was mostly imported material laid down as the cairn was built. The piece of wood incorporated in the layer above it, 318.4, was perhaps from a stick used to probe the area during Victorian trenching to locate the kerb before reconstruction of the cairn. It has not been radiocarbon-dated because its condition suggested it was modern.

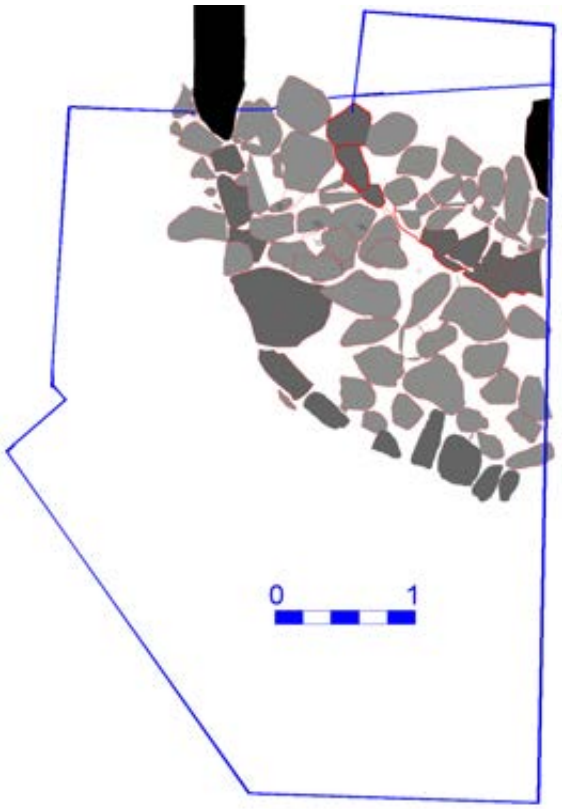
The layers under the cairn were different from those on Area H. There a green clay platform with a thin patchy turf line on top of it immediately underlay cairn stones and fills. There were indeed areas of green clay under the cairn in Area D, but they did not bear such a simple relationship to it. They are discussed in Chapter 9.5.

9.4.5 The chamber wall

The lower courses of the chamber wall appeared fairly early in the 1981 season during clearance of chamber deposits and loose stones, particularly near the central monolith, (Illus 9.92). The west end was at a significantly higher absolute level, around 0.4m, than the east, because the cairn-base rose over deposits surrounding the central monolith (Illus 9.93).

The elevation of the outer face of the chamber wall (Illus 9.93) was drawn much later, on 23 May, and the photographs in Illus 9.96 and 9.96 were taken a further two days later. It looked as if the southern face had been damaged. Most of the fourth layer (from the bottom) of outer facing stones had been taken away and the stones behind them had tipped forward.

Subsequent excavation showed that the original wall was horse-shoe shaped. Its base rose from east to west by 0.4 m over a distance of 1.7 m, stepping up towards the monolith on ledges in the green clay surrounding its base. At the back of the chamber, one metre from Monolith 29, the base of the chamber wall was a single stone. Near the SW orthostat of the chamber, below the viewing platform created for Lady Matheson's Path at least three courses of original wall stones had survived,

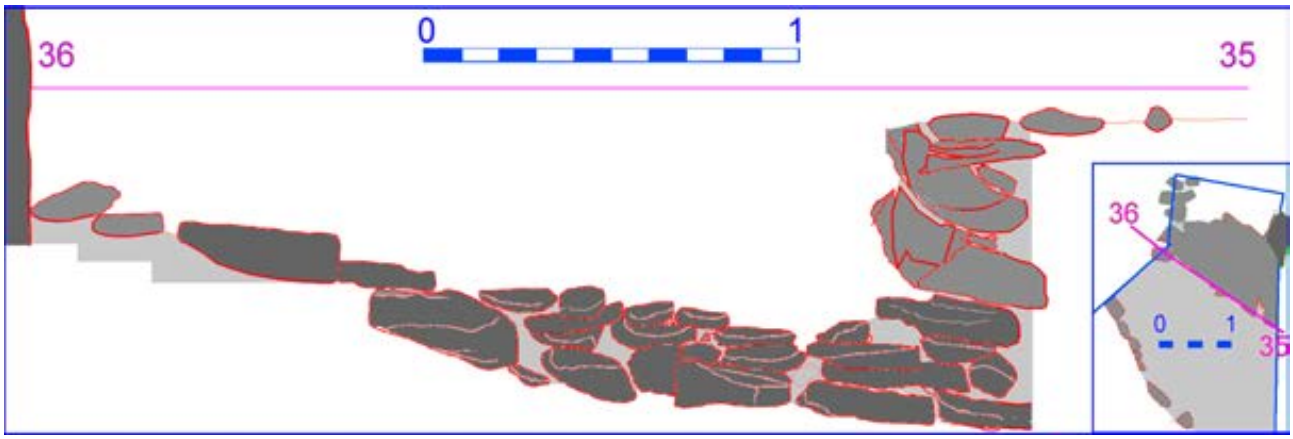


Illus 9.91 The kerb, cairn and outer face of the chamber wall. [Plan 58 of 19 May 1981 and Plan 69 of 24 May 1981 NMRS DC38190 on DC38201]

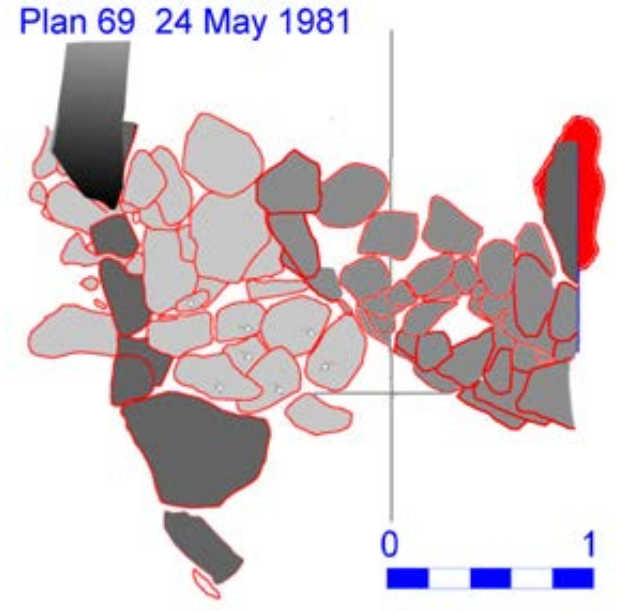
Illus 9.92 The curved west end of the original chamber wall, from the east-north-east on 13 May 1981 [Film 1981.7.22]

giving a total height of about 0.6 m and a width of up to a metre (Illus 9.93, 9.94).

Plan 69 (Illus 9.94) includes some stones replaced during the Victorian period. It shows the cairn at the level to which the outer facing stones



Illus 9.93 South face of the chamber wall on 23 May 1981 [Section 67 NMRS DC38199]



Illus 9.94 Plan 69 of kerb, cairn and chamber wall on 24 May 1981 [NMRS DC38021]

of the chamber wall had been robbed. At that level the wall had an infill of dark brown friable humic clay with charcoal flecks and quartz chips (361). It was described as appearing to have been washed down. It included a piece of peat (253/81), suggesting that it was open to the air in 1857 when peat was cleared from the area. It overlay a more compact version of the brown clay. Because there were many voids above the fill between the stones, the fill may have percolated down through the gaps in the wall rather than having been incorporated purposefully. Fill 361 included a quartz flake along with an indeterminate piece of quartz debitage (CAT 90).

At this level there were signs of Victorian disturbance, so the fact that some of the stones of the western part of the chamber wall on Plan 69 seem to have overlain stones of the outer cairn is not significant in assessing whether the cairn body and the wall were built separately or together.

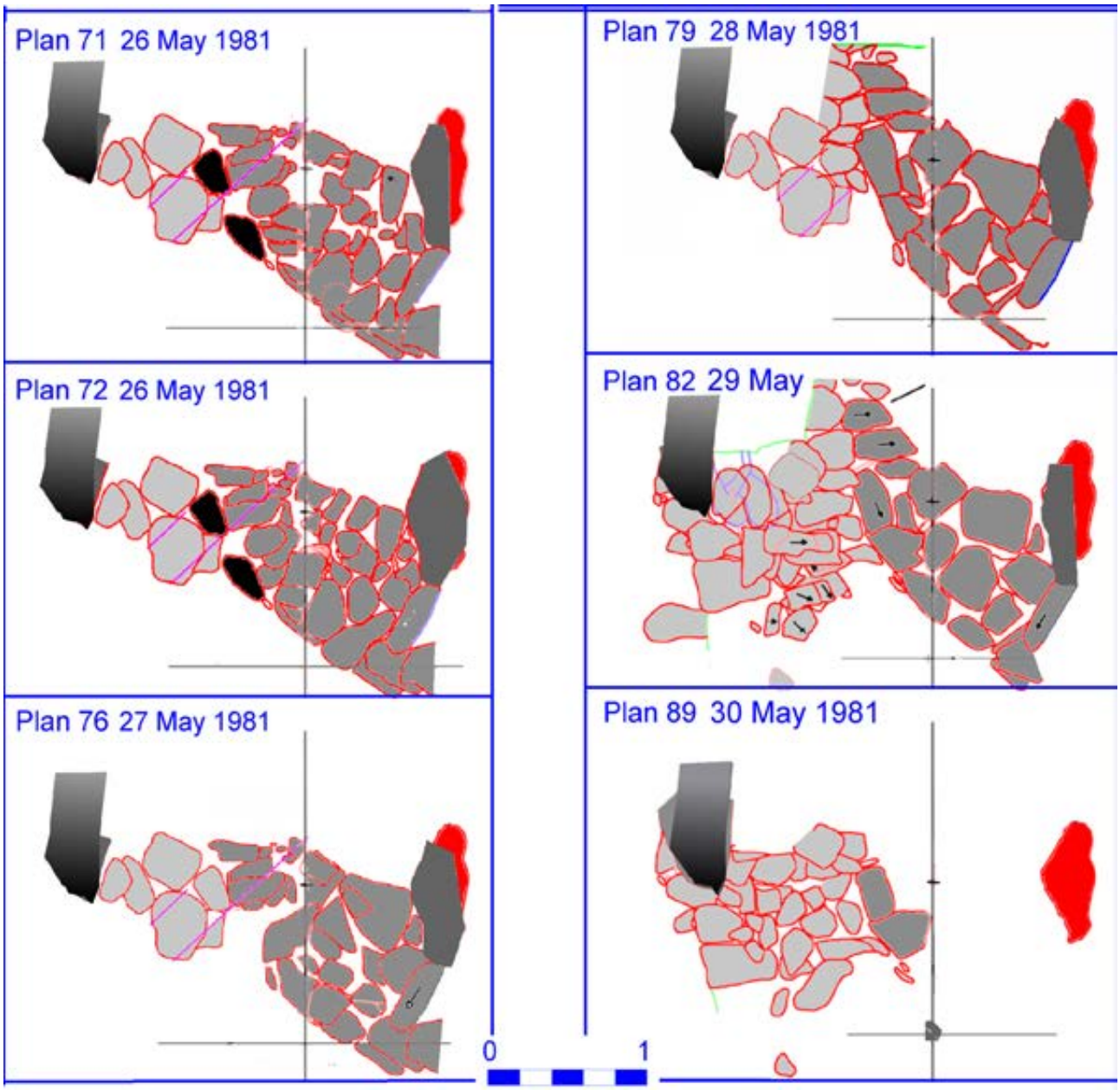
The tipped-out stones originally behind the robbed fourth layer of the outer face are visible to the right of Illus 9.95. Below them three courses of the outer face of the original wall are visible.

A small part of the outer cairn and kerb was retained near the monolith until 30 May (Illus 9.97). Technically, as it was finally shown to be stratigraphically later than the chamber wall this last remnant of the outer cairn should have been removed first. Excavation of the original wall took place from 26 to 30 May 1981 (Illus 9.97). To allow easy cross reference between overlays (which omitted previously planned features) the SW chamber orthostat shape and position has been copied in red from Plan 64 and the central monolith shape from Plan 87 is shown in a graded grey (Technical Note 9.4.3a).

The two stones shown black on Plans 71 and 72 of 26 May were below clay 318-4. They fitted visually with outer wall-face stones, but in fact they were neatly packed against the side of the chamber wall rather than forming part of it, as demonstrated by photographs of 26 May (Illus 9.98) and 27 May (Illus 9.99; Technical Note 9.4.3b). Therefore no wall stones overlay the stones forming the body of the cairn, so the cairn body could have been built after the whole of the cham-

Illus 9.95 Detail of outer face of chamber wall on 25 May 1981 [Film 1981.13.36]

Illus 9.96 Chamber wall and remnants of cairn and kerb retained during excavation of the chamber wall later on 25 May 1981 [Film 1981.14.10]



Illus 9.97 Plans of the chamber wall 24 May to 1 July 1981 [from top left to bottom right, NMRS DC38203, DC38204, DC38208, DC38211, DSC38214 and DC38221]

Illus 9.98 The cairn stones adjacent to the chamber wall 26 May 1981 [Film 1981.15.10]

Illus 9.99 The cairn stones adjacent to the chamber wall 27 May 1981 [Film 1981.16.22]

ber wall had been completed. However the basal layers of the wall, cairn and kerb were (near the monolith) all laid out at very much the same time as each other (Illus 9.90).

The lower courses of the chamber wall were neatly built of good slabs (Illus 9.98 -9.100).

At its west end the basal course of the chamber wall was rounded in a smooth curve and sat on a ledge in the clay mound overlying the cut for the socket of the central monolith (Illus 9.99-9.101).

Near the monolith the wall overlay yellow-green gritty clay 373.1 (Illus 9.1.101-102). Clay 373 overlay the stone paving round the base of the monolith and filled its interstices (Context Sheet 373 and Day Book 239). It contained some pieces of quartz 81.334 and 81.335, not in the catalogue and therefore perhaps all unworked.

According to written records there was a thin patchy layer of green clay 398 below the cairn stones, but a sketch section from the Day Book (Illus 9.102) shows the basal layer of green clay as thicker than the written record suggests that it was. Labels for the stones at the left of the section have been omitted because their interpretation changed after further excavation. The sketch was also annotated to the effect that the basal stones of the chamber clearly overlay the packing stones of the central monolith. (Illus 9.102, 9.104. It overlay a grey gritty clay layer, which showed through it in places. No plan of it survives and it is unclear what area it covered; it may have been very local.

Under that was a complex set of fragmentary turf lines and clays (Illus 9.103). They are described in more detail in Chapter 9.5.

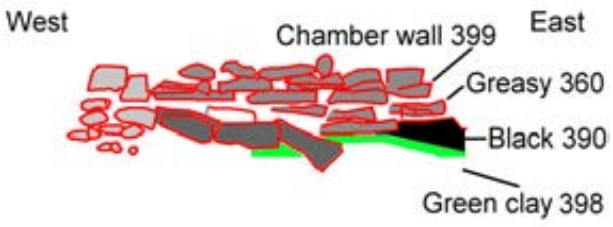
Section 97 shows the chamber deposits and the slot 357 cut through green-yellow-grey sandy clay 355 which formed the bottom layer of the chamber itself (Illus 9.104).

The back of the chamber cut the layered turf lines to the west. The chamber wall (the two small slabs to the left near the bottom of topsoil) sat above a green clay 398 which in turn lay on the upper turf line and its grey soil 918.

This in turn sat on a sequence of layers temporarily given only one number, 926, which consisted of brown gritty clay with quartz chips and some roots above a patchy turf line above orange-brown gritty clay.

Illus 9.100 The chamber wall and the turf line to its south after drawing of Plan 82 on 29 May 1981 [Film 1981.17.27]

Illus 9.101 The basal stones of the chamber wall with to their right turf lines on 1 June 1981 [Film 1981.18.4]

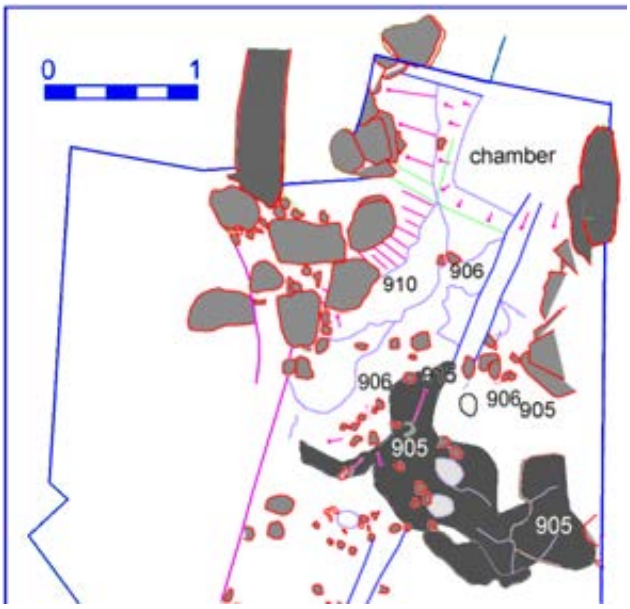


Illus 9.102 Sketch section (not to scale) of clay 360 and the other layers near the monolith on 12 May 1981 [Day Book 186]

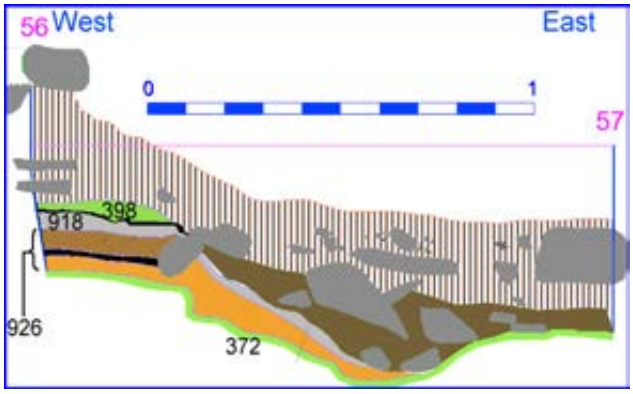
On the last few days of excavation the chamber trench was extended (Illus 9.105).

The northwest corner was neatly squared off. Two courses of stones survived at the back and 3 courses on the north side (Illus 9.105-106).

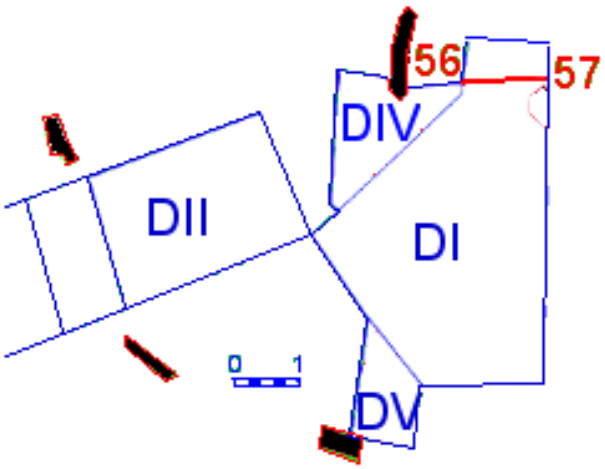
Section 104 shows that the patchy lower turf line was directly cut by the later version of the



Illus 9.103 Plan 88 of 27 May on 101 of 30 May 1981 [NMRS DC38220]



Illus 9.104 Section 97 of 3 June 1981 [NMRS DC38230]



Key Plan for Illus 9.104

chamber (Illus 9.107-8). Section 104 also suggests that at the back of the chamber the upper turf line was contemporary with the paving which covered the socket, although another unlabelled layer may have intervened between the turf line and the lower part of the paving (Technical Note 9.4.5).

Illus 9.107 and 9.108 show that the original layers had been cut away from a level indistinguishable from the modern topsoil, suggesting that the wall was secondary. The material below the wall was blotchy light and dark grey and could not be correlated with layers in the main trench (Illus 9.110).

9.4.6 Discussion of the chamber wall

Although disturbances had reduced the visual quality of the upper part of the chamber wall in this part of the cairn, its lowest three courses were well laid. They narrowed sharply as they curved to form the west end of the chamber. There the lowest course stepped up over the mound of clay at the base of the central monolith, and cut through pre-existing turf lines including one which had formed after the monolith was erected.

The fill of the basal layers of the wall, friable brown clay layer 361 looked as if it had been washed-down and included a piece of peat, suggesting that it was open to the air in 1857 when peat was cleared from the area. It is therefore conceivable that parts of the southern face of the chamber wall were removed and re-set after the area was cleared of peat in 1857; but it seems more likely that the peat was washed in.

The later wall with its square corner seems to have been set up on a ledge cut in front of the remains of the original wall, and that gave the compartment a straight back. If there had been an earlier rounded end, most of it would in 1981 have lain behind the square-plan wall. This latter must be the base of the wall drawn onto Palmer's plan by Captain Thomas in 1857 or 1858 (see Chapter 4 Introduction to the fieldwork). In the time available it was not possible to establish whether that was so. Its date is unclear. It was hoped that a further season of excavation could be arranged. That proved impossible; any future excavation of the chamber should include investigation of the

Illus 9.105 Extension of the chamber trench [Film 1981.20.17]

levels between the monolith and the rear compartment of the chamber.

The patches of turf line on top of 373/398 probably corresponded to a patchy turf line found above the green clay platform and below the cairn and chamber wall on Area H. Because of their discontinuity, and more generally the disturbed nature of the layers immediately under the cairn, it is not possible to relate the turf patches to the turf lines outside the cairn but they are interpreted as later.

9.4.7 The southwest chamber orthostat

Near the east baulk two sections were recorded in early June; the main north-south section (Illus 9.109) was complemented by a short east-west section provided by the side of the chamber cut (Illus 9.110). Because of stones sticking out of the section the line of the main section was about 0.2m west of the standard east baulk line. The short east-west section was much easier to see.

On Section 62 a layer labelled 356 overlay a thin unlabelled layer, above green clay 372 (Illus 9.109). In the written record a thick layer of dark brown friable clay 356 overlay grey clay 355 forming the chamber fill.

On the short section running east-west, however, the highest level was labelled 355. Under this was layer 356, iron-panned dirty green clay (Technical Note 9.4.7).

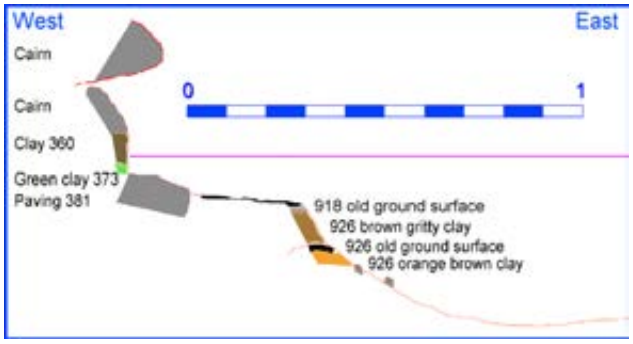
Despite these differences in labelling, the salient point is that near the SW orthostat a friable clay varying in colour from brown to green-yellow-grey, generally sandy and with a variety of inclusions, overlay a thin layer of dark brown friable clay with flecks of charcoal above green clay which looked like the natural.

There was no sign in plan of a cut for the orthostat socket, although in Illus 9.107 layers 356 and to a lesser extent 355 give the impression that they had been dragged down by the weight of the orthostat. The green clay may represent a socket fill; or the clay there may have been natural and the orthostat jammed up against it.

Layer 356 contained no artefacts. Pollen from it (sample 2059) was assigned to mid to late CaN-3a. CaN-3aii started at some date between 2770 and 2360 cal BC.

Illus 9.106 Details of extension of the chamber trench [Film 1981.20.20]

Illus 9.107 Layers behind the end compartment [Film 1981.20.17 extract]



Illus 9.108 Section 104 of 8 June 1981 [NMRS DC38238]

The chamber orthostat had glass amongst its packing stones a little north of the end of Section 62, demonstrating Victorian or later disturbance as described in Part 9.2.

9.4.8 Discussion of the chamber, cairn and kerb

The cairn kerb and chamber wall in Area D were originally built to a high standard. The basal course of the kerb near the monolith was constructed of short straight elements. Further east it had suffered from robbing, presumably shortly before or during the set of activities which led to a plough soil with abundant beaker and other potsherds but possibly also in 1857 when the place was cleared of peat. But although disturbances made it hard to be certain, the body of the cairn in Area D seemed less well built than that in Area H.

The chamber and the chamber wall originally had a rounded west end but at some stage a square end was added in front of it. We did not determine the date of the latter. A prehistoric date cannot be excluded.

The clays under the cairn, like some of those at the base of the plough soil outside the cairn, contained charcoal which was old at the time the cairn was built. They contained pollen closer in date to cairn-construction and a fine Beaker sherd (Cat 932) in the probably but not certainly undisturbed layer 360.

It is not entirely clear that the chamber orthostat was inserted when the cairn wall was built. In Chapter 24: Discussion the possibility that the orthostat was secondary and the original chamber was a simple bag-shape in plan will be considered. One aim of any future excavation should be to re-examine the south side of the pit presumably dug for the orthostat, unavailable during our excavation because of the mass of cairn stones in that area.

9.5 Phase 7: Clays, soils and slots under the cairn

9.5.1 Introduction

Some difficulties were experienced in ensuring accurate registration of plans and long-distance measurements are subject to errors of up to 10%

between different plans while orientations varied by up to 2 degrees (Technical note 9.5.1a).

The layers below the cairn were hard to disentangle. The basal stones of the cairn had pressed into underlying areas making the surface very irregular. Patches of at least two turf lines were found merging into one another along with associated grey silty soils. Another problem was that the green clay of the mound surrounding the monolith was not always distinguishable from other green clay under the cairn (Technical Note 9.5.1b).

In addition to the main section 62 sections 95a and 95b were drawn of the sides of a mini-baulk (Illus 9.111).

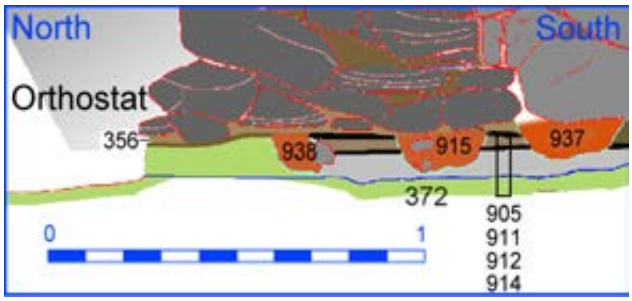
Some of the thin layers beneath the basal cairn stones gave the impression that they had been truncated before they were covered by the cairn. Turf lines offered a promise of correlation between different parts of the area but their interpretation was far from simple. The local sequences below the cairn were recorded as follows.

Table 9.22 Sequence recorded on Section 62 (Illus 9.111)

905	Turf line
911	Mottled grey-brown gritty clay
912	Lower turf line.
914	Grey clay
	Green clay natural in slot cut by Section 62

Table 9.23 Sequence recorded on context sheets near Section 62

905	Turf line
906	Green-grey silty clay
912	Lower turf line.
914	Grey clay
	Green clay natural in slot cut by Section 62



Illus 9.109 Extract from Section 62: layers under the chamber wall and cairn by the chamber

Table 9.24 Sequence east of the monolith from context sheets

398	Patchy green clay
905	Black greasy humic clay: turf line
906	Green silty clay
907	Dirty greasy green clay
911	Mottled grey-brown gritty clay; not shown on plans except on a notation on Plan Day Book 270 drawn 8-9 June 1981
912	
	Thin lens of dense black greasy clay: lower turf line. Also under 911.
914	Grey gritty clay

Table 9.25 Sequence east of the monolith from Section97 (Illus 9.104)

398	Patchy green clay
918.1	Black greasy humic clay: turf line
918.2	Grey subsoil of turf line 918
926.1	Brown clay
926.2	Black greasy clay: lower turf line
926.3	Ginger brown clay
372	Green clay

Table 9.26 Sequence by the monolith in DI and DIV from context sheets

373	Green clay capping the monolith socket
918	A layer of dense greasy black clay: upper turf line in DIV and DI; found immediately east of the central monolith (Plan Day Book 270).
911	Mottled grey-brown gritty clay
912	A thin lens of dense greasy black clay: lower turf line in DIV and DI.
914	Grey gritty clay

They show that of the two or three distinguishable layers of clay east of the Monolith surviving between turf lines 905 and 912 according to context sheets, only one was represented on Section 62 and in the sequence found near the central monolith in DI and DIV. More generally it was impossible to be sure how the turf lines under the cairn related to those in the area south of it (Illus 9.111).

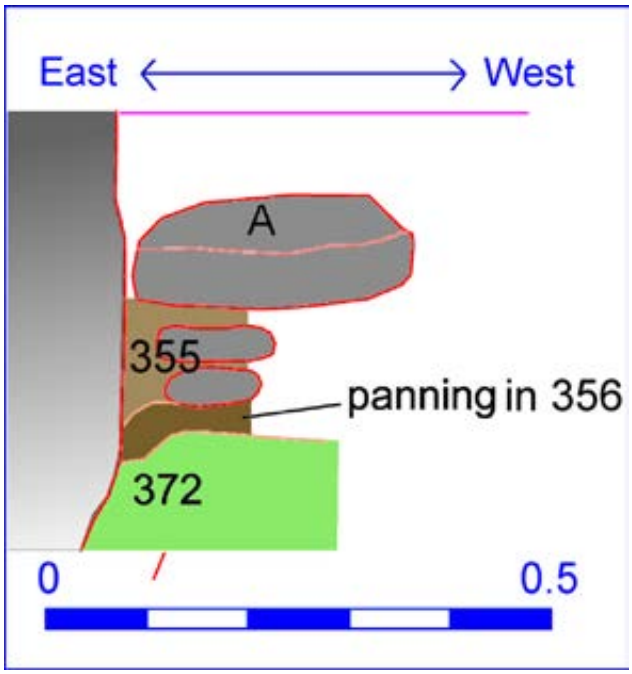
9.5.2 Clays and soils below the cairn

According to written records there was a thin patchy layer of green clay 398 below the cairn stones. It overlay a grey gritty clay layer, which showed through it in places. No plan of it survives and it was not included on any of the sections in Illus 9.111. It is unclear what area it covered. It contained two pieces of quartz.

Table 9.27 Lithics from layer 398

Cat	Comment
100	A piece of quartz flake debitage
101	A piece of quartz flake debitage

Illus 9.112 shows the extent of turf line 905 and the underlying grey-green silty clay 906. The layer labelled 906 was used heterogeneously; not too much reliance should be placed on its correlation with 906 on the main section.

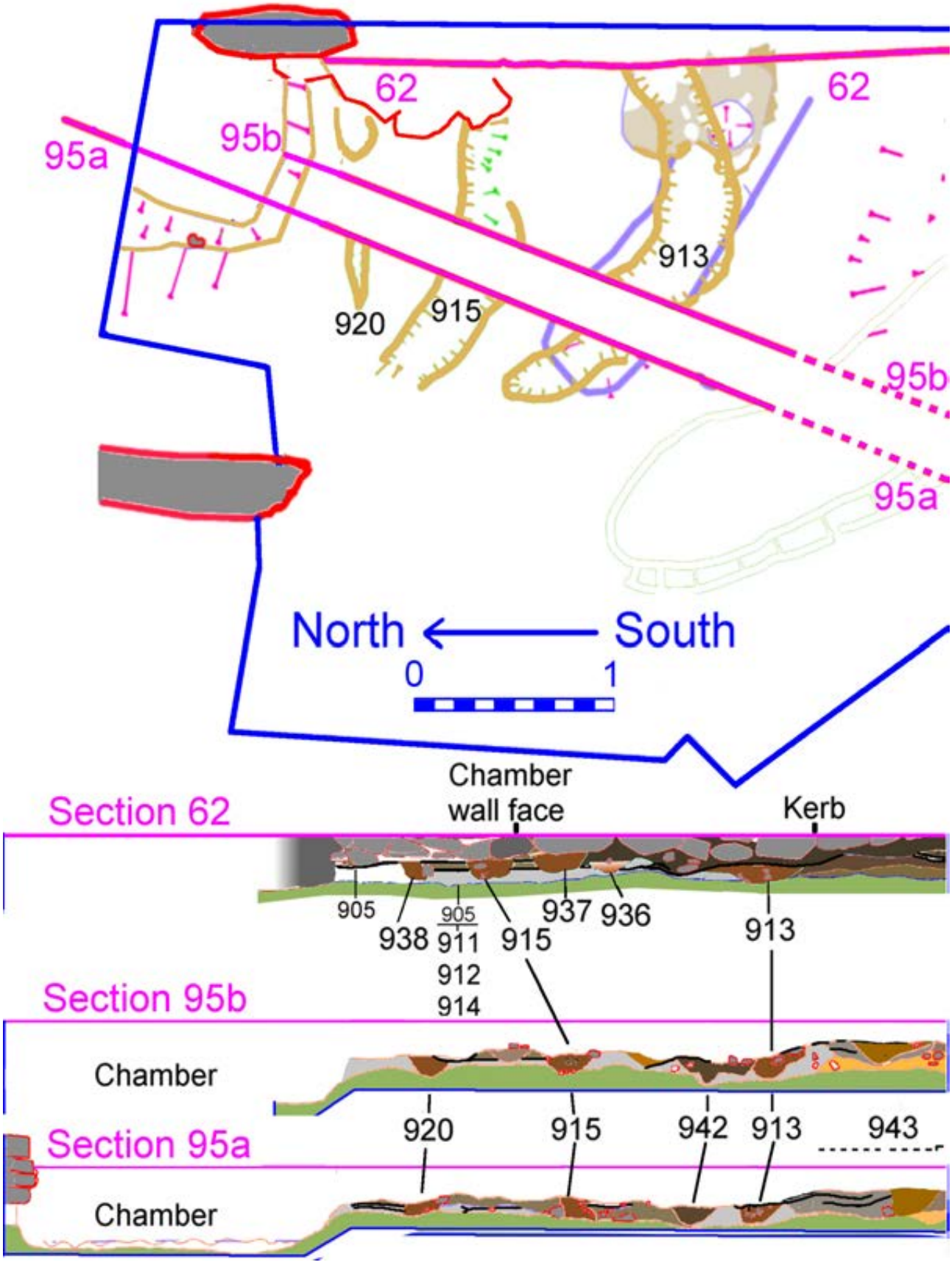


Illus 9.110 Diagram accompanying Section 62: east-west layers under the chamber wall and cairn by the chamber

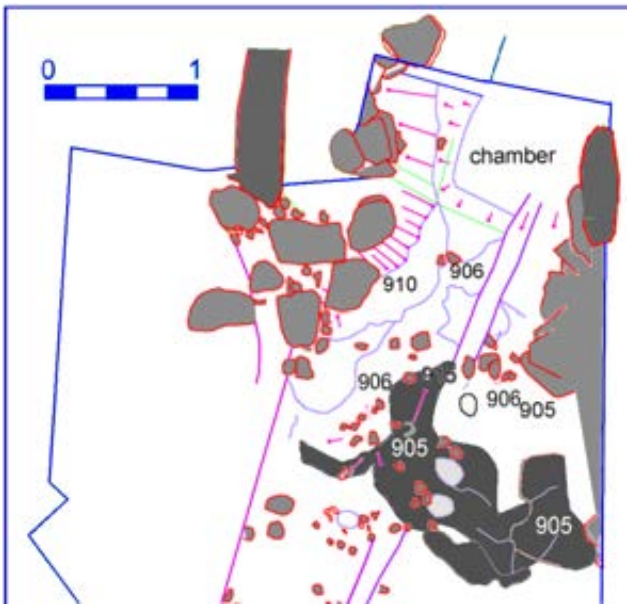
Turf line 905 was usually black at its top and slightly greyer below and the difference between the eastern and western parts shown on the plan probably reflects a minor variation in the level to which it had survived. It contained two quartz chips (81.320; not in catalogue so probably unworked).

On Illus 9.112 it occupied much the same area as the underlying slot 913 into which it had dipped. On the main section 62 a single old ground surface overlay slot 913 (Illus 9.111).

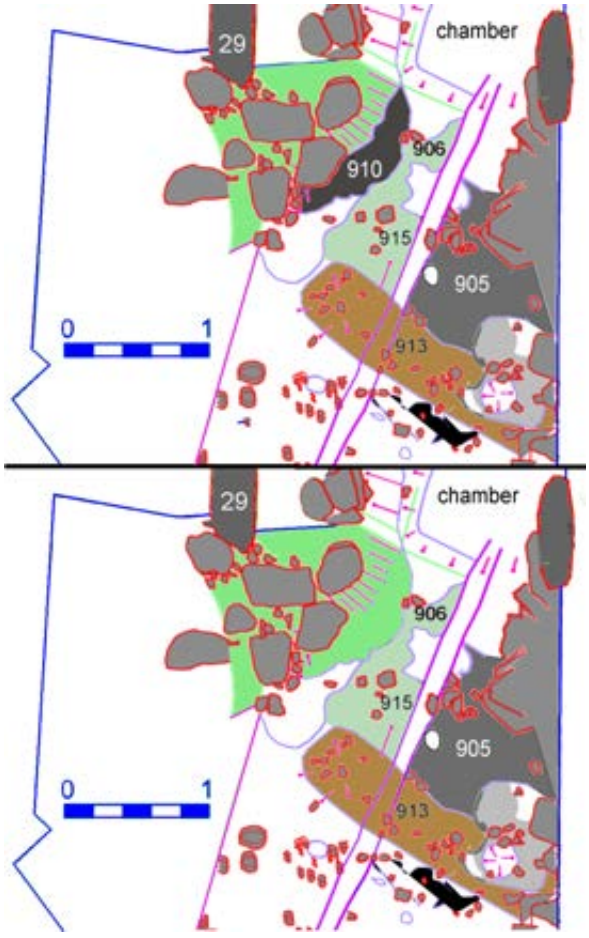
Plan 101 of 30 May 1981 showed a charcoal-rich patch of clay 910 near the mound, but it was later and excavated out of sequence (Illus 9.113 upper plan). Although its western edge coincided with the edge of the cut for the monolith pit it also coincided with the edge of the paving covering the pit and appeared to be at much the same stratigraphic level; it was almost certainly slightly later. It was not described as a turf line but it may have been the same as dark clay 390 discussed in Chapter 9.3. Layer 910 contained a Hebridean Incised sherd (Cat 281 ASH 20). The pollen from it (spot sample 2018) was ascribed to the middle of zone CaN-3a, the likeliest period for building of the cairn; the transition from CaN-



Illus 9.111 Northern end of sections 62, 95a with 95b flipped north-south [NMRS DC38194, DC38227 with DC38228 flipped]



Illus 9.112 Plan 88 of 27 May on 101 of 30 May 1981 [NMRS DC38220]



Illus 9.113 Plan 101 of 30 May 1981. Two versions of features under the cairn the upper with and the lower without layer 910 [NMRS DC38234]

3ai to CaN-3aii occurred sometime between 2770 and 2360 cal BC.

Clay 910 overlay the paving 381 round the base of the Monolith. It also overlay green clay 373 (Illus 9.113). Illus 9.114 shows the plan of green clay 373 near the chamber, drawn as an overlay on 1 June 1981, superimposed on Plan 101 of 30 May. The green clay mound round the base of the monolith was labelled 373.2 and the green clay to the east of the mound may represent material spread from it or possibly 373.1, green clay under the cairn and over the paving slabs near the monolith. The green clay underlay layer green silty clay 906 which in turn lay under turf line 905.

A sketch plan drawn at the end of the 1981 season recorded the survival of layers 911 (mottled grey-brown gritty clay), 912 (lower turf line) and 914 (grey clay) in the area north of slot 915, but without any detail of their precise distribution (Illus 9.115). Excavation ceased at this point and a further season of excavation did not prove feasible.

9.5.3 Discussion of the clays and soils under the cairn

In Area H north of the cairn the main sequence under the cairn was as follows.

Table 9.28 The sequence under the cairn on Area H

771	A patchy thin 'incipient' turf line
760	Green clay platform
758	A strong turf line
777	Grey soil
766	A patchy turf line
789	Brown soils
792	Green-grey soils

There is no obvious reason why the original sequences under the cairn on Area D and Area H would have been vastly different from one another.

But given the patchy occurrence of the turf lines, soils and clays on both Area D and Area H more than one interpretation of their relationships can be offered.

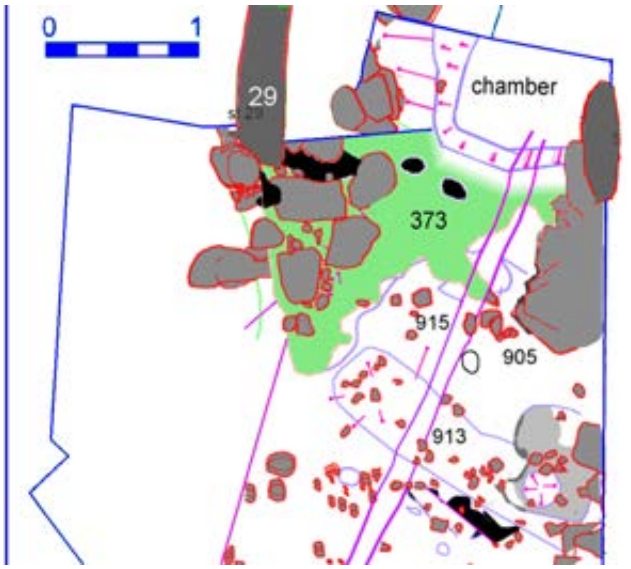
Again the crucial question is whether 905 was equivalent to the upper turf line south of the cairn or to the thin patchy turf line 871 which had formed on the green clay platform on Area H. The strongest turf line under the cairn on Area D was the upper one, 905. It is tempting to correlate it with the strongest turf line on Area H, 758. If that is right, the patchy green clay 398 on Area D might be remains of the green clay platform found on Area H.

On the other hand, if 905 on D should be correlated with thin turf line 771 on H, then the green clay platform on D would have consisted of green silty clay 906 plus dirty greasy green clay 907 plus green clay spread from the central monolith mound. Turf line 912 on D would then correspond to turf line 758 under the platform on H (Illus 9.114-9.115).

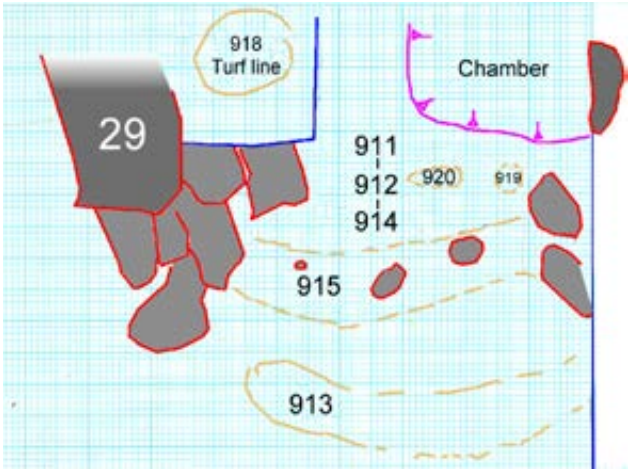
A further complication is that the slots on Area D were much shallower than that on Area H. That implies either gross disturbance of their upper levels or truncation

There is no strong evidence from Area D for preferring one interpretation to the other. The temptation to press the evidence from D to fit the sequence on Area H is difficult to resist, however and the second interpretation provides a better match.

These matters will be discussed further after considering the slots found in the soils and clays on Area D.



Illus 9.114 Plan 87 of 1 June 1981 on Plan 101 of 30 May 1981 [NMRS DC 38219 on 38234]



Illus 9.115 Day Book 270 Sketch plan of 8-9 June 1981

9.5.4 Slot 915

Slot 915 was the more northerly of the two continuous slots found under the cairn. In Illus 9.116 it runs from near the paving stones by the monolith to the remaining cairn stones, which concealed its eastern end. It had several hand-sized stones in its western part. Slot 913 is visible to its south as a dark streak running from the east baulk. Further to the south again and largely out of the picture was an earlier ditch 912 (Illus 9.116-9.117).

Slot 915, when first seen, was largely obscured by green silty clay 906 which underlay 905, the upper turf line (Illus 9.113). Once the clay had been removed the slot proved to be up to 0.4 m wide in its western part, but about 0.8 m from the east baulk of DI it narrowed to about 0.16 m wide (Illus 9.117, 9.118). At the main section it was a maximum of 0.1 m deep, with a rounded base. It was filled with brown clay and clusters of stones and contained no artefacts.

At its western end the slot had been covered by loose charcoal impregnated clay 910 (Plan 101, Illus 9.113) which was very similar to the clays

Illus 9.116 Slots 915 and 913 on 5 June 1981 [Film 1981-20-4 part]

found within lower courses of cairn material. The slot petered out on the subsequent plan (Plan 94, Illus 9.117). The fine brown clay 939 in the mound may reflect its former presence (Illus 9.117-9.118; Technical Note 9.5.4).

Further excavation showed that the feature was extremely shallow. By 4 June only vestiges of it remained (Illus 9.118). But it was not completely excavated.

9.5.5 Slot 920

Slot 920 was 0.48 m long by 9 mm wide and ran east-west. It was filled with small pebbles. It contained no artefacts. Its probable continuation, 941 is described below.

On Section 95a near the middle of the slot it had a sloping flat bottom, and its southern side cut through the grey mineral soils (Illus 9.111). The north side of the slot cut two turf lines separated from each other by about 20 mm. On Section 95b, near its east end, the slot was deeper and its bottom was curved. At that point the south side of the slot was partly overlain by a 0.2 m long patch of turf. Otherwise it and the north side of the slot only cut the lower mineral soil, here over 0.1 m deep.

There are three possible explanations for the patch of thin black material partly overlying the south side of the slot in Section 95b. It may have been an upturned turf; or it may possibly have been a remnant of charcoal-rich clay 390 or of a turf line in the cast of a basal cairn stone.

The simplest explanation for the differences between Sections 95a and 95b is that the soil 914 covered by the lower turf line rose quite sharply by 80 mm over a distance of 200 mm. Similar abrupt changes in level were recorded on Section 62. Again, this may have been caused by compression by stones of the basal cairn layer (Technical Note 9.5.5).

9.5.6 Slot 941 and nearby possible post-holes 937, 938 and 939

Slot 941, perhaps originally part of the same slot as slot 920, lay 0.2 m to the east of the latter, in line with it (Illus 9.117, 118). It was filled with brown clay and was 80 mm wide and at least 0.3 m long. Nearby were possible post-settings 937 and 938 with stone-free brown fills, implying two small postholes about 0.15 m across and about 0.4 m apart. Another possible posthole 939 was not excavated (Illus 9.118) and 938 was only seen in Section 62 (Illus 9.111).

9.5.7 Slot 913

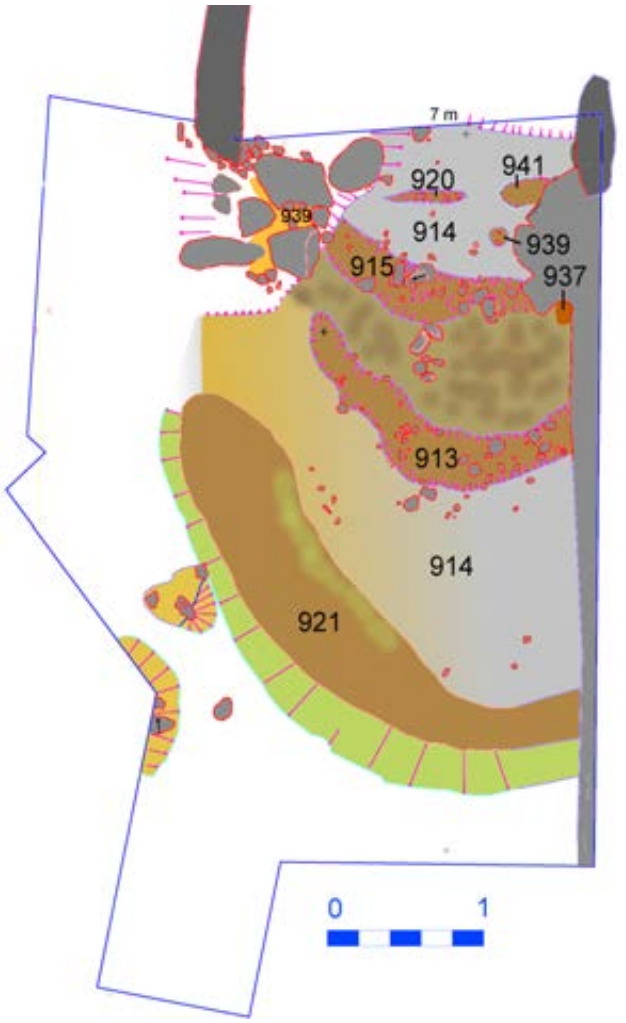
Slot 913 was just inside the line of the cairn kerb on Area DI (Illus 9.111). Its maximum depth was about 0.1 m. The two plans of the slot at different levels differed significantly (Illus 9.114 and 9.117).

A patch of turf line labelled 905 on Section 62 clearly overlay slot 913. Turf lines 905 and 912 had merged at this point and it was the later one, 905, which overlay slot 913, as the main section and plans record (Illus 9.111-9.117).

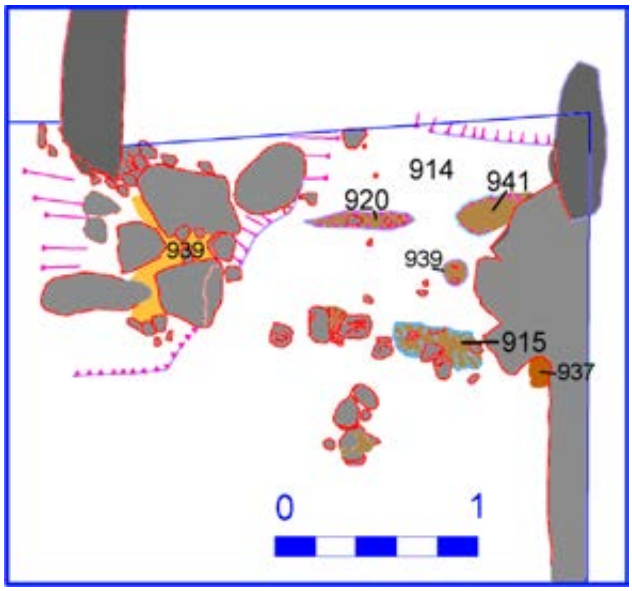
The upper part of the slot, although clear in section, was not well-defined in plan. When first noted it appeared to be fairly straight and about 0.4 to 0.45 m wide. At a slightly lower level, planned four days later (plan 94) it was 0.12 to 0.2 m wide and 1.9 m long. It was crooked and appeared to kink sharply northward towards its east end. As described below this may have been due to confusion with an underlying trough between cultivation beds 2 and 3, for the position of slot 913 on Section 62 (the east baulk) suggests that it in fact continued on a gentle curve rather than kinking sharply northward (Illus 9.111).

Plan 94 of 3 June 1981 (Illus 9.117) shows it extending further west than did Plan 101 of 30 May 1981 (Illus 9.113). Trampling during cairn construction may have been to blame, spreading out the upper layers of the slot (Technical Note 9.5.7).

Its fill included several small stones but none indicated postholes clearly. It contained no artefacts. It had been dug through brown to grey-green mottled clay, and it cut the turf line sequence 911-914 (thought to be equivalent to 905-912.



Illus 9.117 Plan 94 of 3 June 1981. [NMRS DC38226 (part)]



Illus 9.118 Features under the cairn on Overlay 96 of 4 June 1981 on Plan 94 of 3 June 1981 [NMRS DC38229 on DC38226]

9.5.8 Discussion of the slots, clays, soils and turf lines

The three slots under the cairn were all shallow. The two northernmost give an impression that they had been truncated, particularly the northernmost 920/941. Slot 915 is interpreted as having originally risen over the green clay round the base of the monolith, in the same way that the basal layers of the cairn wall rose up over the mound, and it too gives the impression of having been truncated.

The two slots 915 and 920/941 curved in a similar way to each other. That suggests that they may have been contemporary with one another but the possibility that one replaced the other cannot be excluded.

It is noticeable that slot 915 coincided roughly with the outer face of the chamber wall and the southernmost Slot 913 coincided roughly with the outer face of the outer kerb of the cairn. However, the coincidences were far from exact and the slots certainly were not foundation trenches for the wall-faces. The clusters of stones in Slot 915 suggest that it may have been dug to support posts, but there was insufficient time to examine the slot fully and no conclusive evidence for post-settings was detected.

Covered by basal cairn fill, and cutting the uppermost turf line under the cairn, the 'inner' slot 915 appeared to have the same stratigraphic relationship to the cairn and chamber wall as that of slot 773 on Area H. However that interpretation depends on that of the silty grey-green to grey clay 906, greasy green clay 907 and the green clay east of the clay mound round the base of the monolith.

The 'outer' slot 913 seems to be earlier in the sequence than the 'inner' slot 915 because it was covered by a turf line which was cut by slot 915 (Illus 9.111). That may reflect its earlier decay and overgrowth by turf. Perhaps it marked the margin of an unroofed clay-floored area. But it was thought to be contemporary with the 'inner' slot 915 during excavation, and that is the preferred interpretation. However, the possibility that it was filled earlier than the 'inner' slot 915 cannot be excluded.

The slots probably represent a light timber-built structure, perhaps no more than a pair of screens, the inner one enclosing a somewhat larger area than the chamber of the chambered cairn. The outer part was allowed to decay or was removed before the inner one and turf grew over the area outside the inner screen before the latter decayed or was demolished.

As described in 9.3.18 and discussed in 9.3.19, outside the area covered by the cairn two turf lines 334/365 were visible. In places they coalesced into one surface; elsewhere they were separated by fine grey and brown material where clay had lain on the lower turf line and a new turf line had formed on the clay. A yet higher turf line survived weakly in the south section of Area D above the overlying gingery-brown clay 320, although it was not detected in plan (see Chapter 9.3). The correlation of these three turf lines with turf lines 905 and 912 under the cairn is a matter of interpretation rather than record (Illus 9.111). The preferred interpretation is that even the upper of the turf lines forming 365 was originally earlier than the cairn, but continued to grow after the cairn had been built (see Chapter 9.3).

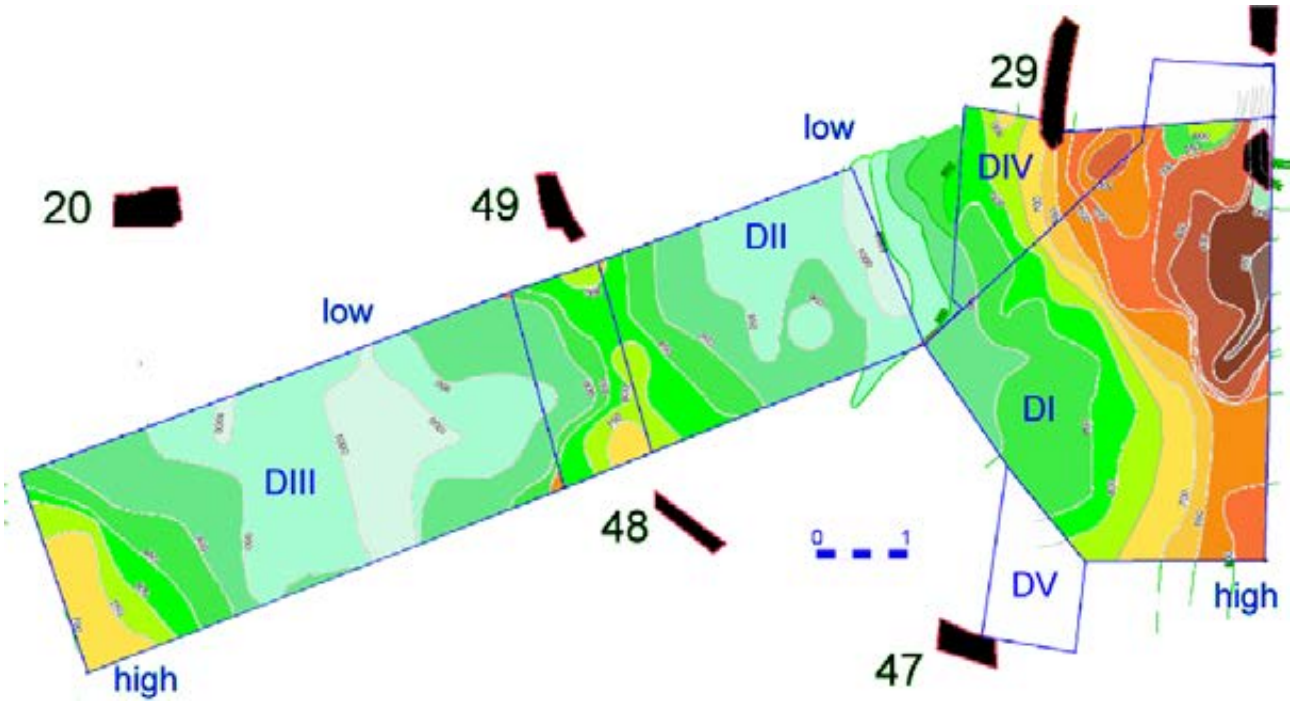
9.6 Phase 6: Ring stone 47 in DV

9.6.1 Introduction

Ring stone 47 was examined in DV, an extension to DI started at the beginning of 1981. It was thus not covered by the contour survey (Illus 9.119). The ground around it rose from the lowest levels of Area DI. Only the upper strata were excavated.

9.6.2 The Ring stone pit.

The uppermost levels under topsoil were discussed in Chapter 9.2.19. Under them by the Ring stone brown compact clay 340 was scarred by an ard mark. Clay 340 was impregnated with grey quartz chips similar to those in a band of gritty material 345 which had been interpreted as quarry dust used to fill a depression, although given the ard mark in the clay this seems to have been a coincidence or trampling rather than showing that the clay had been deposited in modern times. It contained a sherd probably from a fine Beaker (Cat 975) and 7 small probably E/MN corky



Illus 9.119 The contour survey of Area D and the location of Ring stone 47

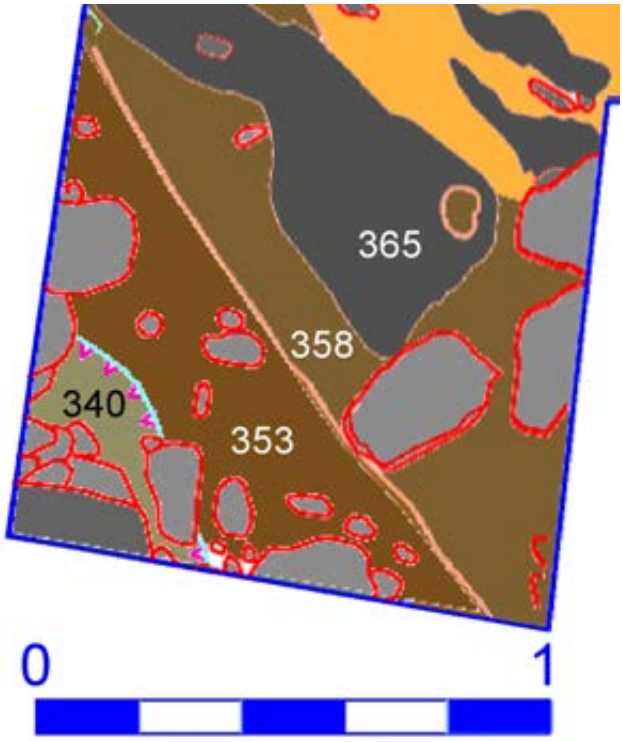
sherds and fragments along with some crumbs (Cat 976-972).

The edge was surrounded by orange gritty clay 341. There were no small finds from 341. Under 341 was clay 353 (Illus 9.120) which was interpreted during excavation as like cultivation-bed gritty clay 388.

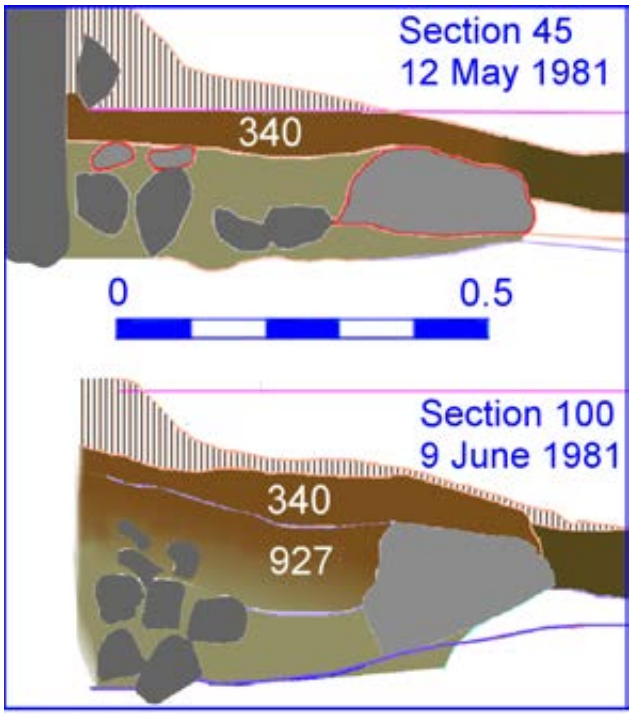
Below 340 in the top of the pit dug for Ring Stone 47 was clay 927. Its edge was 0.1 m to the east of the standing stone and about 0.3 m to its north (as for 340 on Illus 9.120). In the top of this element of the pit were small hand sized stones (371); below them were bigger but still hand-sized stones. When these were cleared away, this element of the pit was filled with larger stones (Illus 9.121). The clay, if any, amongst them was not described.

In section the edge of the socket appears to have been more than 0.3m from the Ring stone.

It and the photographic evidence (Illus 9.122) suggest that Plan 40B was a misinterpretation of the socket edge, which ran a little further north than shown on Illus 9.120 and than as first exca-



Illus 9.120 The pit 927 of Ring stone 47 on 9 May 1981 [Plan 40B on 40A NMRS DC38172]



Illus 9.121 Sections of the east side of Area DV [NMRS DC38177 and DC38223 parts]

Illus 9.122 The soils above the pit for Ring Stone 47 and other nearby features on 9 May 1981 from the north [Film 1981-05-08 part]

vated (Illus 9.124-9.125). The edge of the socket was not clear on sections 45 and 100 (Illus 9.121). Instead a 0.25m long stone lay on it (Illus 9.122 Section 100).

Illus 9.123, taken from the west four days later, shows extension DV on 9 May 1981, with from north to south, grey gritty bank material 388 with patches of turf line in it, a pile of orange stony clay interpreted as redeposited material like clay 388, a fragment of turf line 365, intrusive relatively light coloured linear depression 353 running towards the south-east and, adjacent to the monolith, dark material, probably the top of socket fill 340.

On Illus 9.124 the photographic contrast has been changed to clarify details of the base of 927. The fringe of orange gritty material 341 referred to in the written records is just perceptible on it. The stone-filled feature 927 had been partially emptied.

There was a slight rise in turf line 365 as it approached the stone, before being truncated by ploughing about 0.7 m from the edge of the socket. Ploughing and erosion had prevented the establishing of a stratigraphic relationship between the layers around the pit of Ring stone 47 and the soils covering DI.

9.6.3 Discussion of Ring Stone 47

What little relevant evidence survived suggested, but did not prove, that the top of the pit had been at around the level of the composite turf line 365. Because of the truncation in this area it is unclear whether the pit cut though the turf line or was covered by it. The turf line lay above grey gritty clay 388, which elsewhere was interpreted as part of cultivation bed 2. Another cultivation bed predated the central monolith. Thus Ring stone 47 and the central monolith were in broad terms at the same stratigraphic level as each other.

9.7 Phase 6: Pits 917 and 916

9.7.1 Introduction

As described below the top of Pit 917 had been ploughed. It cut an old ground surface which should be one of the two partially merging ones

(334 and 365) covering much of Area DI outside the cairn, and possibly both (Illus 9.125-9.126).
9.7.2 Pit 917

Pit (917) was full of fresh-looking green clay, brown clay, large and small stones and jumbled fragments of turfs ((Illus 9.125). Most of it lay outside the trench. Its continuation under the baulk coincided roughly with a hump in the local terrain. It was dug into the middle of cultivation bed 2, and its top, as it survived under plough soil, was close to the surviving top of gritty clay 388 (Illus 9.126).

Each section recorded a shallow chord of the pit so its full depth is unknown (Technical note 9.7.2).

A turf line survived to the south at the level of the top of the pit but ploughing (plough soil 344) had removed the exact relationship (Illus 9.126). It appeared to lie in the trough between cultivation beds 1 and 2 running roughly east-north-east across the area (see Chapter 9-5) and to rise up over cultivation bed 2. In Section 103B the lower of two turf lines just overlapped the edge of the pit (Illus 9.126).

Illus 9.123 Area DV on 13 May 1981 showing the pit partially emptied [Film 1981.8.35 part]

Illus 9.124 Extract from Illus 9.138 with colour map changed to show detail of the socket more clearly.

9.7.3 Discussion of Pit 917

That may mean that the pit was cut from that level leaving a turf edge overlapping; but it impossible to be certain about the stratigraphic relationship. The pit must have been about a metre across from north to south (Illus 9.128). It was more than 0.35m deep. If it was roughly circular it will have been substantial, but depending on its east-west length it may even have been as large as the pits dug for Ring stones.

It was dug either around the time that the Ring was erected or between then and the building of the cairn. In its size and in the nature of its fills it was very similar to that a pit found under the passage of the chambered cairn in BIVWX (Chapter 7). Both contained cut turfs along with head-sized stones. The pit on Area BIVWX contained no evidence that it had held a standing stone or a post, and both pits may have been dug as part of rituals as has been hypothesized for many sites of the late fourth and early third millennia BC.. Alternatively it may have been dug to erect a standing stone (or substantial post); this was indeed the provisional on-site interpretation.

If the pit was dug to erect a stone, it would have stood somewhat to the west of a line between the central monolith and the south row. The fact that the pit was more or less on the general line of the

Illus 9.125 Pit 917 on 9 June 1981 [Film 1981-21-23]

southernmost stones of the west side of the avenue and the south row is interesting. It would also have lain roughly on the line of the east row. The possibilities will be discussed further in Chapter 24: Discussion and Conclusions

9.7.4 Pit 916

A smaller pit 916 was discovered to the north-east of Pit 917 (Illus 9.128, 9.129). It had a fill of brown clay and stones. It was not excavated so its depth is unknown. It was interpreted as a posthole. A pollen sample (2017) from this pit was assigned to pollen zone CaN-3aii which ended sometime between 2560 and 2200 cal BC. This suggests that it was roughly contemporary with later use of the Ring, or use of the green clay platform or chambered cairn.

9.8 Phase 6: The central monolith

9.8.1 Sections by the central monolith

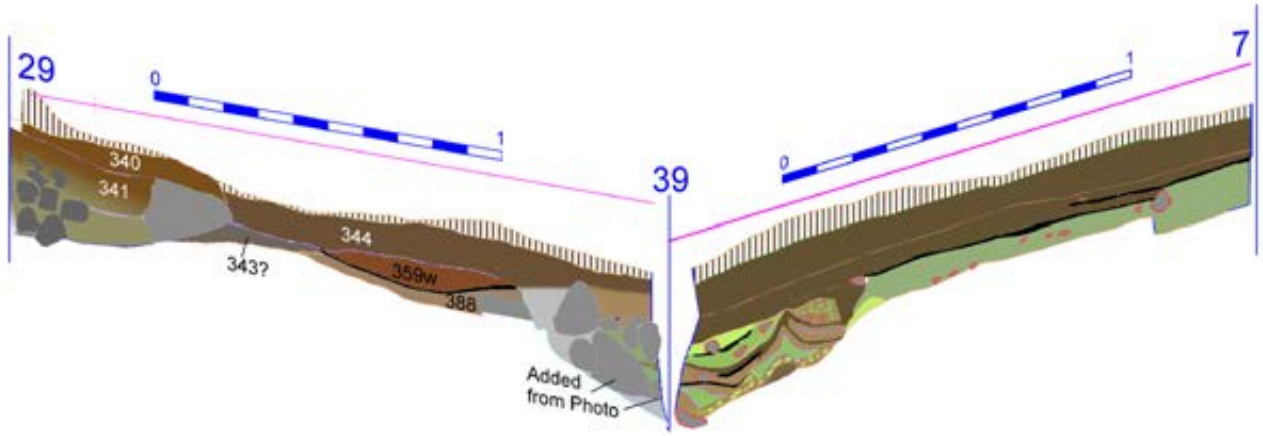
The pit and covering mound of the central monolith were investigated in Areas DI and DIV. Five sections were recorded in the vicinity of the monolith (Illus 9.131).

— Section 80 (45 to 46) ran south from the central monolith. In Illus 9.130 its section line is visible (from the back) at top left by the wooden ruler. Section 80 was drawn after removal of the paving stones to the west of the kerb.

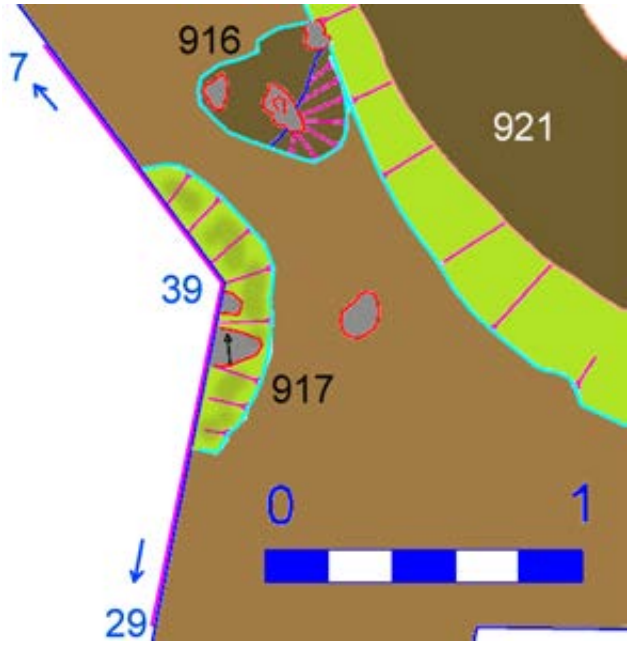
— Section 21b and 81 (5 through 6 to 7) ran from the chamber approximately along the south side of the baulk separating Area DIV from Area DI to the westernmost point of Area DI. It was drawn twice. The two drawings were not on exactly the same line. The main difference was in the northern part where by the time Section 81 was drawn on 29 May 1981 most of the cairn had been removed so that the upper part of the clay mound had become visible. Where the cairn had been retained its fills masked the green clay. Clearly the section drawing did not reflect a vertical plane. Some slight and I trust insignificant liberties have been taken in fitting the two sections together.

— Section 102b (49 to 50) ran west from the monolith, outside the cairn kerb.

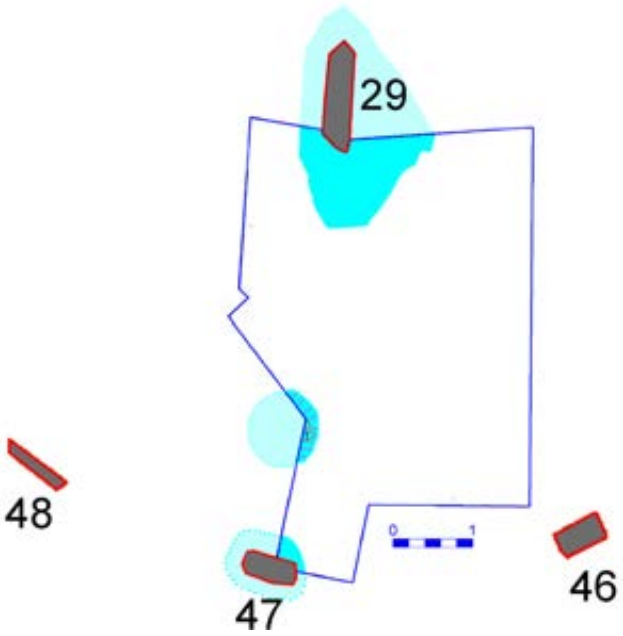
— Sections 84 (43 to 44) and 92 (61 to 62) ran



Illus 9.126 Pit 917 Sections 100, 102C and 103C of west baulk of DV [NMRS DC38233, DC38236 and DC38237] and Section 103B of the southwest side of DI on 4 June 1981 [DC38237B], with some detail added from photographs of 9 June 1981



Illus 9.127 Pits 917 and 916 on Plan 94 [NMRS DC 38226 extract]



Illus 9.128 Pit 917, the central monolith pit and that for Ring stone 47

on slightly different lines from each other roughly east from above the edge of the pit dug for the monolith through the chamber wall and chamber. Section 92 was under the south edge of the kerb.

9.8.2 Discussion of the sections

The general story is clear enough, although the difficulties in distinguishing between the various green clays labelled 373 round the monolith was unhelpful, and some of the other labelling requires careful consideration (Technical notes 9.8.2a,b and c).

By the Monolith the cairn, chamber wall and kerb with their brown clay fills overlay a clay mound usually without an intervening turf line. Sometimes the clay was iron-stained, and while basically green its colour varied through brown and yellow to grey. This probably reflects both slightly different sources of clay (for it must have been built up in basket sized or smaller loads) and subsequent chemical weathering. Green clay also filled the pit.

Generally it was impossible to separate the green clays of the mound and pit where the pav-

Illus 9.129 Pit 916 [Film 1981.20.8]

ing was absent. At one point under the cairn to the east of the monolith the sequence (Section 92; Technical Note 9.8.2a) appears to be near-identical to that recorded in Area DIV; there and at a nearby point (Section 84) a skim of brown clay overlay the pit fill and suggests that it lay open for a while before green clay was mounded up on it.

9.8.3 Layers immediately above the paving and green clay 373

On the south and west sides of Monolith 29, partly in Area DIV and partly in Area DI, the basal stones of the cairn rested in a dark brown gritty clay 362 with much charcoal (Sections 102b and 80 on Illus 9.131).

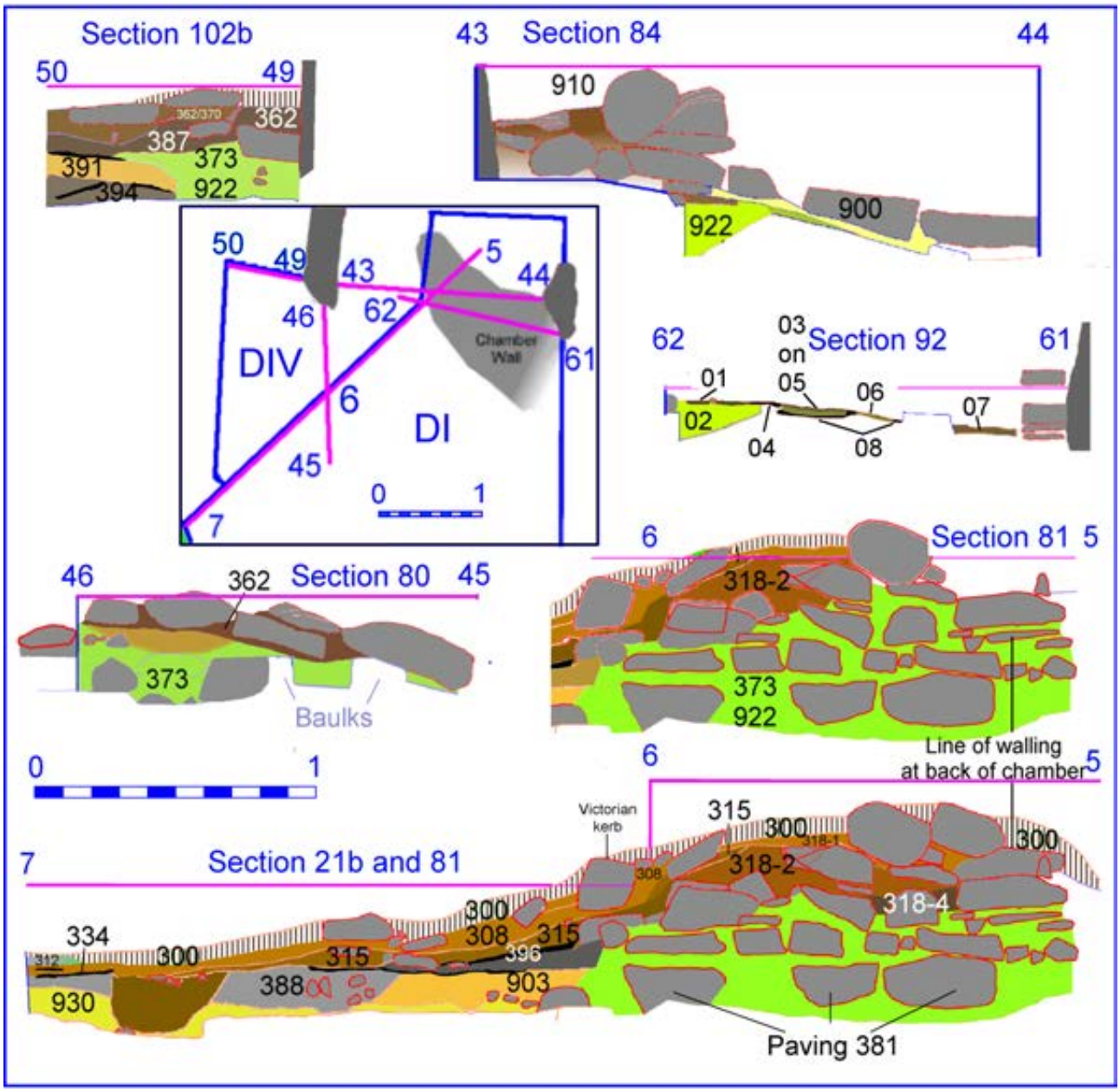
The upper version of the clay, 373.1, was above the paving slabs surrounded the base of the monolith. It had been scarred by ard marks (Illus 9.132). Removal of dark brown clay 370 and its lower part 375, showed that it and the kerb of the prehistoric cairn running south from the central monolith sat on a yellow brown version of clay 373 (Illus 9.133; Illus 9.131 Section 102b; Day book 240-242).

The photograph in Illus 9.134 shows DIV as planned (Illus 9.133) on 15 May. The paving slabs were still mostly hidden by mound clay 373. Above them was a layer of smaller slabs which were at the same general absolute level as the basal level of the chamber wall on Section 80, although they were 0.1 m lower than the stones of the west end of the chamber wall and up to 0.2 m higher than those 1.2 m further to the east (Illus 9.131 Section 81).

On Section 102b orange speckled clay 391 appears to be cut by the socket of the monolith (Illus 9.131). However a series of plans shows that 391 overlay the socket (Technical note 9.8.2c). The details are discussed below (Illus 9.138). The green clay above 391 must have been part of the mound round the base of the monolith.

To the south on Sections 80 and 81 the upper clay mound lay under basal cairn deposits. To the south-east of the central monolith the outer part of the green clay round its base was covered by a band of black clay (910) up to 0.2 m wide. Its edge was very irregular (Plan 87 Illus 9.114). It appears to have been the last relics of basal cairn layer 390 (Chapter 9.4 Illus 9.102). It contained a Hebridean flanged rim-sherd (Cat 281, ASH 20). A spot sample (2018) from this clay contained pollen zoned to around the transition from CaN-3ai to CaN-3aii which occurred sometime between c. 2770 and c. 2360 cal BC.

Illus 9.130 The context of Section 80 from the southeast on 27-8 May 1981 [Film 1981.16.18]



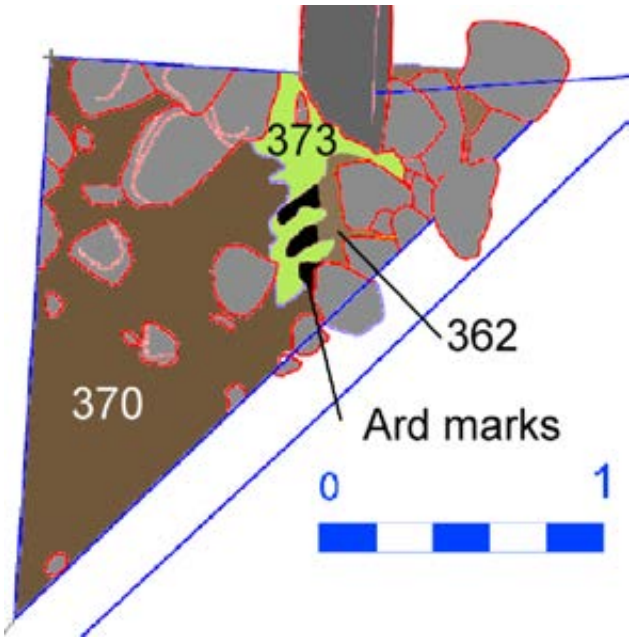
Illus 9.131 Sections around the central monolith, clockwise from top left: Section 102b on 9 June 1981 NMRS [DC38235]; Section 84 on 1 June 1981 [NMRS DC38216]; Section 92 on 2 June 1981 [NMRS DC38224]; Section 81 (part), and Section 21b and Section 81 combined [NMRS DC38150 and DC38213]; Section 80 on 28 May 1981 [NMRS DC38212]

9.8.4 The paving and lower mound

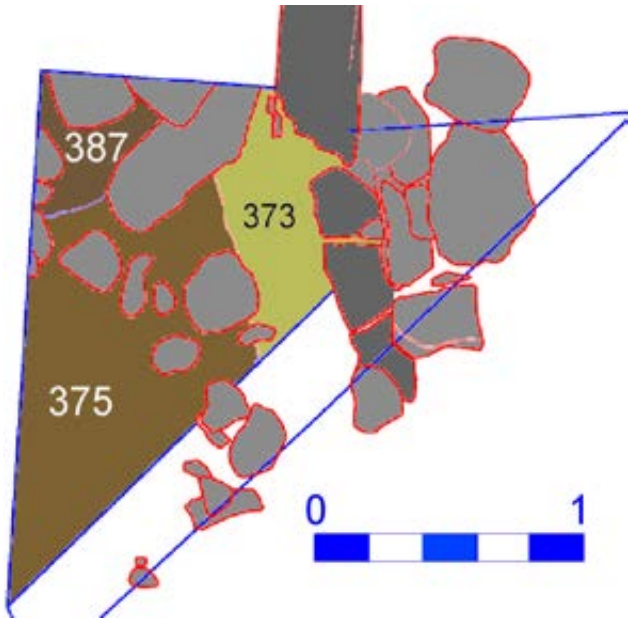
The paving slabs are coloured mauve on Illus 9.136 which includes elements discovered at different periods of excavation; in DIV removal of clay 373 to reveal the paving stones took place in mid May, but in DI removal of overlying cairn elements and associated clays did not occur until early June.

The slabs were up to 0.32 m long and up to 0.1 m thick with small hand-sized stones rammed between them. The platform formed by them extended more than 0.8 m south of the monolith and more than 0.6 m west of it. It extended between 0.7 and 1m to its east (Illus 9.136). It is not clear whether the easternmost slab was part of paving 381. There was probably disturbance in this area when the cairn was built.

At a stratigraphically higher level than paving stones 381 was a small patch of charcoal impregnated clay (908) in the dirty variant of green clay



Illus 9.132 Upper clay 370 and mound clay 373 on 13 May 1981 [Plan 48 NMRS DC38180]



Illus 9.133 Upper clay 373 and clay 375 on 15 May 1981 [Plan 52 NMRS DC38184]

mound material 373 which extended between DIV and the area of DI to the east of the monolith.

Brown clay 375 ran up to the paving and filled the gaps between the westernmost slabs (Illus 9.135-9.136). On the east side the slabs were in a patch of silty brown clay 939, which was not excavated. It may reflect the former continuation of slot 915, part of what are interpreted as light timber structures in Chapter 9-5.

In the northwest corner of DIV under brown clay soil 375 was ginger clay 391 which underlay the green clay on which the slabs rested (Illus 9.131 Section 102b; Illus 9.136-9.138). In the southwest corner of DIV was a broadly similar patch of orange brown gritty clay 382 (Illus 9.136). They formed a (probably short-lived) surface on which the lower part of the green clay mound under the paving slabs was built.

9.8.5 Discussion of the lower monolith mound and paving slabs

If the lower monolith mound with its paving slabs was symmetrical it will have measured about 3m from north to south overall and 1.5 to 1.8m east-west. Subsequent activities in the area to the east of the monolith may have modified it.

A paving slab overlay 391 with intervening green clay suggesting that the paving was added after some delay of possibly significant length.

Before the cairn was built green clay from the mound was spread in the area to the east and south of the monolith and it may be that this coincided with the creation of a green clay floor on which light structures, perhaps little more than screens, were erected. The platform, perhaps reduced in size, would thus have been hidden. This may suggest that there was an earlier phase in which the paving was intended to be visible because it is hard to envisage a purely functional purpose for it.

The sequence thus appears to be:

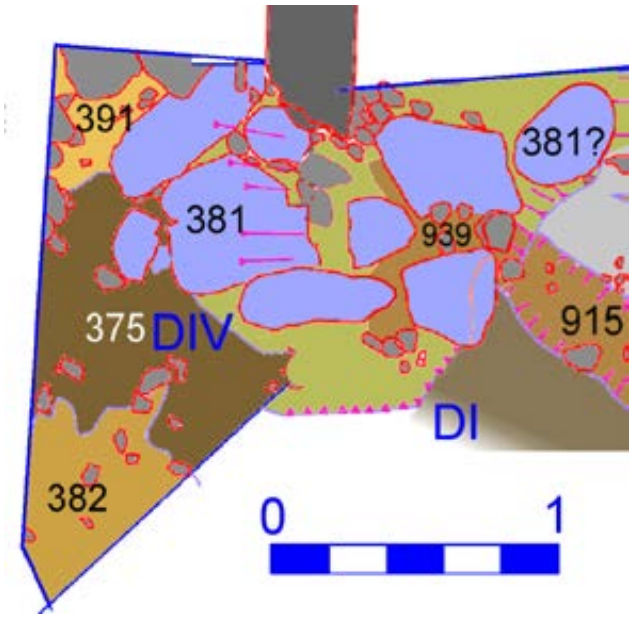
— pit-filling
— delay
— addition of green clay and setting of the paving-stones

9.8.6 The layers cut by the monolith pit

The western edge of the socket was 0.43 m from the west side of the monolith. It cut the orange speckled clay 391 in the northern part of DIV. It top western edge was rounded but lower down it was vertical (Section 102b Illus 9.131).

Illus 9.134 Stones including kerb 380 by the monolith on 15 May 1981, from the west [Film 1981.9.12]

Illus 9.135 Paving 381 in Area DIV c. 15 -17 May 1981. The socket of one large paving slab is visible to the right [Film 1981.9.29 partly rectified]



Illus 9.136 Paving 381 in mauve Plan 56 of 16 May and Plan 94 of 3 June 1981 [NMRS DC38188 and DC38226]

Clay 391 was present only in the NW corner of DIV on top of the soils and turf lines 394. It varied from about 5 cm thick in the north-east to about 8 cm thick in the north-west. It contained a flint chip and a quartz flake (CAT 125). By the north baulk, on Section 102b, the clay which filled the socket seems to have spilled over on to a lens of turf line lying on top of the orange speckled clay hump 391. This does not seem to have been part of a widespread coherent turf line because it was not recorded during excavation nor on the western section of Area DIV, Section 102a (Illus 9.137).

The north end of Section 102a was 0.8m west of the monolith. Taken with the plans it shows that overlying 375 and 387 were later than the cut.

On Illus 9.138 Sketch plan 98 preceded Plan 74, despite its number. On plans 61 and 65 the green clay of the pit for the monolith interleaved with clay 391, interpreted as spoil from digging and backfilling it. The mottled grey soil 394 contained black halos (397) which were interpreted in some cases as turfs or fragments of turf line and in other as marks left by the removal of stones. The halos occurred at various levels separated by about 50 mm (Illus 9.138 Sketch plan 98). Mottled soil 394 rested on a patchy turf line which overlay a patchy grey mottled soil (904). Under the patchy soil 904 was mottled orange clay (903) which may have been equivalent to the low pile of orange clay stained soil 339c in DII around a metre away to the west, which underlay cultivation bed 4 (Technical note 9.8.6).

The pit cut the bottom turf line element 904 of redeposited turf and clay layer 394, and possibly also some of the latter (9.138).

9.8.7 Discussion of the layers cut by the monolith pit

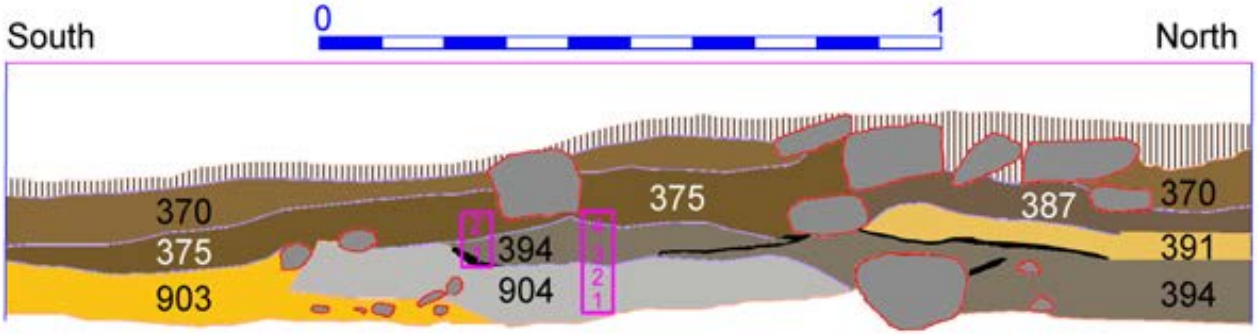
The cultivation bed found in DII should have filled most of DIV. Section 102a can be interpreted as representing it (Illus 9.137). The turfs laid upside down on layer 394 may have been part of the cultivation bed, or they may have been the first upcast from digging the monolith pit. The two explanations are not mutually exclusive: layer 394 may have been hybrid (Technical Note 9.8.6).

9.8.8 The monolith pit

The edge of the pit on Plan 94 was a metre from the southern tip of the monolith. The hachures to the west may have indicated an internal change of slope as on Plan 98 (Illus 9.138). There the monolith pit cut orange grey clay 903 (Illus 9.141).

Perhaps 903 above the stone had fallen away, or its upper part had been squeezed sideways, or both, leaving a local overhang in the side of the pit (Illus 9.141). Since 394 to the west of the monolith was interpreted as a low mound of ragged turfs it is reasonable to suggest the same for the layer of similar material above 903 in Illus 9.141.

The bottom of the green clay mound and the upper fill of the socket were quite variable; from west to east on section 102B it was brown-grey, green-yellow clay, stony fibrous green clay and green clay. Similar variations were seen elsewhere although the colours were predominantly green or green-tinged (Illus 9.142). The pit seems to have been over-filled to form the bottom of the green clay mound for it had been cut from the turf line shown on top of 394 on Illus 9.142 not, as the section misleadingly suggests, from the top of the orange clay 391 (Technical note 9.8.6).



Illus 9.137 Section 102a, the west baulk of Area DIV [DC38235]

The pit was about 1.7 m across from east to west (Illus 9.143). Its southern edge appears to have been about 1 m from the south edge of the monolith. The eastern edge of the monolith pit was 0.98 m from its east side, and the slope was 20 degrees on one section and 30 degrees on another. By way of contrast the west edge of the socket was only 0.43 m west of the monolith and vertical, apart from having a rounded edge. To the east on Section 84 (Illus 9.131) the edge of the socket (922) for the central monolith was found 0.98 m from the base of the monolith, sloping at an angle of 30 degrees, plus or minus 2 degrees, to the horizontal. On Section 92 (Illus 9.131) the edge of the socket sloped at an angle of 20 degrees to the horizontal, plus or minus 2 degrees.

9.8.9 Discussion of the monolith erection and related events

The shallow angles of the eastern side of the pit suggest either a cut to aid in its erection or compression of the edge as the monolith was levered up. This suggests that it was raised from the east.

I envisage that first turfs and soil and then some of the clay cast up from the monolith pit were dumped mainly to the west forming part of layer 394. Much the same seems to have happened to a lesser extent to the south and east. In places the side of the pit overhung slightly either because its top was at the level of the up-cast clay and turfs or because bits of the pit sides had fallen out.

The green clay above the pit was added after settling had brought the top of the pit fill below the level of by now oxidised surrounding spoil, the west edge of the pit had become rounded and an incipient turf line had formed east of the monolith. The greasy dark clay on top of the socket fill to the east of the monolith may be an incipient turf line. Green clay was added over the pit and spoil 391; one paving stone lay vertically above 391.

The following (simplified) sequence is suggested.

1. pit excavation

2. erection of the monolith

3. pit-filling

4. delay

5. addition of green clay and setting of the paving-stones

6. delay

7. spreading of green clay east of the monolith and building of light timber structures

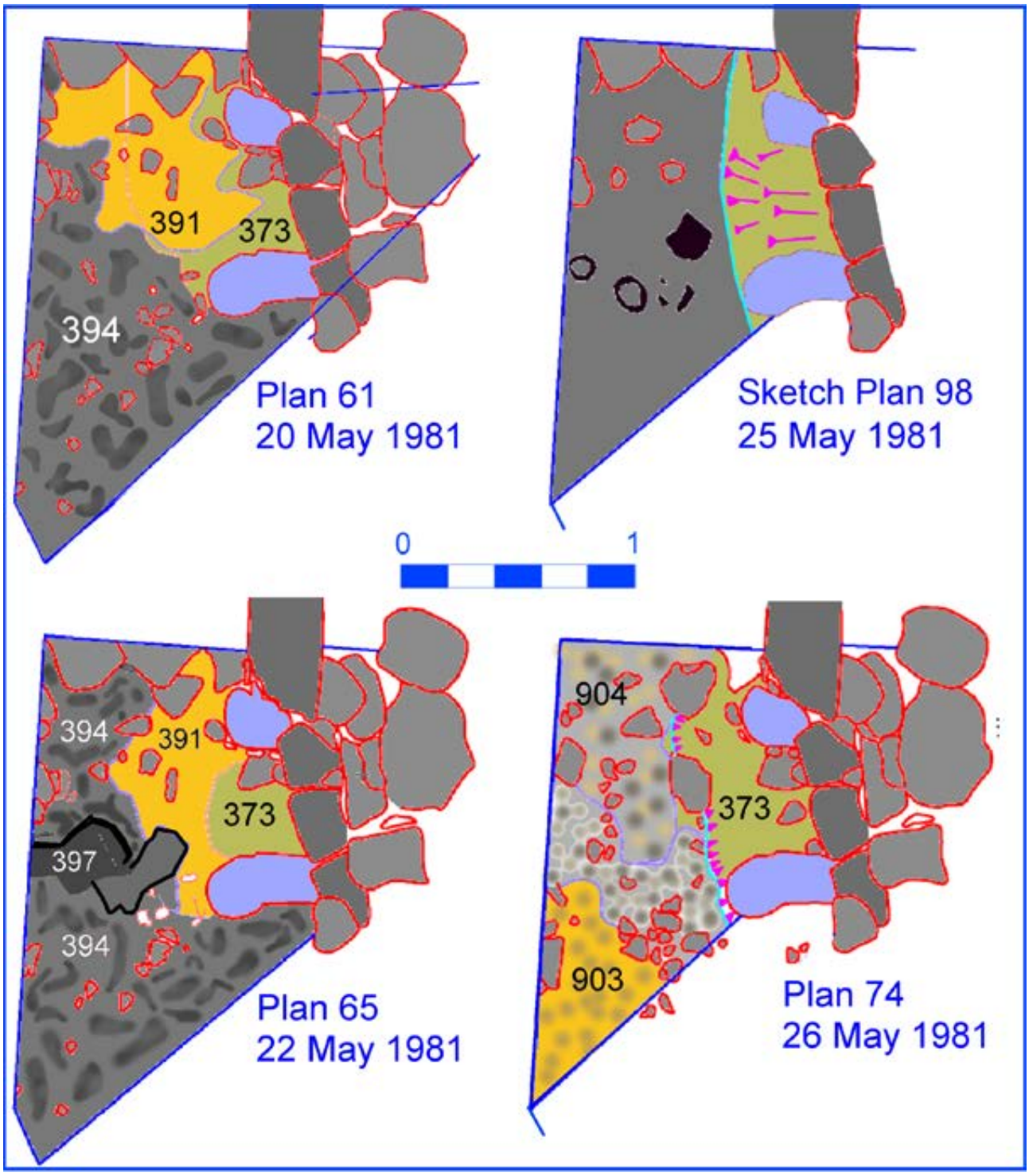
8. delay

9. cairn building

9.9 Phase 5 Cultivation beds and other early features

9.9.1 Introduction

Judging by the remains on this and other excavated areas cultivation beds were created in Area D before the Monolith and Ring were put up (Il-

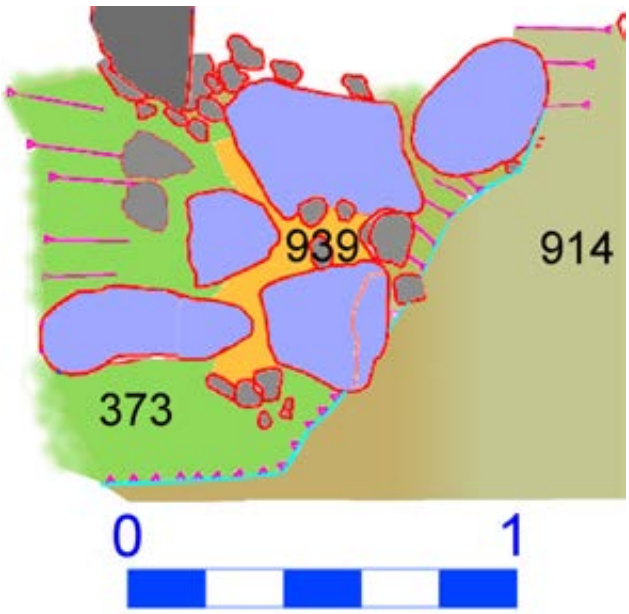


Illus 9.138 Plans of Area DIV showing spoil 391 and the pit for the monolith appearing [NMRS DC39193, 38197, 38231 and 38206]

lus 9.144). The irregularities of the best defined bed, Bed 4 on DII, meant that there need be no expectation of a neat series of evenly spaced straight-sided beds and troughs elsewhere Technical note 9.9.1).

The evidence for the best explored cultivation bed, Bed 4, will be described first, then cultivation Beds 1 to 3 and their intervening troughs in that order. Illus 9.144 provides a key to their numbering.

Illus 9.139 The edges of the pit for the central monolith on 5 June 1981 [Film 1981.20.7]



Illus 9.140 The socket edge south of the monolith from Plan 94 of 3 June 1981 [NMRS DC 38226 (part)]

9.9.2 The early soils and possible cultivation beds in DIII

In Area DIII mineral soil 309 and variants of it lay mostly on the natural clay 323 and 325 (Illus 9.145). Small sherds in soil 309 suggest its development involved human interference subsequent to erection of the Ring (Table 9.29).

Table 9.29 Potsherds in layer 309

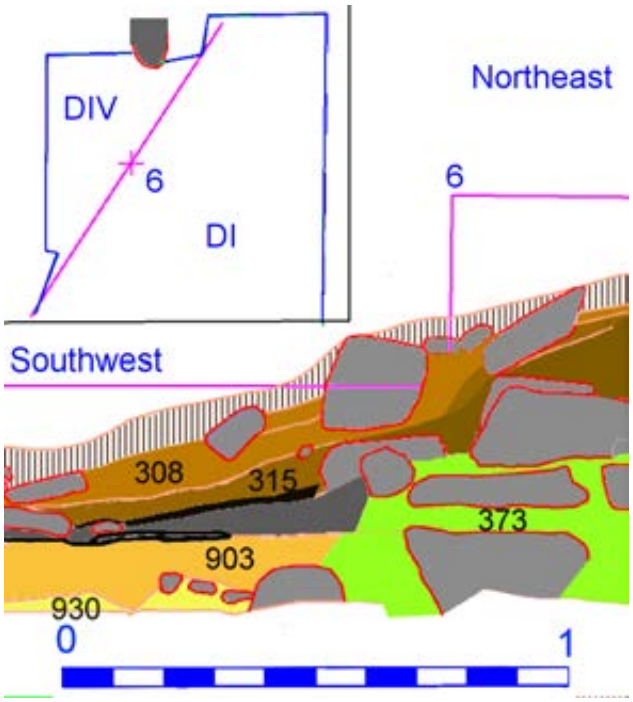
ASH	Find	Comments
36	80.47	Hebridean incised ware.
40	80.48	A sherd of Beaker

On the subsoil 323 and merging with 309 near the west end of the area was a thin layer of reddish mineral soil 304 (Illus 9.146). Posthole 335 was cut into the green natural 323 which directly underlay 304 (Illus 9.145-9.146). It was filled with dark brown stone-free silt and contained no artefacts. The posthole may originally have been cut from the top of 304, where the similarity of their fills would have made it invisible. It seems most likely that the posthole was a prehistoric feature, for it had no peat in it, although the possibility of an early modern date for it cannot be excluded because the black peaty material 302 may have covered it after the clearance of 1857.

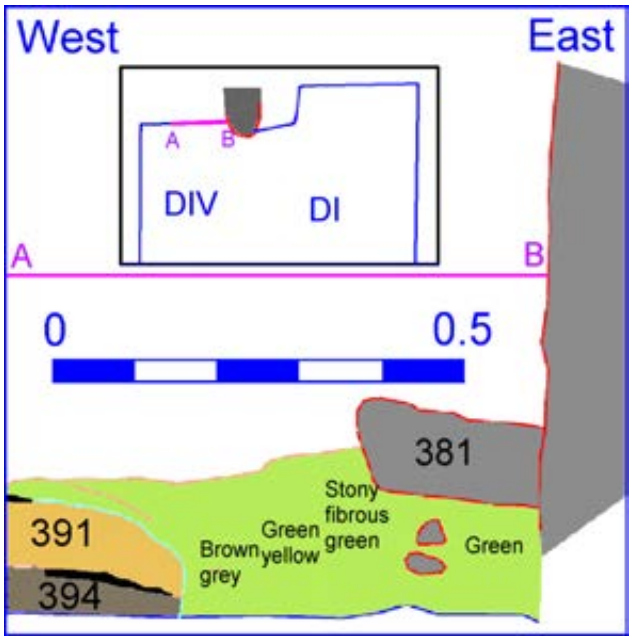
Near the southeast corner of DIII, Soil 309 covered part of a steep-sided shallow feature 330. Feature 330 was 0.8 m across and 0.1m deep, with a gingery brown fill containing lumps of green natural clay but no dateable artefacts (Illus 9.145-9.146).

There was a tendency for the soil near the south baulk to remain darker during drying than the centre of the area (Illus 9.147). The same phenomenon on the north side of the trench was far more marked in its eastern half then in its west (Illus 9.147). If the phenomenon was not an artefact of excavation or caused by moisture seeping from the baulks it may be that the northern trough of the bed on Area DII continued for 2 or 3 metres westward and if it did so the southern trough may have extended westward too.

The photograph also gives an impression of shallow linear features running across it (Illus 9.147). However, although the interface between subsoil and soil on the south baulk section had what might have been a cultivation bed and two trough-like depressions about 2m apart from each other, there was nothing similar on the north baulk



Illus 9.141 An extract from Section 81 (see Illus 9.131) showing levels immediately above the cut for the monolith pit [NMRS DC38213 part]



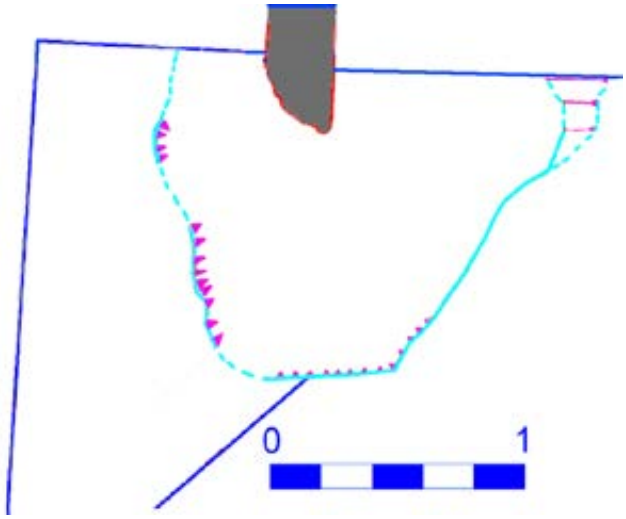
Illus 9.142 An extract from Section 102B showing details of the colour and texture variations in the green clay 373 to the west of the monolith [NMRS DC38236]

section (Illus 9.146). Further, the two most prominent dark marks corresponded partly, although not wholly, to the edges of change between subsoil variations 325 and 323 described below. No beds or troughs were identified during excavation.

9.9.3 Discussion of the early soils and possible cultivation beds in DIII

Given the number of similar soils at different levels in other areas, exact correspondences with layers in DII cannot be proved, but soil 309 was roughly equivalent to gingery orange clay 336 in area DII nearby, which also contained a beaker sherd (Cat 404, ASH 43).

As discussed in Chapter 4.1: Introduction to the fieldwork there does not seem to have been any cultivation of this area after AD 1857, so if there were indeed beds in DIII they should be prehistoric. The possible continuation of Bed 4 may have been matched by others to either side, as may the hypothetical north-south beds; if further excavations take place at Calanais it would be useful to test these possibilities.



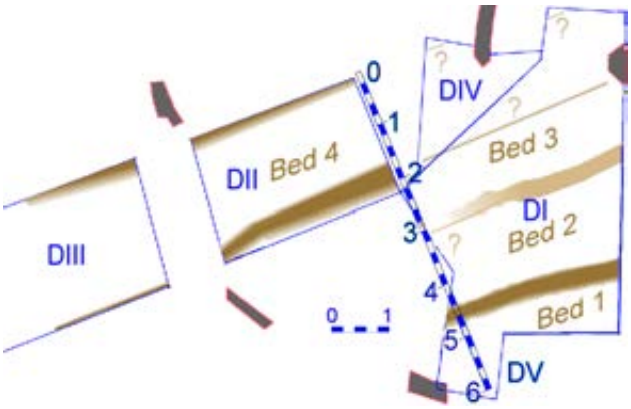
Illus 9.143 The cut for the monolith pit from Plans 74 and 94 [NMRS DC38206 and DC38226]

9.9.4 Variations in the natural clay in DIII

The green clay subsoil (323) was variable in texture. A band of slightly softer, darker green clay (325) ran across DIII, approximately parallel to

and about 4 m from the line between Ring Stones 48 and 49 (Illus 9.145). A narrow slit area was excavated deep into the subsoil by the south edge of DIII to test the idea that this might be the top of a ditch encircling the Ring. It proved to be an entirely natural variation (Illus 9.148- 9.149).

Within the clay at the west end of the area was an area of soft greenish-yellow clay 324 (Illus 9.145). It contained more stones than were present in the rest of the area and on its north side was a band of pebbles. A patch of similar pebbles in the E corner of clay 324, at this point darker brown, soft and silty, contained two small stones set on edge. None of these features contained any artefacts.



Illus 9.144 Reconstruction plan of cultivation beds on Area D

9.9.5 Discussion of variations in the natural clay in DIII

Variations in green clay found spread out on various parts of Area D reflected the natural distinctions in the subsoil found on DIII.In plan the features defined by clay 234 looked almost as if they formed the eastern corner of a sub-rectangular structure. They were however thought most likely to be natural. Any future excavation in this area could usefully test the faint possibility that they were artificial.

9.9.6 Cultivation bed 4 in DII

The sections in Illus 9.150 record part of the sequence discovered in DII in 1980 and 1981. The differences in colouring of strata between 1980 and 1981 reflects the fact that the layers were each variable in colour; soil 310 and the lower clay 329 were both described as of different colours at different times, presumably because they not only varied in composition but their colour and texture differed depending on their water content.

The whole sequence was thin. Excluding the band of stones 307 the archaeologically interesting layers rarely exceeded 0.2 m. Further, the sections missed some important details recorded in the area between them. Despite the flat bottoms of the east and west end sections there were in reality shallow troughs at either side of them. The west section was complicated by the nearby presence of Ring stones while the east section included a pile of orange clay with a hollow centre.

Under topsoil clay soil 310 merged down into a gingery clay soil (329). The latter contained a piece of quartz (81.571), not in the catalogue and therefore probably natural. It was very hard to separate 329 from 310 in section and in places 329 (rather than 310) may have directly underlain topsoil. It thinned over the slight depression alongside the south baulk of DII, surviving at a lower absolute level than over the rest of the area.

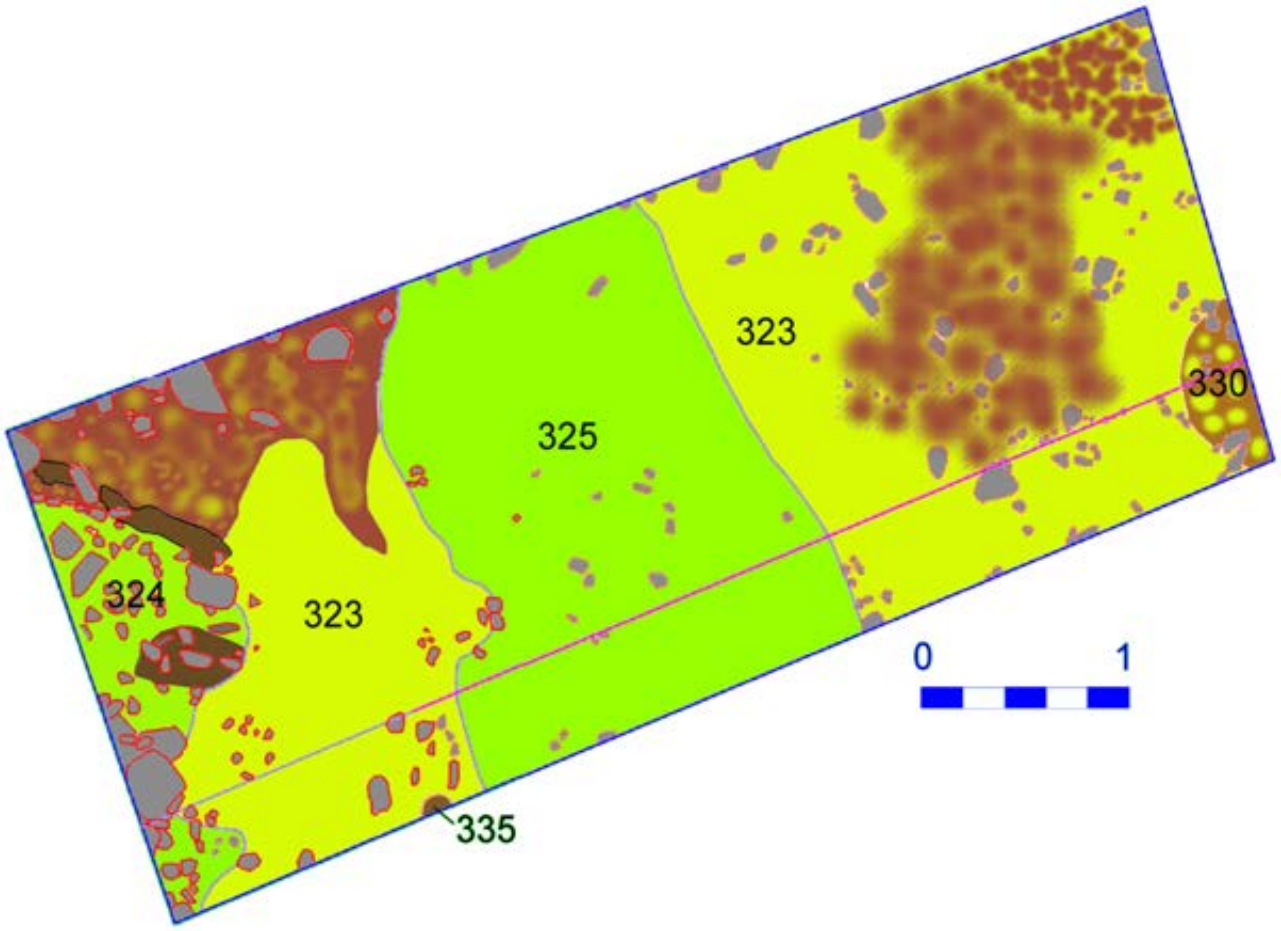
It was perhaps originally the soil of a slightly raised area in the middle of the trench which had subsequently been spread from the centre of the area into the shallow trough to its south (Illus 9.151).

A black clayey turf line (316b) and its corresponding thin mineral soil were well preserved in the northern part of DII. Its soil contained 3 quartz chips (81.316 not in catalogue and CAT 108) and a sherd of nondescript pottery (Cat 1109) along with a piece of charcoal.

Once most of 329 had been removed, more of the turf line and associated mineral soils became visible (Illus 9.151).

9.9.7 The southern trough

A dark brown to greasy black clay (347) lay on the edge of a sinuous depression. Its north edge was filled with small stones (348) mingled with clay 347 (Illus 9.151-9.152). Amongst them was a flint flake (CAT 104). The brown black greasy clay and stones were sandwiched by clay 951 so were a bed-edge deposit rather than basal.



Illus 9.145 The lower layers, mostly natural, in DIII [NMRS DC38143]

At its west end the trough curved to the south-west; but it was so shallow that only its average position and trend is significant. A small collection of angular stones (354) was found nearby (Illus 9.153).

The bottom of the depression was filled with yellow clay (951). Overall the trough appeared to be orientated parallel to Area DII. The yellow clay in its bottom was not simply an in-situ modification of the natural green clay because it overlay clay soil (9.154) and a turf line 316c (Illus 9.157).

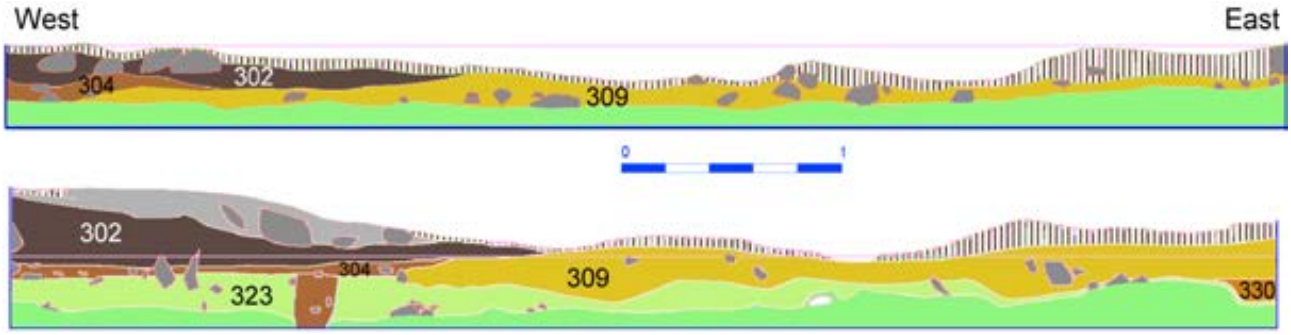
9.9.8 The cultivation bed

Around 1.5m east of the baulk between Ring Stones 47 and 48 there was evidence for upside down and sideways stacked turfs in the cultivation bed (Illus 9.154-156). The turfs lay in reddish yellow gritty clay and brown soil which formed a general surface above the natural immediately to the east. One upside-down turf included clean green clay subsoil above a patch of black greasy clay (378, 379).

A photograph of 15 May 1981 (Illus 9.155) shows a raised area between two linear depressions. The preferred interpretation in 1981, and now, was that there had been a low cultivation bed running roughly east-west in the centre of DII with a trough to either side. As drawn on 15 May (Illus 9.154) the height difference between the top of the bed and the bottom of the southern trough was a few centimetres. The north and south troughs may have continued into Area DIII, as described above.

Sections 53 and 59 (juxtaposed in Illus 9.156) ran approximately along the length of the bed and show the turfs composing the bed at this point. They lay in reddish yellow gritty clay which along with brown mineral soil formed a general surface above the natural.

A pollen sample (2031) from the upside down patch of turf 379 suggested a date at the beginning



Illus 9.146 Area DIII baulk sections23B and 23A. The bottom section (the south section) has been flipped to ease comparison with the north section and plan. [NMRS DC38154 and DC38153]

of CaN-3a at Callanish Leobag. There, after an initial clearance in the birch wood, there was a short term increase in the hazel pollen curve. At the same time the Plantago lanceolata and the Compositae lig pollen increased firmly and there was a development towards the agriculture of zone CaN-3ai.

Removal of soil revealed a somewhat more consistent turf line 316c. It lay above natural green clay (here numbered 384). It was patchily preserved, with a corresponding thin brown mineral soil, and may have been diachronic. At the same level as the turf line were patches of yellow clay (Illus 9.157).

This turf line 316c lay largely under the cultivation bed, although a patch of it extended from under that area southward, diminishing from 0.4 to 0.2 m wide, into the position of the southern trough.

Short ard, hoe or spade marks were visible in the yellow clay and brown mineral soil in the south-eastern part of the area, and a single mark was found in the mineral soil in the northeast part of the area under 316c. Judging by them a tool with a blade about 16 cm wide was used.

9.9.9 The northern trough

Only a small part of the northern trough was revealed so its width was not determined. It appeared to be more a shallow depression than a cut drainage channel. Turf line 316c was present in the NE part of the area under the position of the

Illus 9.147 Area DIII with patchy discolorations overlying natural on 9 May 1980 [Film 1980.6.20]

Illus 9.148 The east end of DIII with exploratory slot trench on the right [Film 1980.14.13]

Illus 9.149 The west end of DIII with exploratory slot trench on the left [Film 1980.14.12]

trough (Illus 9.157), showing that it had filled up after a turf line had formed.

9.9.10 Discussion of Cultivation bed 4 in DII

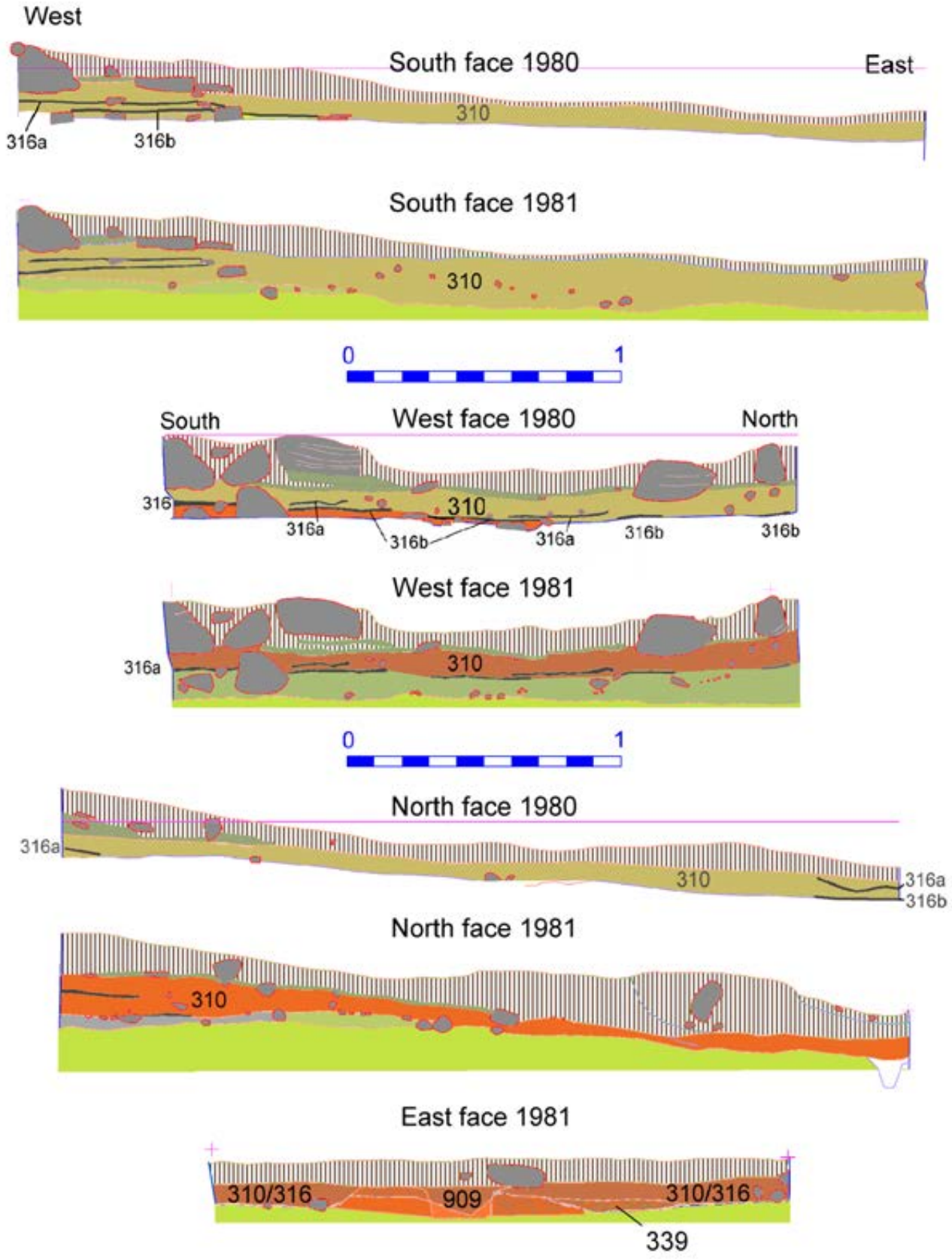
The best interpretation of the evidence is that there was a cultivation bed and parts of two flanking troughs in DII. The bed stopped between one and three metres outside the western circuit of the later ring of stones. The ring may purposefully have been placed just inside an area of earlier cultivation. Alternatively, although this interpretation is not the preferred one, the area to the west of the ring was used only later for flat field agriculture which left behind it a mineral soil indistinguishable from the latest soil in DII.

This was the most thoroughly investigated fragment of cultivation bed on Area D, if one excepts the adjacent remains in Area DIV which would not have been recognised for what they were without the evidence from Area DII. It suggested a wavelength of about 1.5m for the cultivation bed system. The bed seemed to be oriented at most a few degrees north-north-east of the sides of the excavation trench.

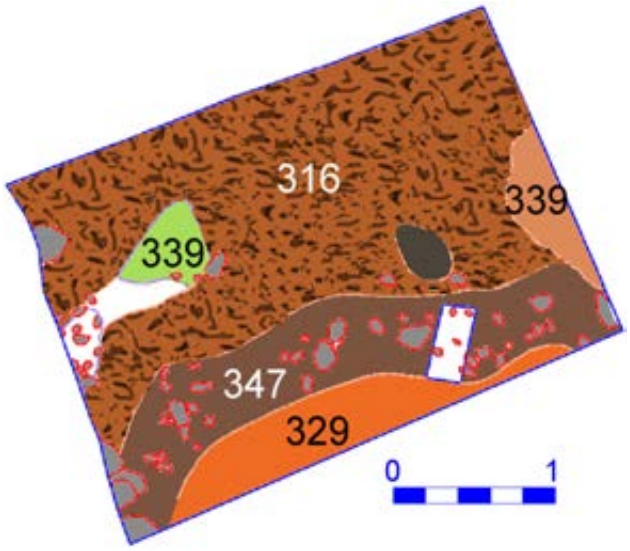
The irregularity of the southern trough suggests that it was not freshly created. It seems more likely that soil had eroded into it and that it had been cleaned out at least a few times and perhaps several or many. The small stones 348 had probably been thrown to one side during cultivation of the lower soil variant of 316, and brown black greasy soil 347 developed among them, possibly as a residue of hoed weeds. The greasy nature of brown black clay 347 suggests that it was essentially the same as the black turf line 316b, except that it had formed over the stones 348 rather than over the mineral soil which underlay the turf line elsewhere. However it may instead reflect decomposition of weeds and other organic debris thrown to the side of the cultivation bed. The yellow clay 951 in the south trough may have accumulated through run-off of a very fine clay component.

If the tool used for cultivation of Bed 4 had a blade 16 cm wide it was probably made of wood. No schist or slate tools have been recorded from pre-Victorian contexts in the area and an ard, spade or hoe made of gneiss would have been very bulky. A hoe or spade is more likely than an ard because the marks in basal levels were short and because the breadth of the bed in DII was close to the optimal breadth (c. 1.3m) for modern hand-cultivated raised beds, allowing soil preparation, weeding and cropping without stepping on the seed bed.

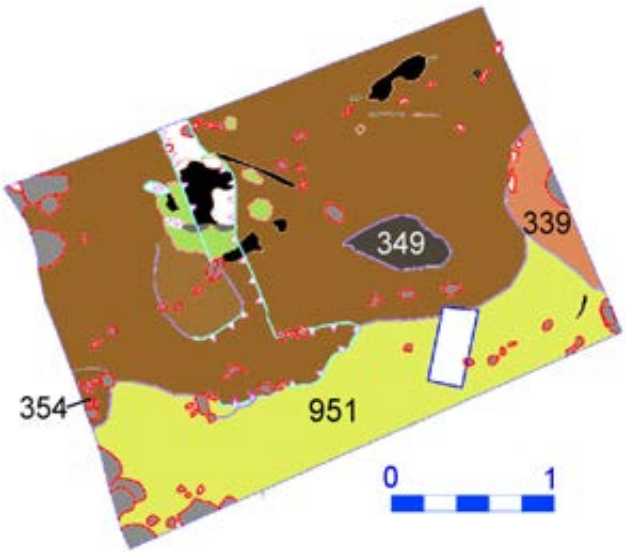
The upside-down turf 379 including clean green clay subsoil suggests that the pasture from which it was dug out must have been growing directly on subsoil. Perhaps the turf reflected grassland undisturbed since plants first started to grow in the area, or perhaps fairly recent activities in the vicinity had stripped all but a thin layer of soil from the subsoil. Because the pollen in the turf (Sample 2031) belonged to the beginning of pollen zone CaN-3a the latter explanation seems more likely. Maybe the turf came from ground



Illus 9.150 The baulk sections of Area DII in 1980 and 1981 [Sections 22b, 21c, 22a 85a, 85b, 86a and 86b [NMRS DC38152, 38150, 38151, 38217 and 38218]



Illus 9.151 Plan 32 of 5 May 1981 [NMRS DC38164]



Illus 9.153 Plan 35 of 9 May 1981 [NMRS DC38167]

Illus 9.152 Area DII edge of trough from the west on 5 May [Film 1981.3.36]

which had been stripped during activities associated with digging of the early ditch (Chapter 9.10). The absence of cereal pollen from the sample fits both interpretations. On the nearby area DIV the base of the cultivation bed was composed of relatively unmodified soil layer 904 zoned to CaN-2d, reinforcing the impression that the bed was built very early in CaN-3a.

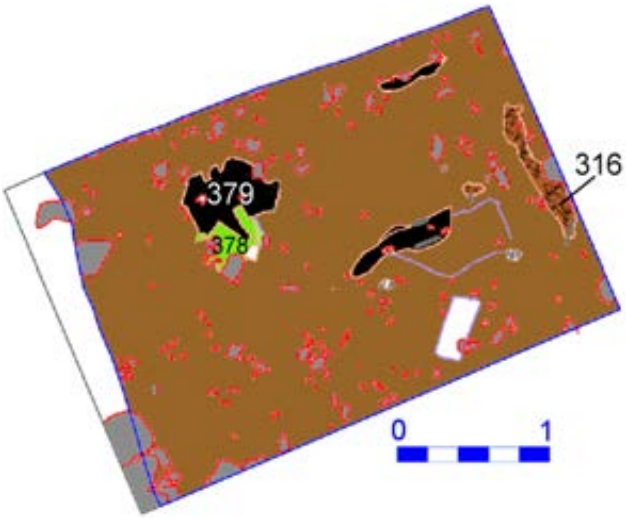
CaN-3a started sometime between 2980 and 2500 cal BC at Leobag. Since the sample appears to have belonged immediately before the cultivation began that provides a starting date for the system of cultivation beds.

When the bed went out of use turf line 316b formed. The reddish clay 329 would then reflect disturbance, perhaps by flat cultivation (the upper soil element of 316) or by levelling, because the soil of 316 between the two turf lines seems to have been widespread but in places extremely shallow (30 to 50 mm, or if the thickness of the turf line which developed in it is included, 50 to 80 mm). The beaker sherd in it suggests a date in the later 3rd or earlier 2nd millennium BC.

9.9.11 Cultivation Bed 4 in Area DIV

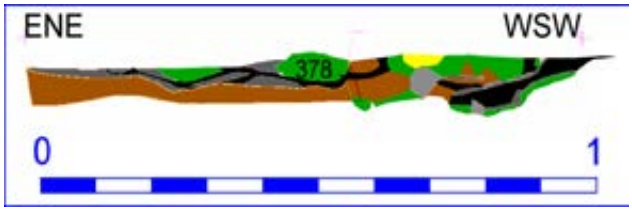
The cultivation bed in DIV was represented by orange gritty clay 903 and humus-rich grit 904. The turf-rich material was described during pollen analysis as peaty, perhaps reflecting a mossy component.

The dip in the top of 903 at the left corresponds to the southern trough in DIII and the northern trough ought to be at or just beyond the north end of the section. That suggests that the northern part of 394 might be filling an intrusion related to



Illus 9.154 Plan 51 of 15 May 1981 [NMRS DC38183]

Illus 9.155 The east end of DII on 15 May 1981 [Film 1981.9.3 and 1981.9.4 joined]



Illus 9.156 Sections 53 and 59 of 16 May and 20 May 198, juxtaposed [NMRS DC38185 and 38191]

erection of the central monolith or to events after erection rather than forming part of the cultivation bed. That suspicion is confirmed by pollen analysis.

Three Kubiena box samples were taken from section 102a, the west baulk of Area DIV. The pollen zones were compared with those in the radiocarbon-dated Calanais Leobag columns CN-3 and CN-1 to establish a local chronology (Illus 9.158).

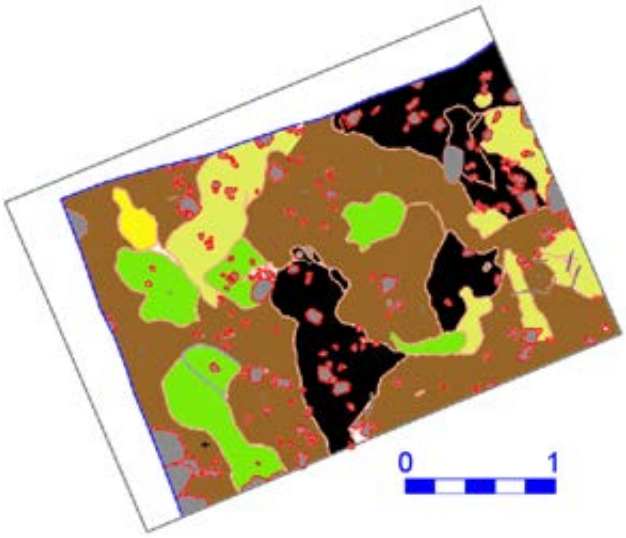
The bottom 2 or 3cm of soil 904 was zoned to CaN-2d, a zone in which cereal cultivation was absent in the Calanais Leobag reference column. The top 5cm of soil 904 included cereal pollen and a diverse herb vegetation and was zoned to CaN-3ai which started sometime between 2980 and 2500 cal BC at Leobag. The bottom 3 cm of layer 394 was zoned to CaN-3aii, a period of mixed cereal growing and pastoralism which started at some date between 2750 and 2300 at Leobag. The top of layer 394 and bottom of 375 included cereal pollen and was zoned to CaN-3b, a period which started at some date between 2560 and 2200 cal BC at Leobag.

9.9.12 Interpretation of cultivation bed 4 and troughs

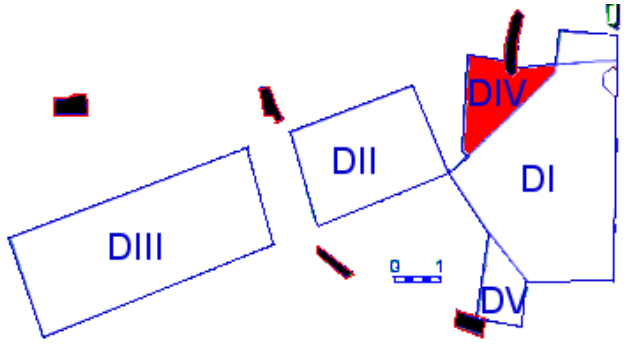
The cultivation bed in DIV was the continuation of that found in DII. The base of layer 904, zoned to CaN-2d, was made up of relatively unmodified soil and clay earlier than the cultivation beds. The rest of layer 904 formed an actively tilled part of the cultivation bed. Its southern trough was the slight declivity in 903 filled with soil 375 which covered the bed at a higher level on Plan 52 (Chapter 9.8 Illus 9.133) and Plan 56 (Chapter 9.8 Illus 9.136).

Some of the apparent patches of turf line in Section 102A may have been stray turfs; soil 394 probably represents turfs and soil stripped at the beginning of digging of the monolith pit. The pollen from the lower part of 394 was interpreted as characteristic of the change from pollen zone 3ai to 3aii, which happened sometime between 2750 and 2300 cal BC at Leobag. The monolith may have been erected close to the beginning of this period.

Soil 375 filling the trough south of layer 904 and running over 394 may as the pollen zoning suggests belong in CaN-3b, which started sometime



Illus 9.157 Plan 57 of 18 May 1981 [NMRS DC38189]



Key Plan DIV

between 2560 and 2200 cal BC and ended around 1900 to 1600 cal BC. It was probably in part contemporary with plough soil 315 on Area DI.

The evidence from DIV has lessons for identification of beds in DI; for if Area DIV had been ploughed in the second millennium BC the remains would have been difficult to interpret (Technical Note 9.9.14).

9.9.13 Introduction to the cultivation beds on Area DI and DV

The remains of cultivation beds on Area DI were not visible on a photograph of the soils under the old ground surfaces 334 and 365 taken on 5 June 1981 (Illus 9.159). The obvious features were slots under the cairn and a curving ditch to its south. Certainly by 5 June some of the cultivation bed soils had been removed by excavation. A rise in soil at the base of the east baulk may represent the gritty soil ridge 388. But the cultivation beds had probably been flattened by subsequent cultivation or grading before the Ring was built (there was evidence for such cultivation or grading on Areas C and H).

Nevertheless, as the descriptions below reveal, the beds and the troughs between them explained some curious features of Plan 94 (Illus 160). The apparent abrupt change in direction of slot 913 (the southern slot under the cairn) was probably due to a trough between Beds 2 and 3. The equally odd change in direction of Ditch 921 is best explained by the presence of a later trough. The confusing mass of intermingled turf lines and thin grey soils above the east part of ditch 921, described below, may also in part be due to the presence of the cultivation bed system.

Other problems take on a new light in the context of near-basal cultivation beds. A change near the base of the SW chamber orthostat between solid natural looking material and turf lines 905 and 912 a little further south may in part at least be due to the transition from a trough to a bed.

The evidence in DI will be discussed from south to north, Bed 1 to Bed 4.

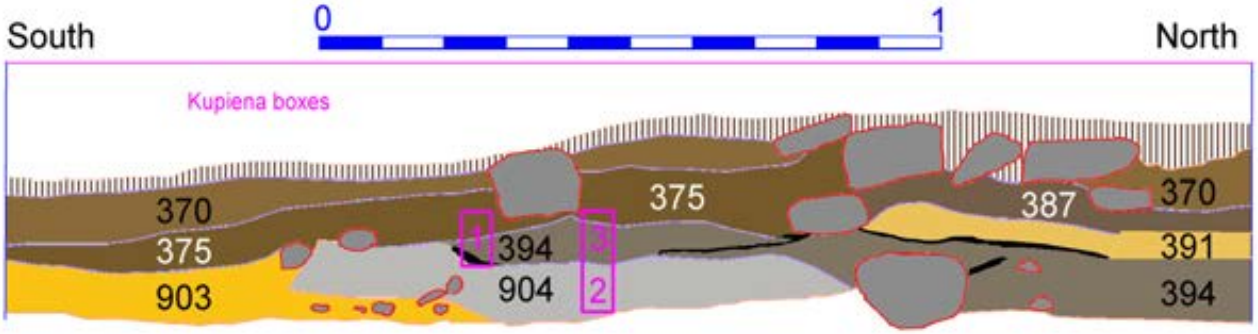
9.9.14 Bed 1, the southernmost bed

Bed 1 underlay the south baulk On Sections 95a and 95b it was represented by grey gritty bank material 946, which was very similar to clay 388 of Bed 2. It was directly overlain by the lower part of turf line 365, over which some of 946 six had spilt. A slightly higher expression of turf line 365 overlay the spill.

The fill of the pit at the base of Ring stone 47 was not shown on the sections and 946 may have continued further south than shown.

Four Kubiena box samples were taken from it (Section 105 boxes 4 to 7 Illus 9.162). The boxes formed two short profiles. The pollen zones were compared with those in the radiocarbon-dated Calanais Leobag columns CN-3 and CN-1 to establish a local chronology. Full details are provided in Chapter 21: Pollen.

The details of the section in Illus 9.162 differ from those on the original section drawing; they



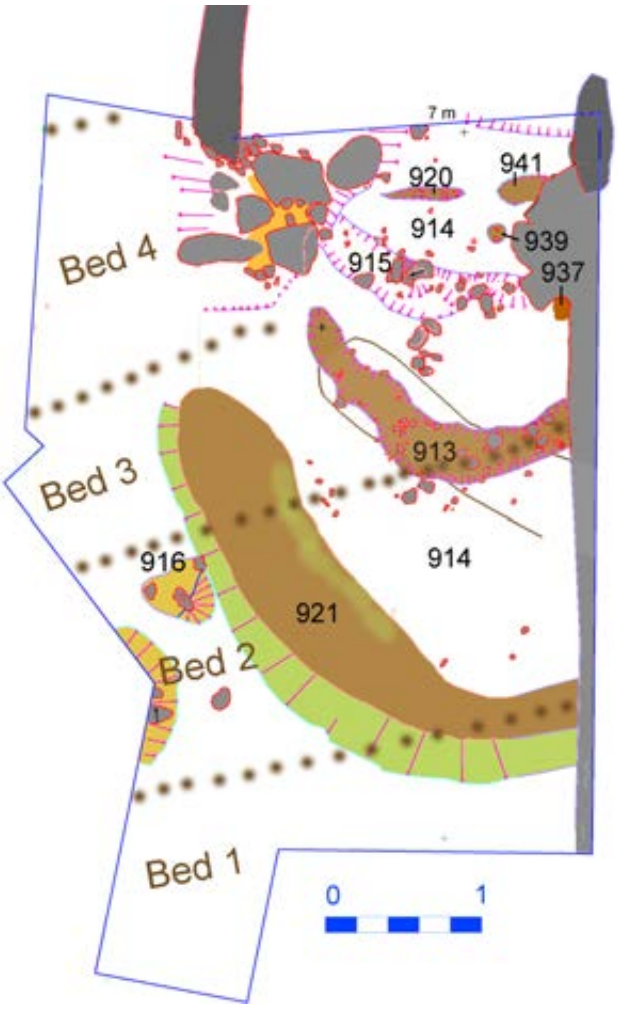
Illus 9.158 Section 102A with Kubiena boxes 1 and 3-2 marked

Illus 9.159 Early features on 5 June 1981 [Film 1981.20.7]

were modified using photographs taken just before sampling (Films Po1 and Po2). The differences no doubt reflect cutting-back of the section for sampling. The original labelling has been revised (Technical note 9.9.16).

The pollen zone sequence was very similar to that on Area DIV, described above. .In Kubiena boxes 4 and 5 the basal 3cm of the lowest level 946 was zoned to CaN-2d, and was made up of relatively unmodified soil and clay earlier than the cultivation beds. The top of 946 formed an actively tilled part of the cultivation bed and its pollen varied from CaN-3ai and 3aii. The uppermost turf line and layer 950 had pollen characteristic of CaN-3b which started sometime between 2560 and 2200 cal BC and ended around 1900 to 1600 cal BC.

In Kubiena boxes 6 and 7 the basal turf line and the soil immediately it were both zoned to CaN-2d. The upper turf line and the base of clay 950 were zoned to CaN-3ai. Most of layer 950 was zoned to CaN-3aii but its top reflected the



Illus 9.160 Reconstruction of cultivation beds on plan of early features Plan 94 [NMRS DC 38226]

transition to CaN-3b sometime between 2560 and 2200 cal BC. So did a turf line on top of 950 and under plough soil 315 which had not been recognised when the section was drawn and was not observed in plan when the area had been excavated.

9.9.15 Discussion of Bed 1

In essence Section 105 cut at a shallow angle along Bed 1. Indeed, that had been the interpretation from the archaeological evidence but it was not possible to understand the detail until the pollen report was fully into account during post-excavation work.

The two columns thus sampled layers at different levels of the cultivation bed. That helps to explain why the soils zoned to CaN-2d were at a lower absolute height in Boxes 4 to 5 than they were in boxes 6 to 7.

Layer 950 on Illus 9.162 was at the same stratigraphic level as ginger-brown clay 320 on the area south of the cairn, which was criss-crossed with ard marks. However the distinctively coloured clay 320 was not present at the section; layer 950 can nevertheless be seen as a variant of it.

A turf line (or at least a humus-rich band of material) identified during pollen analysis appeared to be lie between the plough soil and the underlying layer 950, although it was not noticed during excavation. It may have been very patchy, it will certainly have been disturbed by ard cultivation of the overlying soil, and it may have been sufficiently similar to the plough soil to have been confused with it during excavation.

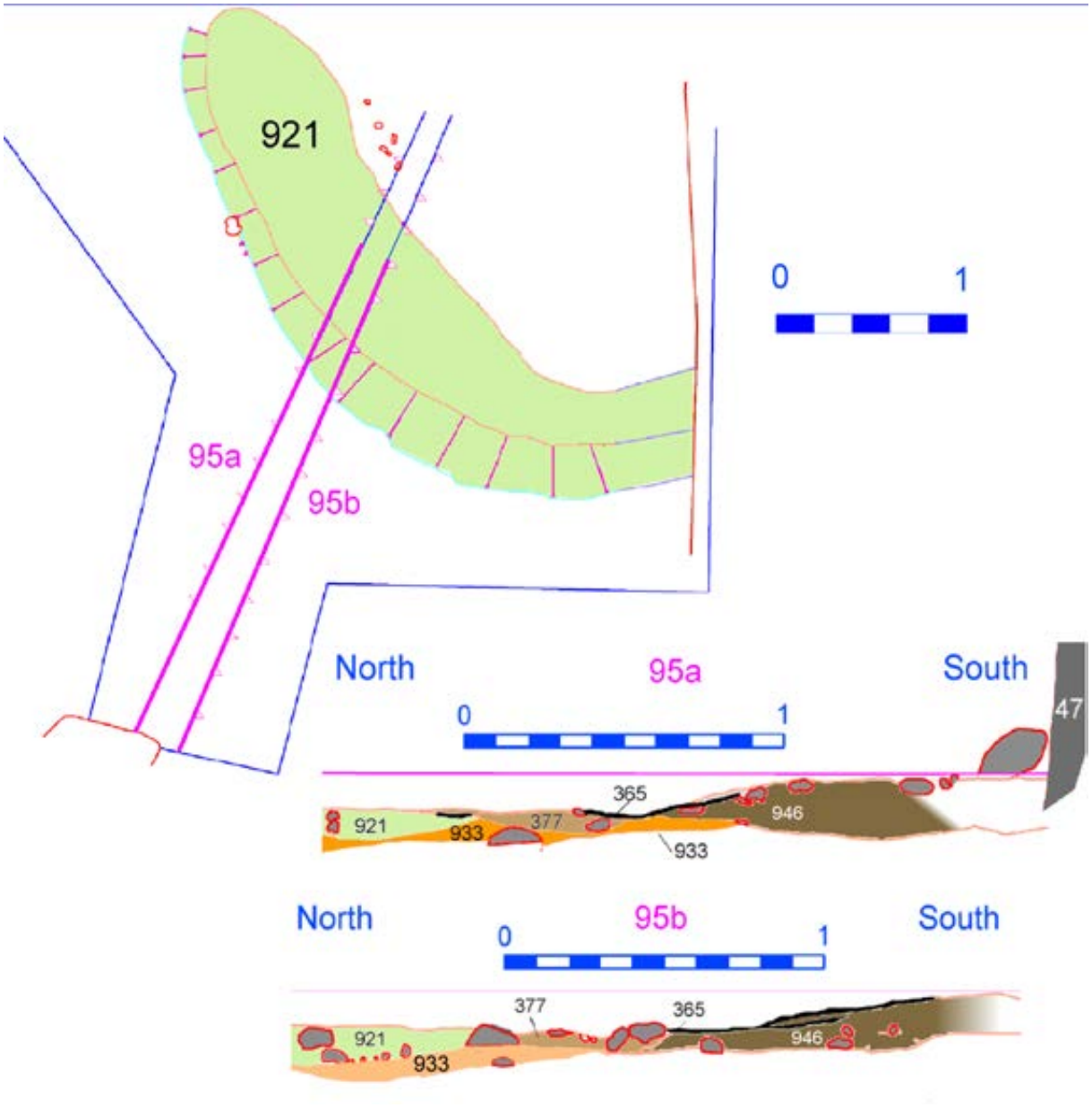
The archaeological dating for the plough soil is much the same as the CN-3 column dating to late zone 3b to zone 3c. That contrasts slightly with the zoning in the Kubiena boxes but the latter is confirmed by a spot sample from 315 on the main part of DI to CaN-3b. Variations within a plough soil can be expected.

9.9.16 Cultivation Bed 1 in Area DV

The lowest level reached in DV, which was not fully excavated, was brown gritty clay 945 near the base of Ring Stone 47 (Illus 9.163). The clay was visually and texturally similar to 946 on Section 105 (Illus 9.162) and to 388, the clay forming the next bed north (Bed 2). Clay soil 945 probably formed the highest surviving level of Bed 1. The socket for Ring Stone 47 cut through it, removing the northern half of the cultivation bed. It was partly overlain by the composite turf line 365, the well-formed turf lines in the south of Area DI (Illus 9.161-9.162).

9.9.17 The trough between Beds 1 and 2

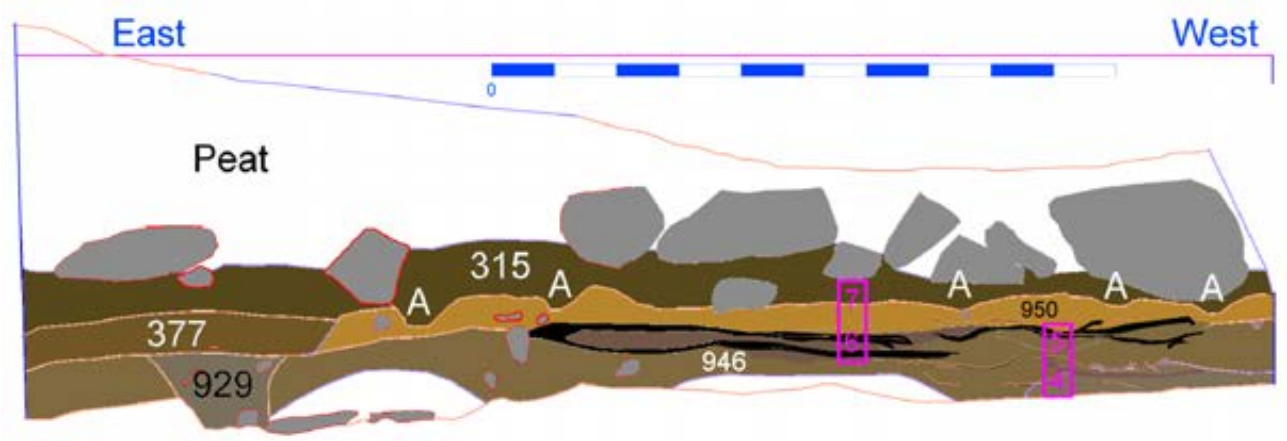
The chocolate coloured clay labelled 377 on Illus 9.161, but perhaps not identical to 377 in the eastern and southern baulks (Illus 9.162) may well have filled the trough between Bed 1 and Bed 2. It overlay the ditch fills of Ditch 921, and if it was a trough fill it confirms that the ditch was earlier.



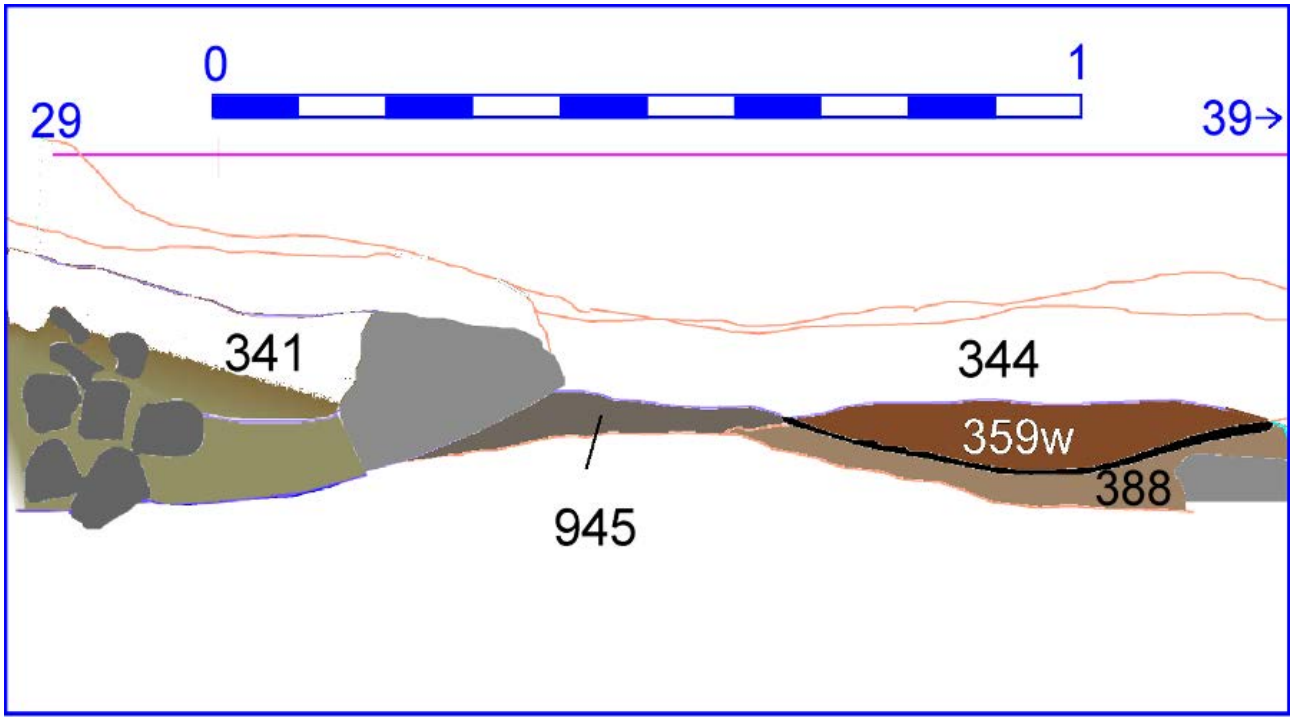
Illus 9.161 Bed 1 on Sections 95a and 95b [NMRS DC38227 and DC38228]

The trough between Bed 1 and Bed 2 was probably represented by the dip covered by a turf line under layer 359w on Section 102c. Its presence would explain the curious sharp change in angle of Ditch 921 as planned on Plan 94 (Illus 9.160). The apparent sharp change in angle may have been due to mistaking this trough for part of the earlier ditch fills.

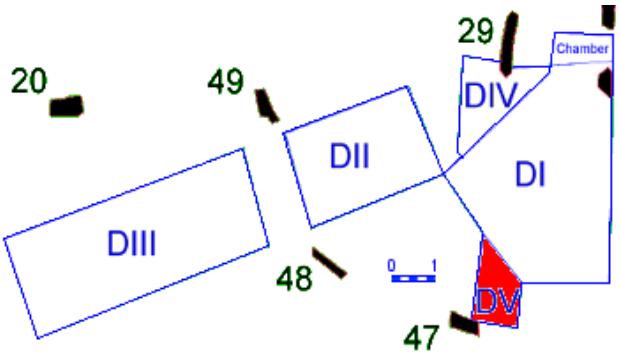
On the east baulk the depiction of the ditch 921 on Section 62 did not match up neatly with the plan and may have been over-simplified (Illus 9.164-9.165). In Illus 9.165, a photograph taken from the north-west, there is a fairly strong suggestion of a trough at the north edge of ditch 921. The fills to the left of the cut of a column-sample with a white tag in it probably represent a trough and turfs, all eventually sealed by the lower variant of turf line 365. There were more thin turf lines and silty grey layers than in the drawing of Section 62 (Illus 9.164). These layers, labelled 396s during post-excavation, are discussed below in the context of Ditch 921.



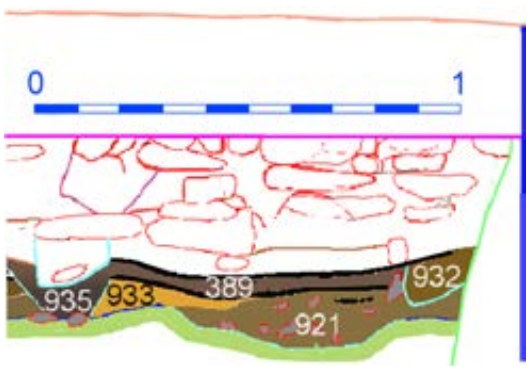
Illus 9.162 Part of section 105 with Kubiena boxes 5-4 and 7-6 marked



Illus 9.163 Part of east facing Section 102C of DV on 9 June 1981 [NMRS DC38236]



Key Plan DV



Illus 9.164 South end of Section 62 [NMRS DC38194 part]

Illus 9.165 South end of Section 62 [Film 1981.21.28 part]

9.9.18 Discussion of the trough between Beds 1 and 2

In this interpretation the rising layers to the left are on the southern slope of Bed 2 and those to the right are on Bed 1, lying over the fills of ditch 921.

However, this is a slightly contentious interpretation because of the complexity of the layers. The evidence from DV is not unambiguous because we did not excavate the lower levels, although the gritty materials 945 and 946 did closely resemble layer 388 of Bed 2 and there was clearly a depression between them. It is the sudden change in direction in plan of what had been interpreted as Ditch 921 (Illus 9.161) which I find the most convincing evidence for the presence of a trough between Beds 1 and 2

9.9.19 Bed 2

Bed 2 was always an obvious ridge of gritty clay 388 on Area DI, truncated by later activities but persisting across the area. Illus 9.166 shows the southern part of the area from the west after removal of most of the turf lines 344 and 365. Partly obscured by the shadow of a Ring stone of the photograph, grey-brown gritty clay soil 388 appears as a lighter band beyond the change in angle of the west (foreground) baulk. The bulk of the bed was made of 388. With the eye of faith trough between Beds 1 and 2 can be seen to its right.

To its left in the foreground a sub-square depression 901 which contained a stone setting at a higher level is the most prominent features but, again with the eye of faith, a possible trough can be seen on the left edge of Bed 2 running towards the east baulk.

In Section 62 chocolate brown clay 377 overlay gritty soil 388. To the right it was cut by Pit 935. It looks as if clay 377 was at this point the topsoil above 388.

The bed and the trough to its north are also discussed in the description of Ditch 921 below where in essence a section through the area of the bed shows simple fills while that through the area of trough 2-3 shows complex interleaving turf lines and associated soils.

9.9.20 The trough between Beds 2 and 3

Bed 2 was cut to the left by slot 913 in Section 62. One of the curiosities of the recording of slot 913 is the sharp kink shown in it near the east section on plan 94 of the lower levels (Illus 9.160). Higher up it appeared to run straight into the east baulk.

9.9.21 Interpretation of the trough between Beds 2 and 3

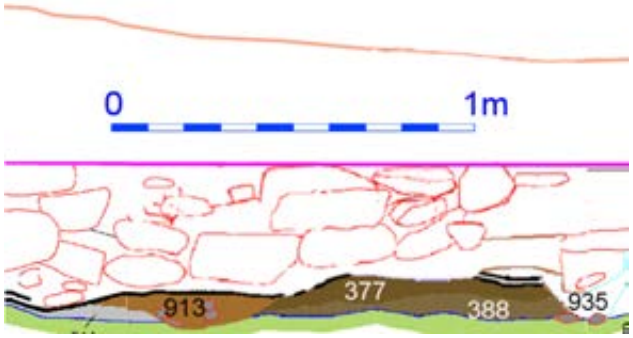
Its appearance on plan can be explained if its eastern part had been confused with the earlier trough between beds 2 and 3. The trough probably coincided fairly closely to the depiction of Slot 913 on Section 62 (Illus 9.168). As with the trough between Beds 1 and 2 it is the kink in plan of the overlying feature (here slot 913) which provides the most convincing evidence for its presence.

No relevant evidence was noted in the west baulk section.

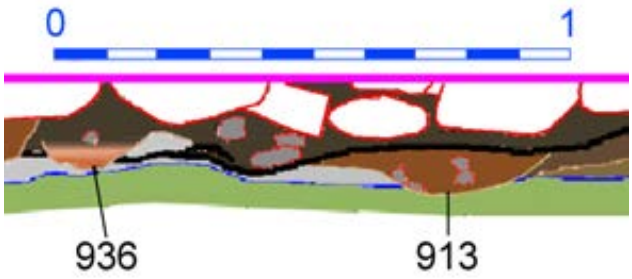
9.9.22 Bed 3 and the trough between Bed 3 and Bed 4

On Section 62 there was a perceptible albeit irregular rise in the subsoil to the north of slot 913 (Illus 9.168). In this area silty grey soil 914 might also have reflected its presence but the northern parts of layers 911 to 914 were not drawn, despite being noted on section. The rise may reflect the presence of Bed 3. If there had been a regularly

Illus 9.166 Area D around 25 May 1981 [Film 1981.14.11]



Illus 9.167 Bed 2 beneath the Victorian kerb stone F4 on the east baulk Section 62 [NMRS DC38194 part]



Illus 9.168 The trough between Beds 2 and 3 on the east baulk Section 62

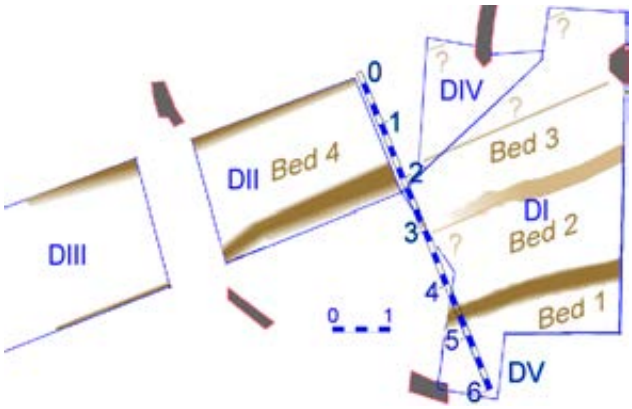
orientated trough north of Bed 3 it should have reached Section 62 near the chamber orthostat (Illus 9.170). No useful information was observed in plan perhaps because the excavation was taken down to subsoil only in a narrow slot by the baulk to allow drawing of Section 62.

9.9.23 Bed 4 in Area DI

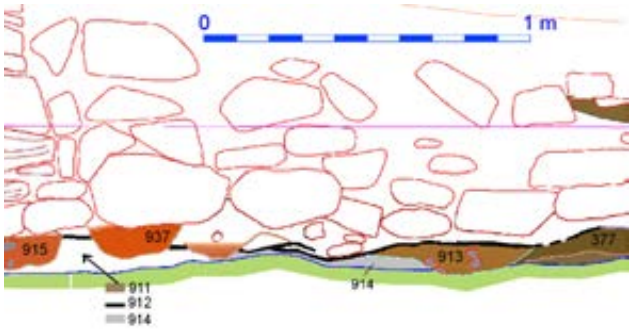
Bed 4 was well attested in Area DII and the remains in DIV suggest that it continued eastward until it was cut by the central monolith pit. No evidence attributable to the presence of a cultivation bed was observed east of the monolith for the area was largely occupied by the chamber, which had been cleaned down to well below the top of neighbouring subsoil.

9.9.24 Discussion of the beds and troughs

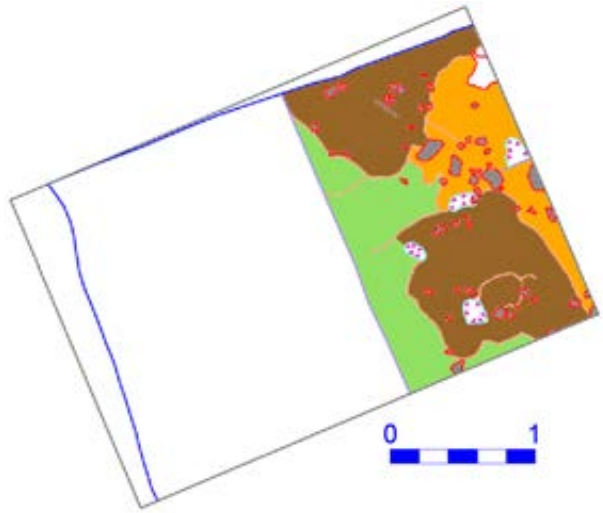
The depiction of cultivation beds on Illus 9.170 relies heavily on interpretation rather than direct



Illus 9.170 Interpretation of the cultivation beds and troughs



Illus 9.169 Bed 3 on Section 62



Illus 9.171 Plan 73 of 26 May 1981 [NMRS DC38205]

Illus 9.172 Clay wedge and depression 909 on 29 May 1981 [Film 81.17.2]

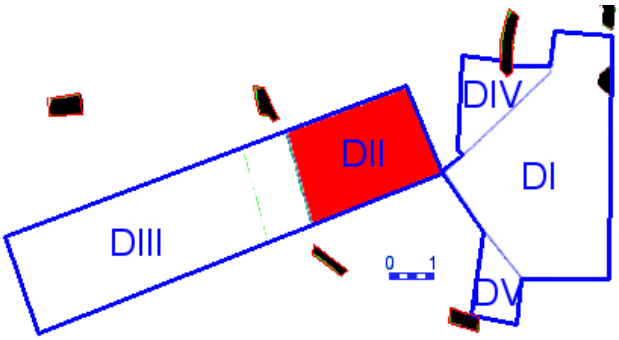
observation. The troughs were shallow broad declivities and often not seen in plan, perhaps because the bottom 0.1m of deposits in this area was not excavated. Official duties prevented a third season. The best prospect of a firmer plan of the cultivation beds lies in future excavation of this and adjacent areas.

The cultivation beds were made of turf, soil and clay, presumably along with other stuff added to improve its fertility. The conclusion from analysis of the pollen in the Kubiena box profiles on Area D is that their use started right after the end of CaN-2d and thus the cultivation beds dated to the start of zone CaN-3a. This started somewhere between 2980 to 2500 cal BC. The Ring and chambered cairn were subsequently built in the same pollen-defined period. Cereal pollen showed two successive maxima in Bed 4. If the archaeological interpretation is correct then these peaks may reflect turning over of the cultivation beds rather than a true chronological succession (Technical note 9.9.23).

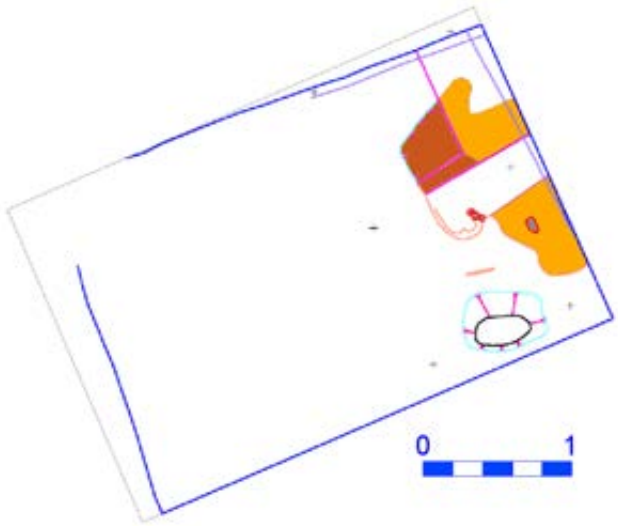
The correlation of the turf lines with increases in heather suggests that there was no attempt to maintain grass cover locally. While there is no proof that the heather was allowed to become shrubby, that and the relatively good preservation of Bed 4 in sub-area DI suggest that the area inside the Ring to the west of the central monolith was not heavily used.

9.10 Phase 4: Early features

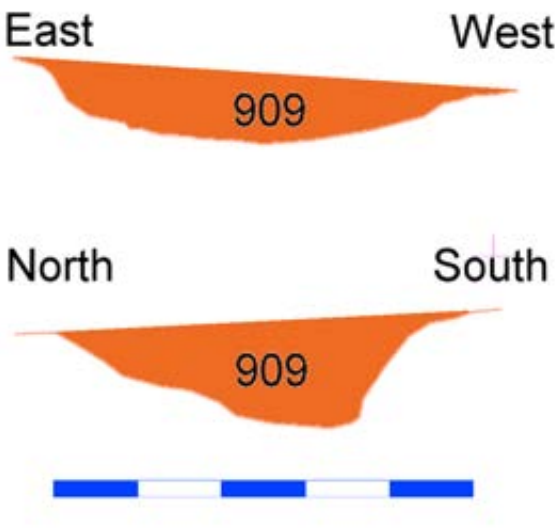
The pre-cultivation bed features on Area D consisted of piles of orange clay and the remains of a shallow curving ditch.



Key Plan DII



Illus 9.173 Plan 99 of 31 May 81 [NMRS DC38232]



Illus 9.174 Profiles 86 of pit 909 [NMRS DC38218]

9.10.1 A pile of orange clay and a pit in DII

In the easternmost part of DII, partly under turf line 316c, was a low pile of orange clay 339c lying directly on the natural green clay (Illus 9.171). In it a shallow feature (909), measured 0.6 x 0.6 x 0.1 m deep (Illus 9.172-9.174). The top of this hollow was filled with gingery soil, similar to the mineral soils underlying the turf lines.

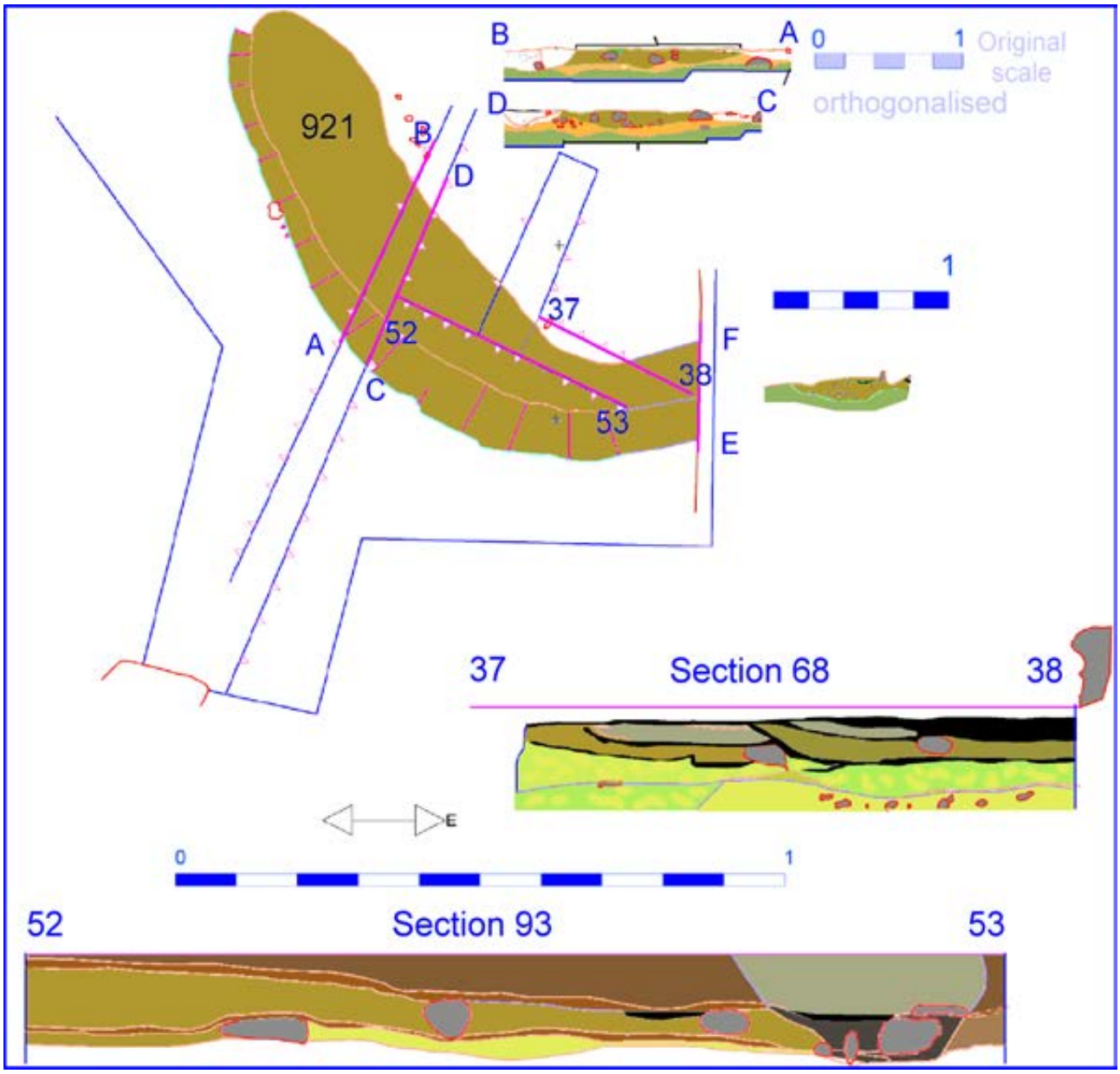
Its top was truncated by soil 310. Feature 909 may have been merely a variation in the top of a low pile of clayey soil. The lowest level of this of clay was widespread at the east end of the area, and underlay part of the lowest turf line 316c. It persisted below clay soil 310 in section (Illus 9.150 East Face).

9.10.2 Discussion of the pile of orange clay and pit in DII

The clay mound at the east end of DII was preserved under the cultivation bed. Its presence may have been related to that of similar basal clay 903 in Area DIV between it and the central monolith. It was presumably a disturbed and oxidised version of the subsoil. It supports the idea discussed above that areas had been stripped of turf at some stage before the cultivation bed was made, for there was no turf line underneath it. The stripping may have been associated with the early ditch 921 found in Area DI.

9.10.3 Ditch 921

Ditch 921 appeared soon after the overlying turf lines 334 and 365 had been removed. In the interpretation preferred here it pre-dated the cultivation bed system. It was just over 0.5 m wide at the east baulk and at most 0.8 m wide; it survived to a depth of up to 0.15 m. As planned, the ditch ran approximately west from the east baulk of DI (Illus 9.175). It was about 3.7 m long and curved to run about 30 degrees west of north and apparently stopped about 1.5 m south of the later Monolith 29, and 0.5 m south of the south edge of the pit dug for the monolith. This part of it was not excavated.



Illus 9.175 Section 68 of 23 May 1981 along edge of ditch 921, Section 93 of 3 June 1981 along its middle, and extracts from Sections 95a and 95b [NMRS DC38200, DC38225 and DC38227-8]

Approximately transverse sections (A-B and C-D (Technical note 9.10.3a)) showed a clay fill with a few small stones (Illus 9.175). Here the top few centimetres of the natural clay below the ditch had been oxidised to a dirty orange colour. A label 947 was assigned to this oxidised clay during post-excavation.

Section 68 (37-38) shows Ditch 921 cut into green clay and yellow stony clay, both seemingly forms of the natural (Illus 9.175). However this easternmost part seems to have been confused by a later trough between cultivation beds 1 and 2. It seems likely that the plan misinterpreted the north edge of the ditch, taking the edge of a later trough as the true edge. In most places its upper fill was brown greasy clay, but the upper fills to the right on Section 68 were probably turfs and turf lines in the overlying trough between Bed 1 and Bed 2. The section also shows the slight rise in the natural as the section cut across the curving edge of the ditch.

Section 93 (52-53) was more or less along the middle of the ditch (Illus 9.175). Most of the western part of the section was in the area in which Bed 2 subsequently lay. Its fills were relatively simple. In its central portion the ditch had a basal layer of green gritty clay covered by a red -brown band of greasy clay of an even 0.01 m thickness which was overlain in turn by gritty green-brown clay with pebbles, above which was a red -brown greasy layer (Section 93). The thin greasy brown layers at the top and bottom were possibly vestigial turf lines, but the lower one may have been primary silts.

The pit shown at the east end of Section 93 was roughly in the position of a shallow feature 395 under gingery soil 320 and cut into clay 377, interpreted as a possible turf (Chapter 9.3 Illus 9.75 Plan 55, Illus 9.79 Section E-F; Technical note 9.10.3b). An annotation on Section 93 implies that it had an upper infill 396, a number used for the black turf lines and grey soils seen in Section 68 (Illus 9.175).

At the south end of the eastern side of Area DI the ditch was overlain by dirty orange clay 933 on its north edge (Section 62 Illus 9.1764). This wedge of dirty orange clay, which contained no artefacts, seems to have been in part at least the upcast from digging the ditch 921. The latter had originally cut through similar dirty orange clay 947 (Illus 9.162).

A sherd, 4 fragments and crumbs from a pot of indeterminate type were found in layer 396 (Cat 956-960), but there were no artefacts in the fill of the ditch, although two fragments of quartz (81.362 and 81.357) were recorded from context 902, a depression with a fill of brown clay and an indefinite edge which developed into ditch 921 but may have been associated instead with the overlying cultivation bed system.

9.10.4 The natural soil and subsoil

A layer of dirty orange clay was the lowest recognised feature above natural in the south part of DI near Ring Stone 47. It was seen only in the slit trenches within the body of the excavated area which were dug to deepen sections 95a and b (Illus 9.161). This dirty orange clay 933 continued above natural to between 3.1 and 3.3 m north of Ring Stone 47. It was cut by the ditch 921. It was assigned a label 947 during post-excavation.

Stratigraphically, visually and texturally it was similar to the piles of orange clay found on Sites DII and DIII underlying a turf line earlier than the old bed system and as described above overlapping the fills of the ditch. Although there was no turf line directly on the orange clay near Ring Stone 47, there was such a turf line further to the NE on DI. It seems fairly likely that the clay survived north of Stone 47 here only because Bed 2 was built over it. There were no artefacts in the orange clay.

9.10.5 Interpretation of early layers and Ditch 921

Although each instance of the clay 933/947, apart from the upcast over ditch fills in the east baulk, can be interpreted as an in situ modification of the natural it seems likely that different processes formed it in different places.

The most likely explanation for the sequence observed in the south-east part of Area DI is that an original thin soil developed in the natural green clay, in its upper parts probably dirty orange and in its lower part dirty green. This thin soil suggests that it is unlikely that the immediate area, exposed on a ridge, was wooded. Pollen in a roughly contemporary turf from Area DII was zoned to CaN2d, as were the lowest layers exposed in the south baulk section. That zone ended sometime between 2980 and 2500 cal BC.

In late CaN-2d in the Calanais samples birch and hazel-type pollen were relatively abundant. Plantago lanceolata and Compositae lig. pollen values were also relatively high (Chapter 21: Palaeoenvironment). Perhaps the hazel pollen came from plants growing in the lower more sheltered ground either side of the ridge while the ridge top was mainly free of trees.

The shallow ditch (921) was cut into the green clay natural. Spoil from it would rapidly oxidise and turn dirty orange if not sealed. There were no obvious signs of rapid silting. The lack of any sharp transition between the basal grey-green clays and the overlying brown clay of the upper few centimetres of the ditch fill suggests a slow steady process or purposeful filling.

The full plan of the ditch is not known, so its nature and purpose are unclear. At about 0.8 m wide and little more than 0.1 m deep it was not designed to hold upright posts; nor were there any signs that it had a formal bank either inside or outside the ditch. The only hint that it might have had an internal bank is the orange clay overlying its north edge near the east baulk; but as argued above this could have been caused by subsequent cultivation bed building and spreading. Its form and function are discussed further in Chapter 24: Discussion and Conclusions.

9.11 The sequence

A summary of the sequence in Area D is included in Appendix 5.

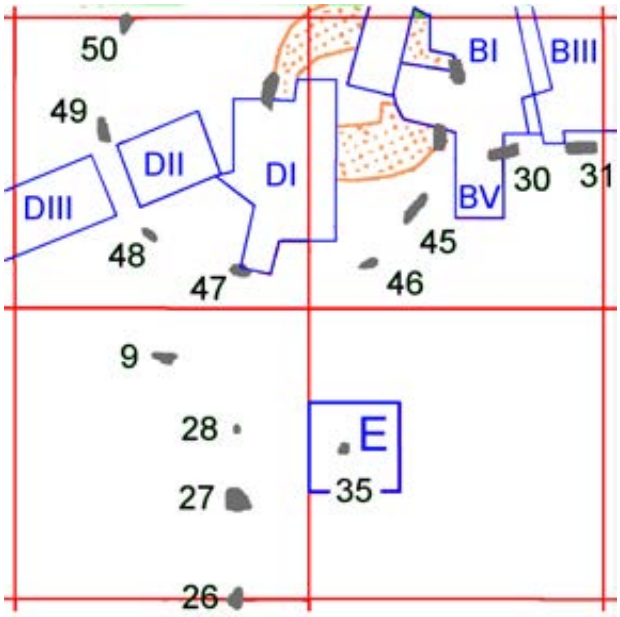
10. Area E

Illus 10.1 Laying out Area E on 30 April 81 [Film 1981.1.8]

10.1 Introduction

Excavation of Area E took place in 1981, supervised by Ian Maté.

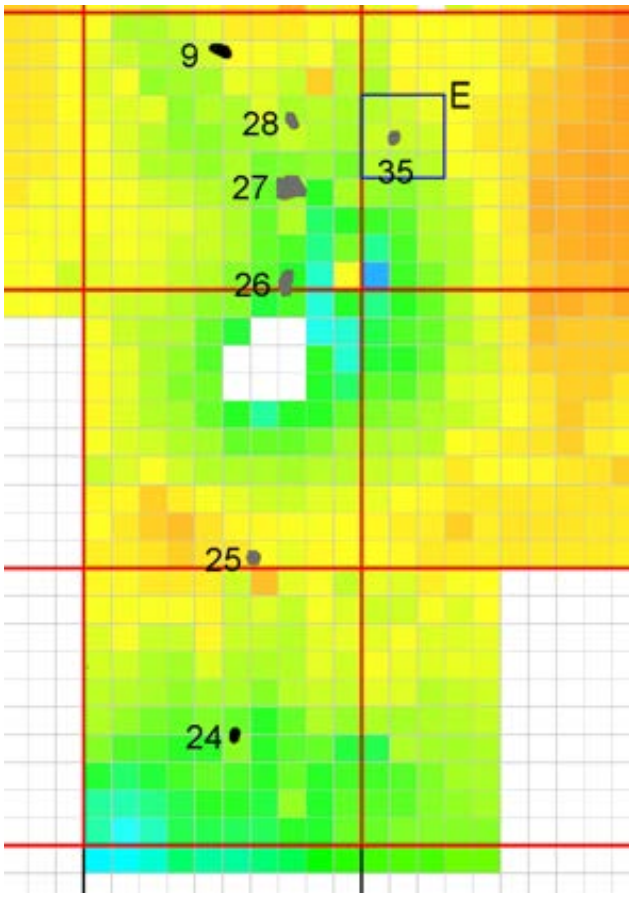
The trench, in its final form a rectangle measuring 3 m by 3 m with a small extension, was placed to investigate Stone 35. The stone had been prone before some date between c. 1860 and 1878. The history of its erection and re-erection is discussed in Chapter 3, Previous Studies. The excavated area included the edge of Lady Matheson's path. It seemed before excavation to have been in an area stripped of peat in 1857 (see Chapter 4 Introduction to the fieldwork).



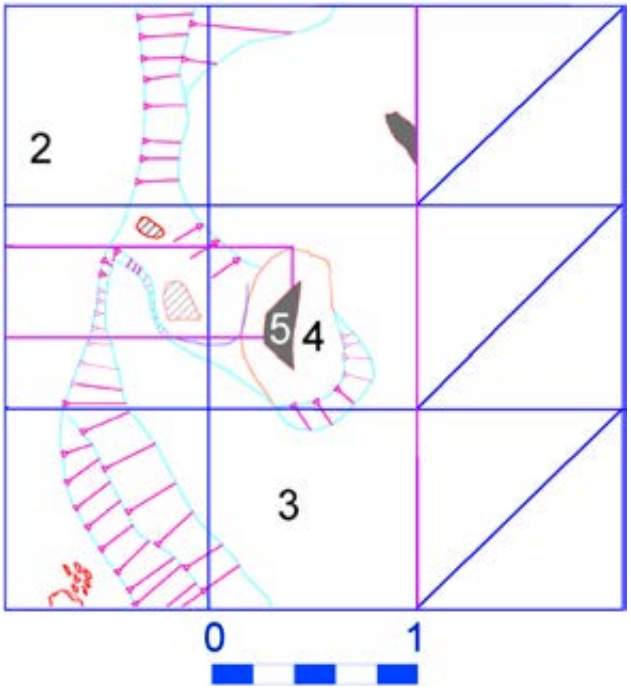
Illus 10.2 Location of Area E

10.1.1 Aims

Our aims in excavating this area were simple. We wished to discover whether there were any prehistoric stone-pits. The trench also offered an opportunity to characterise Lady Matheson's Path more fully, and to see what effect if any it had had on underlying strata. We expected (only partly correctly) to confirm that the area had been stripped of peat by Sir James



Illus 10.3 Resistivity plot at 1m probe spacing (See Chapter 5 Illus 5.13)



Illus 10.4 Topography of the western two-thirds of Area E [Plan 1 NMRS DC38240]

Matheson's workers and that the area under the path should not have suffered from modern soil processes, providing us with an opportunity to discern the effects of the latter east of the path.

10.1.2 Resistivity

In illustration 10.3 the areas coloured green and blue to the south west of Stone 35 mostly correspond to places where rock was near the surface, those coloured yellow correspond to prehistoric soils lying over clay and the areas coloured brown mostly correspond to those on which peat survived to an appreciable depth after the clearance of 1857. Thus Area E lay at the junction between a predominantly rocky area and a predominantly clay-covered area.

10.1.3 Layout

The area was opened in stages. Initially it measured 3m north-south and 2m east-west, and a temporary baulk was maintained between Stone 35 and Lady Matheson's Path. The eastern third of the area was also opened in stages. Towards the end of excavation a small extension was dug north from the north-west corner of the trench, by this time 3m by 3m square.

10.1.4 Context numbering

On the plans and sections the feature numbers, ranging from 1101 to 1151, have been simplified; they run from 1 to 51. The full numbers have been retained in the text.

10.2 Victorian and later features

The main features visible when the area was laid out were Lady Matheson's Path 1102, a flattish area of plant-covered peat 1103 with some surface stones, and the standing stone 1105 with its surrounding mound 1104 (Illus 10.4).

10.2.1 Topsoil and superficial peat

The turf and shallow soil 1101 contained a piece of quartz (81.5), a dressed stone (81.3) and glass

(81.661). Under it were recently grown peat 1103, parts of the make up for Lady Matheson's Path, the mound round the base of Stone 35 and, in places, jagged and uneven bedrock (Illus 10.4).

Under the turf away from Lady Matheson's Path peat 1103 covered the area. Some of it had grown since the peat clearance; but in places it may have been ancient peat modified by grass roots and soil fauna. Three pieces of cement (81.133 and 81.549), 4 pieces of quartz (81.133 81.527 and 81.587) and a piece of limpet shell (81.586) were found in it.

10.2.2 Standing stone 35

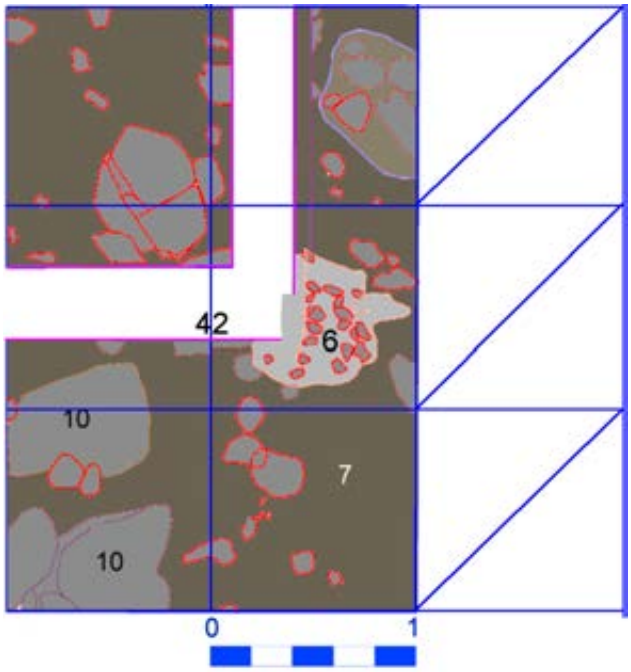
Stone 35 was grey, black and white, with a clear grain and some large crystals. Most of the stones of the Ring, the East Row and the South Row included pink components. Thus Stone 35a stands out as probably having a slightly different geological origin from most of the nearby standing stones; but in this area of glacial till and diverse outcrops that need not translate into a vastly different geographic origin. The fit of its two parts was good, but they were bleached different colours from each other (Illus 10.5).

Its base was 0.3m long and its maximum width was just under 0.2m. It had been broken at some point; Illus 10.5 shows that the repairs were sound.

The mound round the base of the standing stone was little more than a thickening of the topsoil with some interleaved modern peat. Under the standing stone a bowl of concrete 1106 filled the top of stone-hole 1109. Small stones had been set

Illus 10.6 Concrete bowl 1106 under the standing stone with boulder 42 to its left [Film 1981.4.29]

Illus 10.5 The concrete fill of stone pit 1104 from the south-east [Film 1981.1.23]



Illus 10.7 Plan 2; concrete 1106 in hole 1109 [NMRS DC38241]

Illus 10.8 Bedrock outcrops and removal of the concrete in stone hole 1109 on 12 May 1981 [Film 1981.6.29]

Illus 10.9 The stone hole for Stone 35 emptied, from the south on 14 May [Film 1981.8.8]

in the edge of the concrete (Illus 10.6 - 10.8). On Illus 10.7 a boulder 1142 is largely in the temporary baulk.

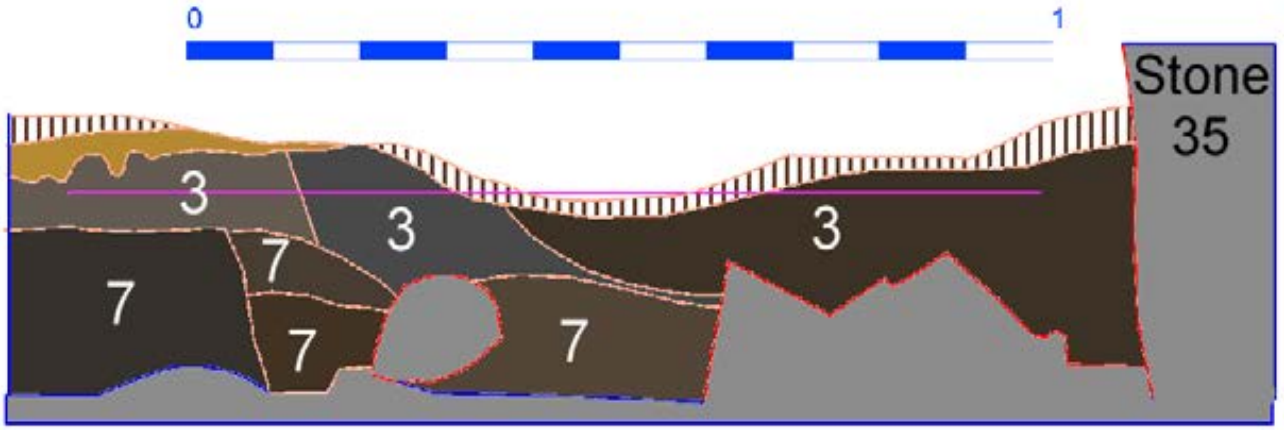
The bottom fill of the hole was a mix of soil and peat (Illus 10.9).

On Illus 10.10 the south face of the east-west temporary baulk on Illus 10.7 shows peat 1103 above prehistoric peat 1107 and bedrock 1110. The varying colours on the section correspond to variations in the texture of the peat; their significance is not clear apart from the overall difference between fibrous to crumbly modern peat and greasy to crumbly amorphous prehistoric peat. Modern peat 1103 grew round the base of the Stone 35.

A large gneiss boulder 1142 was found immediately north-west of standing stone 35 (Illus 10.11). Under it was a loose fill of peat and roots with quartz grains and an abundant worm population. It did not have the usual natural 10 mm wide halo in the soil around it. It therefore seems to have been placed by people rather than by natural forces and can be interpreted as placed to support Stone 35.

10.2.3 Discussion of standing stone 35 and its stone hole

The stone hole (1009) had been cut through modern peat varying in texture from crumbly to fibrous down to rock; a soil and peat mix had fallen into it before the stone was erected, and cement had been used to fix the stone in place. There were no signs of an earlier version of the hole. Although boulder 42 was placed very close to the stone it was not clear whether this was done during the re-erection associated with the concrete or an earlier or later erection.



Illus 10.10 Section 3b along south side of middle east-west temporary baulk [NMRS DC38243]

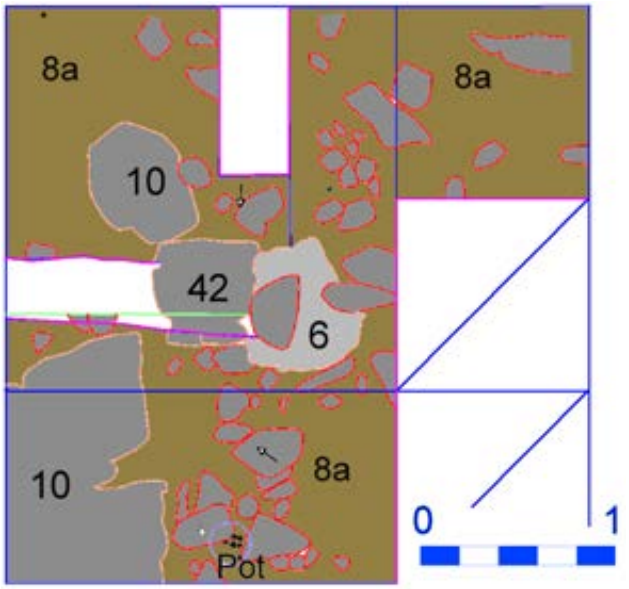
Thus there was an absence of evidence for a prehistoric setting, rather than evidence of absence. But the stone hole shared no characteristics with that which supported an orthostat of the East Row on Area C, nor with the pits on Area A which were interpreted as probably avenue stone holes.

The different colours of the two parts of the stone suggest that they had different histories prior to the 1857 peat clearance. The lower part was lighter in colour than the upper one which suggests that it had become peat-free later. Neither appears on surveys published before peat clearance in 1857, unless the upper part of the stone was the 'extra' stone lying on the surface near the East Row on Palmer's plan of 1857. The height of the peat in this area before late 1857 is uncertain, so this absence of evidence means little.

As discussed in Chapter 3 the stone seems to have fallen at least once after its first modern erection, and been re-erected. There were however no traces of this, apart from the possibility that boulder 42 was used to support Stone 35 at some stage.

10.2.4 Lady Matheson's path

Section 8A (Illus 10.12) is a simplified version of the drawn section showing, amongst other things, the make-up of Lady Matheson's path. The original artificial layer 1102 was probably a mixture of green subsoil clay and a sandy component; the green colour of 1102 was not visible in section. In the south it seems to have been placed directly on remaining ancient peat 1107. In the north it was on loose gritty material with orange clay lumps 1112. Sub-aerial weathering turned the clay 1102 into a sandy loam. It spilled over onto the adjacent area to the east (Section 3b, Illus 10.10).



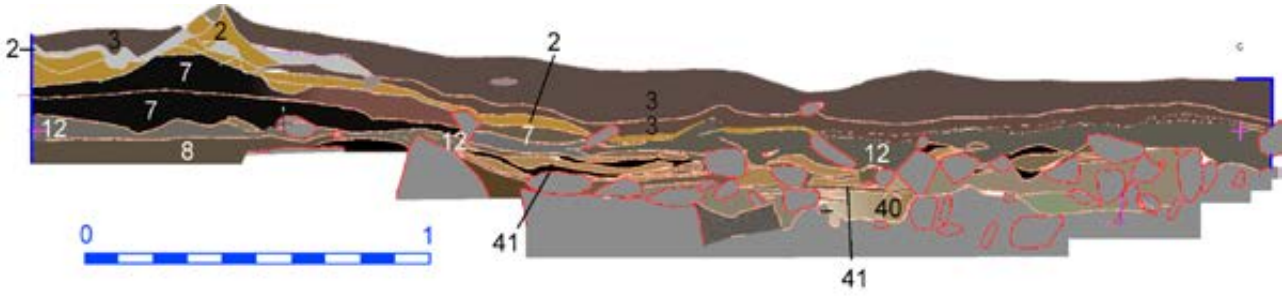
Illus 10.11 Plan 4 of 4 May 1981: pot cluster in soil 1108 [NMRS DC38245]

Ancient peat 1107 overlay a mixture of clay lumps and gritty patches 1112, which was a variant of the general prehistoric soil 1108 covering much of the area except where bedrock outcropped below the peat.

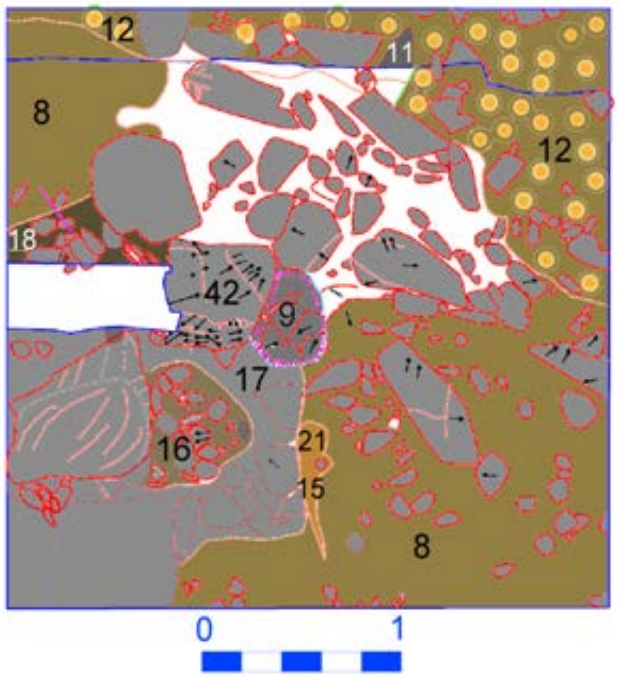
The lower features on Section 8A include black layers 1141in hollows over pockets of clay 1140. Layer 1139, the B/C soil horizon under the peat immediately overlay natural.

10.2.5 Discussion of Lady Matheson's Path

While it is possible that the base of the path had been levelled up in places with peat turfs, as on Area D, no signs of them were observed. If the 'modern' peat under the green loam 1102 was in fact ancient peat modified by the action of grass roots and soil fauna, Lady Matheson's original



Illus 10.12 East-west section 8A on the south-facing baulk of Area E [NMRS DC38249A]



Illus 10.13 Plan 6 Probably natural stony features 1116 and 1117 and ard mark 1115 [NMRS DC38247]

Illus 10.14 Ard mark 15 and 21 turf-mark from the north on 12 May 1981 [Film 1981.6.28 part]

Table 10.1 Pottery from soil 1108

Cat	Comment
300	A heavily abraded Hebridean Incised sherd from the same pot as Cat 301 (ASH 27b) and Cat 302 (ASH 28).
301	An abraded Hebridean Incised sherd (ASH 27b)
302	2 refitted sherds from a Hebridean Incised pot (ASH 28)
303_304	Abraded spalls from a fine E/MN corky pot.
717	A corky sherd from a fairly large cooking pot of indeterminate type.
984	A sherd probably from a small thin fine Beaker
1106	A sherd from a large, slightly coarse Hebridean Incised pot.
1107	A non-corky sherd of indeterminate type.

track from the Post Office was probably a ridge of peat left to provide a dry path for visitors, with at some stage the addition of yellow-green clay and grits. However, as might be expected, the construction of the path was considerably simpler than that near the chambered cairn on Area D where the surface coating was set on a layer of cut peats above a platform of large stones (Chapter 9.2).

10.3 Prehistoric featurest

10.3.1 Prehistoric peat and pre-peat soil

Prehistoric peat 1107 survived under Lady Matheson's Path. Basically black and amorphous, after exposure it varied in texture from greasy to crumbly, with drying cracks. It was not found away from Lady Matheson's Path except where it directly overlay bedrock. The basal layer of peat incorporated charcoal and it may be that it covered, in part at least, an old litter layer; context 1118 immediately under the amorphous prehistoric peat west of the modern stone hole appeared to be part of this litter layer.

Once the peat and litter layer had been cleared away a prehistoric soil (1108) appeared, lapping over the edge of bedrock in the south-west quarter of the area. On the soil near the south baulk was a group of small stones, without any obvious pattern to it, which contained a cluster of pottery (Illus 10.11).

The soil also included a piece of quartz (CAT 131) and a quartz chip CAT 132.

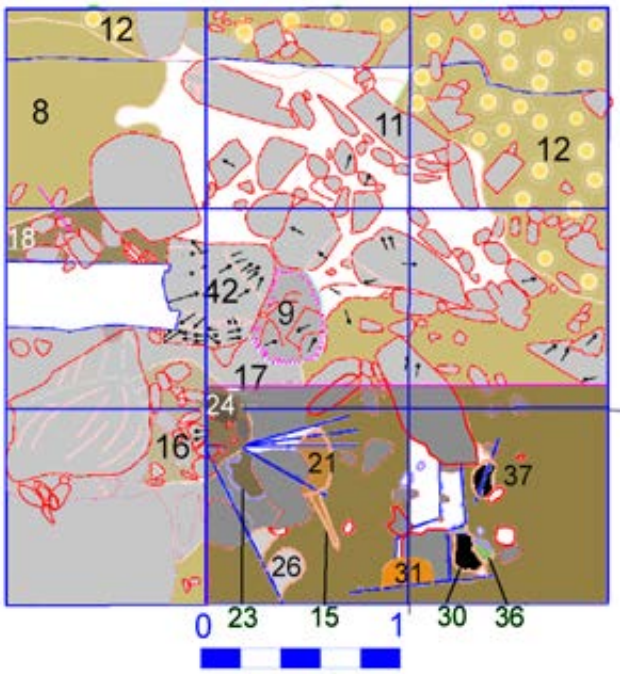
Soil 1108, where sampled by the baulk, belonged to the end of pollen sub-zone CaN-2d (when there was no evidence for cereal-growing) rather than the start of CaN-3a (when cereal-type pollen was consistently present in samples), and the various darker patches lying on it belonged to CaN-3a. Initially the soil appeared fairly homogenous but once trowelled over variations began to appear. These were largely amorphous and indeterminate. The most substantial variation amongst the soils was between 1108 in the middle and south of the area and 1112 which ran from the northwest to the east filling about a sixth of the trench (Illus 10.13). Soil 1112 was a mixture of soil similar to 1108, clay lumps and peaty material. It too contained pottery (Table 10.2). One sherd was refitted with sherds from 1108 (Table 2).

Table 10.1 Pottery from soil 1108 and Soil 1112

Cat	Comment
462_464	3 refitted sherds from a domestic Beaker cooking pot ASH 53a.

Table 10.2 Pottery from soil 1112

Cat	Comments
305	A sherd and crumbs from a Hebridean Incised pot (ASH 28 but not the same pot as in 1118).
465	A sherd from a domestic Beaker cooking pot ASH 53a, from the same pot as 462–4



Illus 10.15 Overlay 7 on Plan 6, variations in soils in the south-east part of Area E [NMRS DC38247 on DC38248]

Soil 1112 also contained a flint flake (CAT 133) and an catalogued piece of quartz (81.343), presumably unworked.

Cutting both Soil 1108 and a roughly circular area of dark brown clay with roots and charcoal (1121) was a well defined ard mark (1115). In plan the ard mark was an elongated triangle and it was also triangular in section (Illus 10.13).

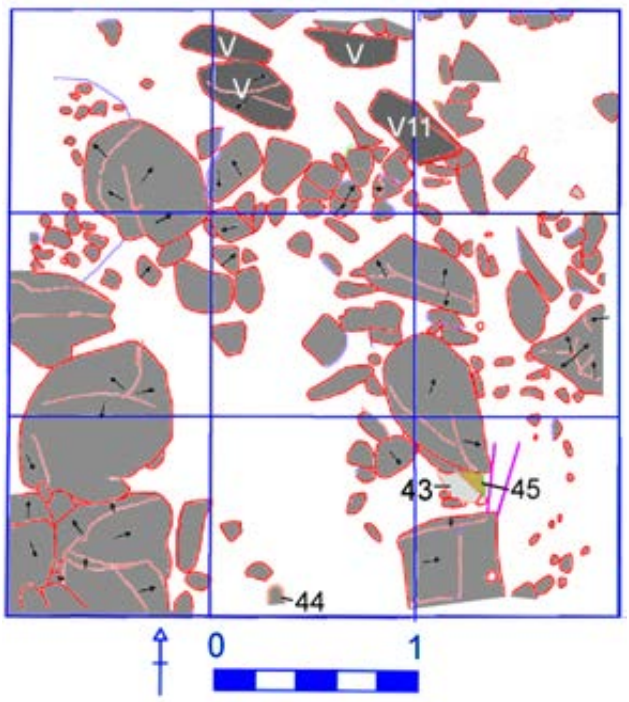
It was filled by loamy clay with some charcoal inclusions. In the photograph (Illus 10.14) the ard mark is a slightly shinier narrow linear area running almost along its vertical centre-line to a point between the small and large rounded stones just below the centre. Above that in the picture is the oval area 1121 which was interpreted as a possible turf.

There was a profusion of minor variations in the soil, including 1123, a slightly darker greasier peaty clay soil than 1108. Another patch consisted of a greener greyer loamier soil with peat inclusions (1120). Within this context was a very dark brown peaty clay, similar to Context 1123, but with less charcoal. Other variations included slightly darker brown peaty clay with more grit (1125). It abutted and preceded layer 1124 which was also like 1123 except that it had less charcoal in it (Illus 10.15).

10.3.2 Discussion of the soil and the pottery

The soil 1108/1112 was generically similar to that found on Area B to the east of the Ring (Chapter 7); but its variations survived (or at least were recorded) in considerably more detail. This variability, the charcoal in some soil variations, and ard mark 1115 gave the impression of a cultivated soil which consisted in part of material brought here to thicken it. The most obvious variation was between soils 1108 and 1112, but the two soils contained remarkably similar pottery, so much so that it seems likely that 1112 was a more recently ploughing of 1108 incorporating some clay and peat. As described in Chapter 10.1.2 resistivity survey had led to a suggestion that Area E was on a loosely defined boundary between areas dominated by rock and areas dominated by clay and it seems likely that ploughing at different periods stopped at different lines.

Thus the west edge of area E was mainly outside the cultivated area; where soil 1108 occurred there it belonged to an earlier pollen zone (CaN-2d) than did soils further east. That and the presence of an ard mark cut into layer 1108 further south-



Illus 10.16 Plan 9 with detail in top right-hand square from Plan 7 and Film 1981-6-13 [NMRS DC38250+ 38248 part]

Illus 10.17 Stone 1111 near the north baulk [Film B&W 1981.6.13]

east in Area E shows that archaeologically indistinguishable parts of 1108 had different histories from one another. The transition between CaN-2d and 3a happened sometime between 2980 and 2510 cal BC.

The cluster of Hebridean incised wares included sherds from more than one vessel (ASH 27b and 28). It was found close to the surface of the soil. It may seem tempting to see it as a ritual deposit but the possibility that it resulted from play, or the urge some people have to collect interesting scraps, cannot be excluded. Along with pottery similar to that in the cluster the soils 1108 and 1112 included sherds from the possible beaker (ASH 53a) and although other explanations are possible it seems most likely that the clustered Hebridean sherds were collected during late 3rd / early 2nd millennium cultivation of a by then ancient plough soil and were tucked into the cluster of stones centuries after their initial incorporation in the soil. It is impossible to exclude the possibility that the sherds were added to the Beaker period soil from an abandoned 'ancestral' settlement, but the preferred interpretation, given the pattern of variations in pollen in the soil, is that the soil was cultivated at two or more periods, an early one resulting in incorporation of Hebridean sherds in the soil, and a much later one resulting in incorporation of sherds from Beaker pottery.

10.3.3 Natural standing stone 1111

Natural standing stone 1111 is shown on Illus 10.16 to 10.18. There were three other broadly

similar vertical stones on Area E (marked V on Illus 10.16), for instance one in the background and on in the slit trench to the right of Stone 1111 on Illus 10.17.

Sections were dug to check its relationship to the peat and the bedrock. Plough soil 1112 overlay a hollow filled with brown peat 1113 which in turn overlay bedrock (Illus 10.19). That peat was interpreted as prehistoric and possibly very ancient. There was no sign of a cut for insertion of the stone through the clay or peat. The vertical stone was clearly earlier than the peat 1113 and it was judged to have been left on end by natural processes during the glacial period.

It could just be that this fairly low but upright stone had been erected purposefully). But it (and the others marked V on Illus 10.16) seem far more likely to be weathered remnants of a variation in the gneiss bedrock. Given that the main fill adjacent to the stone on its north-east was plough soil it seems possible that a failed attempt to remove it had been made in prehistory, perhaps to improve the arable.

10.3.4 Candidate stone hole features

Considerable care was taken to chase up any hint of a prehistoric stone hole. The features which bore some resemblance to artificial holes designed to support standing stones were

— pit 1116 (and its fills 1117 and 1122 to 1129)
— pits 1130 and 1131
— pit 1148 and its fills 1146, 1147, 1149

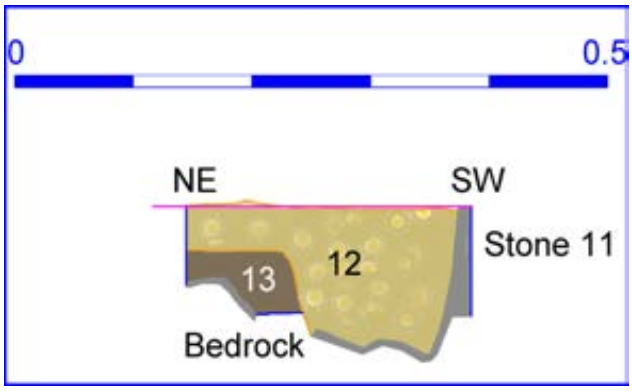
10.3.5 Candidate stone hole 1116

Stone hole 1109, which had held Stone 35, had been cut through angular stones 1116 in soil 1117 which lay directly below the grass and litter layer (Illus 10.13, 10.15). It looked as if similar angular stones had been removed to create feature 1116 (Illus 10.20 - 10.21).

Amongst the stones was a patch of very dark brown peaty clay 1123 with some charcoal, along with a slightly different fill 1122.

It was sectioned along several different lines; none of the sections produced any evidence for an artificial cut. Our conclusion was that the stones and clay fills had reached their positions entirely through natural processes.

Illus 10.18 Stone 1111 from the north [Film 1981.15.11]



Illus 10.19 Section 17 showing fills by Stone 11 [NMRS CSD-DC38259]

Illus 10.20 The probably natural features 1116 and 1117 to the left of the largest stone, photographed from the east on 12 May 1981 [Film 1981.6.26]

Illus 10.21 Detail of probably natural stony features 1116 and 1117 on 13 May 1981 [Film 1981.8.9]

10.3.6 Candidate stone holes 1130 and 1131

Feature 30 in the south-east part of the area is shown on Overlay 7 (Illus 10.15) along with features 31 and 36. It was close to candidate stone hole 48, and perhaps it should not be considered in isolation. It measured about 0.2m north-south and between 0.1 and 0.15 m east-west. It had a black greasy humus-rich clay fill 1130 with a small sand component. In places it had a sharp clear boundary with a patch of light green sandy loam 1128. Under 1130 was a dark charcoal-rich clay 1133, 10mm thick and 120mm long, above a red-brown to yellow clay band 1135, above a slightly yellow-green subsoil-like material 1132. The lowest layer in this area was a grey-green stone-free surface 1136. The layers above it may represent the fill of a hole from which a stone had been removed.

Some 0.2m to the west of this sequence was a patch of soft orange brown material 1131 over a rotten stone 1134 which overlay the grey-green surface 1136 and form the north side of a putatively artificial hole measuring 120mm by 120mm.

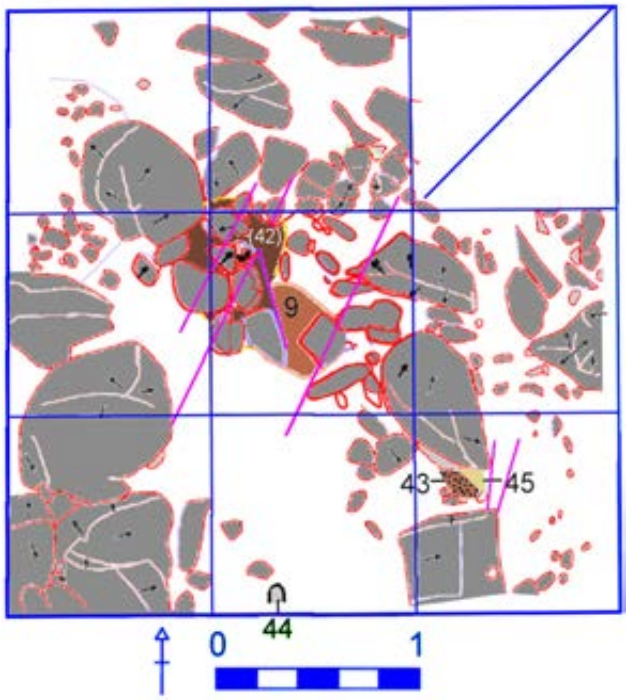
It is just possible that 1130 and 1131 (with their underlying fills) were all part of a single feature. If they were, the feature would have measured about 0.5m east-west by about 120mm north-south. It would have been too slim to take Stone 35.

There was no evidence that 1130 and 1131 were in fact the fills of a hole created by removal of a single stone, and a preferred possibility is that two or more smaller natural stones were removed during ploughing and turfs and other miscellaneous bits of soil and subsoil were thrown into the resulting holes to fill them up.

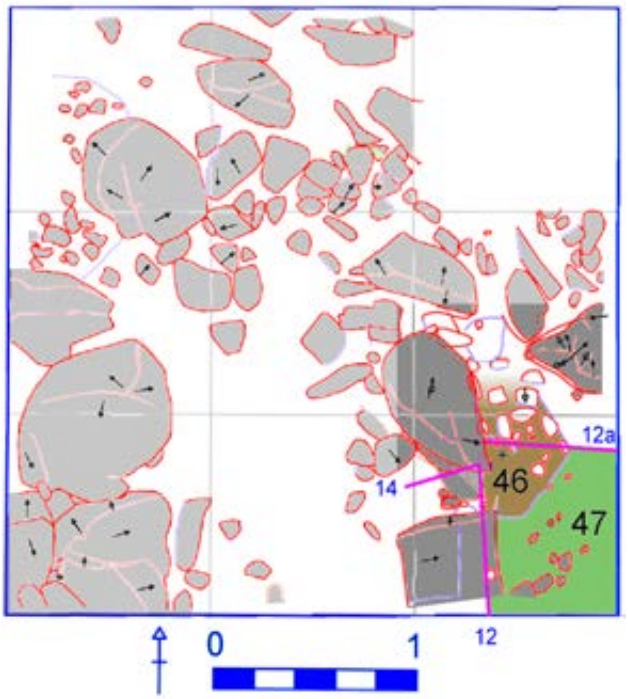
10.3.7 Candidate stone hole 1148

In the south-east part of Area E a thin patch of ashy grey material 1143 rising westwards was found on 21 May 1981. It may have been a patch of topsoil originating in an acid brown soil, and next to it was a small area of brown gritty sandy clay which partially overlay 1143 (Illus 10.22, 10.23). These could represent an upside-down turf. The clay was cut by a peculiar linear streak of smooth grey silty clay with some charcoal, like a fat worm hole but just possibly something to do with the edge of candidate stone hole 1148, which lay to the east.

The top fill of the hole included small stones in a brown clay loam with fibrous roots and no charcoal 1146 (Illus 10.24).

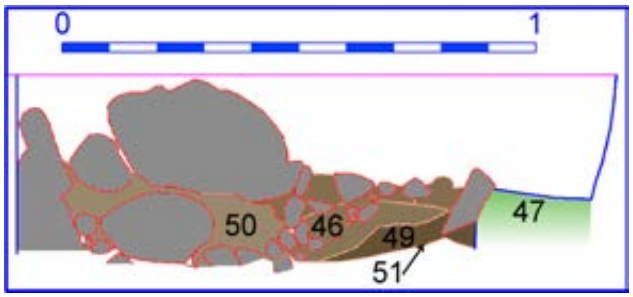


Illus 10.22 Plan 9 of 21 to 23 May 1981 [NMRS DC38250]



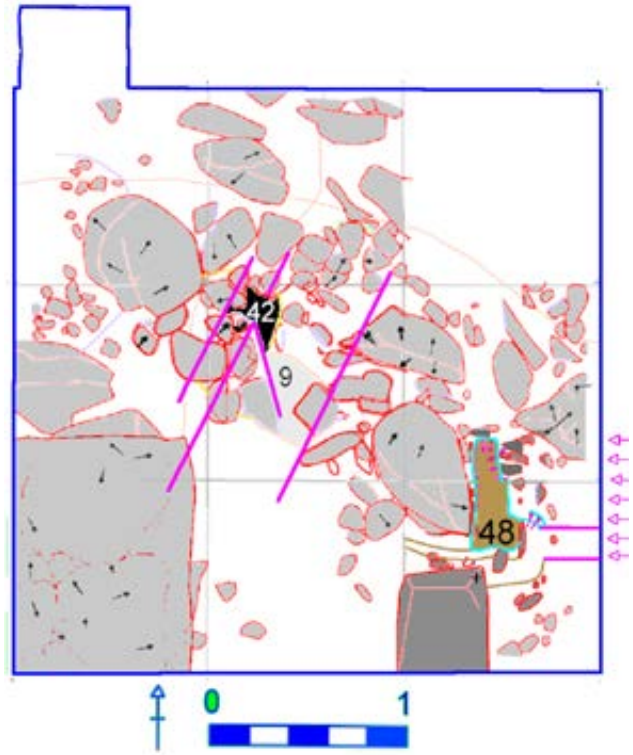
Illus 10.24 Overlay 11 of 25 May 1981 on Plan 9 [NMRS DC38252 on 38250]

Illus 10.23 Candidate stone hole 48 from the west on 27 May 1981 [Film 1981.15.29]



Illus 10.25 Section 12a (see Illus 24 for section line) [NMRS DC38253]

Illus 10.26 Feature 46 and its fills on 27 May 1981 [Film 1981.16.15]



Illus 10.27 Overlay 15 of 30 May 1981 on Plan 9 [NMRS DC38257 on 38250]

Several sections were drawn of which Section 12a was the most illuminating (Illus 10.25).

Below brown loam 1146 was uncemented medium brown sand 1149 with small angular stones. It too contained many fine roots and lacked charcoal. It did not appear to be a slow fill, but rather an abrupt deposit. At a similar level to both 1146 and 1149, separated from them by a near vertical concentration of small stones, was very even-textured silty clay 1150.

The candidate stone hole cut through a green subsoil layer 1147. It was variable with rotted stones, clay pockets and gritty granular clay. It had suffered from brown root mottling and root mats occurred in it. None of the fills of the feature contained any charcoal.

Illus 10.27 shows the final extent of feature 1148 (with its fill 1146). The plans suggest that it was in an area where frost shattering and other glacial forces had produced curving lines of small stones to the north-east, east and south of the candidate stone hole.

In Illus 10.28 only some of these stones survived the excavation process. Others are shown on Plan 15 (Illus 10.27) but they are clearest on Plan 9 (Illus 10.22).

A small boulder to the west of 1146 was in a similar relationship to the candidate stone hole as boulder 1142 had been to the stone hole for Stone 35. However, when it was removed it showed none of the signs of purposeful placement found under boulder 1142. Instead it seemed to have reached its position through natural processes. (Illus 10.28)

Illustration 10.29 shows the feature emptied towards the end of excavation. The scale rod is immediately to the west of a supposed socket element of the feature. Illus 10.30 shows its profiles at 0.2m intervals; the smaller bracket lines above each section are meant to indicate the edges of a putative socket and the larger brackets are meant to indicate the edges of a hole interpreted during excavation as purposefully dug.

10.3.8 Discussion of candidate stone hole 1148

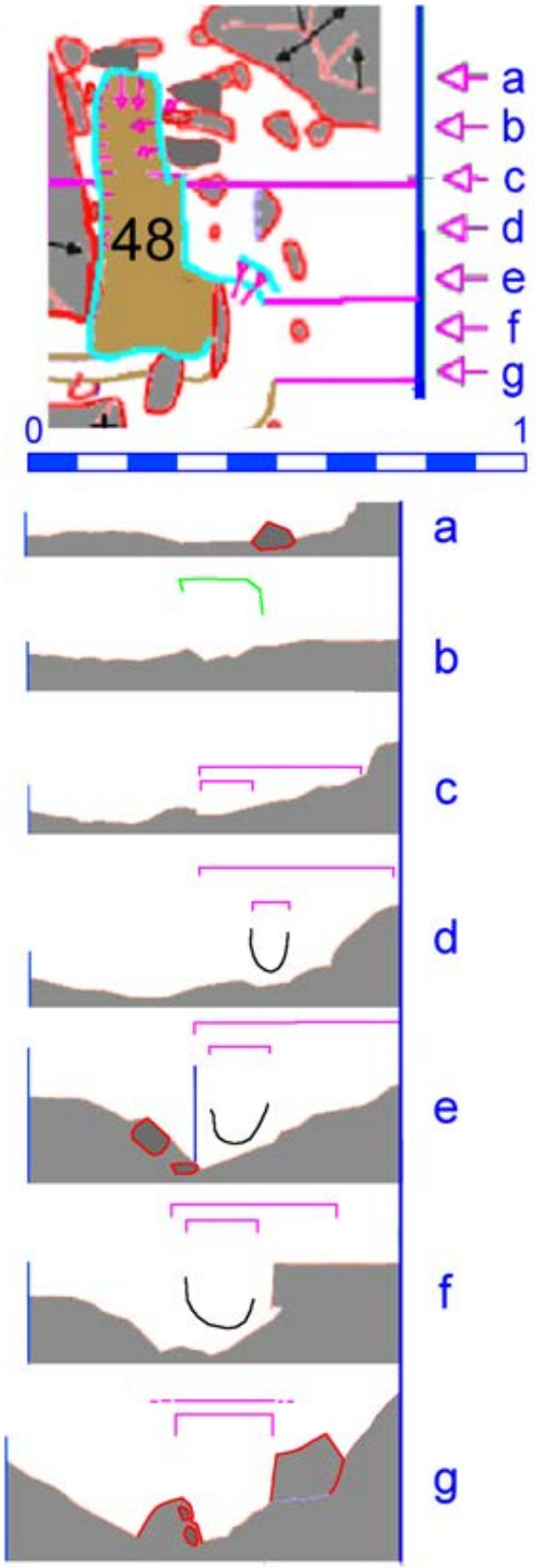
The area excavated as a possible stone hole was largely defined by natural phenomena, in particular

Illus 10.28 Feature 48 and curving lines of small stones to its north and north-east [Film 1981.18.17 part]

Illus 10.29 Candidate stone hole 1148 emptied, from the south on 1 June 1981 [Film 1981.18.12]

the curving lines of small stones described above. The lack of charcoal in the fills suggests that they were not derived from any of the plough soils on Area E. The bottom of the candidate stone socket was irregular, and the hole was shallow, less than 0.2m deep below the pre-ploughing surface. It was too long and thin to have held Stone 35.

Some arguments can be adduced for its being artificial. The stone hole on Area C at about 0.3m deep was not much deeper. Although the small boulder to the west of the candidate socket was natural it could conceivably have provided support to a standing stone in the same way that boulder 42 did for the modern placing of standing stone 35. The natural curving lines of small stones round



Illus 10.30 Sections 16 with inlay of part of plan 15 [NMRS DC38258]

the candidate stone hole might have been noticed by people, who might then have put up a stone at its focus precisely because of the phenomenon. But these are not strong arguments compared to the evidence for natural-seeming fills and the preferred interpretation is that it resulted from glacial deposition and weathering rather than having held any standing stone, let alone a predecessor to Stone 35.

10.4 Pollen sampling

None of the spot samples taken from individual layers on Area E were analysed for pollen. An 80mm deep Kubiena box sample was taken from charcoal rich humic clay under the peat below Lady Matheson's Path. Illus 10.30 shows the west baulk section, recorded in Section 8a (Illus 10.12), with the sampling point near the centre of the photograph below the metal Kubiena box on the timber above the section. No available record correlates the sample with the layers. However, the pollen report records that the material in the top 30 mm was darker coloured than the rest and the material forming the bottom 20mm contained more grit. This lower material corresponds best to layers 1108, because lighter soil 1112 was not present in this area.

The presence of background amounts of elm and pine pollen in the samples and relatively abundant birch suggested that the sequence started before the beginning of zone CaN-3a at Calanais Leobag, perhaps even as early as CaN2c (which ended sometime between 3490 and 3020 cal BC). The sequence demonstrated an increase in hazel-type pollen at the expense of birch locally characteristic of the transition from zone CaN-2d to CaN-3a sometime between 2980 and 2510 cal BC and can be explained as the effect of the opening up of a mixed birch and hazel forest by small-scale clearances. Following the clearance agriculture was practised as shown by the presence of cereal pollen. The pollen report (Chapter 21) provides details.

The preferred archaeological interpretation of this profile rests on the observation that Area E lay on the junction between an area used for agriculture and an area where rock was very near the surface. It is that soil 1108 here was the natural soil which had formed in this area prior to cultivation. The edge of cultivation, varying over the years, was always slightly to the east.

10.5 The stone re-erected.

At the end of the 1981 season the stone was erected in its pre-excavation position by the Ancient Monuments squad under the management of Mr N McPhee (Illus 10.32).

Illus 10.31 The sampling area on the west baulk [Film 1981.18.19]

Illus 10.32 The stone re-erected [Film 1981.19.3

11. Area F

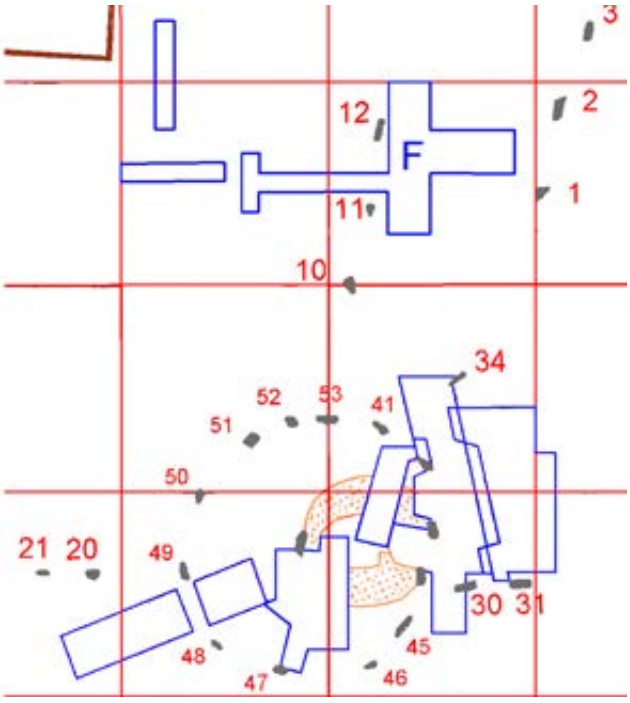
Illus 11.1 Area F on 17 May 1980 [Film 1980.9.8]

11.1 Introduction

Site F was excavated in 1980 in advance of works designed to drain a sparsely vegetated and occasionally waterlogged hollow to the east of Avenue stones 11 and 12. It had been decided to insert two 4" westward-running plastic drain pipes, and a sump 9 inches (225mm) below the lower peat boundary. The excavation was supervised by Ian Mate.

11.1.1 General aims

The aim of the excavation was to record any archaeology before destruction. General research aims were formulated in advance. We were aware of speculation about the astronomical significance of the centre line of the Avenue and alert to the possibility that we might gain information about any predecessors to the stones forming the west



Illus 11.2 Location plan of Area F

side of the Avenue. In the course of the work research questions about soil processes arose (Chapter 19: Soils).

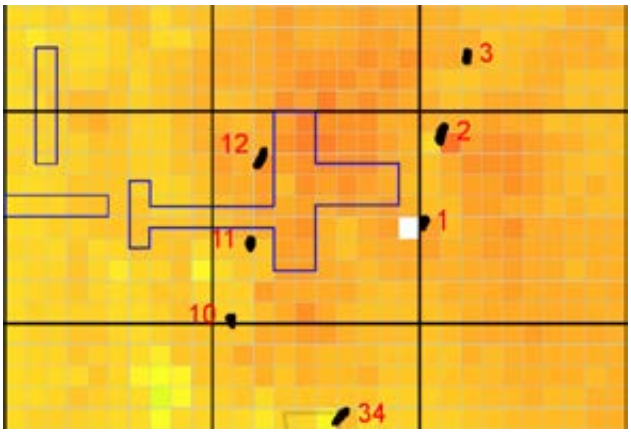
Illus 11.3 The area from the west in July 1955 [NMRS CUP RA 84 extract]

In Illus 11.3 the colours of the standing stones have been lightened to make them stand out from their background.

In July 1955 when Cambridge University air photograph RA 84 was taken the area showed variations in vegetation cover and some erosion scars (Illus 11.3). Tracks made by visitors or sheep or both ran from north to south. The lighter coloured area near the Ring stones and Avenue stones 10 and 11 corresponded to that cleared of peat in 1857. The band of lighter-coloured vegetation running down-slope westward from just north of Avenue stone 11 corresponded to the shallow grass-covered declivity shown on the contour map of the area (Illus 11.5). Pre-modern cultivation beds can be seen in the bottom left-hand corner of the photograph.

Neither in this, nor in air photographs taken in May 1980 during excavation, were there obvious signs of waterlogged ground in the area to be drained. The outline of Area F is shown in blue on Illus 11.3, slightly distorted relative to the ground because its imposition takes no account of topography.

11.1.2 Resistivity



Illus 11.4 Resistivity survey [CSD 04 General Plans]

The resistivity survey in Illus 11.4 was at 1m probe intervals, a spacing not suited to showing shallow features. The colours of the plot are explained in Chapter 5 Resistivity, but basically darker colours represent lower values. The damp area in the Avenue produced readings typical of thicker soils or shallow peat above clay soils elsewhere at Calanais. The slightly lighter square in the trench south-east of Stone 12 may correspond to a stonier area in Area FVII.

11.1.3 Layout

On Illus 11.5 our local contour survey has been imposed on the Glasgow survey (Tait et al 1978)). In the local survey grey and dark brown colours have been used for higher areas and green for lower ones. The contours on the Glasgow survey were at 0.25m intervals and those on the local survey at 0.1m intervals (Illus 11.5; Technical Note 11.1.3). It shows that the ridge rose gently southward towards the Ring and the ground surface was slightly undulating. The ground dipped fairly sharply from the west to the northwest.

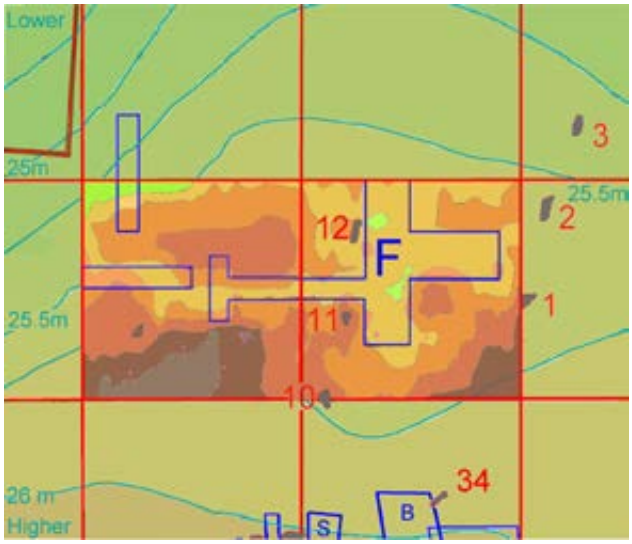
Area F was set in the footprint of the less than 0.1m deep degraded declivity visible on the air photograph and contour plan and the poorly-drained area above it (Illus 11.3, 11.5). Only the north-western trench FVIII sloped much, falling nearly 0.4m over its length at an average slope of c. 8%.

The site was divided into sub-areas labelled I-VIII. The easternmost point of FV lay fairly close to the east side of the Avenue (Illus 11.6). It and Sub-areas FIV-VII covered the central boggy area in the Avenue, Sub-areas FI, II and III ran down the slope to its west. Sub-area FVIII led to an area near the east ends of the cultivation beds to the north-west where a sump was to be placed. In what follows shorthand terms - for instance 'DV' or 'Area DV' rather than 'Sub-area DV' - will normally be used.

In the degraded area inside the Avenue trenches 2m wide were opened, because the exact number and placing of the pipes was uncertain. A trench width of 1m was used elsewhere, in the hope that it would provide an adequate area for interpretation while not damaging more of the site than necessary. In retrospect, given the frustrating hints of alterations to the local landscape at a scale of more than a metre, the trenches were too narrow to allow satisfying interpretations; but it is not clear that 2 m wide trenches would have been a better compromise.

11.1.4 Context numbers

Context numbers ran from 610 to 651. Individual sub-areas were not assigned blocks of numbers; indeed some contexts occurred in all of them. Here,

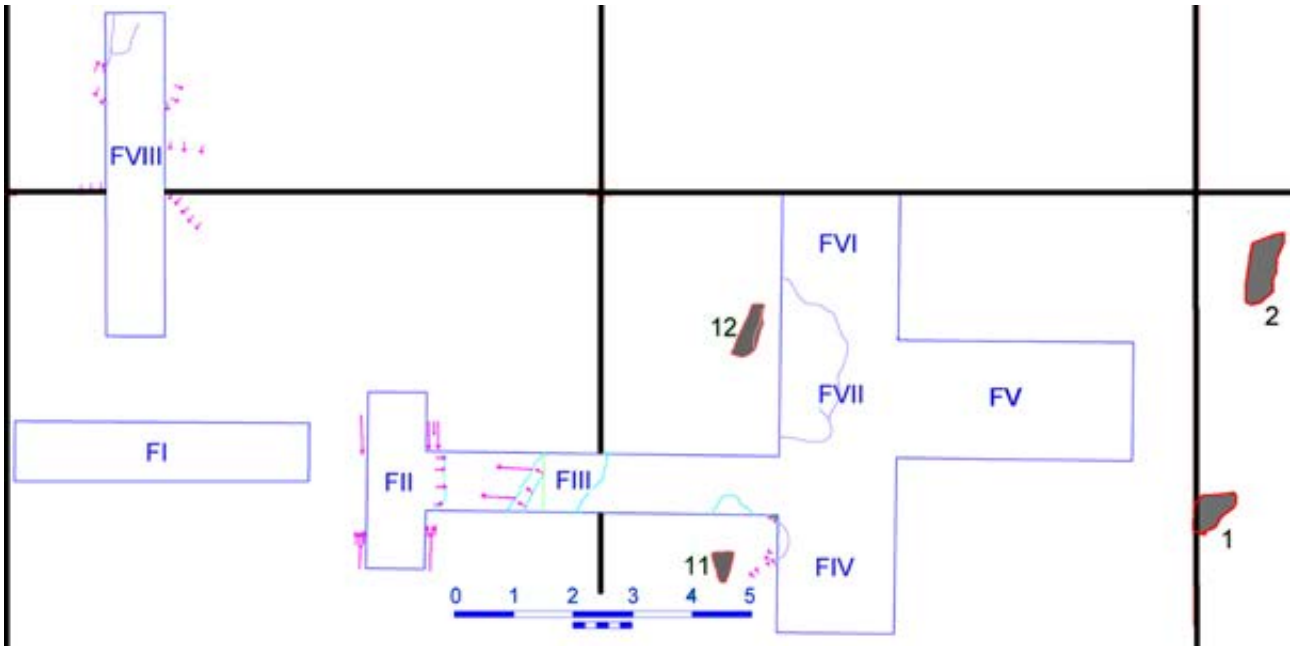


Illus 11.5 Contour survey on Glasgow contour survey [Plan 11 NMRS DC38270]

as on other areas, the context system with its apparatus of Harris matrices did not suit all of what was found because the archaeology was dominated by natural processes rather than artificial features.

11.1.5 The order of description

The features on Area F will be described from recent to early, so far as feasible given the chronological ambiguities introduced by the long development of mineral soil 613/615. A few features lay above the amorphous peat. One or two features



Illus 11.6 Master Plan based on Plan 9 [NMRS DC38268]

were found below the peat but above a mineral soil sequence consisting of dark grey-black humus-rich clay with quartz grits 613 above dark brown humus-rich clay 615. In places this soil covered fragments of turf lines and charcoal spreads, some dated to the 4th millennium BC.

11.2 Phase 18 Modern turf and topsoil

Modern turf and topsoil layer varied in thickness. On the western side of FVII it was between about 0.15 and 0.25m deep (Illus Section 5b). In the most westerly area FVIII it showed much the same range. Round Avenue stone 11 it varied between 0.2 and 0.1m deep (Section 1). In Area FV in the western half of the Avenue it was less than 0.1m deep (Section 3). This suggests that recent soil processes had operated in a fairly uniform fashion throughout the area.

11.3 Phase 18 Stones above peat

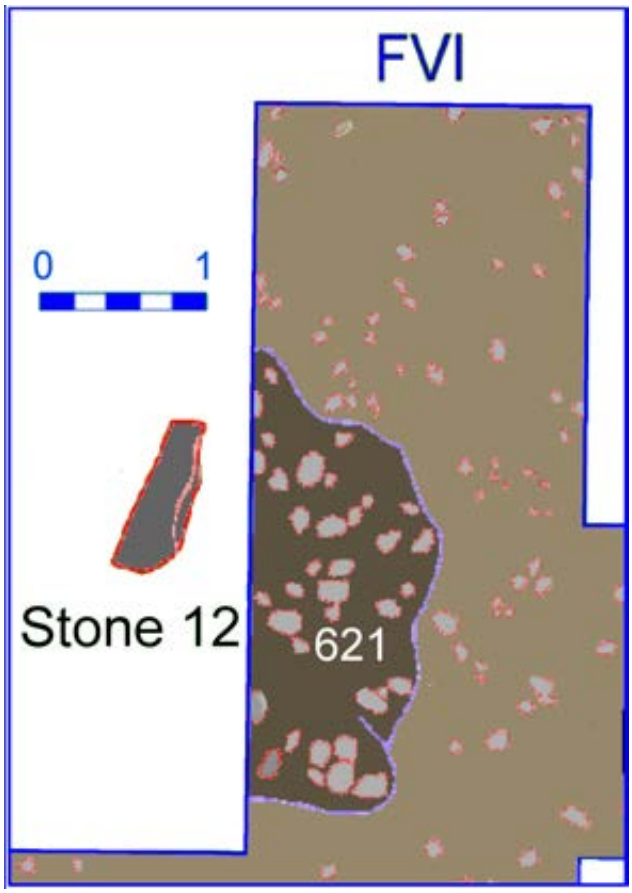
Some of tabular stones 621 with a slightly gritty loose humic infill, filling a hollow on fibrous peat 611a near Avenue stone 12, may reflect an attempt to reduce the effects of poor drainage (Illus 11.7-11.8). They were associated with broken glass. It is however also possible that they reflect erosion in this area and that some at least were part of a pre-peat mound around Stone 12 disturbed after peat clearance (Illus 11.9).

Indeed, topsoil and the soils here were very thin and the upper mineral soil 613 was present only in a mixture with the fibrous peat.

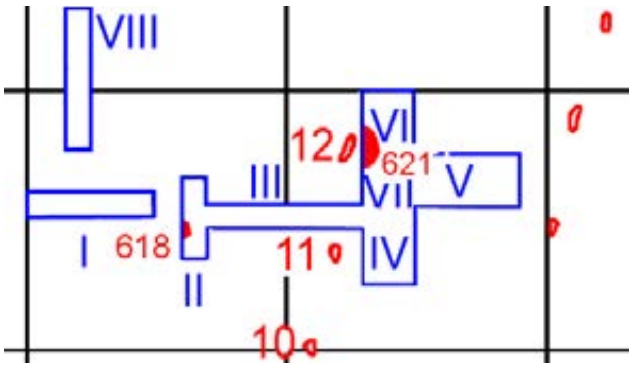
Illus 11.7 Flat stones by Stone 12 [Film 1980.2.35 part]

North of the stones a wedge of fibrous peat 611a merged into the underlying mineral soil below a large stone. The modern soil 610 developed over this recent peat, suggesting a local change in the drainage regime sometime in the last 150 years (Illus 11.8).

Flat stones 618 under the modern vegetation layer in FII may also have been the result of an attempt to fill a poorly drained area in the natural



Illus 11.8 Stones 621 on extract from Plan 9 [NMRS DC38268]



Key plan for stones 621 and 618

Illus 11.9 The cultivation bed system sampled in Area FVII from the west [extract from CUP Air Photograph RA 84)]

shallow declivity running west from the Avenue (Key plan and Illus 11.15). There was no fibrous peat above or below them but they overlay amorphous peat 611b. Root penetration was marked.

11.4 Phase 18 A pre-modern cultivation bed in FVIII

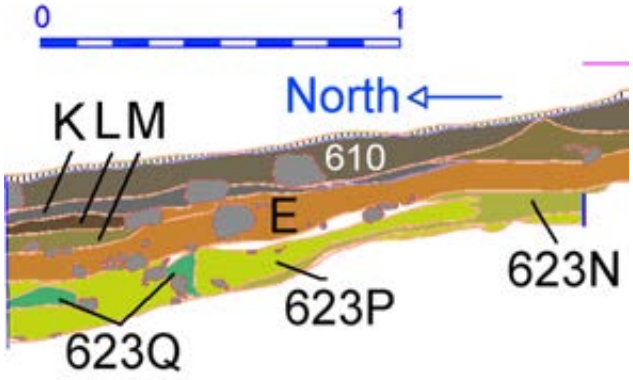
11.4.1 Description

At its north end, FVIII cut the corner of a cultivation bed (643). There was about 0.1 m of turf in its vicinity (Illus 11.12). Both the semi-fibrous and amorphous peat had been locally removed by agricultural activity on the bed itself.

Roots had gone a long way to destroy layering in the bottom end of Area FVIII but several distinct layers survived at the corner of the cultivation bed.

A very dark greyish brown loam with some charcoal inclusions (K) sat on dark brown gritty clay (L) with some up to 0.2m long decayed stones in it. Below that was a lens of dark yellow-brown silty clay (M) overlying a much wider spread layer (E) of orange-brown gritty clay. The layers were thicker on the other side of the trench (Illus 11.11-11.12). At the base loose yellow green gritty

Illus 11.10 Layer L of Cultivation bed 643 [Film 1980.6.23]



Illus 11.12 The north end of Section 5a of 16 May 1980 along the east side of Area FVIII [NMRS DC38264]

clay 623P with rotten rock inclusions was interrupted by wedges of blue-green concreted sandy clay 623Q (Illus 11.12). A stone pounder (80.105) came from the dark loosely structured loam K.

11.4.2 Discussion of the pre-modern cultivation bed

Layers K to M reflect the building of a cultivation bed by mounding up soil and peat with a spade. They also show the results of subsequent chemical weathering.

Stones were included in the makeup. That may suggest either that the crop grown was not potatoes or that this corner was not part of the cultivated area. Other smaller stones lay just beyond its end, presumably tossed there during cultivation.

The air photograph shows that the cultivation bed was very roughly 3m wide and ran for a considerable distance down-slope to the west to the edge of a general change in vegetation. Two narrower beds of an earlier system appeared to underlie it (Illus 11.9). The beds presumably belong with the village of Callernish attested in the mid 19th century (Chapter 2: Introduction).

11.5 Phase 17 Fibrous peat

Beneath the turf a brown fibrous peat 611a survived over most of the site, except in badly eroded areas in the Avenue, and the most northerly end of FVIII where it ran down towards the late field system. This fibrous peat seemed to have grown since peat-cutting ceased, probably at various times in the century before the peat clearance of 1857

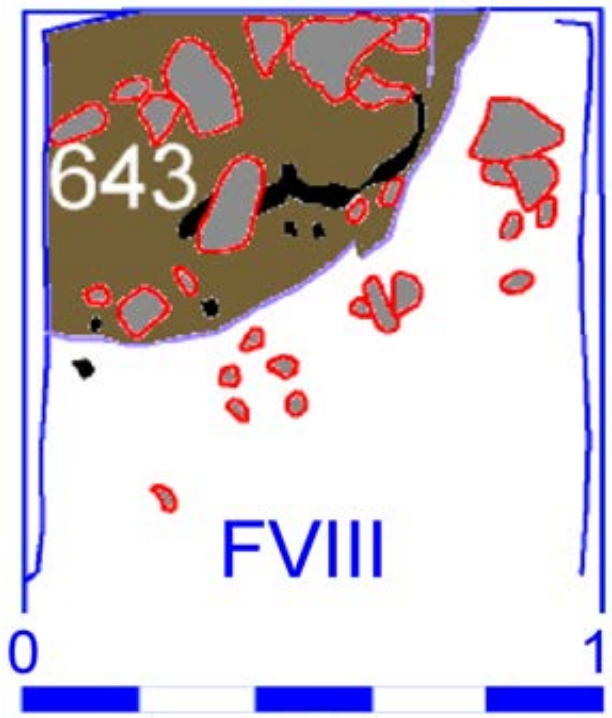
11.6 Phase 15 Amorphous peat

11.6.1 Description

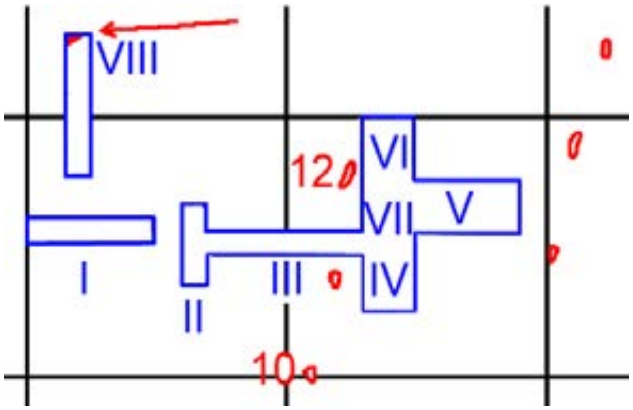
The amorphous peat was the base of much thicker peat cut for fuel before 1857. At the north and east edges of FV (Illus 11.36) and in depression 612 in FIII it was 0.15m thick. In the rest of the western part of FIII it was about 0.09m deep. Elsewhere it was normally thinner and it was absent in the north part of FVIII and near Avenue Stones 11 and 12 (Illus 11.13). A flint flake (80.21) was found in it.

11.6.2 Discussion of the amorphous peat

The amorphous peat probably started growing in the first millennium BC, judging by evidence from Area C at the east end of the East Row. It was cut during the first half of the 19th century AD. When MacCulloch visited before 1819 stones 11 and 12 were not visible. In 1846 Worsaae recorded Stones 10 to 12 on his plan but Stones 11 and 12 were not on his sketch view. Shortly before 1857 all three stones were shown largely peat-free on Callender's 'birds-eye view' with just south of Stone 10 the edge of a peat-dome still lapping up round the Ring stones (Chapter 3 Previous studies).



Illus 11.11 Layer L of cultivation bed 643 on extract from Plan 5 [NMRS DC38264]



Key plan for the cultivation bed

The peat was regarded as unsuitable for radiocarbon dating or pollen analysis because it seemed likely to have been contaminated.

11.7 Phases 10-15 Superficial pre-peat features

11.7.1 A pile of stones in FI

A group of stones 651 was found in Area FI sitting directly under the amorphous peat in and above the 613 and 615 mineral soil development (Illus 11.14, 11.15). They were much invaded by humus-rich or peaty soil and formed a self-supporting pile after the soil had been removed from around them.

An internally bevelled Hebridean Incised rim sherd (Cat 284 ASH 23) was found amongst the stones.

They were not wholly uncovered because time ran out. It is possible that there was a pit under them.

Illus 11.15 Areas FI and FVIII from Plan 9 [NMRS DC38268]

11.7.2 Piles of stones in FVIII

In FVIII a loose, self-supporting group of stones 617 sat entirely on the mineral soil 613 surface within fibrous peat 611A and amorphous peat 611B (Illus 11.15). It was close to stones 624 with mineral soils 613 and 615 backed up against it which formed a rough field wall at a change in slope. Perhaps 617 was a localised cluster of stones cleared away during cultivation. To the east there was a thicker development of soils 613 and 615, suggesting soil drift from agriculture further up the very slight slope.

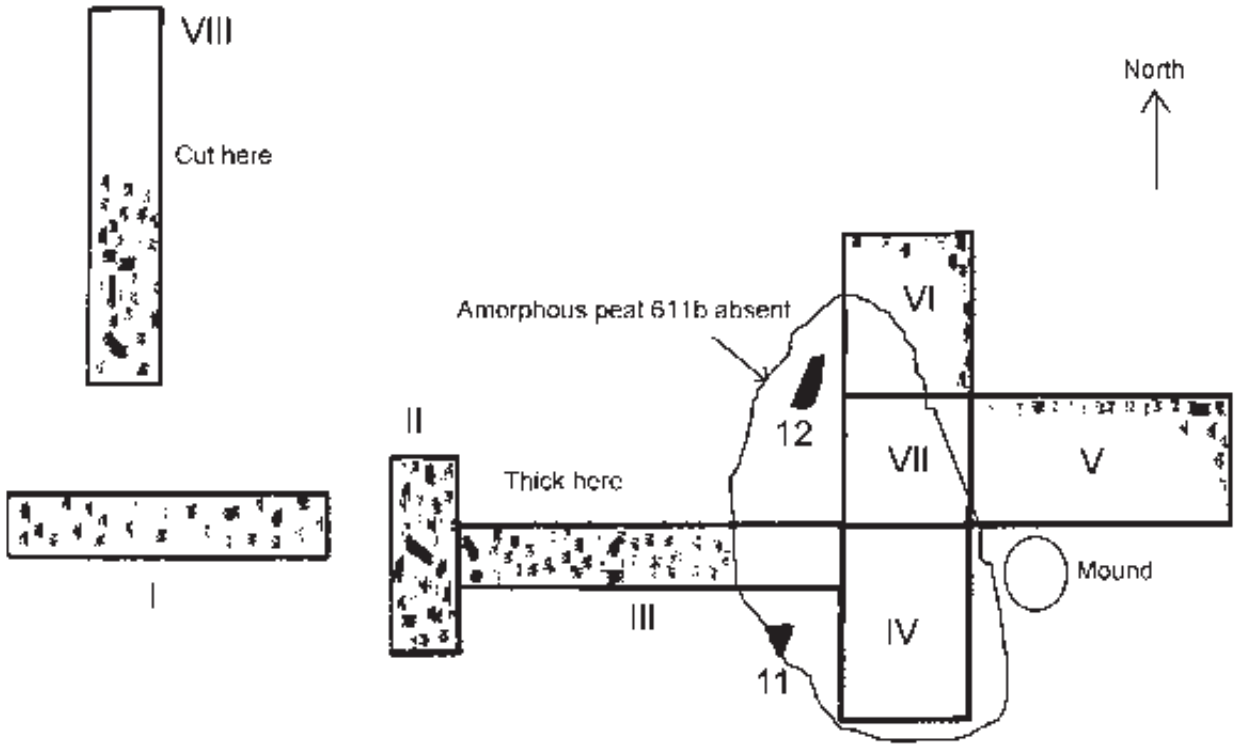
11.7.3 A depression and ridge in Area FIII

Removing the peat in Area FIII west of the Avenue, revealed a depression 612 in the surface of the pre-peat mineral soil 613, running roughly north-south (Illus 11.16). The amorphous peat 611b thickened from 0.09 to 0.15 m as it crossed this feature.

A ridge of brown gritty clay (614) ran north-north-east by south-south-west up-slope from the depression and, the soil 613 in it shared some of the characteristics of the lower mineral soil 615.

11.7.4 Discussion of the depression and ridge in Area FIII

These features may have been the product of some of the last activities before the growth of peat in the first millennium BC. The depression was tentatively interpreted as part of a furrow in a rig and furrow system but no other elements of this putative field system were found. It seemed



Illus 11.13 The extent of amorphous peat [slightly modified from Context Sheet 611]

Illus 11.14 Pile of stones 651 in Area FI [Film 1980.13.12]

too slight to be part of an enclosure defining a sacred area enclosing the stone setting. Perhaps instead it was the boundary of a field.

11.7.5 Pre-peat shrub or tree growth

At the south end of Trench VIII, nearest to FI, there was an apparently little disturbed area of black amorphous peat beneath which was a well developed soil layer 613 (Illus 11.17). Underneath soil 613 was mid brown, slightly greasy gritty clay 615.

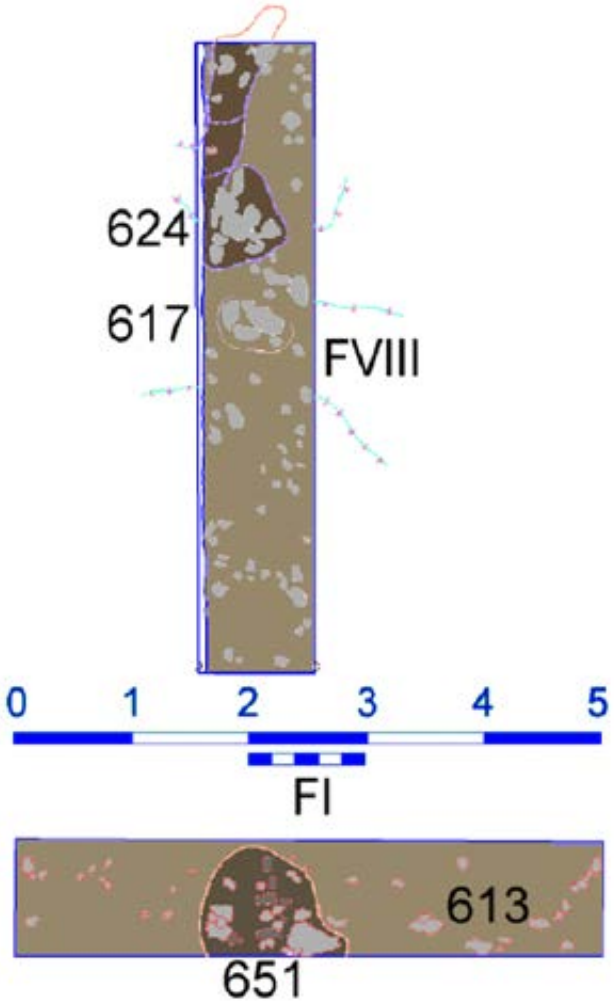
The layers below 615 included dark, yellowish brown, gritty clay with weathered stone, penetrated by the roots (Illus 11.17). Within it there were several variations, including a lens of green grey gritty clay (J) and (H), and dark yellowish brown silty clay.

11.7.6 Discussion of the pre-peat shrub or tree growth

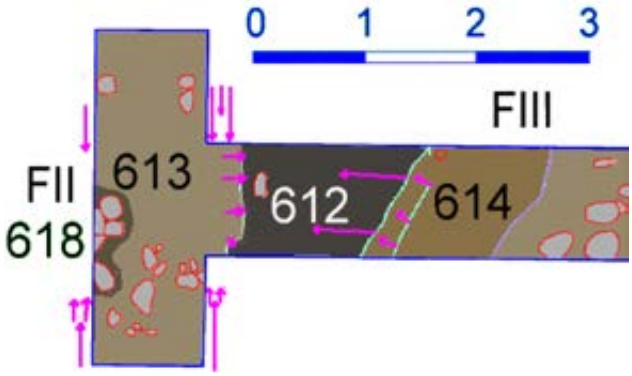
The roots probably represent plants growing on layer 613, the upper pre-peat mineral soil. This area was not particularly sheltered from the prevailing west winds and it seems most likely that the plants were shrubs, or dwarf rather than fully grown trees.

11.7.7 Shallow troughs in FVI and FVII

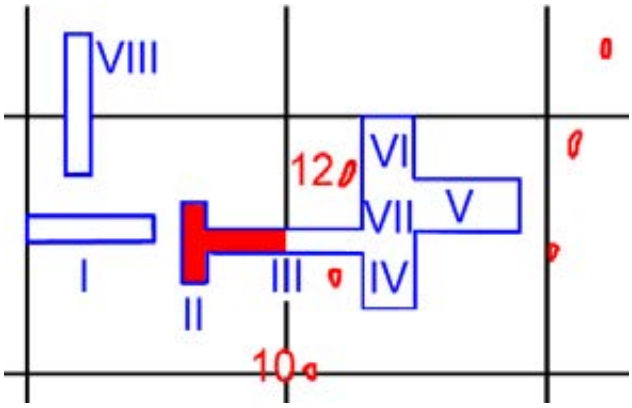
Two shallow dark linear troughs occurred just below topsoil on Area FVI and FII, running east-west about 2 m apart from each other (Illus 11.18). They seemed to start just east of the mound round the base of the standing stone 12.



Illus 11.15 Areas FI and FVIII from Plan 9 [NMRS DC38268]



Illus 11.16 Extract from Plan 9 [NMRS DC38268]



Key plan depressions on FVII and FVII part)

11.7.8 Discussion of the troughs

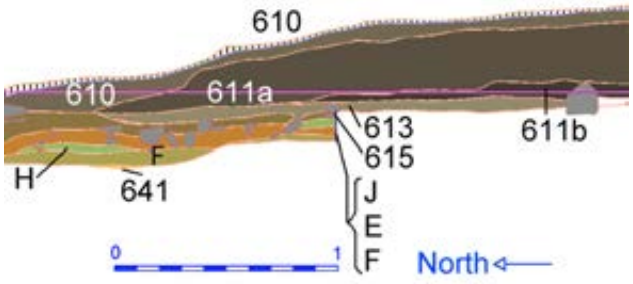
On Areas B, and D at the Ring and C at the east end of the East Row traces of one or more systems of cultivation beds survived. They seem to have been superseded by flat cultivation. But that does not provide a satisfactory explanation for the troughs. The southern trough on Area FVII did not continue into Area FV, nor was there any evidence for a trough along the north or south side of FV which might have been expected if there had been a cultivation bed system. It is most likely that the troughs had a different origin. But they do not seem to have been created for drainage. There had at some time been a hollow immediately to their west but the troughs did not connect with it.

Illus 11.18 raises the possibility that dark soil with superficial stones near the base of Stone 12 was of the same date as the troughs. Perhaps it, the troughs and the slight linear humps around them reflected a pastoral structure built of turf or based on sleeper beams, but the remains were very slight (Illus 11.18). They remain an enigma.

11.8 Phases 10 to 15 Partly post-Avenue mineral soils and related features

11.8.1 Mineral soil 613

Under the peat the mineral soil varied downwards. The upper soil variant 613 was humus-rich, dark grey when dry and black when wet (Illus 11.20).



Illus 11.17 The south end of Section 5a along the east side of Area FVIII [NMRS DC38264]

Illus 11.18 Features by Stone 12 [Film 1980.2.35]

None of the green minerals of the native clay were visible in it. It did not seem to have been much altered by modern soil processes. In FVIII it contained 5 spalls (with two refitting pairs) of a probably E/MN non-corky pot (Cat 626-630).

11.8.2 A low mound near the centre of the Avenue

A raised area of the site, forming a 20mm deep mound (628) somewhat to the west of the centre line of the Avenue, lay under the south baulk of FV and the east baulk of FIV (Illus 11.19). It was composed of dark brown clay with black and green mottles, though sometimes black brown with unstained quartz grains or greenish gritty clay. These latter two fractions were loose, though they could in places be clayey and greasy. To the west it ran under a patch of soft slightly furry clay which may have been a turf line largely modified by soil processes, and it may have lain under 615.

At its edge it was cut by a possible ard mark 627, 0.2m long, 30mm wide and 10mm deep, with a charcoal rich fill. It was first noticed at the base of 615, the lower part of the pre-peat mineral soil. It cut into the natural green mottled stony clay 623. A faint trace of another possible ard mark was seen nearby.

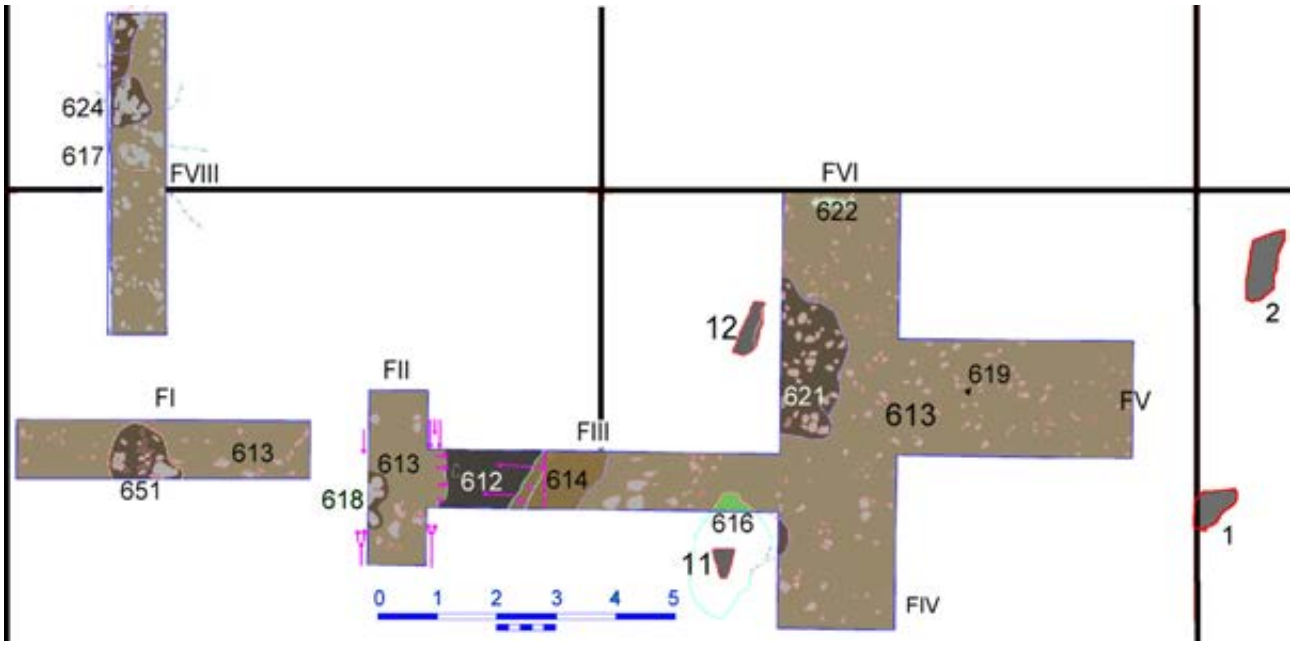
The mound was penetrated with fleshy grass roots. Its water retention capacity was unusually high. The area of mound 628 was always slightly damper though that was not visibly connected to textural changes. The dampness may have been connected to the lumpy peat in this area providing a reservoir, though the water spreading properties did not occur in FV, and to greater root penetration allowing channels for water to go down and be retained by the clayey soils. In the end the 'mound' was interpreted as a 'natural' set of modern subsoil changes initiated by disturbance above it related to the Victorian bottle glass.

11.8.3 Mineral soil 615

The lower soil variant 615 was humus rich and possibly iron enriched. It contained very weathered stones which had green minerals surviving when they were over 20 mm in diameter (11.20). It contained two body sherds and a fragment of a possibly E/MN non-corky pot (Cat 738-740 and two sherds from another thinner E/MN non-corky pot (Cat 741-1). Although in general 615 overlay or is presumed to have overlain various versions of natural green clay, in parts of Area F it also directly overlay pockets of archaeological remains. At one point there was a small pile of clay 619 poking through layer 613; it is described in Part 11.4.

The lower part of the soil, 615, seemed to be a slightly altered form of the archaeology found in adjacent depressions. Except under the mound round Stone 11 (616), soil processes will have destroyed much of the original differences in colour of the deposits created by people's activities.

Where no anthropogenic layers survived the pre-peat soil lay on well-cemented stony yellow-green mottled clay, sometimes with a sandy component. The stones were very weathered, and often crumbly. Under that again was an altered version of the natural green clay 623. It was stony, mottled, and heavily invaded by brown loose humus, and less well cemented than the layer above.



Illus 11.19 Plan 9 at the general level of soil 613 [NMRS DC38268]

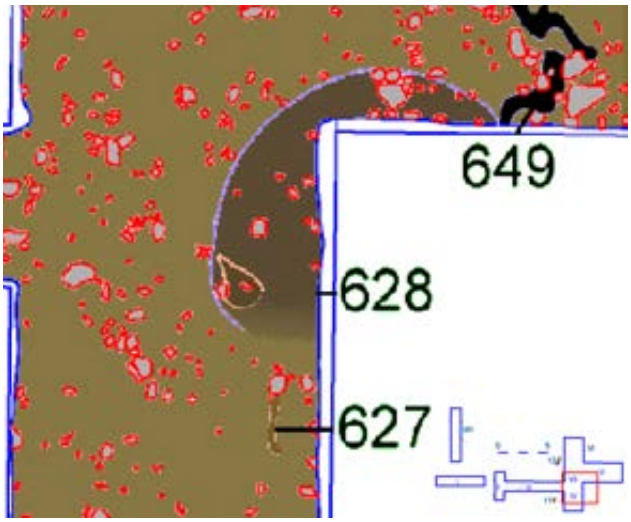
11.8.4 Discussion of the mineral soils

The mineral soil was often about 0.2m deep although in places it was far less. The underlying depressions, described below, contained turf lines. They would not have survived unless they were rapidly covered with a blanket of clay or soil. It is not obvious where the covering clay or soil came from. There are three main possibilities, which are not mutually exclusive.

1. The topology of the area may have been much more irregular when the turf lines formed. Perhaps it was originally as undulating as the area to the west of the Avenue (Illus 11.1). If so, humps in the ground surface may have been levelled for cultivation or when stones of the Avenue were set up locally, providing material to fill the depressions. That would have removed the turf line in higher areas and covered it in lower areas.

2. Shallow cultivation beds may have preferentially preserved underlying archaeology and the troughs between them may often have truncated it. There was a little evidence for low cultivation beds in FVI and FVII although it was ambiguous.

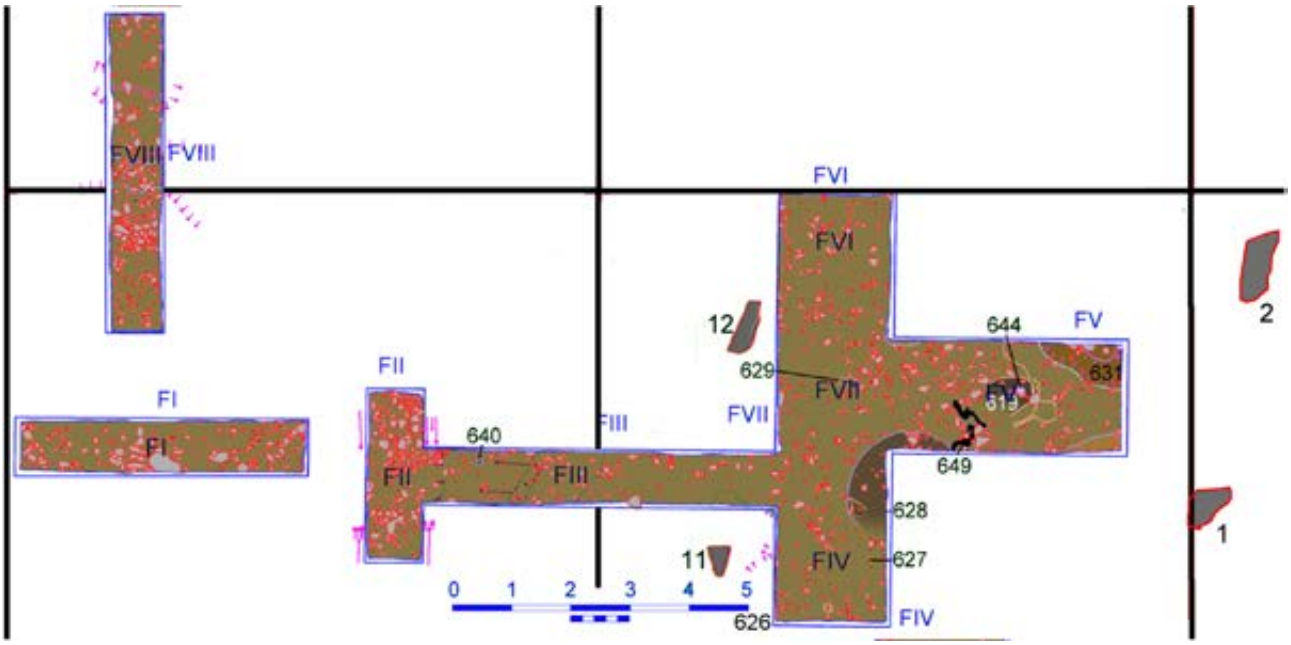
3. Organic material such as sea weed, sand and



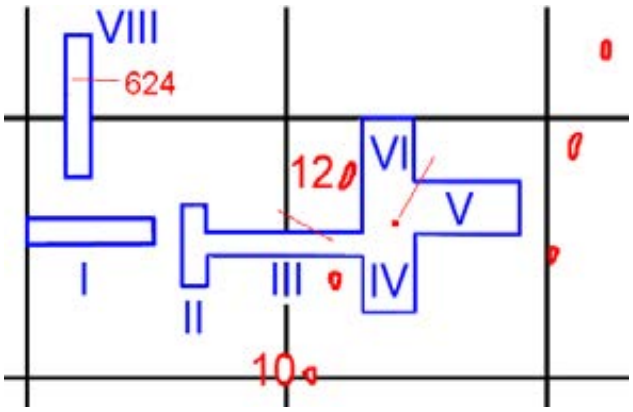
Illus 11.20 Extract from Plan 10 [NMRS DC38269]

turf may have been spread to improve the ground for cultivation, with more put in the hollows than on higher areas. However it seems unlikely that it would have been added in sufficient thickness to prevent cultivation damaging the underlying turf lines and charcoal layers, unless it were only put on top of existing mineral soils.

As described below, a piece of charred hazel from layer 648 in one of the hollows was dated (SUERC-11601, 4760+/-35) to between 3640 and



Illus 11.21 Plan 10 of 13 May 1980 at the general level of soil 615 [NMRS DC38269]



Key plan stone cluster 624

3380 cal BC, while another piece of hazel charcoal from an earlier layer 649 was dated (AA-24965 4385+/-35 BP) to between 3330 and 2890 cal BC. The fact older charcoal survived above later charcoal provides more support for the idea that levelling took place, but raises the spectre that material in other hollows may have been chronologically inverted as a result of levelling.

The direct archaeological evidence for cultivation on Area F came from the few ard marks which survived. Less directly, the fact that turf lines and charcoal spreads survived in depressions taken with the general uniformity and thickness of the soil cover means that soil 613/615 was almost certainly the result of a combination of levelling, shallow prehistoric cultivation and subsequent pre-peat soil processes.

11.9 Possibly Phase 6 to possibly Phase 7 Features below the later plough-soil

11.9.1 Stone cluster 624 in FVIII

In Area FVIII there was a cluster of stones 624 forming a rough line running north-west by south-east matching a slight break in slope in the surrounding ground (Illus 11.22, 11.23). Uphill to the south soil had accumulated against the stones. To the north the slope steepened downward.

The upper mineral soil 613 stopped at the stones. Most of them were set in the lower mineral soil 615 although one was set half in the underlying green clay 623 forming the transition to green natural below.

11.9.2 Discussion of stone cluster 624

The stones may have formed part of a rough field wall. An alternative and preferred interpretation given its irregularity is that they were merely cleared to this spot during cultivation of the area to the south. Thus the pile can be seen as accumulating as soil 615 crept downhill.

11.9.3 The mound around stone 11

Fibrous turf 610 covered mound 616 round the base

of Stone 11. The mound consisted largely of green gritty clay with rotting green stones. Amorphous peat 611b was not present but level peat cutting would have removed most of it on the mound, and after that colonisation by grass would have removed any remaining traces. Underneath the mound was buried turf line 620, dark brown when moist, slightly silty clay, humus rich with no stones and no charcoal. It was not greasy, arguing for non-humification and thus pre-peat soil conditions.

The green clay mound 616 and the turf line 620 were separated from the mineral soil 613/615 by stones (Illus 11.24, 11.25). The section reflects the affects of topsoil development which had converted the top of the mound and probably also the top of mineral soil 613/615. The latter was a plough soil and the section probably reflects cessation of ploughing close to the mound.

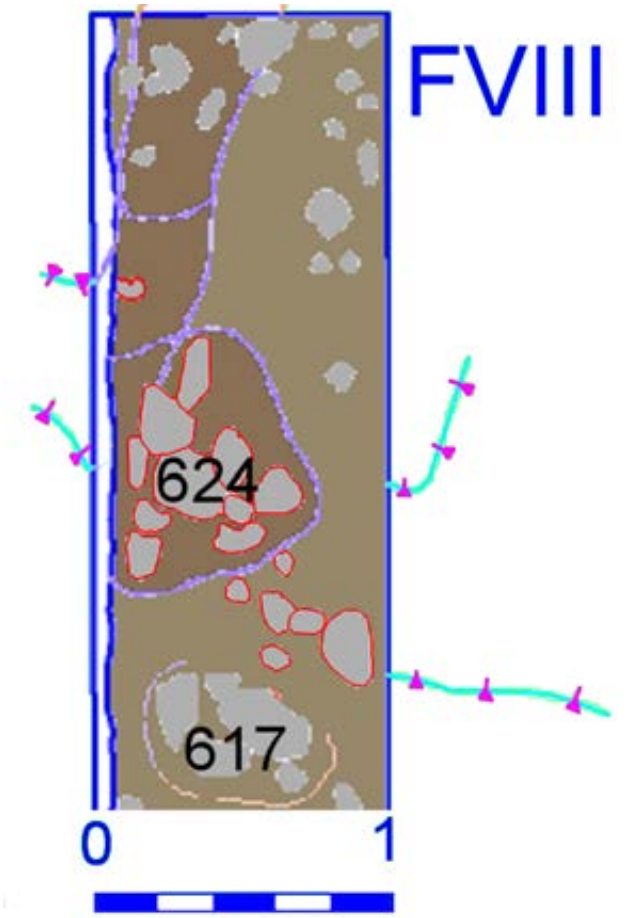
On the eastern flank of the mound the mineral soil 613/615, if it was ever present, seems to have been entirely invaded by modern fibrous turf.

Two thinly developed turf lines existed within 620, in a slight hollow under the western flank of the mound. It had been truncated by the ploughing which created 613. The layer under 620 was a dark yellowish brown slightly greasy layer 623E with rotten rock inclusions and a clear 60 mm thick downward transition to green gritty clay 623G with rotten rock inclusions.

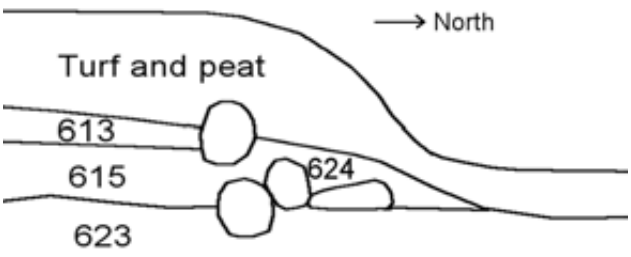
11.9.4 The mound round Stone 12 and depression filled with green clay 622

Under superficial tabular stones there was a slight mound near the base of Avenue stone 12 (Illus 11.26). Stone 12 lay just 0.3m to the west of point and the stones and underlying brown greasy material below 611a probably represent a mound like that round stone 11. Layer B of the modified mound material was dark brown rooty clay. Layer D was dark brown slightly greasy material.

The lower mineral soil 615 appeared to overlie the mound. Under it and running up onto the edge of the mound were two turf lines (C) separated by light green gritty clay (F). Under them lay dark green clay 622 filling a depression; the pottery in this layer shows that it was not the natural green clay.



Illus 11.22 Stone cluster 624 [Plan 9 NMRS DC38268]



Illus 11.23 Stone cluster 624 [Context sheet 624]

Illus 11.24 The mound around Stone 11 [Film 1980.9.21]

Table 11.1 Pottery from clay 622

Cat	Comment
280	A Hebridean Incised sherd (ASH 19)
990	A sherd from a very thin fine Hebridean Incised pot or a Beaker.
991	A spall from the same pot as Cat. 990.

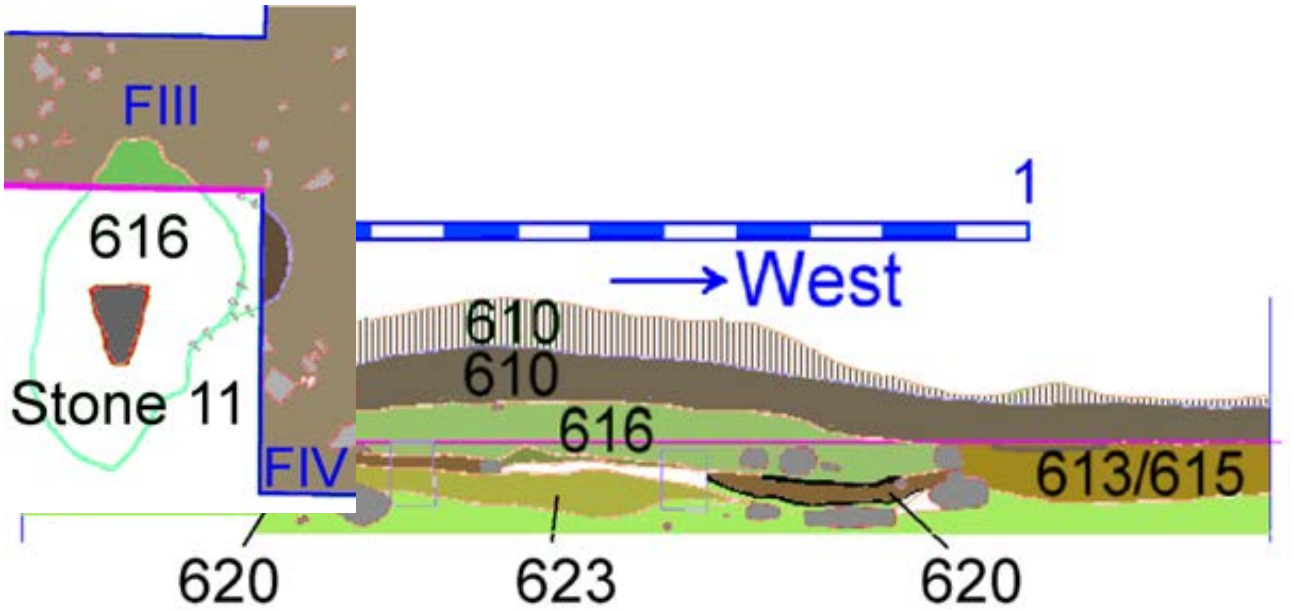
A piece of chert (80.108), probably unworked, was also found.

At the north end of FVI the lower mineral soil in the depression contained several turf lines (11.26-11.27).

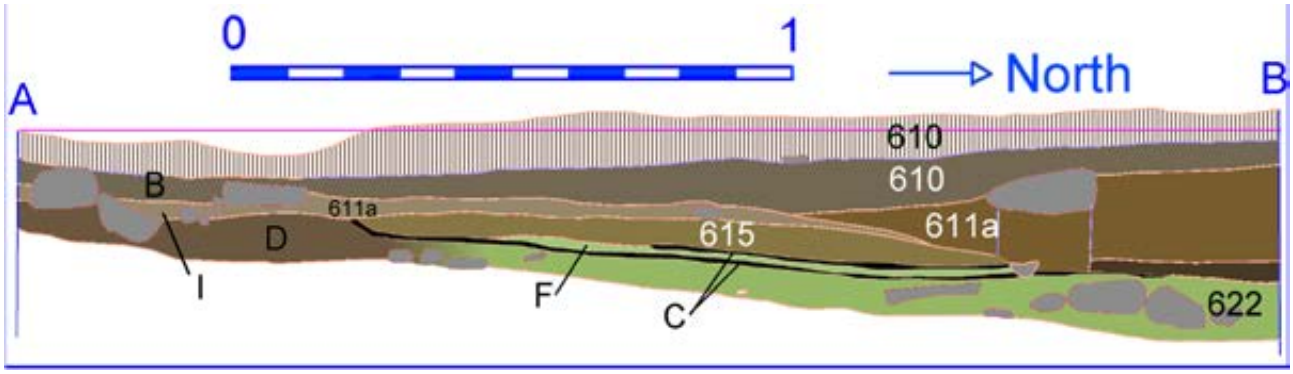
In Illus 11.28 the colour map of 11.27 has been distorted to show detail of the section face and turf lines more clearly.

11.9.5 Discussion of the mounds round the bases of Avenue stones 11 and 12 and depression 622

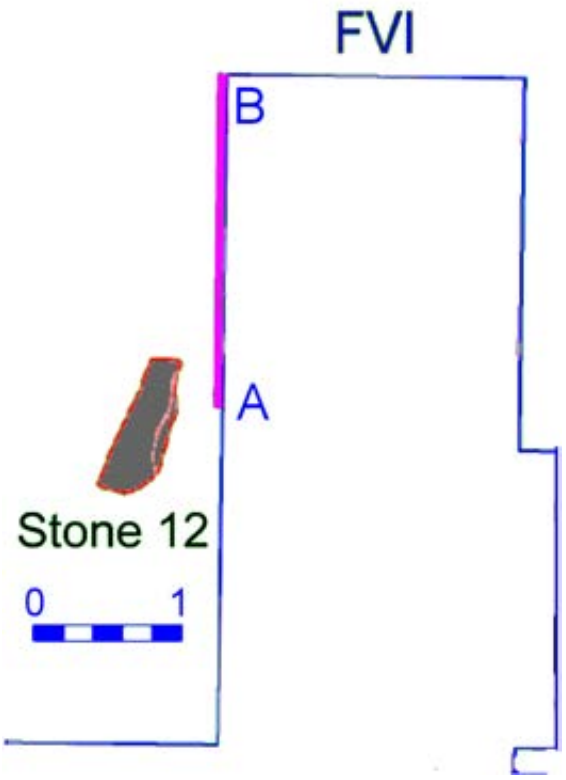
There were two turf lines in the hollow 620 under the green clay 616 in the mound at the base of Avenue stone 11. However the two turf lines near Stone 12 appeared to rise over the mound round its base. While there is of course no pressing reason for the turf line pairs near Stones 11 and 12 to be of the same date as each other it is very tempting to ascribe a similar formation process to them both. In each pair the lower turf line might be that into which the pit of the nearby stone was cut. The thin clay above it might be spoil from the stone pit or material trampled onto the lower turf line during pit-digging and stone erection. The upper



Illus 11.25 Key plan and Section 1 of the mound around Stone 11 [NMRS DC38260]



Illus 11.26 Section 5b near Stone 12 [NMRS DC38264)



Key plan for Section 5b

Illus 11.27 The north baulk of FVI showing the depression [Film 1980.12.26]

Illus 11.28 Detail of Illus 11.27

turf line would then be that which formed over the spread or trampled clay. If this interpretation is correct then green clay 616 must be the result of a later spreading of the clay mound round the base of Stone 11 covering the later turf line. The 'nose' of the mound shown in the Key plan for Stone 11 might be taken as some support for this idea.

It is however probably safer to interpret the turf line pair under the mound round Stone 11 as having a different type of origin to that round Stone 12. That round mound 11 could then be interpreted most reasonably as a chance survival in a levelled hollow.

The mound round the base of Stone 12 was possibly contemporary with the filling of 622 of the depression. It looks as if the depression was levelled up and a clay mound was made round the base of Stone 12 before a thin turf grew over both. Clay washed over the turf line and another thin turf line grew on it. Eventually both turf lines were truncated by cultivation and soil changes forming layer 615.

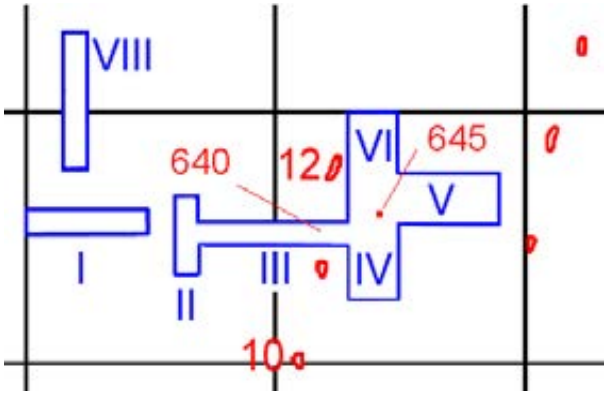
Three turf lines appear to be present in the northern part of the depression (Illus 11.28). One pair of turf lines may correspond to that further south in 11.25 but it is not clear which. Some of the lowest short dark bands in the depression may represent inclusion of individual turfs during filling.

These features, particularly the depression, were reminiscent of troughs between cultivation beds in Areas B, C, D or H. Further excavation round Avenue stones 11 and 12 lines might allow a better understanding of the nature of the depression and the mound, and the relationship of the turf lines to Stones 11 and 12. Analysis of the pollen in the depression, the turf and in mound layers might allow an at least approximate date for the standing stones through comparisons with the dated pollen columns at Calanais Leobag.

These features have been assigned to possibly Phase 6 to possibly Phase 7 on the basis that there were no definite Beaker sherds from Area F and it is possible that it was not used for agriculture after Phase 7 until well into the 2nd millennium BC.

11.10 Possibly Phase 3 to possibly Phase 5: earlier features below the plough soils

11.10.1 Soil patches close to Stone 12



Key Plan for soil patches

A small (50 mm x 50 mm x 30 mm) oval patch 640 with some charcoal on its surrounds lay between stones 11 and 12. It first became visible at the junction between the mineral soil and the subsoil, in an area where there were textural changes presumably to be associated with proximity to stone hole 11, and to the glacial cemented subsoil. It was thought unlikely to be a stake hole and may have been a fragment of pre-ploughing soil. Its position was not planned.

Illus 11.29 Feature 645 in FVII [Film

1980.10A.6]

In F VII, close to the flat tabular stones 621 there was a grey, slightly charcoal rich clay patch (645) with distinct edges measuring 0.13 by 0.15 m but only 15mm deep (Illus 11.29).

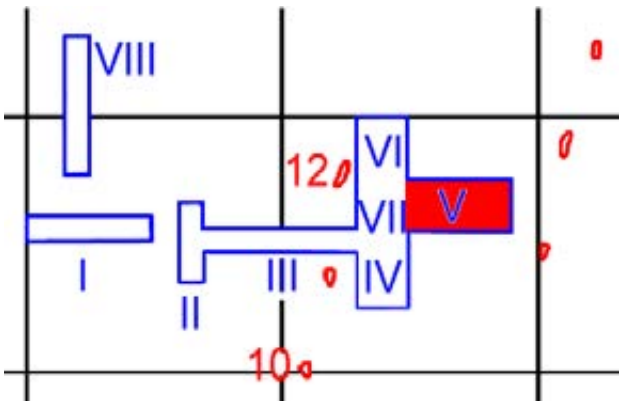
It lay immediately below the mineral soil 615 and was similar in size to F644, the stake hole in FV, but it was irregular and probably a decayed turf or fragment of pre-ploughing soil.

Under the east edge of the flat tabular stones 621 there was an apparently natural shallow small depression 629 filled with charcoal-rich brown clay which measured 0.2 m by 0.15 m in diameter and 20mm deep (Illus 11.21). It lay below the mineral soil and over the natural green mottled stony clay. A similar small natural depression 626 lay at the south end of FIV (Illus 11.21).

These soil patches can only have survived if covered by clay or soil before ploughing took place.

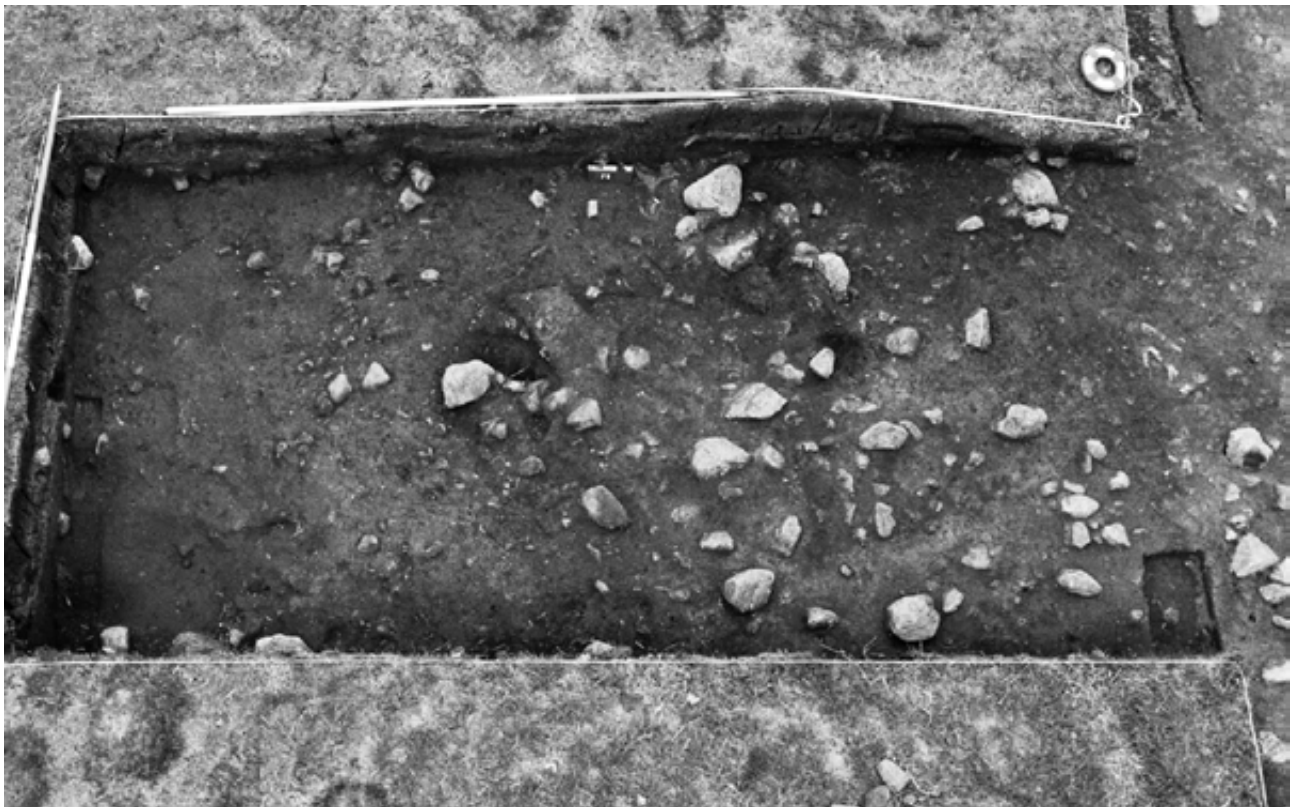
11.10.2 A pile of clay and stones in the middle of Area FV

Below the mineral soil within the Avenue area hollows were filled up in antiquity by silty material alternating with turf lines. The soil cover in this area was insubstantial and the material in the hollows had been affected by soil processes, mainly induration and humification of the turf lines.



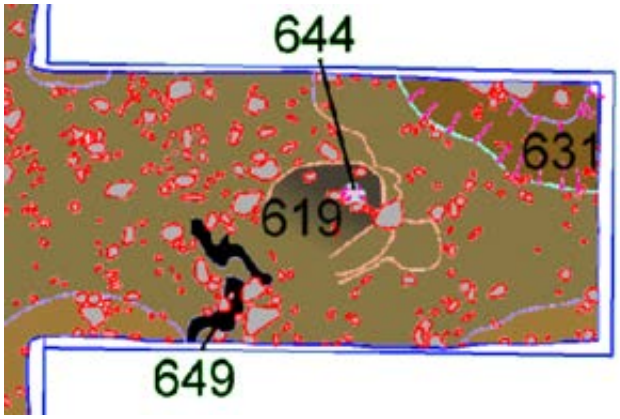
Key plan for FV

However a truncated mound survived in the centre of the area under the mineral soils (Illus 11.30). A small triangular area of black, humus rich clay 619 with charcoal had appeared at the level of soil 613 (Illus 11.20). It broadened into a patch of clay at the level of soil 615 (Illus 11.31) but it showed no definite shape when sectioned. Perhaps it had survived as a clay clod derived from a pile of clay below. Unlike most features



Illus 11.30 FV from the north between 12 and 15 May 1980 [Film 1980.8.20]

at this level its colours and textures had at least partly survived the homogenising effects of soil processes. It seems logical to suppose that the underlying pile was originally wider and that the vagueness of the boundaries of the lower part of 619 reflect those processes.



Illus 11.31 Detail of FV in Plan 10 of 13 May [NMRS DC38269]

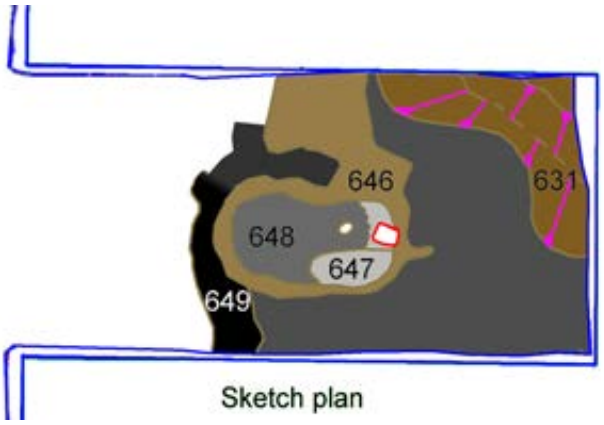
Charcoal rich streaks 649 and a faint broad curving streak of darker soil at the western end of FV, all visible on Illus 11.31, had also survived the ploughing and soil modifications represented by the overlying mineral soils. They were at a much lower stratigraphic level than 619. Posthole 644 was also visible (Technical note 11.9.7).

11.10.3 Layers in a hollow under 619

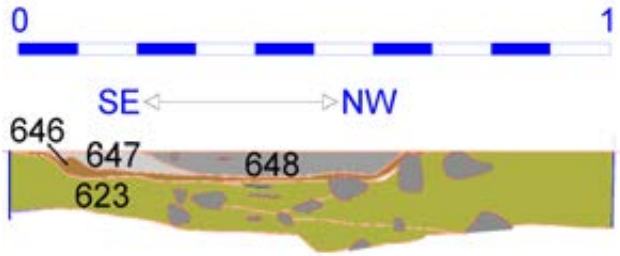
Several layers survived in a slight hollow partly under clay pile 619 (Illus 11.32-11.33). The uppermost was a patch of very dark greyish brown, stony, gritty clay 647 and 648. Clay 647 included a sherd and two fragments of E/MN non-corky or Beaker pottery (Cat 985-987). Together with its slightly gritty charcoal-rich variant 648 clay 647 formed a layer up to 50mm deep. Section 2 truncates both layers (Illus 11.33).

A piece of hazel charcoal from 648 was dated (SUERC-11601, 4760+/-35) to between 3640 and 3380 cal BC. The hazel was clearly residual because another piece from an earlier level 649 had a significantly later date, as described below.

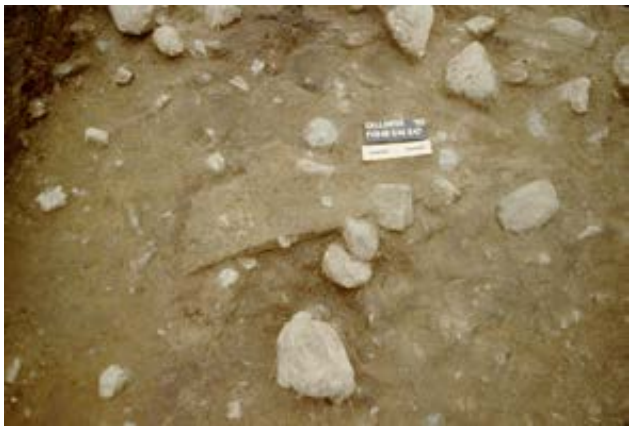
Clays 647 and 648 both overlay a very thin layer, 650, slightly smoother and more charcoal rich (not shown on section or plan). That in turn lay on a



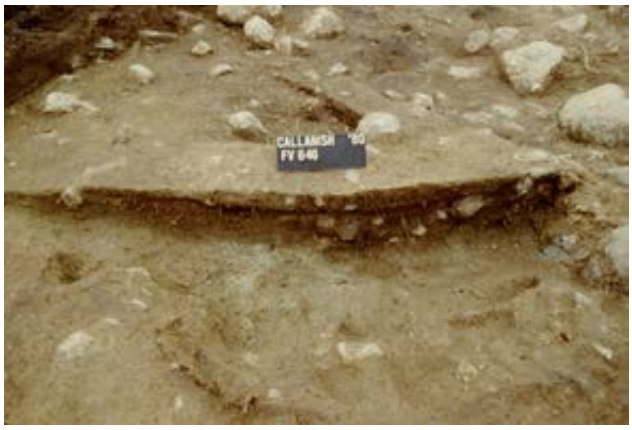
Illus 11.32 Sketch plan of 23 May 1980, and for the northern part of 649 Context Sheet 649



Illus 11.33 Section 2 of 27 May 1980 across the central depression in FV [NMRS DC38261]



Illus 11.34 Feature 646, 647 and 648 on 19 May 1980 Film 1980.11.11]



Illus 11.35 Turf line 646 sectioned in the depression [Film 1980.12.21]

humus rich stone and grit free turf line 646 (Illus 11.32, 11.33). This turf line was first seen as a ring of material round 647 and 648 (Illus 11.32). It was clearly visible in the side of stake-hole 644.

To the west 646 overlapped onto the southern and western shoulders of its protective dip where 646 overlay the thin, distinct band of charcoal-rich clay 649 (Illus 11.31, 11.32). A single piece of hazel from 649 was dated (AA-24965) to between 3310 and 2910 cal BC, with a somewhat greater likelihood of being after 3150 than before. This date was significantly later than that of the piece of charcoal in the later layer 648.

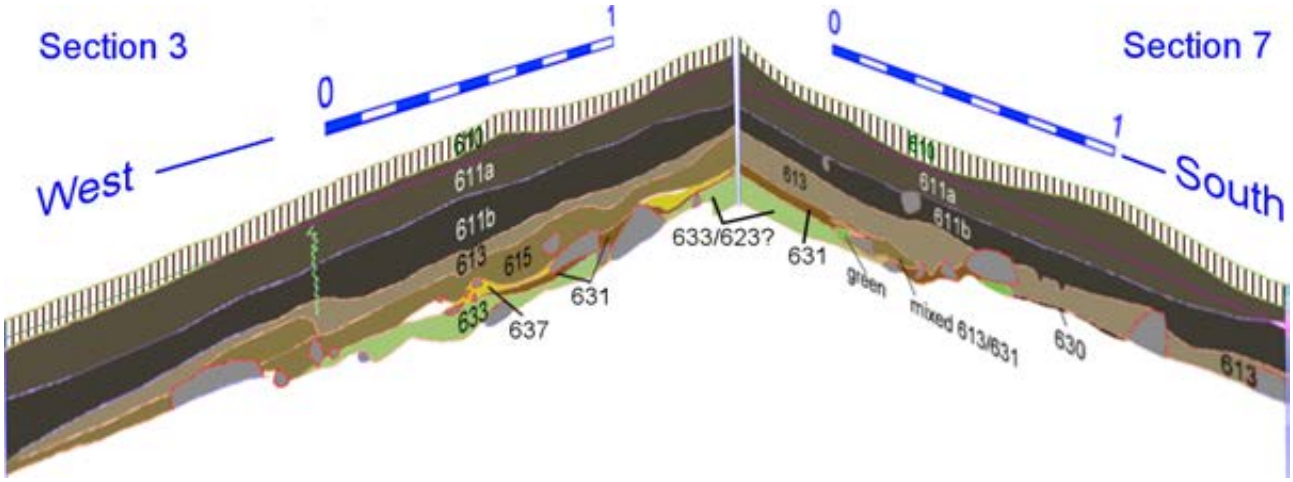
11.10.4 Layers in a depression in the NE corner of Area FV

The north face of FV showed the general sequence with the topsoil and both fibrous peat 611a and amorphous peat 611b overlying the mineral soil 613/615. Under it various thin layers lined a shallow linear depression (Illus 11.32, Illus 11.36 Section 3, and Illus 11.37)

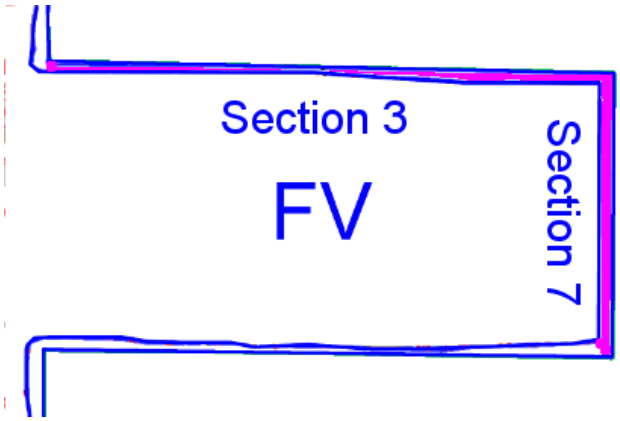
The east end of FV was broadly similar although the interpretation of the upper and lower mineral soils was different with 615 not noted on Section 7 (Illus 11.36). On Section 3 the western part of turf line 630/631 appeared to be dished, and on Section 7 it dipped and then rose to the north-east corner.

The shallow depression was lined by turf line 631. Even-textured and gritless clay, it was somewhat similar to 620, the buried turf line under the mound round the base of Stone 11. Turf line 631 contained two undiagnostic pottery fragments and a crumb from pots (Cat 988, Cat 989).

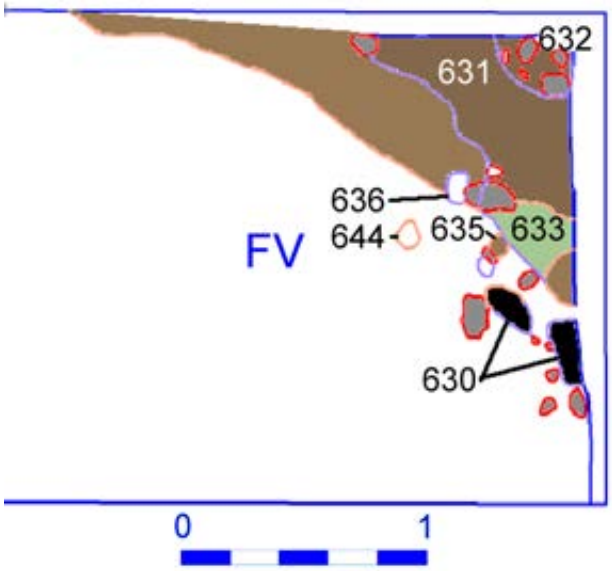
The near-litter layer 631 of this soil was very patchy, and other parts of turf line 631 were orig-



Illus 11.36 Section 3 North face of FV and Section 7 East face of FV of 25 May 1980 [NMRS DC38262 and NMRS DC38266]



Key plan for FV Sections



Illus 11.37 Plan 6 of 15 May 1980 [NMRS DC38265 (part)]

inally called 630, 634, 635, 636 and 638. This patchiness was apparently due to the removal of stones as described below.

Pockets in soil 631 contained slightly greasy, yellow brown, mottled, slightly sandy clay 637 with grits and charcoal (also called 639). In places it mingled with the overlying mineral soil 615. The pockets were casts left by stones which had been removed well before peat grew over the area, presumably during cultivation. The stone group 632 in the NE corner of FV was stratigraphically at the same level as the removed stones (Illus 11.16, 11.17).

Below 631 there was a sharp (less than 5 mm) transition down to charcoal-rich gritty, slightly sandy clay 633 which dried to a grey green ashy colour. 633 was probably the immediate subsoil of 631.

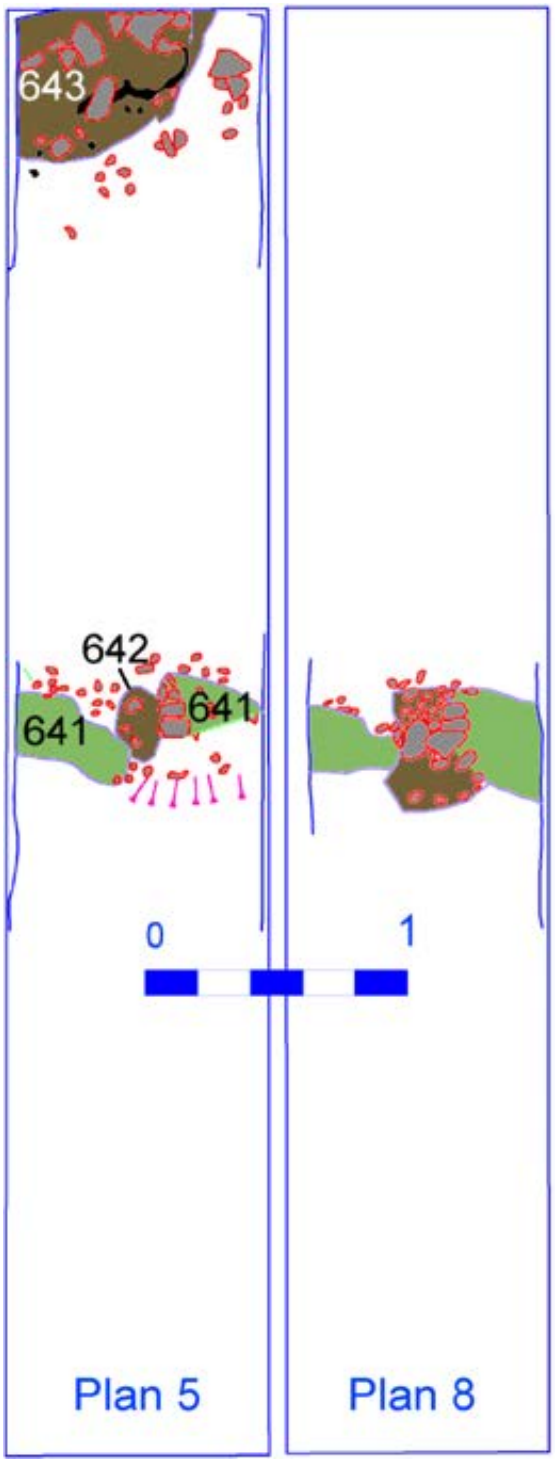
On the outer southern edge of the depression turf line 631 rose over a thin spread of charcoal 630 was found it (Illus 11.15, 11.17). It lay on a very light green gritty soil. Charcoal spread 630 was interpreted as the same as 649 to the west of the central depression in FV.

A stake hole 644 was found under the mineral soil 615 in Area FV (Illus 11.19-11.20). It was filled with soft grey-brown clay with some charcoal and it measured 0.16 by 0.26 m in diameter, surviving to a depth of 50mm. The material immediately surrounding it (at the level of soil 615)

Illus 11.38 Surface 631 and stones 632 [Film 1980.8.14]

Illus 11.39 Feature 630 [Film 1980.7.11]

Illus 11.40 Stake hole 644 [Film 1980.10.27]

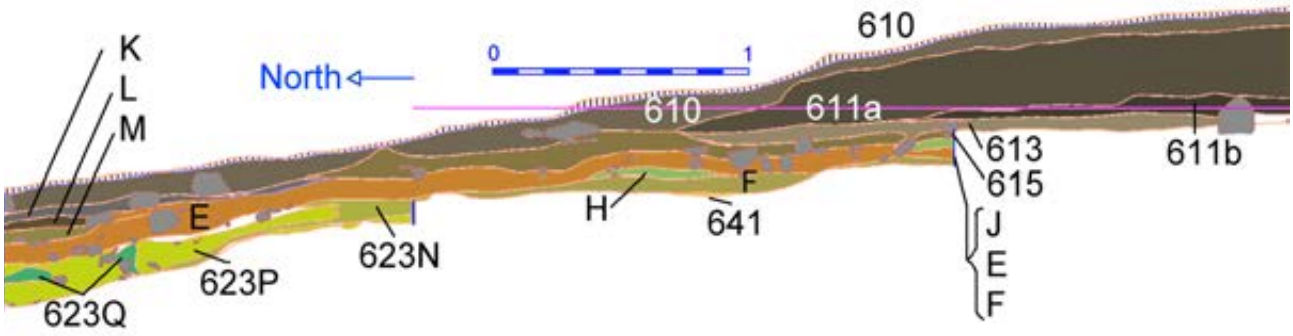


Illus 41 Area FVIII Section 5a [NMRS DC38264a]

was greenish-yellow brown with grits; lower down it penetrated 648, gritty clay with some charcoal). Thus the charcoal in its fill probably came from one of the higher charcoal-rich layers in this area, for it must have been cut from a higher level and its top must have disappeared through soil processes or have been removed during cultivation. Its chronological relationship to the ploughing was thus ambiguous.

11.10.5 Discussion of the layers in hollows in FV

One tentative interpretation of the curving shallow depression near the northeast corner of FV was



Illus 11.42 Plans 5 and 8 [NMRS DC38264 and DC38267]

that it represented a very small ring ditch. But the various layers in the two hollows in FV correlated closely with one another. Charcoal spread 649 was equivalent to charcoal spread 630. Turf line 646 was a continuation of the buried turf line 631 with casts of removed stones in its surface (Illus 11.36). There seems little doubt that both hollows were the truncated remains of an originally continuous set of layers. That suggests that the 'ring' ditch was merely an amorphous depression.

Charcoal rich layer 649 with 630 had been truncated by the cultivation which formed mineral soil 613/615. There seems to be no reason why the piece of hazel charcoal in spread 649 should have been much earlier than the deposit in which it was found. The charcoal spread very probably represents a discrete event, perhaps burning of a small fire. Hazel is a short-lived tree. It is likely that the deposit was of much the same date as the charcoal. It provides a terminus post-quem for the cultivation of between c. 3300 and 2900 cal BC.

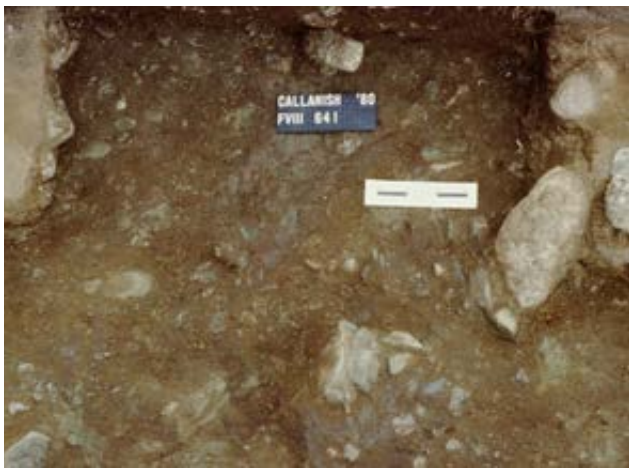
This allows the cultivation which formed the first version of 613/615 to be of the earliest Callanish Leobag period of cereal cultivation, which ended between 3490 and 3020 cal BC (Chapter 23: Palaeoenvironment). However, it also allows the cultivation to have been of considerably later date, either that which started sometime between 2980 and 2500 cal BC and which included the cultivation beds on Areas B, D and H under the Ring or some even later episode.

Layer 648, however, judging by the residual charcoal in it, may have been the base of material dumped to fill hollows in this area. That dumping must have preceded cultivation and it must have resulted in a soil thick enough to prevent even more truncation than did take place in FV.

11.10.6 An early enigmatic feature in FVIII

At the base of layer F there was an apparently natural discontinuous layer of light green soft, greasy, grit-free clay 641, in what was elsewhere dark greyish, mottled brown clay (11.36, 11.37). It incorporated near its centre an egg-shaped mass of dark yellowish brown fibrous clay 642, very rooty with stones. 641 was half sectioned as was the 641/642 boundary but there was no sharp division; they merged over 30 mm. An infilled root stain was found, curving from the baulk to 642 (just visible on Section 5 Illus 11.41).

Therefore one explanation for these layers is disturbance by tree roots. But feature 641 was very shallow (<40 mm) and 0.2 to 0.3m wide. The impression was that it was too wide and shallow to have been caused by tree roots. Perhaps it was the base of a shallow ditch or gully dug near the break in slope before cultivation started. But it remained enigmatic.



Illus 11.43 Feature 641 [Film 80.9.22]

12. Area H

Illus 12.1 View of Area H from the west on 12 May 1981 [Film 1981-6-21.TIF]

12.1 Introduction

In Illus 12.1 Area H is in the foreground and Area B in the background. The secondary kerb stone in Area H is matched by the fallen kerb stone on the near edge of Area B and the curve of the edge of the cairn can be seen immediately to its right.

The excavation of Area H was supervised by Annemarie Gibson.

12.1.1 General aims

In 1980 the partial excavation of Area D had revealed much damage to the cairn. It was sometimes difficult to distinguish the Victorian and later interventions there from prehistoric activities. Area H was opened in 1981 to investigate the structure of the cairn where it seemed to be relatively well-preserved, to see if there was a stratigraphic relationship between the cairn and Ring stone 42, and to characterise the strata under the cairn.

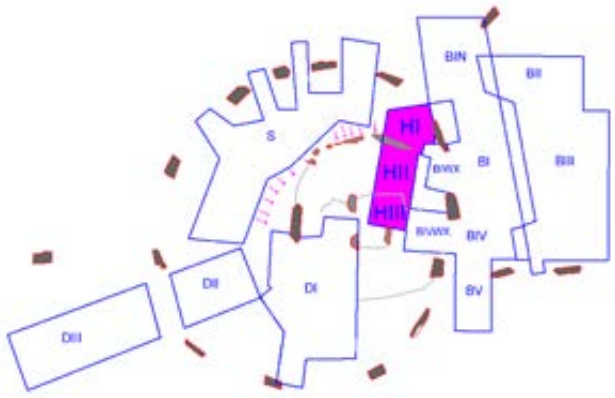
12.1.2 Resistivity

The resistivity survey of August 1979 did not include Area H because the latter was entirely within the Ring.

12.1.3 Layout and progress of excavation

Work started on 1 May 1981 (Illus 12.2). The trench was 1.4m wide at the south end and 1.5m wide before it expanded to the east about 1m from the northern end. It averaged about 5m long. It covered part of the area between the cairn and the Ring stones to the north (HI), the cairn (HII), and the NE part of the chamber (HIII). A small ex-

Illus 12.2 Laying out Area H, from the north on 1 May 1981 [Film 1981.1.10



Illus 12.3 Location of Area H

tension was added later in the northeast to investigate the cairn kerb more fully (Illus 12.3, 12.4).

During the last days of the excavation a small area between Area H I and Area BIWX was opened to examine the relationship between layers associated with the building of the cairn and those associated with the erection of Stone 42, and to allow a concordance between the lower layers recorded in Areas B and H. A full account is given in Chapter 7: Area B.

12.1.4 Contour survey

There was no pre-excavation contour survey of Area H. Spot heights were measured. The area outside the cairn was flat.

12.1.5 Context numbering

Context numbers ran from 700 to 799 and 1000 to 1007.

12.1.6 The main cairn section drawings

The main section drawings will be referred too in many different parts of this account. Thus in a sense they do not fit into any particular part of it. For that reason they will be described and discussed briefly here.

On the east section (Illus 12.5, 12.6) layer 706 was definitely and 708 was probably part of post-peat capping of the cairn.

Under them layers 712, 729, 1008 were parts of the secondary cairn, fills added when a massive kerb was erected in the 2nd millennium BC, following robbing of the cairn probably in the last quarter of the 3rd millennium BC and the earlier part of the 2nd.

Layers 728 732 and possibly also 733 were parts of the primary cairn. Despite the labelling of layer 732 as a basal chamber wall fill, under 769 on the west section and at much the same level as 770 on the east section, I suspect that those were simply errors. There is no other evidence for them. Gritty clay 732 was restricted to the cairn

Under the cairn and chamber wall was a green clay platform 760. Cut into it at its south end was a slot with three fills including 772 and 778.

Off to the right of that on the depicted section was part of the eastern chamber wall and various complex features were found in and under this corner wall of the chamber.

Under the green clay platform was a pair of turf lines 758 and 766, each overlying light-coloured

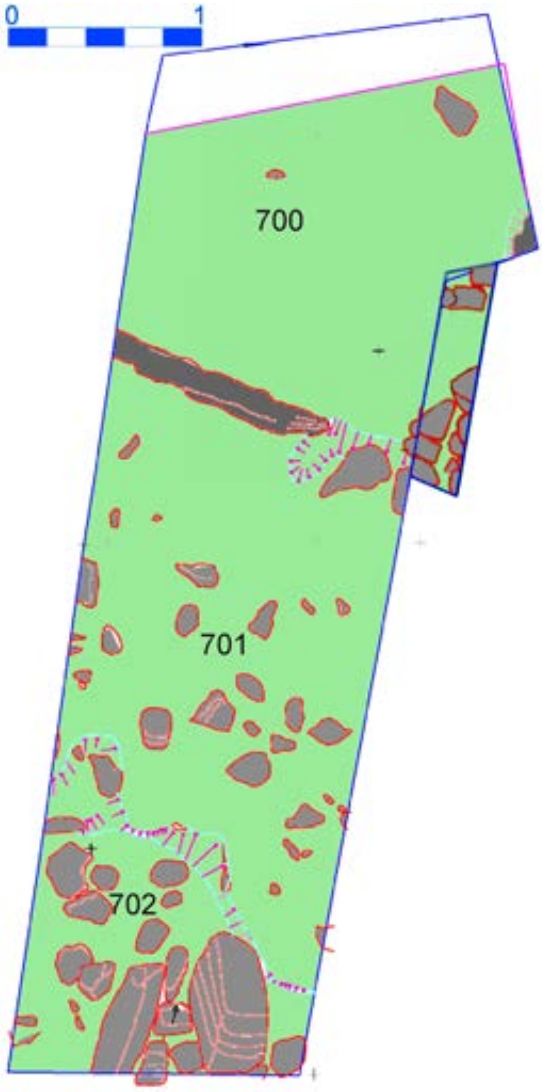
soils and below the lower of them were the relics of a system of cultivation beds including greenish-grey soil 792.

Much the same set of layers can be seen on the west section (Illus 12.7, 12.8). The certain (706) and probable (708) post-peat capping, the secondary cairn (712, 729 and 768), the primary wall 769 and the primary cairn 728, 732 and possibly 733, the green clay platform 760, the slot and its three fills 772, 778 and 730 and the underlying turf lines, soils and various earlier features.

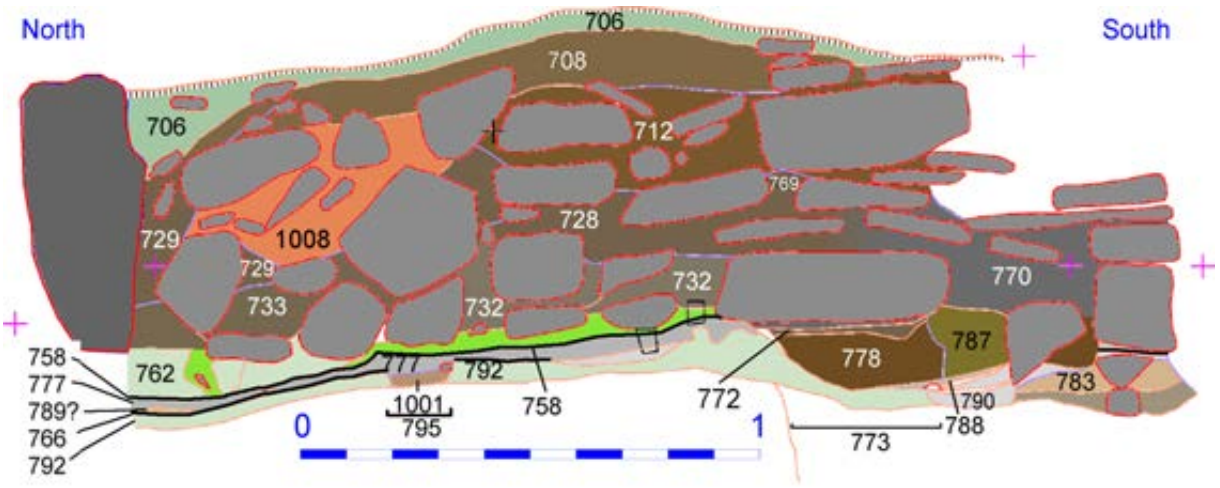
The lack of stones in the top part of the south end of Section 34a is a strictly local phenomenon (Ch 12.2.3, Illus 12.13). Less than half a metre eastward there were three more courses of large stones, more like those on the more distant east section. But the latter may reflect Victorian rebuilding.

It is, incidentally worth noticing the large drooping piece of modern turf on Illus 12.8. A prehistoric version of a hanging turf like this was found in each of two places on Area B; one was the edge of the stone-pit for Ring stone 42 and the other was the edge of the scoop for the early enclosure. Both had been rapidly covered by clay and looked like turf lines (rather than merely turfs) growing down into the features. But in fact the features post-dated the turf lines which drooped into them.

The various phases of activity on Area H will be discussed in reverse order, from recent to late, so far as possible. To reduce the amount of repetition a few discoveries, will be presented partly out of chronological order.

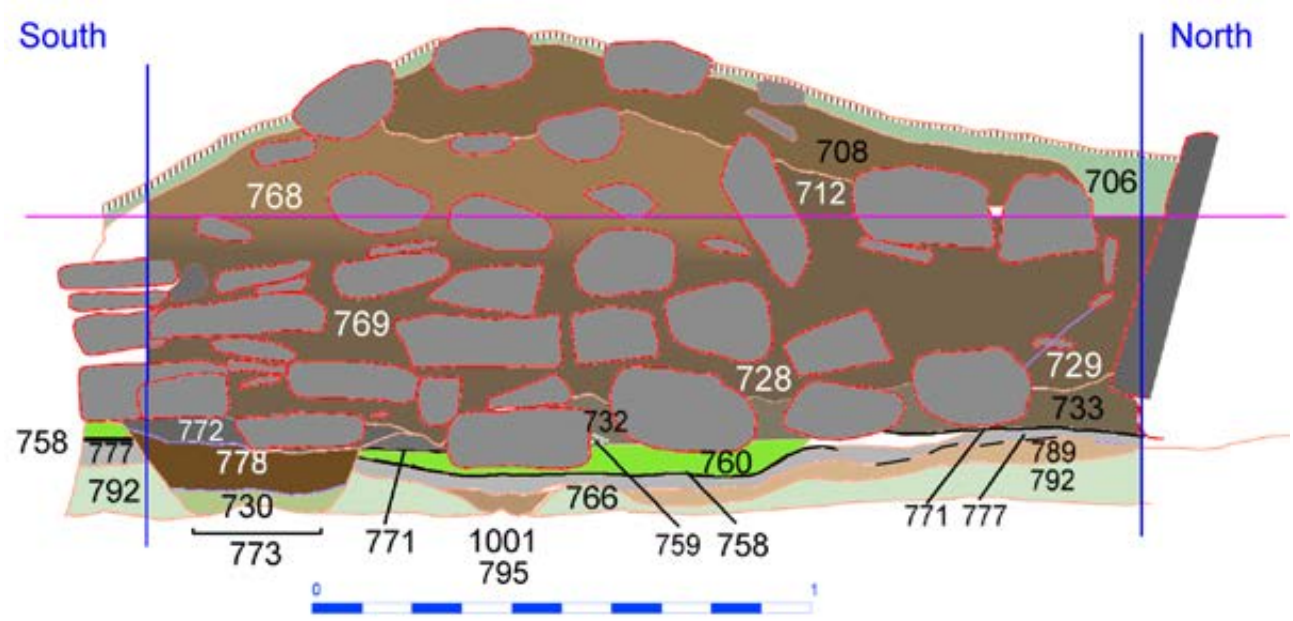


Illus 12.4 Plan 1 and Plan 20 Area H after deturfing [NMRS DC38272 and DC38292]



Illus 12.5 The east section of the cairn (Section 33A) including layers in set-back element to bottom right [NMRS DC38305A]

Illus 12.6 The east section of the cairn as on Section 33A but omitting layers in set-back element to bottom right of Illus 12.5 [Film 1981.19.12]



Illus 12.7 The west section of the cairn Section 34A [NMRS DC38306]

12.2 Phase 18: Victorian and later activities

The area north of the cairn was covered by turf on a friable brown to dark brown soil 700; no peat fragments were visible in it. The top of the cairn was covered by thin turf 701 with stones protruding. It included Festuca species, Poa Plantago maritima and other species associated with turf from a seaside or machair environment, reflecting modern repairs. The vegetation covering the chamber floor was lush, and the soil 702 was moist, slightly greasy and very dark brown.

12.2.1 Recent disturbance outside the cairn

In this area north of the cairn ministry grit 705 lay mainly over the mound round the base of Stone 42 of the Ring, where it contained a flint (81.468), not catalogued.

The possibility of a shallow pit dug by the north end of Ring stone 42 is described later because the

Illus 12.8 The west section of the cairn as on Section 34A [Films 1981.19.20 and 19.22]

evidence is best described in the context of earlier strata. The other features identified at this level, mixed material at the base of Ring stone 42 and rough paving 719 near the kerb were interpreted as prehistoric and will also be discussed later.

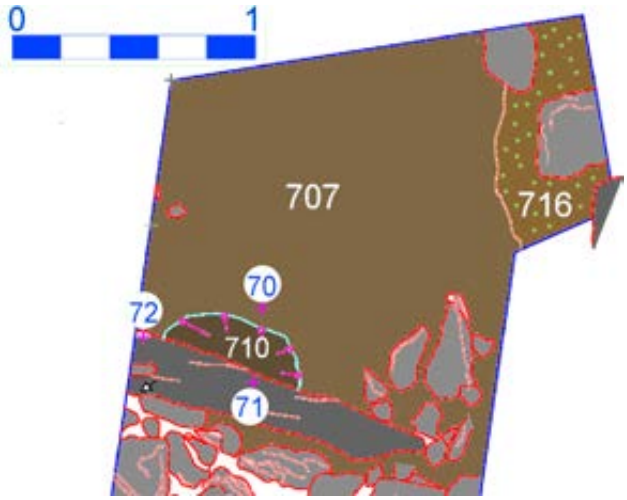
Under the turf 700 and Ministry grit 705 was a small pit 710 (Illus 12.9, 12.10). It was filled with rooty gritty loam 713 and contained peat lumps. The lower fill 714 contained 3 small fragments of peat (81.27 to 81.29).

Because it had not been affected by the soil processes which had modified other layers outwith the area of the cairn, the pit almost certainly dates after peat stripping in 1857, the peat fragments being chance inclusions.

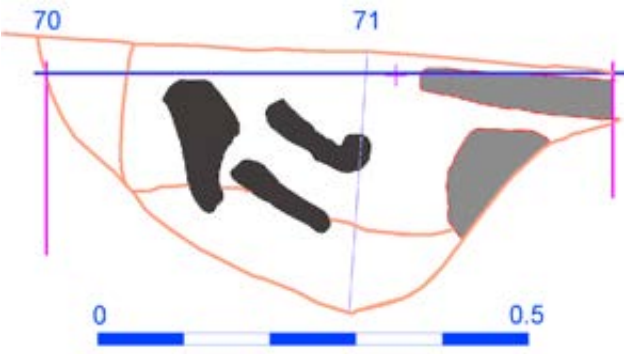
Below the pit was a stone-filled feature, (Illus 12.12). It is shown on Plan 4 as part of slot 735 (Chapter 12.5.4 Illus 12.49), but as photographed it seems to be a pit fill. This must be the lower part of 710 referred to in the Day Book (page 3).

12.2.2 Discussion of Pit 710

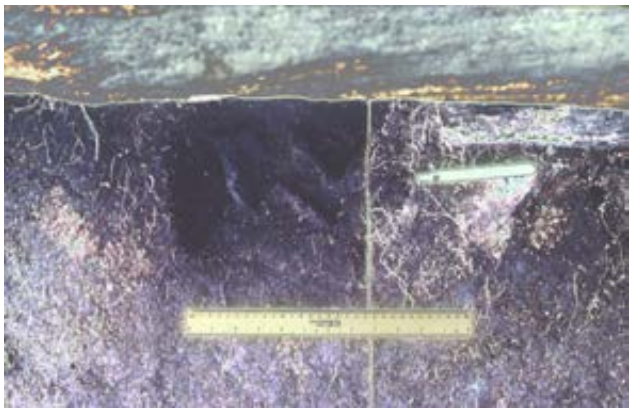
The upper part of the pit was probably dug after 1857 to explore the way in which the kerb stone had been set up. It may have been followed by straightening up of the slab although on balance that seems unlikely. It would have been necessary to disturb all the loose material behind it and there



Illus 12.10 Section of Pit 710 showing peat lumps in black [NMRS DC38284]



Illus 12.9 Part of Plan 2 showing Pit 710 [NMRS DC38273 part]



Illus 12.11 Pit 710 from above, sectioned [Film 1981.2.4 colours remapped]

Illus 12.12 Stone-filled feature below 710 on 6 May 1981 [Film 1981.3.28]

Illus 12.13 Rubble in the chamber from the south [Film 1981.2.3]

were no clear signs that that had occurred after peat was stripped from the area of the Ring.

12.2.3 Disturbance in the chamber

There were many early modern and modern disturbances in the chamber. The northeast chamber orthostat 753 leant; it was probably not the original orthostat; that may have been a large stone 715 lying on the floor. The chamber wall had been damaged and there were voids under it (Illus 12.13).

As on the other areas at Calanais the natural was stiff green clay. The chamber floor may originally have been made of the green clay 760 found on Site H under the outer cairn and chamber wall. However, by 1981 the intrusion described below, clearing out and cleaning had removed nearly 0.2 m of prehistoric chamber material below the chamber wall base, along with some natural clay 721.

The turf 702 at the top of the chamber contained a 1929 florin (81.4), china (81.650), and glass (81.649). In the quarry dustings 709 used to stabilise the surface and repair eroding hollows the finds included china (81.646, 81.652), glass (81.643, 81.651) leather (81.653) and a piece of iron (81.654).

Quarry dustings 709 lay amongst and over stone tumble 717 (Illus 12.16). The most recent position of a large recumbent stone 715 in the chamber was also associated with the dustings.

The northern portal stone 753 had slumped (Illus 12.14 - 12.17). It was shown erect by RCAHMS in 1923 (see Chapter 24 Illus 24.45; NMRS RCD/13/12). But it was oddly set into the corner between the chamber and passage and was a foot shorter than the southeast orthostat.

It is likely that the fallen stone 715 was the original northeast chamber orthostat and the present arrangement of stones was a Victorian construction. In its correct position its toe would have fitted into a small feature 780 (Illus 12.18, 12.25). In overall size it was more like the other orthostats than was the present northeast orthostat; but it was triangular in cross-section which provides the only argument against the interpretation preferred here.

Also under the quarry dustings 709 was light yellow, gritty loose sandy clay 720 (Illus 12.19, 12.20; Technical note 12.2.3). It had probably been washed down from cairn.

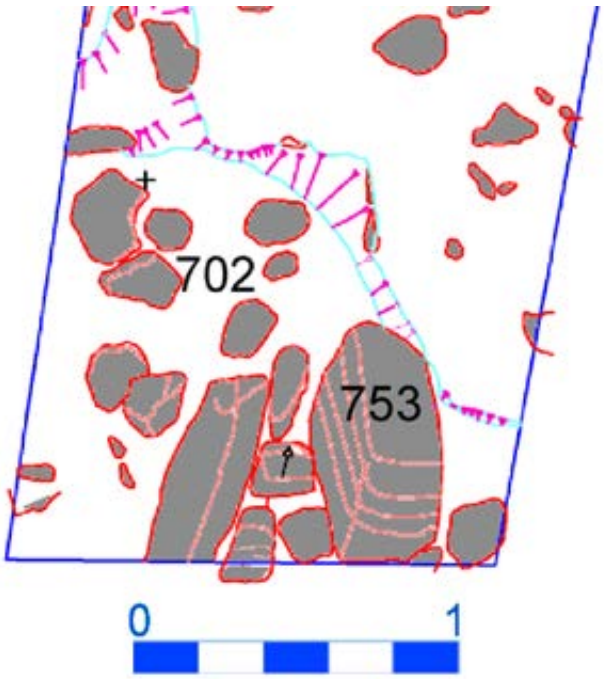
Gritty clay 720 sealed an intrusion containing modern material. The top fill of the intrusion was light olive-green sandy clay 740, (Illus 12.18, 12.19). Clay 740 included glass (81.210), china (81.223) and a piece of a glazed pot (81.153).

The intrusion probably filled up in several stages, because a turf line was found above its basal fill (Illus 12.18-12.20).

Clay 720 also covered natural clay 721 in the southern part of HIII (Illus 12.20).

The basal layer of the intrusion was green clay 761, then turf line 742 and above them the un-labelled layer on Section 14, and finally clay 740, in which there were two earth clods 744 and 745 (Illus 12.20, 12.21). Context 724 contained pieces of glass (81.94) in addition to those in its fill 740. Neither 742 nor 761 produced any finds.

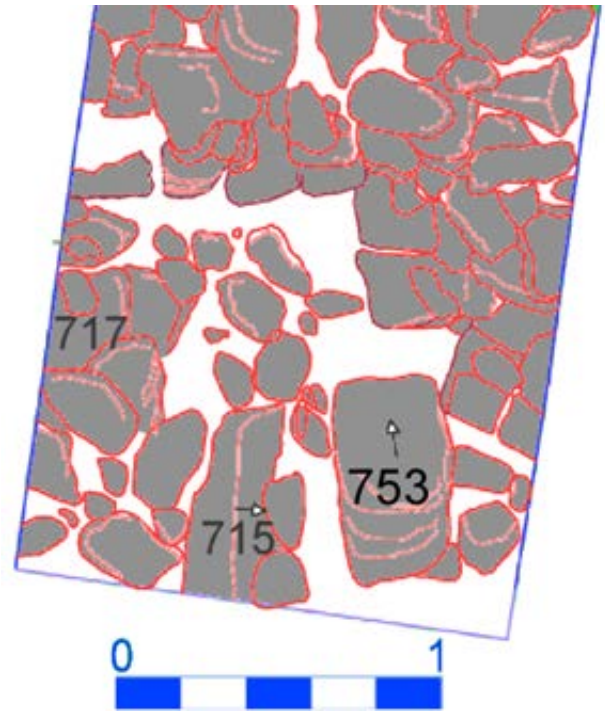
Illus 12.14 The modern chamber floor from the west on 5 May 1981 [Film 1981.3.12]



Illus 12.15 Plan 1 of 2 May [NMRS DC38272]

Near the north east corner of the chamber olive-green clay 740 overlay relics of a hole 731 still containing 4 woody roots presumably where a sturdy bush had grown in the chamber (Illus 12.21).

Erosion from the feet of visitors prior to deposition of layer 720 can be blamed for the truncation of these layers (Illus 12.20). The fills were complicated by a patch of clay above the turf line 742 on top of which another turf had formed (Illus 12.20, 12.22). It suggests a second episode of filling of the chamber followed by a fairly long period during which it remained largely undisturbed.



Illus 12.16 Plan 2 of 5 May [NMRS DC38273]

Illus 12.17 Recumbent stone 715 and portal stone 753 in the chamber from the north-west [Film 1981.12.17]

In the corner of the chamber was sticky sandy yellowish green upcast material 757 with yellow brown mottles. This contained a piece of quartz (81.221), not in the catalogue and therefore presumably unworked. Clay 757 was interpreted as a patch of upcast from some disturbance, possibly during the original excavation of the intrusion; or it may have been the result of disturbance by the bush whose roots were found in layer 731 (Illus 12.21 - 12.24).

12.2.4 A cast of the base of the original northeast orthostat

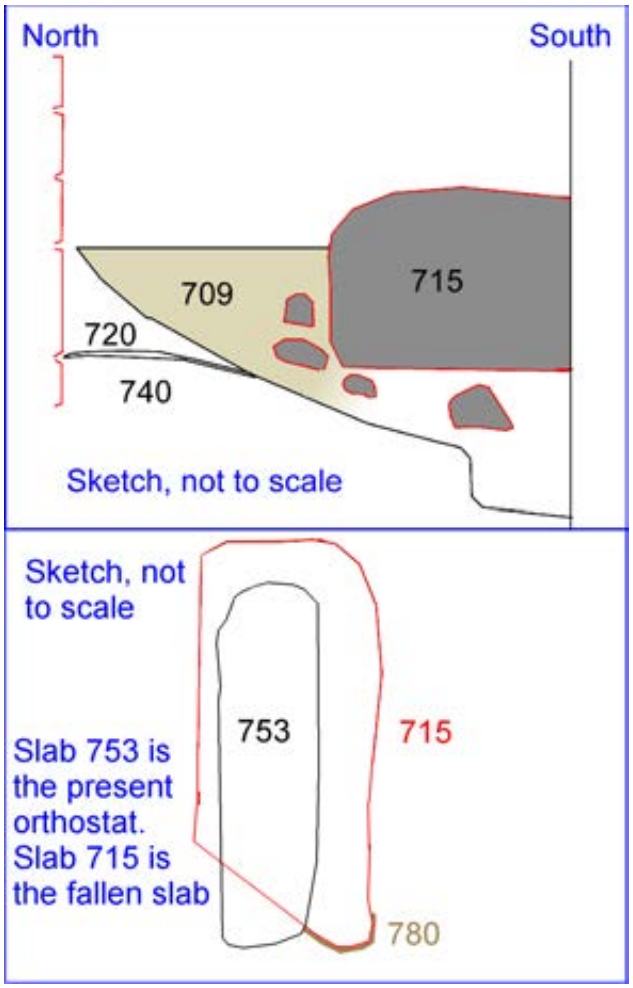
Below green clay south of clay 757 was a small depression 780 filled with mid brown slightly sandy clay (Illus 12.25). It was interpreted as possibly the cast of the bottom tip of the original north-eastern chamber orthostat, which may have been the fallen stone 715 rather than that in position in 1981 (Illus 12.18). Depression 780 cannot be shown to be definitively original (which is to say of the same date as the chamber wall) but it may have been, because it did not cut any demonstrably late layers. It would have fitted the end of fallen stone 715 better than the present orthostat 753.

North of 780 what may have been a cast of part of the rest of the orthostat base cut a fill 772 of a slot 773 under the chamber wall (Illus 12.25). The slot itself predated the chamber and had been partially cut away by erosion and intrusions in it. To the west a remnant of redeposited green subsoil 752, a fragment of the green clay platform, survived on the southern side of the slot (Illus 12.25). The cast of the northeast orthostat also cut the fill of a possible posthole 781 under the chamber wall. The slot fills and the posthole will be described along with the green clay platform in Chapter 12.6.

12.2.5 Discussion of disturbances in the chamber

The intrusion suggests that the chamber was trenched well below its floor level by Sir James Matheson's workers soon after peat had been cleared from the site. There were no surviving traces of the black sticky deposits containing cremated human bone described by Sir James Matheson in 1857 (Innes 1860). The intrusion continued as a gully on the line of the modern drainage ditch 101 on Area B. The 1857 exploratory trenching had probably affected the chamber and passage more or less equally.

Judging by the turf layers in the fill the intrusion lay open for an appreciable time before green clay 740 was added and sandy yellow-brown clay 720 was laid or formed through silting. There was then a period of wall-collapse; quarry dustings were used to level a surface above the tumble.



Illus 12.18 Sketch section of the chamber deposits, the fallen slab 715 and the AD 1981 NE orthostat 753 [Day Book 4 and context sheet 715]

Table 12.1 Pottery from capping 708

Cat	Comment
590	A sherd of Food Vessel ASH 75
591	A sherd of Food Vessel ASH 75 with little of its external surface surviving.
592	A sherd of Food Vessel ASH 75
593	2 refitted sherds from Food Vessel ASH 75
723	An indeterminate sherd with large parts of its exterior spalled/abraded away; could possibly be at the coarse end of E/MN spectrum
1022	An abraded slightly corky spall probably E/MN but could be Beaker.
1023	A spall from a Beaker or possibly an E/MN corky pot.
1024_1029	3 spalls and 3 fragments, the smallest of which may well have come from Food Vessel ASH 75, and the other pieces (all spalls) are consistent with this pot, but without the decorated fragment, these sherds and fragments would have been classed as '?E/MN or Beaker'.
1030	A spall from a probably E/MN corky pot with carefully-smoothed I (E spalled off).
1031	A sherd a thin fine Beaker.

The woody roots in 731 are of some interest in demonstrating that there was a period of more than a few years during which the chambered cairn was not actively curated.

12.2.6 Victorian capping of the cairn

The definitely Victorian or later cairn capping layer 706 reflected maintenance and repairs, as most likely did the probable capping layer 708. Those levels are coloured in Illus 12.27 and 12.28; later levels are left uncoloured apart from turf lines.

Under the turf 'ministry grit' 706 contained glass (81.660) and a small heavily weathered spall of indeterminate pot (Cat 1021). On the east side of the trench near the kerb the upper cairn stones slanted down to the north and east (Illus 12.26, 12.27). A wedge of ministry grit 706 lay immediately behind a smaller kerb stone (to the left in Illus 12.26).

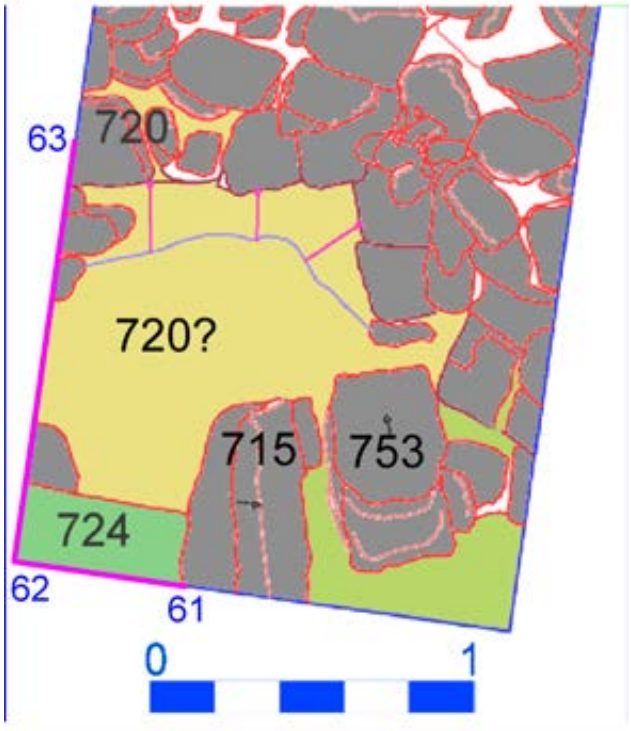
On the west side of Area H the massive kerb stone was not vertical. It leant to the north (Illus 12.28 and Chapter 12.3.2 Illus 12.35). Deep pockets of ministry grit (706) lay amongst the uppermost cairn stones behind it. It seemed that pressure from the cairn had levered the kerb stone out.

There were a few stones 719 outside the kerb in plough soil 707 (Illus 12.29). They too may be remnants of a collapse of the cairn.

12.2.7 Discussion of the kerb stones and capping layer 706 of the cairn

It is possible that the main kerb stone was set up more than once, as it was in Area BIWX, but there was no evidence for that, nor any to suggest that it had ever fallen completely. To the east however the volume of the cairn filled with 'ministry grit' 706 suggests a late 19th or 20th century AD date. It may reflect a collapse of the small kerb-stones and the cairn behind them, and Victorian activities associated with reinstatement of the two smaller kerb stones after the collapse.

This disturbance must be distinguished from an earlier episode of cairn robbing and repair which probably occurred mainly in the late 3rd and 2nd millennia BC.

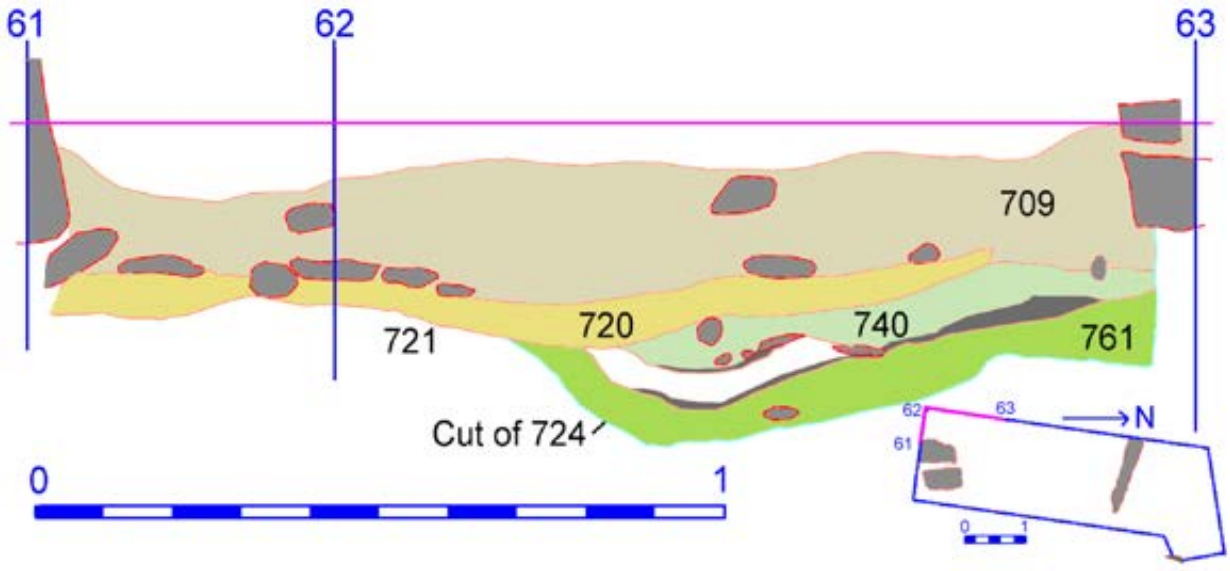


Illus 12.19 Plan 3 of 5-6 May [NMRS DC38274]

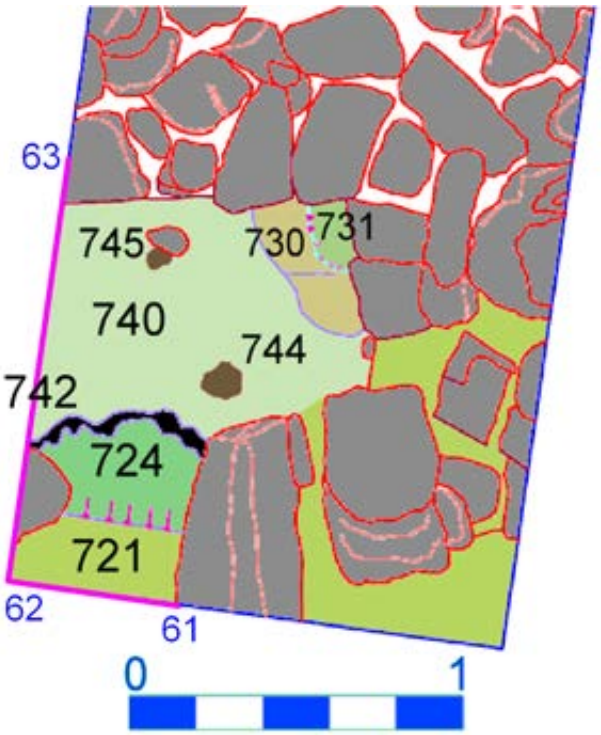
12.2.8 Capping 708 on the cairn

Near the top of the cairn, under patently modern material including ministry grit 706, was an intriguing layer 708 (12.35-12.38). It consisted of slightly greasy clay with charcoal flecks and rotted stones, and it blanketed the cairn in Area H. It represented turf and stone modified by natural soil processes. This layer was notable mainly for a cluster of large sherds from a Food Vessel (Table 12.1).

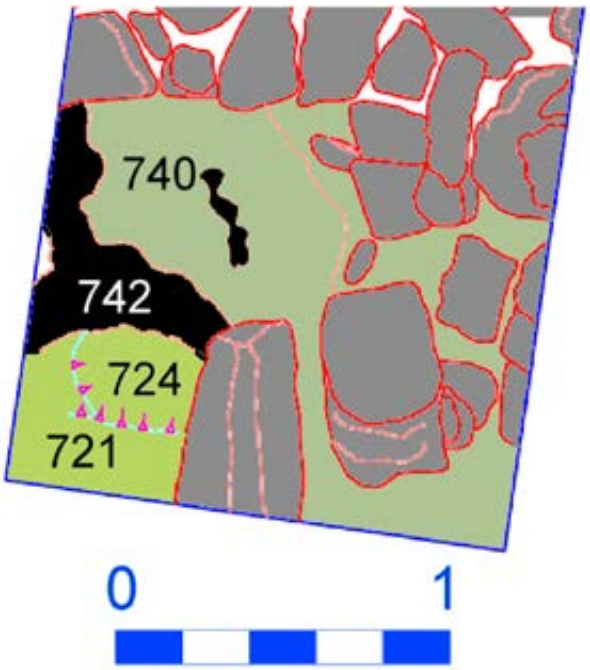
Layer 708 also included 3 quartz flakes and 2 pieces of quartz (CAT 141), a flint side scraper on a bipolar flake (CAT 235), and two larger than normal pieces of charcoal, identified as birch and as willow (81.12 and 81.14). It very probably also contained 3 charred barley grains and one charred wheat grain (Small Find 75 and Sample 764 in range CSS 752-773; see Technical Note 12.2.7). The sample also produced two unidentifiable charred seeds and a trace of wood charcoal.



Illus 12.20 Section 14 of the chamber [NMRS DC38286]



Illus 12.21 Plan 4 of the fills of the intrusion [NMRS DC38275]



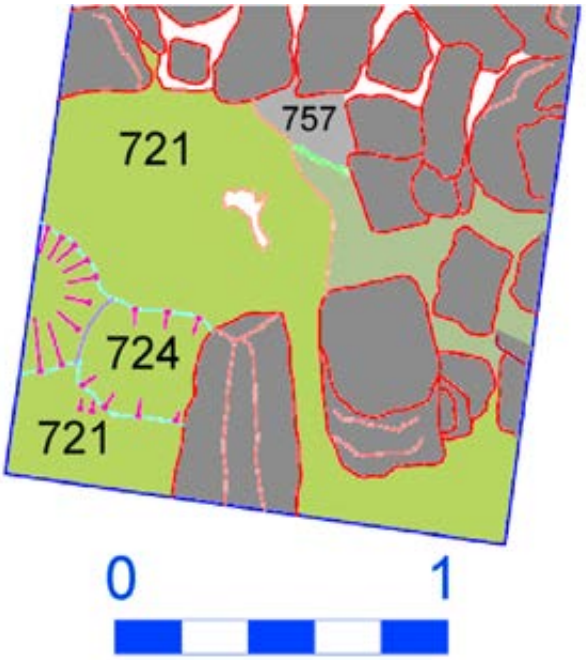
Illus 12.22 Plan 6 Intrusion 724 and ground surface 742 on 11-12 May 1981 [NMRS DC38277 and DC38278]

The three cereal grains produced dates statistically indistinguishable from one another. A charred barley grain (sample 764-2 SUERC-11610 at 3220+/-35), a charred wheat grain (sample 764-1 SUERC-11609 at 3215+/-35 and a charred barley grain (sample 374 SUERC-11602 at 3195+/-35 BP) dated to 1610 to 1410 cal BC, 1610 to 1410 cal BC and 1530 to 1400 cal BC respectively.

12.2.9 Discussion of layer 708 and the finds from it

Another sherd of the Food Vessel (Cat 594) came from 712, the loose gritty dark brown clay fill of the cairn under layer 708. It may well have slipped down from 708 between the cairn stones.

The simplest explanation for the cluster of sherds is that they were in soil and turf taken from elsewhere to cap the cairn. The clustering of sherds of Vessel 75 does not preclude their having been shovelled up with soil and turf; but they were distinctive enough that they might have been collected while the soil was being spread on the cairn, and then discarded once curiosity was thwarted or satisfied.



Illus 12.23 Plan 7 Intrusion 724 and ground surface 742 c. 16 May 1981 [NMRS DC38278]

Illus 12.24 Chamber fills from the West on 16 May 1981 [Film 1981.9.15]

That may have happened after it had been cleared of peat in 1857. The soft capping of exposed dry stone work is a long established conservation practice in Scotland. Another possibility is that the capping was laid in the 2nd or early 1st millennium BC when the kerb slabs were added. This explanation would allow the cereal grains in the capping 708 to be approximately contemporary with it, although strictly speaking they provide only a terminus post quem (provided by the earlier 95% confidence level) of 1530 cal BC.

Whether added before peat covered the place or after 1857 AD there are several possibilities for the source of the turf and soil. Many of the layers containing sherds of Food Vessel ASH 75 had been disturbed by ploughing or other forms of ground-working. Some sherds came from Area B in the general soil developments 112 and 117; and others were in the area of the enclosure (120 and 167), in the fill of the cast of a paving stone (125) near Ring stone 42, in a plough soil (130), and 813, a high-level deposit attributed to prehistoric deposition of burial material south of the ditch. One sherd came from Area DII 313, a soil between the central monolith and the west side of the Ring which was probably approximately contemporary with ritual deposition and disturbance by ploughing elsewhere on Area D.

The area immediately northeast of the cairn seems the likeliest place for the source of the turf, soil and stones; for that may explain why the stones of the late enclosure (and associated fills) were largely absent in that area.

There is one argument against a fairly modern date for the capping. It contained no modern finds of the sort fairly abundant elsewhere where there had been post-peat repairs and intrusions. Despite this the simplest explanation is that turf and soil were used to cap the cairn in the later 19th century or earlier 20th century AD.

12.2.10 Discussion of Victorian and later disturbance in Area H

The preferred interpretation is that the workers who cleared the last of the peat from the place

found this part of the cairn in a broadly similar condition to that in which it is today. They then trenched the chamber and the passage. They or their successors capped the exposed stones of the cairn with turf, soil and stones collected from nearby areas. They dug a small pit to look at the bottom edge of the main kerb slab. They may have tidied up the inner face of the chamber wall. But they did not do as much reconstruction here as they did to the southern part of the cairn in Area D.

12.3 Phase 13: The secondary cairn and its kerb slab

12.3.1 Description

On the west side the main secondary kerb slab slanted outward, and the upper part of the gap behind it was filled with Ministry Grit 706 (Illus 12.28) the upper stones did not slope down in the same way but a lower level of stones 734 (not on Illus 12.28) consisted of stones set on end.

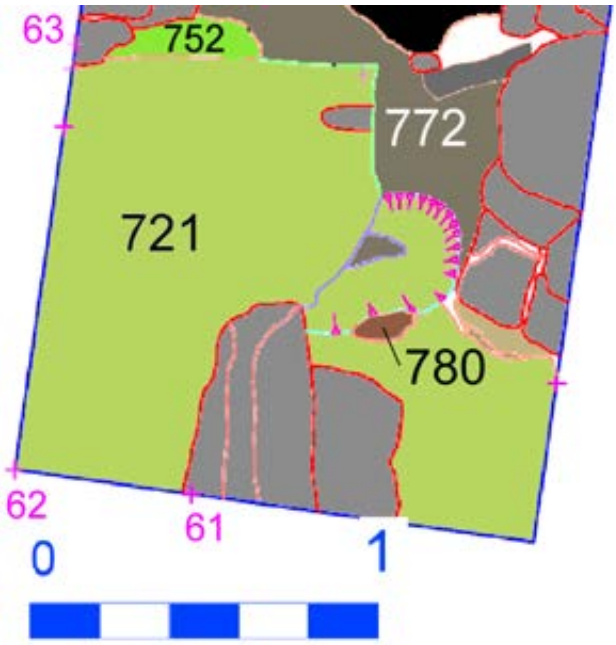
The massive kerb stone 711 which formed four-fifths of the modern edge of the cairn in Area H was set high in the sequence (Illus 12.30, 12.31). In 1981 it leant outwards at an angle of about 15 degrees (Illus 12.28, 12.35).

It was in a slot 735 which extended below the recent pit 710 (Illus 12.32-12.33; Technical note 12.3.1).

Table 12.2 Pottery from slot 735

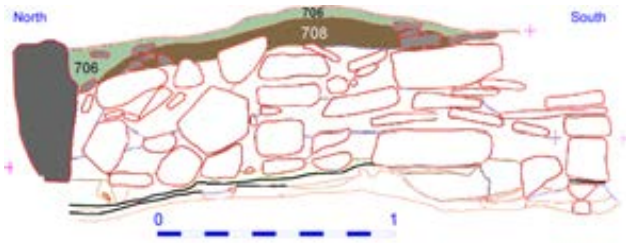
Cat	Comments
131_ 132	2 conjoining spalls from E/MN corky pot
133	Abraded body sherd from a different E/MN corky pot from Cat Nos 131 and 132
543	Small abraded body sherd probably from a Beaker ASH 67.

The slot contained a few sherds of pottery (Table 12.2), burnt bone and charcoal. A sample of pollen (2027) from 735 had nearly all the characteristics of pollen zone CaN-3ai when there was an emphasis on agriculture, apart from a low

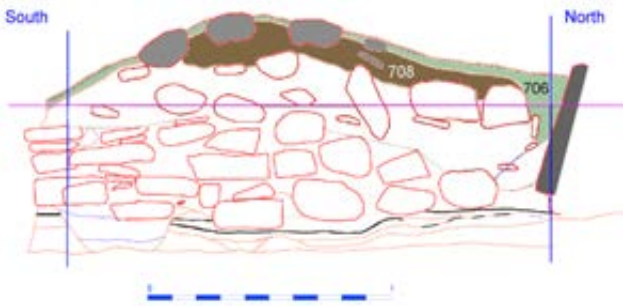


Illus 12.25 Plan 9 after removal of chamber wall stones showing feature 780 emptied [NMRS DC38281 part]

Illus 12.26 he top of the cairn and chamber wall from the north after removal of turf and part of the capping [1981.1.29 part]



Illus 12.27 Capping levels on east side of Area H [NMRS DC38305 a]



Illus 12.28 Capping levels on west side of Area H [NMRS DC38306]

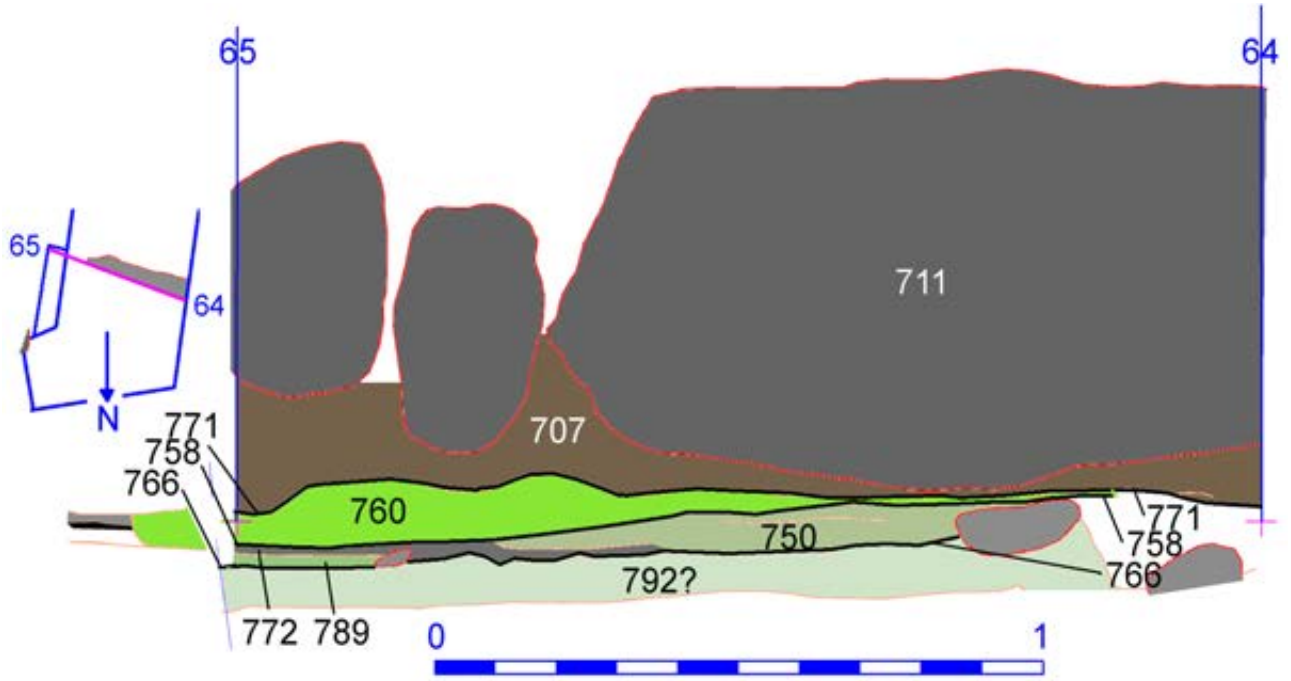
Illus 12.29 Stones 719 [Film 1981.3.4]

showing for Compositae; it started between 2980 and 2510 and ended between 2770 and 2360 cal BC.

The slot was cut into soil 738, an area of dark brown sandy clay with charcoal and rotted stones. A piece of willow charcoal from the soil was radiocarbon dated (AA-24968 3575+/- 45) to between 2040 and 1770 cal BC suggesting that the kerb slab was erected in the second millennium BC or later. Soil 738 is discussed in more detail after description of the cairn.

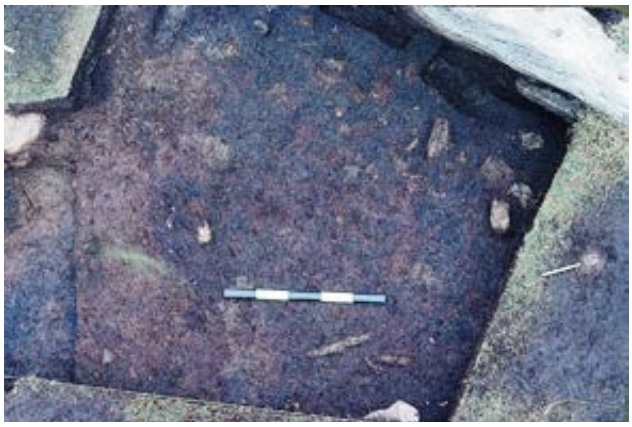
In Illus 12.34 two small baulks had been retained consisting mainly of soil 738.

On the east side of the cairn near the kerb all but the lowest stones slanted down to the north and east. Together with upper part of the fill labelled 729 on the east baulk section the stones suggest that there had been collapse and reinstatement of the smaller kerb stones along with some of the fill which had been placed behind them (Illus 12.27, 12.29).



Illus 12.30 Section 33D; the kerb stones from the north [CSD-DC38305]

Illus 12.31 The kerb stone from the south on 4 June 1981 [Film 1981.19.24]



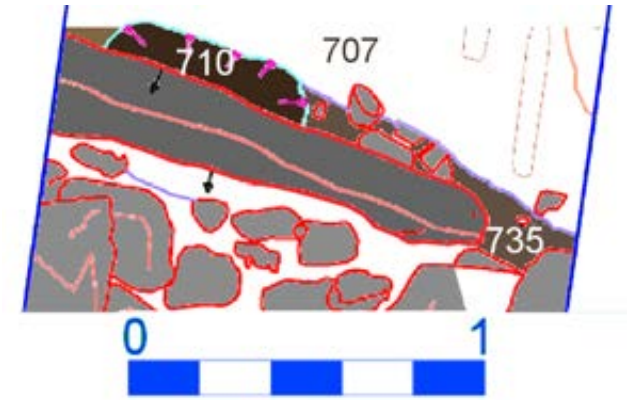
Illus 12.32 The cut 735 for the kerb slab [Film 1981.4.36 remapped]

12.3.2 Discussion of the secondary kerb slabs

The kerb slab had been levered out by cairn pressure to about an angle of about 15 degrees (Illus 12.35). It seems likely that it never fell flat. It thus differed from the otherwise similar kerb slab on Area BIWX which fell down at least once.

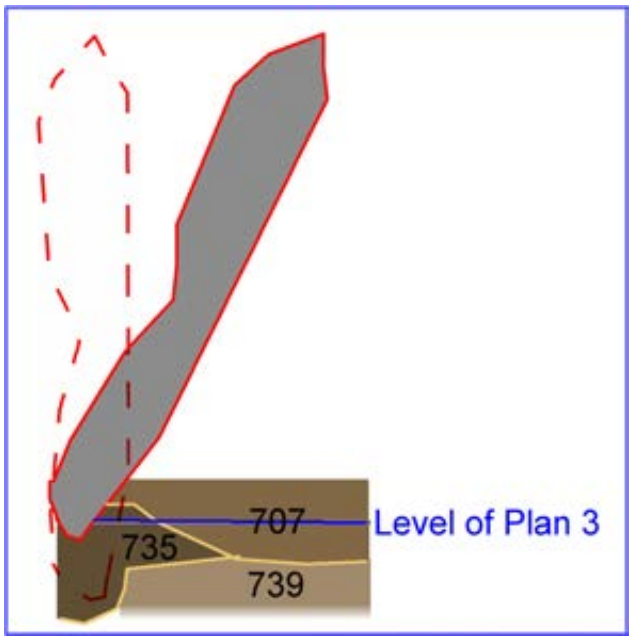
The two large stones forming the eastern side of the secondary kerb were set at a similar level (Illus 12.30, 12.31). They may have collapsed judging by the signs of disturbance to the cairn inside them and the patch of paving outside them.

The slot fill 735 was not visible on Section 33D (Illus 12.30). Brown plough soil 707 was recorded as directly underlying the kerb stones and overlying turf line 771 here but it seems likely that what was labelled as 707 in fact included slot 735. Clay and soil from the cairn was probably spread northward during stone-robbing and formed part of plough soil 707. Slot 735 was set into this soil and backfilled with material from the layers through which it was cut. Several of them included pollen of much the same period CaN-3ai as found in the slot. The artefacts also probably derived from those layers.



Illus 12.33 Part of Plan 3 of 5-6 May [NMRS DC38274 part]

Illus 12.34 The area into which the slot was cut, from above on 13 May 1981 [Film 1981.7.12]



Illus 12.35 Sketch section of kerb stone [Day Book 8]

The setting-up of the kerb slab must post-date layer 738 which produced a radiocarbon date between 2040 and 1770 cal BC. It represents conversion of the cairn in the 2nd or early 1st millennium BC after it had become very dilapidated.

12.3.3 Secondary Layers 712, 729, 768 and 1008 of the cairn

Clays 1008 and 729 reflect backfilling of the cairn after the main kerb slab was erected. But fills 768 and 712) may be the relics of a period of rummaging about in the cairn for building stone. That is to say they may in part be disturbed layers than redeposited ones.

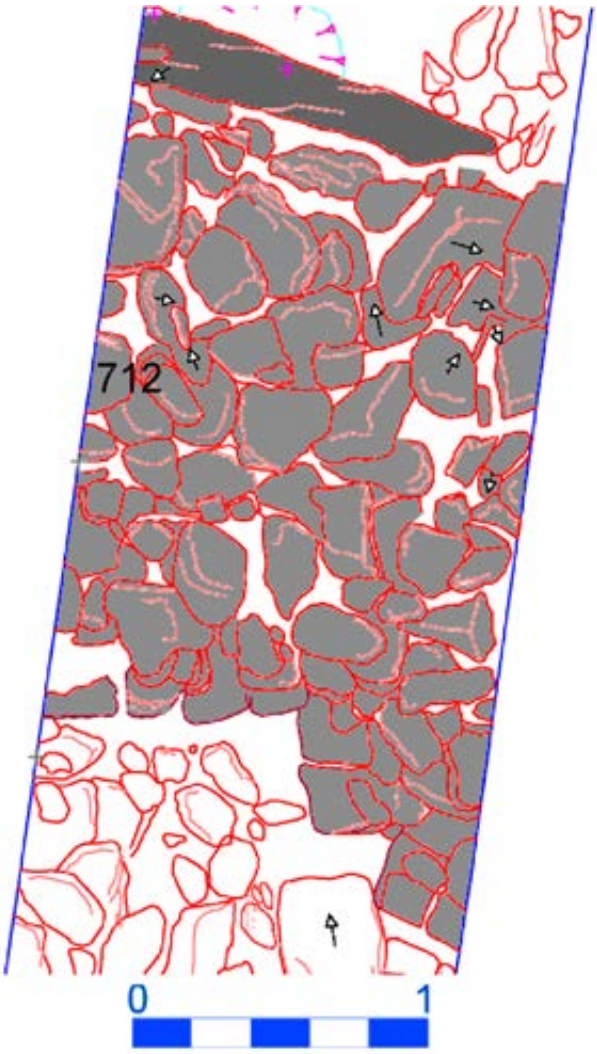
The secondary fill between the stones of the uppermost layer of the cairn was loose gritty clay (712) with abundant fibrous roots. The written site record states that 712 was amongst the stones of the outer cairn; Plan 3 and Section 33a show that it did occur on the chamber wall (Illus 12.37, 12.40). It and associated stones probably reflect filling up of the cairn when the secondary kerb (the large slab and two vertically set stones) was set up. Fill 1008, very loose, very rooty medium orange clay, was probably a variant of 712, and judging by its context label it was only distinguished from 712 when the section was drawn at the end of excavation. It is shown on Section 33 (Illus 12.40) but not on plan. It contained no finds.

Fill 712 included several sherds.

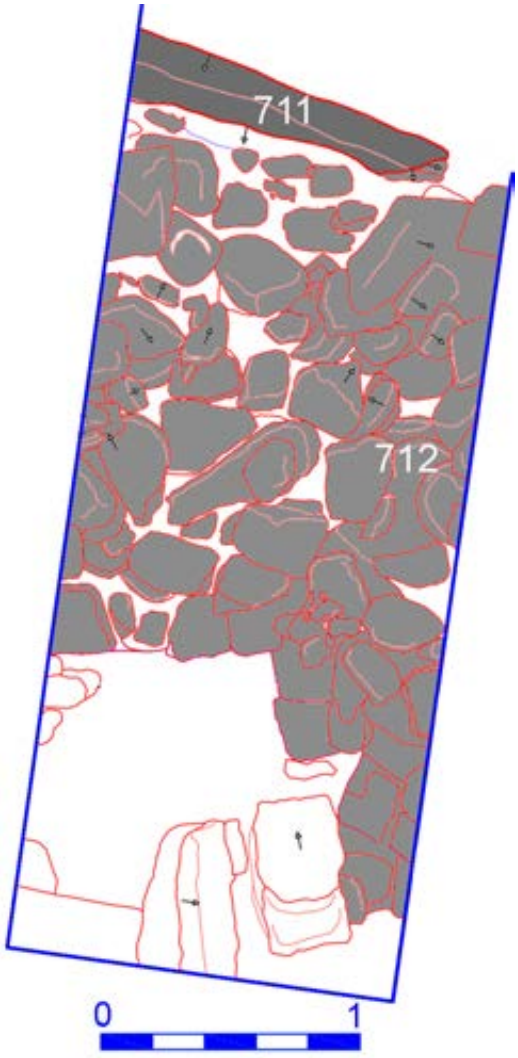
Table 12.3 Pottery from 712

Cat	Comment
156	An abraded spall from an E/MN corky pot.
157	A sherd from an E/MN corky pot.
158	A spall from an E/MN corky pot.
594	A sherd from Food Vessel ASH 75
724	A sherd from a fine E/MN non-corky pot, possibly Hebridean, or from a fine Beaker.

Layer 729 was found mainly close to the kerb stone. It was described as simply as a slightly more



Illus 12.36 Plan 2 on 5 May with the first layer of outer cairn stones removed [NMRS DC38273]



Illus 12.37 Plan 3 on 5-6 May with the second layer of outer cairn stones removed [NMRS DC38274]

compact version of layer 728. That may be due to post-depositional processes related to fills above, but it is nevertheless difficult to understand. On the main sections it looks almost as if it could have been made more compact by outward pressure of the cairn against the kerb slabs. It contained no finds.

12.3.4 The secondary layers of the chamber wall

Much of the upper part of the chamber face of the wall had disappeared before 1981. One stack of stones in the middle west of the face had slipped towards the chamber and the stones to its west had long fallen away (Illus 12.39).

Table 12.4 Pottery in fill 768

Cat	Comment
18_26	9 sherds from a large fine E/MN corky pot (ASH 8)
1007_ 1020	7 spalls and 7 fragmentary spalls from a fairly large E/MN corky pot or pots
27	A featureless sherd from a fine Beaker or less likely a particularly fine E/MN non-corky pot
28	Spall possibly from a very fine Beaker
29	A sherd probably from a fine Beaker.

Illus 12.38 The cairn on 5 May 1981 at the level of Plan 2 [Film 1981.3.5]

Illus 12.39 The south face of the chamber wall after removal of turf [Film 1981.2.4]

Below soil 708 on the western side of the wall was a very loose light to medium brown rooty soil 768. It lay above the well-laid levels of the chamber wall and the inner part of the cairn. The distinction between the chamber wall and the cairn was just visible at this level (Illus 12.37, 12.38).

Two pieces of quartz (81.670, not in catalogue) were also found. The soil also contained several small pieces of charcoal (alder, birch and hazel (81.229).A piece of willow charcoal (81.230) from 768 was dated (AA-24969 4095+/-45) to between 2880 and 2490 cal BC. In earlier publications (Ashmore 1999a, Ashmore 2000) it had been wrongly ascribed to context 767 (Technical Note 12.8.5).

After the upper secondary or highly disturbed levels of the chamber wall had been removed and Plan 4 recorded (Ch. 12.5.4 Illus 12.49) no further excavation took place until the outer cairn and the deposits in the chamber had been dealt with.

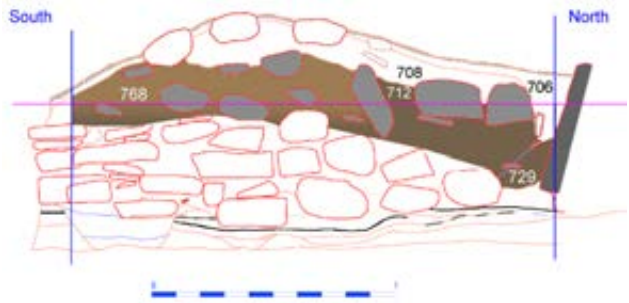
12.3.5 Discussion of the secondary layers of the cairn

The secondary cairn sequence follows dilapidation of the cairn in the 2nd millennium BC, including removal of all but one of the small flat stones which formed the primary kerb. The sequence is made slightly more complicated by the fact that the two minor secondary kerb stones probably fell away and were then reinstated, with orange fill 1008 behind them (Illus 12.40). It looks as if the kerb stone was then pushed out somewhat and stones and dark soil had were put in the gap so created behind it.

The original cairn was robbed in two ways, it seems, The stones and soils of its uppermost levels were both pulled down to the north. Subsequently, probably, large stones were removed but some soil left in situ. It is hard to be sure because the upper parts of the cairn looked far more solid in plan than they did in section.

The original kerb was completely removed apart from one probable basal kerb slab, described and discussed later (Chapter 12.5.10). The secondary kerb slab was added in the 2nd millennium BC. Stones and soil 712, 1008 and perhaps upper 729 were placed behind it to make up the cairn to the height of the kerb.

Illus 12.40 Secondary cairn levels on Section 33A [NMRS DC38305 a]



Illus 12.41 Secondary cairn levels on Section 34 [NMRS DC 38306]

Unlike its equivalent in Area B the secondary kerb slab probably never fell completely (see Chapter 12.3). The sherd of a Food Vessel (81.34 ASH 75) in 712 had probably worked its way down from the probably Victorian capping layer although it could have been incorporated in the secondary cairn levels with the stones and soil used to fill up the cairn behind the kerb.

The upper slanting stones behind the smaller pair of kerb stones may have been part of rebuilding after erection of the kerb stones. But it looked as if the associated fills (upper brown clay soil 729 and Ministry Grit 706) had been added later than orange clay 1008 near the east baulk (Illus 12.40). The preferred interpretation is that the smaller kerb stones fell out sometime after peat had been removed in 1857 and there was a minor collapse of the cairn material behind them. The kerb stones were set up again and the gap filled with stones, soil and then grit.

12.4 Phases 10 to 12: The late ploughing and related features

12.4.1 Late ploughing

The late plough earth (707) contained a variety of potsherds (Table 12.5).

Illus 12.42 Plough marks in soil 707 on 2 May 1981 from the north [Film 1981.1.29 part]

Illus 12.43 Plough marks 734 at the base of soil 707 from the north on 6 May 1981 [Film 1981.3.27]

Table 12.5 Pottery from plough soil 707

Cat	Comments
44_47	4 spalls, 2 conjoining, from an E/MN corky pot ASH 10a.
129	An E/MN corky sherd (ASH 11)
468	A sherd from a very large abraded domestic Beaker cooking pot (ASH 55).
718	A Hebridean Incised sherd with most of the exterior spalled off.
719	A heavily abraded sherd from an E/MN non-corky pot or a domestic Beaker.
720	A heavily abraded sherd from a domestic Beaker or less likely an E/MN corky cooking pot,
721	A heavily abraded spall probably from an E/MN non-corky pot.
992	A small spall, probably a thin fine Beaker.
993	A small, abraded fragment probably from an E/MN corky pot.
994	An abraded spall from a probably E/MN corkypot.
1110	A sherd from a thin fine E/MN corky pot.
1005_ 1006	2 refitted parts and a crumb of an abraded spall possibly from an E/MN minimally corky pot, but too small to be diagnostic.

It also contained an 'opal-like microlith' (81.514), not seen during cataloguing, a quartz flake (CAT 140) and quartz fragments (81.66), presumably unworked because not catalogued.

At its base were a few ard marks 722 (Illus 12.42-12.44). In fact, although not recognised at the time, plough marks had been visible in soil 707 earlier. They ran at about the same angle as ard marks 722 planned at the base of the soil (Illus 12.44).

In addition to ard marks 722 at the base of soil 707 there were two broad ard marks 734 filled with light green gritty sandy clay (Illus 12.44). They were about 0.1 m deep. An unclassified piece of pot (81.82) was recorded in the Finds Book as coming from these ard marks but was not found during cataloguing.

The fact that ard marks 734 and 722 were at a distinct angle to each other suggests that they reflect two episodes of cultivation. But because they did not have a direct stratigraphic relationship with each other their relative chronology is unknown.

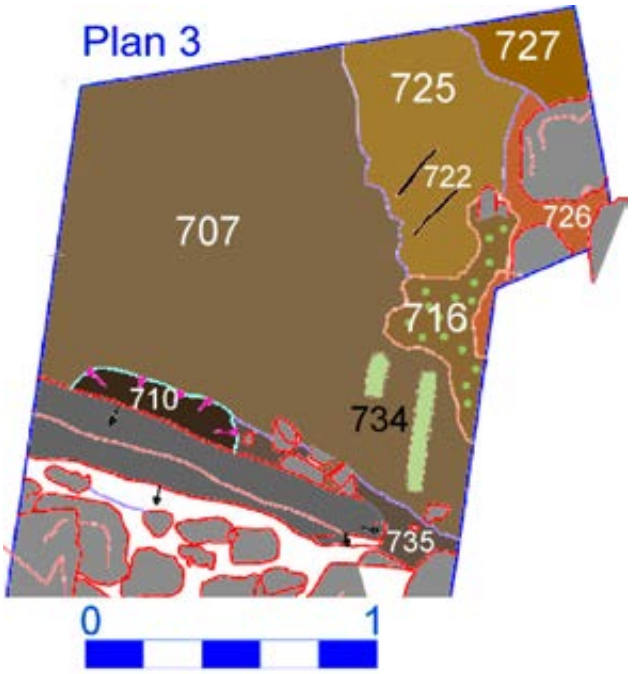
When Area H was extended slightly to the northeast to investigate the kerb another strong ard mark was found (Illus 12.46 Plan 22). It was cut into layers 716 and 738, and had, presumably by chance, run between two stones at a lower level (Illus 12.45, 12.46).

Two pollen samples (2080 and 2082) were taken from plough soil 707 and one (2076) from ard mark 734. A sample (2012) was also taken from the underlying turf line 751.

The latter sample produced a pollen spectrum characteristic of the transition from sub-zone CaN-3a to 3b, which occurred at some time between 2560 and 2200 cal BC. But the plough soil and ard samples produced spectra characteristic of the earlier CaN-3a. The uppermost plough soil 707, discussed above, was assuredly later in its final form than the cairn, but the layers into which ploughing penetrated seem to have been of approximately the same period as use of the cairn. The soil through which the ard cut must have been composed largely of material pulled down from the cairn.

One of the layers cut by the ard, mixed clay 716, formed a slight mound round the base of Ring stone 42 (Illus 12.47); more and more of it appeared as the plough soil 707 was stripped away. It will be discussed along with Stone 42 (Chapter 12.8). Below soil 707 the rest of the area was divided between three layers of soil, a brown loam 725, a mixed soil 739 and, near the cairn, greasy dark-brown sandy clay 738 with charcoal and rotted stones.

Soil 725 was a probably a variant of 739, and both can be regarded as the subsoils of plough soil 707. The medium brown clay 725 had a compact, loamy structure and included a few small rotted stones. An E/MN corky sherd (Cat 130) and a piece of quartz (CAT 143) were found in it. It overlay clay 716 north of Ring stone 42 and may

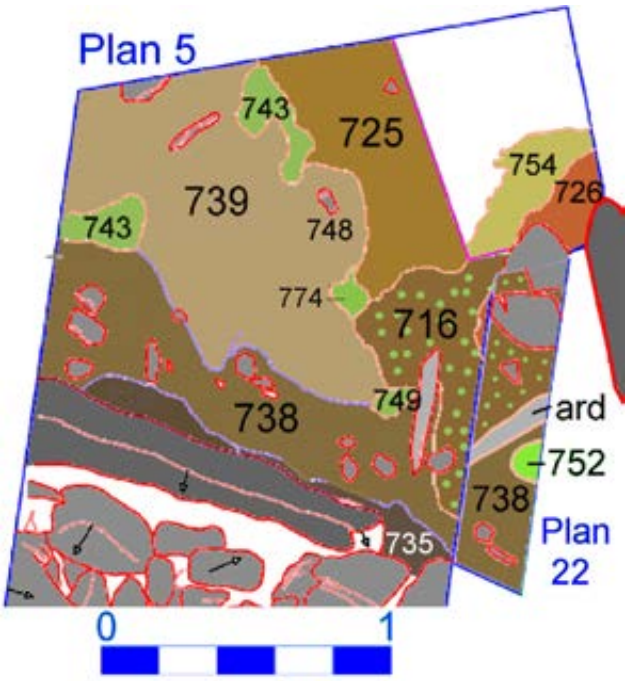


Illus 12.44 Plan 3 plough marks at the base of 707 on 5-6 May [NMRS DC38274]

Illus 12.45 Plough marks at the base of soil 707 in the NE extension [Film 1981.18.33]

represent a breakdown of the mixed light green clay and the brown sandy clay forming 716; the similarity of the brown component of 716 to soil 725 was remarked on during excavation.

A slight dip 748 appeared the surface of soil 725 under the plough earth (Plan 5 Illus 12.46). It was interpreted as representing a small removed slab about 0.3m long. It was filled with soil 739 and a small abraded sherd probably from a fine, thin-walled Beaker (Cat 1004) was ascribed to it but presumably should actually be ascribed to soil 739. Soil 739 which filled most of the area north of soil 738 was also medium brown (Illus 12.46, 12.48).



Illus 12.46 Plan5 plough marks at the base of 707 [NMRS DC 38276]

Table 12.6 Pottery from soil 739

Cat	Comment
139	Spall from an E/MN pot.
140_141	2 sherds from a very thin, fine E/MN corky pot, possibly burnt.
142	A sherd from an E/MN corky pot
373	A sherd possibly from a 'domestic' Beaker (ASH 41)
998	A small abraded spall from a small fine Beaker, or an E/MN non-corky pot.
999	An abraded burnt sherd; indeterminate but just possibly of E/MN date
1000	An abraded burnt spall conjoining with Cat. 999
1001	A fragment and crumbs from same pot as Cat. 999 and 1000
1002	Spall from probably E/MN corky pot.
1003	Spall from probably E/MN corky pot.

Illus 12.47 The first appearance of 716 near the base of Stone 42 from the north on 5 May 1981 [Film 1981.3.2]

Soil 739 also contained two pieces of quartz (81.151), not in the catalogue so presumably unworked.

It overlay part of 738, greasy dark brown sandy clay with charcoal and rotted stones under the kerb slabs (Illus 12.46). Layer 738 was dark brown sandy clay with charcoal and rotted stones. It overlay olive-grey clay 750 which in turn overlay black turf line 751 which was interpreted as the same as 758 under the green clay platform. Soil 738 contained a wide range of potsherds, all of early to middle Neolithic type (Table 12.7). The absence of definite Beaker sherds from 738 (and 739, although it had two possible examples (Table 12.6) was notable given their common occurrence in higher layers.

A few lithic artefacts were also found in soil 738: flint (81.205) and quartz (81.204, 206 and 221). A piece of willow charcoal (81.203) was radiocarbon dated (AA-24968 3575+/- 45) to between 2040 and 1770 cal BC.

Illus 12.48 Soils 725, 738 and 739 on 11 May 1981 (see Plan 5 Illus 12.46) [Film 1981.5.20]

Table 12.7 Pottery from soil 738

1	A sherd from a small, fine E/MN corky cooking pot (ASH 1
3	2 conjoining sherds with most of interior spalled off, and spalled surface abraded, from a small, fine E/MN corky pot (ASH 2b).
134_138	2 conjoining sherds and 3 spalls from an E/MN corky pot.
223	A sherd from an E/MN non-corky pot (ASH 14).
224_225	2 sherds from a fine but fairly large E/MN non-corky pot
226_227	2 sherds from a fairly fine E/MN corky pot
228	A sherd from a small, fine E/MN non-corky pot; possibly a cup.
229	An abraded sherd from fairly fine E/MN non-corky pot.
230	An abraded spall from a fine E/MN non-corky pot.
231	A Hebridean Incised sherd.
277	A sherd from an E/MN non-corky pot.
278	A sherd from a relatively large E/MN non-corky pot.
995	A sherd from a burnt, irregular-shaped undiagnostic piece of pottery with most of surfaces and body spalled away and abraded..
996	A sherd from a fairly fine E/MN non-corky pot or domestic Beaker.
997	A heavily abraded spall, probably from a fairly large E/MN corky pot; or possibly from a Hebridean Incised pot

A thin medium brown slightly gritty layer of clay (727) in a slight depression in the northeast corner of the area overlay a turf line which was labelled, possibly wrongly, 771 (the topmost turf line under the cairn); it was reminiscent of the plough earth above. In another depression in the northwest corner clay 739 also overlay a turf line (See Chapter 12.7 Section 13 Illus 12.101). This turf line was stratigraphically at the same level as the soil with rotted stones 738; if a slight turf line had formed on the latter it would explain why it was also considered to have some of the characteristics of a turf line.

12.4.2 Discussion of the late soils and ploughing in Area HI

The occurrence of CaN-3a pollen in plough soil 707 at a higher level than a turf line 751 zoned to the transition between CaN-3a and 3b, a later zone, parallels the sequence under the cairn discussed below. There green clay zoned to CaN-2d overlay a turf line zoned to CaN-3aii in a Kubiena box profile. Clearly the two reversals were chronologically distinct, with that outside the cairn centuries later than that under the cairn, but they both reflect the phenomenon of soil with an earlier pollen assemblage occurring above a turf line with a later one. Also, as described above, Soil 707 and the underlying soil 739 overlay greasy clay 738 which produced a radiocarbon date between 2040 and 1770 cal BC. This is even later than the transition between CaN-3a and 3b.

One possible explanation is that the pollen reflected local circumstances and the zonation of Calanais should not be based on that of Callanish Leobag. The sequences from Calanais Fields did not cover this period so there is no more local reference column (Johnson et al in prep), which makes the possibility difficult to assess.

Another possible explanation, taking the evidence from Areas D and H together, is that the soil on both areas was formed of clays pulled down from the cairn in prehistory. In this hypothesis the cairn stones were removed for building elsewhere leaving soil with a CaN-3a pollen spectrum which although worked over during the years of Zone CaN-3b or 3c did not incorporate sufficient pollen to change the basic character of the pollen spectrum in the soils.

Yet another possible explanation is that a considerable amount of soil and clay was imported from 'ancestral' deposits. There was some direct evidence for that, particularly on Area D. As described in subsequent parts of this chapter there was also some similar direct evidence for such importation on Area H. But the contents of clay soils 738 and 739 point in the same direction. The amount of pottery in 738 and 739 was remarkable, given that its volume was fairly small. So was the early character of the assemblage; definite Beaker sherds were notable by their absence (Tables 12.6 and 12.7). Admittedly, the radiocarbon date of between 2040 and 1770 cal BC shows that layer 738 must have been open on the robbed edge of the cairn at some time in the first quarter of the 2nd millennium BC. But the pottery in it could been sorted from the clay and stones pulled down onto the area north of the cairn when stones were removed for building elsewhere. However, its presence may reflect importation of 'ancestral' soils.

Dark brown soil 738 with its abundant rotted stones was comparable to a greasy soil 747 under the cairn below a line of rotted stones near the kerb slab and above the green clay platform. It too contained only neolithic-style sherds, again in surprising abundance given its small volume. It seems likely that 738 and 747 were parts of one layer. Indeed, perhaps they reflect spreading of the fills of a slot of the same date as that found under the chamber wall, which had been backfilled with 'ancestral' material. That may have happened prior to commencement of cairn building, or during removal of the early kerb rather than when the later massive kerb slab was erected. Alternatively a layer of Phase 3 'ancestral material' like layer 369 in Area D might have been imported to this area, before the cairn was built, presumably in Phase 7.

The paucity of Beaker pottery in the soils supports the hypothesis that subsequently the area north of the cairn was not used much if at all for small ritual deposits like those inferred from the features under and in plough soil 315 in Area D. There ground working and probable secondary funerary activities continued into CaN-3c, which probably started at some time between 1900 and 1600 cal BC. But on Area H the evidence for such activities was largely absent.

12.5 Phase 8: The primary cairn and chamber wall

12.5.1 Introduction

On top of the green clay platform 760 a well-built wall almost exactly a metre wide bounded the chamber and a cairn of substantial stones was laid outside it, taking the width of the cairn and chamber wall to slightly over 2.1m.

As described above the distinction between the chamber wall and outer cairn became clear in layer 712 of what has been described as the secondary cairn at the level of Plan 3 (Illus 12.37). By that time two fairly good layers of large stones had been removed from the cairn.

12.5.2 The upper primary layers of the outer cairn

Fill 728 of the cairn was described on the Context sheet as black friable loose soil (Illus 12.35, 12.37). But a note in the Day Book (p 10) describes it as fairly compact and, indeed, looking as if it had been purposefully laid and compacted; it seems likely from these divergent descriptions that it was more compact near its base than at its top. It surrounded two layers of well-laid stones. It contained three potsherds (Table 12.8).

Table 12.8 Pottery from fill 728

Cat	Comments
159	A sherd from a fine E/MN corky pot.
160	A sherd from thicker E/MN corky pot than Cat no 159
161	An E/MN corky sherd with its exterior spalled off.
725	A heavily abraded probably E/MN non-corky pot.

It also contained a piece of mylonite (CAT 144 and a quartz lump, possibly a single-platform core disfigured by burning (CAT 145). A piece of quartz (81.77) was not located during cataloguing. Sample 2366/81 produced birch, alder and hazel charcoal.

12.5.3 Discussion of the upper primary layers of the cairn

The sections and plans give an impression that the layers of stones surrounded by 728 were either part of the original cairn or stones which had been disturbed and re-laid more or less in their original positions.

In section it looks as if the boundary between 728 and layers above it may have been the surface of the dilapidated cairn for a considerable time.

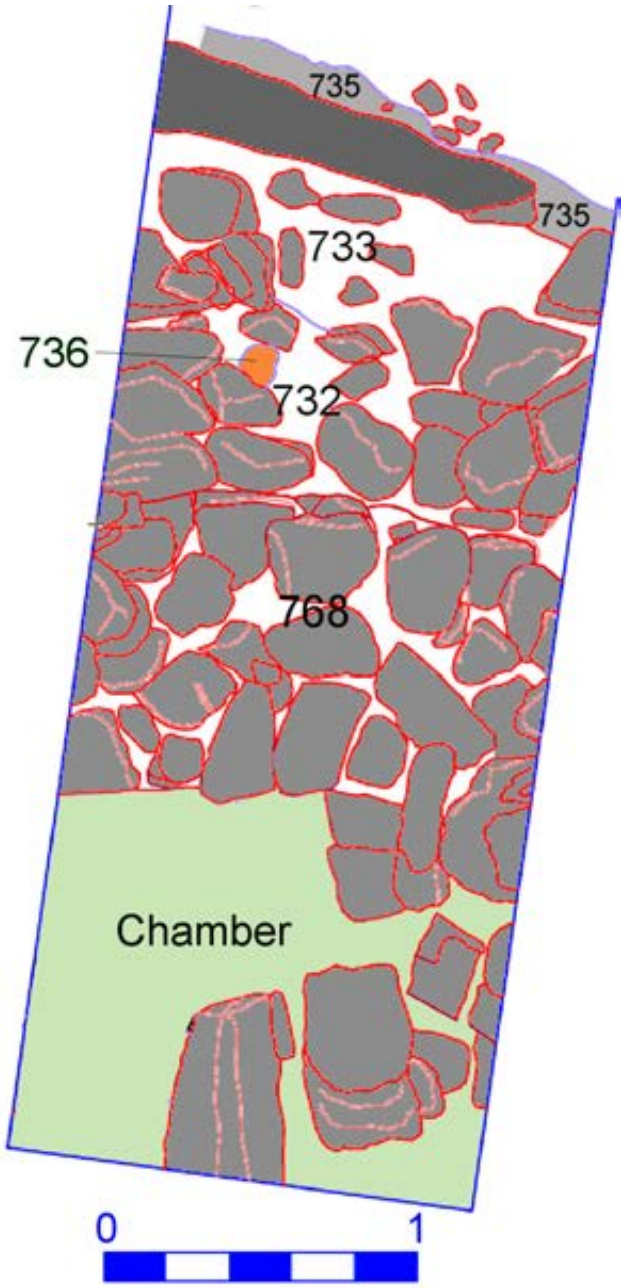
One interpretation is that these stones were left approximately in their original positions by the stone-robbing which removed higher parts of the cairn. Perhaps weeds and other debris were thrown amongst them. When it came to filling up the area behind the kerb they may have been tidied up.

It does not seem very likely that the stones were brought from elsewhere and laid in good layers when it was decided to add the kerb slabs. One could envisage that the upper stones of the cairn had been robbed to build the enclosure wall-base east of the Ring and that when it was decided to turn the cairn into a kerb cairn in the 2nd millennium BC they were brought back and used to build up the cairn. But the weakness of that interpretation is that there is no good reason why the well-layered stones should not have been built up much closer to the kerb-stone position than they were.

So the idea that the well-laid stones had been left on the cairn seems to fit the evidence better than the idea that they were removed and brought back after a considerable interval.

But the possibility that the stones were disturbed makes it unsafe to ascribe the finds from 728 to the primary cairn. Even in the preferred interpretation the stones were disturbed and re-laid, and the upper part of clay 728 was a loose fill, even if the lower part looked as if it had been compacted (Day Book 10).

Another layer of stones was removed before Plan 4 was made (Illus 12.49).



Illus 12.49 Plan 4 of 9-11 May [NMRS DC38275]

12.5.4 Primary cairn level 736.

The three fills under 728, shown on Plan 4 (Illus 12.49), were the near-basal gritty clays 732, 733 and 736. Of these the most voluminous was 732 which surrounded well-laid layers of large stones.

The main section, drawn towards the end of excavation, is misleading in suggesting that the top of gritty clay 732 was below the top of the basal layer of stones. It appeared on Plans 4 and 5, and Plan 6 showed a yet lower layer of stones so clay 732 must have filled at least the two tiers of stones on Plans 5 and 6 and have provided the bedding for the layer of stones shown on Plan 4 in Illus 12.49. Plan 4 thus shows the fourth layer down of large stones in the outer cairn.

Illus 12.50 Discoloured area 736 on 8 May from the east [Film 1981.4.22]

Illus 12.51 The cairn on 9 May 1981 at a level between Plan 3 and Plan 4 of 9-11 May [Film 1981.5.11]

The patch of reddish clay 736 was in gritty clay 732, about half way between the chamber wall and the kerb. On Illus 12.52 the area of clay 736 is outlined in blue dots, as is the edge of the chamber wall (compare with Illus 12.49). It lay immediately under well-laid slabs shown in Plan 3, although slabs only sealed it completely at the height of Plan 2 (Illus 12.36). It was below the well-compacted lower part of clay 728. It looked like a modified version of 732. It was less rooty, the clay in it was slightly reddish and neighbouring stones were discoloured over an area of about 0.5m diameter (Illus 12.50).

The in-situ primary cairn stones immediately above 736 did not completely seal it. However the clay in context 736 was distinctly different from clay 728.

Two sherds were found in clay 736 where it met 732 (Table 12.9).

Table 12.9 Pottery in 736

Cat	Comment
279	An abraded E/MN non-corky sherd.
351_352	2 heavily abraded rim sherds from AOC Beaker ASH 38.

It is worth noting that these sherds were not at the top of the context, but at the side. Context 736 also produced a fragment of what may have been cremated bone. A piece of hazel charcoal from it (sample 2243/8; AA-24967, 4050+/-45 BP) was dated to between 2860 and 2470 cal BC). Sample 2026 contained pollen characteristic of the beginning of zone CaN-3ai. That dated it to shortly after the transition from CaN-2d to 3a, at some time between 2980 and 2510 cal BC, a broadly comparable date to that of the charcoal, suggesting that the fill was of a fairly homogenous composition.

Most of the other finds from this immediate area were attributed to the surrounding context 732 or the overlying context 728 because it seemed safer to attribute finds which could belong to one of two contexts to the more general and the later one.

12.5.5 Discussion of context 736

The cairn stones at the base of context 736 and to its sides were discoloured and the local fill was

reddish. That suggests a fire in oxidising conditions, in other words on a surface exposed to the air.

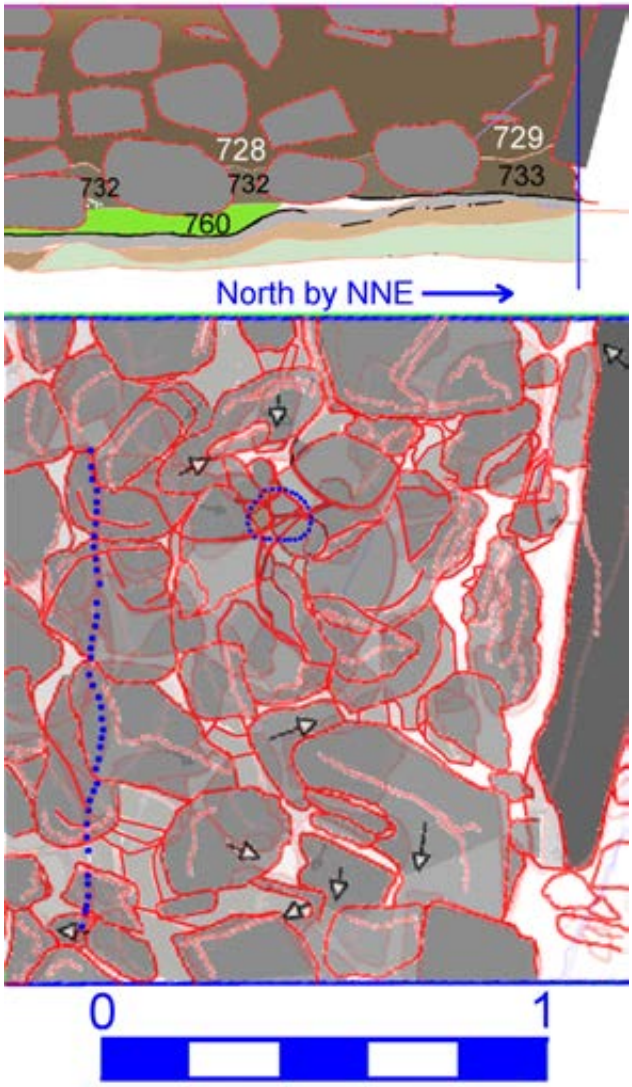
The charcoal and pollen in 736 belong to a period between 2980 and 2510 cal BC (pollen) or between 2860 and 2470 cal BC (charcoal). But the pollen (and maybe also the charcoal) probably came in with the gritty clay used to bed the stones and fill the gaps between them.

On the basis of the observed archaeology the simplest interpretation is that a small fire was lit on the second layer of cairn stones (resulting in their discolouration and that of the clay in the context) and when work resumed a third layer of stones was added. Subsequent robbing, in this interpretation, seems to have left two good layers of stones and the compact lower part of clay 728 in situ above the context. That makes it unlikely that context 736 was exposed to the air at any date after the cairn was built.

The possibility that the conjoining Beaker sherds worked their way down through loose unconsolidated upper fill and compacted lower fill 728 (Day Book 10) should be excluded. If they had, despite the compacted appearance of lower 728, they would not have been surrounded by 736, which was a modified form of 732, but by a modified version of 728.

The stratigraphic evidence is not strong enough to entirely preclude the sherds having been deposited during secondary activities, but any belief that the Beaker sherd could not have been in the primary cairn because the Calanais type of chambered cairn has a much earlier date must be weakened by the discovery of two probable Beaker sherds, one domestic and one fine (Cat 671 and 672), in slot 730 under the chamber wall. The probable Beaker sherd from context 733 of the lower cairn, described in Chapter 7.5.8, provides more evidence, albeit feebler because of the amount of disturbance near the kerb. Nearby in Area BIVWX Feature 885, related to the same slot under the passage wall, produced a sherd probably from a thin fine Beaker (Cat 736).

It seems fairly conservative to assign a two out of three chance to the probability of each of 4 things, that context 736 was primary, and that each of the 3 sherds, Cat 671 and 672 from slot 730 and Cat 736 from Feature 885, were from Beakers. For the cairn to date before Beakers reached the area all have to be false. That allows a calculation (given that the four things are independent of each other) that there is only a one in 81 chance that the primary cairn pre-dated the arrival of Beakers in the area. And in my view the chance that Context 736 was part of the primary cairn was more like 4 out of 5, which would make the odds even sharper. The preferred interpretation is that the cairn was built after Beakers had been brought to the Calanais area.



Illus 12.52 Context 736 amongst the stones shown on Plan 4 of 9-11 May 1981 with overlying stones of Plan 2 and Plan 3 and part of Section 34A [NMRS DC38275, DC38275 and DC38306]

Illus 12.53 The near-basal stones of the outer cairn appearing towards the end of 9 May 1981 [Film 1981.5.32]

12.5.6 Other primary fills of the cairn

Table 12.10 Pottery from gritty clay 732

Cat	Comment
2	A sherd and a crumb from an E/MN corky pot (ASH 2a).
166_167	Two sherds from an E/MN corky pot.
168_171	Two sherds and 2 fragments from an E/MN pot or fine Beaker.
172	A sherd from a fine E/MN corky pot.
173	2 refitted sherds from an E/MN corky pot with most of exterior and all of interior spalled off.
174_175	2 sherds possibly from a single Hebridean Incised pot; all of exterior spalled from one sherd, most of exterior spalled from the decorated sherd.

Dark greyish brown slightly gritty clay 732 lay amongst the basal courses of the cairn throughout the inner half of the outer cairn (Illus 12.49, 12.53). It contained several potsherds (Table 12.10).It also contained 2 quartz flakes (CAT 147 and 148) and a piece of stone thought on site to have been a piece of pot (81.105, not in catalogue). Some of these artefacts were found very close to context 736 and may in fact have been in it; with our recording system we always assigned ambiguously stratified material to the more general or later of the possible contexts.

Layer 732 also contained carbonised hazel nut shells (81.108 and sample 2353), several pieces of alder, birch and hazel charcoal (sample 2365) and a piece of birch charcoal (81.116). This latter piece was dated (AA-24966 4210+/-50) to between 2910 and 2630 cal BC. The age was significantly different from the age AA-24967 for charcoal from context 736 (Chi-squared = 5.21 against a fail value of >3.84).

The equivalent fill of the outer part of the cairn was dark brown slightly sandy clay 733 (Illus

12.49). It contained more humus than 732. Several sherds were found in it (Table 12.11).

Table 12.11 Pottery from basal fill 733

Cat	Comment
176	An E/MN corky sherd with its interior spalled off.
177	An E/MN corky sherd with its exterior spalled off.
178	An E/MN corky sherd
541_542	2 small and abraded body spalls probably from a fine beaker.
1036_1038	Abraded sherd and 2 fragments from a fine E/MN non-corky pot or a Beaker.

It also included a piece of birch charcoal (81.674)

It is not entirely clear how much of layer 733 by the kerb was primary and how much secondary. It was 'set into' crumbly loam 747 (Day Book 10). During excavation the interpretation of the relationships was that the very lowest basal cairn stones 741 pre-dated 733, but the next layer of primary cairn stones (also 741) post-dated it (Day Book 10). That makes 733 a primary fill.

However the basal stones 737 of the cairn beside the secondary kerb stones were planned (Illus 12.55) only after some at least of 733 and some at least of the stones in 733 had been removed. They were set on end and formed a ragged line (Illus 12.55). Some of them sloped into the basal course of stones 741.

They had rotted in situ. The lowest layer of the fill among them was a medium grey brown crumbly loam 747, micaceous with olive green flecking and greasy when rubbed (Illus 12.56). It seems that 747 lay directly between 733 and the green clay platform 760.

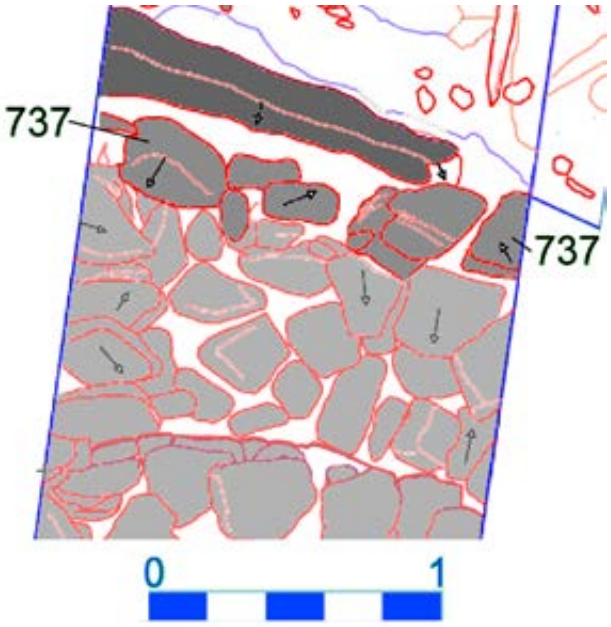
Layer 747 shared characteristics with the radiocarbon-dated layer 738 outside the cairn. Although it was also reminiscent of the incipient turf line 771 inside the cairn and directly overlay scalloping in the clay left by the original kerb it may either have been the disturbed remnants of a slot in the green clay platform or it may relate to

Illus 12.54 The cairn on 6 May 1981 at a slightly lower level than Plan 3 [Film 1981.3.20].

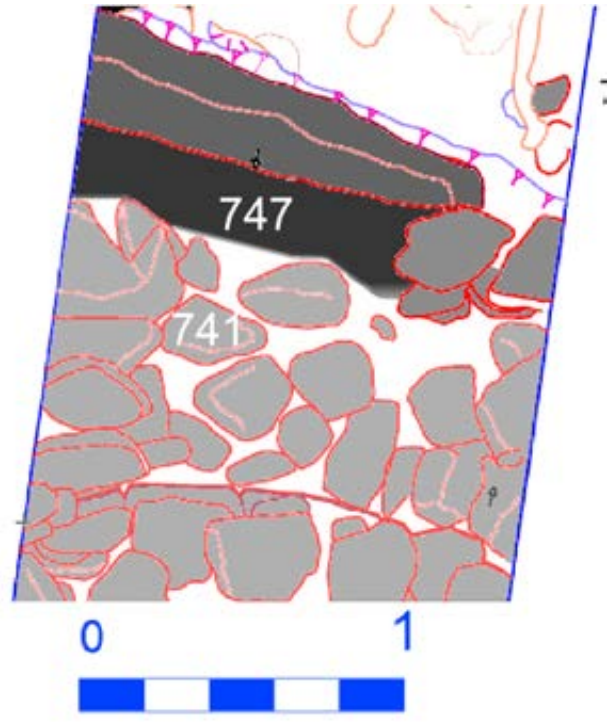
installation of the secondary kerb stone. It contained a quartz flake (CAT 154) and several potsherds (Table 12.12).

Table 12.12 Pottery from fill 747

Cat	Comments
48_53	5 sherds, a fragment and crumbs possibly from one Hebridean Incised pot (ASH 10a but not the same pot as Cat 44–47 from layer 707).
179_180	2 sherds from an E/MN corky pot.
1034	Spall from and E/MN corky pot.
1035	Spall from an E/MN corky pot with all of one surface and virtually all of other spalled off.
1032_1033	2 refitted spalls from an E/MN corky pot or a fine Beaker.



Illus 12.55 Plan 5 of the second layer of stones from the bottom on 11-12 May showing stones 737 set on end [NMRS DC38276]



Illus 12.56 Plan 6 of the basal stones of the outer cairn on 11-12 May showing loam 747 [NMRS DC38277]

The two levels of basal stones (741) of the cairn with fill 732 were mostly large well-preserved rounded boulders (Illus 12.57, 12.58). They were carefully arranged and had been placed together to form a coherent foundation on which the rest of the outer cairn was built. But the bottom layer of stones does not seem to have extended as far as the secondary kern slab (Illus 12.58).

12.5.7 Discussion of the other primary fills of the cairn

Layer 732 seems to be entirely straightforward. It included 'ancestral' soils, clays, charcoal and artefacts, from a settlement or settlements, presumably in the neighbourhood, and it was used to bed the lower primary cairn stones. Similar 'ancestral' clays had been used to fill a slot in the green clay platform under the chamber wall in the immediately preceding period.

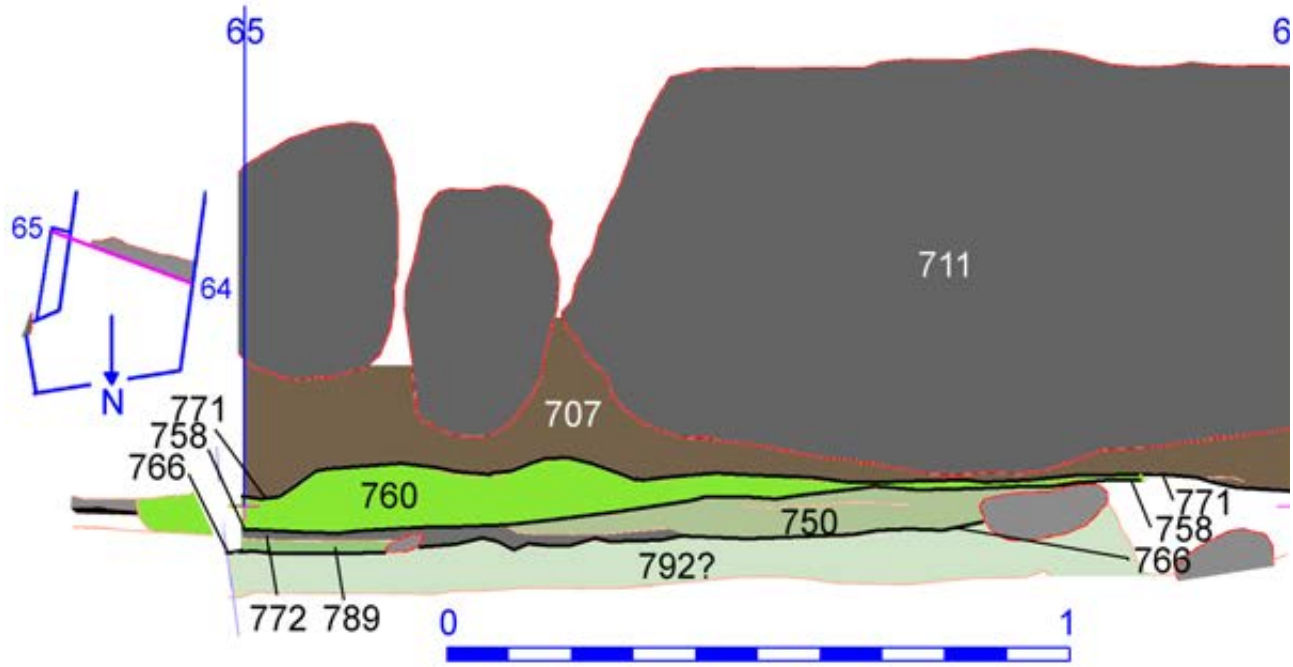
Two significantly different interpretations of layer 733 by the secondary kerb slab are possible. By this stage of excavation the kerb slab stood on a layer of loam 747 inside the kerb line, and soil 738 and soil 707 outside it (Illus 12.58 and 12.59). The stones may have been removed when the cairn was robbed, in which case the outer part of layer 733, rotting vertical stones 737 and basal fill 747 may all be secondary.

Layers 738 and 747 could be interpreted as consisting of disturbed material from pre-cairn contexts, perhaps spilled fills of a slot joining up with slot or gully 758 in Area BIWX a short distance away, or layers of clay containing 'ancestral' artefacts which had contributed to the formation of soil 707. However, a single piece of willow charcoal (sample 203/81) from soil 738 (AA-24968, 3575±45 BP) dated to between 2020 and 1880 cal BC. It may be that this was introduced during late ploughing, but there is no particular reason to suppose so, given the abundance of charcoal and neolithic pottery in the layer, and it seems most likely that whatever its origin, it had been manipulated when the secondary kerb slab was set up that the part of 733 nearest the kerb slab, should be regarded as a secondary rather than primary fill of the cairn.

Illus 12.57 The cairn late on 11 May 1981 [Film 1981.6.30]

Illus 12.58 The basal stones of the outer cairn on 13 May 1981 [Film 1981.7.17]

Illus 12.59 Inner face of kerb slabs, cairn stones 741, black layer 771, cracking 752 and green clay (760) [Film 1981.7.18]



Illus 12.60 Section 33D, outer face of secondary kerb stones [NMRS DC38305D]

12.5.8 The original kerb

Under the basal cairn stones green clay 760 was covered with polygonal cracks 752. Very similar green clay and cracks was found below the chamber wall. The basal stones of the cairn and chamber wall had left dents in green clay platform, which will be described more fully in Chapter 12.6. One dent deep enough to reveal the top of the packing stones of an underlying posthole (Illus 12.61-12.62).

The flat boulder marked K on Illus 12.62 and 12.63 was probably an original in-situ kerb slab. It lay on turf line 758 under the cairn, and turf line 771 which lay on top of the green clay outside and just under the secondary cairn lapped up slightly onto the side of stone K (Illus 12.63). The label of the clay between the turf lines was not recorded on this section but must it have been green clay 760 (See Section 33D Illus 12.60).

Outside the secondary kerb at the level of the green clays 750 and 760 was a pattern of scalloped stone impressions 1004 (Illus 12.64). The three indentations of the original kerb slabs to the west of flat boulder K do not seem to have been planned, but they were clearly visible. The two small baulks visible to either side of the ranging rod at the bottom of Illus 12.64 have greasy dark brown sandy clay 738 on them. Between the small baulks it is not possible to say where the bottom of trench 738 and the top of any kerb slabs lay, while west again the photographic evidence is ambiguous.

12.5.9 Discussion of the original kerb

The original kerb consisted of stones of about the same size as those making up the basal layer of the cairn. They formed a face very slightly outside the line of the later kerb.

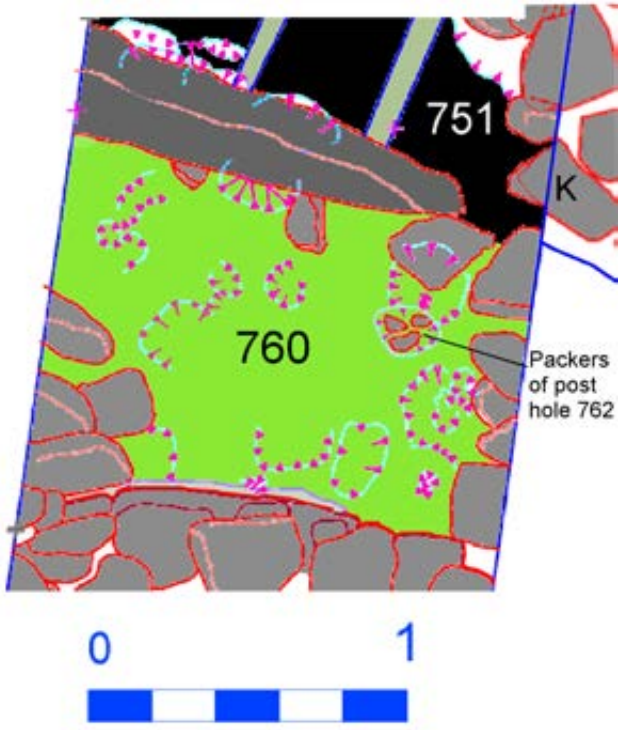
The original kerb was thus similar to that on Area D (Chapter 9.4). Its almost complete removal, except near the Ring stone, may have coincided with building of one of the stone-based enclosures on Area B nearby, although that must remain speculation.

12.5 10 The chamber wall

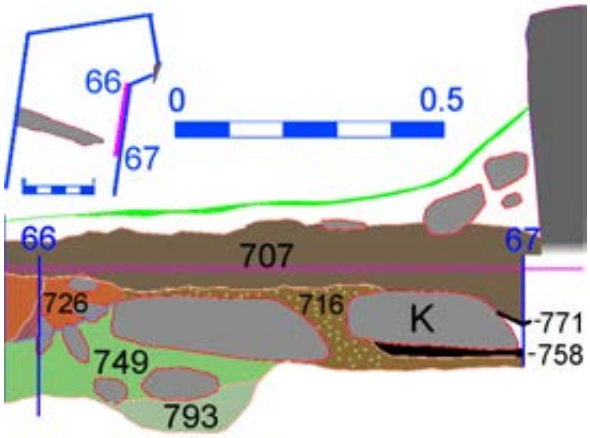
By the chamber wall a gritty down-wash (759) underlay the lower infill 732 of the cairn (Illus 12.65). It contained a quartz flake (81.222). Fills 732 and down-wash 759 overlay a patchy black layer 771. Down-wash 759 and black layer 771 will be discussed in Chapter 7.5.12 after description of the chamber wall (and 771 is discussed in more detail in Technical Note 12.5.12).

As mentioned above the upper disturbed layers of the wall were removed alongside those of the

Illus 12.61 Basal dents and hexagonal cracking 752 inside the kerb [Film 1981.7.29]

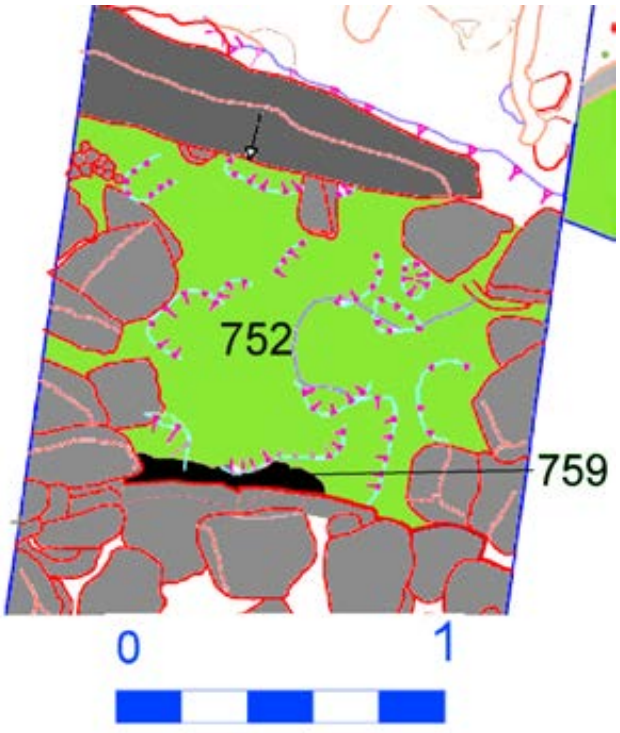


Illus 12.62 Plan 8 modified with green clay platform 760 and packers of posthole 762 showing at base of indentation [NMRS DC38279]



Illus 12.63 Section 33B [NMRS DC38305B]

Illus 12.64 Scalloping in green clay 850 outside the kerb, from the north on 13 May 1981 [Film 1981.7.11 part]



Illus 12.65 Plan 7 [NMRS DC38278]

cairn until about 11 May when cairn and chamber wall could be distinguished clearly from one another. Then the wall was left unexcavated until the cairn had been removed. Illus 12.66 of 2 May 1981 shows the wall from the south shortly after removal of turf. Illus 12.67 shows the lower courses of the wall on 13 May 1981 near the start of the period during which it was left unexcavated.

The north face of the wall was well built and well preserved to four or five courses. It was made of stones of varying size. It cannot have been intended to be seen except during construction (Illus 12.68; Chapter 12.5.1 Illus 12.35-12.38). But it appeared very sturdy.

Once excavation of the chamber wall recommenced it was removed in layers B to F. Layer A had consisted of the stones surrounded by light brown soil 768, which had also covered the inner part of the cairn (finds and a radiocarbon date are described in Chapter 12.3.4).

Layer B stones were surrounded by a rooty dark brown friable soil layer 769. That soil was found only in the chamber wall, not in the outer cairn (Illus 12.69, 12.70). It thus seems likely to have represented a (disturbed) pre-peat fill rather than material which had worked its way downwards later.

Table 12.13 Pottery in fill 769

Cat	Ctxt	Comments
181	769	An E/MN corky sherd with its interior spalled off
182_195	769	14 sherds from an E/MN corky pot.
196_197	769	2 sherds from a fine E/MN non-corky pot..
198_200	769	3 heavily abraded featureless E/MN corky sherds
207_217	769	10 sherds, a fragment and crumbs perhaps all from one E/MN corky pot (except perhaps the most abraded, black sherd).
1039	769	A small E/MN or domestic Beaker sherd.

Illus 12.66 The chamber face of the wall on 2 May [Film B&W 1981.2.4]

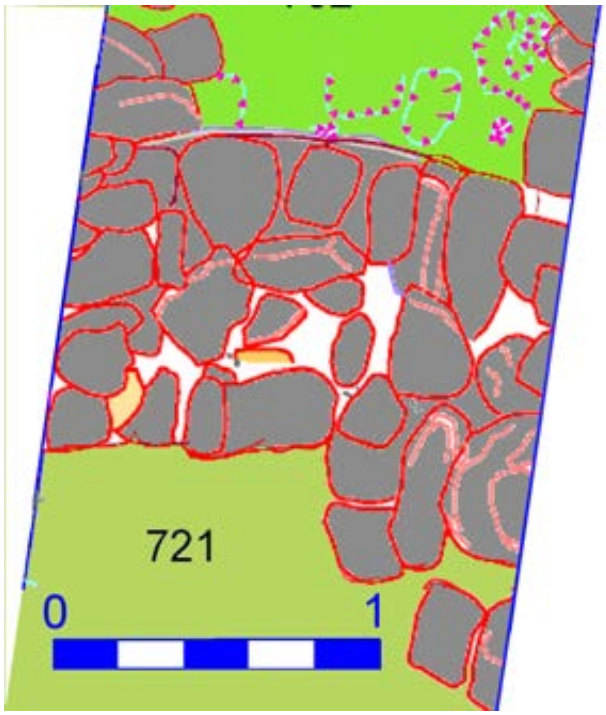
Illus 12.67 The lower part of the chamber face of the wall on 13 May [Film 1981.7.36]

Illus 12.68 The north face of the chamber wall on 18 May 1981 [Film 1981.10.6]

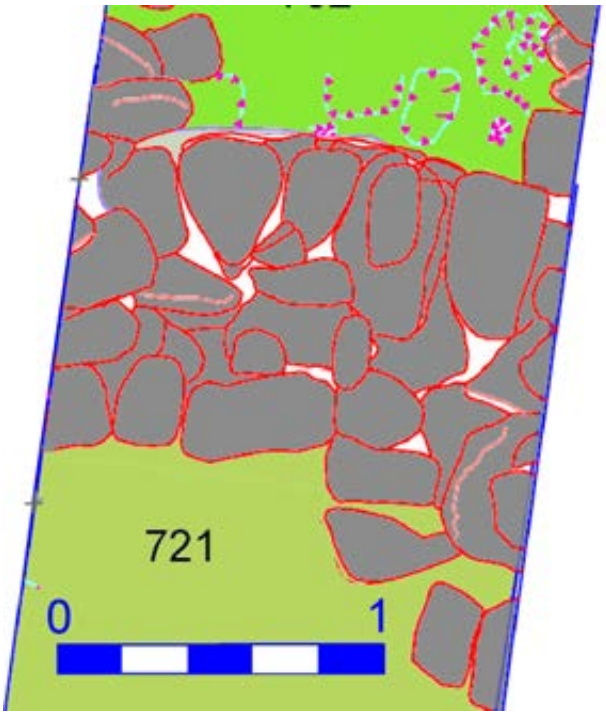
Soil-rich fill 769 also included a quartz flake (81.669) and 2 pieces of birch (81.324). This fill extended between the chamber wall facing stones. It also occurred at a lower level between the face stones, at the general level of fill 770, and there 769 contained two pieces of modern glass (81.327, 81.328) sealed by a wall face stone. Behind the chamber wall-face the wall stones at the top of 769 had substantial gaps amongst them (Illus 12.69,12.70).

The next layer of stones embedded in 769 was more solid (Illus 12.71, 12.72); but 769 itself was very rooty and loose near the chamber face. The largest chamber wall-face stone on Illus 12.67 and 12.69 sealed the glass fragments referred to below (see Illus 12.75).

Soil 369 remained amongst the chamber wall facing stones. Removal of soil 769 in the body of the chamber wall revealed very dark grey clay 770



Illus 12.69 Plan 25 (on Plan 8) of the level A wall stones with the top of fill 769 [NMRS DC38297]



Illus 12.71 Plan 26 (on Plan 8) of the Layer C wall stones, with 769 in cracks [NMRS DC38298]

Illus 12.70 Gaps at the top of 769 [Film 1981.12.35]

Illus 12.72 Stones in 769 from the west on 21 May [Film 1981.13.3]

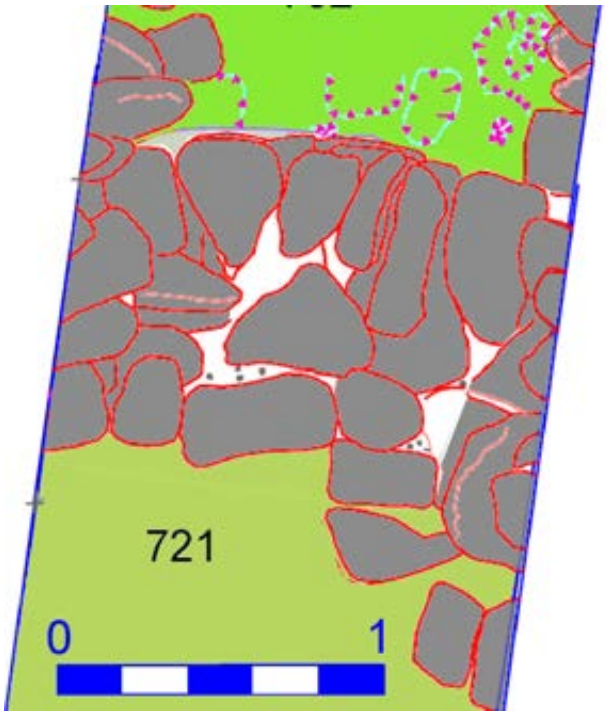
Illus 12.73, 12.74). There were several small sherds in it (Table 12.15)

It also contained a quartz flake (CAT 159).

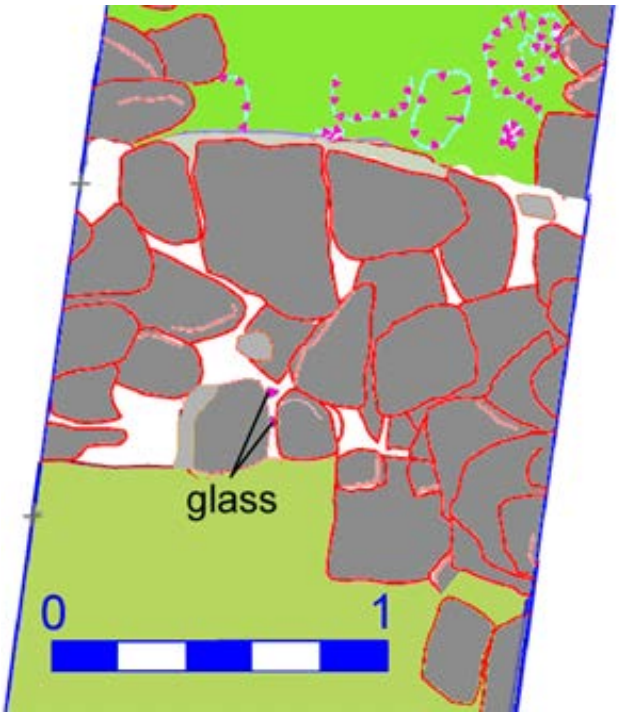
Analysis of pollen sample 2071 from layer 770 was ambiguous, suggested an early stage in zone CaN-3a (at some time between 2980 and 2510 cal BC) but the high Ericaceae possibly indicated a development towards the transition of Zone CaN-3a to CaN-3b at some time between 2560 and 2200 cal BC.

On Illus 12.75 rotten stones are shown in a lighter grey than soil ones. Two pieces of modern glass were discovered (81.327, 81.328). They lay in soil 769 between two facing stones (Illus 12.75) which supported a large slab (Illus 12.73).

In Illus 12.77 too the rotten stones are in a lighter grey than solid ones. The soil 770 behind the inner wall-face continued to be very rooty but the wall-face itself looked solid. The last of soil 769 at the wall-face had been found above this level.



Illus 12.73 Plan 27 (on Plan 8) of the layer D wall stones with clay 770 [NMRS DC38299]



Illus 12.74 Stones in 770 from the west on 22 May [Film 1981.13.7]

Illus 12.75 Plan 28 (on Plan 8) of the Layer E wall stones with layer 770 [NMRS DC38300]

Illus 12.76 Chamber facing stones at the level at which glass was found [Film 1981.13.24]

Plan 30 shows the next level of stones, Layer G, after removal of the upper part of the grey clay 770 (Illus 12.78).

There were considerably more gaps between the stones at the next level down (Illus 12.79, 12.80). Yet overall this layer was coherent and neat. The gaps between them were still filled with grey clay 770.

Removal of grey clay 770 started to reveal a patchy black layer 771 between the basal stones and overlapping onto some of them. Layer 771 under the chamber wall was the same layer as layer 771 under the outer cairn (Illus 12.81) apart from the fact that the latter did not lap up onto any of the cairn stones.

Table 12.14 Pottery in fill 769B

Cat	Ctxt	Comments
201_206	769B	2 spalls from a fairly fine E/MN corky pot.
203	769B	A sherd from a fairly fine E/MN corky pot with part of exterior spalled off. Probably not the same pot as Cat No 201–202; not the same pot as Cat No204–206
204_206	769B	3 featureless spalls from an E/MN corky pot with laminar fabric. Not the same pot as Cat No 201–202 or 203

12.5.11 Discussion of the primary cairn

The labelling of the baulk sections (Illus 7.82, 7.83) suggests that layer 732 was a basal chamber wall fill, under 769 on the west section and at much the same level as 770 on the east section). But those were simply labelling errors. There is no other evidence for their being under the wall. Gritty clay 732 was restricted to the cairn. The same applies to layer 728 on the east section (Illus 12.82).

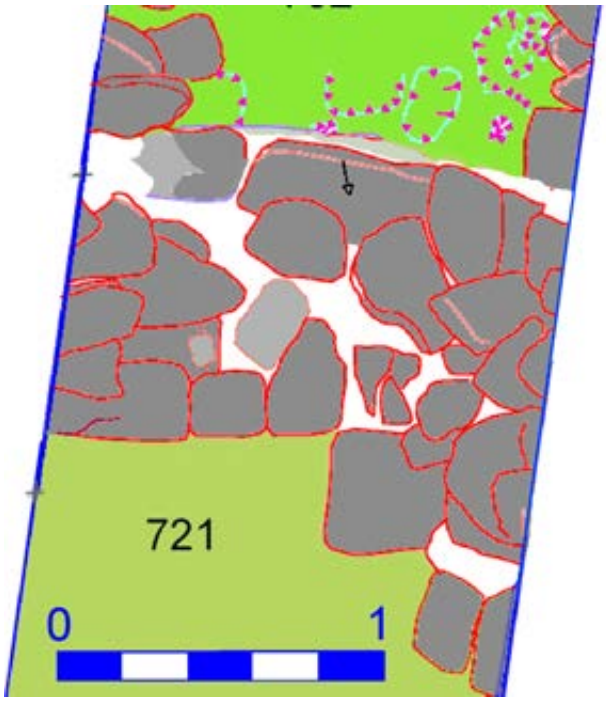
The primary layers suggested on the two section drawings include 733. As discussed above that may be wrong. Layer 747 below 733 seems to be relatable to layer 738 outside the cairn, with its early radiocarbon date of between 2020 and 1880 cal BC. That has to be treated as circumstantial rather than definitive dating evidence for the original deposition of 738. Another thought is that the vertical stoned 737 behind the kerb were probably set there to resist the pressure of the cairn. But no evidence was found for such a supporting feature in Area BIWX behind the massive secondary kerb slab there (which duly fell over). Perhaps after all it 733 was laid down when the original cairn with its relatively light facing kerb was built. None of the evidence provides conclusive proof that 733 was secondary or primary, and both could be true if a primary layer of clay 733 was disturbed when the secondary kerb slab was set up, but the simplest explanation is that it was secondary.

Table 12.15 Pottery from layer 770

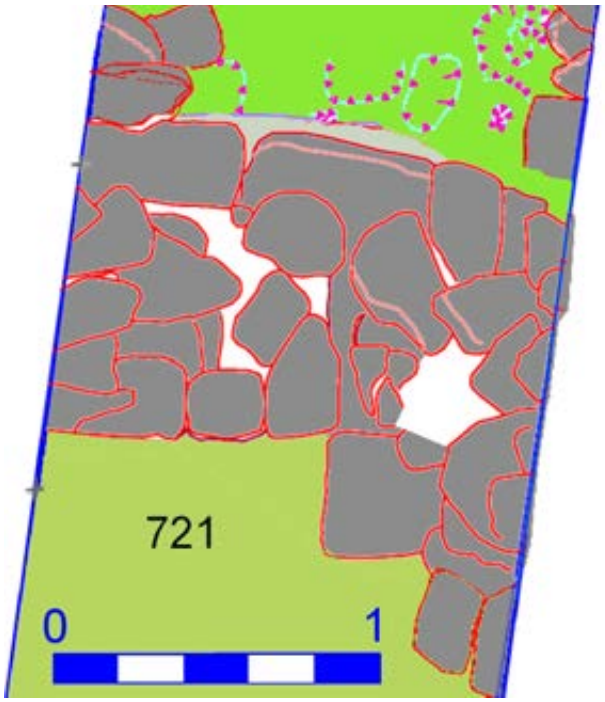
Cat	Comments
6	A sherd from a thin-walled, fine E/MN corky pot (ASH 3).
7	A sherd from a thin-walled, fine E/MN corky pot; not same pot as Cat 6.
8	A sherd from a slightly thicker but fine E/MN corky pot; not same pot as ASH 3 or Cat nos 7 or 9
9	Small, heavily abraded and probably burnt E/MN corky sherd. Not same pot as any of Cat 6 to 8.
218_219	2 sherds with interior faces spalled off from an E/MN corky pot
1040_ 1043	3 spalls and one sherd from a Hebridean Incised pot.

The ASH 38 International Beaker sherd pair Cat 351 found in context 736 of the cairn probably found its way there during cairn construction, for it was well stratified at the junction between 732 and 736, separate from the overlying and at its basal level compact clay 728. Also, as detailed in Chapter 12.5.5 probable Beaker sherds were found in slot 730 under the chamber wall and on Area BIWX in a closely related context; the chance that the primary chambered cairn dated to before Beakers had been brought to the area is less than one in 81.So the preferred interpretation is that the sherd was in primary cairn fill and the chambered cairn was built after 2500 BC; and both of the two radiocarbon-dated pieces of charcoal in the cairn were residual.

The original kerb of the outer cairn was made of horizontally laid small boulders and slabs, impressions of which underlay the later kerb line. One basal stone of this kerb seems to have survived near Ring stone 42. This outer face collapsed or was robbed in the late 3rd or 2nd millennium BC, and the cairn was robbed.



Illus 12.77 Plan 29 (on Plan 8) of Layer F wall stones after removing 769, revealing layer 770 [NMRS DC38301]



Illus 12.78

12.5.12 Discussion of the chambered cairn

The simplified outline sequence shown in Illus 12.84 is based on the west baulk section and omits much detail. The profiles of layers on the east baulk section were different.

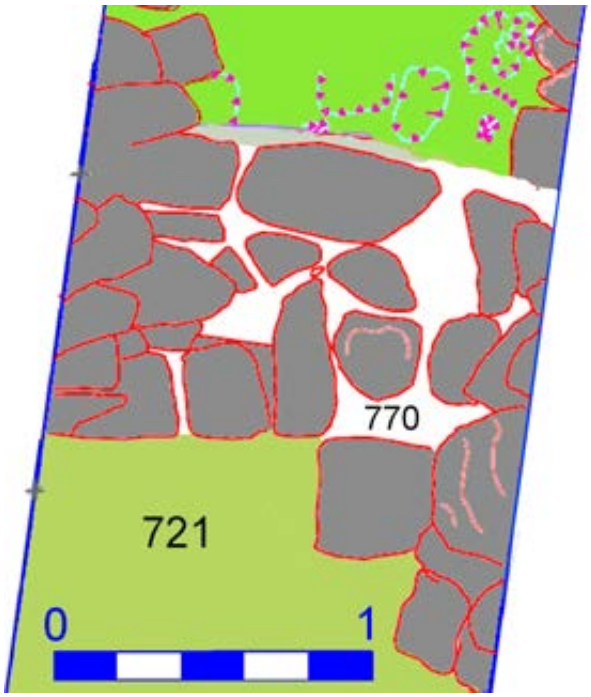
Some of its assumptions are questionable. It is conceivable that the original structure was stepped, although that seems unlikely because the cairn was so small. If it was, the step would presumably have been at the north face of the chamber wall. The diagram does not include any attempt to show the corbelling of the chamber wall discussed below. There may never have been many loose stones outside the dilapidated cairn; robbing may have been more direct and thorough than shown.

The stones of the original chamber wall and cairn were carefully laid using good slabs. The basal stones left dents in the underlying green clay platform. Each layer apart from the basal one was laid on clay and soil bedding; the basal one lay on a weak old turf line 771 on which black silty material settled in the wall area after the basal stones had been laid (Illus 12.35 - 12.38).

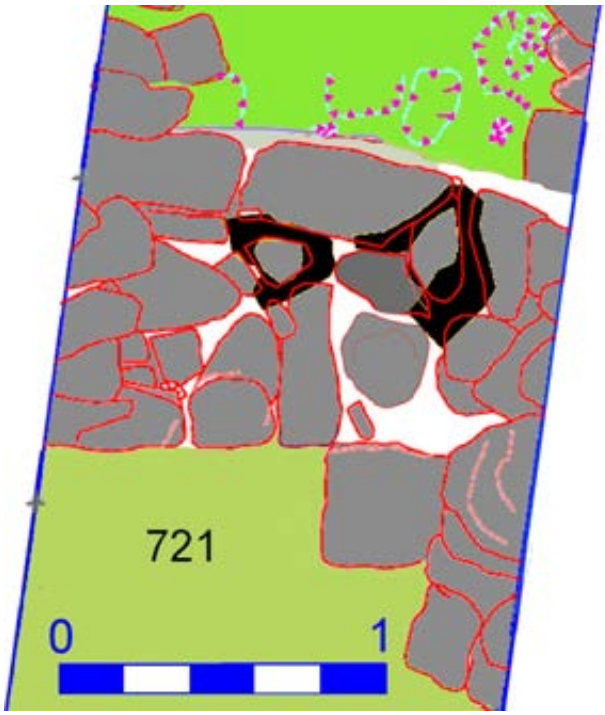
The northern face of the chamber wall was well constructed and showed no signs of having been rebuilt after peat had been cleared from the site, although it was covered by a capping layer. However, if some stones in the cairn towards the top were re-laid when the kerb slab was added, slightly overlapping some wall stones, the chamber wall may also have been tidied up.

The middle part of the chamber face of the wall, by way of contrast, showed clear signs of having been rebuilt or repaired from the third layer upward, both in the disturbed rooty nature of the clay soils behind it and the glass found below the next course of wall stones (Illus 12.75). The innermost piece of glass was 0.2m from the wall-face; far enough to make it unlikely that it was merely tucked into a joint - although I witnessed the 'storing' of artefacts in prehistoric walls during maintenance and repairs in Orkney some 30 to 35 years ago and it must remain a possibility. The most economical explanation is that the wall facing stones had fallen down and been put back some time after peat clearance.

The 1m wide wall may have been designed to support large chamber capstones. The two can-



Illus 12.79 Plan 31 (on Plan 8) of the Layer H wall stones [NMRS DC38303]



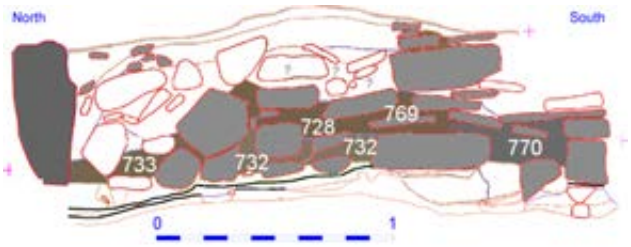
Illus 12.81 Plan 32 (on Plan 8) of the Layer G basal wall stones with patchy black layer 771 overlapping some stones [NMRS DC38304]

Illus 12.80 Basal wall stones [Film 1981.13.33]

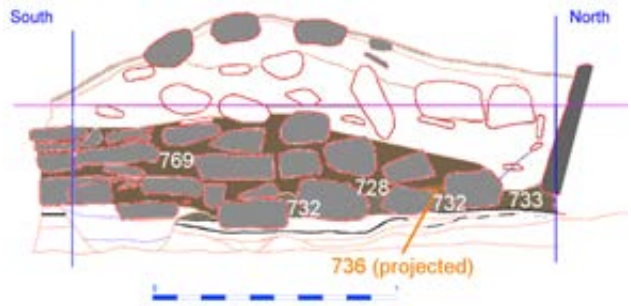
didate roof slabs (the one forming most of the secondary kerb in Area H and the similar kerb slab on Area B) were slightly shorter. If they had indeed been used as roof slabs at one stage, then the walls must have been corbelled inward, even though the four orthostats in the chamber could have helped to support the weight of the roof. In 1923, when measured by RCAHMS, the tallest orthostat (the southeast one) stood to 3' 6" feet (1.1m) and the shortest at 2' 7". But the latter was very likely not the original northeast orthostat, and the recumbent stone 715 in the chamber would when erect probably have been a similar height to the present southeast one (Illus 12.19). The use of slabs above a chamber orthostat to support a roofing slab at a higher level is fairly common in chambered cairns and the highest orthostat provides only a minimum height for the ceiling of the chamber. Probably, given the existence of the orthostats and the two massive slabs, the cairn wall was more than a metre tall and had a flat ceiling.

However, the wall with its external cairn was thick enough to allow a completely corbelled roof for the chamber, which at the surviving height of the original stonework was close to 2m wide. Alternatively and in principle, the roof might have been made of organic materials. The survival of substantial pine stumps under the peat at several sites in Lewis suggests that suitable timbers might have been available. Radiocarbon dating places many Lewis pine deaths between 3700 and 2700 cal BC (Dickson and Dickson 2000, 37-39, 67). Pine pollen appears (admittedly in small quantities) in the earliest levels of the CaN-3 pollen diagram at Calanais and is present in all subsequent levels. Some pine charcoal at Calanais was radiocarbon-dated to between about 2500 and 2300 BC (SUERC-11590; SUERC-11591).

The double-faced character of the chamber wall raises the possibility that it stood independent of the outer part of the cairn. The most persuasive arguments against this are that though solid it was clearly not designed to be seen and secondly that the green clay platform and the incipient turf line 771 were similar under the chamber wall and the outer cairn (Chapter 12.6 and Technical Note 12.5.12). This supports the idea that there was very little difference in time between building of the chamber wall and the outer cairn.



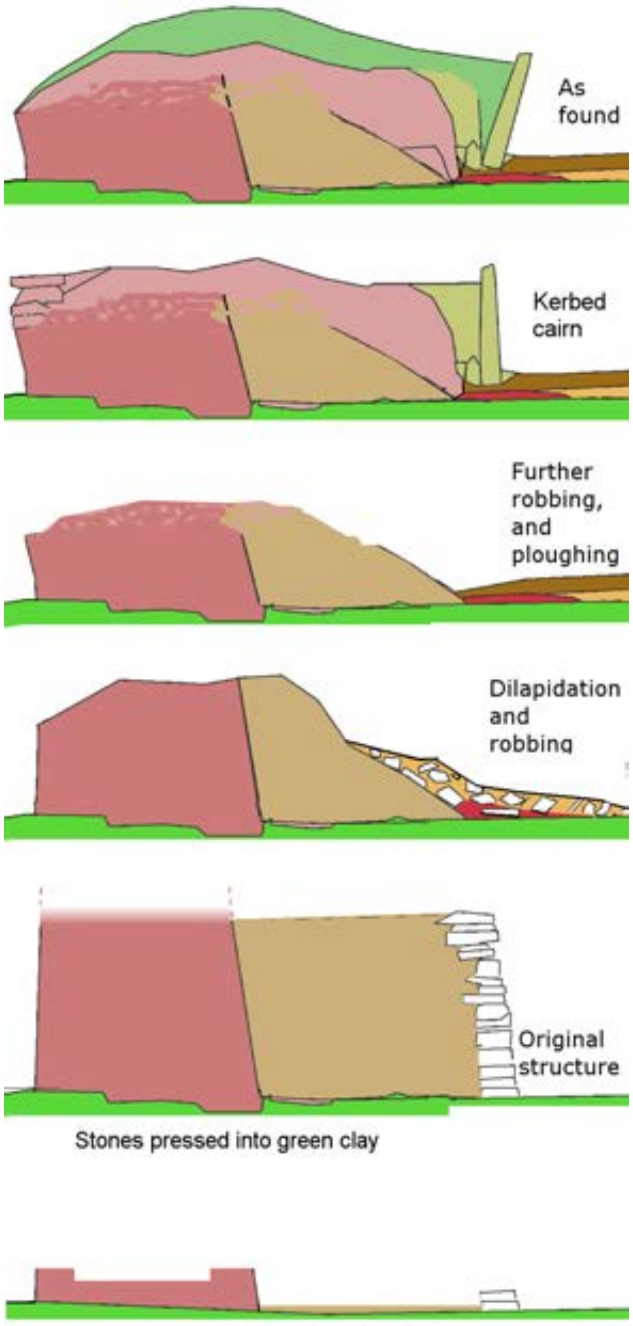
Illus 12.82 The primary levels of the cairn on Section 33a [NMRS DC 30385a]



Illus 12.83 The primary levels of the cairn on Section 34 [NMRS DC 38306]

However in contrast to the chamber wall, no black silty material was observed on top of any of the basal stones of the outer cairn. Turf line 771 there was looked at in detail during pollen sectioning as described in Chapter 7.6 and had much more of the character of other turf lines than of a layer of silt which had washed down through the cairn. Also there was a small pile of material 759 at the base of the northern face of the wall; this gritty downwash was banked against it under the lower fill 732 of the outer cairn, and that is most simply interpreted as having happened before the outer cairn was built. But no more than one or two layers of the wall need have been built when gritty material washed down outside it, presumably from bedding soil or dirty stones or both (Illus 12.65, 12.68).

The preferred interpretation is that the chamber wall and the outer cairn in Area H were built at the same time as each other in all but the trivial sense that on Area H the basal layers of the chamber wall were laid before the cairn basal layers.



Illus 12.84 Simplified outline sequence of changes to the cairn

The massive secondary kerb slab and two smaller kerb stones were erected at some time after 2040 cal BC and the cairn back-filled. Over the next millennia the kerb slab was forced out by the weight of the cairn. In 1981 it leant at an angle of 15 degrees. At some stage - perhaps after the place had been cleared of peat in 1857 - the two smaller secondary kerb stones probably fell and some of the secondary cairn material behind them fell out; the kerb was re-erected and the cairn back-filled.

12.6 Phase 7: The green clay platform

12.6.1 The green clay platform under the chambered cairn

The term 'platform' should not be taken to mean a neat free-standing structure; it is simply a convenient label for a flat layer of green clay 760 lying inside the Ring under the weak turf line 771. The platform was of variable thickness, from less than 0.1m to more than 0.15m. In plan it covered the whole of the area under the chamber wall and cairn in Area H and at least a small area outside it to the north near Ring stone 42.

Its colour lay towards the greener end of the range of parent clay green to grey-green tints noted on Area DIII, where several square metres of seemingly little altered natural clay were exposed. It was covered by a pattern of polygonal drying-out cracks 752, into which the boulders and stones of the chambered cairn had pressed (Illus 12.85-12.87). There was continuity between dark material 771 in and around the stone casts demonstrating that the patchy litter layer of turf line 771 formed before the stones were laid (Illus 12.86). Clay 760 contained two quartz flakes (81.225) and a piece of quartz (81.228).

Kubiena box sample profiles (Illus 12.88) were taken through the platform and underlying old ground surface 758 for pollen analysis (Chapter 21: Palaeoenvironment Illus 21.21). The green clay contained pollen of CaN-2d and CaN-3a; the former an earlier zone than the pollen characteristic of CaN-3aii in a thin gritty humic-rich to organic-rich layer under the green clay. That should have been the litter layer of turf line 758 underlying the green clay. Turf line 758 (and 751 to the north of the green clay platform) contained pollen suggesting that it belonged at about the time of the junction between sub-zones 3ai and 3aii.

Thus there was an inversion, or perhaps one should say an apparent inversion, for it may be related to the timing of importation of the green clay if the latter was exposed to the contemporaneous pollen rain for only a short time during the year.

The pollen analysis included descriptions of the makeup of layers and confirmed that there was

Illus 12.85 Dents in the clay and turf line 771 under the cairn from the west-north-west [Film 1981.16.9]

Illus 12.86 Dents in the clay and layer 771 under the chamber wall, and the slot 773 cut by Victorian trenching in the chamber [Film 1981.14.14]

more humification of the top of the green clay and in 771 than lower down. That showed that 771 was a turf line, albeit poorly developed, rather than simply a superficial layer of dark downwash.

12.6.2 The green clay outside the chambered cairn

In the small NE extension of Area H a patch of green clay 760 was discovered with identical cracking 752 to that of the platform under the cairn (Illus 12.89 Sections 85-86 and 64-65, 12.84). It had survived little changed perhaps because, above the surviving line of plough soil 738, there had been a cluster of slabs. The junction between the two areas of green clay could be seen directly. The clay lay above the northernmost stones of an area of stones which ran from the cairn to Ring stone 42 above fairly clean green clay 749 (Illus 12.89 Section 85-6). It post-dated filling of the pit dug for Ring stone 42 and a mound above the pit.

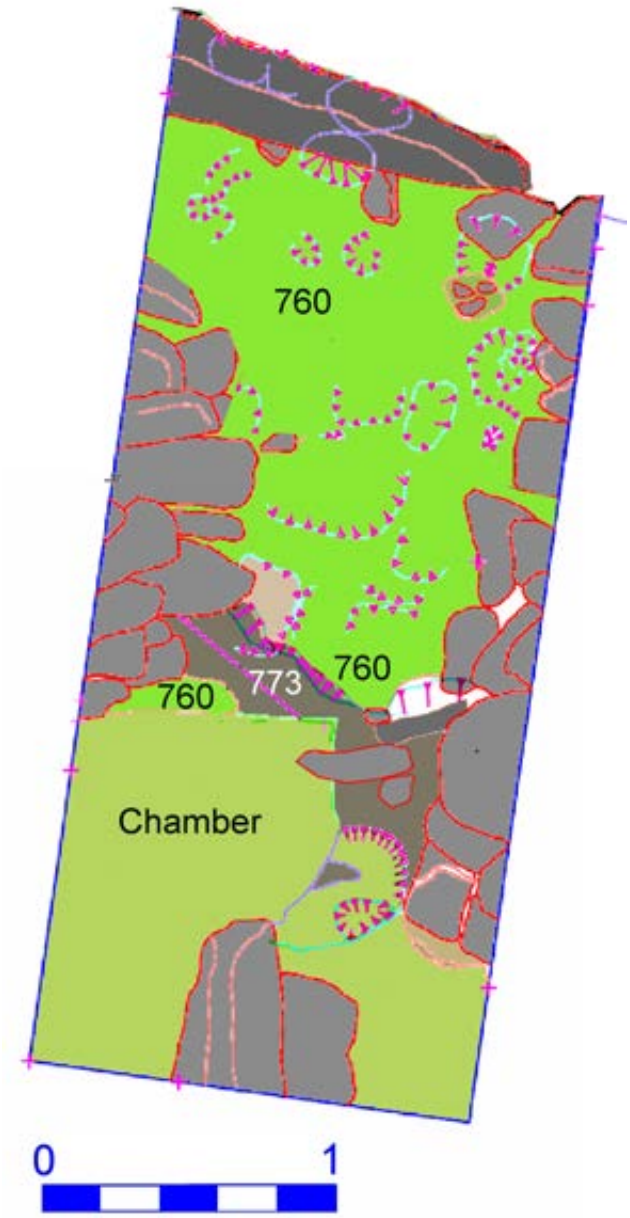
More generally green clay 760 extended just north of the line of the kerb slab. As described above in Chapter 12.5.8 a set of shallow scallops or stone-casts (1004) suggested that the original external wall of the cairn was made of small horizontal slabs, one of which survived near Ring stone 42.

There were some ambiguities in recording of the layers on these sections (Technical note 12.6.2).

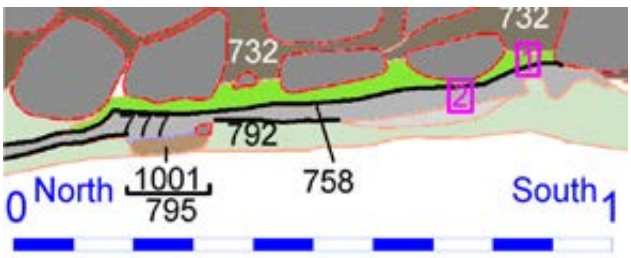
Most of the area north of the cairn was covered at this level by light olive-grey gritty clay 750. It lay on turf line 751 which was identical to turf line 758 under the platform. However as described below clay 750 and green clay 760 seem not to have been laid in a single operation because mixed clay 716 lay over 750 but near the kerb stones 716 lay under 760 (Illus 12.89 Section 85-86; Illus 12.90). However clay 716 may well have been disturbed more than once and the difference in time between the laying of 750 and 760 was probably small.

12.6.3 Discussion of the green clay

The amount of clay left over after the Ring stones were set up would have been enough to account for clay 760 composing the platform. But it would not have been enough to provide clay 750 as well. The total volume of clay displaced by digging the 13 Ring stone holes, erecting the stones and putting packers and clay back in the pits might have been about 3 to 6.5 cubic metres. But if clays of the same type and stratigraphy as Area D 320 and Area H 750 and 760 covered the whole Ring area they would have had a volume between 6.8 and 10.2 cubic metres (Technical Note 24.10). Thus the Ring pits are unlikely to have provided enough clay to account for the amount of green and oxidised clay at this stratigraphic level. Further the stratigraphy demands that if the clay came from the pits it was not spread out as soon as it had been dug up. Instead it must have been stored for



Illus 12.87 Plan 15 on 9 on 8b showing dents in the green clay below the chamber wall and outer cairn [NMRS DC38287, DC38281 and DC38280]



Illus 12.88 Pollen sampling in the east baulk

a while. There was no obvious quarry-source for the clay at Calanais apart from the pits dug for the standing stones. Economy of hypothesis suggests that it or at least much of it was brought in from outside the Ring.

The preferred interpretation is that the clay from the pits was spread out before turf line 758 formed on top of it. That is to say, the clay from the Ring stone pits was laid down distinctly earlier than the green clay of the platform. It is discussed below in the context of the turf lines and Ring stone 42 pit.

After the green clay and other clays had been spread out over the area of the Ring a light timber structure was built where the chambered cairn was later to stand. The clay can thus be interpreted as levelling in preparation for the timber structure.

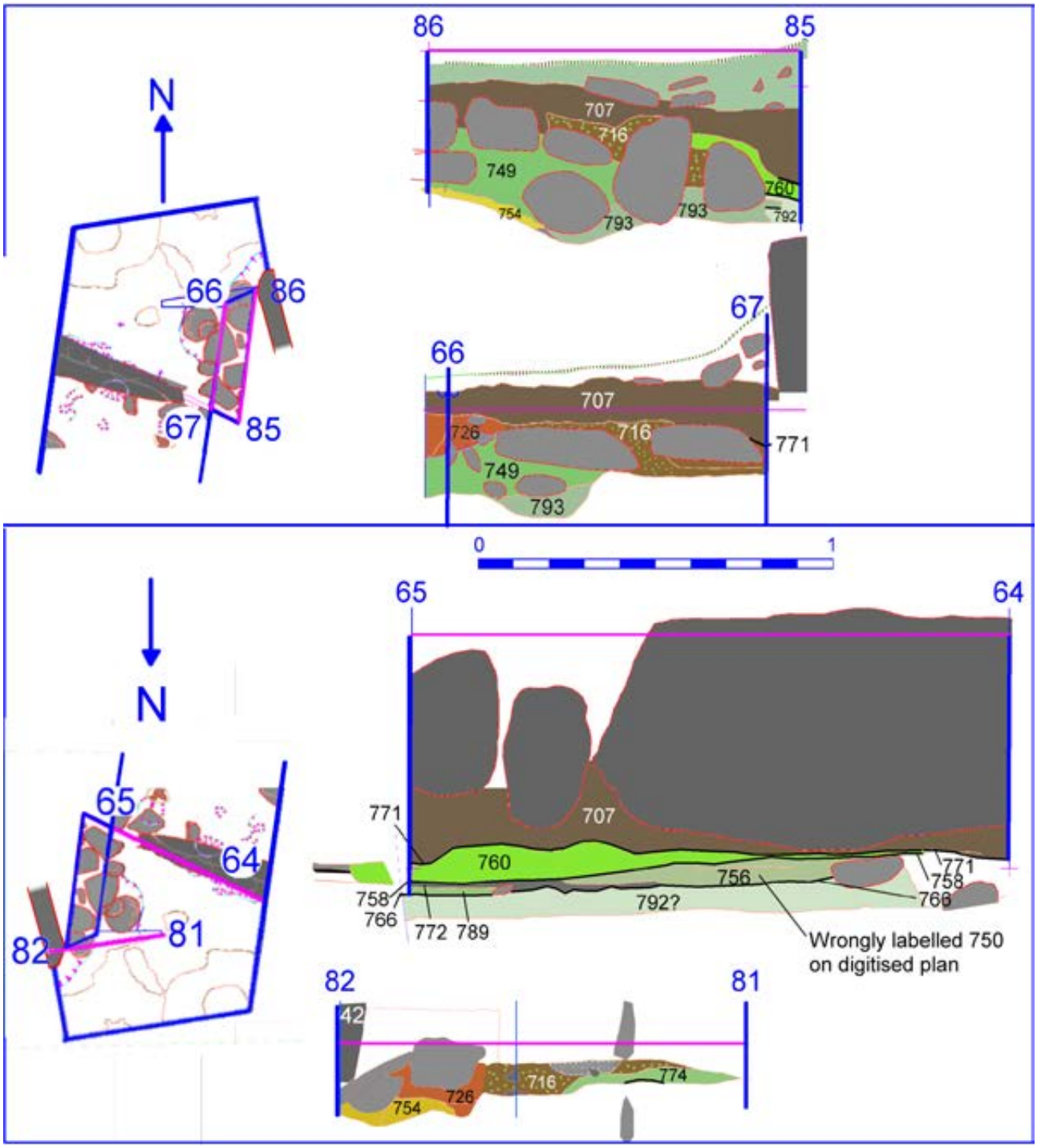
12.6.4 A slot 773 in the platform

A slot 773 cut the thin black incipient turf line 771 and the green clay platform (Illus 12.86, 12.91). It had been cut away by 19th century trenching in the chamber. A small part of the green clay platform (752 on 760) survived to the southwest of the slot.

The slot was roughly 0.45 m wide and 0.2 m deep (Illus 12.92). It generally contained fills, 772 over 778 over 730 (Illus 12.90 Section 34a). The stratigraphy in its eastern part was much more complicated (Illus 12.99 Section 33a).

The top fill in the east part of the slot was a patch of dark grey peat-like material 772 spilling onto the green clay 760 under the body of the cairn. It was mostly absent in the west although it survived in the west baulk (Illus 12.93 Section 73-74. By the east baulk it was a brown loose fibrous clay loam. It did not contain any artefacts. A charred hazel nut shell from it (sample 2038) produced a radiocarbon date (SUERC-11616 4430+/-35 BP) of 3330 to 2920 cal BC.

The middle layer 778 was mainly humic rich clay containing hazel nut shells and charcoal (Illus 12.95, 12.96). It also included slightly gritty, humic rich clay with ochre and small flecks of charcoal. A pollen sample (2051) was zoned to the middle of sub-zone 3a, the transition between CaN-3ai and CaN-3aii, dated at Leobag to a time



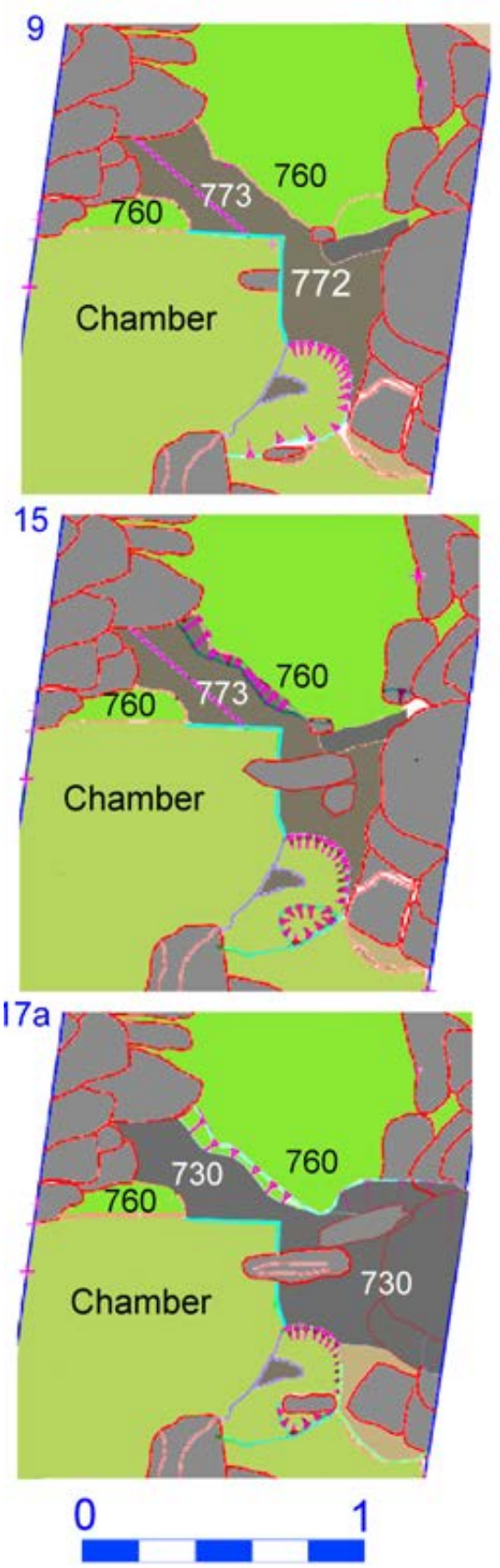
Illus 12.89 Sections 33B (66-7), 33C (85-6), 33D (64-5) and 34A (81-2) showing the strata north of the kerb [NMRS DC38305 and 38306]

between 2770 and 2360 cal BC. A charred hazel nut shell from sample 2051 produced a radiocarbon date (SUERC-11617 4425+/-35) of 3330 to 2920 cal BC.

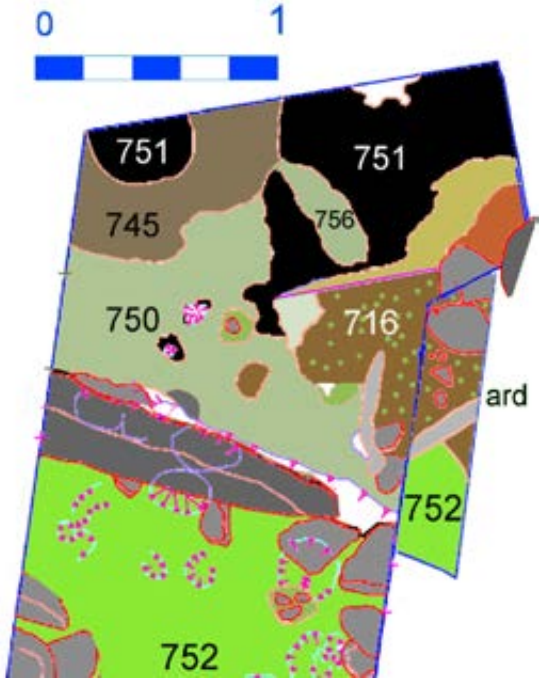
The lowest fill (730) was grey-brown with a slight green tinge, charcoal-rich sandy clay with a component of small sub-angular stones (Illus 12.97, 12.98). It contained several potsherds.

Table 12.16 Pottery from slot context 730

Cat	Comment



Illus 12.91 Plans 9 to 17a of the area round slot 773, [NMRS DC38281, DC38287 and DC38289]



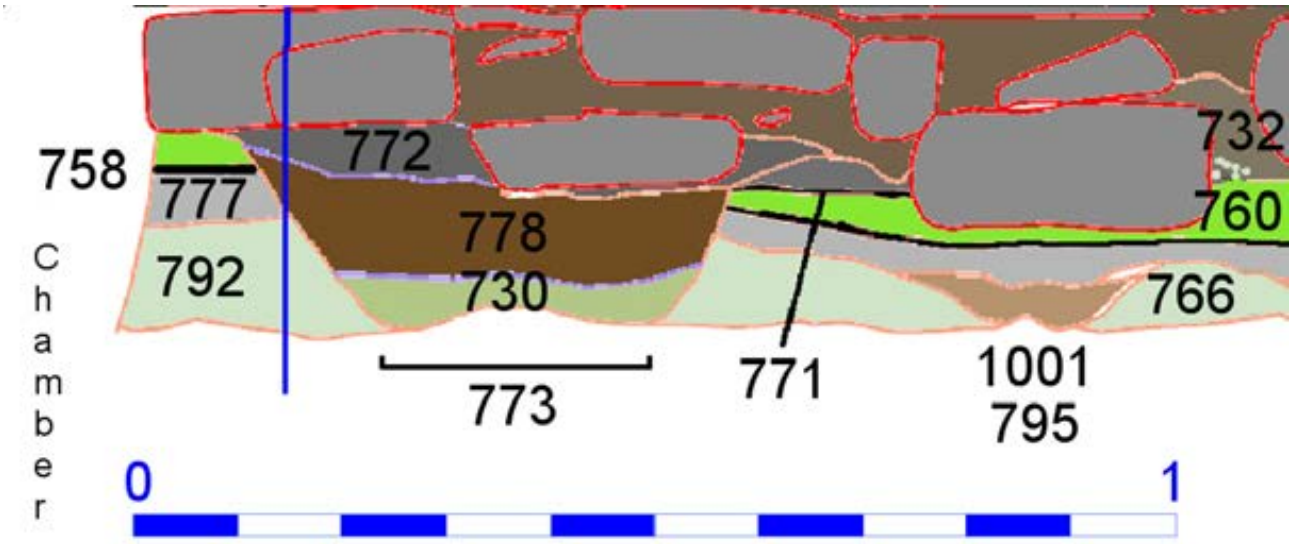
Illus 12.90 Plans 22 on 7 showing the surface 752 of green clay 760 and green clay 750 outside the cairn [NMRS DC38278-9 and DC38294]

162_165	3 sherds and a fragment from an E/MN pot, all spalls; possibly burnt
671	A possibly thoroughly burnt sherd from a fairly fine domestic Beaker.
672	A thoroughly burnt sherd probably from a fairly fine domestic Beaker.

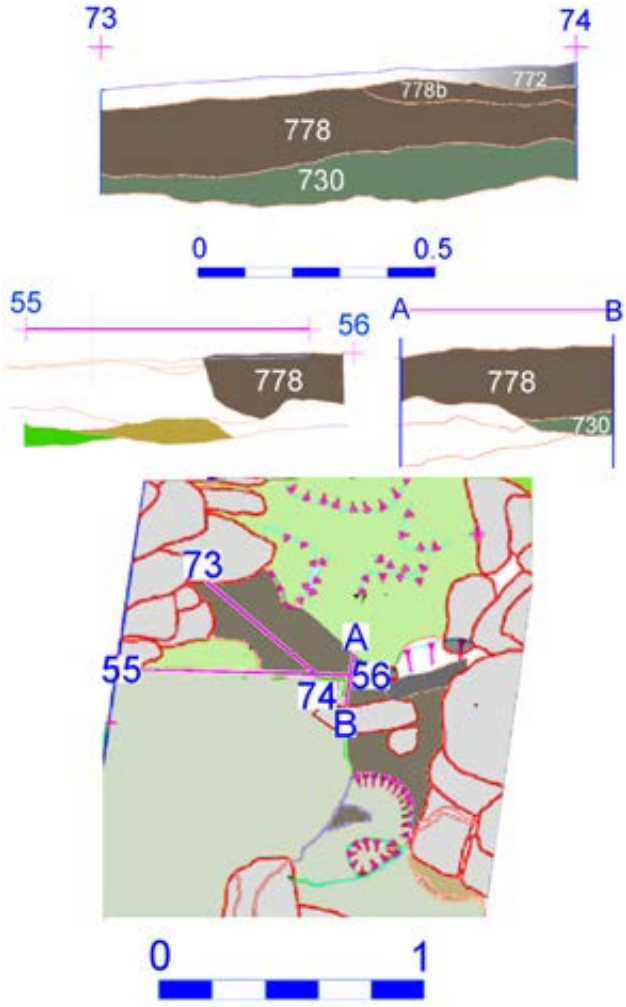
It also contained some burnt bone (81.332, 81.350 and 81.352) and at least one quartz flake (CAT 146); the finds bag for a quartz flake 81.667 was not found during cataloguing. A pollen sample (2048) was zoned to CaN-3ai, starting between 2980 and 2510 cal BC and ending between 2770 and 2360 cal BC).

Three sections were drawn across the fills of 773 near the east baulk (Illus 12.99). To recap the descriptions above, the 'classic' sequence within slot 773 was, from top to bottom:

— 772 a patch of very humic material overlapping onto the green clay platform
— 778 gritty humus-rich clay



Illus 12.92 Part of west baulk section 34a crossing Slot 773 [NMRS DC 38306]



Illus 12.93 Sections 8b, 8c and 9b of Slot 773 [NMRS DC 38280 and 38281]

— 730 brownish sandy clay

On Section A-B no fills were described within slot 773. The stratigraphy was complicated by (probable) posthole 787 which cut 773, by post-hole 781 and by the fact that where one might have expected green clay of the platform to be visible there was slightly sandy brown clay 786. Could this have been the same as 730, elsewhere in the bottom of slot 773?

The main east baulk section was slightly west of the line A-B on Illus 12.99. It showed the side of possible post-hole 787. The basal fill 730 of the slot was absent, unless it was layer 788; although that seemed to run too far south to be one of the slot fills the slot may have turned at this point.

Possible posthole 787 contained an E/MN corky sherd (Cat 220).

Section 75 to 76 appears to include both 730 and 778 but the top fill was brown loose fibrous clay loam, not peaty like the 'classic' 772

Clearly far more was going on at this point, where the slot in Area H joined the similar (and only partially excavated) slot in the chambered cairn passage in Area B, than was seen in plan during excavation.

At the corner between Areas H and B a wedge of early layers survived in the passage, south of the slot there. Dark green clay 885, which was probably part of the green clay platform and equivalent to 760 in Area H lay on grey soil 888

Illus 12.94 Slot 773 with the green clay platform beyond it and to bottom left of it [Film 1981.14.16]

Illus 12.95 Middle fill 778 of cut 733 Film 1981.15.15]

Illus 12.96 Middle fill 778 of cut 733 Film 1981.15.25]

overlying a grey sandy clay 890 and then natural ((Illus 12.100).

12.6.5 Discussion of the slot 773 and other cut features under the wall

Two of the cut features found in this area, 781 and 787, later than the slot, appeared to be the remains of postholes or small pits. 781 was about 0.4m deep and 787 may have been about 0.6m deep; but only small parts of them survived because they were on the edge of the chamber; they were not well understood (Illus 12.99, 12.101).

The original width of the slot is hard to estimate everywhere. In the west where it was at its least disturbed it was roughly 0.45 m wide and 0.2 m deep. On the east side of the trench on the main baulk section it again seemed to be about 0.45m wide and 0.2m deep. That suggests that it continued in a straight line.

The slot cut green clay 760 which was dated elsewhere to after 2750 cal BC and was significantly later than the radiocarbon-dated charred hazel nuts in the slot fills. The hazel nut shells must have been residual. The original interpretation of the slot was that there had been two silting episodes, implying that it had lain open. There is however no evidence on the plans or sections to support this interpretation. Because the topmost fill 772 overlapped onto the green clay platform, because the tops of the two lower fills were nearly flat and because the charred hazel nuts in the upper and middle fills were several hundred years old when they were deposited, the slot must have been carefully filled and that action may thus have had a ritual significance.

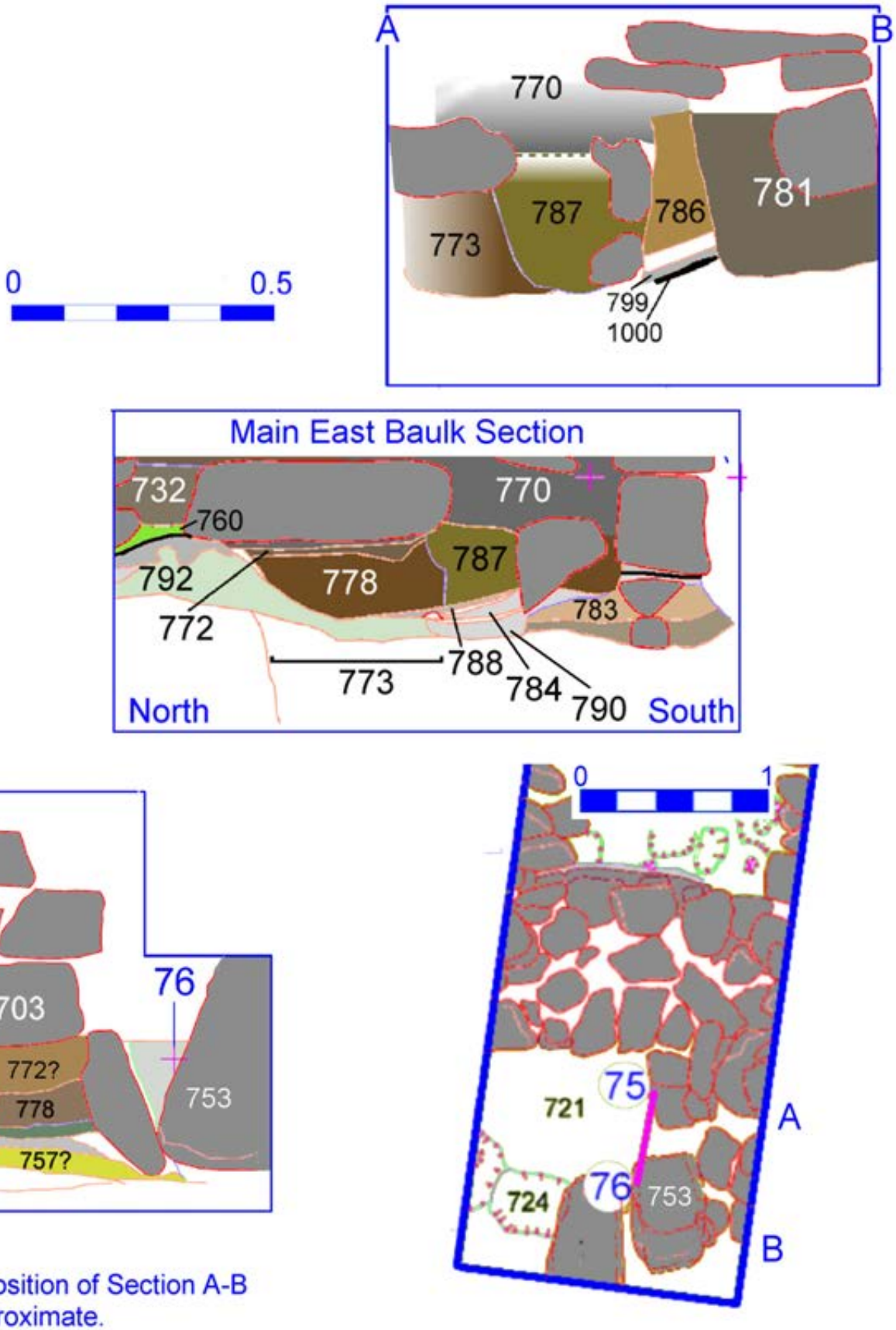
Two probably Beaker sherds were found in fill 730 (Cat 671 and 672). One had definitely, and the other probably, been heavily burnt. Given their context, that suggests ritual activity at the time of filling.

Like the slot on Area H, that on Area B contained charred material which produced dates centuries earlier than the true date of the slot. They were probably parts of a single structure.

The ill-understood pits 781 and 787 near the north corner of the chamber and passage are broadly reminiscent of the (largely unexcavated)

Illus 12.97 To the right, fill 730 in cut 773 through the green clay platform 752/760; from the west on 25 May 1981 Film 1981.14.13]

Illus 12.98 In the foreground, fill 730 in cut 773 through the green clay platform 752/760; from the south on 25 May 1981 [Film 1981.14.15]



Illus 12.99 Sections of slot under the chamber wall [NMRS DC38305, DC38279D and E]

features associated with the slot along the north side of the passage on area B. It is not clear whether 781 and 787 held uprights. They may have been pits dug along the line of the filled-in slot for some other purpose.

Taken together, the slots in Areas D, B and H can be interpreted as defining a shape similar to the plan of the northern half of the chamber and passage. But the match was not exact. The preferred interpretation is that it originally held the timbers of a light structure (Chapter 24: Discussion and Conclusions).

12.7 Phase 6: Turf line 751/758 and its soils

Turf lines 758 under the green clay platform and 751 in the area north of the cairn were the same as each other (Illus 12.103, 12.104). Reddish tones have been digitally enhanced in the photograph (Illus 12.103) to help bring out the contrast between features north of the cairn. That area includes small temporary baulks much as on Plan 8b (Illus 12.104) although the correspondence is not exact because the photograph was taken somewhat before Plan 8b was drawn. Brown clay 716 with a grey-green component survived above the general level on the small baulk running west from the re-entrant corner near Stone 42. Much of HI was covered by turf line 751 but there were patches of its parent soil 756 showing elsewhere (see Illus 12.108 Plan 9 for its full extent).

Turf line 1009 in a depression in the northwest corner may have been the same as 751 but had no direct connection to it. It may instead have been local to the depression, forming in a dip in the underlying mixed clay 743 (Illus 12.106, 12.108 Section 13).

At this stage of excavation the stones visible in the east side of the trench to the north of the kerb were thought to lie partly in the pit dug to erect Stone 42, but subsequent work showed that at least some of the upper ones were part of a later mound of clay and stones. It was also assumed that all of the clay fills under the stones were in the pit for Ring stone 42, but there was also probably a depression on the west side of the stone-pit somewhat like that in the northwest corner of HI.

Illus 12.100 The junction between Areas B and H, with the passage in the background and a wedge of surviving layers [Film 1981.19.19]

Illus 12.101 Possible posthole 781; slot 773; small depression 780 [Film 1981.16.1]

Illus 12.102 Slot 773; small depression 780; possible posthole 781 [Film 1981.16.24]

Illus 12.103 Area H from the west with Area B in the background on 20 May 1981 [Film 1981.11.11 colours remapped redder]

12.7.1 Turf line 758 under the green clay platform and its underlying soil 777

Turf line 758 was well-developed (Illus 12.103, 12.104). Its surface had several impressions in it from the pressure of cairn stones through the green clay platform. Although by chance the main baulk sections do not show any of the cairn stones impinging on turf line 858 the bases of some of them were did so. Indeed one had pressed down onto the packers of a posthole 762 (Illus 12.103, 12.104).

On the east side of the trench turf line 858 overlay soil 777. It rose southward at a slope of c. 13% before reaching a maximum elevation under the chamber wall, where it had been cut away by slot 773 (Illus 12.105). Above the same soil 777 on the west side it overlay a slight central depression and surrounding slight elevations. The distance between the peaks of the elevations was about 1.6m. This rise, fall and rise mirrored similar changes in the height of underlying layers, probably reflecting the presence of early cultivation beds (Chapter 12.10).

Soil 777 was 30 to 40mm thick and in places it overlay an earlier old turf line 766 which retained a weak litter layer. Ard marks were found near the peak of the underlying soil 792 cutting down into it through turf line 766 but sealed by the overlying turf line 758, and they undoubtedly represent ground-working of 777. The turf line 766 was not visible on most of the west baulk section but may have been represented by the patchy turf line at its north end (Illus 12.105). No artefacts were found in the soil or the turf line.

Turf line 758 and its underlying soil 777 were sampled for pollen in Kubiena boxes (Illus 12.105, boxes outlined in magenta; see Chapter 21: Palaeoenvironment).

Soil 777 was zoned to the end of CaN-2d or the beginning of CaN-3a. At Calanais Leobag thick birch woodland started to decline substantially. The division between the pollen zones happened at some time between 2980 and 2500 cal BC; but

the changes towards an agricultural landscape took place over perhaps as many as 4 centuries.

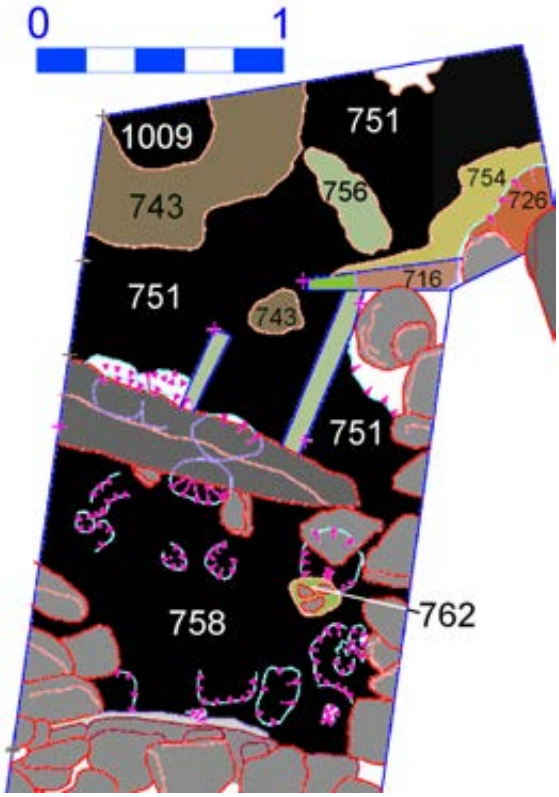
Turf line 758 belonged to the junction between CaN-3ai and CaN-3aii, dated at Calanais Leobag at some time between about 2780 and 2360 cal BC. There started to be a greater emphasis on pastoralism in the Calanais Leobag pollen catchment area. Sphagnum moss spores appeared in this level under the green clay. Just above the turf line a thin layer of humus-rich to peaty grit underlay the green clay platform.

12.7.2 Discussion of turf line 758 and soil 777 under the cairn

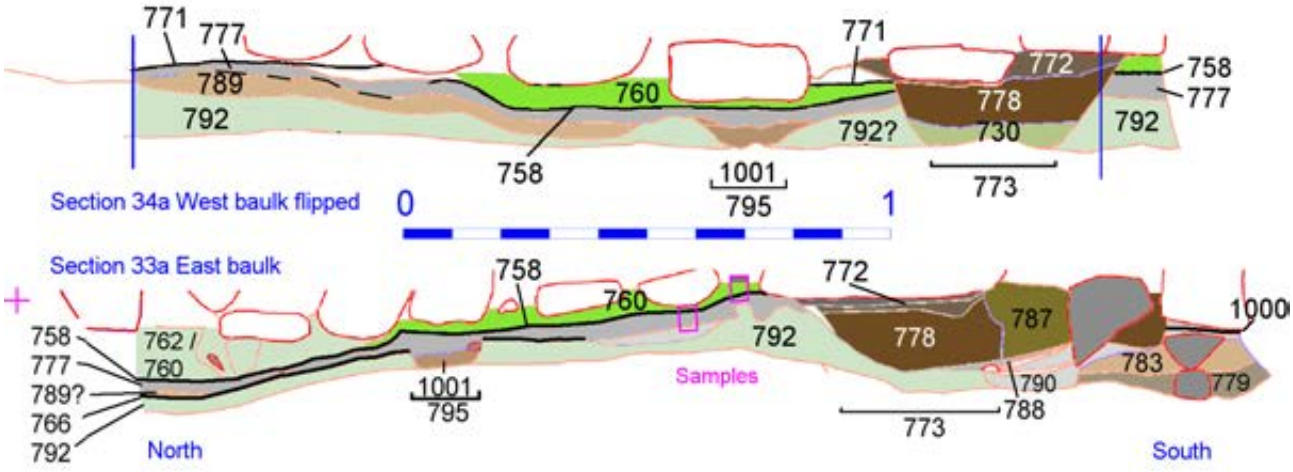
Perhaps the presence of decayed moss explains the strong black colour of this turf line and perhaps moss grew locally because drainage was impeded by the clay layer. One could speculate whether the humus-rich to peaty grit above 758 in the Kubiena box samples was created by trampling of gritty material onto the surface of turf line 758 when it included a lot of moss.

The pollen zoning suggests that the formation of the turf belonged at the start of a reduction of emphasis on agriculture. But the pollen in soil 777 was basically of much the same date as that in the early cultivation beds on Area D, so the preferred interpretation is that soil 777 developed through the ground-working of turf, soil and clay spoil from digging the pits for the nearby Ring stones. on which a fragment of the green clay platform 760 with its polygonal cracking 752 survived (Illus 12.106).

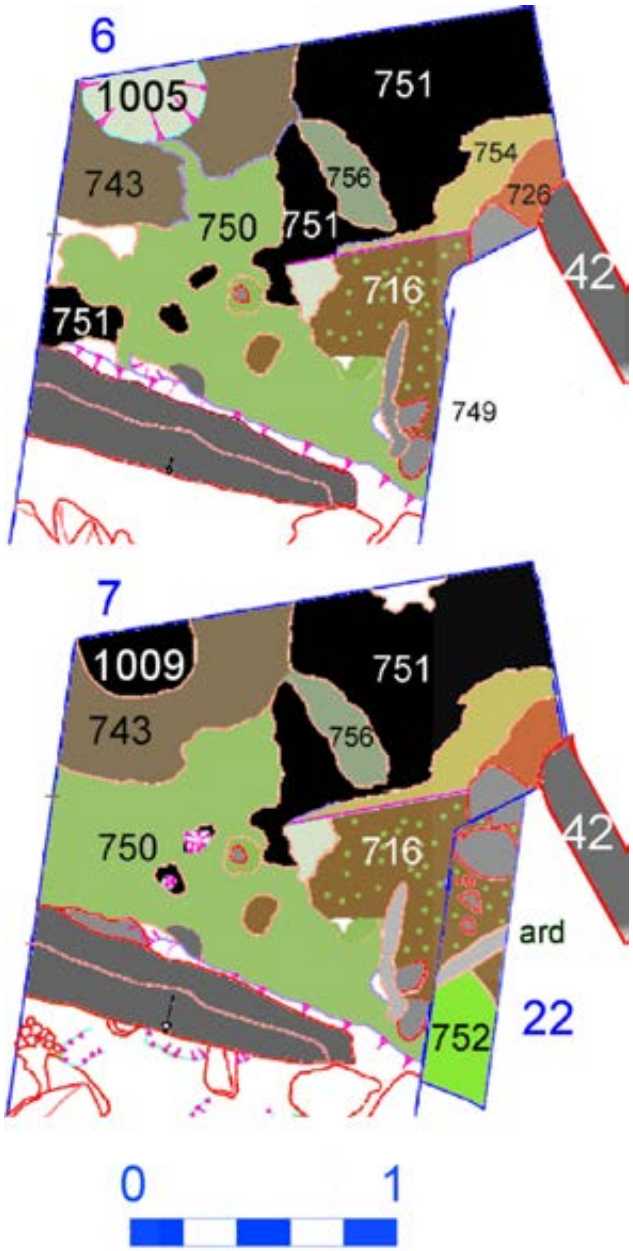
In the small extension green mottled clay underlay platform clay 760/752. Round the side of Ring stone 42, under clay 716, were large boulders (Plan 9 & 24, Illus 12.108). As discussed below



Illus 12.104 Plan 8b of c. 20-21 May 1981 [NMRS DC 38280]



Illus 12.105 The main baulk sections under the cairn and chamber wall, including turf line 758 [Sections 33a and 34a NMRS DC 38305 and 38306]



Illus 12.106 Plans 6 to 7 of Area HI with north-east extension plan 22 [NMRS DC38277 to DC38279 and DC38294]

12.7.3 Turf line 751 north of the cairn and its underlying soil 756

Under olive-green-grey clay 750, turf line 751 was in a shallow valley running from southwest to northeast (Illus 12.106, 12.108). Turf line 751 was not as coherent nor as solidly black as 758 under the cairn (Illus 12.103).

In the northwest of HI was a depression (Illus 12.109, Chapter 12.7.6). In the southeast near Ring stone 42 was a mound of mottled clay 716 some of the uppermost of these went with a stones in a clay mound which stretched into Area B to the southeast and which dated later than erection of the Ring stones.

Soil 756 beneath turf line 751 varied from medium grey-green loam to yellow-brown sandy clay and grey-brown greasy clay. It also contained patches of turf-like material and a few patches of clay assumed to be the same as very variable clay 743 which had appeared at a higher level in the top of the depression in the northwest corner of HI.

Like its equivalent 777 under the cairn, soil 756 was thin, in section no more than about 30mm deep (Illus 12.109). Under it was turf line 766, described as having a very weak litter layer or in places none at all; but even where there was no litter layer it did look very like the thin grey to grey-brown clay soils which often underlay litter layers.

Turf line 751 dipped about 0.10m into the north-east corner of the trench from distances of c. 0.5m to the west and south. The dips were the sides of a shallow trough running roughly east-northeast by west-southwest (Illus 12.108, 12.109).

Near Ring stone 42 it had been truncated by a thin layer below mixed clay 716. Its relationship to the north edge of the pit dug for Stone 42 was thus not visible in the main baulk section.

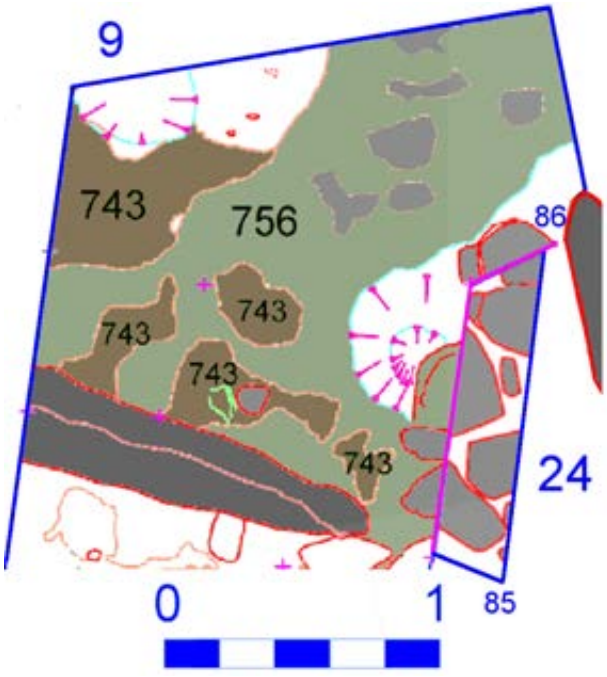
12.7.4 Discussion of turf line 751 and related layers

Turf line 751 and its underlying soil 756 probably survived well because they were in a shallow trough running roughly northeast by southwest. Clearly that cannot have been the only reason because in the southwest part of HI they (and indeed the overlying green clay 750) spread over a wider area. But the trough may have been a dip between two cultivation beds. This is discussed further in Chapter 12.10.

A pollen sample (2012) from turf line 751 had a high proportion of heather pollen (43%) which, together with an absence in cereals and in the indicators for pasture land led to an interpretation that it went with the transition of zone

Illus 12.107 Decayed turfs in soil 756 and the depression in the northwest corner of Area HI on 27 May 1981 [Film 1981.16.6]

CaN-3a to zone CaN-3b at some time between 2560 and 2200 cal BC (Chapter 21: Pollen). No pollen samples from the overlying green clay 750 were analysed, but a spot sample from the overlying plough soil 707 had pollen characteristic of sub-zone CaN-3ai. This suggests either a reversal, with older pollen in plough soil 707 than in turf line 758, or mixing of pollen of various zones in the soil (highly likely, given that it was a plough soil) or local conditions producing a very different mix of plants to that found at the same time at Calanais Leobag. Of course, all three effects may have been present. But inspection of the pollen diagrams from Leobag suggests that there was a peak in heather of about the same percentage as in turf line pollen sample 2012 during CaN-3aii close to the junction with CaN-3ai, and that cereal was absent at the junction between CaN-3ai and 3aii [Chapter 21 Illus 21.3). It is entirely credible that the pollen in sample 2012 belonged around that time. Such a reinterpretation would accord with the pollen evidence from under the cairn



Illus 12.108 Plans 9 & 24 of Area HI [NMRS DC38280 &DC38296]

where 758, the same turf line as 751, belonged to the junction between CaN-3ai and CaN-3aii.

The decayed turfs preserved in the thin soil 756 below turf line 758 (Illus 12.108, Illus 12.109) are interpreted as possibly being those cut in the first stages of digging the pit for Stone 42. That would accord with the interpretation offered below that the pit for the Ring stone was cut through the lowest wide-spread turf line 766.

The lighter clay under the ranging rod on Illus 12.107 corresponds on Plan 9 (Illus 12.108) to clay which had been under clay 726 to the north of the Ring stone and to clay which appears to have been in a depression to the west of and earlier than the pit for the Ring stone. These are described and discussed in Chapter 12.8.

12.7.5 Discussion of the origins of soils 756 in HI and 777 under the cairn

The total volume of clay released by digging the 13 Ring stone holes, erecting the stones and putting packers and clay back in the pits might have been about 3 to 6.5 cubic metres. The volume of soils of the same slight thickness as 777 and 756, if they were spread over the whole area of the Ring, would have been 3.9 to 5.2 cubic metres (see Technical note 24.11.1). Thus the clay from the pits could be the origin of those soils. The turfs preserved in 756 strengthen the case for its originating in spoil from some such operation. It would make sense if the turf from digging the Ring stone pits was then covered with green clay for when the latter was spread around the turfs would be revealed near the back-filled pits.

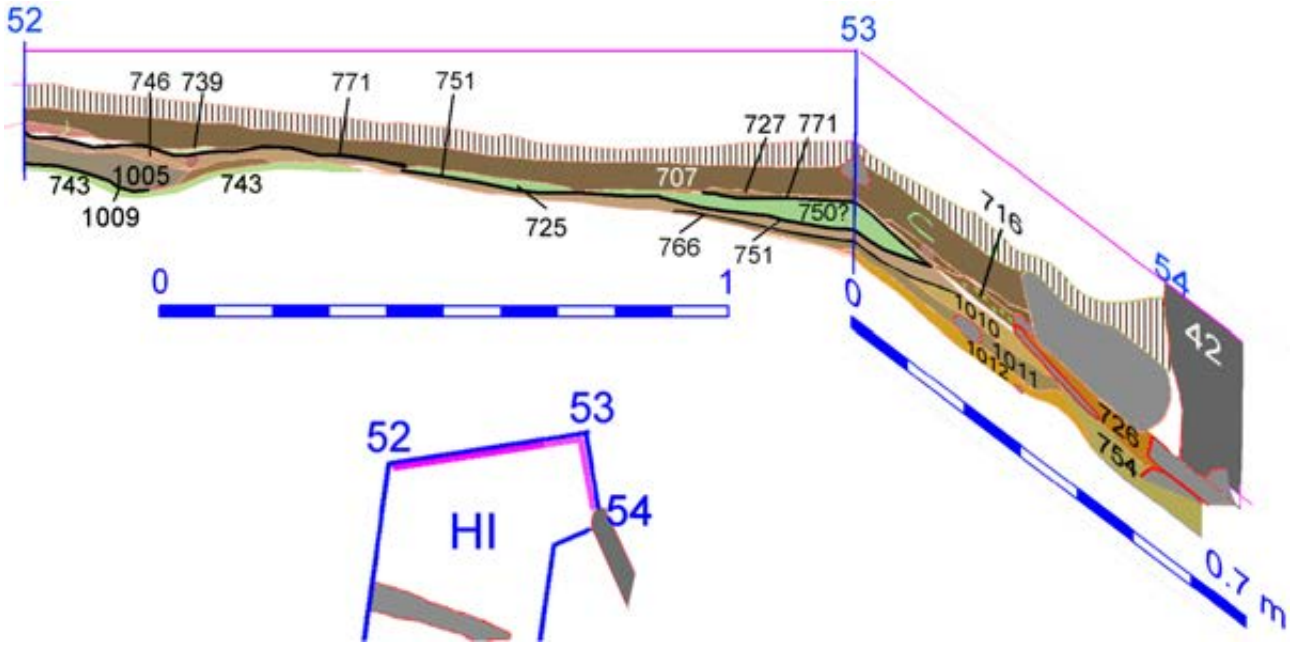
That in itself does not prove that soils 756 and 777 did develop from Ring stone pit spoil but it does demonstrate that setting up the stones would account satisfactorily for the volume of the soils between turf lines 766 and the overlying 751/758 in Area H.

As a working hypothesis this is stratigraphically satisfactory. It does mean, however, as pointed out above, that the green clay laid on turf line 751/758 had a different origin.

12.7.6 The depression in the northwest corner of HI

The depression in the northwest corner may or may not have had a different history from the central part of the area (Technical note 12.7.3). In the depression the topmost sandy clay soil 746 produced a C14 age SUERC-11612 (4475+/-35 BP) from a piece of hazel suggesting a date between 3350 and 3020 cal BC.

Below clay soil 746 in the depression was grey soil with charcoal 1005, lying on turf line 1009.



Illus 12.109 Section 13 showing the east side and end of Area HI [NMRS DC38285]

Below that again was very variable clay 743. In some places it was olive-green with a brown sandy gritty component and in other places a brown clay/loam with subsoil mix, slightly greyish and in yet other places a yellow-brown gritty clay with a slight green tinge with abundant fine fibrous roots and thin brown mottling and black specks and charcoal traces and more cemented and compacted (Illus 12.107 - 12.109).

Soil 746 contained several potsherds.

Table 17 Pottery from clay soil 746

Cat	Comments
143_154	10 sherds, 2 fragments and crumbs from an E/MN corky pot
155	a fine possibly Beaker sherd
522	A rim flange from a large, thin, fine Hebridean Incised pot (ASH 62).
523	A small sherd probably from a domestic Beaker, definitely not from the same pot as Cat. No. 522.

12.7.7 Discussion of the depression

The depression is too far from Ring stones 41 and 42 to be directly related to either. Its base was not reached. The lowest observed layer in it was highly variable soil (here 743, but probably much the same as soil 756) made up of debris left over from digging the pit for the Ring stone and backfilling it.

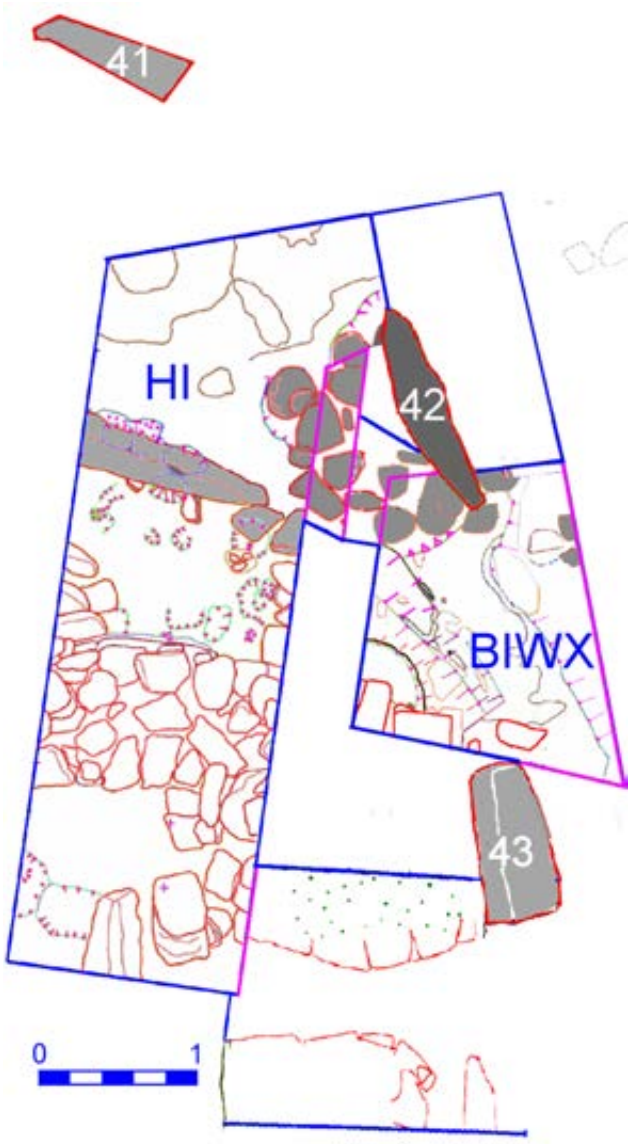
The charcoal in its upper fill 746 must have been residual and the soil may have been imported from a nearby settlement or settlements; that is the preferred interpretation of similar clays in Areas B, D and in other parts of Area H where much younger Phase 7 material lay under similar clays containing Phase 3 material.

The depression was completely filled between the time the Ring-stone was set up and the time the green clay platform was built. But its origin is unclear. It may have been cut into a cultivation bed but that is an interpretation depending on a conception that there were cultivation beds here, not on direct observation.

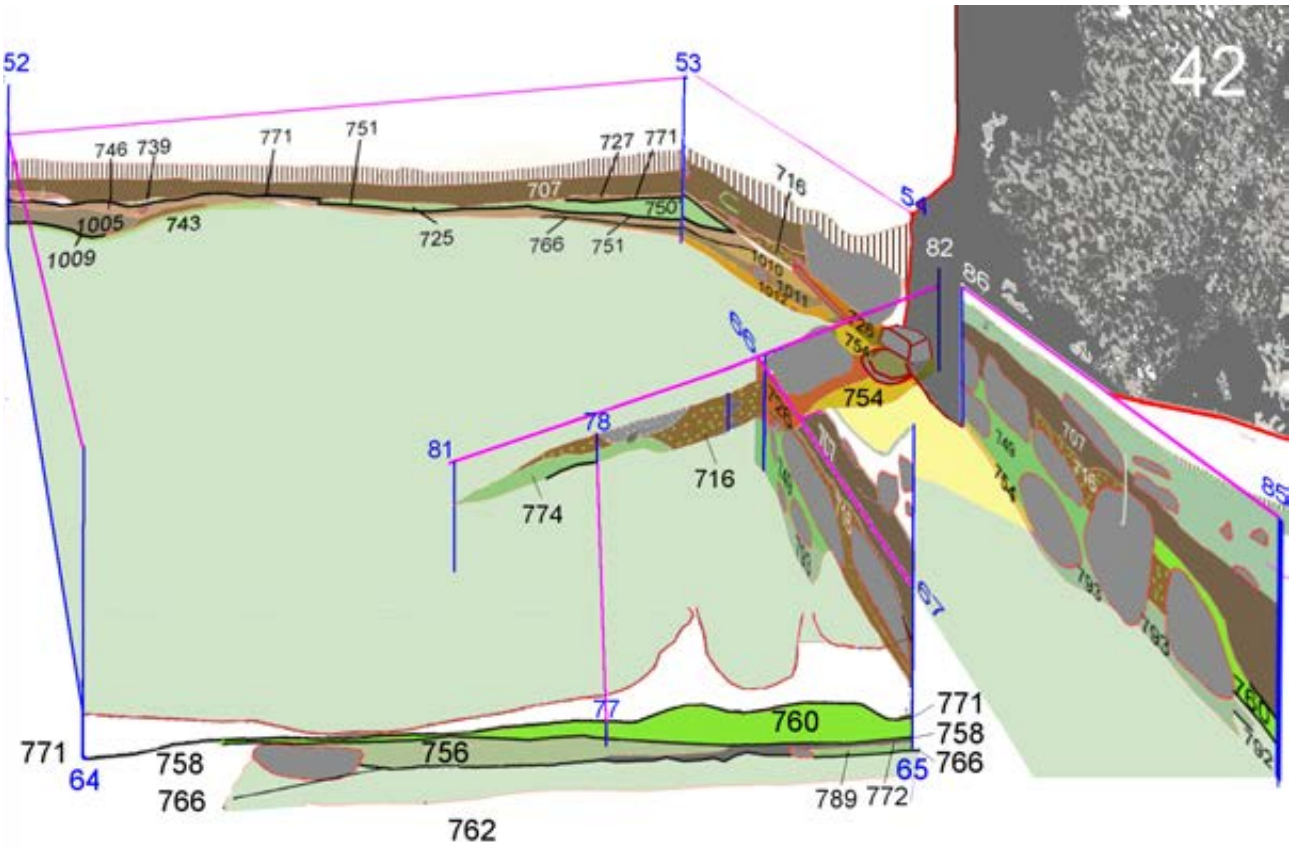
12.8 Phase 6: Ring stone 42, the mound around it, and the pit for the Stone

Ring stone 42 was a tall gneiss slab, in plan near general ground level it was 1.5m long north-north-east by south-southwest and c. 0.2m wide, narrowing at each end. Area H was initially laid out with a small north-eastward projection so that it just included the tip of the Ring stone. The other end of the stone was just in Area BIWX.

A small extension was subsequently opened between Ring stone 42 and the cairn kerb to improve understanding of their relationship and then, on the last day or so of excavation Areas H and B were joined. That showed that the large stones



Illus 12.110 Large stones near Stone 42 in Areas H and B



Illus 12.111 Sections close to the pit for Ring stone 42, from the south

near the orthostat were in a much larger area than that covered by the pit for the Ring stone (Illus 12.111).

Illus 12.111 shows Area H1 from the south and provides an overview of the sections near to Ring stone 42 which are described and discussed below.

— Section 33D (64-65) running east-west in the foreground are the strata under the secondary kerb including turf line 758/751 and the soil 756 under it.

— Section 34a (81-82) running west from the Ring stone and includes mixed clay 716 in a depression to the west of the Ring stone pit. Nearer the stone yellow-green clay 754 is a fill of the Ring stone pit.

— Section 13 (52-53) running east-west in the north has already been discussed in connexion with old ground surface 751 and the depression in the northwest corner of Area H.

— Section 13 (53-54) in the northeast, running north from the Ring stone also includes upper clay 716 and yellow-green clay pit fill 754.

— Section 33B (66-67) was recorded before Area H was extended and includes what seems to be yet another depression under green clay 749. It also includes part of the overlying secondary mound.

— Section 33c (86-85) at bottom right includes a little of yellow green clay 754 in the Ring stone pit; but it is dominated by the secondary mound of clay and boulders between the Ring stone and the chambered cairn.

— Section 8a (77-78) is included only as a section line because of the perspective. It recorded turf line 751 running northward from turf line 758. It included the same or another turf line near that at the bottom of Section 81-82. In its middle the turf lines ran over a hump and at its peak they were separate from one another.

All of these sections are presented in undistorted form in the narrative below. But despite the ambiguities in Illus 12.111 where many of them meet near Ring stone 42, it gives a useful overview of the stratigraphy of the stone pit (yellow fills) the secondary mound (green clay, boulders and

dirty clay) and the enigmatic depressions at the bottom of sections 86-85 and 66-67 (with more evidence of the latter or yet another in the western part of 81-82).

12.8.1 The upper clay and stones north of Ring stone 42

After the upper plough soil, had been cleared away in the area to the north of Stone 42 dirty clay 716 and part of clay 726 were removed in a sondage to a level below that of the rest of the trench. Yellow brown sandy clay 754 which may have been in the pit for Ring stone 42 appeared in the sondage after removal of part of clay 726 (Illus 12.112).

Clay 754, partly separated from the overlying clay 726 by the flat slab, was found in the stone-pit north of Stone 42 (Illus 12.111 - 12.114). However, there was a complication in this area because there may have been a later intrusion. In the section in Illus 12.113 the line of the thin slab seems to be continued to the north by other changes in fills suggesting a shallow cut through plough soil 707 filled with mixed soil 716 and, lower down, red-brown clay 726.

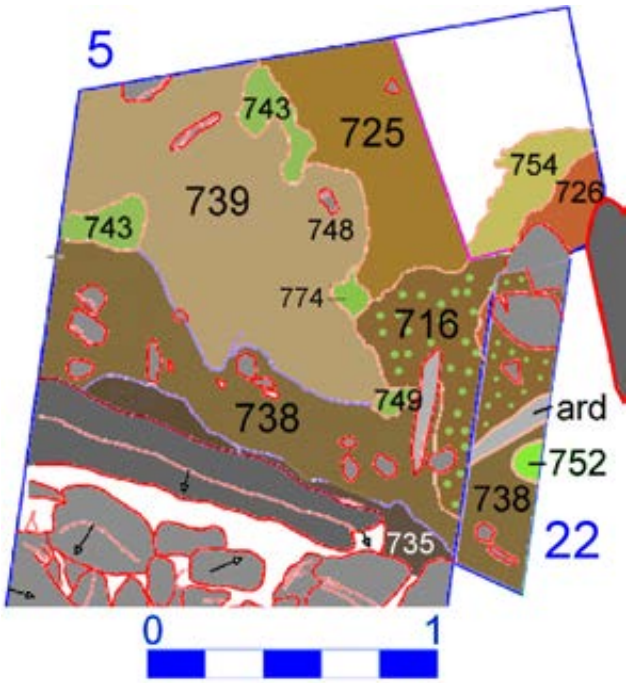
If that is right, the clays above the slab (and perhaps the slab itself) were dug up and put back in this area. The conundrum, discussed below, is whether the cut was made before or after peat covered the place.

12.8.2 The upper clay and stones west of Ring stone 42

To the west of the Ring stone mixed brown and grey-green clay 716 lay among and over boulders in the top of a depression (Illus 12.112). Below it was light olive grey gritty sandy clay 774 with brown staining and mottling. Clay 774 (wrongly labelled 778 on the digital version of Plan 5) may have been the same as olive green clay 750 (Illus 12.112).

Illus 12.115 and 12.117 are the same except that Section 34a has been flipped east west in 12.113 to allow easier comparison with the photograph in Illus 12.114 and plan 8.

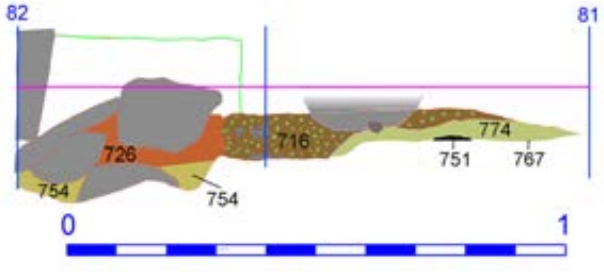
Near the Ring stone cleaner reddish clay 726 lay under the topmost boulders and slabs (Illus 12.112 - 12.118). Its sinuous vertical junction



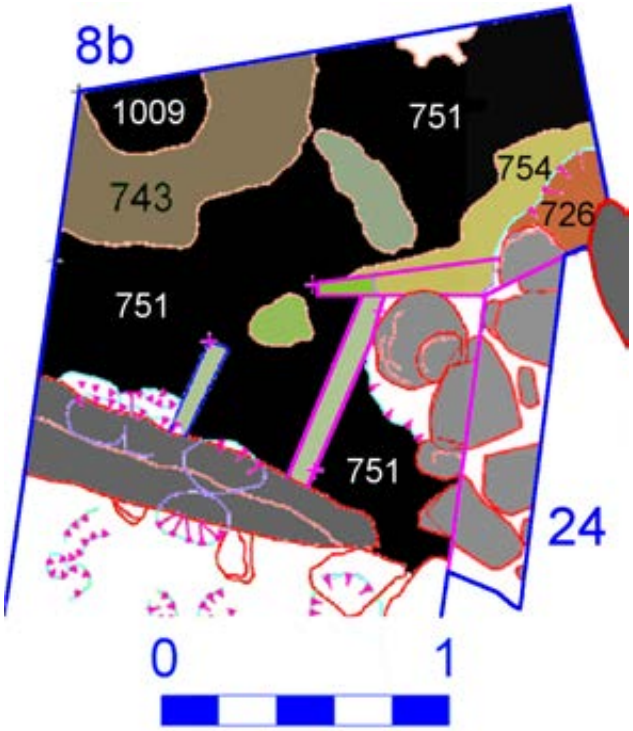
Illus 12.112 Plans 5 and 21 [NMRS DC38276 and DC38293]

Illus 12.113 Possible disturbance to the north of Ring stone 42 [Film 1981.19.32]

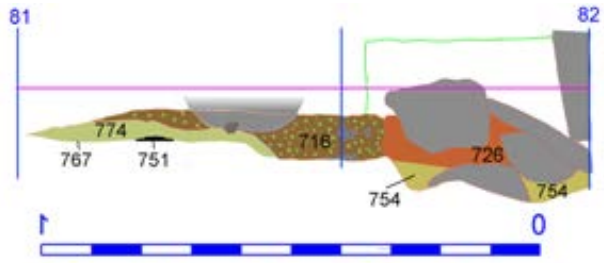
Illus 12.114 Packers 718 over and within Stone 42 pit from the north [Film 1981.12.25]



Illus 12.115 Section 34a, west-north-west and north, drawn from the north (see Illus 12.111 for section line 81-82) [NMRS DC38307A



Illus 12.116 Plan 8 and 24 [NMRS DC 38279 and DC38296]



Illus 12.117 Section 34a, west-north-west and north (flipped east-west, see Illus 12.111 for section line 81-82) [Day Book page 9 and NMRS DC38307A flipped]

with 716 coincided with the overhanging edge of an overlying boulder (Illus 12.117). That suggests that the difference between 716 and 726 may have been partly due to natural weathering or human interference only after the boulder was in place.

Mixed clay 716 and clay 774 were in an intrusion (nor bottomed in Section 34a).

Mixed clay 716 lay alongside olive-grey clay 750 and over olive-grey clay 774 (Illus 12.117). Removal of 716 and the green clays revealed turf line 751 and the rounded edge of a depression (Illus 12.116). This was taken to be the corner of the pit for Stone 42 when first found; but it was part of a separate depression.

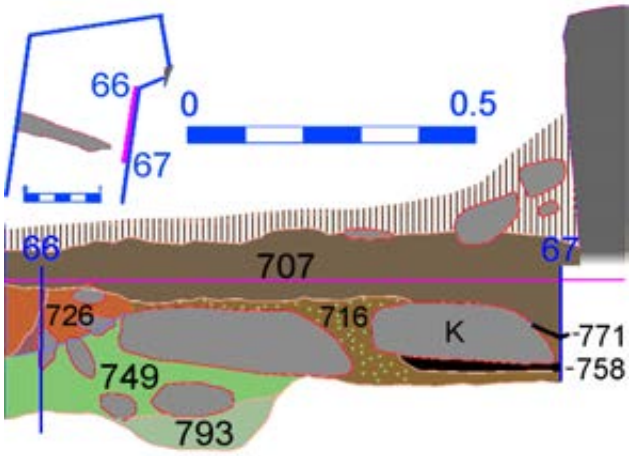
Yellow clay 754 below reddish clay 726 on Section 34a (and elsewhere) was probably in the pit for the Ring stone (Illus 12.112, 12.115-12.117). The section catches only a small part of turf line 751/7. Its relationships to the depression and to the stone pit are not revealed (Illus 12.117).

Further south where Area HI was subsequently extended to allow examination of the relationship between the cairn and the Ring stone the stratification was more complex (Illus 12.118, 12.121).

Near the secondary kerb a flat slab (K on Illus 12.118) overlay turf line 758/751 which in turn overlay a grey brown gritty soil which should be equivalent to soil 756 elsewhere on Area H at this level (Illus 12.120).

Clay 716 appeared to overlay it slightly but that was probably due to post-depositional disturbance, perhaps when the kerb was robbed out. In the next section to be considered clay 716 is earlier than the green clay under the cairn Section 85-86 (Illus 12.120, 12.121).

Returning to Section 66-67 (Illus 12.118), the other flat boulder lay over fairly clean olive-green redeposited natural 746 with a slight brown sand mix which in turn lay over light grey green sandy uncompacted clay 793 with occasional gneiss grits and some small rotted stones, which was slightly sticky and porous with iron-staining along fine fibrous roots. This lay in a 0.1-0.2m deep depression about 0.25m across. If the strata here were the same as on Section 33C, less than 0.3 to the east, the depression started at the level of the lowest turf line 766 and the soil 792 associated with levelling of the underlying cultivation beds.



Illus 12.118 Section 33B southwest of Stone 42 [NMRS DC 38305B]

Illus 12.119 Section 66-67 with mixed clay 716; reddish clay 726; infill 754 of pit); green clay redeposited natural 774 [Film 1981.12.29]

The boulders between the kerb and the Ring stone on Section 85-86, the easternmost one to the south of the Ring stone, were mostly set at the top or bottom of fairly clean olive-green clay 749 although the upper ones give the impression of having been laid on top of it with mixed clay 716 between them (Illus 12.121, 12.122)).

The basal layer in the sequence, 793, was light grey green sandy clay with occasional gneiss grits and some small rotted stones, uncompacted, slightly sticky, porous with iron-staining along fine fibrous roots. It overlay natural clay. Its description would fit the lowest soil in the Calanais general sequence or in-situ altered natural.

The depression in the natural clay in which clay 793 lay was about 0.1m deep and around 0.3m wide, not very different from the depression crossed by section 66-67 described above. But it is difficult to assess that precisely because the junction of 793 and pit fill 754 was obscure. The angle between the section and the Ring stone pit was less than 20°.

Towards the cairn both turf line 771 and green clay 760 (mostly found under the cairn) ran up over deeply set boulders showing that the lower mound stones and clay 716 were put in position before the green clay platform.

The section gives the impression that turf line 766 and underlying 792 were set into a cut through natural. In fact that appearance almost has to be wrong. Instead upcast natural 793 was placed back into an area from which the turf line and underlying soil 792 had been cut when the Ring stone was set up; then at a later date pressure from the weight of the cairn pushed extended the underlying soft layers northward. In fact that is the likeliest way the odd little northward bulge in clay 792 could have been created.

12.8.3 The clay and stones south of Ring stone 42

On the last days of excavation part of the baulk between B and H was removed in the vicinity of Stone 42 (Illus 12.123, 12.124).

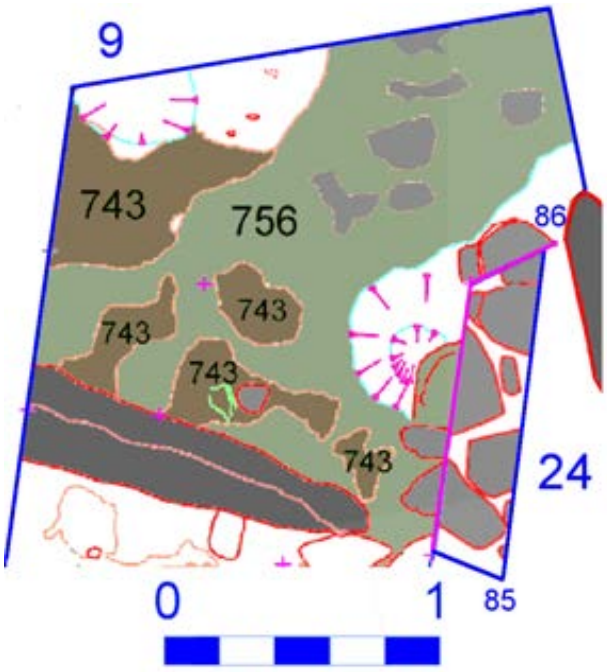
The pale material under the secondary kerb stones is the green clay platform 760. Under it are turf lines 758 and 766, and soil 756 together with other clay soils.

Two large boulders and a smaller rounded stone were found. They were set into a cut through the turf lines visible under the eastern secondary kerb stone in very much the same way as on Section 33C on Illus 12.121 except that the cut reached the baulk to the south.

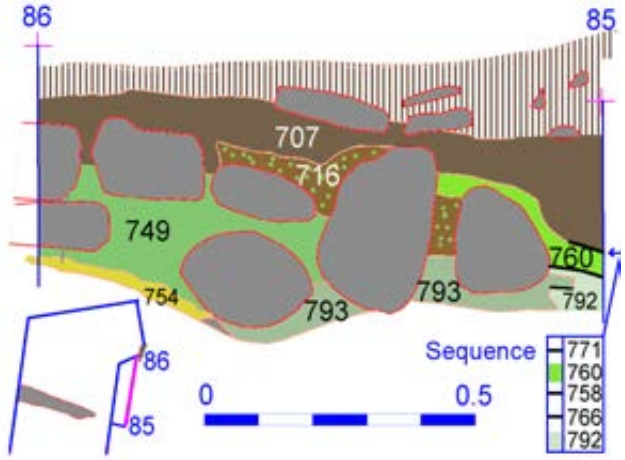
The cut for the stone pit is visible, running through a point 0.2m from the left end of the scale (Illus 12.123, 12.124).

12.8.4 Discussion of the clay and stones round Ring stone 42

Illus 12.124 is composite, using plans from Area B and H (Technical note 12.8.4). The clay of the



Illus 12.120 Plan 9 and 24 [NMRS DC 38280 and DC38296]



Illus 12.121 Section 33C showing stones between the kerb and Stone 42 [NMRS DC38305C]

mound surrounding the boulders is not shown.

The preferred interpretation of the clay and boulders is that there was a fairly amorphous secondary platform around the base of Ring stone 42 (Illus 12.124). There may have been an original low setting of boulders in green clay, but if there was it had been damaged and re-formed or more likely enhanced significantly before the green clay platform was laid down in the area in which the chambered cairn was subsequently built.

Although it was hard to disentangle the various green clays on Area HI the evidence from the sections allows a credible grouping of some of them. For instance clay 774, a light olive-grey and gritty patch, was laid down at much the same time as green clay 750 was used to level the area. Indeed, several of the olive-green clays may have been the laid down at the same time as 750, and given that all of the green clay at this level was brought to HI in baskets or bags there was probably as much difference between different parts of 750 as there was between it and clays like 774.

12.8.5 Discussion of the pit for Ring stone 42

The area coloured light yellow on Illus 12.124 represents the pit for the Ring stone and is based on the sections summarised in 12.111. The area coloured light green appeared in Area B to be the edge of the pit. But given the evidence cited above both areas may in places mark the edge of a wider area cleared of soil and clay as a preliminary to digging the pit.

The pit for the Ring stone cut turf line 766, the lowest one, surviving elsewhere under soil 756 which is interpreted as made up from superficial debris from the upper layers of the pit left over after the stone had been erected (Illus 12.111 Section 53-54; 12.124). The strongest turf line in Area H, 751/758, probably marked a long period during which turf grew on soil 756.

The highest indubitable Ring stone pit fill was clay 754, yellow-brown compact sandy and slightly greasy when rubbed. Its description is not that of fresh natural clay. It has a slight organic component and has been chemically weathered.

Too little of the pit for Ring stone 42 was excavated for certainty but it seems that its west edge was c. 0.6m from Ring stone 42, but only c. 0.1m away in the north and given that the Ring stone was c. 1.5m long and a bit more than 0.3m broad at the base the pit may have been about 1.7 to 1.8m long and 1.5m broad (Illus 12.115, 12.117). That said, the Ring stone was erected from the east, judging by the fact that the spoil from the pit was to its west (the residue of the spoil was soil 756). Therefore the pit edge may have been somewhat further to the east at its top to provide a slight sloping edge to aid erection or as the result

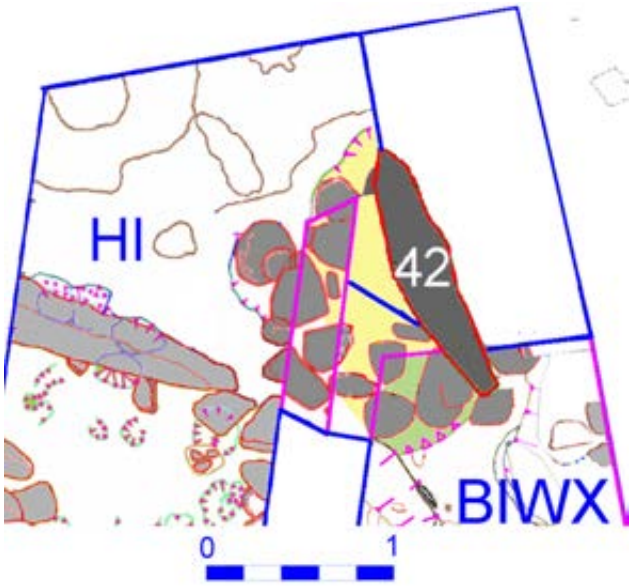
Illus 12.122 Section 33C 86-85 between the mound and the kerb [Film 1981-19-35]

Illus 12.123 Boulders and other features between Areas B and H [Film 1981.21.19]

of squashing when the stone rested on the edge during erection.

Charcoal previously ascribed to green clay 767 in the pit and used for a radiocarbon date (AA-24969 4095+/-45 BP) was shown in 2011 to have come from secondary cairn capping 768 (Technical Note 12.8.5).

The grey silty soil 792 underlying the lowest turf line 766 on Section 33C (Illus 12.121) was identical to the lowest soil 871 excavated in the nearby part of Area B. Both soils were once sealed by the turf line through which the pit for Ring stone 42 was cut. A single piece of birch charcoal (sample 2368/81) from this soil 871 was radiocarbon-dated (AA-24959 4140+/-45) to between 2880 and 2580 cal BC. The significance of this is discussed in Chapter 24 Discussion and Conclusions.



Illus 12.124 Boulders near Ring stone 42

12.8.6 Discussion of the depressions near Stone 42

The pit for Stone 42 appears to have been partly cut into an earlier depression focussed on a point at least 0.5m west of Ring stone 42 and superficially of the same character as that in the north-west corner of Area H (Illus 12.111, 12.117). Plan 9 (Illus 12.120) reinforces the impression that the Ring stone pit had cut through a depression. The main difference in fills is that turf line 751 was not seen in the depression near Ring stone 42. The basal fill in it was redeposited natural 793 which elsewhere lay in a cut through turf line 751/758 and pre-dated the green clay platform. So it may be that this depression was related to that in the NW corner of HI, but it is far from obvious what either was for.

12.9 Phase 6: Soils below the green clay platform and an interrupted slot

Illus 12.125 and 12.126 show opposite sides of the narrow baulk under the massive kerb slab. The photograph was taken from the south while Section 33D was drawn from the north. Along with photograph 1981.21.19 in Illus 12.123 they provide the simplest record of the general sequence under the cairn.

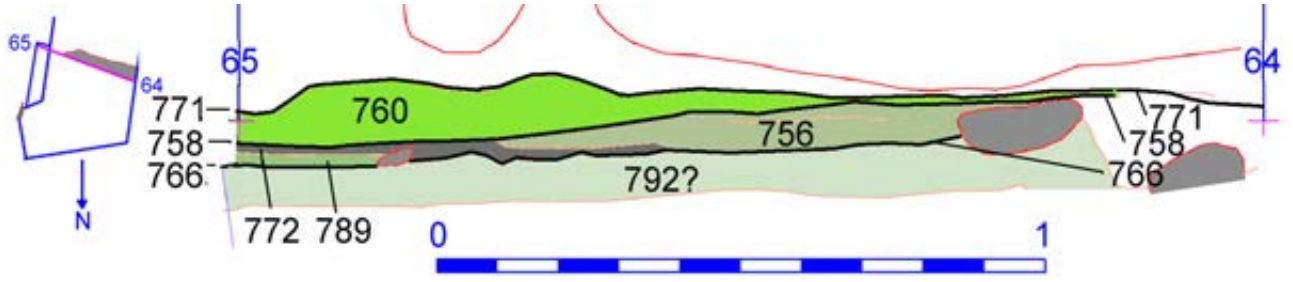
12.9.1 Soils under the green clay platform

Under the green clay platform 760 and turf line 758 was a light grey-brown soil 777. Soil 777 was the equivalent of 756 north of the cairn (Illus 12.124, 12.126). They lay below turf line 758/751, interpreted as formed through ground-working of upcast from the pit dug for nearby Ring stones. Soil 777 belonged to the end of pollen zone CaN-2d or the beginning of CaN-3a. The transition between the two took place between 2980 and 2510 cal BC. On the soil, in places, was a light olive green, very patchy, uncemented gritty sandy loam (776), drawn only on Plan 9, which may reflect soil development associated with the overlying turf line 758 or, more likely variability in source material. Very variable material 743 north of the cairn bore the same relationship to 756 (Illus 12.120).

Turf line 766 below soil 756/777 was a thin light grey ashy layer with patches of black litter layer and charcoal. Its litter layer was not well-developed; as will be seen below its surface could look coherently dark when wet (Illus 12.129), but when it dried out it could look more like brown clay such as 789 with dark smears and fragments in it. The equivalent turf line in the area north of the cairn was also labelled 766. It was at its clearest under the later kerb (Illus 12.125, 12.126).

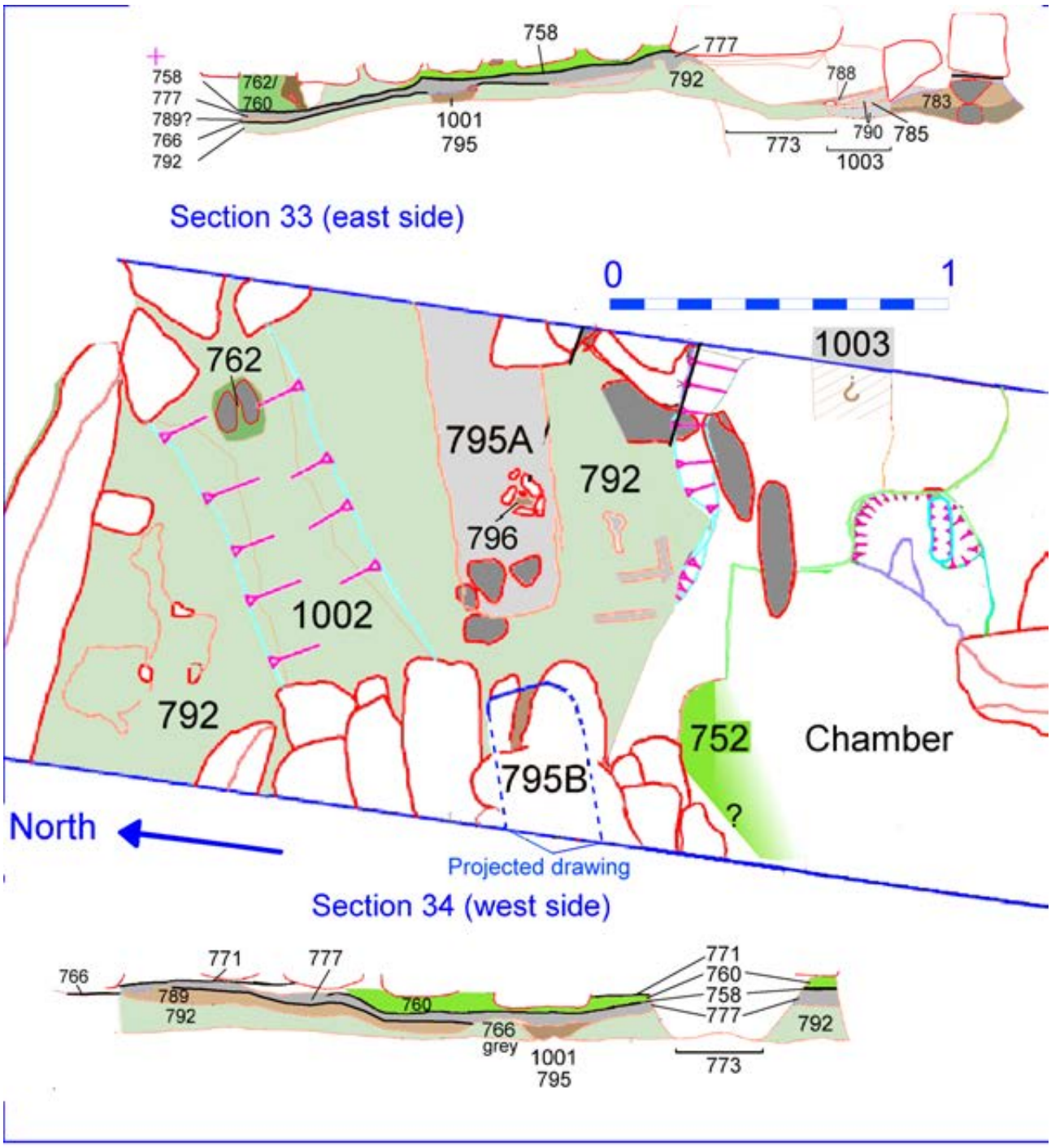
Under turf line 766 on the west side of the trench was another light-grey-brown loamy soil 789, browner than 777. It overlay a light grey soil 792 with a green tinge; where it was absent plough soil 756/777, or in some places turf line 766 directly overlay 792 (Illus 12.126, 12.127). Soils 789 and 792 seem to have been formed by cultivation on the underlying natural clay.

Illus 12.125 Clay 738 over turf line 771 over green clay 760 over turf line 758 over soil 777/756 over turf line 766 on light greenish soil 792 from the south [Film 1981.19.25]



Illus 12.126 Extract from Section 33D under the kerb [NMRS DC38305]

There were no finds from any of these layers. Given the large number of small eroded sherds from higher levels it is clear that they were introduced to Calanais after these soils had formed. In effect that means that before the Ring was erected no artefact rich soils or clays were imported and very few artefacts or fragments of artefacts were deposited. One exception, a probably Hebridean Incised sherd from soil 743 which underlay the lowest turf line 766 in Area HI is discussed below. A few others were found in similar levels on Area B.



Illus 12.127 Features under the green clay platform Sections 33 and 34 and overlay 18 on Plan 9 [NMRS DC38305, DC38306, DC38281 and 38290]

Illus 12.128 Packers of posthole 762 in dip above trough 1002 from the northwest on 27 May 1981 [Film 1981.16.9]

Illus 12.129 The lower ground surface 766 in trough 1002 and slot 795 from the south on 1 June 1981 [Film 1981.17.12]

Illus 12.130 Trough 1002 to the left and slot 795 to the right from the west on 2 June 1981 [Film 1981.18.27]

Illus 12.131 Trough 1002 and slot 795 from the west on 3 June 1981 [Film 1981.19.1]

12.9.2 Trough 1002 and interrupted slot 795 under the cairn

Because details of trough 1002 and slot 795 were close to each other and they were excavated more or less together, nearly all drawings and photographs include both; they will be illustrated together before each is discussed (Illus 12.127; Technical Note 12.9.2).

The dip of trough 1002 appeared even before turf line 758 had been cleared away, as did the packers for posthole 762. The latter had first appeared at the base of one of the stone casts in green clay 760. In the underlying soil 777 the olive-green fill of the posthole was visible (Illus 12.127, 12.128).

In Illus 12.129 turf line 766 dipped into the trough, which had been partly excavated. Slot 795 was just visible in the foreground. The slot was recorded as cutting turf line 766 (Illus 12.127) although that is not clear here.

In Illus 12.130 the lower fills of the trough had been sectioned. Interrupted slot 795 was visible to the right. Here too it looked as if turf line 766 overlay the slot.

In Illus 12.131 the eastern part of slot 795 to the right of the ranging rod has been emptied. In the east section its relationship to turf line 766 is not clear; but the latter was not recorded on the section drawing as present above the slot and the context sheet recorded that the slot cut the turf line.

12.9.3 Details of posthole 762, slot 795 and posthole 796

Posthole 762 was about 0.2 to 0.25m across and originally about the same deep, with a gently rounded base. It was filled with olive green gritty clay and contained three packers (Illus 12.128-12.131). No post-pipe was visible.

It may have been cut through the green clay. A basal stone of the cairn had been placed above it and three packing stones of the posthole first appeared at the base of the cast made by the stone after it sank into the green clay. Admittedly, had the posthole originally been cut through the green clay more disturbance to the packers might have been expected. But its olive green gritty clay fill was more like the green clay platform than the soils under turf line 758.

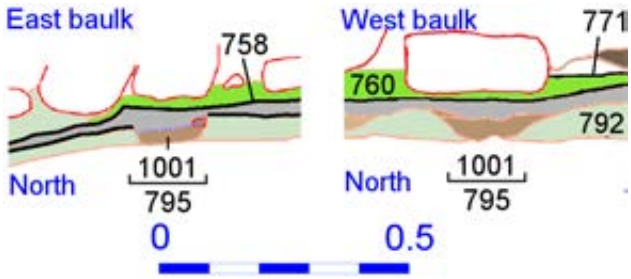
Cut through turf line 666 and soil 792 was an interrupted slot 795A / 795B (Illus 12.127, 12.131-12.132). It had a medium brown slightly sandy grey fill (1001) with ochre mottling and iron staining. The shorter part of the slot had bits of what looked like turf line 766 in its fill. It varied in width from 0.35 m to 0.25 m and in depth varied between 30 and 40 mm; it had a gap 0.2 m wide in it. Its bottom varied between flat and slightly ridged (Illus 12.132).

From the west part of the slot came a fragment of hazel charcoal and two fragments of birch charcoal (sample 2256). The hazel charcoal produced a date (AA-24970 4205+/-45) of between 2910 and 2630 cal BC.

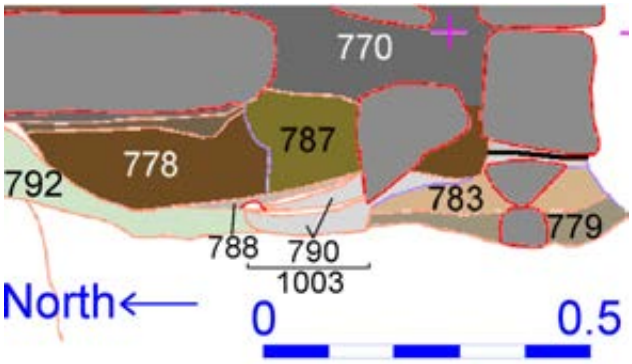
About 0.35 m to the east of the gap, near the south edge of the slot, were stone packers for a small post 796. The post hole measured 0.14 m across externally and the post pipe in it was hardly more than 70 mm across. Like the slot it had been invisible in soil 777 above turf line 766. The cluster of stones just to the east of the gap may indicate the position of another upright timber (Illus 12.127, 12.130).

12.9.4 Discussion of posthole 762, slot 795 and posthole 796

Posthole 762 was later than slot 795. It may be related to the later small timber structure erected on the platform. However, if so, it would have stood free from the walls of the structure and probably was not directly related to it.



Illus 12.132 Sections of slot 795

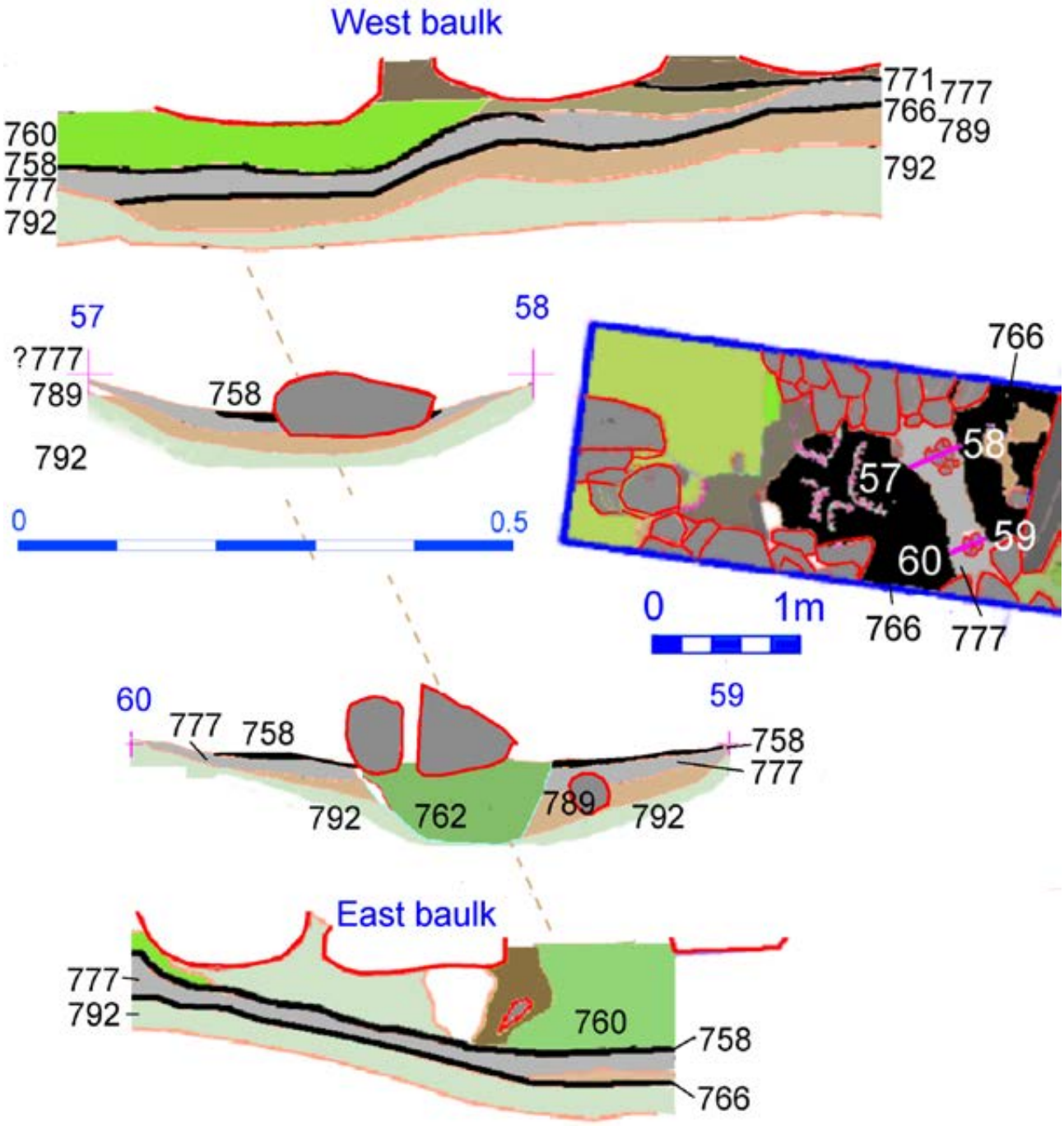


Illus 12.133 The lower south end of the east baulk ection 33 [NMRS DC38305]

Although slot 795 was extremely shallow, posthole 796 suggests that it supported a light timber structure; if made of birch it would probably not have had a long life. An alternative interpretation is that the interrupted slot supported sleeper beams.

The gap in slot 795 was only 0.2m across, and if it reflected the width of an entrance in a timber structure it would have been uncomfortably narrow for a person of traditional build even if the jambs were set back somewhat from the terminals. Alternatively if the slot supported horizontal beams then the interruption might be where two round-ended beams were laid (nearly) end to end.

In the east baulk the slot was set just below and to the south of a sharp change in the slope of turf line 758 (Illus 12.132). The top fill of the slot was very similar to the overlying soil 777. It seems possible that the slot was originally cut through turf line 758 and that the turf grew back over it once it had been backfilled. If that was so its original depth would have varied between 60 and 80 mm.



Illus 12.134 Sections 11A, 11B, 33, 34a across the depression 1002 between cultivation beds [NMRS DC38283B]

The presence of turf in the western part of the slot presumably represents material thrown back when it was filled in.

12.9.5 A possible slot 1003 and related layers

Area HII under the chamber wall included what may have been the remnants of another slot, feature 1003, 1.2m from slot 795 near the angle between the later chamber and passage. It was only seen on east baulk section 33a (Illus 12.133; for its broader context see 12.127).

The main fill of slot 1003 was very slightly sandy light grey clay 790 with charcoal and grits, in two levels separated by a lens of ashy gritty clay 785.

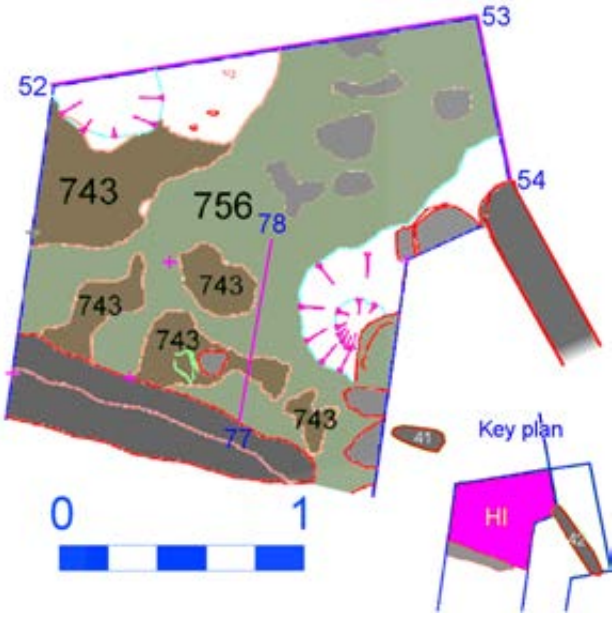
The original relationship of the upper part of the slot to the turf lines and clay found to its north

Illus 12.135 Linear depression, soil 743, depression (746), old topsoil (765); patches of turf (763); from the south [Film 1981.14.30]

on Area H had been removed by a later slot 773, represented on this section by its fill 778. The lower part of its north side was cut into the basal soil 792.

To the south the relationship of the possible slot 1003 to higher turfs and soils had also been cut away by a later feature 787, possibly a post-hole and maybe in slot 773 (Illus 12.133).

A little further to the south, above its absolute level on the section, was grey gritty sandy clay lens 799 containing some scraps of charcoal (not on Illus 12.133). It was probably part of the soil elsewhere called 777. This lay over a turf line 1000 which was probably the same as the turf line 766 further north. Black turf line 1000 overlay a very thin light grey brown sandy soil 790, a variant of the usual slightly leached accompaniment of such turf lines, under which was a fairly thick light grey-brown ashy layer 783 below which was



Illus 12.136 Plan 9 [NMRS DC38281]

a fairly thick stone free grey brown sandy clay 779 which lay over the subsoil (Illus 12.133).

Elsewhere under the chamber wall parts of the same layers were recorded as a lens of brown/yellowish grey soil 798.

There were no finds from any of these layers which were mostly detected in section rather than in plan.

12.9.6 Discussion of slot 795, possible slot 1003 and related layers

Layers 783 and 779 (along with 798) were probably the equivalent of the cultivation bed soils 789 and 792 elsewhere on Area H. Ashy grey-brown soil 783 sounds from its description as if it might have been the same as 789. But the description of 779 (stone-free medium grey brown slightly sandy clay with mica, abundant charcoal, greasy with some diffuse indistinct yellow-brown mottling) sounds little like that of 792 (light grey clay with a green tinge, slight silt content with some stones and occasional charcoal; 30% mottled/iron stained with sharply defined edges) which underlay 789.

Nevertheless what was visible of the stratigraphy of slot 1003 was similar to that of slot 795; and although the fill of slot 1003 was more complex than that of slot 795 with, apparently, episodes of filling interrupted by periods of either slower filling or formation of incipient turf lines, it was of much the same dimensions in section as 795. If it was indeed a slot and it had originally continued westward 1003 would have been removed entirely by erosion in the chamber of the chambered cairn. So the possibility that it ran parallel to slot 795 is worth considering.

On Area D there were two similar slots 913 and 915 similarly close to each other, the outer one sealed by a turf line which the inner one cut. Like slot 795 on Area H they seemed to be too shallow to have provided real support for upright timbers; but they may have served to bed in the toes of the uprights of a timber structure, or to support sleeper beams. The possibility that they might have been related to the slot or slots on Area H is discussed further in Chapter 24: Discussion and Conclusions. There the conclusion is that, on current evidence, it is very unlikely to reflect reality and the idea is included only because it can be tested during any future excavations.

Another possibility is that feature 1003 was cut into soil which had accumulated in a cultivation trough and represents partial cleaning out. That would make the soils to its south part of a cultivation bed, a credible interpretation. That too could be tested in future excavation.

12.10 Phase 5: Possible cultivation beds under the cairn

12.10.1 Depression 1002

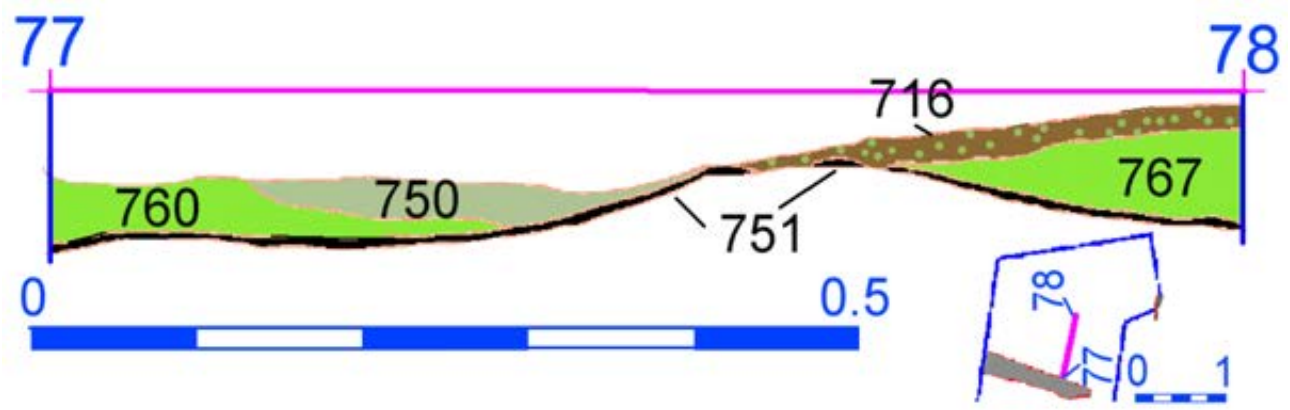
Linear depression 1002 in the soils below the green clay platform ran across Area H roughly west-south-west to east-north-east. It was about 0.1m deep and, between crests to either side, roughly 1.5m to 1.7m wide. All of the soil levels under the platform dipped down into it (Illus 12.127, 12.134).

The crest of soil 792 appears to have been much disturbed. It looks almost as if soil 792 had been dug up from further south and thrown onto it. The underlying junction with the subsoil probably gives a better measure of the cultivation bed profile.

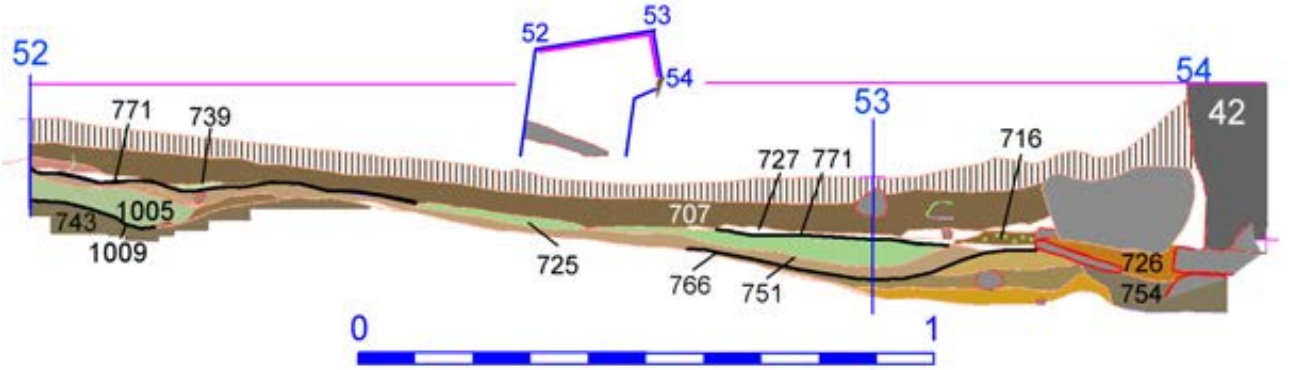
The lowest turf line 766, which reflects growth on soil 777, was absent in much of the west baulk. In plan and photograph however 766 was shown as present except where it had been cut at the base of 1002. At the west baulk the rise of light grey green soil 792 immediately north of slot 795 probably reflects the original profile of the cultivation bed.

12.10.2 Discussion of depression 1002

The depression may have been the trough between two cultivation beds. It cannot have been another part of the pre-cultivation enclosure implied by the ditch 921 on Area D because it ran at the wrong angle for any regularly-shaped enclosure based on the Area D ditch lacking a re-entrant sector in Area H. The sections suggest a roughly 1.5m to 1.6m wave-length for a cultivation bed system, similar to that of the cultivation beds seen on Area D.



Illus 12.137 Section 13 showing the north-northeast end of the dip in Area HI [NMRS DC38285]



Illus 12.138 Section 8a showing a raised area below turf line 751 with dips to the north and south [NMRS DC38279]

12.10.3 A possible cultivation bed trough

Another possibility discussed above is that shallow slot 1003 was cut into soil which had accumulated in a cultivation trough and represents partial cleaning out. That would make the soils to its south part of a cultivation bed, a credible interpretation.

12.10.4 Possible cultivation beds north of the cairn.

At the lowest level excavated, the area to the north of the cairn was covered by the remnants of soil 756 with very variable clay loam 743. Although the picture is confused by depressions excavated through the possible cultivation beds to the northwest and to the southeast, in essence soil 756 lay in a shallow dip between rises to either side (Illus 12.135-12.137). The north baulk element of Section 13 ran at a shallow angle to the flank of the north-western rise with the central dip at its junction with the east baulk (Section point 53 on Illus 12.136, 12.137).

Loam 743 had subsoil with a slightly gritty texture mixed into it. Its colour varied locally. It was a product of an episode of cultivation above the basal soils (789 / 792) and the thin turf layer (766) which formed on them. It contained a sherd probably from a Hebridean Incised pot (Cat 722).

On the south side of the dip turf line 751 overlay a raised area (Illus 12.136, 12.138). The temporary section shown in Illus 12.138 did not record underlying strata but normally it lay over thin soil 756 which covered turf line 766 or in some places directly overlay mixed soil 743 (Illus 12.136, 12.137).

12.10.5 Discussion of the cultivation beds

Under the cairn linear depression 1002 seems to mark the trough between two cultivation beds.

Illus 12.139 Reconstruction of troughs between cultivation beds

No other troughs could be identified with any confidence. However, if the spacing of the cultivation beds was about 1.4 and 1.6 m as the spacing between the two northernmost ones suggests, then otherwise inexplicable variations in the levels shown in the sections can be explained. The existence of a depression filled with cultivation soils would explain some of the complexities of the east section at its southernmost end. In particular slot 1003 might represent cleaning our of (part of) a trough there.

There were patches of cross ploughing or conceivably spade marks on the hypothetical cultivation beds. if the area was pasture covered the first activity of those creating cultivation beds would have been to score the turf deeply with an ard, for the hoes and spades were probably unsuitable for dealing with coherent grassland. However the marks were probably the bottom of cultivation marks associated with soil 777.

It is tempting to assign the start of cultivation bed use to the transition between pollen zones CaN-2d and 3ai, because that was what was found on Areas DI and DIV. That fits adequately with the pollen evidence from Area H, and thus the first use of the beds on Area H should date to some time between about 2980 and 2510 cal BC.

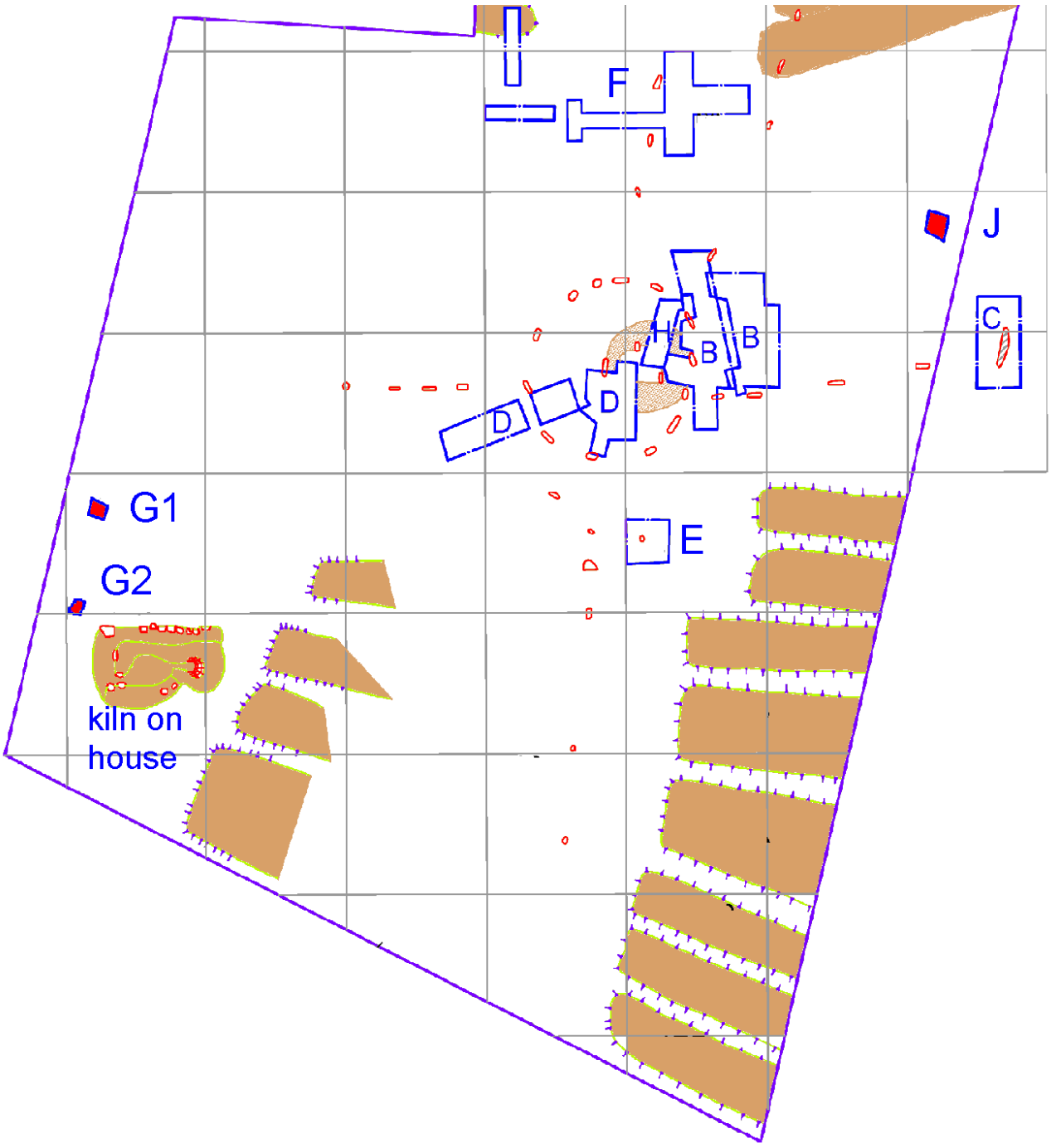
The Hebridean Incised sherd from Soil 743 was probably in material filling the trough between two beds so does not provide a date for the latter.

The preferred interpretation is that after cultivation beds and troughs had been in use at approximately in the positions shown on Illus 12.139 they at least partially grassed over (patchy turf line 766) and when the Ring was erected turf, soil and clay spoil from its pits served as the source material for very variable soil 756 plus 743.

12.11 Unexcavated strata

At the end of excavation basal and near-basal soils remained over Area H except in the chamber area. The highest of these was the mixed soil 756, covering much of the area north of the cairn. It is possible that remains of structures survive north of the cairn, but the area that had been under the chamber wall and cairn probably retains only cultivation beds.

13. Test Pits G1, G2 and J



Illus 13.1 Location with National grid lines

13.1 Introduction

The test pits were excavated to provide an understanding of the characteristics of the soils at Calanais. Test pits G1 and G2 were subsequently used as cess pits. The work was carried out by Ian Maté on whose report and notes this account is based. Details of soil descriptions are in Chapter 19: Soils and Chapter 25: Technical notes 13.2.1 to 13.4.2.

13.1.1 Context numbers

During post-excavation work in the 1980s context numbers 601 to 607 were assigned to the layers in Pit G1. In 2008 during tidying up of the context record these numbers were changed because they overlapped with the context numbers for Area F. They became 1301 to 1307; and context numbers 1321 to 1329 were assigned to the layers in G2, 1331-42 to the general layers in Pit J and 1351 to 1354 to the layers in the NE corner of Pit J

13.1.2 General characteristics

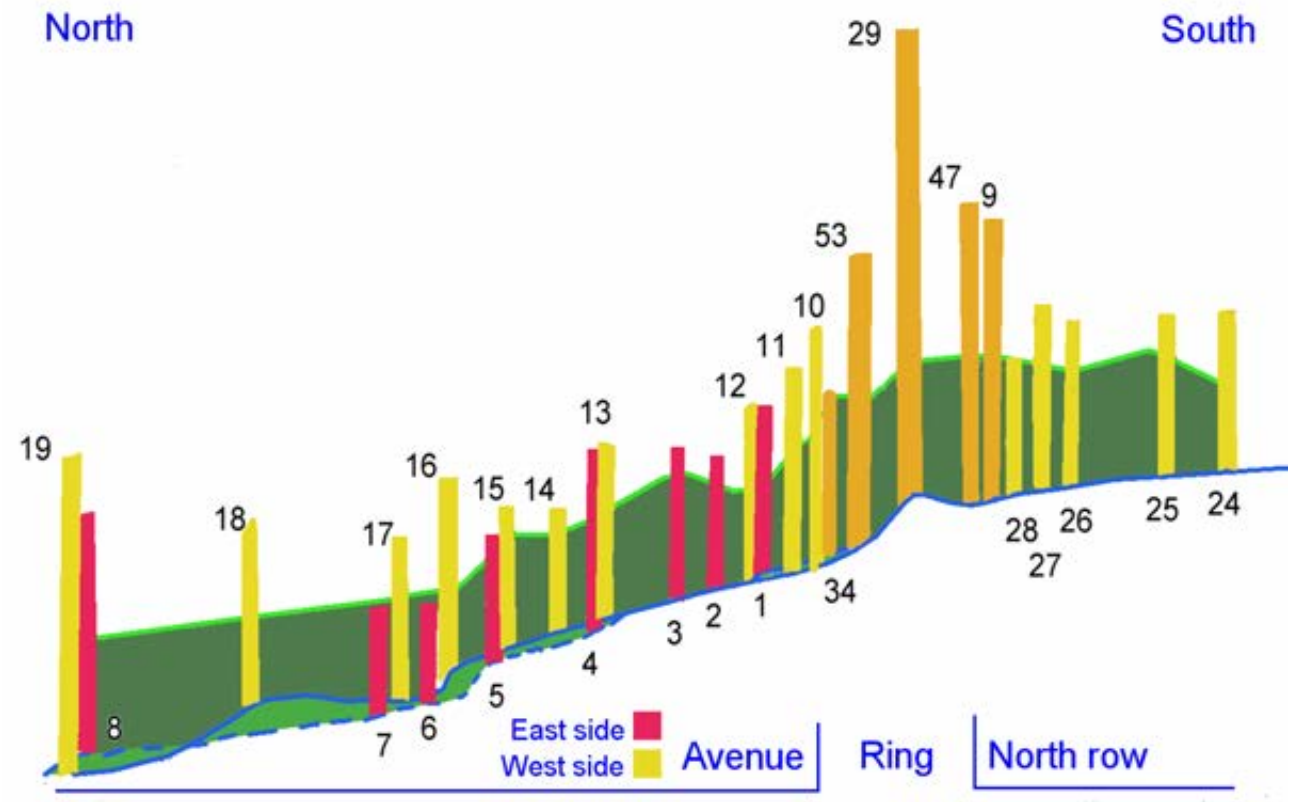
The evaporation-transpiration rate on Lewis is lower than the total precipitation, leading to the suggestion that acid soil processes should have dominated, but the very high clay content of the soil had prevented strong podsolization where the soils were neither directly nor indirectly disturbed. The presence of earthworms and horizon differentiation suggested a weakly acidic soil.

13.1.3 Peat

As discussed in Chapter 3 (Previous studies) early records, notably recordings of peat etch marks on the stones (Pitt-Rivers 1882), showed that peat once covered the whole site to a depth of about 1.5m (Illus 13.2).

The centre of the Ring was covered by c. 1.5 metres of peat till 1857. However other areas had either been cut for fuel at earlier dates in the 19th century. Immediately east of the area in the care of the state in 1980, , on the line of the East row, the peat on Area C showed clear signs of cutting with recent growth overlying probably ancient peat (see Chapter 8 Area C). The northern Avenue area (which included Area A) was probably cleared relatively early and used for early modern agriculture.

A basal peat date (GU-1403; 2640+/-110) calibrating to between 1050 to 400 cal BC suggested initial peat growth in one part of the site in the first half of the first millennium BC. It seems likely that peat growth actually started at the



Illus 13.2 Peat depths (green) from etch marks on the stones (vertical scale exaggerated)

Illus 13.3 Air Photograph 1980 showing 1980 and 1981 test pits and various rigs [Air Photo 25]

transition from pollen zone CaN-3d to CaN-3e (Chapter 8: Area C). If that is correct then peat started growing in an uncontrolled way at Calanais between 920 cal BC (the earliest limit for the end of CaN-3d) and 400 cal BC (the latest limit for the radiocarbon date).

In the area of Johnson and Flitcroft's excavations of a buried field system near Calanais Farm, to the south-west of the main setting at NB21253265, peat growth ranged in date from in round terms 500 BC to 800 AD and from 250 BC to after about 1700 AD. (Johnson et al forthcoming). The markedly different dates for uppermost peat in the two columns at Calanais Fields probably indicate peat cutting. The dates for peat growth initiation at Calanais Fields are somewhat later than for Calanais itself but there is insufficient evidence to say whether that was because of differences in farming practices or some effect of subsoil, altitude and exposure. Similar differences within the area in care at Calanais may have resulted in somewhat different dates for initiation.

13.1.4 Soil improvements

Worms were absent over the site as a whole during the period of over 2000 years that it was covered in peat Worm re-introduction occurred either by the portage of worm eggs on sheep and cattle hooves [J C C Romans, pers. comm., 1980] or by the proximity of improved land.

Pits G1 and G2 were dug through cultivation beds. The ends of other fairly characteristic examples can be seen at the right hand side of the photograph and smaller ones between the South Row and the farm building near G2 (Illus 13.3). The long cultivation beds can be ascribed to the period after potatoes were introduced, but in areas such as that in which Pits G1 and G2 were dug the re-introduction of worms cannot be ascribed to a definite period. Without the artificial disturbance and improvement of the soils the cultivation beds and other cultivated areas at Calanais would probably be more acid.

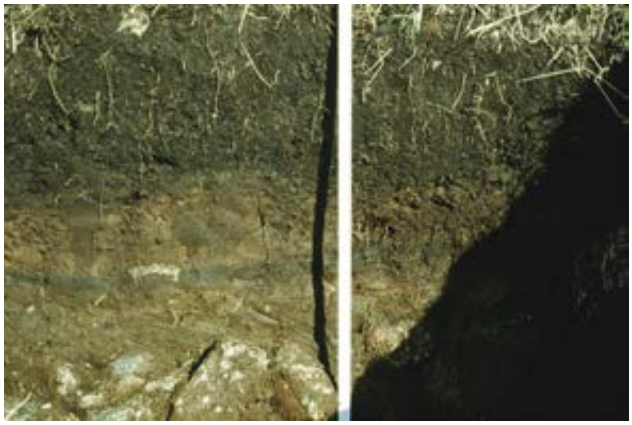
Pit J was in an area where there were no visible cultivation beds.

13.2 Test Pit G1

Illus 13.4 Soil Test Pit GI early in 1980 [Film 1980.1.4]

Excavation of soil test pit G1 commenced on 30 April 1980. It was dug approximately 12m NNW of the 19th century farm house and kiln and 8m from the outcrop at the west end of the west avenue (Illus 3.1). The position chosen was to the west of the area in care, below the outcrop of bare Lewisian Gneiss, in the centre of a cultivation rig in the hope that there would be a complete profile including a late farming soil. It was far enough from the outcrop for the higher part of the profile to be little affected by rock from it. The vegetation cover in early May was lush bent grass with Yorkshire Fog and creeping soft grass with common rushes. There were frequent tussocks of Molinia, and moss appropriate to a damp acid environment; but violets and other plants indicate a fairly high nutrient status. The area was a flush with nutrients draining from upslope.

13.2.1 Description



Illus 13.5 Layers on the east-facing section of Pit G1 [1980.1.2]

The rig sequence consisted of a litter layer above nearly 0.2m of uncompacted crumbly black peat with clay 1302, above between 0.15 and 0.2 m of brown fibrous peat 1303. At the bottom of this was a thin layer of black peat 1304.

Below that was a thick brown coarse sandy clay layer 1305 varying up to 0.5 m deep, with many fine and fleshy roots. Under that was a layer 1306 with abundant boulders with clay and sandy clay between them. Occasionally this matrix material had a slightly red-brown tinge. The boulders were of gneiss, and varied in shape from rounded to angular and from blocky to tabular. There was charcoal between the stones; one piece was Sorbus. It is worth noting that this was not boulder clay.

13.2.2 Discussion of the G1 profile

It was noticeable along roadside cuttings (almost invariably sloped) that peaty gleyed podsols with

Table 13.1 Summary soil profile in Test Pit G1 (see Technical Note 13.2.1 for detail)

Context	Description	Depth
1301	Litter layer with a few worms.	0 to 0.02m
1302	Uncompacted, springy peat with clay, many roots, and a few rounded stones.	0.02 -0.21 m
1303	Fibrous peat, redder at the top, becoming browner downwards.	0.21-0.38 m
1304	Sticky, greasy amorphous peat.	0.38-0.41 m
1305	Coarse sandy clay.	0.41-c. 0.9 m
1306	Rounded, angular, blocky - tabular gneiss boulders with some charcoal between stones.	0.9 m
1307	Light green olive sandy clay with some stones.	

iron pan and ochreous B horizons were fully developed. Where stone content was higher in part of the profile, humus penetration was marked, leaving no obvious ochreous horizons; the upper humic soil layer extended down to meet green clay derived either from glacial till, itself derived from Lewisian Gneiss, or directly from Lewisian Gneiss.

Pit G1 fitted into the humus-penetrated category but the pottery and charcoal suggested anthropic disturbance prior to peat development. The Pit G profile therefore did not represent purely natural processes. Post peat profile development had not established an ochreous horizon, but the stones would have militated against this. The post-peat disturbance showed a wormed 'Hebridean black soil' or improved land, where presumably imported soil or sand with seaweed and the floors and thatches of black houses had been incorporated, the only visible remainder being the unstained quartz sand grains.

Table 13.2 Pottery from layer 1306 in G1

Cat	Comments
221	A sherd from a fine E/MN non-corky pot (ASH 12).
631	A sherd from a probably E/MN slightly corky cooking pot with its exterior probably burnt from use.
640	A sherd probably from a large, E/MN non-corky cooking pot; most of interior spalled off.
641_648	8 sherds, mostly spalls, from a large probably E/MN non-corky pot or pots.
649_670	15 sherds including at least 5 conjoining, plus 7 fragments and some crumbs from a probably E/MN non-corky pot or pots
306	A Hebridean Incised sherd.
632_635	4 sherds, 3 refitting; most likely to be E/MN non-corky but can't rule out possibility of domestic Beaker
636_637	2 sherds from a thin, fairly fine pot; could be either E/MN non-corky or domestic Beaker. Possibly from same pot as Cat. 638
638	A sherd possibly from a cooking pot, possibly the same pot as Cat. 636-7..
639	A sherd probably from a fine Beaker

The pottery identifications allow the possibility that boulder layer 1306 relates to 4th or 3rd millennium BC settlement. It is conceivable, however, given that the mainly probably E/MN pottery was accompanied by a sherd from a fine Beaker that the collection consisted of sherds found during agriculture in the post-medieval period.

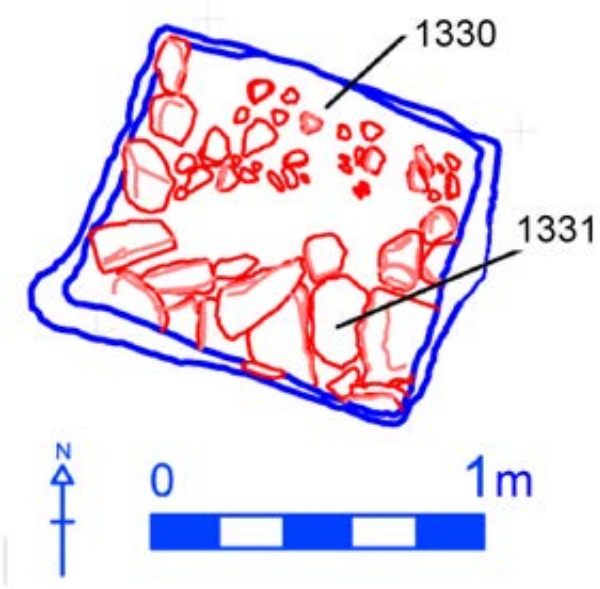
13.3 Test Pit G2

In 1981 another soil pit G2 was dug 8 m SSW of G1, close to a house shown seemingly in use on a

sketch drawn in 1857 (Innes 1960). Pit G2 was on what appeared from air photographs CUP RA84 and RA85 of 1955 to have been cut into a squarish pre-modern cultivation area. In essence soils may have developed before peat covered them, probably in the 1st millennium BC, but they seem likely to have been greatly modified in the 19th century AD.

13.3.1 Description

Under the litter layer was rooty peat which in its lower parts had about 5% disintegrated stone. At about 0.3 m down this gave way to a succession of three layers which seem to correspond to soil 1305 above the boulders in G1. The uppermost (1324) had fairly abundant (40%) small stones in its upper part and was a dark greyish brown fine sandy clay layer. Under that was a similar but lighter coloured layer 1325, very wet and sticky with fewer (20% stones) and fairly abundant thick fleshy roots. Below that, about 0.5 m from the modern surface, was a root mat 1327 varying up to 0.04 m thick. The boulder layer which was such a prominent feature of G1 was absent and the root mat overlay green fine sandy clays with rotted stones in them.



Illus 13.6 Test Pit G2 contexts on the surface of 1324.

Illus 13.7 Test Pit G2 contexts on the surface of 1324.

On the surface of 1324 stones up to 0.2m long seemed to define the re-entrant angle of a dry-stone structure (Illus 13.6, 13.7). The test pit was too small to allow its dimensions to be estimated. It could have belonged to almost any period, although the re-entrant right-angle tends to suggest a fairly recent date.

13.3.2 Discussion of the G2 profile

The presence of earthworms and horizon differentiation suggested a weakly acidic soil. The cultivation rigs here were wider than most of those which could be ascribed with confidence to the early modern period. Without the artificial disturbance and improvement of the soils the soil characteristics of the site would probably have been more acid.

13. 4 Test Pit J

In 1981 a third test pit was dug in an area apparently without any cultivation rigs close to the east boundary of the area in care (Illus 13.1). There was not much distinction between the vegetation in the parts identified topographically as probable cultivation beds and that of the southern part of the area in which Test Pit J was dug. It was in general much affected by trampling and broken up by paths; it was dominated by Juncus squarrosus patches and Scirpus tussocks in a higher frequency than adjacent areas.

It was slightly over 2m square and was dug to a depth of 0.76m. Because its profiles varied, two

Table 13.3 Summary soil profile in Test Pit G2 (see Technical note 13.3.1 for details)

Context	Description	Depth
1321	Litter layer under grass.	0 - 0.02m
1322	Very rooty stone-free peat with some quartz grains and charcoal.	0.02 - 0.09m
1323	Peat with some quartz grains and small rotten stones.	0.09 - 0.28m
1324	Very dark greyish brown humic fine sandy with no mottle and with small to medium sized stones (0.06 to 0.2m). Charcoal in top surface along with many very fine roots.	0.28 - 0.39m
1325	Dark greyish brown slightly sandy clay. Very wet and sticky with some roots.	0.39 - 0.52m
1326	Rooty mixed sand with a 10% humic clay fraction Slight cementing in places. Lenses of green.	0.52 - 0.55m
1327	Discontinuous root mat.	0.55 - 0.59m
1328	Fine sandy clay with some clay lenses and very fine fibrous roots, with some evidence of cementation. Less than 10% stones	0.59 - 0.69m
1329	Green sandy clay with 20% small rotted stones.	0.69m down-wards

Table 13.4 The general profile in Test Pit J See Technical note 13.4.1 for more details of this profile

Context	Description	Depth
1351	Litter layer; medium brown wet under grass	0 -2 cm
1352	Very wet medium brown peat, fibrous with fleshy roots	2 - 8cm
1353	Slightly dark fibrous peat	8 - 11cm
1354	Dark brown fibrous peat with grits and dried peat lumps	11 - 14cm
1355	Orange brown fibrous peat	14 - 27cm
1356	Medium brown peat becoming orange brown downwards with a 20mm orange band at bottom.	27 - 48cm
1357	Dark grey brown amorphous peat	48 - 49cm
1358	(1) Dark brown very rich humus rich clay with fine roots and no mottle. Some very small rotted stones along with quartz grits and some charcoal	49 - 55cm
1359	(2) Medium brown slightly sandy silty clay with a slight yellow green tinge and diffuse indistinct dark brown mottles. It contained small stones of which the smaller green stones were all rotted.	55 - 60cm
1360	(3) Uncemented although very compact green brown silty clay with some white rotted stones less than 10mm in diameter at the top. Vertical fine fibrous roots very common	60 - 68cm
1361	(4) Uncemented green subsoil	68-70cm
-	Shallow root mat	70cm
1362	Green clay loam with a much cemented top surface.	70 downwards

were recorded, the first representing much of the pit and the second the much simpler profile near its SE corner.

13.4.1 The J profile

Table 13.5 The profile (Profile 2) at the SE Corner of Area J

Context	Description	Depth
1371	peat	0 - 52cm
1372	As 1338	52 - 58cm
1373	As 1339	58 - 63cm
1374	As 1340	63 - 70cm
1375	As 1341	70 - 76cm

13.5 Pollen

Two pollen samples were analysed. There is some ambiguity in the provenance of sample 2060 which probably came from Test Pit GII but may instead have come from Test Pit J (Technical Note 13.5). The pollen spot sample 2060, probably from GII layer 3 (presumably context 1540) is described in Chapter 21: Pollen. It was assigned to straight after the clearance which marked the transition of zone CaN-2d to CaN-3a sometime between 2980 and 2510 cal BC.

Pollen spot sample (2036) from GIII (=J) Layer 4 (presumably context 1361) probably dated to the transition of zone CaN-3a to CaN-3b between 2560 and 2200 cal BC when human impact on the local landscape temporarily declined.

The inversion of these zones would have been difficult to interpret if the samples were from the same profile. Perhaps not too much weight should be put on the possibility.

13.6 Summary Description

The test pits revealed no iron panning or ochreous horizons sensu stricto. They revealed no natural buried litter layers ('turf lines') of the kind prevalent at the Ring. It seems likely that the iron pans, ochreous layers and buried litter layers found near the Ring reflected human activities of a kind absent in the areas of the test pits. On Area F soil processes absent from the test pits were recorded; they may reflect a different cultivation and drainage history.

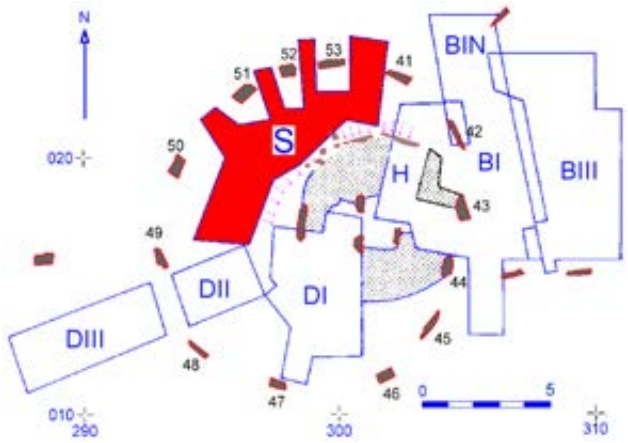
The boulder layer in Pit GI and the layer of smaller stones in Pit G2 may have parts of two different structures. The latter may have been of fairly recent date if the pollen in the black peat above it was imported with peat used to create an agricultural soil, but the former included potsherds which could be of 4th or 3rd millennium BC type and may indicate settlement of that period (if they do not represent a post-medieval collection of sherds found during agriculture).

14. Area S

Illus 14.1 Area S looking west showing sedge circles and damage to the turf [NMRS 1144712]

Illus 14.2 Area S looking north-east showing sedge circles and damage to the turf [NMRS 1144727]

14.1 Introduction



Illus 14.3 Location plan

The turf covering Area S had suffered erosion from visitors' feet, exacerbated by occasional water-logging (Illus 14.1-2). It was partially excavated in May 1988 to allow turf replacement. The work was directed by Peter Strong.

14.1.1 General Aims

Illus 14.4 Air photograph taken in 1955 from the west with the colour maps of the Ring stones lightened [CUP RA85]

Damage to this part of the area within the ring was not only recent. It was visible on the Cambridge air photo of 1955 (Illus 14.4).

The brief in 1988 was to remove worn turf from within the NW area of the circle of standing stones so that it could be replaced with new thick turf, making an allowance for a drainage layer of quarry dust. The site was excavated to a depth of 15cm below the planned ground surface level. The aim was to record all layers and features while minimizing disturbance. The brief precluded realisation of opportunities to extend research.

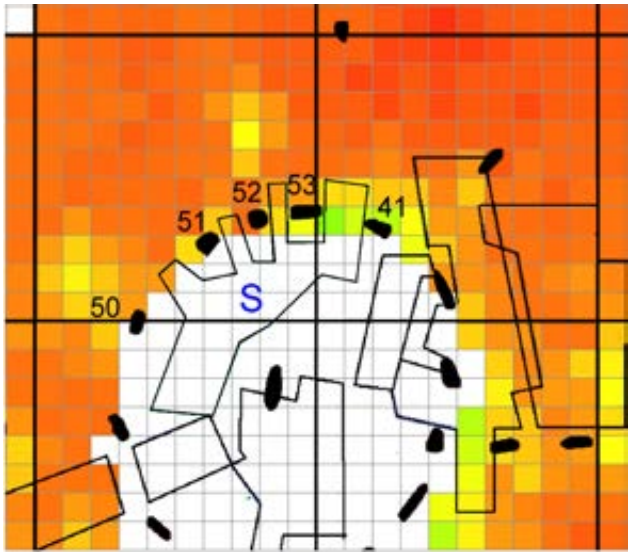
14.1.2 Resistivity Survey

Very little resistivity survey was undertaken within the Ring (Illus 14.4). Thus only the northern tips of Area S fell in surveyed areas.

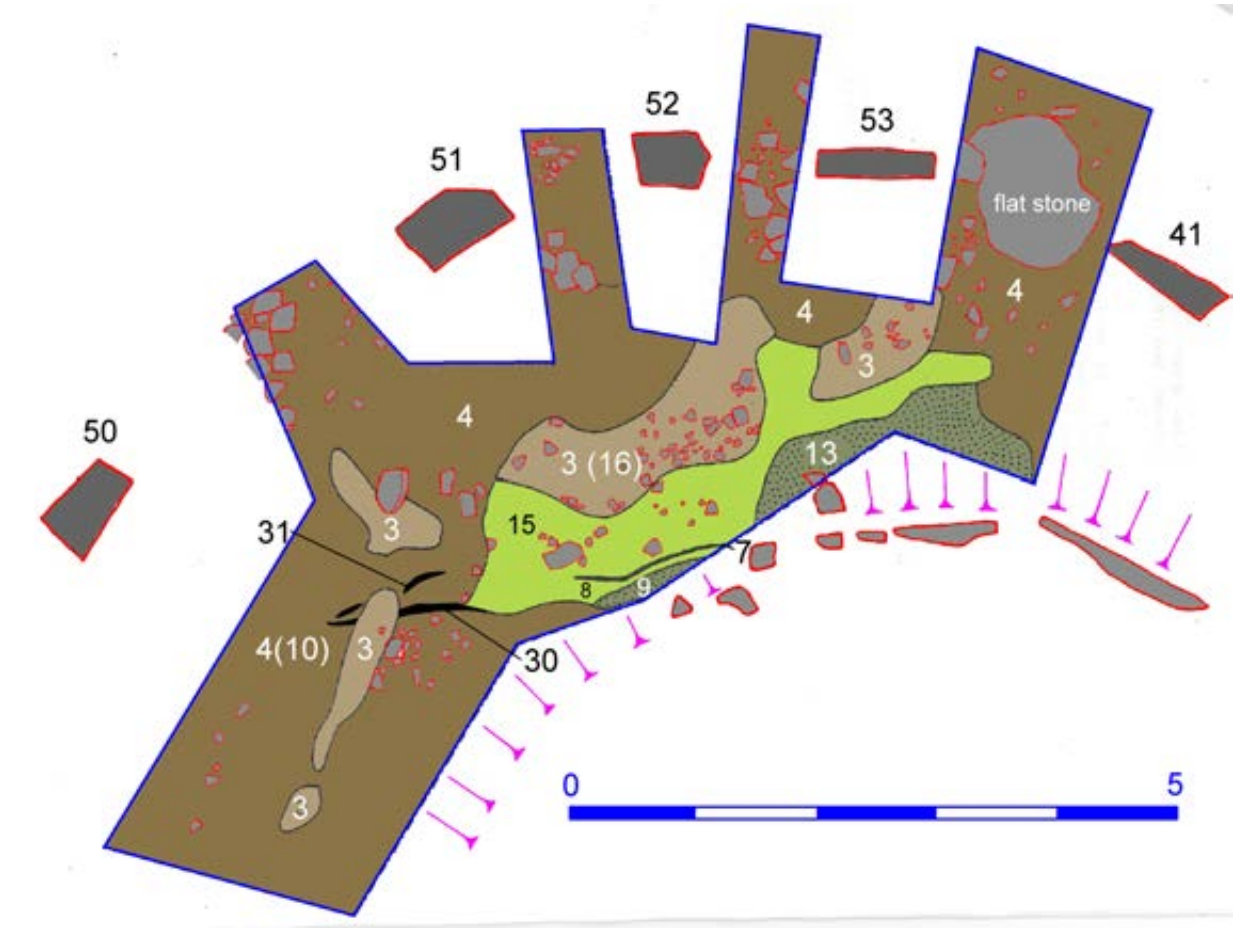
An area of relatively high resistivity values corresponded to a flat stone found between Ring stones 53 and 41. Higher values than those in the general surroundings matched stony area in the next 'finger' to the west. The survey was however of too low a resolution to pick up more useful information.

14.1.3 Layout of the trench

Shallow dips existed between the standing stones and between the kerb of the mound and the stone ring. Several head sized stones showed through the turf, particularly between the standing stones, and in places it had been worn away to reveal the underlying surface of small stones and gritty earth (Illus 14.1, 14.2).



Illus 14.5 Results of the 2007 analysis of the 1 m probe spacing survey (high values in yellow and green, low in orange-brown)



Illus 14.6 The turf and layers immediately beneath it [Area S Level 2]

Illus 14.7 Layer 3 and 4 on 10 May 1988 [NMRS 1144671]

The existing vegetation was composed of short worn grass, patches of nardus stricta and a few tufts of molinea caerulea and circular patches of close cropped sedge (carex nigra).

Area S was laid out to embrace these worn patches and the paths between stones 51 and 52, 52 and 53, and 53 and 41. The whole area was about 8 sq m.

14.1.4 Context numbering

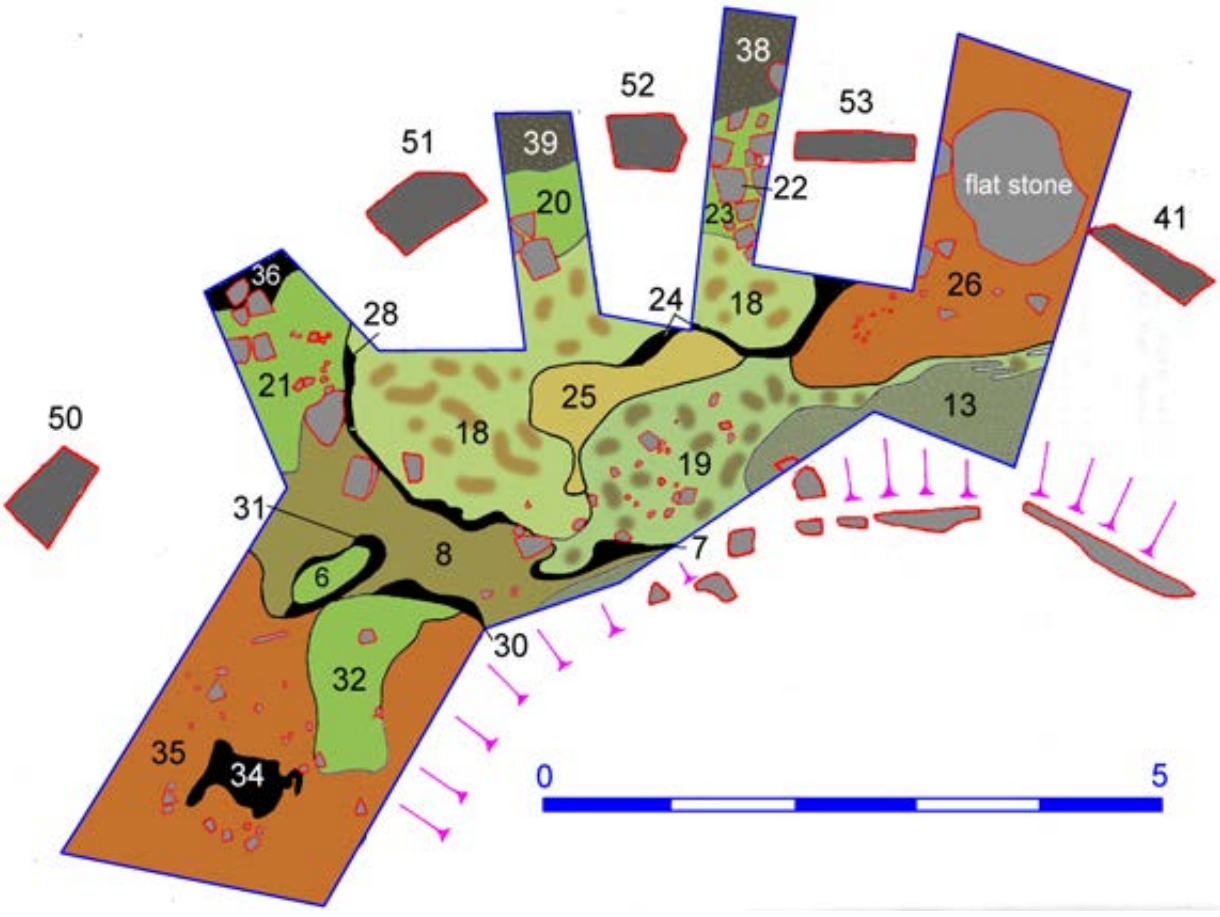
The features were numbered from 1 to 44. In the full context list they have been changed to run from 1201 to 1244 but in this chapter the shorter forms have been retained.

14.2 Victorian and later activities

14.2.1 Description of superficial layers

Under the turf a spread of fine (3mm) quarry grit covered the site in varying thickness. Immediately below it layers 4 and 10 varied from a dark greasy peat to a rusty brown root mat. At the E end of the trench it included a small number of head sized stones. It contained many broken modern bottle glass sherds. Layer 4 also underlay the higher parts of the turf cover, especially around the base of the standing stones and near to the kerb of the mound, but the root mass did not cover the eroded path between the kerb and the standing stones. In the central shallow gulley of the path, which ran approximately ENE, there were accumulations of small stone rubble up to 0.2m deep (layer 3). They lay roughly down the centre of the trench and contained abundant glass sherds (Illus 14.6).

To the east a very rooty fibrous version of the peaty layer 4 had destroyed any superficial soil layers. In the middle part of the trench erosion had revealed a much earlier layer, green to yellow sandy clay (15). It had also probably removed parts of a cultivation layer (13) which survived to the south of the clay between the eroded path and the kerb



Illus 14.8 Layers revealed by removal of peaty soil and roots [Area S Level 3]

(Illus 14.6). Although the south-western part of the trench did not display such obvious signs of erosion it had in fact been damaged severely; once the peaty rooty material 4 and 10 had been removed some of the earliest layers on Area S were revealed.

14.2.2 Discussion of the superficial layers

Like the other excavation areas in and around the Ring, Area S had been covered by about 1.5m of peat, cleared away in 1857. Root mats comparable to that in Layer 4 were found in Test Pits G1, G2 and J at 0.24, 0.27 and 0.21 below the base of the peat, suggesting that the mat on Area S might have been a similar depth below the peat base there in 1857. If so, considerable material may have been removed during clearance and by erosion (some 20 to 25cm including the thickness of the turf).

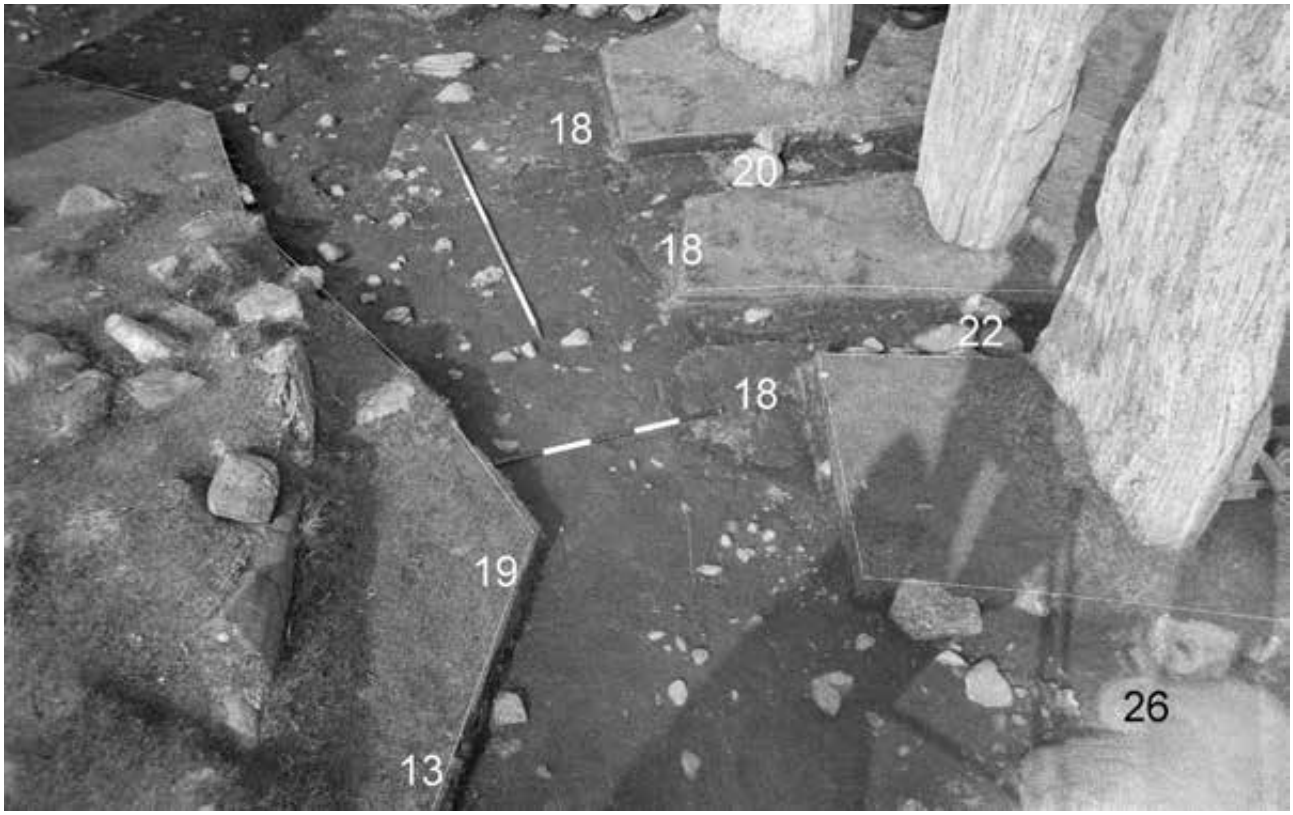
14.3 Disturbed clays and a cultivation layer

When peaty rooty material 4 was removed along the N side of the trench, yellow clay 18 with irregular root penetration was found extending across the trench (Illus 14.8-14.9). This may have been the result of ploughing of underlying areas of green clay like those (20, 21 and 22) which survived closer to the line of the Ring stones (Illus 14.8).

14.3.1 Late plough soils and ploughing

At the north-eastern and south-western extremities of Area S the removal of modern soil, roots and peaty material revealed reddish brown early cultivation soils (Illus 14.8). In the main part of the trench later levels survived, which can be broadly summarised as black litter layers with green clay over them, all truncated by cultivation with an ard.

In considering the late ploughing, a dense dark grey and charcoal rich material (13) at the SE corner of Area S was probably most significant (Illus 14.8 -10). It appeared to extend under the baulks to the south and east. It was quite unlike any of the other layers on the site except layer 9, and contained many fragments of very soft rough pottery and much charcoal. In almost every case



Illus 14.9 Layers 13, 18, 19, 20, 22 and 26 on 13 May 1988 [NMRS 1144701]

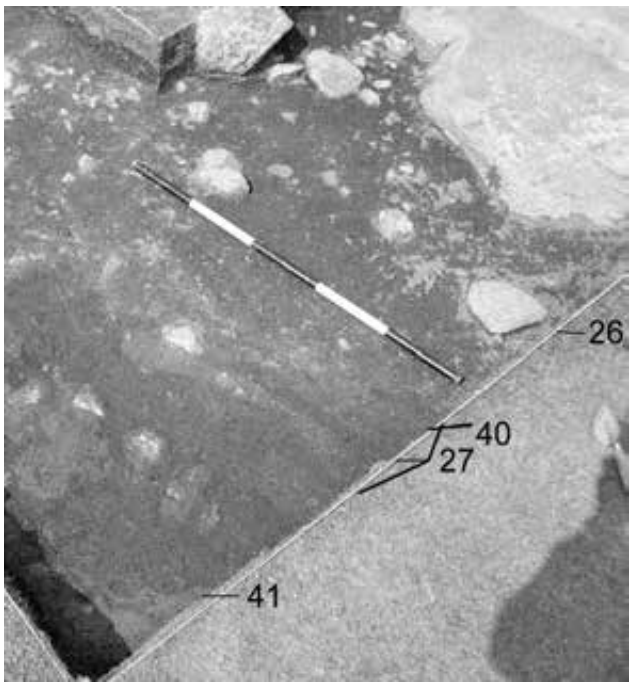
the pottery disintegrated. All identifiable sherds (31 sherds plus 24 fragments and some crumbs, Cat 1049-1103) came from a single Early/Middle Neolithic cooking pot with corky fabric.

Several bulk samples were taken. They contained between them 16 pieces of charcoal identifiable to species, 7 alder, 3 birch, 3 hazel and 3 Pomoideae.

A charred hazel nut shell (Sample Bag 4) produced a date (SUERC-11608 4510+/-35) between 3360 and 3090 cal BC. A piece of hazel charcoal (sample Top Block) produced a date (SUERC-11618 4450+/-35) between 3340 and 2930 cal BC.

Traces of plough soil 13 showed along the south baulk close to the kerb of the cairn where a truncated section demonstrated a vertical sequence of-charcoal-rich clay 9 over a layer of greenish-brown clay (8) partly stained by iron, which in turn covered a thin black layer of fine humic soil (7) over another layer of green clay (6) (Illus 14.8). These layers had been truncated by erosion associated with the path along the centre of the trench.

Plough soil 9 by the middle southeast facing edge of the area (Illus 14.8) was considered to be similar to plough soil 13 and might have been covered by an additional layer of clay immediately under the turf.



Illus 14.10 Ard marks 27 in sand 40 on 13 May 1988 [NMRS 1144705]

Under the black charcoal and pot layer 13 a series of parallel ard marks (27) ran parallel to the stone kerb; they had bitten into firm sandy clay 40 (Illus 14.10). Two circular features (41) filled with the same charcoal rich material as 13, with poorly preserved potsherds, cut the ard marks; they can be considered as part of the base of layer 13. Samples of ard mark fill 27 were taken but they produced no identifiable charcoal. Further to the W, fainter traces rather near to the modern surface ran in approximately the same direction.

Red/brown humic clay (35) with traces of ard marks cut into it underlay the area where the rooty matter (4 (10)) had been, near the west end of the trench. Lying on soil 35 was an irregular surface of small stones and coarse mixed greenish clay and sand (32). Traces of three separate ard marks (33) were cut into this material. A sample produced 5 pieces of alder charcoal. Alder was the commonest identifiable species in plough soil 13 and although no traces of the plough soil were found above greenish clay and sand 32 it seems likely that it was once present there and the ard marks were the result of an ard cutting through it into layer 32.

The middle of the trench was occupied by mottled green clays 18 and 19 which are discussed below.

Outside the Ring to the north of green clays 20 and 22, layers 38 and 39 were broadly similar to plough soil 13 although more black and humic; they differed from other black layers on Area S in having charcoal and mineral matter in their composition. Layer 36, north of the green clay 21 between Ring stones 50 and 51, lay in a depression and was smooth and black.

14.3.2 Discussion of the late ploughing

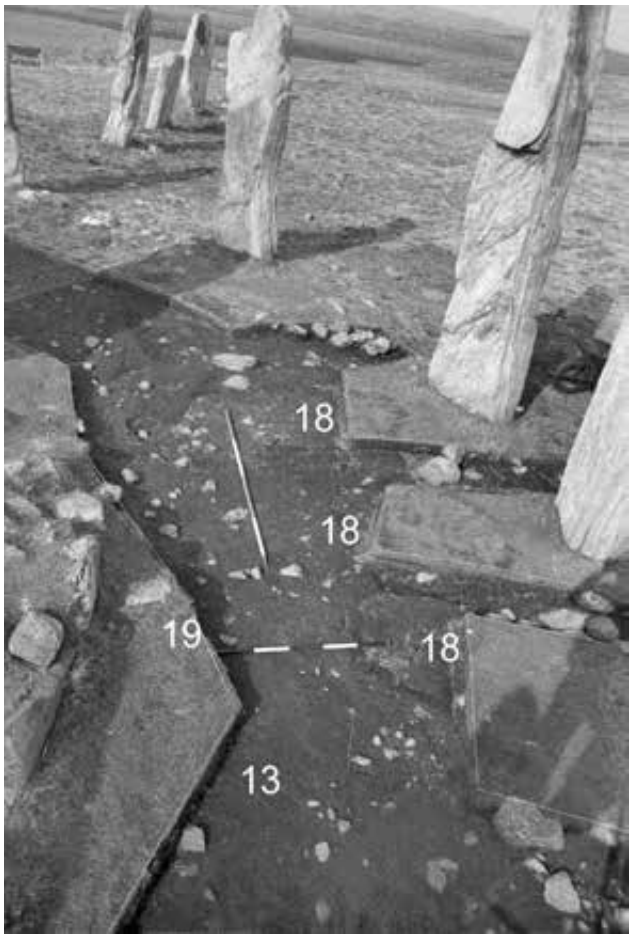
Although erosion and soil processes had truncated the stratigraphy it seems likely that the whole area was once covered by a plough soil, of which only layer 13 (and perhaps 9) remained intact. The ard marks in mixed clay 32 immediately below the rooty topsoil suggest that in the west of the Area erosion had removed a plough soil. The alder charcoal from these ard marks encourages an interpretation that plough soil 13 had once covered this area because alder was the commonest identifiable

charcoal in layer 13. Similar ard marks were found on Areas B, D and H below levels equivalent to soil 13. Layers of green clay 15, 18 and 19 probably formed part of the subsoil of plough soil 13.

The two radiocarbon dates from plough soil 13, both from charred hazel, were almost certainly from material old at the time ploughing took place. Clay layers 352 and 369 at the base of plough soil 315 on Area D produced similar dates in the last third of the fourth millennium BC (see Chapter 23 Radiocarbon Dates). However those layers also included early Beaker sherds. Plough soil 13 on Area S may therefore represent clays imported around or a few generations after 2500 cal BC. Although it was ploughed it looks as if deposition of small ritual deposits did not take place here, in contrast to what happened in Area D to the south of the chambered cairn.

Layers 38 and 39 were probably the bases of a roughly contemporary cultivated soil outside the Ring lapping up onto green clay and stone mounds round the bases of the Ring stones. Similar patches occurred on Area H, notably layer 738 by the large kerb stone bounding the chambered cairn, which is the easternmost kerb stone on Illus 14.8.

It is somewhat surprising that no ard marks were visible in the extensive mottled green clays 18 and 19 but perhaps erosion had removed their upper layers.



Illus 14.11 Round feature 43 and other layers on 13 May 1988 [NMRS 1144638]

14.4 Areas of green to yellow clay and stones

As described above no archaeological layers survived above the early cultivation soils in the north-eastern and south-western extremities of Area S.

14.4.1 Green to yellow clay layers

In the narrow trenches between the orthostats of the ring, head size and larger but portable boulders, many of which had been seen showing through the turf, were observed occupying depressions. At the northeast end of the trench a large oval flat stone occupied almost all the space between stones 53 and 41.

A large part of the area under and between the central spread of stones was covered by the light coloured greenish clay 15 with darker organic mottling distributed across it (Illus 14.6). Most of it had a lumpy granular texture similar to freshly dug natural material. It was much cut up and discontinuous at the S side near the kerb. In places it appeared to conjoin and conflated with a lower layer of clay and it was not always clear which was the layer under consideration.

Low mounds of yellowish clay (18) extended from the bases of the standing stones 51, 52 and 53 which terminated at or were truncated by the line of a path which had eroded the upper strata left after peat clearance in 1857 (Illus 14.8).

Lumpy green clay 19 was earlier than smooth green clay 40. It first appeared as mottled dark brown patches over greenish clay and had the appearance of poorly mixed materials. It contained a small patch of burning and two small round grey filled features. It was finally resolved as a deposit

of greenish clay lumps lying over a probably more continuous black layer similar to 24/28. It also overlay khaki brown gritty clay 25 with small stones (Illus 14.8).

In the west, a small patch of green clay (6) was probably the same as mottled greenish clay 15, separated from it by truncation.

Firm clean light coloured sandy clay 40 was not granular or lumpy as the other green clay deposits had been and differed only slightly in consistency from light-coloured greenish clay 15 above it. It probably also underlay charcoal-rich clay 41 which was the base of plough soil 13 (Illus 14.12).

The patch of coarse sandy green clay and rotted stones 32 in the western part of the trench (Illus 14.8) was different from the others. It directly overlay basal soil 35. It is described and discussed below.

A large round feature 43 filled with green to yellow sandy clay was found between Ring stones 50 and 51 (Illus 14.8, 14.10). It was not excavated. It may have been remnants of clay similar to green clays 20 and 23.

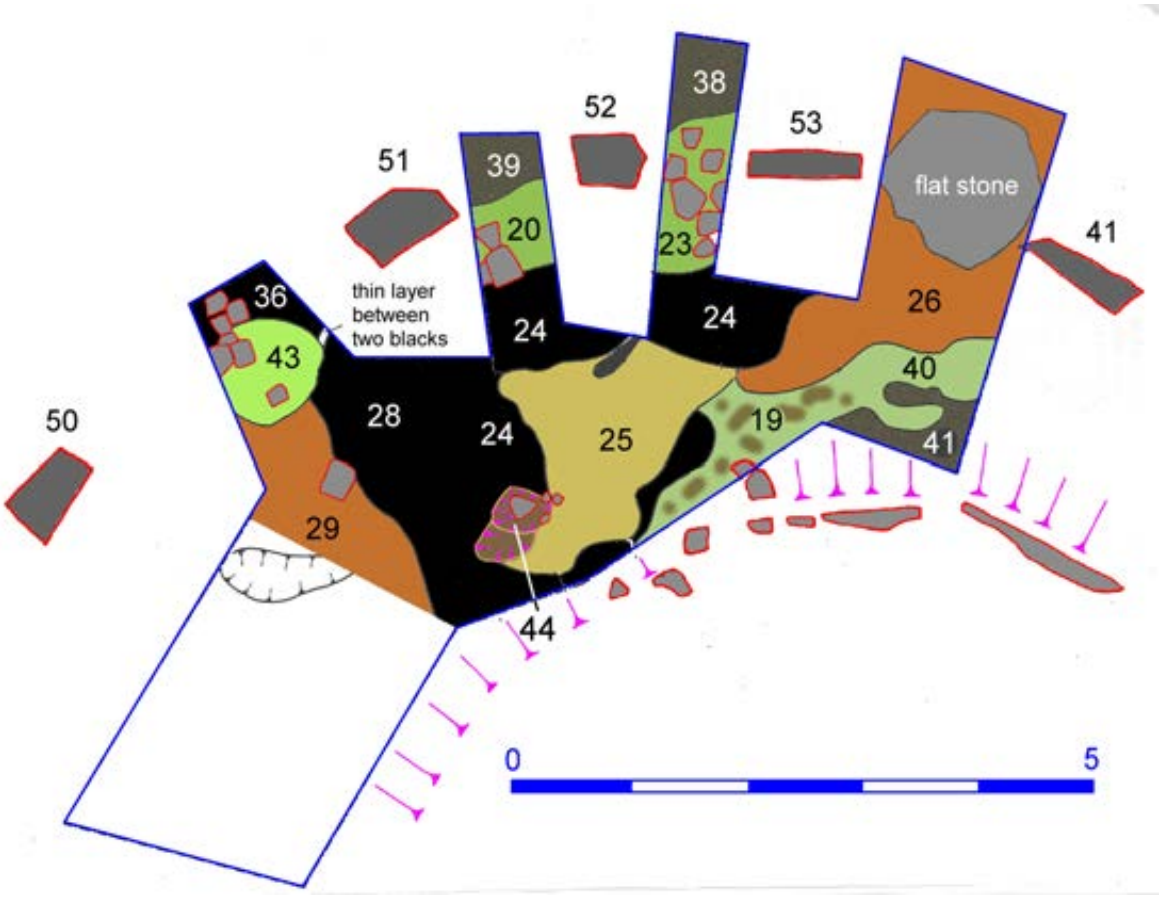
14.4.2 Discussion of the green to yellow clays

The masses of clay and stones (20, 21 and 22) may have been the remnants of mounds round the bases of the Ring stones. Some of the other areas of green to yellow clay gave the impression of being redeposited natural clay perhaps laid to level up the underlying depressions.

Green clay 15 seemed to be a mixture of similar materials inseparable during excavation. It was probably mainly a disturbed version of the underlying green mottled clays 18 and 19.

Its texture and the discontinuities had probably been created by ploughing which had penetrated through a plough soil of which layer 13 was the most substantial surviving representative.

Both yellowish layer 8 and greenish layer 18 overlay at least one litter layer. Layer 8 may originally have lain between two litter layers but 18 overlay an area where two litter layers had combined. The brief for the excavation prevented full investigation of the relationships.



Illus 14.12 The layers revealed after removal of up to 0.15m of deposits [Level 4 Plan]

Layers 18 and 19 may have been roughly equivalent to olive-green clay 750 on Area H, and patches of green clay at much the same level sufficiently different to have been given separate context numbers. Like the greenish clays on Area S, layer 750 overlay a turf line (751/758). Clearly however the green clay on Area S had suffered modifications by subsequent weathering and the ploughing represented by plough soil 13.

Green clays 18, 19 and 40 on Area S can be dated by analogy with the similar clays on Area H to the period after the Ring stones had been erected and before the cairn was built.

14.5 Turf lines

Litter layers 7, 24, 28, 30 and 31 all belonged to one or other of a pair of turf lines 28 above 24, sometimes separated by thin skims of clay but in other examples a continuous development through both of the periods in which 24 and 28 grew.

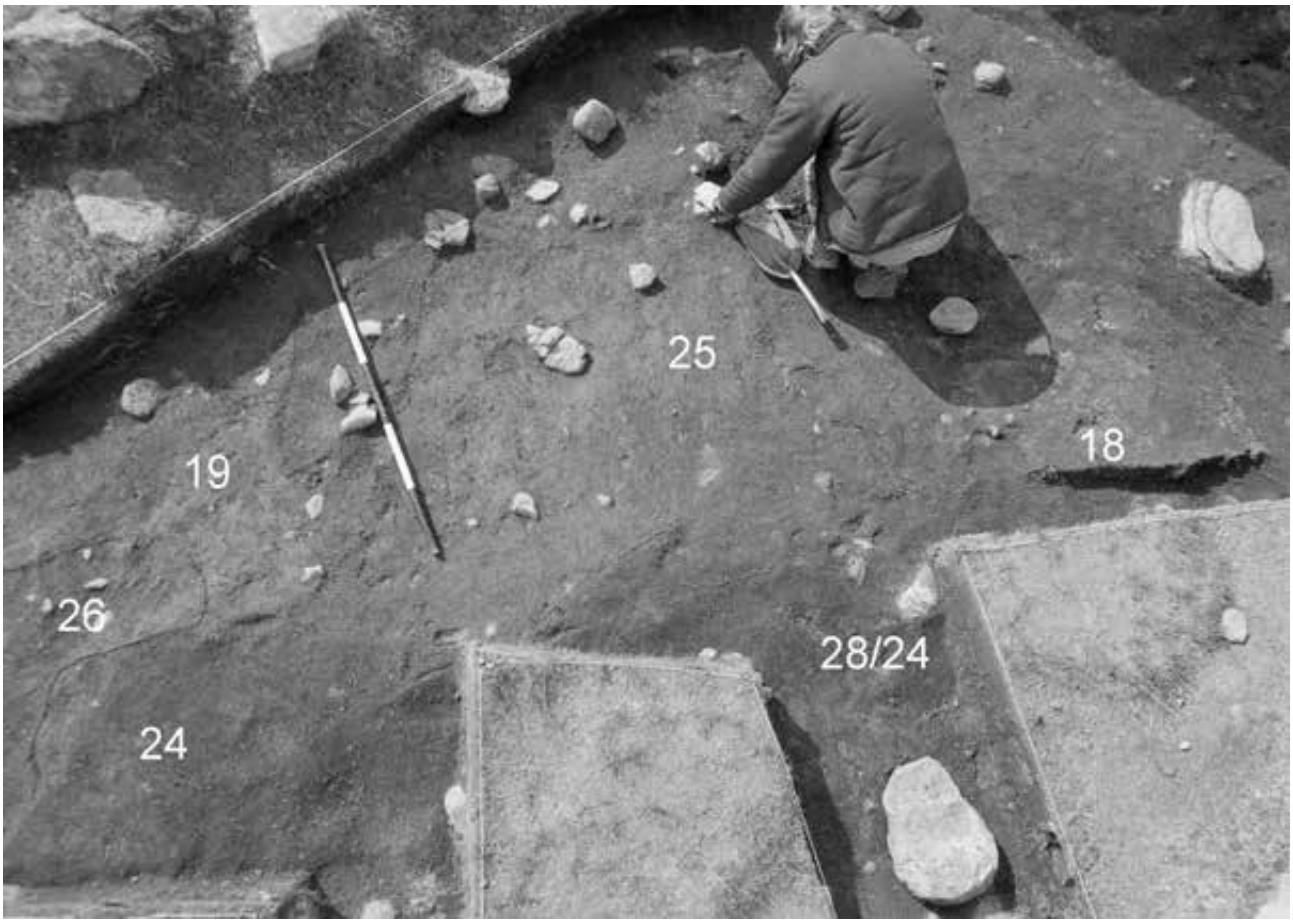
14.5.1 Litter layers

Parallel to the S baulk two linear black features 30 and 31 were found to be the truncated ends of more continuous layers lying obliquely to the visible surface. Litter layer 30 connected with litter layer 7.

Below green clay 15 and mixed clay and rubble 16 was a thin black turf line 24 and to its west the edge of black litter layer 28 ran under brown stained green clay 18. Turf lines 24 and 28 were generally indistinguishable although in places they appeared to be separated, 24 being the lower one.

Litter layer 24 lay over khaki gritty sand (25) which was unlike other soil layers encountered on the site so far. It was a slightly raised area of early plough soils of which coarse mixed sandy clay 32 and red-brown coarse humic clay 35 were other, perhaps slightly earlier, examples.

Between Ring stones 51 and 52 litter layer 24 was cut by a pocket of stones and their green clay matrix 20 (Illus 14.12). To the north black char-



Illus 14.13 Litter and other layers on 14 May 1988 [[NMRS 1144643]

Illus 14.14 Exploration of posthole 44 from the west [NMRS 1144639]

coal-rich plough soil 39 probably ran over green clay 20. Between Ring stones 52 and 53 litter layer 24 was cut by a depression filled with stones 22 in a matrix of compressed green clay lumps 23. To the north and likewise 38 covered or was cut by the northern edge of green clay 23.

In the south-western part of Area S there was a small dip over which black humic skin 34 had developed in red-brown humic coarse clay layer 35. This depression was probably similar to other examples in the trench but more truncated by (probably recent) erosion. On the other hand, it is possible that turf line 34 had formed on the earlier cultivated soil before building of the Ring started.

Samples were taken of all the black layers for radiocarbon, pollen and macro analysis. Only samples from layers 13 and 33 produced identifiable charcoal.

14.5.2 Discussion of the litter layers

A pair of litter layers (766 and 751/758) was also found on Area H. they were separated by a thin clay soil 756 with decayed turfs in it. On Area H they appeared to correspond to a pre-Ring turf line and a later one formed on spreads of spoil left after erection of the Ring stones.

On Area S green-yellow clay 6 appeared to separate the two litter layers. The written account suggests that layer 6 extended across the trench but that is not evident from the plans; however layer 5 was stratigraphically equivalent to layer 6; the nearby clay 8 was a mixture of layer 6 and later greenish clay and the plans show that it did run from side to side. These layers lay at the maximum depth of excavation allowed by the brief, most of them had been truncated, and it was not possible to clarify their relationships unambiguously.

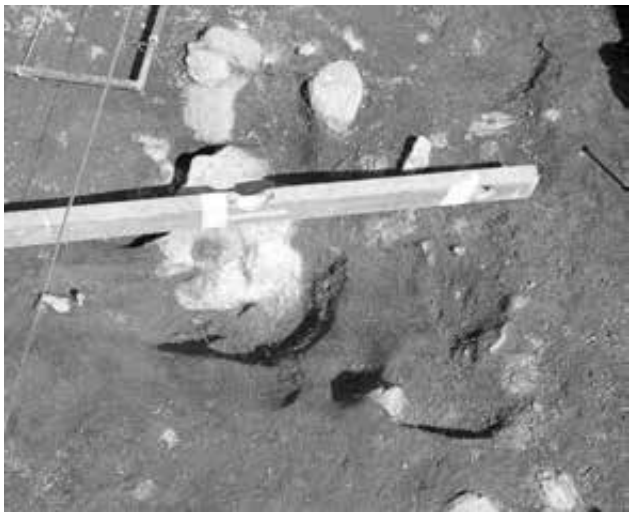
14.6 An early posthole

In attempting to relate litter layers 7 and 28 by removal of the overlying patch of khaki clay 8, and in attempting to separate litter layers 28 and 24, a posthole was discovered. During post-excavation it was numbered 1244 and the abbreviated label 44 is used in this narrative (Illus 14.14).

14.6.1 Excavation of the early posthole 44

Its upper fill was covered by smooth fine litter layer 7, which was equivalent to the main upper turf line 28. . The most obvious feature was 0.3m wide and probably corresponded to a post-pipe. There were indications that the full post-pit may have been about 0.75m in diameter with an ashy grey fill. This fill had the characteristics of a leached layer lying over an iron pan.

A thin line of iron pan was observed under the black layer 0.25m south of the packing stone at the edge of a depression around it (Illus 14.14).



Illus 14.15 Posthole 44 from the west on 14 May 1988 [NMRS 1144653]

Illus 14.16 Posthole 44 partially sectioned from the SSE [NMRS 1144662]

In Illus 14.16 the south edge of the partially excavated post pit is by the right-hand end of the level. The post-pipe has been partially emptied around an angular stone (0.15 x 0.3 x 0.3m) which lay across the hole. There was a large vacuity under the angular stone, separated from it by green lumpy redeposited clay in the central depression over the post-pipe. In the post-pipe a thin lower black layer which was not always distinguishable from the upper ran down the sides of the hole and over the lower soft dark brown sandy fill.

In compliance with the excavation brief the posthole was not excavated apart from a partial section to resolve the relationships between the black layers.

14.6.2 Discussion of the posthole

The post-hole was covered by both of the main litter layers 24 and 28 although the earlier one seemed to dip down below its upper fill. It was probably roughly contemporary with erection of the Ring of standing stones. Judging by evidence from Area H the stones were erected through turf line 24 and turf line 28 formed over layers of clay spoil from the Ring stone pits.

The post-pit may have been substantial, although the excavation brief prevented its exploration; certainly the post--pipe, if such it was, was at 0.3m across far larger than any post-holes excavated in 1980 or 1981.

Another large pit was found under the passage of the chambered cairn on Area B but excavation did not reveal any evidence for a post-pipe. There were stacked inverted turfs in the top levels of the pit. A large pit was also found in the south-western trench-edge section of Area D but too little of it was seen to tell whether it had held a post. Both had ambiguous stratigraphy, but in both cases they could have dated to the same period as pit 44 on Area S.

14.7 Early cultivation

14.7.1 Early cultivation soils

Towards the south-west, the edge of litter layer 28 covered a khaki coloured silty loam 29 with a

high degree of fine gritty sand, similar to soil 25 (Illus 14.6). It underlay a shallow depression lined with black humic layer 31, similar to litter layer 28. Proceeding westwards, gritty sand 29 underlay a black humic layer 30 similar to 28, and the edge of 30 in its turn covered an area of mixed greenish clay lumps and rotted stone 32. The black humic lining 34 of a shallow depression was similar to 30 and likewise was later than greenish clay 32.

All those layers lay over a brown humic but coarse material 35 with many stones up to fist size, rotted stone and clay lumps.

At the north-eastern end of Area S in the area covered by red-brown gritty clay 26 the ground seemed to have been scarped away and fell slightly towards the large flat stone. Red-brown gritty clay 26 lay under green clay 40 and very probably also litter layer 24 although the excavation brief did not allow close investigation of the relationships.

14.7.2 Discussion of the early soils

The unevenness of the old surfaces of the early cultivation soils allowed remains of higher layers to survive in dips. These seemed to follow a slight, long linear depression curving around from the SW towards the ENE. Its general trend was similar to that of cultivation beds with intervening troughs in other excavation areas at Calanais. But there was no convincing evidence for or against cultivation beds.

14.8 Stratigraphy and dating

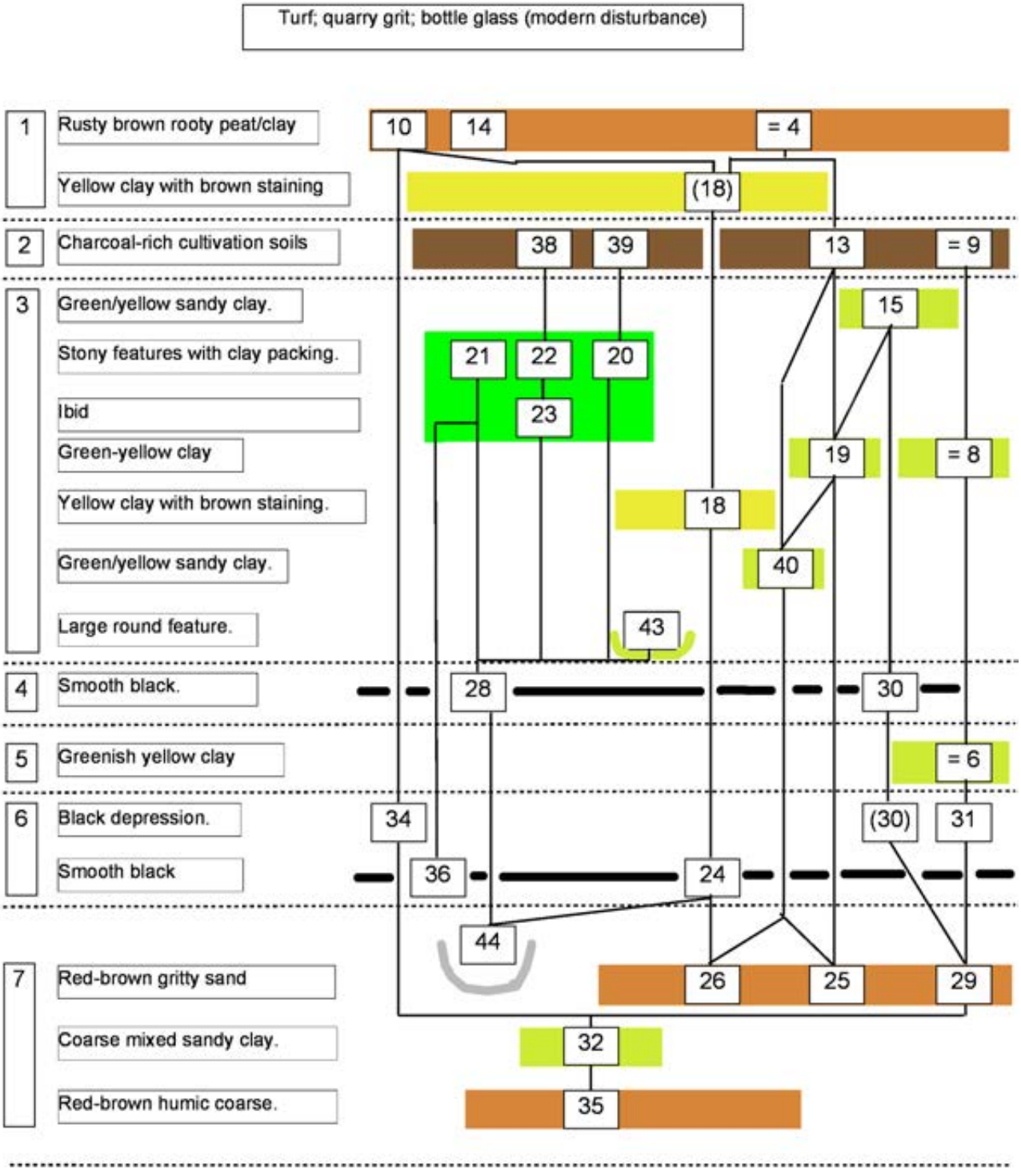
14.8.1 Stratigraphy

The contexts below modern turf, peat and quarry dust and a weathered version of yellow clay 18 could be grouped into 7 blocks (Illus 14.19). The top block consisted of rusty brown rooty peat and clay and yellow clay with iron staining. The second block comprised charcoal-rich cultivation soils 13 and 9 in the mid south and 38 and 39 to the north of the Ring stones. The potsherds in cultivation soil 13 were so crumbly that few could be retrieved; they all came from a single Early/Middle Neolithic cooking pot with corky fabric (Cat 1049-1103). Ard marks were found in

Illus 14.17 The eastern part of the area from the south on 14 May 1988

some of the underlying layers. Block 3 consisted of green-yellow clay features, some with stony packing. They probably belong in the period after the Ring had been erected.

Two areas of smooth black litter layer, 28 and 30, formed Block 4 but in places they merged with litter layers from block 6, in which the main litter layer was 24. The other black humic layers in this block survived in depressions above one of which a patch of greenish clay (6) had been preserved. It is possible that some of the higher green and yellow clays also lay between the litter layers of Blocks 4 and 6. It seems likely that the Block 6 litter layers were earlier than erection of the Ring



Illus 14.18 Stratigraphy

and the Block 4 litter layers formed where clay spoil from the Ring building had sealed the earlier ground level.

Block 7 consisted of various red-brown coarse clay soils and a patch of greener soil 32. The soils correspond to early cultivation and should go with the cultivation beds identified at Calanais in 1980 and 1981. Although there were hints of a curving linear depression running from the southwest to the east-northeast, in approximately the same direction as most of the troughs between cultivation beds on other excavation areas at Calanais, they were not strong enough to provide independent evidence for the existence of an underlying trough between cultivation beds.

14.8.2 Dating

A charred hazel nut shell produced a date between 3360 and 3090 cal BC and a piece of hazel charcoal a date between 3340 and 2930 cal BC. The dates almost certainly represent residual charcoal, which was found in some abundance in imported soils and clays elsewhere at Calanais. Area S thus produced no useful absolute dating evidence. The only relative dating evidence came from interpretation of the Block 3 clays as spoil from digging pits for the Ring stones.

14.9 Summary description

At block level the sequence on Area S was fairly simple and corresponded with that on Area H a metre or so to the east. Early cultivation, perhaps using spades or hoes rather than ards, and possibly taking the form of cultivation beds, was followed by formation of a stable (but on Area H generally weak) vegetated turf line. Then the Ring was erected. The builders may have put mounds of clay and stones round the bases of the stones. The messy operation of erecting the Ring stones spread patches and sheets of clay over the area. A turf line (Block 4) formed on these areas of clay.

Area S contained one feature which had no precise parallels in other areas, the large posthole 44 stratified between Blocks 6 and 7. There were other, different, features at the same stratigraphic level elsewhere. They included slots on Areas H and D; and it is possible that large pits on Areas B and D were also at this stratigraphic position. That on Area B, however, seems more likely to have been at a higher level corresponding to part of Block 3. That will be considered further in Chapter 24.

None of the evidence from Area S could be tied to the green clay platform 760 found under the cairn on Area H and the area of green clay 750 to its north. None could be linked to the chambered cairn. However the proliferation of green and yellow-green clays in Block 3 may be their equivalent.

Block 2 corresponds to cultivation of the area by people using ards. This soil contained charcoal old at the time of cultivation and potsherds implying that soil and, cultural material had been imported. In area D similar material, along with small pits and mounds of clay, was interpreted as a long succession of ritual deposits. There was however nothing on Area S forcing similar interpretations and it is conceivable that the imported soil and clay was introduced for purely agricultural reasons.

Peat then grew over the area to a depth of up to 1.5m. It was cleared away in 1857. After that came the Victorian and later use of the site for cultural and recreational purposes, which led to erosion from visitor's feet along informal paths and concomitant attempts to repair the damage by putting down quarry dust and perhaps turf.

Overall this sequence has resonances with the sequences in Areas D and H (Illus 14.1). The excavation brief precluded investigation of some relationships and of the early cultivation layers. But the results played an important role in consolidating interpretation of the excavations at Calanais.

15. Cremated Bone

Pieces of cremated bones found in black deposits in the chamber in 1857 were identified by Professor Anderson of Glasgow as from human bone (See Chapter 4: Introduction to the Fieldwork; Innes 1860, 112). Only the most superficial attempts have been made to discover whether this material survives somewhere in Glasgow.

Pieces of cremated bone were found in 17 contexts at Calanais, many of them during sieving of samples for charcoal.

Source Key

CL	Context List
FC	Finds Catalogue
MS	Macroplant sieving
MR	McCullagh charcoal report

They were all very small. Although structural carbonate from well fired pieces of cremated bone can now be dated accurately the samples from Calanais are too small and too poorly preserved for dating using current techniques.

Contexts H 730 and BIVWX 883 produced relatively high numbers of finds. The contexts were both fills of a slot for a structure on the green clay platform. That slot also produced Phase 3 radiocarbon dates despite belonging to Phase 7. The pollen in it however was probably Phase 7 in date and context 730 also contained probable beaker sherds suggesting a date after 2500 cal BC. The bone fragments may therefore have been in clay and soil imported from settlements dating to before 3000 BC or they may have originated in activities taking place around 2500 BC or somewhat later. The bone in contexts in BIVWX probably has a similar taphonomy.

Because they have not been examined by a specialist they may be of human or non-human origin. Obviously it would be interesting to ascertain what species they came from; but the taphonomic problems mean that their interpretation would be difficult even if they could be identified precisely. To minimise handling, the plan is that the fragments will be assessed by cremated bone specialists only when dating and other scientific techniques have improved sufficiently to produce reliable information from such poor samples.

Table 15.1 Cremated bone

Area	Ctxt	Find or Sample	Weight and Comments	Source
?	?	772	0.15g	MS
BII/III	803	54	4/5/81 Burnt Bone	FC
BIVWX	878	699	28/5/81 Burnt Bone	FC
BIVWX	881	694	Bone	FC
BIVWX	881	S694	minute fragments of bone.	MR
BIVWx	882	2022	0.11g	MS
BIVWx	883	2011	0.44g	MS
BIVWX	883	497	6/6/81 Cremated Bone	FC
BIVWX	883	623	6/6/81 Cremated Bone	FC
BIVWX	883	697	1/6/81 Burnt Bone	FC
BIVWX	883	698	1/6/81 Bone	FC
BIVWX	883	698	Small to minute flecks of bone.	MR
BIVWX	885	698	The sample contained one fragment of bone, (c 1.0cm3) and many minute flecks.	MR
BV	167	702	13/5/81 Burnt Bone	FC
BV	9999	167	Burnt Bone	FC
BVSX	141	391	Charcoal & Burnt Bone	FC
DI	315	80.81	Bone?	CL
DI	377	277	19/5/81 Fragment Bone	FC
DI	383	2354	0.15g	MS
HII	728	2366	Some fragments of bone.	MR
HII	730	332	22/5/81 Fragment Bone	FC
HII	730	352/81	Bone (burnt)	CL
HII	730	350	26/5/81 Cremated Bone	FC
HII	730	2048; 32	0.02g	MS
HII	735	353	26/5/81 Burnt Bone (Sample 352 acc CL)	FC
HII	736	81.104	Piece of cremated bone; but primary source for information in context list is unclear.	CL
S	1213	Bag 4, 13/05/88	0.08g	MS
S	1213	Top Block, Cal 88, 13/05/88	0.05g	MS
S	1233	Second Bag, 13/05/88	0.18g	MS

16. A Coarse Stone Tool

The only coarse stone tool found during our excavations at Calanais was noticed by Mrs Margaret Ponting (now Curtis) in a stone pile some distance from the excavation areas. It was made of the local rock, gneiss, and had probably been a beach cobble.

It is 173mm long, 88mm wide and 63mm deep (maximum dimensions). It weighs 1595 gm and has a density of 2.52.

One end has a clear 38 by 29mm facet and the other a vaguer flattening of about the same size. Overall it looks fairly smooth except on one side where differential erosion has produced a step of about 6mm.

It may have been used for instance as a net sinker or a thatch-weight, or indeed both. The end facets give a strong impression that whatever other uses it may have had at various times it has been used as a pounder, although the coarse crystals of the rock preclude identification of wear marks.

The tool could be of almost any date and its use may have had little or nothing to do with the stone setting.

Illus 16.1 The pounder

17. The Lithic Assemblage

Torben Bjarke Ballin

17.1 Introduction

In order to allow necessary repairs of the cairn, Historic Scotland undertook excavations of the Calanais ritual complex. These excavations were carried out by Patrick Ashmore (1980/81) and the results subsequently published in popular form (Ashmore 1995). This publication dealt mainly with the monuments (Stone Circle, cairn, avenue and half-oval structure) and the sequence of construction and abandonment of the structures at Calanais. The small finds were only mentioned briefly. The purpose of the present specialist report is therefore to present the lithic assemblage from the 1980/81 excavations. The presentation of the lithic artefacts includes a discussion of the date of the assemblage and the activities it may represent.

17.2 Raw Materials

The lithic assemblage from Calanais consists largely of quartz (234 pieces) supplemented by some flint (45 pieces) and mylonite (34 pieces) (Table 17.1); one large flake is a metabasic rock of Cleitichean type and it is very local to the site at Calanais (determined by Dr G. Collins, IGS, Edinburgh, in connection with examination of the assemblage by C. Wickham-Jones.

As the quartz and mylonite appeared to cover a range of related material, 10 type samples were selected (six pieces of 'quartz' and four pieces of 'mylonite') and subsequently discussed with geologist Dr Allan Hall of the Department of Archaeology, University of Glasgow.

It was concluded, that the material originally classified as quartz probably contains small amounts of quartzite as well. Some of the pieces classified as mylonite are certainly mylonite, whereas other pieces initially assumed to be mylonite are less certain and may be either mylonite, hornfels (both metamorphic rock types) or fine-grained sedimentary rock. In the complete archive catalogue, nine of the 233 pieces of quartz have been classified as possibly quartzite, and five pieces as rock crystal. Though some of the 'mylonite' pieces may actually belong to closely related rock types, the term has been kept for the entire group, as the only pieces from this group to be classified with any degree of certainty are mylonite.

17.2.1 Quartz

A few pieces of the Calanais quartz have abraded cortex, suggesting that they were acquired on the shores of Lewis. However, most of the quartz artefacts have no abraded surfaces. Instead, some of them contain bits of the original rock matrix (gneiss), mainly feldspar and mica. This quartz is vein quartz and it was probably quarried in nearby outcrops (the Cnoc Dubh quartz quarry is situated c. 3.5 kilometres south-east of Calanais; Ballin 2004).

The original colour of the quartz is white ('milky quartz'), but a large proportion of the raw material has a secondary brownish tinge. This brown colour may in some cases be a patina caused by the iron content of the peat, but in most cases the colour coincides with varying degrees of fire-craz-

Table 17.1 Lithic assemblage: percentages of raw materials

	Quartz	Flint	Mylonite	Other	Total
Debitage	78	13	9	<1	101
Cores	90	10			100
Tools	40	30	30		100
Entire assemblage	74	14	11	<1	100

ing and is probably due to burning. Most of the burnt quartz displays limited areas of peeled-off surfaces, but in some instances the burning caused the quartz to disintegrate completely.

The quartz varies in fineness and homogeneity from very pure with a waxy bluish-white lustre to coarse and grainy with a dull lustre. The purer and more homogeneous quartz has good flaking abilities, clearly demonstrated by the site's arrowheads, whereas the coarser and less homogeneous quartz tends to break in a more irregular way. The grainier varieties can be difficult to distinguish from local quartzite, and in the archive catalogue only pieces which are distinctly grainy have been classified as quartzite. A few pieces of quartz are so homogeneous, clear and translucent, that they have been classified as rock crystal. The three materials, quartz, quartzite and rock crystal, seem to form a continuum.

17.2.2 Flint

The flint from Calanais is poor, being relatively coarse and heterogeneous with frequent impurities. Most pieces have retained a considerable cortex-cover, demonstrating that the flint is pebble flint, probably from a nearby beach source. The greatest dimension of the flint nodules was approximately four to six centimetres. Even though the flint is relatively poor compared to other types of flint, and even though the general size of the flint nodules will have made reduction difficult, the knappers of Calanais probably still considered the flint a better and more controllable raw material than the local and more abundant quartz.

17.2.3 Mylonite

This raw-material is distinctly layered, with some layers being brownish grey and some bluish grey or white/grey. It is very fine-grained and most pieces are heavily weathered. Some contain pods of quartz and a dark greenish ferromagnesian mineral, probably amphibole. As mentioned above some samples could only be identified as either 'fine-grained sedimentary rock, hornfels or mylonite', but one sample (sample 4) was classified as a typical mylonite, possibly a 'tectonised amphibole' (report by Geologist Allan Hall, Department of Archaeology, University of Glasgow). At present, the provenance of this raw material is uncertain: if it is mylonite it may be local (Dr Allan Hall), if it is hornfels it may be from the Island of Skye (Dr G. Collins in report by C. Wickham-Jones).

Mylonite is known to occur in several places on the Western Isles, and there is a small outcrop a few kilometres north of Calanais (Fettes et al. 1992, 113). More substantial outcrops occur along the Outer Hebrides Thrust Zone, which runs along the east-coast of the Western Isles, from the northern tip of Lewis to the southern tip of Barra (Smith & Fettes 1979, 78).

With its characteristic appearance, the mylonite may have been selected for non-utilitarian, symbolic reasons, but having been modified into tool types such as arrowheads, scrapers and knives (see below), the raw material was obviously much harder in its fresh state. In rock and mineral guides, mylonite, as well as hornfels, is often described as 'hard and flint-like' (Jensen 1973, 135). Table 17.1 shows that flint and mylonite were preferred for tools, with both of these raw materials having been selected for tool manufacture far more frequently (cf. tool ratios, below) than should have been expected from their proportion of the entire assemblage (Table 17.1).

17.3 The Assemblage

17.3.1 Definitions

The definitions of the main lithic categories are as follows:

Chips: All flakes and indeterminate fragments the greatest dimension (GD) of which 10 mm.

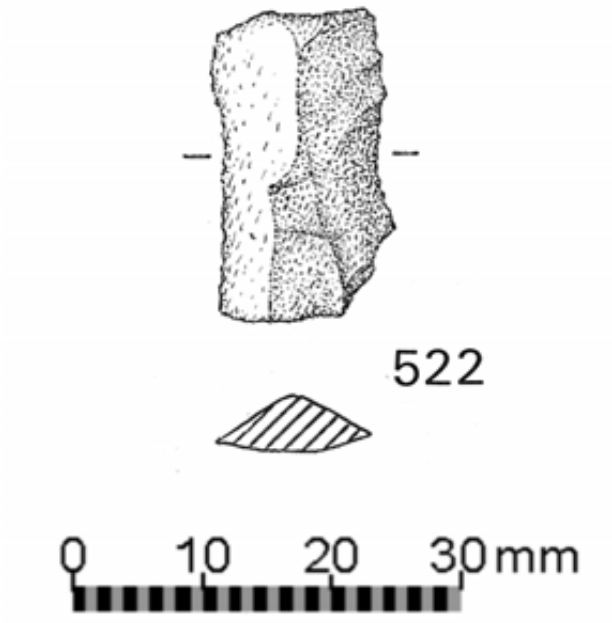
Flakes: All lithics with one identifiable ventral (positive/convex) surface, GD > 10 mm and L < 2W (L = length; W = width).

Indeterminate pieces: Worked lithics which cannot be unequivocally identified as either flakes or cores. Generally the problem of identification is due to irregular breaks, frost-shattering

or fire-crazing. Chunks are larger indeterminate pieces, and in, for example, the case of quartz, the problem may originate from a piece breaking along natural planes of weakness rather than breaking in the usual conchoidal way.

Blades and microblades: Flakes where L ^{3} 2W. In the case of blades W > 8 mm; in the case of microblades W £ 8 mm. In Southern Scandinavia microblades are defined as pieces narrower than 10 mm, in Norway as pieces narrower than 8 mm; this difference is due to different raw-material situations, and the blades of Norway are generally much smaller than in Southern Scandinavia. As the blades in Scotland have similar sizes as the Norwegian blades, I recommend adopting the 8 mm definition (cf. Wickham-Jones: Rhum: Mesolithic and Later Sites at Kinloch, Soc Ant Scot Monograph 7, 1990, p 73).

Cores: Artefacts with only dorsal (negative/concave) surfaces – if three or more flakes have been detached, the piece is a core; if fewer than three flakes have been detached, the piece is a worked nodule.



Illus 17.1 Medial fragment of quartz macroblade

Tools: Artefacts with secondary retouch (modification).

17.3.2 Composition of the lithic assemblage

The composition of the lithic assemblage from Calanais is shown as table 17.2.

17.3.3 Debitage

During the excavations at Calanais 274 pieces of lithic debitage were recovered. Seventeen pieces were chips, 123 flakes, 131 indeterminate pieces and chunks, two macroblades and one microblade (table 17.2).

The very low number of chips is probably mainly a result of the retrieval policy, in casu, the lack of consistent sieving.

Table 17.3 illustrates that the raw materials quartz, flint and mylonite are distributed differently in the three main debitage categories, chips, flakes and indeterminate pieces. For the categories chips and flakes the proportions flint and mylonite are quite similar, with quartz representing a share of c. 50-70%, flint c. 20-35%, and mylonite c. 10-11%. In the case of indeterminate pieces the proportion of quartz is c. 90%. The cause of this difference in proportions is probably mainly due to two factors, namely: 1) the raw materials representing different activity patterns, with some primary knapping of quartz taking place on-site and very little primary knapping of flint and mylonite (cf. numbers of debitage, cores and tool ratio, below), and 2) differences in flaking abilities, with flint and mylonite flaking in the classic conchoidal fashion and quartz flaking much more irregularly and to some extent along internal planes of weakness; even if all three raw materials had been involved in primary knapping, reduction of quartz would still result in considerably higher numbers of indeterminate pieces (chunks). Note, however, that most of the indeterminate pieces of mylonite have been deemed indeterminate due to their weathered state; they are probably all weathered flakes.

No judgement can be passed on the mylonite blade due to its weathered state, but it is highly unlikely that the quartz blade and the flint microblade represent systematic blade production.

Table 17.2 Lithics. General artefact list

Debitage		
	Chips	17
	Flakes	123
	Indeterminate fragments/ chunks	131
	Blades	2
	Microblades	1
	Total debitage	274
Cores		
	Single-platform cores	4
	Bipolar cores	4
	Core fragments	2
	Total cores	10
Tools		
	Barbed-and-tanged arrowheads	6
	Short end-scrapers	12
	Double-scrapers	1
	Side-scrapers	3
	Pieces with edge-retouch	6
	Pieces with bifacial retouch	2
	Total tools	30
Total		**314**

The quartz blade only makes up approximately 1% of all quartz flakes, and the flint microblade was produced applying bipolar technique; as discussed at length elsewhere (Ballin 1999), systematic microblade production cannot be based on this technique.

Analyses of quartz assemblages frequently include a distinction between primary, secondary and tertiary or inner flakes (i.e. flakes with more, less or no cortex), with the aim to find out whether the initial stages of primary production (decortication) took place on-site. This procedure has not been undertaken in connection with the analysis of the Calanais lithics, and it cannot be recommended as a general approach. The main reason for this is the fact that some raw materials, such as quarried pitchstone, vein quartz, and mylonite have no cortex at all, and in other cases (nodules and pebbles) the proportion of cortex per inner volume varies with nodule or pebble size. To demonstrate this, table 17.4 was produced.

Table 17.4 shows that when cubic nodules double in length their surface area increases by a factor of four and their inner volume by a factor of eight; thus the amount of inner material doubles in relation to the area of cortex (cf. V:S ratio, table 17.4).

This fact is rarely, if ever, taken into consideration in connection with this type of analysis. The conclusion must be that comparison of numbers of primary, secondary and tertiary flakes at different sites must take nodule sizes into account. It should also be noted that comparisons should restrict themselves to limited geographical regions and sites with the same raw material basis (same raw materials and same nodule sizes).

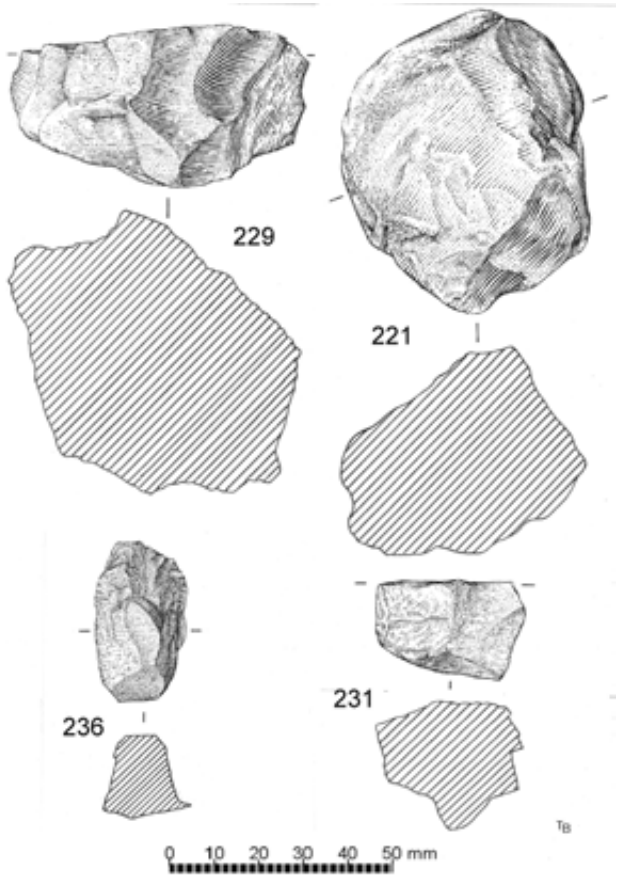
Length, cm Surface, cm2 ('cortex') V o l u m e , cm3 ('inner material') Ratio S:V

17.3.4 Cores

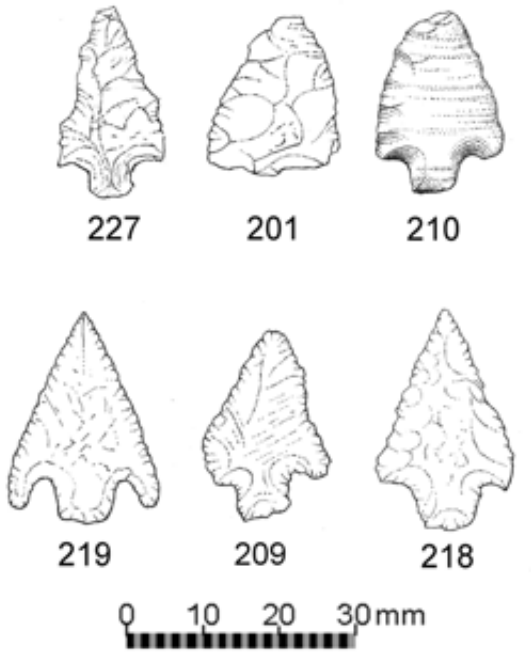
Only nine cores were found at Calanais, three of which are single-platform cores, four are bipolar cores and two are core fragments (table 17.5). Apart from one core fragment in flint, all cores are in quartz.

The single-platform cores (average dimensions: 41 x 49 x 45 mm) form a heterogeneous group, varying considerably in size (platform-apex 68-22 mm) and degree of preparation. Two cores are relatively squat and have no platform preparation or crests (CAT 230, 231 (Illus 17.2)), and two have trimmed platform-edges and two or three relatively simple crests (CAT 203, 229 (Illus 17.2)). The largest of the four single-platform cores is missing part of its platform-edge, and it is possible that this artefact is a large, coarse end-scraper. No platform rejuvenation flakes or crested blades / flakes were retrieved.

The bipolar cores (av. dim.: 47 x 36 x 27 mm) of Calanais are as heterogeneous as the platform cores. They differ in size (terminal-terminal 72-20 mm) as well as in reduction stage, with the smallest core (CAT 228) having been totally exhausted and the largest (CAT 221 Illus 17.2)) having been abandoned in the initial stages of production due to irregular flaking (this core is possibly in quartzite [examined by Dr Hall]). One bipolar core (CAT 215) has preserved part of a trimmed platform-edge and a typical zigzag-shaped crest



Illus 17.2 Quartz cores: 229 and 231 single-platform and 221 and 236 bipolar



Illus 17.3 Arrowheads, all quartz except 210 which is mylonite

Table 17.3 Lithic assemblage: debitage

Tools																	
Barbed-and-tanged arrowheads, quartz	1					1			2	1							5
Barbed-and-tanged arrowheads, mylonite						1											1
Short end-scrapers, flint		1		1				1									3
Short end-scrapers, quartz										1		1			1		3
Short end-scrapers, mylonite						1	1	1	1	1			1				6
Double-scrapers, flint					1												1
Side-scrapers, flint																1	1
Side-scrapers, quartz										1							1
Side-scrapers, mylonite										1							1
Pieces with edge-retouch, flint		1	1													1	3
Pieces with edge-retouch, quartz				1										1		1	3
Pieces with bifacial retouch, flint										1							1
Pieces with bifacial retouch, mylonite		1															1
Total	**1**	**3**	**1**	**2**	**1**	**3**	**1**	**2**	**3**	**6**		**1**	**1**	**1**	**1**	**3**	**30**
Grand total	3	3	1	2	1	3	1	4	3	8	3	1	1	1	1	4	40

Table 17.4 Examples of changing Surface:Volume ratios with growing nodule sizes. For simplicity's sake the nodules of the examples are cubic

1	6	1	6:1
2	24	8	3:1
4	96	64	1.5:1
8	384	512	0.75:1

Table 17.6 The percentage distribution of quartz, flint and mylonite (flakes, cores and tools from known contexts) in trenches B, D and H.

	B	D	H	Total
Quartz	26	51	23	100
Flint	48	42	10	100
Mylonite	86	14	0	100

Table 17.5 Lithic assemblage: cores

	B	BI	BIS	BIW	BII	BIII	BIV	BV	BVS	DI	DII	DIV	DV	E	F	H	TTL
Cores																	
Single-platform cores, quartz	1										3						4
Bipolar cores, quartz/quartzite								1		2						1	4
Core fragments, flint	1																1
Core fragments, quartz								1									1
Total	2							2		2	3					1	10

demonstrating that in this case the bipolar technique was applied to exhaust an abandoned platform core. Both core fragments (Av. dim.: 32 x 30 x 21 mm) have remaining trimmed platforms. The core fragment in flint (CAT 202) has one remaining platform, but disintegrated due to thermal action (probably frost). The core fragment in quartz (CAT 213) has two remaining platforms perpendicular to each other. It was probably split due to bipolar reduction of the original core.

17.3.5 Tools

The assemblage contains 30 tools, 16 of which are scrapers, six are arrowheads and eight are retouched pieces (table 17.5). Twelve tools are in quartz, nine are in flint and nine are in mylonite; the mylonite tools are all weathered, in most cases heavily so. The general tool ratio is 11%; for quartz it is 5%, for flint 20%, and for mylonite 27%.

The arrowheads from Calanais are all barbed-and-tanged arrowheads. (Illus 17.3) The majority, five pieces, are in fine homogenous quartz, and one (CAT 210) is in mylonite. All the arrowheads belong to Green's Sutton type (small miscellaneous), with two being of sub-type Sutton A (with no or vestigial barbs; CAT 218, 227) and four being of sub-type B (with 'unshaped' barbs; CAT 201, 209, 210, 219) (Green 1980, 45ff, 117ff). They are all of approximately the same size (av. dim.: 25 x 17 x 5 mm), but one has a slightly different L:B ratio: where most of the arrowheads are approximately 50% longer than they are wide, CAT 227 is c. twice as long as it is wide. Two arrowheads have the outermost tip broken off, two have one barb broken off, and one has the tang broken off.

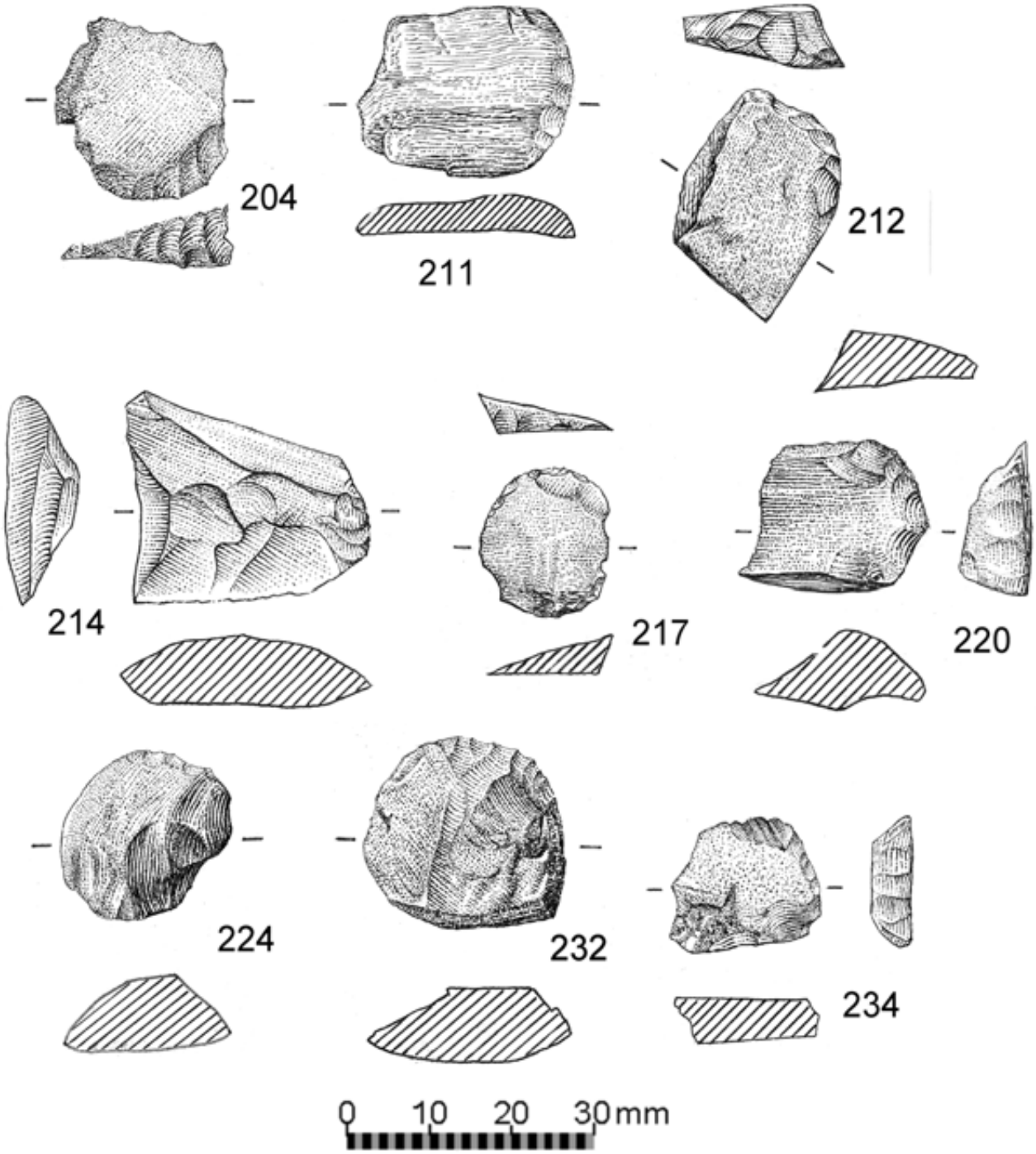
All six arrowheads have both faces shaped by invasive retouch, but the retouch varies in extent and quality. The aesthetically finest point, CAT 219, has a regular, finely denticulated outline and long barbs, and it is relatively flat (W:T ratio: c. 4). The other points are all somewhat less well shaped with slightly irregular outlines and vestigial or short barbs, and they are considerably thicker (W:T ratio: 3.4-2.3). The knappers of Calanais apparently found it difficult to thin the quartz arrowhead blanks, probably due to the flaking qualities of the material.

Sixteen scrapers were retrieved: twelve short end-scrapers, one double-scraper, and three side-scrapers. The scraper group is dominated by seven mylonite scrapers, with five scrapers being in flint and four in quartz.

The short end-scrapers are approximately of thumbnail size (av. dim.: 22 x 20 x 8 x mm), and six are in mylonite (CAT 211, 212, 214, 220, 224, 232 (Illus 17.4)), three in flint (CAT 204 (Illus 17.4), 207, 217 (Illus 17.4)) and three in quartz (CAT 225, 234 (Illus 17.4), 239). The scraper-edges are generally convex, steep and well-shaped, probably by pressure-flaking, and the scrapers have no shoulders where edge and lateral sides meet. Only two short end-scrapers have slightly irregular outlines, CAT 214 (Illus 17.4) and 225. They both have acute scraper-edge angles and come from the area BIV/BV. In the cases where the reduction technique can be determined, flint scrapers are usually manufactured in bipolar technique and mylonite scrapers in direct, hard-hammer platform technique; one of the quartz scrapers was made in direct hard-hammer technique, the technique of the other quartz scrapers cannot be determined. The scraper-edges of the short end-scrapers are mostly at the distal end, but two scrapers have the working-edge at the proximal end.

The flint double-scraper (CAT 208 Illus 17.5) is somewhat larger than most of the short end-scrapers (27 x 29 x 9 mm). It has a steep, convex edge at either end, with the proximal working-edge being relatively short and inverse, and the distal working-edge being somewhat broader and normal; the distal scraper-edge is splayed and displays prominent shoulders where edge and lateral sides meet. This scraper has a prominent bulb-of-percussion at the proximal end, and along the right lateral side, ventral face, it has been thinned by invasive retouch. Both edges have overhanging areas demonstrating that the piece has been used. The corner between the proximal edge and the right lateral side is heavily abraded which suggests hafting; thinning by invasive retouch may have been carried out to make the piece fit into a haft.

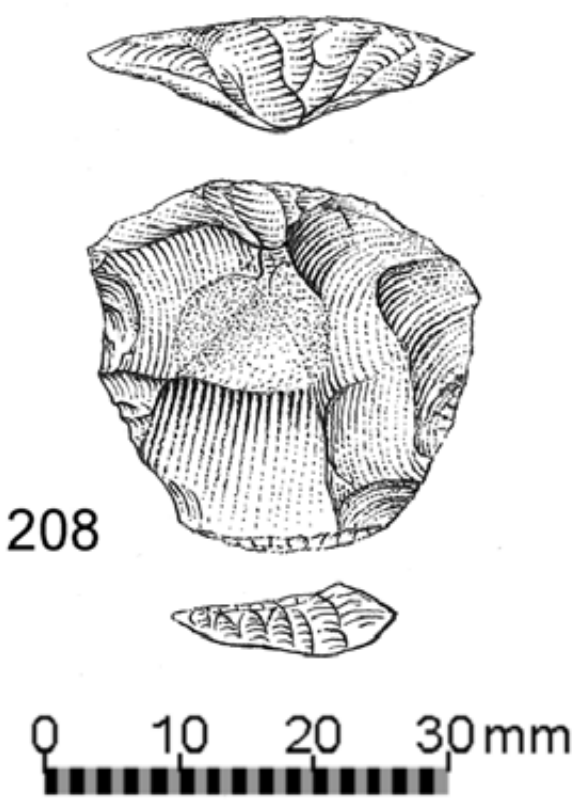
The three side-scrapers form a heterogeneous group, with individual shapes and sizes, and with one being in flint (CAT 235 (Illus 17.6), one in quartz (CAT 226) and one in mylonite (CAT 222



Illus 17.4 Short end scrapers all mylonite except 204 and 217 which are flint

(Illus 17.6). The flint scraper is small (23 x 14 x 7 mm) and on a bipolar flake; it has a slightly convex edge along its right lateral side. The pieces in quartz (33 x 26 x 16 mm) and mylonite (37 x 25 x 16 mm) are both on irregular broad hard-hammer flakes with sporadically retouched edges. The mylonite scraper has the working-edge at its broad distal end, and the quartz scraper has its working-edge at its broad proximal end; it is possible that the 'retouch' of the quartz piece is in fact platform-edge trimming thus disqualifying it as a tool.

Retouched pieces: This artefact group consists of six pieces with edge-retouch (three in flint and three in quartz) and two pieces with bifacial



Illus 17.5 Flint double-scraper

retouch (one in flint and one in mylonite). The pieces with edge-retouch form a very heterogeneous group and differ considerably in size and shape. Two pieces are relatively intact with one missing the proximal end, the other the distal end.

One of these pieces (CAT 233 (Illus 17.7)) is in homogeneous, pure quartz (34 x 24 x 8 mm), and it has along its left lateral side a regular, flat retouch.

The other piece (CAT 205 (Illus 17.8)) is in flint (40 x 20 x 5 mm), and it has a steep retouch along its left concave side and a flat retouch along its right straight side. Most probably the flat retouch of both pieces forms cutting edges, which is supported by flat, ventral use-wear. The other four pieces with edge-retouch are small fragments of tools of unknown function.

Of the two pieces with bifacial retouch, the mylonite artefact (CAT 216 (Illus 17.9)) is most likely a broken rough-out for an arrowhead (26 x 18 x 8 mm), and the flint artefact (CAT 223) is probably a small flake struck off a finished arrowhead (17 x 5 x 3 mm). It is not possible to determine the typology of the complete arrowheads (leaf-shaped, lop-sided, or barbed-and-tanged?).

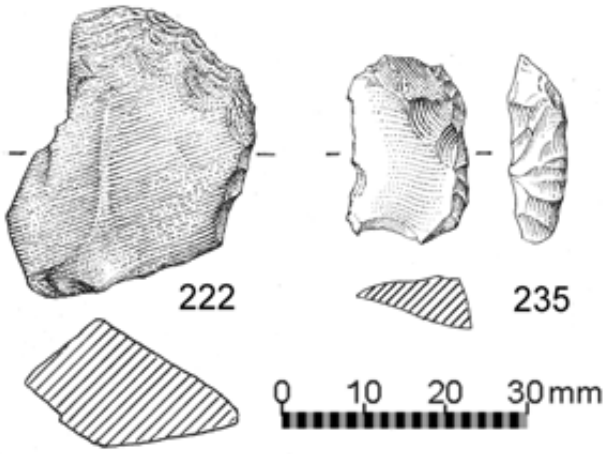
Table 17.6 Lithic assemblage: tools

17.4 Technology

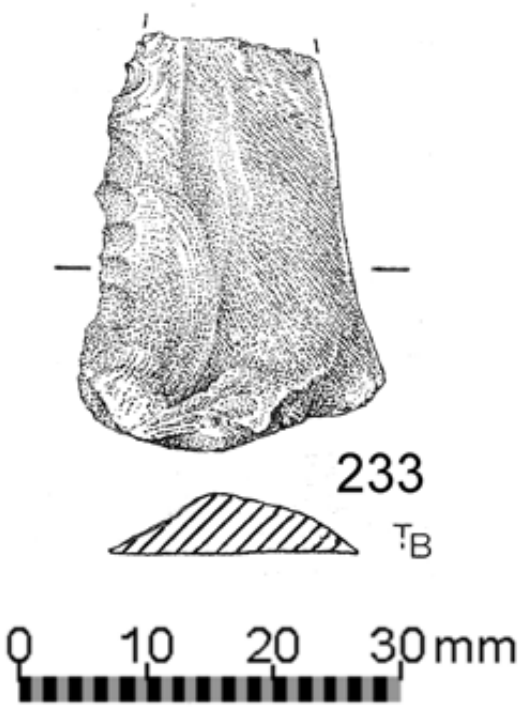
The lithic assemblage from Calanais is, with 314 pieces, very small, especially considering the fact that the report deals with three sub-assemblages – quartz (234 pieces), flint (45 pieces) and mylonite (34 pieces). This, obviously, makes it impossible to obtain statistically reliable samples of, for example, cores and flakes. However, the technological 'signals' from the three sub-assemblages are consistent enough to allow some conclusions (see description of artefacts above).

17.4.1 Quartz

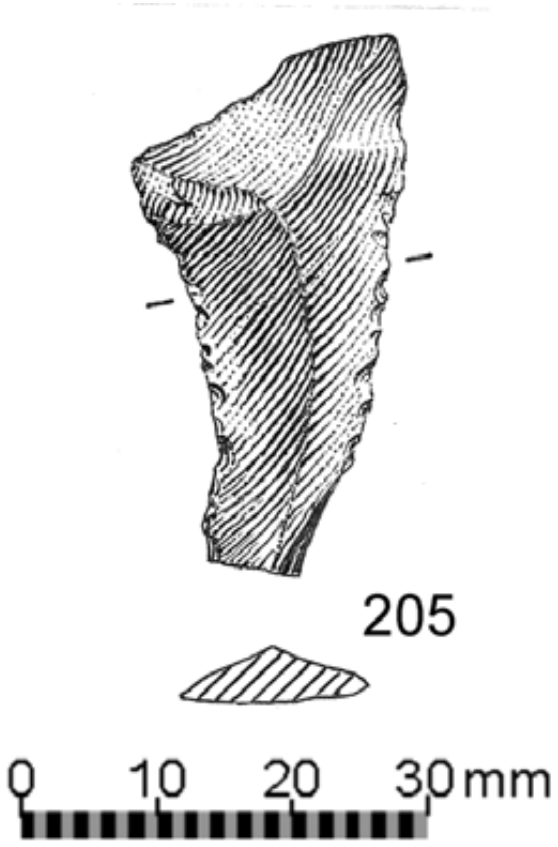
Based on the quartz cores and flakes from the site it is apparent, that the quartz technology at Calanais is a platform technology which aimed at the production of flakes. After collection of vein quartz at a (probably nearby) source, cores were prepared by shaping of (usually) one platform and two to three crests or guiding ridges. Then production of flakes was initiated by detaching one of the crests. When the platform core was exhausted, production would usually be continued by application of bipolar technique until the core was



Illus 17.6 Side scrapers, 222 in mylonite, 235 in flint



Illus 17.7 Retouched quartz piece



Illus 17.8 Retouched flint platform flake

finally abandoned. On rare occasions, production would be initiated on unprepared nodules using bipolar technique. No preparation flakes (platform rejuvenation flakes and crested flakes) were found, but this is most likely due to the small size of the assemblage. For a more detailed description of this approach to production of quartz flakes, see Ballin (forthcoming c).

17.4.2 Flint

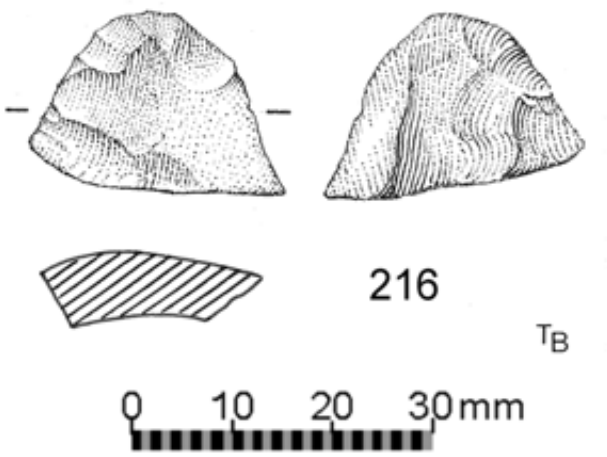
Even though a few flakes and tools show evidence of hard-hammer platform technique (supported by a core fragment with a trimmed platform-edge), it is obvious from examination of the sub-assemblage, that flint was usually reduced by using bipolar technique. This is probably a result of the small sizes of the collected beach pebbles, as nodules with dimensions of 4-6 cm cannot be decorticated without wasting too much of a rare and precious material (see for example Finlayson 2000, 105). Instead production would be initiated by splitting nodules using hammer-and-anvil, that is, bipolar technique (for a discussion of bipolar technology, see Ballin 1999). This approach, and the small sizes of the nodules, resulted in a high number of flakes with cortex; of all unmodified flakes, approximately two thirds have some degree of cortex-cover on the dorsal face.

17.4.3 Mylonite

Most mylonite pieces are heavily weathered, but the least weathered flakes and tools clearly demonstrate that the Calanais mylonite was worked using hard-hammer platform technique. There are no cores in the assemblage. The choice of technique in the case of mylonite is probably partly due to this raw material being quarried as larger blocks allowing the necessary preparation of platform cores.

17.5 Spatial Distribution

Tables 17.3 and 17.5 show that 83% of all lithics from the site is from the trenches B/B1, BV, D/DI, DIV and H. The remaining 17% are scattered on trenches further away from the cairn, including



Illus 17.9 Mylonite rough-out with bifacial retouch

A, C, E and F. In summary, most of the artefacts are from the chambered cairn and an area up to two meters from its kerbstones, with very few artefacts having been found in trenches BII/III and DII/III.

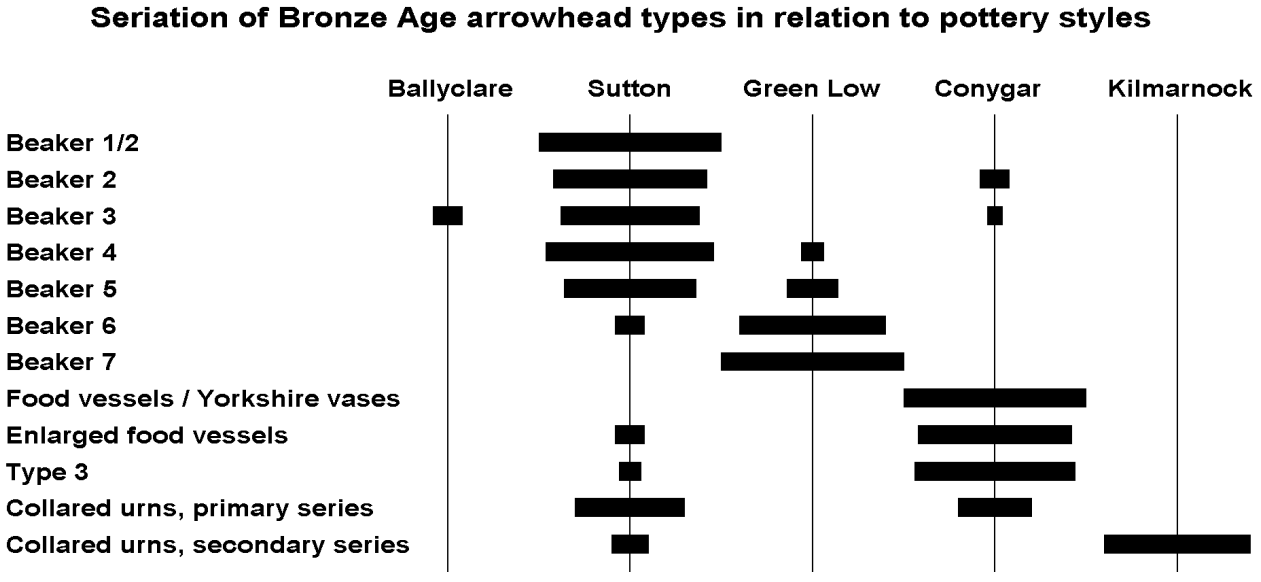
17.5.1 Raw material

An examination was carried out on the spatial distribution of flakes, cores and tools from known contexts in the main trenches B, D and H. This revealed some interesting trends (table 17.6).

The quartz is heavily concentrated on trench D (WSW of the tomb). Approximately half of the sample was found here with c. one quarter in trench B (E of the tomb) and one quarter in trench H (the walls and the chamber of the tomb). The flint was roughly equally distributed on trenches B and D with a minor proportion in trench H (10%). Almost all mylonite was recovered in trench B with a fraction of the sub-assemblage found in trench D (14%) – no mylonite from the sample was found in trench H.

An examination of the contexts of the sampled artefacts demonstrated that most of the flint and mylonite was relatively late, that is, associated with Beaker contexts (Contexts 141, 810, 315), the half-oval structure (Contexts 142, 183) or contexts from the cairn (Context 318.III) or immediately under it (Contexts 362, 370). The earliest pieces of flint and mylonite are one piece of flint associated with the cultivation rigs (Context 348), and one piece of mylonite stratigraphically dating it to the interval between the construction of Ring Stone 47 and the later ploughing (Context 340).

Some quartz was recovered from late contexts (Beaker layers), but generally the quartz tended to come from context in the chamber wall (Context 769) or from the outer cairn mass (Contexts 318.I, 318.III, 712, 732, 747, 770). These pieces of quartz may also be of Beaker date because there was a securely stratified early beaker sherd in the cairn mass. Some quartz came from under the cairn (Contexts 362, 398), and some from upcast



Illus 17.10 Seriation of B-A-T sub-types in relation to pottery styles

from the construction of the Ring Stones or the Monolith (Context 375). Compared with the flint and mylonite, a larger proportion of the quartz was contemporary with, or earlier than, the cairn.

17.5.2 Cores and tools

Most of the cores and tools (four cores [CAT 202, 203, 213, 215], three arrowheads [CAT 201, 209, 219], seven scrapers [CAT 204, 207, 208, 212, 217, 220, 235], and one piece with bifacial retouch [CAT 216]) are from late contexts (Beaker or modern) immediately E of the chamber passage (Contexts 107/100, 112, 113, 134, 141, 160, 708, 810, 813, 837). Some of these pieces may represent clearing of the cairn, but it is possible that others derive from shallow feature 894, which has been interpreted as a disturbed crouched burial (see Chapter 7 Part 6).

One arrowhead (CAT 227), and one bipolar core (CAT 236) are from disturbed and undisturbed cairn contexts respectively (Contexts 318.I, 732), and two scrapers (CAT 232, 239) are from pre-cairn contexts (Context 340, 362). Five cores (CAT 221, 228, 229, 230, 231), four scrapers (CAT 222, 224, 225, 226) and one piece with bifacial retouch (CAT 223) were recovered from the area WSW of the cairn (backfill and the late Contexts 315, 336, 385) and may represent clearance material or post cairn activities. From contexts associated with the second stage (earthen) enclosure (Contexts 142, 818) came arrowheads (CAT 209, 210) and scrapers (CAT 211, 214). The remaining tools were retrieved in trenches E and F.

17.5.3 Burnt lithics

Approximately one third of all lithic finds are burnt (80 pieces of quartz and 8 pieces of flint). Burnt pieces come from all layers – from pre-Stone Circle and post-Stone Circle contexts as well as pre-cairn, cairn and post-cairn (Beaker) contexts. At the horizontal level, burnt lithics were recovered from trench B (the area E of the cairn), trench D (the area WSW of the cairn) and trench H (the cairn) as well as trenches E and F. In each sub-trench (BI, BII, etc.) 33% ± 10% of the lithic artefacts are fire-crazed; only trench H differs from the general trend with a burning ratio of c. 80%. In an attempt to explain this ratio, the contexts of the burned material from trench H were examined.

No single explanation was found, with an equal amount of burnt material being from post-cairn and cairn/pre-cairn contexts. It cannot be ruled out that some of the quartz may have been scattered across the cairn in connection with the burial ritual, but the amount of quartz recovered from the Calanais cairn (234 pieces) is negligible compared to that recovered from the neighbouring Olcote cairn (15,098 pieces of quartz; Neighbour 2005), and this does not seem like a plausible interpretation.

17.6 Diagnostic types, dating and technological attributes

As discussed in Ballin (forthcoming b) there are different degrees of diagnosticity, and unfortunately the diagnostic types and technological attributes displayed in the Calanais lithic assemblage are only diagnostic in the broadest sense.

Typologically, the most significant type in the assemblage is the barbed-and-tanged arrowhead (B-a-T). There are six arrowheads of this type, all of which belong to Green's sub-types Sutton A and B (Green 1980, 45ff, 117ff). The B-a-T arrowhead as a general type belongs to the Early Bronze Age, with the five B-a-T sub-types (Sutton, Ballyclare, Green Low, Conygar and Kilmarnock) varying in diagnostic value. To demonstrate this, Illus 17.10 was produced, based on Green's tables VI.8, VI.11 and VI.13 (associations of B-a-T sub-types with Beaker steps, Food Vessel types and Series of Collared Urns).

The Ballyclare type is mainly Irish but does appear in the British highland provinces (mainly Wales and Scotland; for example, at Bayanne, Shetland, Ballin forthcoming c). Associations with diagnostic bronze artefacts prove that this type is as ubiquitous as the Sutton type, and the Ballyclare and Sutton types can be defined as large and small variants of the same morphological type. The Sutton and Conygar types are found all over Britain, whereas the Green Low type is English/Welsh and the Kilmarnock type Scottish (for type

definitions, see Green 1980, 45ff, 117ff). Green's Conygar arrowheads associated with Beaker Steps 2 and 3 are crude and atypical specimens.

As illus 17.10 demonstrates, the Sutton type is clearly the least diagnostic of the B-a-T sub-types, but even though it is a well-known archaeological fact that absence of evidence is not evidence of absence, the total dominance of the Calanais arrowhead assemblage by Sutton points suggests a date in the earlier part of the Early Bronze Age. This is supported by the lack of Food Vessels and Urns and the dominance of the Beaker pottery by early Beaker styles. The small thumbnail scrapers and the knives with an edge formed by acute retouch can be assigned to fourth and third millennia BC at large.

Technologically there are few chronological indicators in the assemblage. There are no true blades or microblades present, suggesting a third millennium date. A general third millennium date is also supported by the occurrence of invasive retouch on not only the barbed-and-tanged arrowheads, but also on some scrapers and knives.

17.7 Stratigraphy (vertical and horizontal)

As described in Part 17.5, horizontally, quartz, flint and mylonite were distributed slightly differently, with quartz found mainly in trench D and to a lesser extent trenches B and H, flint was concentrated evenly on trenches B and D, and mylonite was more or less restricted to trench B. This suggests that the different raw-materials represent either different activities or separate episodes or both. An analysis of the three raw-materials' distribution by context shows that all raw-materials are present from bottom to top, but with quartz tending to be earlier and flint and mylonite later.

Examination of the cores and tools and their contexts showed that generally no types were significantly associated with specific areas or layers or discriminating other types. The B-a-T arrowheads, the most diagnostic type present in the assemblage, came from several different stratigraphic levels. One arrowhead was recovered from disturbed layers of the cairn (CAT 227); two were associated with the second stage (earthen) enclosure (CAT 209, 210); two are thought to have formed part of a disturbed crouched burial (CAT 218, 219); and one was found in the backfill (CAT 201).

With approximately one third of the lithics from all contexts having been burnt, the burnt material cannot be connected to any one event at any particular time. Instead, it suggests that burning of lithics took place throughout the period of deposition, and that most of the lithics (particularly the quartz debitage) may be settlement material from a time before the construction of the first ritual structures on the site, or from nearby settlements contemporary with or later than these structures (cf. report on the lithics from Rosinish, Benbecula, where approximately 38 % of the quartz assemblage was burnt; Ballin forthcoming a).

17.8 Conclusion

The lithic assemblage from Calanais is relatively small. It contains 314 pieces, most of which is quartz (74%) supplemented by some flint (14%) and mylonite (11%). The quartz and flint is probably local, with the quartz being quarried vein quartz, and the flint having been collected as small pebbles at a nearby beach. The mylonite (some of which may be hornfels) may be either from local sources on Lewis (most likely), or from Skye.

The assemblage comprised 274 pieces of debitage, ten cores and 30 tools. The cores are single-platform cores (quartz) and bipolar cores (quartz and flint), and the tool group is dominated by barbed-and-tanged arrowheads (Sutton) and thumbnail scrapers. Five of the site's six arrowheads are in quartz, with one being in mylonite, whereas the scrapers are in all three raw materials. The quartz and mylonite sub-assemblages were produced applying platform technique with the flint material manufactured mainly in bipolar technique.

Almost all the lithic artefacts were recovered from within an area of up to two meters from the cairn. Approximately half the quartz came from trench D, with the remaining quartz material being evenly distributed on trenches B and H. The flint artefacts were evenly distributed on trenches B and D, and the mylonite came almost exclusively from trench B. Quartz, flint and mylonite was found at all stratigraphic levels, but with a major part of the quartz being early, and most of the flint and my-

lonite being late. Cores and tools as well as burnt lithics appeared at all levels, that is, contexts from before the Stone Circle till after the cairn. The only truly diagnostic lithic artefacts in the assemblage are the six barbed-and-tanged arrowheads. B-a-T arrowheads belong to the Early Bronze Age, and the fact that all arrowheads in the Calanais assemblage are of Green's Sutton type suggests that they are from the Beaker period (see illus 17.10). One arrowhead was found in disturbed levels of the cairn; two were associated with the earthen enclosure; and two may have formed part of a disturbed inhumation burial, from which a Beaker sherd was retrieved. One arrowhead was recovered from backfill. In general, the stratigraphic evidence supports the typological dating of the arrowheads to the Early Bronze Age period.

Calanais is a highly complicated site with structures and finds representing activities in the fourth millennium BC (pre-Stone Circle cultivation), the first half of the third millennium (Stone Circle and cairn), and the later third and earlier second millennia (secondary burials, clearing-out of the cairn chamber, and cultivation). Ploughing may have continued into the second half of the second millennium BC. Due to the complicated stratigraphy of the site, it is not possible to prove absolute contemporaneity of any two artefacts, although some are so stylistically similar that contemporaneity is likely (for example, the quartz arrowheads from the area east of the cairn). Probably most of the quartz artefacts represent settlement material (earlier, contemporary with and later than the structures), whereas a proportion of the tools (quartz, flint and mylonite arrowheads and scrapers) may represent activities associated with the structures (probably mainly the cairn and secondary burials).

17.9 The Catalogue

17.9.1 Introduction

The catalogue below includes all lithic artefacts recovered in connection with the 1980-81 excavations at Calanais. The general structure of the catalogue is tripartite, embracing:

1. debitage;

2. cores;

3. tools.

To increase the use-value of the catalogue, the debitage has been sorted by:

iv. area;

v. context; and

vi. year of recovery and original small find number.

Cores and tools have been sorted typologically.

17.9.2 Debitage

CAT No	Old SF No	Area	Context	Chips	Flakes	Indet pieces	Total debitage	Of which burnt	Comments
1	1980/205	A	2			1 quartz	1		
5	1980/189	B	108		1 mylonite		1		Macroblade.
6	1981/142	B	141		1 quartz		1		Original finds book says site BV S ext.
167	1981/522	B	141		1 quartz		1		Medial fragment of macroblade.
160	1981/523	B	141		1 mylonite		1		Geological sample 1 - examined by Dr Allan Hall, University of Glasgow.
7	1981/526	B	141			3 quartz	3		
8	1981/588	B	813			1 quartz	1		
9	1981/495	B	889			1 quartz	1		
10	1981/610	B	889		1 igneous	3 quartz	4		Determined by Dr Collins (Ed. Univ.) to be a metabasic rock of Cleitichean type and it is very local to the site at Calanais.
11	1981/696	B	889		1 quartz		1		Very pure - almost rock crystal.
4	1981/637	B	107/100			1 quartz	1		
2	1981/504	B	Backfill		1 mylonite	2 mylonite	3		
3	1981/517	B	Backfill		6 quartz	5 quartz	11		
12	1981/507	BI	107		1 mylonite		1		The original finds book says site BI S ext.
13	1980/182	BI	117		1 flint		1		
14	1980/137	BI	149		1 quartz		1	1	N-S trench.
15	1981/180	BI	846		1 flint		1		The original finds book says 846 was in BIV, just south of the drainage ditch, which the discussion of related contexts confirms.
16	1981/609	BI	846		1 mylonite		1		
17	1981/091	BI S ext.	107		1 mylonite		1		

CAT No	Old SF No	Area	Context	Chips	Flakes	Indet pieces	Total debitage	Of which burnt	Comments
18	1981/467	BI S ext.	107		1 flint		1		
20	1981/630	BI W ext.	107		1 quartz		1		
21	1981/488	BI W ext.	855		1 quartz		1	1	
22	1981/599	BI W ext.	855			1 quartz	1		
23	1981/087	BII	117		4 quartz	2 quartz	6		
24	1981/525	BII	850/112			1 quartz	1		
161	1981/567	BIII	112		2 mylonite		2		Geological sample 2 - examined by Dr Allan Hall, University of Glasgow.
25	1981/568	BIII	112			1 quartz	1	1	
26	1981/622	BIII	141		1 quartz		1	1	
27	1980/134	BIII	142		1 mylonite		1		
28	1981/466	BIII	815	1 mylonite			1		
29	1980/224	BIV	139			1 mylonite	1		
30	1981/551	BIV	160			1 quartz	1		
31	1981/509	DIV	370		1 mylonite		1		Conflict between Area BIVand context number (which implies Area D) in original finds book; the entry is sandwiched between two for Area BIV/V.
32	1981/172	BV	810		1 flint		1		
33	1981/177	BV	810		1 flint		1	1	
34	1981/481	BV	810		1 flint		1		
35	1981/503	BV	810		1 mylonite		1		
36	1981/578	BV	810		1 quartz		1		
37	1981/579	BV	810		1 quartz	4 quartz	5	1	

CAT No	Old SF No	Area	Context	Chips	Flakes	Indet pieces	Total debitage	Of which burnt	Comments
38	1981/474	BV	837		1 flint		1		
39	1981/607	BV	837			2 mylonite	2		
40	1981/608	BV	837			1 myl / 3 qtz	4	1	
41	1981/483	BV S ext.	141		1 flint		1		
42	1981/502	BV S ext.	141			1 mylonite	1		
43	1981/510	BV S ext.	141		1 mylonite		1		
44	1981/576	BV S ext.	141			1 mylonite	1		
45	1981/577	BV S ext.	141		1 quartz	1 quartz	2		
46	1980/188	BV	160		1 flint		1		
47	1980/190	BV	160		1 quartz		1	1	
48	1981/506	BV S ext.	812		1 mylonite		1		
49	1981/144	BV S ext.	813		1 quartz		1	1	
50	1981/601	BV S ext.	815		1 quartz		1	1	
51	1981/569	BV	160			1 quartz	1	1	
52	1980/058	C	203/205		1 flint		1		
54	1981/470	DI	315		1 flint		1		
56	1981/472	DI	315			1 flint	1	1	
53	1981/482	DI	Backfill		1 flint		1		
59	1980/037	DI	308			1 quartz	1		
61	1980/073	DI	315			1 quartz	1	1	
62	1980/075	DI	315			1 flint	1		

CAT No	Old SF No	Area	Context	Chips	Flakes	Indet pieces	Total debitage	Of which burnt	Comments
63	1980/081	DI	315		1 quartz		1		
64	1980/082	DI	315			1 quartz	1		
65	1980/084	DI	315	2 quartz			2		
66	1980/089	DI	315		1 quartz		1		
67	1980/091	DI	315			1 quartz	1	1	
68	1980/095	DI	315			1 quartz	1	1	
69	1980/100	DI	315		1 flint		1		
70	1980/104	DI	315		1 quartz		1		
71	1980/122	DI	315			1 quartz	1		
72	1980/152	DI	315		1 flint		1		
60	1981/049	DI	315		6 quartz	6 quartz	12	7	
73	1981/287	DI	315		1 flint		1		Microblade, platform technique applied.
74	1981/288	DI	315			1 quartz	1		
55	1981/471	DI	315	1 flint			1		
75	1980/148	DI	318			1 quartz	1		
76	1980/149	DI	318			1 quartz	1		
77	1981/346	DI	318		1 quartz		1		
83	1981/550	DI	352			1 quartz	1		Cat orig had 325
81	1980/150	DI	326		1 quartz		1		
166	1980/187	DI	326			1 quartz	1		Main artefact list says 'Pottery'.
84	1980/146	DI	331			1 quartz	1		The original finds book says context 318 F331; 331 is in 318.

CAT No	Old SF No	Area	Context	Chips	Flakes	Indet pieces	Total debitage	Of which burnt	Comments
85	1980/147	DI	331		1 quartz		1		The original finds book says context 318 F331; 331 is in 318.
86	1981/511	DI	352			2 quartz	2	2	
87	1981/548	DI	353			1 quartz	1		
88	1981/478	DI	360	1 flint			1		
89	1981/585	DI	360			3 quartz	3		
90	1981/598	DI	361		1 quartz	1 quartz	2		
163	1981/258	DI	369		1 quartz		1	1	Geological sample 7 - examined by Dr Allan Hall, University of Glasgow.
91	1981/267	DI	369		1 quartz		1	1	
92	1981/532	DI	369			2 quartz	2	1	
93	1981/570	DI	369			2 quartz	2	2	
94	1981/672	DI	369	1 quartz			1	1	
95	1981/275	DI	374	1 flint			1		
96	1981/473	DI	374		1 flint		1		
97	1981/299	DI	376		1 quartz	1 quartz	2	1	
98	1981/528	DI	376		2 quartz		2		
99	1981/337	DI	388			1 quartz	1	1	
100	1981/552	DI	398		1 quartz		1	1	
101	1981/591	DI	398		1 quartz		1	1	
78	1980/066	DI	318.III		1 quartz	2 quartz	3	3	One piece used as geological sample 6 - examined by Dr Allan Hall, University of Glasgow.
79	1980/068	DI	318.III		1 flint		1	1	

CAT No	Old SF No	Area	Context	Chips	Flakes	Indet pieces	Total debitage	Of which burnt	Comments
80	1980/112	DI	321/2	1 quartz		1 quartz	2		
82	1980/194	DI	321/2		1 flint		1		
57	1981/515	DI	Backfill			1 quartz	1	1	
58	1981/593	DI	Backfill			5 quartz	5		
106	1980/023	DII	300			1 flint	1		
102	1981/590	DII	336		2 quartz		2	1	
103	1981/594	DII	336			1 quartz	1		
104	1981/073	DII	348		1 flint		1		
105	1981/545	DII	379			1 quartz	1		
162	1981/546	DII	379			1 mylonite	1		Geological sample 4 - examined by Dr Allan Hall, University of Glasgow.
108	1981/595	DIV	316			1 quartz	1		
109	1981/476	DIV	362		1 flint		1		
110	1981/555	DIV	362	1 flint	2 flint		3		
111	1981/556	DIV	362	1 quartz	5 quartz	9 quartz	15	3	
112	1981/557	DIV	362		1 quartz		1		
114	1981/559	DIV	362		1 quartz		1		
115	1981/560	DIV	362	1 flint			1	1	
116	1981/561	DIV	362	1 mylonite			1		
117	1981/562	DIV	362		1 quartz		1		
118	1981/563	DIV	362		2 quartz	12 quartz	14	3	
119	1981/581	DIV	362	2 quartz	4 quartz	2 quartz	8	1	
120	1981/583	DIV	362		1 quartz		1	1	

CAT No	Old SF No	Area	Context	Chips	Flakes	Indet pieces	Total debitage	Of which burnt	Comments
121	1981/477	DIV	370		1 flint		1		
122	1981/512	DIV	370		1 quartz		1	1	
123	1981/554	DIV	370			2 quartz	2	1	
124	1981/283	DIV	375		1 quartz	1 quartz	2	1	
125	1981/320	DIV	391	1 flint	1 quartz		2	1	
107	1981/596	DIV	Backfill		1 quartz	1 quartz	2		
126	1981/603	DV	300	1 quartz			1		
127	1981/580	DV	340		1 quartz	3 quartz	4		
128	1981/664	DV	359		1 quartz		1		
129	1981/319	DV	365			1 quartz	1	1	
130	1981/133	E	1103		1 quartz		1	1	
131	1981/132	E	1108			1 quartz	1	1	
132	1981/232	E	1108	1 quartz			1		
133	1981/293	E	1112		1 flint		1	1	
134	1980/217	F	611		1 quartz		1		
135	1980/218	F	611			5 quartz	5	1	The find 1980/218 includes CAT 234 (1980/218) Proximal fragment of short end-scraper
136	1980/021	FVII	611		1 flint		1		
137	1981/002	H	700		1 flint		1		
138	1981/574	H	700		1 quartz		1	1	
139	1981/575	H	700			1 quartz	1	1	
140	1981/521	H	707		1 quartz		1	1	

CAT No	Old SF No	Area	Context	Chips	Flakes	Indet pieces	Total debitage	Of which burnt	Comments
141	1981/597	H	708		3 quartz	2 quartz	5	5	
142	1981/589	H	712		1 quartz		1	1	
143	1981/107	H	725			1 quartz	1	1	
144	1981/079	H	728			1 mylonite	1		
145	1981/564	H	728			1 quartz	1	1	May be a single-platform core disfigured by burning.
146	1981/682	H	730		1 quartz		1		
147	1981/110	H	732		1 quartz		1	1	
148	1981/114	H	732		1 quartz		1	1	
149	1981/127	H	738			1 quartz	1	1	
150	1981/204	H	738			1 quartz	1	1	
151	1981/205	H	738		1 quartz		1	1	
152	1981/206	H	738		1 quartz		1		
153	1981/208	H	738			1 quartz	1	1	
164	1981/213	H	738			1 quartz	1	1	Original finds book says ‘Pot’.
154	1981/209	H	747		1 quartz		1	1	
165	1981/216	H	747		1 quartz		1	1	Original finds book says ‘Pot’.
156	1981/227	H	760		1 quartz		1		
157	1981/228	H	760		1 quartz		1		Contains some feldspar as well.
158	1981/669	H	769		1 quartz		1	1	
159	1981/329	H	770		1 quartz		1	1	
19							0		Discarded.
113							0		Discarded.
155							0		Discarded.

17.9.3 Cores

SINGLE-PLATFORM CORES

CAT 203 (1981/530) Rough-out for single-platform core, with platform and three crests. Quartz. L 68 mm, W 59 mm, Th 42 mm. Area B, Context 160.

CAT 229 (1981/565) Single-platform core, with trimmed platform-edge. Quartz, burnt. L 39 mm, W 39 mm, Th 29 mm. Area DII, backfill.

CAT 230 (1981/565) Fragmented single-platform core, no apparent edge-trimming, may be coarse end-scraper. Quartz, burnt. L 35 mm, W 64 mm, Th 78 mm. Area DII, backfill.

CAT 231 (1981/590) Single-platform core, with trimmed platform-edge. Quartz, burnt. L 22 mm, W 33 mm, Th 29 mm. Area DII, Context 336.

BIPOLAR CORES

CAT 215 (1981/579) Bipolar core on abandoned platform core, with trimmed platform-edge and typical zigzag-shaped crest. Quartz. L 57 mm, W 50 mm, Th 35 mm. Area BV, Context 810.

CAT 221 (1981/593) Bipolar core, probably abandoned in the initial stages due to irregular flaking. Quartzite. L 72 mm, W 55 mm, Th 43 mm. Area DI, backfill.

CAT 228 (1981/260) Bipolar core, totally exhausted. Quartz, burnt. L 20 mm, W 17 mm, Th 11 mm. Area DI, Context 385.

CAT 236 (1981/103) Bipolar core. Quartz, burnt. L 38 mm, W 20 mm, Th 18 mm. Area H, Context 732.

CORE FRAGMENTS

CAT 202 (1981/641) Core fragment with a trimmed platform-edge. Flint. L 28 mm, W 18 mm, Th 12 mm. Area B, Context 100/107.

CAT 213 (1981/553) Core fragment with a trimmed platform-edge. Quartz. L 35 mm, W 41 mm, Th 30 mm. Area BV, Context 160.

17.9.4 Tools

ARROWHEADS

CAT 201 (1981/513) Barbed-and-tanged arrowhead, probably of Green's type Sutton B. Tang and barbs broken off. Quartz. L 21 mm, W 17 mm, Th 5 mm. Area B, backfill.

CAT 209 (1980/135) Barbed-and-tanged arrowhead, Green's type Sutton B. One barb broken off. Quartz. L 25 mm, W 17 mm, Th 4 mm. Area BIII, Context 142.

CAT 210 (1981/188) Barbed-and-tanged arrowhead, Green's type Sutton B. Mylonite, heavily weathered. L 24 mm, W 17 mm, Th 5 mm. Area BIII, Context 818.

CAT 218 (1981/136) Barbed-and-tanged arrowhead, Green's type Sutton A. Quartz. L 29 mm, W 18 mm, Th 6 mm. Area BV S ext, Context 141.

CAT 219 (1981/138) Barbed-and-tanged arrowhead, Green's type Sutton B. Slightly denticulated edges. Quartz. L 28 mm, W 20 mm, Th 5 mm. Area BV S ext, Context 141.

CAT 227 (1980/049) Barbed-and-tanged arrowhead, Green's type Sutton A. Quartz. L 25 mm, W 14 mm, Th 6 mm. Area DI, Context 318.I.

SCRAPERS

CAT 204 (1980/051) Short end-scraper on bipolar flake. Flint. L 22 mm, W 22 mm, Th 8 mm. Area BI, Context 100/107.

CAT 207 (1981/469) Left lateral fragment of short end-scraper on platform flake. Flint, burnt. L 15 mm, W 10 mm, Th 6 mm. Area BI W ext., Context 113.

CAT 208 (1981/068) Double scraper on platform flake, with slightly splayed edge at the distal end and some abrasion of the proximal right corner (hafting?). Flint. L 27 mm, W 29 mm, Th 9 mm. Area BII, Context 112.

CAT 211 (1981/466) Short end-scraper on platform flake. Mylonite, heavily weathered. L 25 mm, W 21 mm, Th 6 mm. Area BIII, Context 815.

CAT 212 (1980/219) Short end-scraper on platform flake. Mylonite, heavily weathered. L 23 mm, W 19 mm, Th 8 mm. Area BIV, Context 134.

CAT 214 (1981/505) Fragmented short end-scraper on platform flake. Mylonite, heavily weathered. L 32 mm, W 25 mm, Th 8 mm. Area BV, Context 183.

CAT 217 (1981/475) Short end-scraper on bipolar flake. Flint. L 18 mm, W 15 mm, Th 4 mm. Area BV, Context 837.

CAT 220 (1981/502) Short end-scraper on platform flake, small flake detached on ventral face just behind the scraper-edge. Mylonite, heavily weathered. L 22 mm, W 19 mm, Th 8 mm. Area BV, Context 141.

CAT 222 (1981/048) Fragmented side-scraper on platform flake. Mylonite, heavily weathered. L 37 mm, W 25 mm, Th 16 mm. Area DI, Context 315.

CAT 224 (1980/080) Short end-scraper on platform flake. Mylonite, heavily weathered. L 18 mm, W 22 mm, Th 9 mm. Area DI, Context 315.

CAT 225 (1980/101) Fragmented short end-scraper on platform flake. Most of the working-edge has broken off. Quartz. L 25 mm, W 31 mm, Th 13 mm. Area DI, Context 315.

CAT 226 (1980/103) Side-scraper on chunk. Quartz. L 33 mm, W 26 mm, Th 16 mm. Area DI, Context 315.

CAT 232 (1981/041) Short end-scraper on platform flake. Mylonite, heavily weathered. L 23 mm, W 25 mm, Th 10 mm. Area DV, Context 340.

CAT 234 (1980/218) Proximal fragment of short end-scraper on indeterminate flake. Quartz. L 19 mm, W 16 mm, Th 7 mm. Area F, Context 611.

CAT 235 (1981/479) Side-scraper on bipolar flake. Flint. L 23 mm, W 14 mm, Th 7 mm. Area H, Context 708.

CAT 239 (1981/558) Fragmented short end-scraper on indeterminate flake. Quartz, burnt. Area DIV, Context 362.

17.9.5 Retouched pieces

CAT 205 (1981/480) Proximal fragment of platform flake with edge-retouch along both lateral sides. It has alternating steep retouch on the left lateral side and acute retouch on the right side. Flint. L 40 mm, W 20 mm, Th 5 mm. Area BV, Context 813 (Context 874 acc. Finds Book].

CAT 206 (1981/467) Medial fragment of indeterminate flake with edge-retouch. The dorsal retouch resembles core-edge trimming, but may be ordinary retouch or even heavy use-wear. The ventral retouch may be modern damage. Flint. L 25 mm, W 11 mm, Th 6 mm. Area BI S ext., Context 107.

CAT 216 (1981/508) Fragment with invasive retouch on both faces, probably rough-out for an arrowhead. Mylonite, heavily weathered. L 26 mm, W 18 mm, Th 8 mm. Area BV, Context 813.

CAT 223 (1980/074) Fragment with invasive retouch on both faces, probably rough-out for an arrowhead. Flint. L 17 mm, W 5 mm, Th 3 mm. Area DI, Context 315.

CAT 233 (1981/527) Proximal fragment of platform flake with acute edge-retouch along the left lateral side. Quartz. L 34 mm, W 24 mm, Th 8 mm. Area E, Context 1103.

CAT 237 (1981/205) Proximal fragment of plat-

form flake with edge-retouch along the left lateral side. Flint. L 14 mm, W 15 mm, Th 5 mm. Area H, Context 738.

CAT 238 (1981/629) Medial fragment of indeterminate flake with edge-retouch along one lateral side. Quartz, probably slightly burnt. L 19 mm, W 31 mm, Th 10 mm. Area BI W ext., Context 107.

CAT 240 (1981/225) Medial fragment of indeterminate flake with edge-retouch along one lateral side. Quartz, burnt. L 15 mm, W 13 mm, Th 5 mm. Area H, Context 760.

17.9.6 Missing finds bags

Year/SF	Trench	Context	Material	Comment
80/019	B	108	Chert	Natural flake?
80/079	DI	315	Quartz/pottery	
81/001	B	Backfill	Mylonite	Tool
81/005	E	1100	Quartz	Retouched
81/077	H	728	Quartz	
81/092	BI ext.	107	Flint	Flake
81/128	H	739	Quartz	
81/314	DII		Quartz	
81/394	BV S ext.	141	Pumice	Shaped
81/498	BIV W ext.	889	Quartz	
81/499	BIV W ext.	889	Quartz	
81/514	H	707	Opal-like	'Microlith'
81/547	DIV	362	Water-worn pebble	
81/667	H	730	Quartz	

17.9.7 Lithic fragments bagged with pottery

— 2 pieces quartz in 80.111
— 1 frag quartz in 81.401
— 1 frag quartz from Area S (1988)

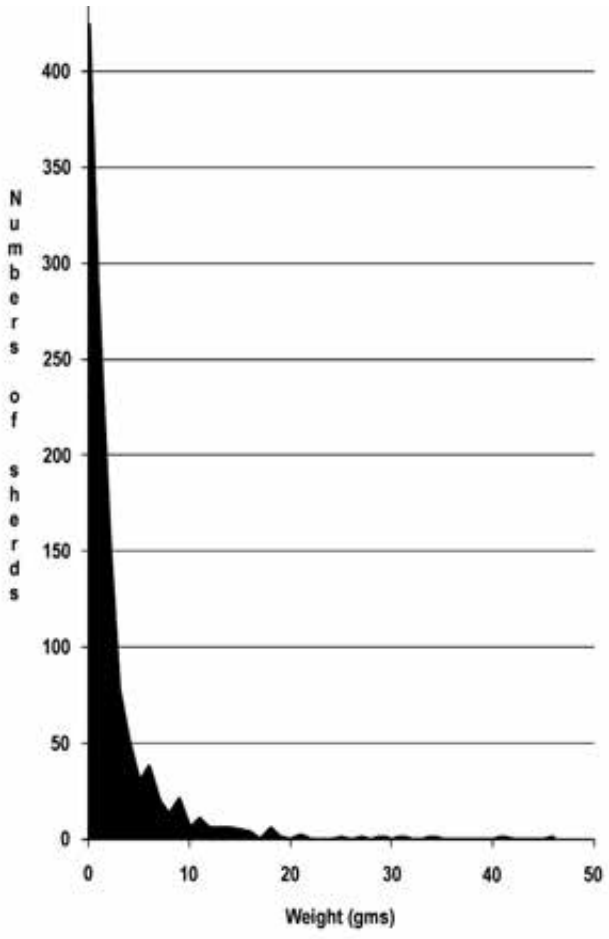
18. The Pottery Assemblage

Alison Sheridan (JAS), Audrey Henshall (ASH) and Melanie Johnson (MJ), with excavation detail from Patrick Ashmore (PJA)

18.1 Introduction (JAS)

The ceramic assemblage from the 1980/81 excavations at Calanais – excepting finds of obviously post-medieval date (i.e. glazed china) – comprises just over 1100 sherds and fragments, plus numerous crumbs, weighing around 3 kg overall. At least 169 – and probably many more – pots are represented (see below). All but a handful of sherds are likely to date to between the second half of the 4th millennium BC (i.e. the Early/Middle Neolithic) and the first half of the 2nd millennium BC (i.e. the Early Bronze Age), with the Hebridean Neolithic, Grooved Ware, Beaker and Food Vessel ceramic traditions being represented.

The assemblage was initially reported on by ASH shortly after the excavation; preparatory work for this had included cleaning and labelling of the sherds, and gluing many of the conjoining sherds. That report, recording the state of knowledge during the early 1980s, is archived. Its catalogue arranged the assemblage into chronological and fabric groupings as far as was possible, providing details of individual identifiable vessels; a large 'unclassified' category covered material that could only tentatively (if at all) be assigned to a period, and this was not described in detail. In 1997 MJ undertook the cataloguing of this 'unclassified' material and also weighed the entire assemblage and updated the discussion. Since then, advances in our understanding both of Scottish prehistoric pottery and of the sequence of activities at Calanais have necessitated a further revision. This was undertaken by JAS at various times between 2010 and 2012 and the work included a thorough re-examination of the whole assemblage and an overhaul of the Catalogue. An unique running Catalogue number was added for each piece of pottery over 5 mm in its greatest dimension. The final report has therefore been written by JAS incorporating elements of ASH's report and of MJ's work, together with stratigraphic and distributional information and analysis from PJA. The organisation of the Catalogue, and its relationship with the ASH version of the catalogue, is explained in its preamble (Chapter 18.11.1). The current ordering by Catalogue number mostly follows the ASH numbering sequence. Readers will be able to re-order the entries by period, area, context etc. by converting the catalogue to editable form. In the following text, references to the ASH Catalogue numbers are prefaced 'ASH' to distinguish them from the final Catalogue numbers.



Illus 18.1 Numbers of sherds (pieces > 10 mm in maximum width or length) and fragments (pieces between 5 mm and 10 mm in width or length), by weight

18.2 Condition of the pottery (JAS and PJA)

One of the challenges posed by this assemblage is the fact that it consists mostly of small, featureless pieces: 864 out of 1110 sherds and fragments (i.e. 77.8%, or just over three-quarters of the assemblage) are smaller than 25 mm in their length or width, and 95% weigh 10 g or less (Illus 18.1; Technical Note 18.2.1). The largest sherd (excluding those formed by the refitting of conjoining sherds) measures just 63 x 45 mm (Cat 385, Beaker ASH 42).

Furthermore, most pots are represented only by a single sherd, constituting less than 2% of the vessel. The largest proportion of any pot to survive is only c 15%, with the three vessels in question comprising a Grooved Ware bowl (Cat 489–495, 497–519 and 521, ASH 61), a small fine Beaker (Cat 353–355, possibly 358, 362–364 and 366–371, ASH 39) and a larger Beaker (Cat 374–382, 384–398 and 401–403, ASH 42. As will be discussed below, the degree of fragmentation relates to the circumstances of deposition, with most (if not all) of the Early/Middle Neolithic pottery having been brought into the site in sherd form, whereas the Grooved Ware pot ASH 61, at least some of the Beaker pottery, and the Food Vessel ASH 75 had probably been deposited whole.

Most of the assemblage is also heavily abraded (Table 18.1), and once again this relates to depositional circumstances, and also to the fact that post-depositional disturbance occurred.

Table 18.1 Degree of abrasion. (Note: Catalogue entries recording intermediate degrees of wear have been counted as the more worn degree)

Wear (as abrasion to fracture surfaces)	No of shds/ rgs	%
1:fresh or slightly abraded	13	1.2
2: medium abrasion	311	28.0
3: marked abrasion	786	70.8
Total	1110	
100		

A high proportion of the assemblage is of a laminar fabric, consisting of spalls or pieces from which a surface has spalled off. Most, but by no means all, of the laminar pieces appear to be of Early/Middle Neolithic date.

Some sherds and fragments are friable; a few (mostly of Early/Middle Neolithic date) are burnt; and some of the sherds from Area S were in such poor condition when discovered that they disintegrated upon excavation. As for the material from test pit J, this was so friable and scrappy that it is difficult to be certain that the five 'fragments' really are of pottery; they are given the benefit of the doubt here, and regarded as being 'indeterminate'.

The fragmentary and worn appearance of the pottery, together with the fact that the same fabrics and inclusion types are found in pottery of demonstrably differing age (see below), hampers attempts to arrive at a reliable estimation of the overall number of vessels represented, and has posed a challenge for the identification of individual pieces as to pot style and date. The 'minimum number of individual pots' figure cited above (169) is based on feature sherds such as rims and those with other distinctive characteristics; more vessels are bound to be represented among the large number of featureless body sherds and fragments in the assemblage. As far as attribution of pieces to a specific pot type and period is concerned, the large number of sherds and fragments that Henshall placed in her 'Unclassified' category reflects the difficulty of the task. The re-examination of the whole assemblage has allowed some of those 'Unclassified' pieces to be given a firmer identification (not least because many had been found close to larger, more easily identifiable sherds which they resemble); as a consequence, just over half the assemblage (57%) has been attributed to a chronological period to the confidence level of 'definite' or 'probable'. Most of the remaining 43% is likely to date to either the Early/Middle Neolithic or to the Chalcolithic/Early Bronze Age.

18.3 Fabric

While some variability in fabric was observed (Table 18.2), the fact that the same fabric types (namely 1, 2, 3 and 4) occur among vessels of dif-

Table 18.2 Fabric types and frequency. The overall percentage has been rounded to 100

Fabric	No of shds/	
frgs	%	
1: Fairly hard, corky (voids mostly 0.5–3.5 mm but sometimes bigger); often also sparse, mostly sub-angular inclusions, up to 4 mm, of one or more stone type; mica platelets occasionally present. Overall density of voids and inclusions		
< 5%, usually <3%; can be laminar fabric	401	36.1
1a: Hard, sparse and small corky sockets (density 3% or less), no other obvious inclusions apart from minute mica platelets	109	9.8
2: Hard, slightly sandy, with a few corky voids; abundant mica platelets on surface. Can include larger sub-angular lithic inclusions of various minerals, up to c 4 mm in greatest dimension. Density c 5% or less	131	11.8
3: Fairly hard, non-corky and non-sandy, sparse lithic inclusions (3% or sparser); inclusions can be angular and up to c 4.5 mm in maximum dimension. Mica platelets can be present	330	29.7
3a: As 3 but very hard	10	0.9
4: Hard, gritty (= ASH's 'harsh gritty'): angular & sub-angular fragments, mostly of quartz/ite, some with integral mica; can be up to 5.7 x 5.7 mm but generally smaller than 2 x 2; density 5–7%	90	8.1
4a As 4 but inclusion density >7% and up to c 25%	2	0.2
5: (seen only in ASH 75): sub-angular and rounded fragments, up to 7.8 x 5.4, of fine-grained speckled stone, creamy-coloured with blackish mineral inclusions, at density of 7–10%	28	2.5
Indeterminate/none visible	9	0.8
Total	**1110**	**100**

Table 18.3 Distribution of sherds and fragments by area and sub-area

Sub-area	Wt	No shds/frgs	% by Wt	% by No shds/frgs
AI	30	5	1.0	0.5
AII	12	2	0.4	0.2
B	13	2	0.4	0.2
BI	151	55	5.0	5.0
BII	51.5	29	1.7	2.6
BII/III	17.5	6	0.6	0.5
BIII	74.5	43	2.5	3.9
BIIISX	46.5	12	1.5	1.1
BIINE	8.5	2	0.3	0.2
BIN	28	11	0.9	1.0
BISX	5	3	0.2	0.3
BIV	301	78	10.0	7.0
BIVSX	30	12	1.0	1.1
BIVWX	94	23	3.1	2.1
BIWX	70	23	2.3	2.1
BNW	2.5	2	0.1	0.2
BV	197.5	70	6.6	6.3
BVSX	278.5	88	9.3	7.9
BVWX	57	15	1.9	1.4

Sub-area	Wt	No shds/frgs	% by Wt	% by No shds/frgs
C	14.5	5	0.5	0.5
D	5	1	0.2	0.1
DI	680	233	22.6	21.0
DII	30.5	14	1.0	1.3
DIII	10	5	0.3	0.5
DIV	5.5	5	0.2	0.5
DV	87	21	2.9	1.9
E	79	14	2.6	1.3
FI	4	1	0.1	0.1
FV	13.5	10	0.4	0.9
FVI	4.5	3	0.1	0.3
FVIII	6.5	5	0.2	0.5
G1	167	42	5.6	3.8
HI	150	70	5.0	6.3
HII	224	140	7.4	12.6
JI	2.5	5	0.1	0.5
S	55.5	55	1.8	5.0
Totals	**3007**	**1110**	**100.0**	**100.0**

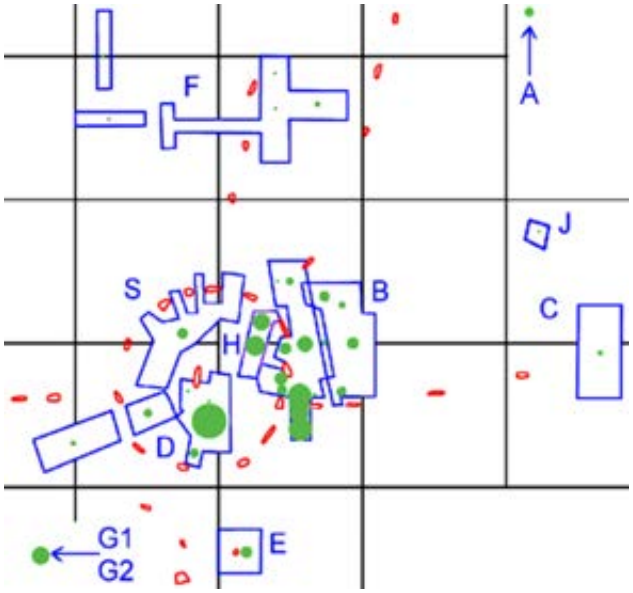
ferent date means that the use of this characteristic as a chronological indicator is limited, especially when trying to distinguish between Early/Middle Neolithic and Chalcolithic/Early Bronze Age pottery.

The only clear exception is fabric category 5, which was only found in the Early Bronze Age Food Vessel ASH 75, but it should also be noted that Fabric 3a mostly comprises sherds that are suspected to be of post-Early Bronze Age date (see below).

The recurrence of the same kinds of lithic inclusion in pottery of different dates – including a soft stone that leached or burnt out, creating the corky voids as seen in many of the Early/Middle Neolithic sherds, in the Grooved Ware pot ASH 61 and in some of the Beaker pottery – suggests that the pottery had probably been made locally.

18.4 Spatial and contextual/stratigraphic distribution (PJA/JAS)

Pottery was found in all of the excavated areas and in Test Pit G1, albeit in widely varying quantities. Illus 18.2 shows the overall distribution of sherds and fragments by sub-area, and Table 18.3 shows the breakdown of the pottery in the different areas and sub-areas.



Illus 18.2 Overall distribution of pottery by sub-area; the largest green circle in DI represents 233 sherds (plus 30 fragments), weighing 0.68 kg

Most of the pottery (87% both by number of sherds plus fragments and by weight) was found in the central Areas B, D and H, while very little was found in Areas A, C, E, F, G1 and S, and as noted above the 'ceramic' finds from test pit J are not definitely pottery. The differing sizes of the trenches, and the fact that only the top 15 cm of Trench S was excavated, do not fully account for this distributional variability and it appears that there had been a genuine concentration in the vicinity of the chambered cairn, with a fall-off away from this. The layers excavated in Area S, for example, included those that had elsewhere produced abundant pottery. All that was found in S were sherds, fragments and crumbs that probably belong to a single pot of Early/Middle Neolithic date.

Furthermore, there is some variation in the type of pottery found in the different areas, with all the pottery from Area A (with just one possible exception, Cat 743), being post-Early Bronze Age in date and probably significantly later than this (see 18.3.18), while the five sherds found in Area C (Cat 558–562, ASH 74) may belong to a Food Vessel – a style of pottery represented by only one other pot from Calanais (Cat 563–572, 576–578, 580–583, 585–594, 912 and 1024–1029, ASH 75).

Of the pottery from the vicinity of the chambered cairn, more than 40% of the entire Calanais assemblage (by both weight and sherd-plus-fragment count) was found in Trench B, mainly from BIV, BIVS, BV and BVS to the SE of the chamber tomb passage entrance. Over a fifth of the assemblage came from sub-area DI to the south of the cairn, predominantly from prehistoric plough soil contexts. About a sixth of the sherds came from Area H, somewhat more from the cairn (HII) than from the soils to its north (HI); those from the cairn were well below average in weight except sherds of the aforementioned Food Vessel ASH 75, which were found in capping levels.

The spatial distribution of pottery of different periods will be discussed in more detail in the rest of this Chapter; in the meantime, it should be noted that in a few cases, it was possible to track the distances that separated sherds belonging to the same pots. With the Grooved Ware pot ASH 61, the three sherds that were not found with the 27 others in the shallow scrape or pit 877 just outside the Ring came from less than 0.3 m away;

similarly, the sherds from Beaker ASH 42 – a pot which may well have been deposited in a grave – were not distributed over a wide area, with the furthest-flung piece under 2 m away from the main sherd cluster. A longer distance – around 7m in one case, and nearly that in the other – separated sherds (some conjoining) from the Early International Beakers ASH 38 and ASH 39.

The depositional history and taphonomy of the artefactual assemblage is complex, with some pottery probably having been brought onto the site in sherd form, among clay and earth used to level up the surface particularly in Phase 7, some being brought in with small amounts of soil and clay as part of individual depositions, and other pottery being brought in as complete pots, for use in episodes of structured deposition. The incorporation of residual material (e.g. in the primary chambered cairn make-up) complicates matters, as do various episodes of disturbance and restructuring that occurred both during prehistory and in the more recent past. As will be seen in the detailed presentation of the evidence below, it can be hard to relate specific kinds of pottery to specific stages in the history of the site on purely stratigraphic grounds, although a notional chronology of ceramic deposition can be proposed. In brief, even though the Early/Middle Neolithic pottery from Calanais is likely to have been used – elsewhere – around the same time that the pre-Ring, Phase 3 (and possibly Phase 2) cultivation was taking place at Calanais, this pottery was not deposited on the site until later (except, perhaps, in Area F – see below); how much later is discussed below in 18.3.3. The dating of the deposition of the single Grooved Ware pot – probably shortly after the erection of the Ring – is discussed in 18.3.5 and 18.3.6. Ceramic deposition seems to have occurred intermittently until perhaps Phase 12, and then after a considerable interval, there was probably some minor deposition during the later phase/s of disturbance (i.e. Phase 16, and possibly Phase 17).

18.5 Assemblage composition (JAS)

Given the aforementioned caveats regarding identification, the following chronological ordering of the pottery is proposed:

1. Early/Middle Neolithic (comprising undecorated and decorated vessels belonging to the Hebridean Neolithic tradition)

2. Late Neolithic (Grooved Ware)

3. Probably Chalcolithic and Early Bronze Age (Beaker and Food Vessel)

4. Post-Early Bronze Age (possibly Iron Age and/or later)

5. Ambiguous or indeterminate.

Categories 1–4 will be described below.

18.5.1 Early /Middle Neolithic pottery (JAS/ASH)

The Early/Middle Neolithic pottery encompasses both undecorated and decorated vessels. The undecorated pots (Illus 18.3–18.5) are in corky, non-corky and minimally-corky fabrics. It should be noted that Henshall's category 'non-corky' included vessels of fabric category 2, which do have sparse corky voids. The decorated vessels (Illus. 18.6–18.8) are almost all in non-corky fabrics 3 and 4, and their decoration is almost invariably by incision (see below for the exceptions). While most of these 'Hebridean Incised' decorated vessels seem to have been large bowls and jars, generally thicker-walled than the undecorated pots, a small number of fine, thin-walled decorated vessels are present and these will be discussed below (18.3.1.2). Furthermore, it needs to be kept in mind that some of the undecorated non-corky Early/Middle Neolithic body sherds (and possibly a few of the corky sherds) may have come from decorated pots, since we know that some Hebridean Incised vessels had decoration that did not extend over the whole of the body (as seen, for example, at Clettraval and Unival chamber tombs, North Uist: Henshall 1972, 308, 309). This may well be the case, for example, with Cat 233, a relatively large undecorated sherd in fabric 3 from a large pot.

There is every reason to suspect that the undecorated and decorated Early/Middle Neolithic pots were constituent parts of the same overall

ceramic repertoire, as is the case with other Hebridean Neolithic assemblages such as Northton, Harris (Simpson et al. 2006, 44-68) and Eilean an Tighe, North Uist (Scott 1951a).

The degree of fragmentation is very high, with most vessels being represented by just a single sherd, or at most a few sherds. Henshall identified a minimum number of 33 individual vessels of Early/Middle Neolithic date (mainly on the basis of rimsherds and other 'feature' sherds) but the total may well be significantly higher, given the large number of featureless body sherds in the assemblage that are similar in fabric, thickness and surface finish to those covered by her catalogue entries ASH 1–36.

18.5.2 Undecorated vessels

Notwithstanding the possibility, mentioned above, that some undecorated body sherds could belong to decorated pots, there is an indication that undecorated vessels are indeed present in the assemblage. These vessels (Illus 18.3–18.5) are generally thin-walled (5–8 mm, exceptionally 10 mm thick) and fine-textured, with surfaces that have been carefully smoothed and coated with a thin slip (or else wet-smoothed); a few may have been polished to a low sheen (e.g. Cat 2, ASH 2a). They occur in fabric types 1, 1a, 2 and 3, most commonly 1. Their shape must largely be determined from rim sherds, as very few other 'feature' sherds exist; the absence of any flat bases, and the presence of curving belly sherds, are taken to indicate that they had been round-bellied. It is hard to tell whether any of the undecorated vessels had been carinated; the main candidate sherd (Cat 39, ASH 9, Illus 18.4) could just as easily have been an inturned, bevelled rimsherd as a carination, and two other sherds (Cat 13, ASH 'NC' and Cat 245, ASH 18) that may have a gentle carination are too small for a firm identification.

Support for the assumption that the 'undecorated' vessels had indeed been undecorated (as opposed to being from pots that had been decorated below the rim area) is provided by comparanda from other Hebridean Neolithic assemblages; these also suggest the overall shape of the pots in question. Vessels with similarly-shaped rims to those from Calanais tend to be simple hemispherical or deeper bowls (cf. Northton: Simpson et al. 2006, fig. 2.26, 5; Eilean an Tighe: Scott 1951a, fig. 5.W1, fig. 6.Y2, fig. 9, 2.1; Clettraval: Henshall 1972, 308, No 16). Bowls with flanged rims also appear to be represented at Calanais (see below).

Although the rim sherds are too small to allow reliable estimation of the pots' rim diameters, it is clear that several are from small vessels, with estimated rim diameters ranging between c 120 mm (ASH 1) and c 200 mm (ASH 4). One thin, fine, curving body sherd (Cat 228, ASH 'NC', not illustrated) may well have come from a small cup.

The range of rim shapes represented among the undecorated pots is as follows:

vi. Rounded, upright or slightly everted (e.g. Cat 222, ASH 13; Illus 18.3);

vii. Gently pointed and upright (e.g. Cat 15, ASH 7a) or slightly everted (e.g. Cat 54, ASH 10b) (Illus 18.3);

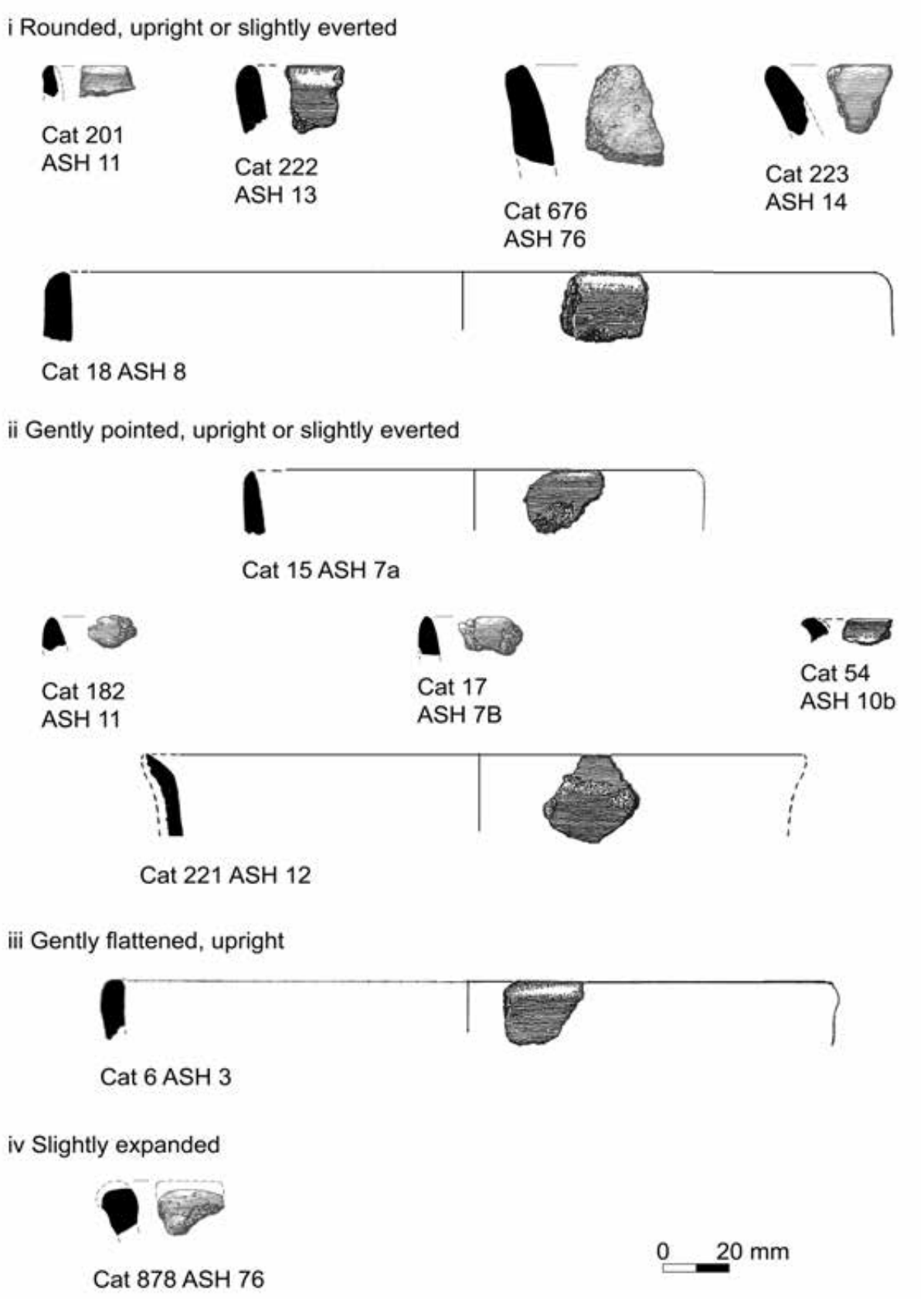
viii. Gently flattened, upright (Cat 6, ASH 3; Illus 18.3)

ix. Slightly expanded on exterior, flattish or rounded on top, rounded and upright or slightly everted (Cat 235, ASH 17 (not illustrated), Cat 878, ASH 76 crb; Illus 18.3)

x. Externally-bevelled, upright or slightly inturned (Cat 1, ASH 1; Cat 10, ASH 4; Cat 11, ASH 5 (a very gentle bevel); Cat 12, ASH NC; possibly also Cat 39, ASH 9 and Cat 868, ASH 76 (although the 'bevel' might be an abraded surface); Illus 18.4)

xi. Flanged (Illus 18.5; see below).

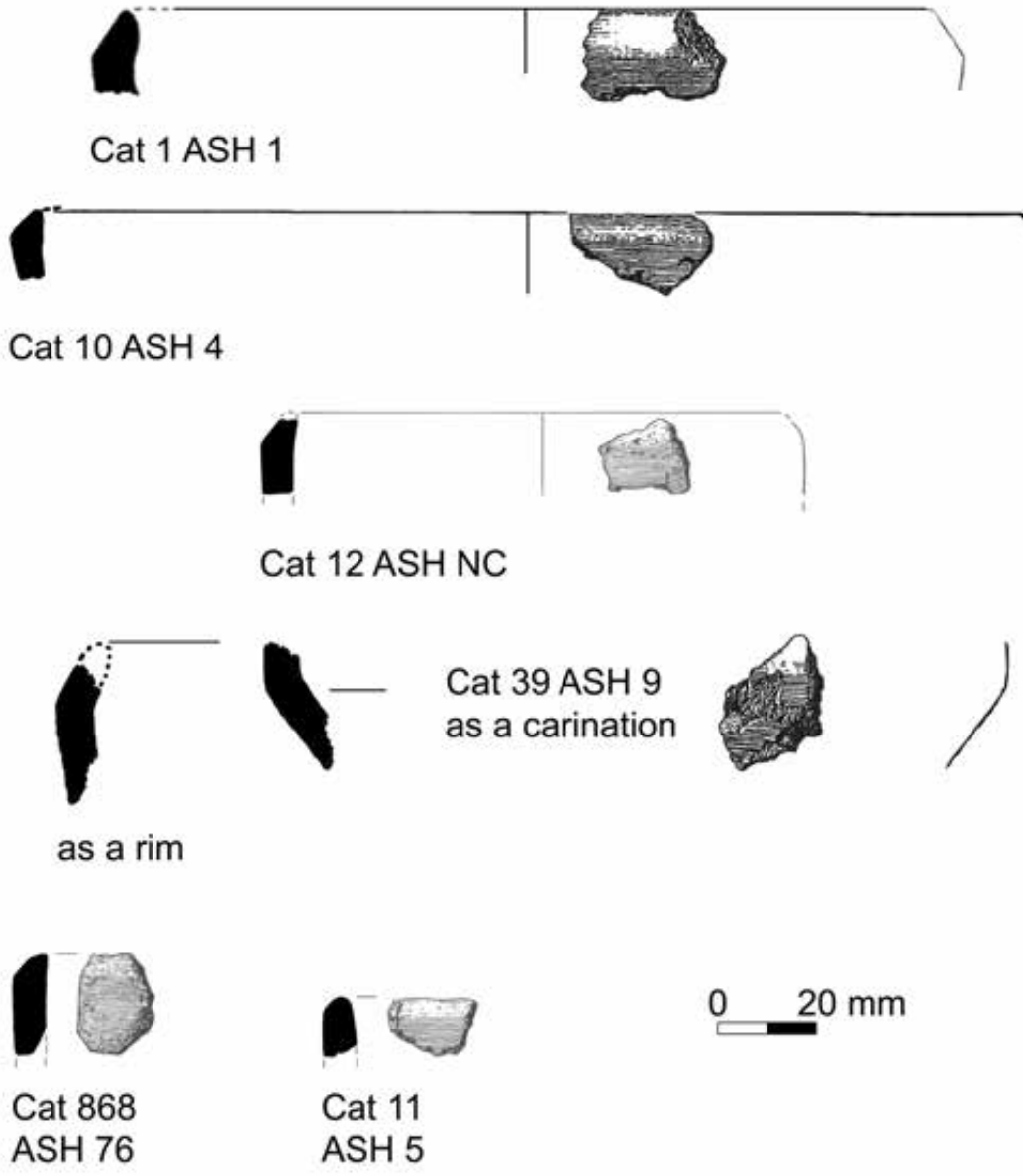
The realisation that some sherds that had previously been assumed to be upright rims may instead be rim flanges (e.g. Cat 2, ASH 2a) resulted from close perusal of the decorated flanged rims in the assemblage (e.g. Cat. 281, ASH 20). Although no sherd is sufficiently large to prove that it had lain at a near right-angle to the body of the pot, this interpretation accounts for the slightly unusual 'exterior' of Cat 2 – actually the under-



Illus 18.4 Undecorated sherds that definitely or possibly belong to rim type v (externally bevelled). Those with ASH numbers up to and including 11 are of corky fabric; the others are non-corky. Cat 12, 868 and 11 drawn by Marion O'Neil; the rest by Tom Borthwick

side of the flange – and for other features noted on other sherds: a squarish profile, or divergent surfaces, one flattish and the other concave (e.g. Cat 232, ASH 16). The candidate sherds are Cat 2 (ASH 2a), 3 (ASH 2b), 4 (ASH 2c), 14 (ASH 6), 16 (ASH 7a), 224 (ASH 15), 232 (ASH 16), 236–7 (ASH 17a), 730 (ASH 76 Unc) and two spalls from among 1049–1103 (ASH 'NC'), one of which has a markedly curved exterior as if from the flange-neck junction. One further sherd, Cat 730 (ASH 76 Unc), is a 'possible'. Six of the candidate sherds are shown in Illus 18.5, with two of these presented both as flanges and as upright or slightly sloping rims, to illustrate the different ways of interpreting the sherds.

The fabric of these undecorated pots has already been mentioned. As regards the material that had left the corky voids in so many of the sherds, the slightly angular shape of the voids indicates that the absent material had not been grass or other plant matter. The shape suggests some kind of stone, and this is confirmed in the corky Late Neolithic Grooved Ware pot ASH 61, where the final remains of the stone in question survived in some of the voids.



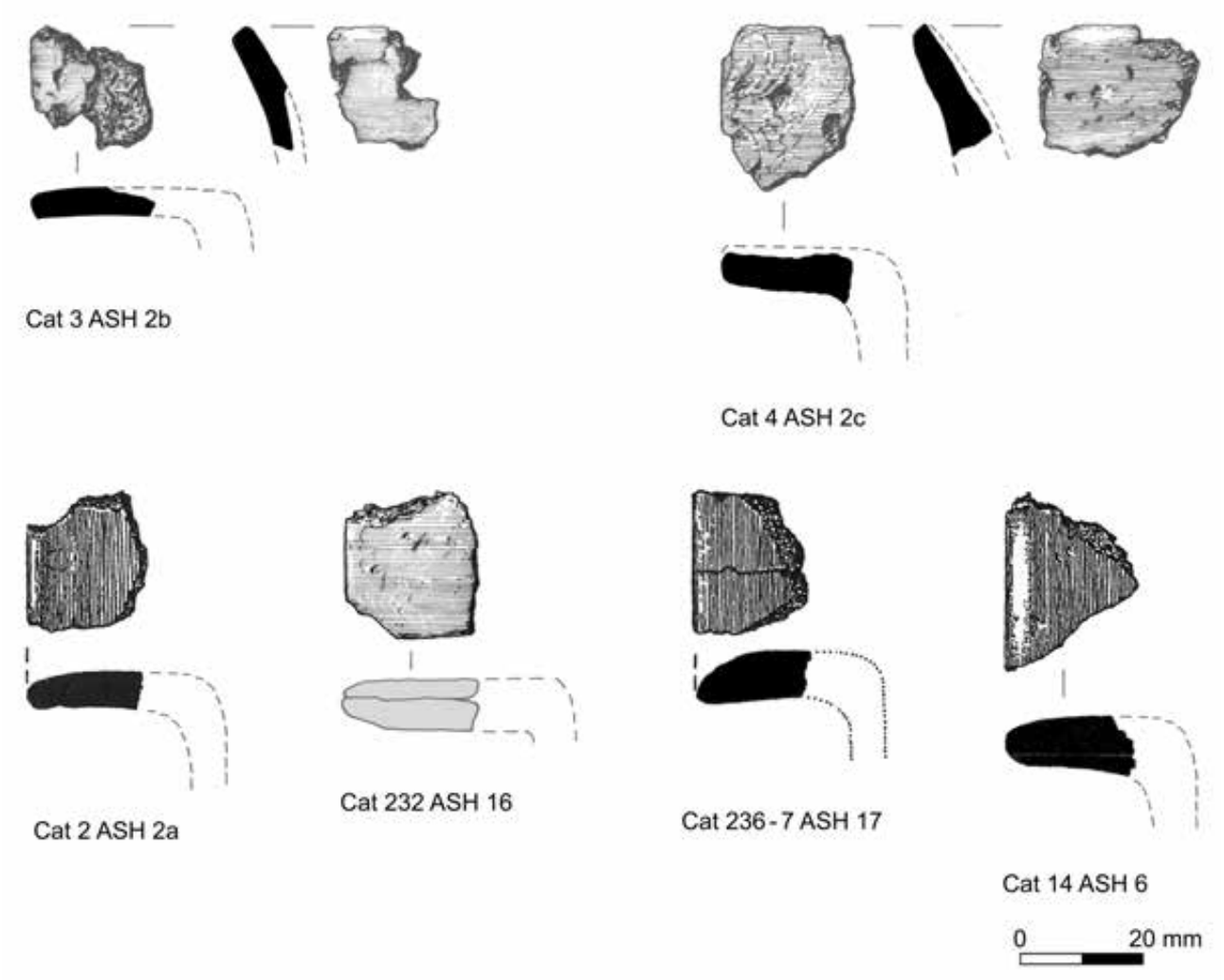
Illus 18.4 Undecorated sherds that definitely or possibly belong to rim type v (externally bevelled). Those with ASH numbers up to and including 11 are of corky fabric; the others are non-corky. Cat 12, 868 and 11 drawn by Marion O'Neil; the rest by Tom Borthwick.

Some 'corky' sherds also contain lithic inclusions which, like those in non-corky sherds, consist of small, sub-angular and rounded fragments of several minerals including quartz/ite and a black mineral, sometimes attached to the quartz/ite. Tiny mica flecks are occasionally present. The inclusions have the appearance of coarse sand and were either present naturally in the clay, or else deliberately added as a filler.

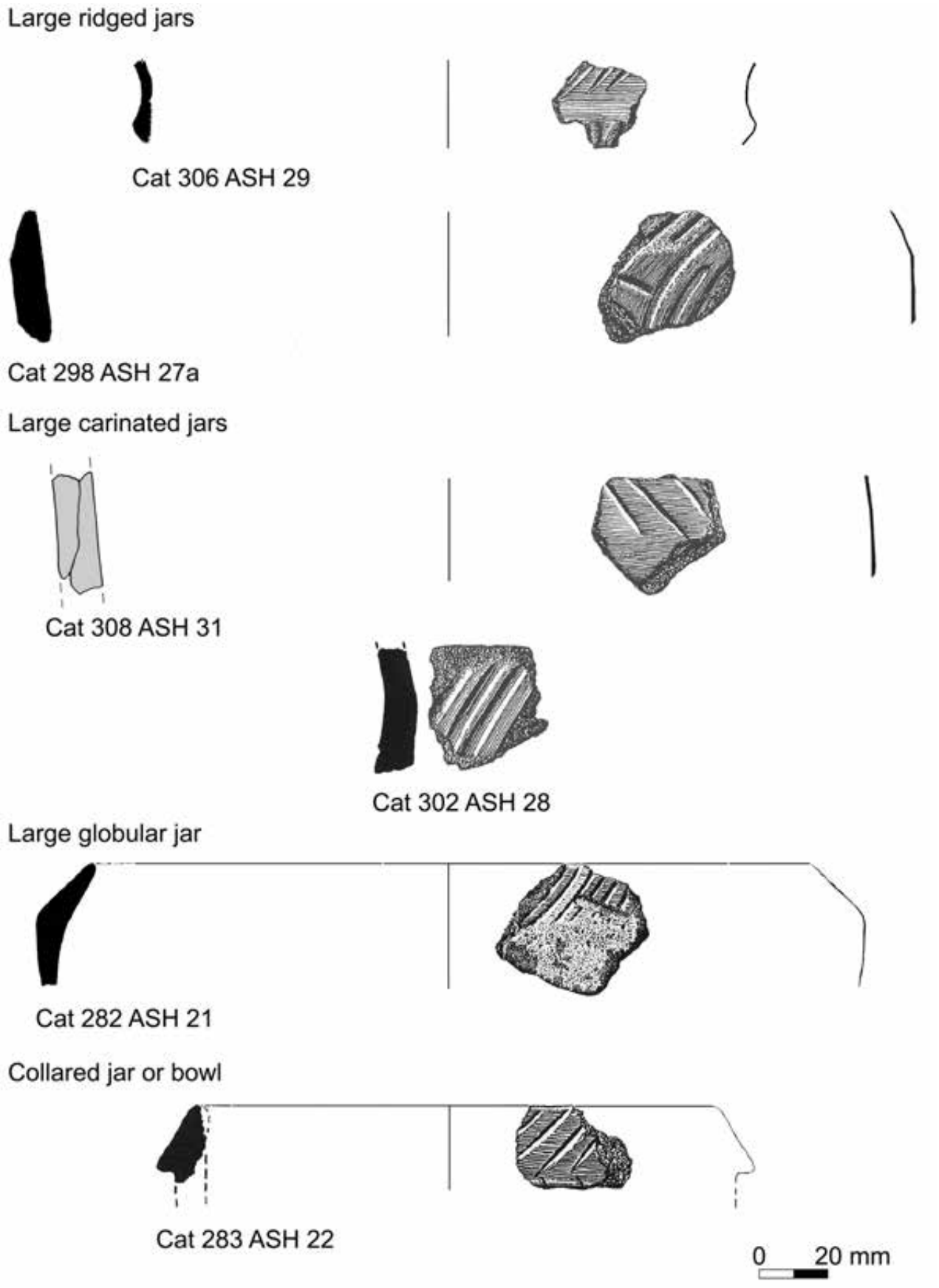
Some of the undecorated sherds have broken along coil joint lines (as in ASH 10b), indicating their manner of manufacture. Many sherds are of a laminar fabric, prone to spalling. Hardness varies.

A few undecorated sherds have a thin encrustation of black organic material, either on the exterior (as with Cat 4 (ASH 2c)), or on the interior (e.g. Cat 117). If this organic residue had been burnt on, this implies that the pots had been used for cooking. In a few instances the residue takes the form of a black stain rather than an encrustation, present on either the exterior (as in Cat 14 (ASH 6)) or the interior (Cat 64, among ASH 11); the possibility that this represents the evaporated contents of the vessel (or of a spill, in the case of exterior staining), rather than burnt-on residue, must be borne in mind.

The spatial and contextual distribution of this pottery is discussed below (18.5.4).



Illus 18.5 Undecorated sherds that are probably rim flanges; Cat 3 and 4 are shown as both flanges and as slightly splaying rims. Those with ASH numbers up to and including 11 are of corky fabric; the others are non-corky. Cat 3, 4 and 232 drawn by Marion O'Neil; the rest by Tom Borthwick



Illus 18.6 Decorated sherds of Hebridean Incised ware, from large jars plus collared jar or bowl. All drawings except section of Cat 308 (which is by Marion O'Neil) by Tom Borthwick

18.5.3 Decorated vessels

The decorated vessels (Illus 18.6–18.8) encompass a variety of vessel forms, sizes and textures, as follows:

xii. Large ridged jars

xiii. Large carinated jars

xiv. Large globular jar/s

xv.Collared jar or bowl

xvi. Carinated and shouldered bowls, including examples with flanged rims

xvii. Fine, thin-walled pots of uncertain form

i.) At least three possible examples of large, deep-bellied, ridged jars have been identified (Cat 298–9 (conjoining sherds; ASH 27a), 718 (ASH 76 unc) and 1106 (ASH NC)), with Cat 298–9 and 718 coming from pots c 260 mm wide and 1106 from a pot c 270 mm wide. All are in Fabric 4 – Henshall's 'harsh, gritty' fabric – and the wall thicknesses range between 10.6 mm and 11.7 mm. Where decoration survives, it is in the form of diagonal incised lines; on Cat 298 these run in two directions but do not form the herringbone design usually seen on such pots (e.g. at Northton: Simpson et al. 2006, fig. 22; Scott 1951a, fig. 8, 1.1). The ridges would have made it easy to grip these large pots, as well as evoking the ribbing on basketry.

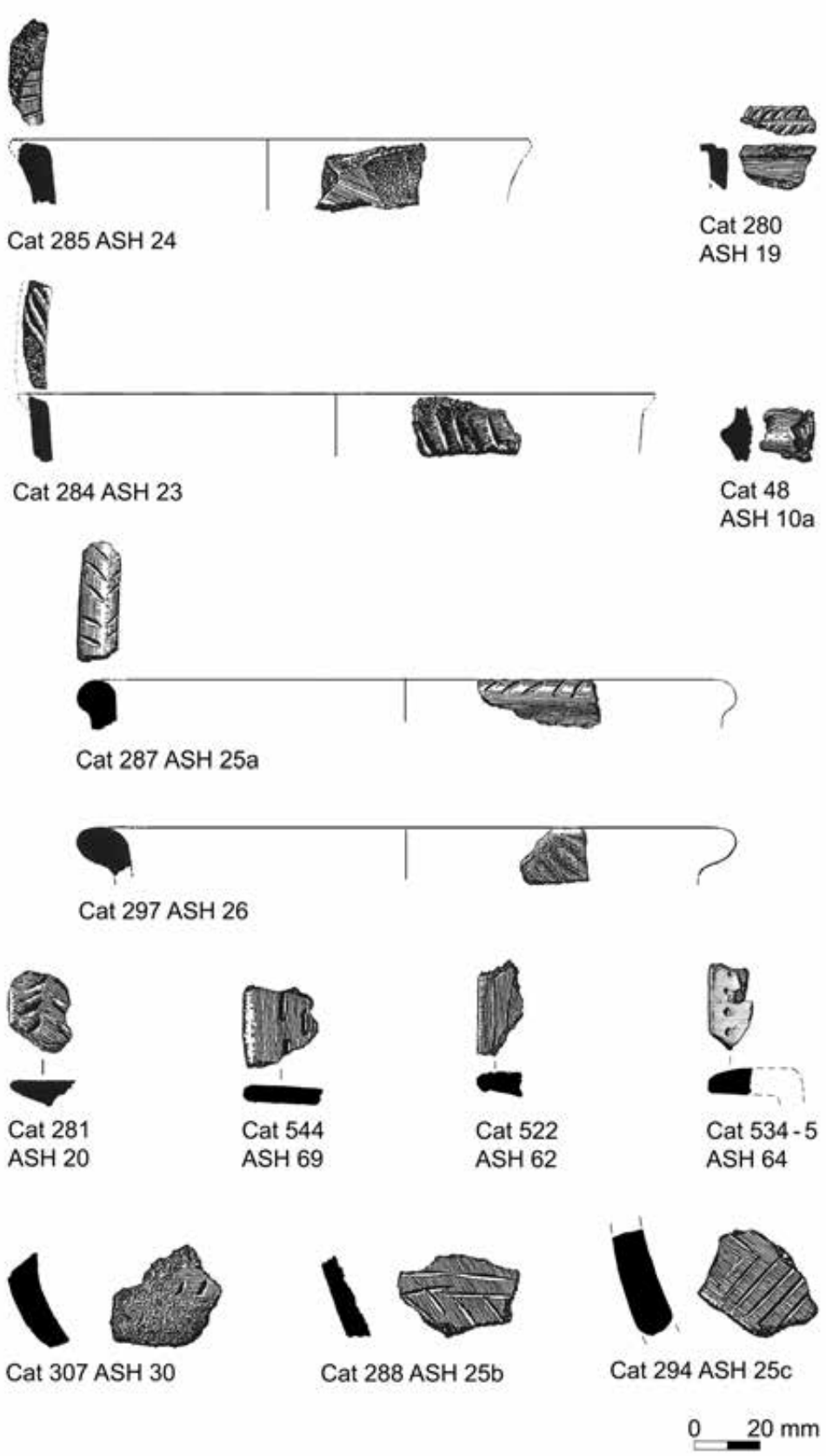
Whether the spall Cat 306 (ASH 29) had also been from a ridged jar is uncertain; it is smaller than the vessels described above (with a diameter at the ridge of c 180 mm), although of the same fabric type, and an alternative possibility is that it was from a carinated bowl.

ii) Cat 302 (ASH 28) is a rim- and necks herd from a large, deep-bellied, carinated jar with an estimated rim diameter of c 220 mm. Like the ridged jars, it is of Fabric 4, relatively thick-walled (11.4 mm), and would have been a robust vessel for cooking or storage. The short neck is decorated with fairly broad diagonal incised lines, which could have been made with a piece of straw or the end of a twig. Cat 308 (ASH 31) might also have come from the neck of a large carinated jar, with an estimated neck diameter of c 240 mm and wall thickness of up to 14.1 mm. It, too, is of fabric 4 (and is particularly gritty, with an inclusion density of 7–10%), had split along a coil joint plane, and has diagonal incised line decoration.

Comparanda for this vessel form can be found, for example, at Clettraval and Unival (Henshall 1972, 308, Nos. 5–11; 309, Nos. 7, 9, 10, 13).iii) Cat 282 (ASH 21) is from the rim and upper belly of a large, globular jar, with an inturned rim that meets the belly in a well-defined carination. The estimated diameter at this carination is at least 240 mm. It is thinner-walled than the other large vessels (maximum 8.9 mm) and is of fabric 2. In shape it is comparable with pot O.11 from Eilean an Tighe (Scott 1951a, fig. 7).

iv) Cat 283 (ASH 22) comprises a collared rim from a small, probably deep-bellied pot (with estimated rim diameter of c 150 mm); fabric 4; thickness at least 11.1 mm; decoration in the form of incised diagonal lines on the collar. Although it is unclear whether the body had been smooth or carinated, this rim form finds abundant parallels in assemblages of Hebridean Neolithic pottery (e.g. Eilean an Tighe pots Z.27 and O.45, Scott 1951a, fig. 7) where it is also found on larger vessels, including ridged jars.

v) The category 'carinated and shouldered bowls' (Illus 18.7) comprises pots of various sizes, including small (<150 mm in maximum diameter) and medium-sized (150 – 200 mm) as well as large (> 200 mm). Rims range in shape from rounded and upright (Cat 267 (ASH 18) and 287 (ASH 25a)) or slightly everted (Cat 297 (ASH 26)) to flanged – with narrow (Cat 284 (ASH 23) and 285 (ASH 24)) and broad flanges (Cat 280 (ASH 19 – part of the flange broken off), 281 (ASH 20), 522 (ASH 62), 534–5 (ASH 64), 544 (ASH 69)). Where pots are represented only by rimsherds, their inclusion within this shape category is based on comparanda with similarly-shaped rims: for example, a flanged rim is associated with a cari-



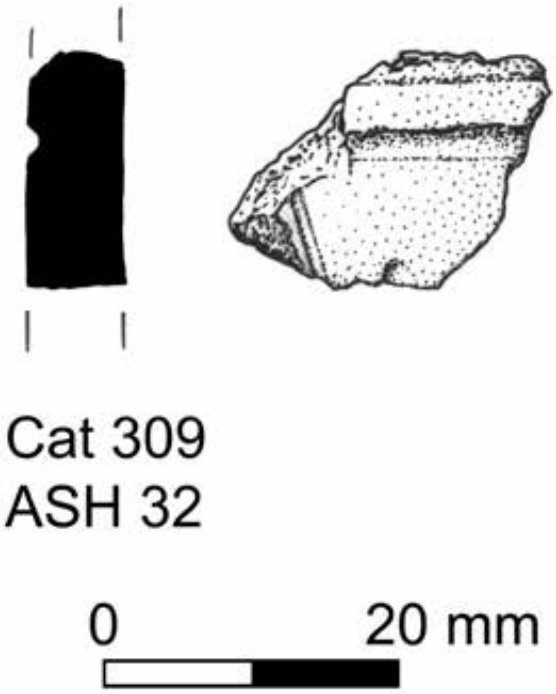
Illus 18.7 Decorated sherds of Hebridean Incised ware, probably from carinated or shouldered bowls and including four rim flanges. Cat 534–5 drawn by Marion O'Neil; rest by Tom Borthwick

nated bowl shape at Unival (Henshall 1972, 309, No 11). Various decorated body sherds may well belong to this shape category, although they might equally belong to uncarinated bowls; candidates include Cat 305 (ASH 28) and 332 (ASH 36) – fairly thin, fine belly sherds with incised lines, arranged in a herringbone design on 305.

Where carinations are present, these are gentle (as in Cat 330 (ASH 36), whereas the shoulder on Cat 48 (ASH 10a) – a fine vessel with corky (type 1) fabric – is prominent and cordon-like.

While this group includes at least one fairly thick-walled pot – Cat 307 (ASH 30), 10.7 mm thick, of fabric 4, and with a belly diameter of c 130 mm – most of the other pots are thinner-walled, with the rim flange Cat 544 (ASH 69) being as thin as 4.2 mm. The vessels also range in fabric and include examples in fabrics 1 (Cat 48 (ASH 10a) – the aforementioned shouldered bowl), 1a (Cat 522 (ASH 62), from a flanged bowl) and 3 (Cat280 (ASH 19), another flanged bowl). These, like the undecorated pots described above, constitute the finer end of the Hebridean Neolithic ceramic spectrum and they may well have been used for serving food. Some fine pots could, however, have been used for cooking, as suggested for example by the thin black organic encrustation on the interior of Cat 305 (ASH 28) – although whether this had been burnt on, or represents the residue of evaporated pot contents, is uncertain. The rim flange Cat281 (ASH 20) is of a colour that suggests that it could have been burnt, post-firing.

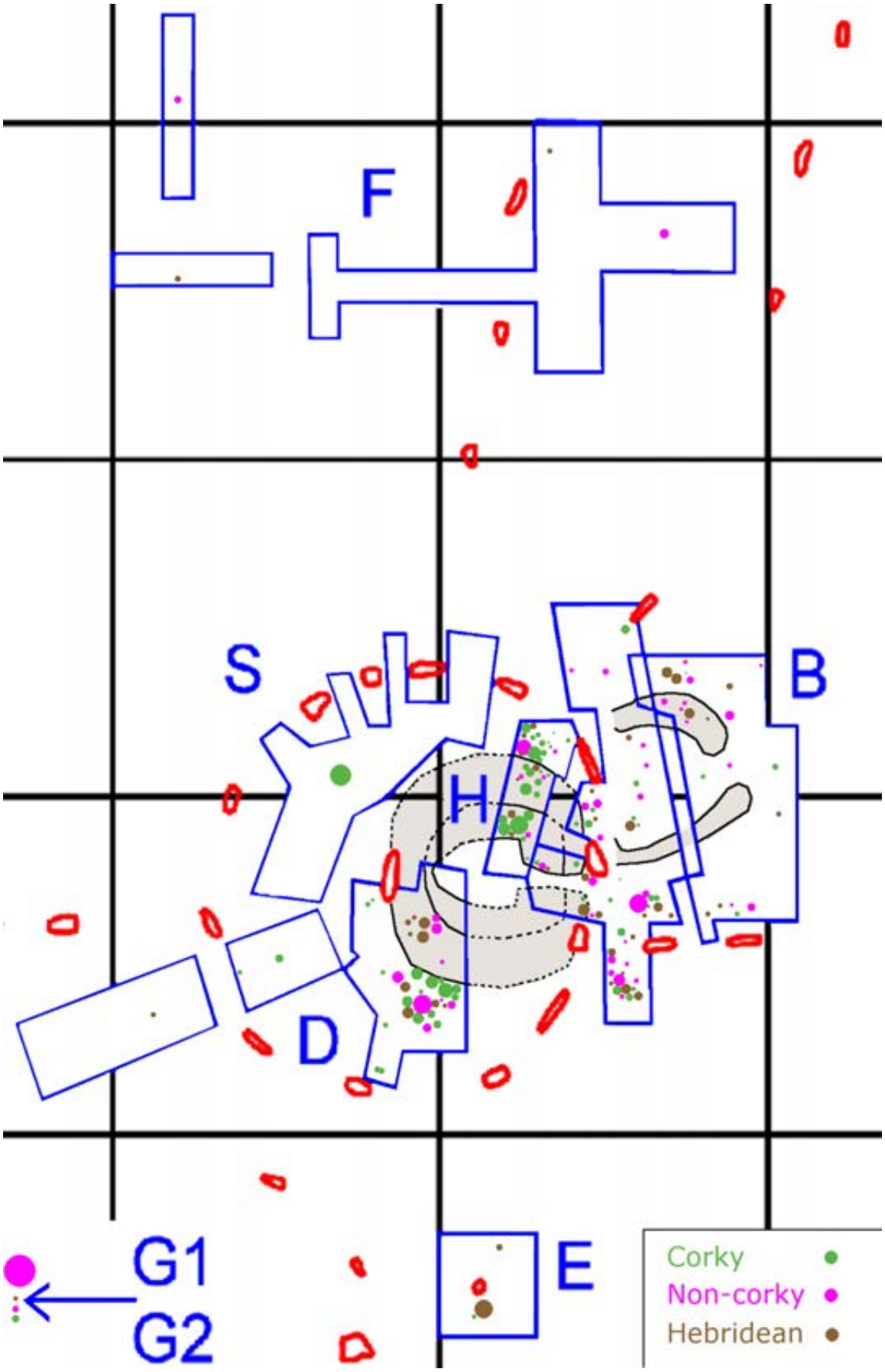
The surfaces of these carinated and shouldered vessels had been carefully smoothed and in at least one case (Cat 522 (ASH 62) – a large flanged bowl) the surfaces had been polished to a low sheen. Decoration is mostly in the form of diagonal incised lines – including lines arranged in herringbone design, as on Cat 287 (ASH 25a) – but a few of the pots have impressed decoration: deep jabs on Cat. 307 (ASH 30); shallower stab impressions plus incision on Cat 48 (ASH 10a); oval stab impressions on the top of rim flange Cat 280 (ASH 19) and irregular 'dot' impressions on the top of the rim flange Cat 534–5 (ASH 64). Impressed decoration is known from other assemblages of Hebridean Neolithic pottery (e.g. at Unival: Henshall 1972, 309, No 11, and at Allt Chrysal, Barra: Gibson 1995, fig. 4.35.146 and 154 – the latter on the interior of a flaring rim).



Illus 18.8 Sherd from fine, thin-walled pot with incised decoration. Drawn by Marion O'Neil

vi) Sherds from five pots fall into the category of 'Fine, thin-walled pots of uncertain form' (Illus 18.8): Cat 309 & 311 (ASH 32), 312 (ASH 33), 313–4 (ASH 34), 315 (ASH 34) and 316 (ASH 35). Wall thickness ranges from 4.7 mm (Cat 316) to 7.4 mm (Cat 311), and all are of the hard, virtually inclusion-free fabric 3. The surfaces have been carefully smoothed; Cat 309 & 311 and 312 had been polished to a low sheen, inside and out. Decoration is by incision, in some cases deep (309 & 311), featuring horizontal and diagonal lines; both are found on 309.

The question arises as to whether these are from a particular and distinctive type of pottery called Unstan Bowls – bipartite bowls of various sizes with shallow bellies and straight, vertical or slightly inturned collars, the collars usually decorated with horizontal and diagonal lines. Such vessels are known from Hebridean Neolithic assemblages (e.g. Eilean an Tighe: Scott 1951a, fig.



Illus 18.9 Spatial distribution of Early / Middle Neolithic pottery

8, 1.4 and 1.12; Northton: Simpson et al. 2006, fig. 2.20; and Eilean Domhnuill: Armit 1987, 1989 and in prep), and are also found in Orkney (e.g. at the eponymous chamber tomb at Unstan: Henshall 1963, 252–3)and – in an earlier form – in north-east mainland Scotland, where the pot style seems to have developed (e.g. at Spurryhillock, Aberdeenshire: Alexander 1997, illus 6, SF 2). The Hebridean examples tend to be thin-walled and fine-textured, whereas in Orkney they occur in a wider range of thicknesses and fineness.

While it is indeed possible that the Calanais sherds are from Unstan Bowls, none of the sherds is from the diagnostic collar-belly junction; and since it is known that some fine carinated Hebridean Incised bowls can have the same decoration and be of comparable thinness and fineness (e.g. at Unival: Henshall 1972, 309, No 11), one cannot rule out the possibility that the sherds belong to such pots.

18.5.4 Distribution of the Early / Middle Neolithic pottery (PJA)

In Illus 18.9 and subsequent sherd plot diagrams the smallest dot represents 0.5gm, and the areas of the dots are proportional to the weights of sherds from individual contexts.

A small but significant minority of the Early/Middle Neolithic sherds was found in soils and clays formed before and around the time the Ring was erected, and a little was found in the grey patches SE of the Ring entrance and may represent post-Ring but pre-cairn ritual deposits. However, the contextual distribution makes it clear that most of this pottery was brought to the site as smallish sherds in soils that had been brought in from nearby 'ancestral' sites to build up the pre-cairn layers and the cairn itself. The heaviest concentration of Non-corky sherds was in Test Pit G1 well to the southwest of the main excavation areas, so perhaps one such ancestral site lay in that area, a possibility discussed in Chapter 24.4.5.

The question of how and when this pottery was introduced into the site is pursued in 18.5.5.

Turf line 164, which formed the surface through which the Ring stones were erected, included two Hebridean sherds (Cat 313–4 and Cat 317) and one Non-corky sherd (Cat 164). Two sherds, Cat. 315 (Hebridean Incised) and Cat 868 (probably E/MN Non-corky) were found in green clays near the eastern Ring stones, as detailed below, and their presence may have related to Ring stone erection.

The third greatest single find of Non-corky pottery, 42g, came from a shallow patch of charcoal-rich grey sand 846 northwest of the innermost stone of the East Row, close to where the Grooved Ware pot ASH 61 was found. It is conceivable that this was a ritual deposit emphasising the potsherds rather than the soil containing them. There were lesser concentrations of both fabric groupings and Hebridean sherds in the area south of this deposit, and south-east of the chamber tomb passage entrance, mostly in ground-worked soils.

The relationships of Corky and Non-corky sherds to the chambered cairn fills differed from one another (Illus 18.9). The sherds in the body of the cairn and chamber wall on Area H were all Corky apart from three spalls and a sherd from a Hebridean Incised pot (Cat 1040–43). Non-corky pot related to the cairn on Area H, in contrast, was found only in small amounts in the secondary filling of the chamber wall, and in dark greasy clay by and under the secondary kerb. In layers related to the cairn on Area D Corky sherds were concentrated in layers of imported clay soils (352, 369 and 374) immediately outside the cairn but Non-Corky (including Hebridean Incised) sherds were found only in the highly disturbed basal layers of the cairn. It seems, then, that the cairn was bedded with clay brought from an 'ancestral' settlement site where Corky wares had been in use, but Non-corky sherds mostly reached the places where we found them after the cairn had been robbed.

Clay soils associated with the northern part of the enclosure bank contained no Corky sherds and a fair scatter of Hebridean and Non-corky sherds (Illus 18.7). One possibility is that the sherds had various origins and were brought in with individual baskets of clay soil when the enclosure was built. Another is that enclosure was not built when the chambered cairn was built but somewhat later when the cairn was being robbed, for as noted above

Hebridean ware and to a lesser extent Non-corky ware was associated with cairn destruction levels. But the most likely explanation is that the sherds were in the clay and soil components of locally cut turves used to build the enclosure wall. This is given credibility by the occurrence of Hebridean and Non-corky sherds in pre-Ring turf line 164 and in green clays stratigraphically between it and post-Ring turf line 162, as listed above, and by the fact that the interior of the enclosure seems to have been cut down through these turf and clay levels.

The greatest concentration of Hebridean Incised ware by weight was in a plough soil 1108 in Area E (Cat. 300 to Cat. 302). The next greatest concentrations were in destruction levels of the cairn and in clay soils associated with the enclosure bank and its destruction, as described above.

Hebridean Incised ware and Non-corky ware were more widely distributed than Corky ware sherds (Illus 18.9) fitting the idea that they were associated with early farming in the area.

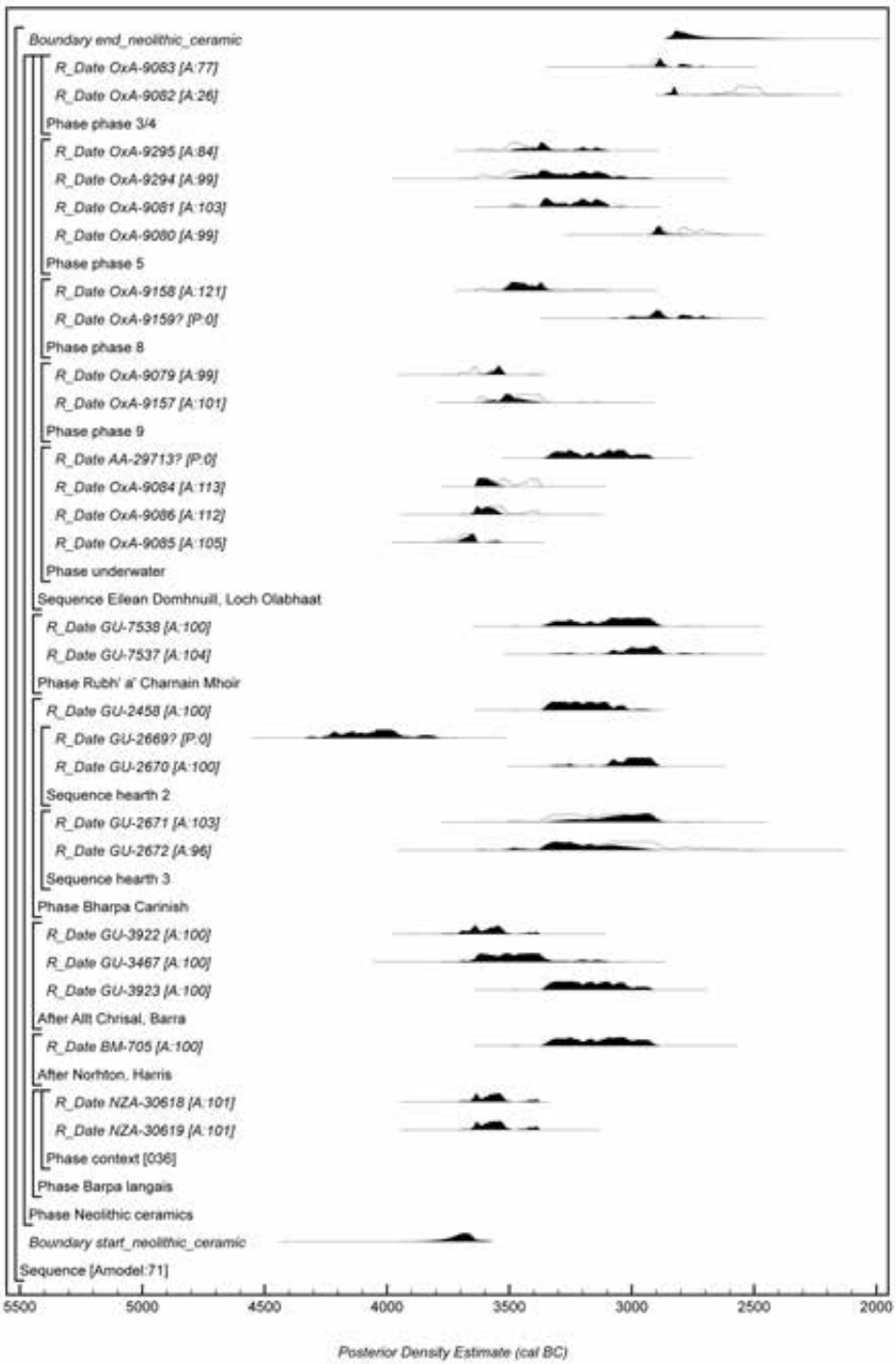
18.5.5 Discussion of the Early to Middle Neolithic pottery (JAS/ASH/PJA)

Despite the spatial and contextual differences between the corky and non-corky sherds outlined in 18.5.4, by analogy with other Hebridean ceramic assemblages it is reasonable to regard the undecorated and decorated Early/Middle Neolithic pottery from Calanais as being contemporary and forming a unified ceramic tradition that is characteristic of the Hebrides during the Early/Middle Neolithic. Its dating is discussed below. Specific parallels for individual vessel shapes and for decorative techniques, motifs and designs have been suggested above. The simple, uncarinated, undecorated bowls have been found alongside Hebridean incised pottery at Eilean Domnhuill, North Uist (Armit 1989, 2003 and in prep); Northton, Harris (Johnson 2006, fig. 2.26.5) and Allt Chrysal, Barra (Gibson 1995, fig. 4.29), for example. The undecorated vessels usually form a minority element in the overall assemblage. Ultimately the ancestry of the undecorated pots can be traced to the early fourth millennium Carinated Bowl (CB) tradition (Sheridan 2007a), and this is reflected in their fineness, wall thickness and surface finish; but there are no classic 'traditional CB' carinated bowls present, and their makers were several generations more recent than the makers of 'traditional CB' pottery.

The decorated vessels are readily paralleled among Hebridean Early to Middle Neolithic assemblages, as seen at the aforementioned sites and at a number of other settlement and funerary sites in the Hebrides, including Eilean an Tighe, North Uist (Scott 1951a), Bharpa Carinish, North Uist (Crone 1993), the Udal, North Uist (Crawford 1980), Rubh' a' Charnain Mhoir, Berneray Causeway, North Uist (Downes and Badcock 1999), Barpa Langais, North Uist (Sheridan 2009), Dalmore, Lewis (Cowie pers. comm.) and Clettraval, North Uist (Scott 1935; Henshall 1972).

As noted above, the possible presence of Unstan Bowls among the decorated pottery is also a feature shared with many of the other Hebridean assemblages, with Eilean Domhnuill having provided a particularly fine selection. This particular vessel type is also found in Orkney and in north-east Scotland, and its ancestry can arguably be traced to the early fourth millennium decorated bipartite bowls found at Balbridie, Aberdeenshire (Ralston 1982); evidence for its emergence in north-east Scotland, and its spread thence to Orkney around 3600 BC, is accumulating (Schulting et al. 2010). It seems that the use of Unstan bowls was adopted in the Hebrides through contacts with Orkney around the middle of the fourth millennium BC.

The genesis and development of Hebridean Neolithic pottery has been discussed elsewhere (Sheridan 2003, fig. 2.5). Essentially it represents a west Scottish fusion of, and development from, two formerly separate ceramic traditions – the CB tradition, with its roots in northern France, and an Atlantic, ultimately Breton tradition, as seen in its earliest Scottish manifestation at Achnacreebeag, Argyll & Bute (Sheridan 2010, with further references). Added to this are influences deriving from continuing links down the Atlantic façade during the first quarter or so of the fourth millennium. By the time the 'Hebridean Neolithic' pottery was being made, this fused tradition had evolved with regionally specific trajectories – with pottery in south-west Scotland (Jack Scott's 'Beacharra Clyde'



Illus 18.10 Probability distributions of dates associated (with varying degrees of closeness) with the Hebridean Neolithic pottery tradition: each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon dates two distributions have been plotted, one in outline, which is the result of simple radiocarbon calibration, and a solid one, which is based on the chronological model used. Distributions other than those relating to particular samples correspond to aspects of the model. For example, the distribution 'start_Neolithic_ceramic' is the estimated date for the start of Hebridean Neolithic pottery tradition. The large square brackets down the left hand side along with the OxCal keywords define the model exactly. Illus by Peter Marshall (see Marshall 2009, figure 4, v2); the dates at the top, listed as 'Sequence 1', relate to Eilean Domhnuill, Loch Olabhat

pottery: Scott 1964) differing somewhat from pottery in the Hebrides (Sheridan 2003; 2004c).

The dating of Hebridean Neolithic pottery leaves much to be desired since the number of reliable, firmly-associated radiocarbon dates is small, despite the important contribution made by the Eilean Domhnuill assemblage. Unfortunately, the Calanais material does not help with dating this tradition since the pottery is not securely associated with any of the radiocarbon-dated samples. That said, as argued in 23.4.7–8, an argument can be made for linking the charcoal samples dating to c 3300–2900 BC from various parts of the site with the pottery's initial period of use: for example, the material brought into the site during Phase 7 to create a clay platform contained both sherds and pieces of charcoal, which could have derived from the same episode of settlement activity elsewhere. The c 3300–2900 BC date range is consistent with other dates for Hebridean Neolithic pottery (Illus 18.10).

The latter have recently been subjected to Bayesian modelling by Peter Marshall (Marshall 2009), who has kindly allowed his results to be reproduced here (Illus 18.9). Bearing in mind that not all the dates are as closely associated with the pottery as one would wish, and that in the case of Northton, the date was obtained from a bulk sample of animal bone, Marshall's model places the beginning of this tradition (at least as far as its radiocarbon-dated manifestation is concerned) to 3740–3640 cal BC at 68% probability and 3840–3580 cal BC at 95% probability, with most dates falling after 3500 BC.

The end date falls around 2800 BC; thus, a date range of c 3300–2900 BC for the manufacture of the Early/Middle Neolithic pottery found at Calanais is indeed plausible. This places the production of the pottery contemporary with the Phase 3 episode of cultivation on the site. Whether any of the pottery had been made before c 3300 BC, and had been contemporary with the earlier farming episodes in the area, Phase 2a (3720–3530 cal BC) and/or Phase 2b (3640–3380 cal BC; see 24.3.2 for details), cannot be determined. Given the overall date range for the ceramic tradition as presented in the Bayesian model, one cannot rule out this possibility.

The question of whether one should use the term 'Middle/Late Neolithic' (following Parker Pearson 2012 in his review of pottery from South Uist), rather than 'Early/Middle Neolithic', to describe the overall currency of the Hebridean Neolithic tradition is a moot point, and one suspects that many more dates and more modelling will be required before we can truly judge how long-lived the tradition had been. The term 'Early/Middle Neolithic' had been used to describe the Calanais material from an early stage in its reassessment, not least because of the probability that this ceramic tradition had emerged during what, for the Hebrides, would count as the Early Neolithic. However, it is acknowledged that, if the Calanais pottery had indeed been made between c 3300 BC and c 2900 BC, then 'Middle/Late Neolithic' might be a better term to use to describe it. But since the whole of the publication text has used 'Early/Middle Neolithic', then for the sake of convenience that term will be retained, albeit with the qualification made here. This is not simply a matter of semantics; the question of when the Calanais pottery was made is relevant to its relationship with the Grooved Ware found at Calanais, as discussed further below (18.3.4).

If the Calanais pottery had indeed been made between c 3300 BC and c 2900 BC, then when was it deposited at the site? This is a difficult question to answer, as the evidence is complex and ambivalent. It does indeed seem probable that there was more than one episode of deposition, even if the pottery had all been made at roughly the same time. We can say, with a fair degree of confidence, that some of the pottery was almost certainly introduced during Phase 7, after the construction of the Ring and possibly as late as c 2500 BC. (See 24.3.2 for the site phasing.) It would have been deposited as centuries' old, worn sherds – perhaps midden material from an old settlement or settlements nearby – which were incorporated within clays roughly contemporary with the platform upon which timber structures were erected. The evidence supporting this statement is summarised in Chapter 24.11 and described in detail in the excavation narratives. Furthermore, given the spatial and contextual distribution of the pottery, it seems likely that additional sherds entered the site along

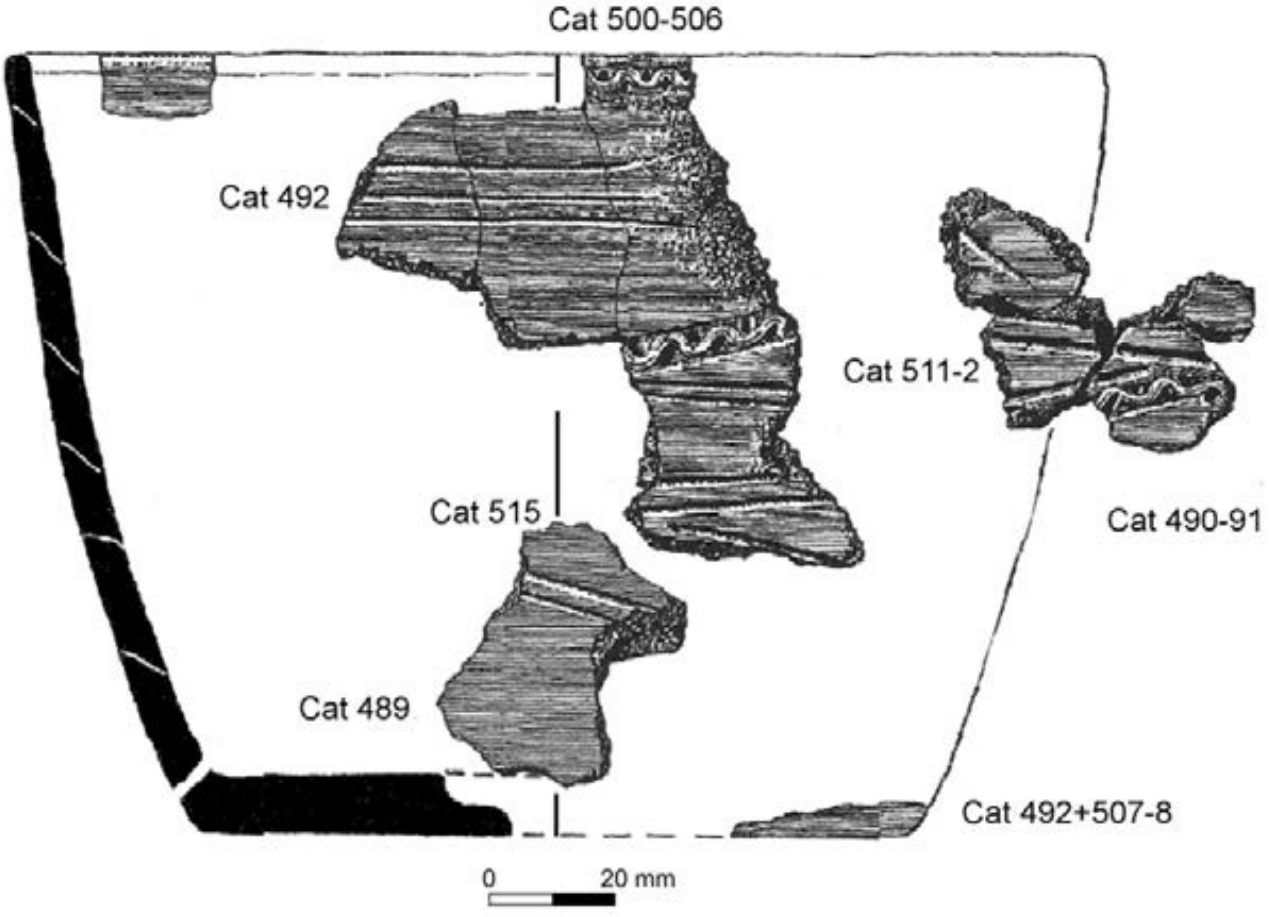
with the soils used to build up the wall and body of the chambered cairn, during Phase 8, perhaps as late as post-2500 BC [Appendix 12].Some of these sherds would subsequently have been disturbed and spread around when the cairn was robbed.

There may have been other episodes of deposition (e.g. when parts of a pot were deposited in area S). An important question is: Was any Early/Middle Neolithic pottery deposited prior to Phase 7? There are hints that a few sherds might have been, and the evidence is set out below. The possibility that some pottery was deposited as early as Phase 3, and was associated with the cultivation that occurred during that Phase, is raised by the evidence from Area F (see Chapter 24 Discussion 24.4.4-24.4.5) A deposition date in Phase 5b – possibly around 3000-2900 BC, and just prior to the Ring's erection – is possible for sherds Cat 243, 313–314, 317 that were found in the pre-Ring turf line BI 164, and Cat 676 which was found in soil below 164 (see 7.15.5 and 7.16.1); and a Phase 6b date (possibly 2950–2850 BC, contemporary with the Ring's erection) is possible for the deposition of Cat 315, which was found in the yellow-green clay fill/capping of Ring Stone 42 stone-hole (see 7.15.5). Interestingly, sherds 313–4 and 315 come from two of the Unstan-like bowls, while 317 is from another thin-walled, fine bowl. However, slight uncertainties about the interpretation of the green clay context where Cat 315 was found, and the long-live nature of the turf line where Cat 313-4 were found, means that we cannot be precise about how their depositional history relates to the Ring's erection.

18.6 Late Neolithic: Grooved Ware (JAS)

18.6.1 Description

Just one pot – ASH 61 (Cat 489–495, 497–519 and 521, Illus 18.11) – can be ascribed to this ceramic tradition. It is a fairly small, fine, thin-



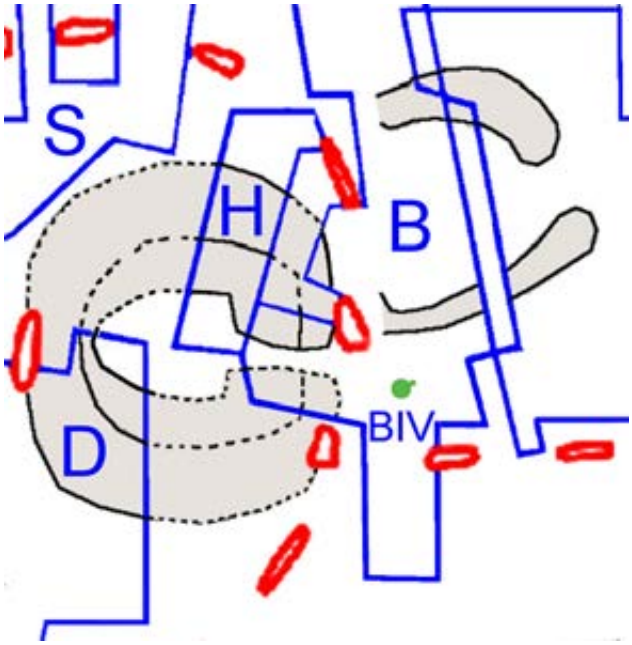
Illus 18.11 Grooved Ware pot ASH 61. Drawing by Tom Borthwick

walled, tub-shaped bowl with a wide flat base, gently splaying wall and gently-pointed rim. The estimated rim and base diameters are c 186 and c110 mm respectively, the estimated height 132 mm, and the wall thickness 5.0–10.2 mm. Around 15% of the pot is present, and its constituent sherds range from being moderately to heavily abraded. Several sherds had broken along coil joint lines, and the base sherds had spalled along a joint plane. The exterior is a medium brown with varying degrees of orange; the core is generally mid to dark grey; and the interior is medium-brown to blackish. There are traces of a very thin black organic encrustation on the interior, which may well represent the remains of the pot's evaporated contents, rather than any material that had been burnt on. (In other words, there is no evidence that this had been used as a cooking pot.) The fabric (type 1) is hard and corky, with some relatively large voids, over 2 x 2 mm; traces of a dull, brownish, fine-grained rotten stone at the bottom of two hollows on the base may provide a clue as to what had produced the corky texture as seen in the Calanais sherds. The surfaces had been carefully smoothed and slipped and there is decoration on the interior immediately below the rim (comprising a single, thin horizontal incised line) and over much of the exterior surface. The latter consists of horizontal and diagonal incised grooves (the latter probably arranged in triangle and/or lozenge shapes), and narrow horizontal and diagonal bands of 'wave and dot' decoration, featuring a meandering line in false relief, the effect being created by having carefully gouged the clay from either side of the line, then stabbing the hollowed areas with a sharp oval-ended tool.

A few other sherds were considered by Henshall as potential Grooved Ware candidates, but the evidence to support their identification as such is weak and, as she pointed out, alternative identifications can be suggested. In particular, Cat 524 (ASH 63, Illus 18.xx) had been likened to the ASH 61 pot because of its banded decoration, and because the sherd had been thought to have come from just above the base of a pot. However, careful reassessment of its curvature indicates that this is from the neck of a small pot (whose diameter at this point had been c150 mm), with the linear decoration running horizontally rather than diagonally, and it is most likely to have come from a thin-walled Beaker, albeit a particularly gritty example (see 18.7.7)

18.6.2 Location of the Grooved Ware (PJA/JAS)

The sherds of ASH 61 were found a few metres east of the Ring, in area BIV (Illus 18.12). Twenty seven of the 30 sherds were found in the shallow scrape or pit 877, and the remainder less than 0.3 m away, in a roughly circular patch of grey sand with charcoal flecks (866).



Illus 18.12 Distribution of sherds of ASH 61

The sherds from 866 (namely Cat 489–491) conjoin with others from 877. Both these contexts appeared to have been disturbed by ground-working represented by a generally black soil 160; that and the later ground-working which formed soil 141 may well be responsible for the presence of Early/Middle Neolithic and probably Beaker sherds (Cat 496, 520 and 733–4) in 877.

Even though only 15% of the pot is present, this is still a considerably greater proportion than was the case with the Early/Middle Neolithic pottery, and it seems reasonable to suggest that the pot may originally have been deposited complete in

877 (or else as a substantial part of a pot). The subsequent disturbance could explain not only the displacement of the three sherds to 866, but also the disappearance of the rest of the pot. Also, the edge of the late ditch 100 was very close to these contexts and may have removed related pot-rich features.

The stratigraphic evidence is not inconsistent with the deposition of the pot in the pit after the stone ring had been erected and before the chambered cairn was constructed. It may be that the pot's deposition formed part of the rituals associated with the initial phases of use of the Ring, thus belonging to Phase 6c or 7 in the overall chronological scheme – or even to Phase 6b immediately after the Ring's erection. (See Chapter 24.3.2).

18.6.3 Discussion of the Grooved Ware (JAS)

The presence of Grooved Ware at Calanais is of considerable significance, as this type of pottery is very rare indeed in the Hebrides, and absent from the north-west mainland of Scotland (Longworth & Cleal 1999). The only other Grooved Ware find in the Western Isles is a small, thin-walled fine bowl from the passage tomb of Unival, North Uist (Henshall 1972, 309). The deposition of that bowl represents secondary activity in the tomb, occurring after – and probably several centuries after – the deposition of Hebridean Neolithic pottery (Scott 1948). The Unival bowl, while not identical to ASH 61, is closely comparable in being a small, thin-walled, fine-textured bowl with incised decoration in triangular/lozenge designs. It is smaller than the Calanais vessel; its wall splays more and the rim curves upwards; and it has stab decoration in filled triangles/lozenges rather than the wave and dot design, although both pots have horizontal and diagonal grooves, and share the internal sub-rim groove.

The variety of Grooved Ware represented by ASH 61 belongs to the early part of this ceramic tradition and is particularly widespread, being found for example at the Stones of Stenness (Ritchie 1976), Quanterness (Renfrew 1979) and Barnhouse (Jones 2005) in Orkney; at Balfarg henge, Fife (Henshall and Mercer 1981, 128–9 and fig 43); Balfarg Riding School, Fife (Henshall 1993, with P41–46 offering especially close parallels for ASH 61, and P48–54 also being comparable); Machrie Moor, Arran (Haggarty 1991, illus 6, see especially nos. 17a and 20a); Knowth passage tomb 6, Co. Meath, Ireland (Eogan 1984);and at various sites in southern England, including Woodlands, Wiltshire – the find spot chosen as the type-site for this variety of Grooved Ware by Ian Longworth (Wainwright and Longworth 1971).

The evidence from Stenness, Balfarg henge and Machrie Moor indicates a pattern of association between this type of Grooved Ware and stone (and timber) circles, some set within early henge monuments. Indeed, it has been argued (Sheridan 2004a, 32–3 and fig. 5.1, and see Chapter 24) that this strikingly broad geographical spread was related to the spread southwards and south-westwards, from Orkney, of the use of stone circles (with some being preceded by timber circles, as at Machrie Moor, Arran: Haggarty 1991) and of the practice of using Grooved Ware pottery in general. The two phenomena appear to be linked, with the use of Grooved Ware appearing to be an integral part of the ceremonies. It should be noted that at both Stenness and Balfarg henge, the vessels that are most similar to the Calanais vessel had been found as large parts (e.g. around a third) of a pot, as if a whole pot – or a large portion thereof – had been deposited.

The dating of this early type of Grooved Ware has recently been reviewed (Schulting et al. 2010, 33–39), and while its use may have begun in Orkney prior to 3100 BC, the evidence from the Stones of Stenness suggests its use there during the 29th century BC (ibid., illus 23). The vessel from that site which most closely resembles the Calanais pot – pot 16 (Ritchie 1976, fig. 6, 16) – was found in the west ditch terminal, from where some of the bones that were AMS-dated in 2006 and 2007 had been found (Sheridan and Higham 2006 and 2007). The dating evidence from other sites is consistent with a use of this pottery during the first few centuries of the third millennium BC. At Balfarg Riding School, the pottery most similar to the Calanais bowl is associated with six dates from Timber Structure 2, the charcoal-impregnated layer in the ditch and the pit (Dalland

1993, table 8). These dates cluster within the first three centuries of the third millennium, with some standard deviations extending back into the late fourth millennium; Bayesian modelling of those dates might suggest a narrower date range. And at Knowth passage tomb 6, three recently-obtained AMS determinations for calcined human bone found in the immediate vicinity of the Grooved Ware pot cluster tightly (when Bayesian-modelled) in the range c 3000–2900 cal BC (Schulting et al. 2010, 37; Schulting et al. forthcoming).

The dating from other sites is problematic, but could still be taken to indicate the use of this type of Grooved Ware within the first half of the third millennium BC. At Balfarg henge, feature A11 – a posthole of one of the timber circles within the henge, whose fill included parts of a pot comparable in style to the Calanais vessel (Henshall & Mercer 1981, fig. 43,7) – produced charcoal that was dated to 4035±50 BP (GU-1161, 2860–2470 cal BC at 95.4% probability). However, the dated sample was bulked charcoal of alder (c 32 g), willow (c 4.2 g), hazel (c 3 g), oak (c 1.7 g) and unidentified species (c 48 g: Dickson & Stenhouse 1981), thereby casting some doubt on its reliability. Furthermore, since this was a date measured before technical upgrades at the dating laboratory, Ashmore et al. (2000) have recorded that its standard deviation needs to be increased to ±110, thereby reducing its precision to 2890–2290 cal BC at 95.4% probability.

The dating evidence for the timber circles at Machrie Moor (Haggarty 1991) is not good enough to be used, although it should be noted that the complex timber circle (site 1) that has produced the Grooved Ware similar to the Calanais pot is comparable with other complex timber circles that have been dated – mainly in Ireland – to between 2900/2800 and 2500 BC (e.g. at Knowth, Co. Meath; Ballynahatty, Co. Down; at sites on the M3 motorway in Co. Meath; and near Ballygawley, Co. Tyrone: Eogan and Roche 1999; Hartwell 1998; Lyne 2008; J. Lochrie pers. comm.).

The dating evidence from southern England, reviewed by Garwood (1999), is ambivalent and inadequate, with some dates within the first half of the third millennium, and others in the second half.

As for the Calanais Grooved Ware pot, there is no directly-associated radiocarbon-dated material, and so its dating depends on the comparanda cited above, and on the supposed date of the erection of the Ring. The comparanda from Stenness and Knowth suggest that the pot could be as early as the 30th or 29th century BC. That date is consistent with the limited and indirect dating of Phase 6b (i.e. the erection of the Ring), with its terminus post quem of 2980–2510 BC, the interpolated date for the start of pollen zone 3a. (See 24.3.2 and 24.9.1)

In theory, then, the Calanais Grooved Ware pot could have been made while the Hebridean Neolithic ceramic tradition was still current (as discussed in 18.3.3) – although one cannot rule out the possibility that its manufacture postdates that of the Early/Middle Neolithic pottery found at Calanais by up to a few centuries. That the Grooved Ware pot had been made locally is suggested by the fact that it has the same corky fabric as had been seen in some of the Early/Middle Neolithic pottery from the site. How, then, is its presence to be interpreted?

The most plausible scenario is that this exotic style of pottery appeared, along with the idea of creating a stone circle (and the beliefs and ceremonial practices that accompanied this), as a result of links with Orkney around or shortly after 3000 BC – the same links that are responsible for the more general southward spread of the use of timber/stone circles and of Grooved Ware (Sheridan 2004a; 2012a). This would not have been the first occasion on which links had existed along the Atlantic façade, between the Hebrides and Orkney, as the shared use of virtually identical Unstan Bowls clearly demonstrates. Exactly when the shared use of Unstan Bowls occurred remains a matter for debate, but recent Bayesian modelling of the radiocarbon dates for the Knap of Howar settlement in Orkney (where such vessels were found in its Phase 2) indicates that Unstan Bowl use at that site is bracketed between 3620–3370 cal BC and 3320–2920 cal BC (95%: Schulting et al. 2010, 33 and illus 21). Thus, the Orkney-Hebrides Unstan Bowl link could theoretically predate the stone circle/Grooved Ware link by up to several centuries.

18.7 Chalcolithic and Early Bronze Age: Beaker and Food Vessel

At least 53 vessels – 51 Beaker plus one definite and one probable Food Vessel – have been identified, making Beakers potentially the commonest category of pottery found at Calanais (although the difficulties of estimating the minimum number of Early/Middle Neolithic vessels makes comparison of vessel numbers hard).

The Beaker pottery is diverse in style and likely to relate to different episodes, and different kinds of activity; the Food Vessels are likely to represent at least one further episode of activity. Overall, the episodes of activity represented by the Beakers and Food Vessels could span as many as 750 years. As will be seen below, the question of how these episodes relate to the other evidence for activities at the site (e.g. the construction, use and modification of the chambered cairn) is not always easy to answer.

In order to structure the description and discussion of the Beaker and Food Vessel pottery, it will be dealt with as follows:

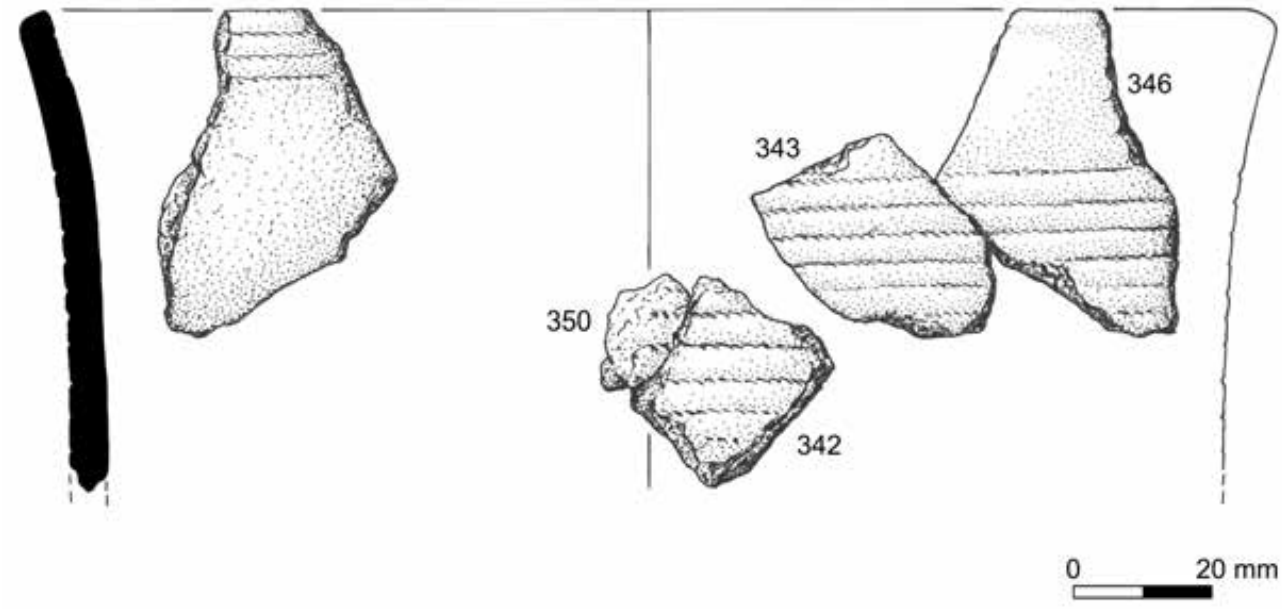
18.7.1-4: Stylistically earliest, international-type Beakers; **18.7.5-13:** Miscellaneous fine and 'domestic' Beakers; **18.7.10-12:** Beaker ASH 42, from a possible grave; **18.7.13-15:** The Food Vessels

18.7.1 Stylistically earliest, international-type Beakers (JAS)

Stylistically the earliest Beaker pottery is represented by sherds of four very thin-walled, fine, almost inclusion-free Beakers (ASH 37–39, Illus. 18.13–18.15, and ASH 40, not illustrated) of international style. In David Clarke's Beaker typology (1970), ASH 37 and 38 – and probably also ASH 40 – fall into his 'All Over Cord[-impressed]' (AOC) category, and ASH 39 into his 'European' (E) category. According to Lanting & van der Waals' stepwise Beaker typochronology (1972), they would all fall within steps 1–2. According to Humphrey Case's scheme (2004), all belong in his 'Group D'. And according to the latest typochronology, by Stuart Needham (2005), all will have been 'Low-Carinated Beakers'. All four classification schemes agree that these are early and of styles with a wide, international distribution.

The AOC Beaker ASH 37 (Illus 18.13) is represented by four abraded sherds from the rim and neck, as follows (Table 18.4).

(Note that Henshall had originally attributed Cat 350 to ASH 38, but in fact it belongs to this pot, conjoining with Cat 342.) Cat 343 and 346 probably conjoin, but their edges are too abraded



Illus 18.13 International-type, AOC Beaker ASH 37. Drawing by Marion O'Neil

to form a firm conjoin. Overall, less than 5% of the pot is represented by these sherds.

Table 18.4. Sherds from Beaker ASH 37

Cat	SF No	Area	Con-text	Shd Wt (g)	ASH No
342	81.382	BV	813	4	37
343	81.396	BV	813	5	37
346	81.179	BV	810	9	37
350	81.416	BVWX	160.3	1	38 [sic]

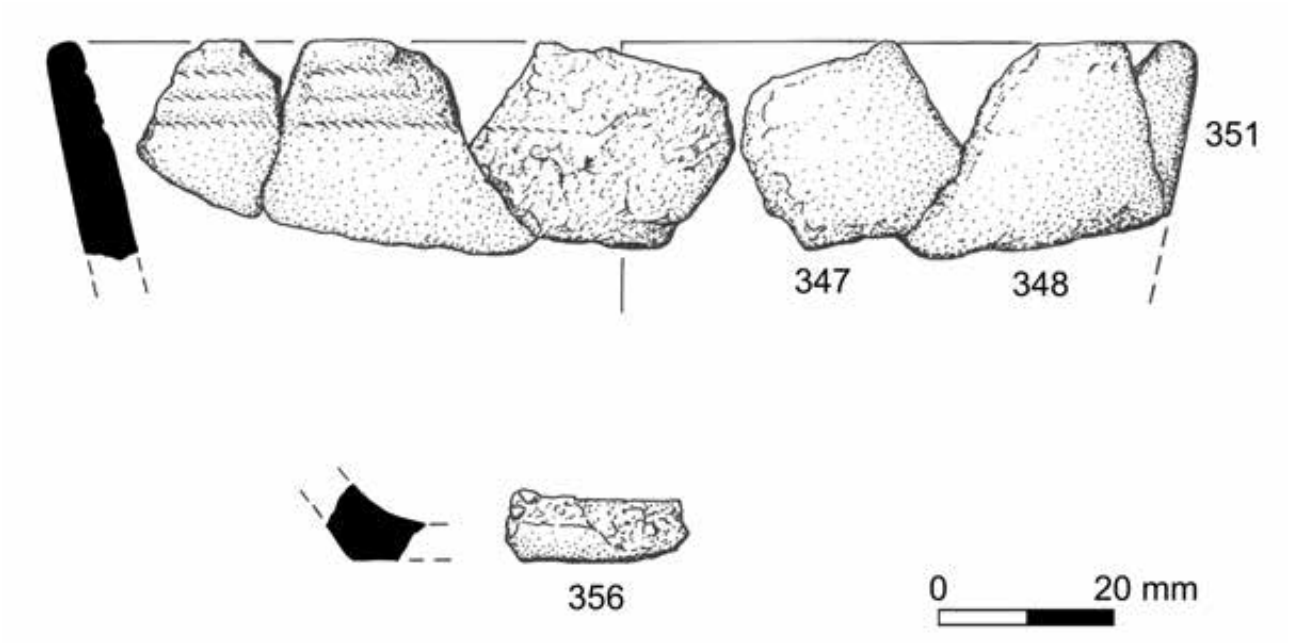
The rim is gently squared off; it and the upper neck splay gently, before the rest of the neck descends near-vertically to what would have been a low carination and flat base.

The estimated rim diameter is c 180 mm, narrowing to c 160 mm at the upper neck; wall thickness ranges from 4.4 mm (on Cat 350) to 6.5 mm, and the fabric is virtually inclusion-free (type 3), although tiny mica platelets give the surfaces a slightly glittery appearance. The sherds are a dark, slightly reddish-brown throughout and the surfaces had been very carefully smoothed (and possibly slipped or at least wet-smoothed), and polished to a medium sheen on the exterior.

Beaker ASH 38, a smaller AOC Beaker, is represented by between six and eight sherds (Illus 18.14; Table 18.5). Three of these (Cat 347, 348 and 351), are from the rim and upper neck area and conjoin with each other. A fourth neck sherd, Cat 357, may also belong to this pot although one cannot rule out the possibility that it belongs to ASH 37; it does not (contra the original Henshall catalogue) seem to belong to ASH 39. Cat 846 is a very small sherd from the pot's gentle carination. A base-belly junction sherd, Cat 356, may also to belong to this pot; it had originally been attributed to ASH 39 but differs from that Beaker slightly in colour and its characteristics are consistent with those of the ASH 38 sherds.

Again, less than 5% of the vessel is present.

As with ASH 37, the rim is gently squared off and, along with the upper neck, gently everted. The estimated rim diameter is c 130 mm and the wall thickness ranges from 5.7 mm to 7 mm. The fabric matches that of ASH 37 (including the presence of glittery mica platelets). The surfaces are a dark reddish-brown and the core is dark grey; the surfaces had been very carefully smoothed (and possibly slipped), and the exterior polished to a low sheen.



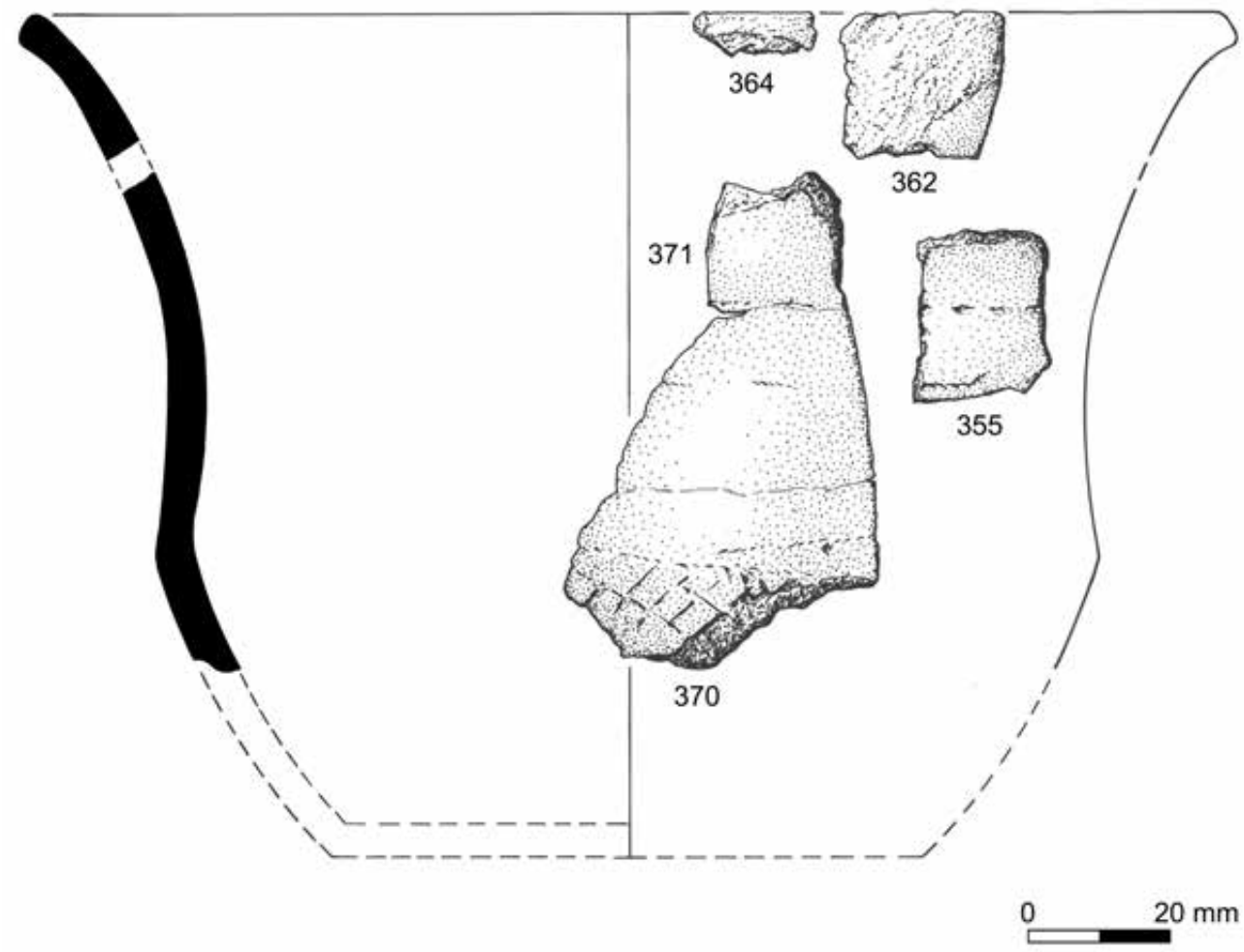
Illus 18.14 International-type, AOC Beaker ASH 38. Drawing by Marion O'Neil

Table 18.5 Sherds from Beaker ASH 38

Cat	SF No	Area	Con-text	Shd Wt (g)	ASH No
347	81.176	BV	810	4	38
348	81.619	BVSX	837	4	38
349	81.431	BVSX	812.1	1	38
351	81.104	HII	736	2	38
352	81.104	HII	736	1	38
356	80.115	BI	117	2	39 [sic]
357	80.144	BI	120	2	39 [sic]
846	80.61	BV	117	1	76 crb

Both ASH 37 and 38 have been decorated with horizontal impressions of fine (c 1mm thick) twisted cord, with three lines on the inside just below the rim, and a blank area on the exterior of the neck before the horizontal lines commence. By analogy with other AOC Beakers, it is assumed that these lines will have continued down to the bottom (or close to the bottom) of the wall, and indeed the small sherd 846 confirms the presence of horizontal lines on either side of the carination.

A belly sherd from one other pot (Cat 372, ASH 40; not illustrated) has twisted cord impressions and could be from an AOC Beaker although it is slightly thicker than the others and is somewhat gritty (fabric 4).A second sherd that may well belong to this pot, and is from the neck, also has twisted cord impressions, albeit very faint (Cat 917, ASH 76 crb).Beakers ASH 37, 38 and



Illus 18.15 International-type Beaker ASH 39. Drawing by Marion O'Neil

40 are the only pots in the Calanais assemblage with twisted cord impression.

The 'European' Beaker ASH 39 (Illus 18.15) is somewhat less incomplete than ASH 37 and 38, with around 15% of the body being present. It is represented by 12, possibly 13 sherds from the rim, neck, carination and belly (Table 18.6, and see also 18.11.5, Entry 1).

Table 18.6 Sherds from Beaker ASH 39

Cat	SF No	Area	Context	Shd Wt (g)	ASH No
353	81.170	BII	112	<1	39
354	80.39	BI	107	1	39
355	80.115	BI	117	3	39
358 (poss.)	80.144	BI	120	<1	NC
362–363	81.305	BIWX	9999	3	39
364	80.185	BNW	9999	<1	39
366	80.61	BV	117	4	39
367	81.448	BV	812	3	39
368	81.174	BV	813	4	39
369	81.396	BV	813	2	39
370–371 (conjoined)	81.137 + 81.392	BVSX	141	13	39

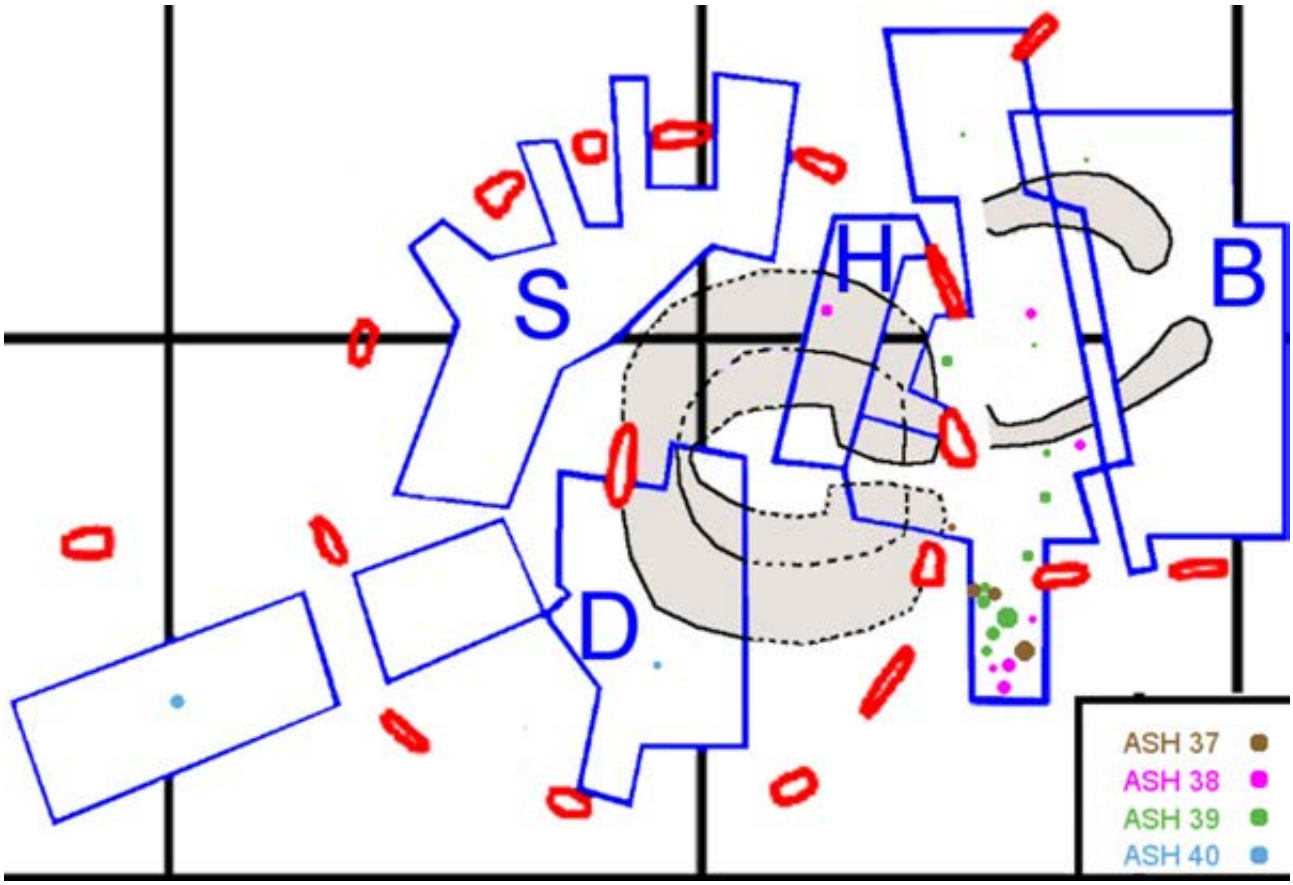
The rim is gently squared off and the neck (which occupies around 2/3 of the pot's height) is long and sinuous, flaring at the top. The neck-belly junction is marked by a low gentle carination, and the pot would have had a flat base (Fig. 18.14). In size it is comparable with ASH 37, with an estimated rim diameter of c 165 mm and estimated carination diameter of c 130 mm; enough of the pot is present to estimate its height at c 120 mm. Wall thickness ranges between 4.7 mm and 5.9 mm.

The fabric is virtually inclusion-free but for a few corky voids on its interior (fabric 1a). The surfaces had been very carefully smoothed, possibly slipped, and polished – to a medium to high sheen on the exterior, and a low to medium sheen on the interior. There are signs that the interior may have been scraped prior to polishing, to ensure thinness of the walls, and some sherds had broken along strap joint lines to reveal that the constituent straps had been fairly narrow on the neck. The exterior surface is blackish-brown; the core, dark grey; and the interior is medium brown, slightly reddish, becoming darker brown at the upper neck. Patches of very thin black staining on both surfaces may represent the residue left by evaporation of pot's contents (although some deliberate blackening of the exterior may have occurred); this residue does not represent material burnt on by the use of the pot for cooking.

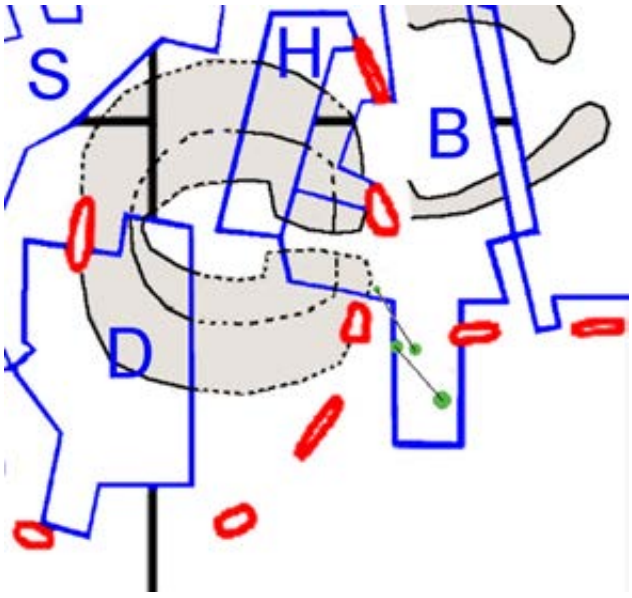
While of recognisably international style (Clarke's 'European', 'E'), this Beaker contains a local element in that part of its decoration has been made by impressing the edge of a cockle shell, collected from a nearby beach, into its surface. (See below for other examples of the use of shell on Calanais Beakers).

The decoration is fairly sparse and comprises roughly horizontal short stretches of shell impression, forming 2 discontinuous lines on the neck, spaced around 9 mm apart. There is a discontinuous line of shell impressions immediately above the carination, an untidy, slightly diagonal line on the carination, and another line immediately below it. Below this, there is a shallow incised criss-cross lattice design on belly. The decoration had been partly smudged by the final pot-smoothing process.

In her discussion of the early Beakers, Henshall also included the tiny rim sherd with a low, sub-rim external cordon (ASH 49a, Cat 450) within this category, and while this pot may indeed have been early, it is not the only Beaker in the assemblage with such a cordon (c.f. ASH 50, Cat 457–8, for example), nor is the sherd as diagnostic an indicator of 'early, international style' as the shape of ASH 37–39. It will therefore be discussed below along with the 'miscellaneous fine and domestic' Beakers – on the understanding that the 'miscellaneous fine Beaker' category might well include some vessels that are as early as the 'international style' Beakers but which, like Cat 450, are not indubitably early.



Illus 18.16 Distribution, by weight, of sherds from the early international-style Beakers ASH 37–40. They were probably all originally deposited before construction of the chambered cairn and enclosure



Illus 18.17 Distribution, by weight, of sherds from AOC Beaker ASH 37.The cairn is included although it may have been later than initial deposition of the Beaker. The lines show conjoining sherds

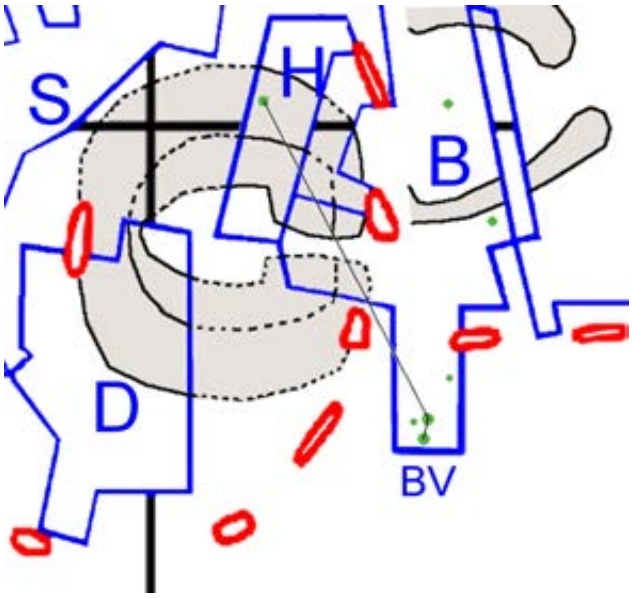
18.7.2 Distribution of stylistically earliest, international-type Beakers (PJA)

With the exception of Cat 372 (ASH 40) which was found in Area DIII, and Cat 917 (ASH 76 crb but may well be from ASH 40), which was found in DI, all the sherds from the early, international-style Beakers described above come from the east side of the excavated area (Illus 18.16).

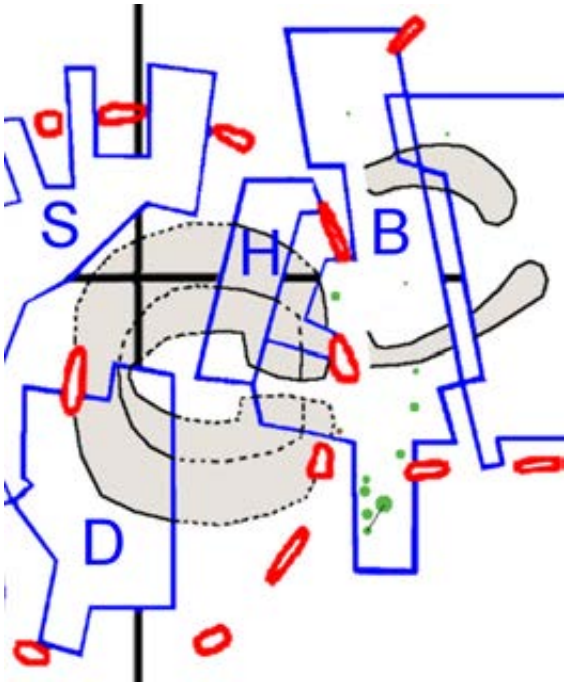
All four of the sherds from AOC Beaker ASH 37 were found in Area BV and its western extension into the passage area (Illus 18.17, Table 18.4). Two (Cat 242 and 243) came from the oval Pit 813 with its dark soil containing much charcoal; one (Cat 346) came from disturbed green sandy clay 810 in the southern part of Area BV, around a metre away from pit 813; and the fourth (Cat 350) was found in the post-Grooved Ware, pre-Insular Beaker soil 160 in Area BVWX. The overall extent of the spread of sherds from this Beaker is nearly 3 metres.

The six to eight sherds of AOC Beaker ASH 38 were more widely spread, with a distance of nearly 7 m between the most widely-separated sherds (Illus 18.18, Table 18.5). One (Cat 356, the wall-base junction sherd that may belong to this pot) came from superficial pre-peat soil 117 in BI, while another (Cat 846) came from the same context in BV. Two came from the southern part of BV, in disturbed sandy green clay 810 (Cat 347) and perhaps slightly less disturbed sandy green clay 812.1 (Cat 349).Cat 348 came from BVSX, context 837 – slowly-accumulated fills of a cultivation bed trough. The two sherds that are most important in terms of the dating of activities at Calanais are, however, Cat 351 and 352, as these shed light on when the chambered cairn was constructed. (Cat 351 conjoins with Cat 348 from BVSX.) Both 351 and 352 were found in the primary fill 736 of the cairn in Area H and, as argued elsewhere, these are unlikely to have arrived in that position through percolation through the cairn material. Instead, as argued in Chapter 12 (Area H), it is highly likely that these two sherds had been introduced in soil used to bed the large stones of the primary layers of the cairn. Broadly similar contexts also contained fairly abundant sherds of Early to Middle Neolithic Corky pottery, which must have been residual. This implies that the initial deposition of Beaker ASH 38 – probably in the southern part of Area BV – pre-dated the construction of the chambered cairn, and suggests that its disturbance occurred when the cairn was constructed.

The sherds that belong to Beaker ASH 39 were even more widely spread (Illus 18.19, Table 18.6), with slightly over 10 metres between the furthest-flung sherds. The greatest number and weight of sherds of came from BV and its southern extension (Cat 366–371), from ground-worked soil 141, late plough soil 117, and from the dark pit 813; note that pit 813 had also produced sherds from ASH 37. Three (including Cat 358, which may belong to this pot) came from BI, one from turf 107 (Cat 354), one from pre-peat plough soil 117 (Cat 355), and one from upper soil 120 in the as yet unbuilt enclosure (Cat 358). Two sherds (Cat 362, 363) were found in BIWX,



Illus 18.18 Distribution, by weight, of sherds from AOC Beaker ASH 38.The cairn is included although it was later than initial deposition of the Beaker. The line shows conjoining sherds



Illus 18.19 Distribution by weight of International Beaker ASH 39.The cairn is included although it may have been later than initial deposition of the Beaker. The largest spot represents 13g.The line shows conjoining sherds

very probably in the loose cairn material or the turf (9999), and a rimsherd (Cat 364) was found in the northwest of Area B, also in 9999. Finally, Cat 353 came from BII, in context 112; this context was a plough soil which in some places was composed of ploughed-down and spread Stage 2 enclosure bank, and in others seems merely to have been the subsoil of the prevalent pre-peat soil 117.

Finally, the sherd from the fourth stylistically early Beaker pot (Cat 372, ASH 40, possibly an AOC Beaker, not illustrated) came from general soil 309 in Area DIII, to the west of the Ring (Illus 18.16).

18.7.3 Discussion of the stylistically earliest, international-type Beakers (JAS)

The question of how and when these Beakers were originally deposited at Calanais will be considered below, in the light of the spatial and contextual data presented in 18.7.3; first, their comparanda and likely date will be reviewed.

Beakers of Clarke's AOC and E types (including small pots comparable to ASH 38) are particularly widely distributed over Britain, extending as far north as Shetland (Clarke 1970, fig. VIII and maps 1 and 2). They have been found in graves, in chamber tombs and in domestic contexts.

The grave finds include the earliest finds of Beaker pottery in Britain – as in the case of the 'Amesbury Archer' and 'Boscombe Bowmen' graves, Wiltshire and the graves from Sorisdale, Coll and Upper Largie, Argyll & Bute, for example (Fitzpatrick 2011; Ritchie & Crawford 1978; Sheridan 2008; Cook et al. 2010). As discussed elsewhere (Sheridan 2008; Cook et al. 2010; Shepherd 2012), the graves feature oval or sub-rectangular pits dug into the ground, with the deceased interred in a wooden, probably plank-built rectangular 'coffin' or in a stone version thereof (i.e. a cist), or perhaps sometimes without any container. Examples from Scotland include the following:

— The aforementioned oval grave with a small AOC Beaker from Sorisdale, Coll (Ritchie & Crawford 1978);
— the Dutch-style graves from Upper Largie, Argyll & Bute (Sheridan 2008; Cook et al. 2010) and Newmill, Perth & Kinross (Watkins & Shepherd 1980, the former with AOC, Cord-Zoned Maritime and epi-Maritime-type Beakers, the latter with a herringbone-impressed 'European' Beaker); and
— the cist graves with AOC Beakers from Dornoch Nursery, Sutherland (Ashmore 1989) and Salen, Mull (Duns 1883), the latter with fragments of a copper blade.

Sherds from two Beakers from the Poltalloch Estate in Argyll & Bute – one an AOC Beaker, the other a 'European' type (Maritime) Beaker with cardium (cockle shell) impressions, might also have come from cist graves (Clarke 1970, 71 and 514; RCAHMS 1988, 20, fig. C and 21). Like the Calanais Beakers, these are thin-walled and fine-textured.

Human remains from three of these Scottish graves – Sorisdale, Upper Largie and Dornoch Nursery – have recently been radiocarbon dated (as have the 'Amesbury Archer' and 'Boscombe Bowmen'), and all have produced dates within the third quarter of the third millennium BC (Sheridan 2007c), placing them among the earliest Beaker finds in Britain. For example, the Sorisdale individual produced a date of 3879±32 BP (2470–2220 cal BC at 95.4% probability, OxA-14722: Sheridan 2005, 183). Significantly, where the human remains have survived and it has been possible to undertake strontium and oxygen isotope analysis of the molar enamel of the deceased, the results have come back as 'non-local' in the case of Sorisdale (Sheridan 2008b), the 'Amesbury Archer' and some of the 'Boscombe Bowmen' (Fitzpatrick 2011). All may have been immigrants from the Continent, with the 'Amesbury Archer' believed to have come from Alpine central Europe, some of the 'Boscombe Bowmen' possibly coming from northern France, and the Sorisdale individual conceivably coming from the Netherlands (although more research is required to check the last identification). A probable Dutch connection has also been claimed for the Upper Largie and Newmill graves (Sheridan 2008b; Watkins & Shepherd 1980). Therefore, it seems likely that these international-style Beakers are associated with the widespread (but sparse) appearance in Britain of a small number of Continental immigrants; the rea-

sons for their appearance are discussed elsewhere (Sheridan 2008b; 2012b; Shepherd 2012). That said, it should also be noted that AOC Beakers appear to have a long currency in Britain: there is evidence (e.g. from Eweford, East Lothian: Sheridan 2007c, fig. 11.8) suggesting that AOC Beakers continued to be made into the last quarter of the third millennium (at least until c 2200 BC. See Needham 2005 for a discussion of this phenomenon). AOC Beakers are, however, principally a Chalcolithic phenomenon. On the Continent, the comparanda for our early, international-style Beakers are unlikely to precede the 25th century by very long, if at all. (See Sheridan 2008c for a discussion.) This therefore offers a generalised terminus post quem for the Calanais examples.

The other contexts which have produced early, international style Beakers include a few chamber tombs in Scotland (Clarke 1970, 529–30, 531–2), with Geirisclett, North Uist constituting a Western Isles find (Henshall 1972, 310, UST 18,2); here, however, the sherds of AOC Beaker are less fine-textured than those of Calanais ASH 37–39, and are closer in fabric to ASH 40.It is assumed – though cannot be proven – that the Beakers found in chamber tombs had accompanied interments. Where this has been tested through radiocarbon-dating human remains from such contexts, this has been found to be the case (e.g. at Achnacreebeag, Argyll & Bute: Sheridan 2005).

The non-funerary finds of early, international-style Beakers in Scotland include sherds of AOC pottery from Tiree (Clarke 1970, 514), of AOC and E Beaker from Torastain Cornaig, Coll, and those of both AOC and cardial-impressed E Beakers, thin-walled and fine-textured, from a midden at Sanna Bay, Ardnamurchan (ibid., 513; Mitchell 1934, 146; Ritchie 1970, 52). A further sherd of AOC Beaker from Ardnamurchan was found in sandhills at Cul na Croise, Kentra Bay (Ritchie 1970, 51-2). The recent excavations at a Beaker period settlement on machair at Sligeanach, Cill Donnan, South Uist (Sharples 2012) have produced sherds of an AOC Beaker (Sheridan 2012c, fig. 11.11, A1). A radiocarbon date – on sheep bone from the same context as the AOC Beaker – of 3875±35 BP (2470–2200 cal BC at 95.4% probability, OxA-8905) is virtually identical to that obtained for the Sorisdale individual (but see Sheridan 2012c, 231 regarding the dating of material from the trench in question).

Given these comparanda, it therefore seems likely that the Calanais international-style Beakers date to the third quarter of the third millennium (i.e. within the Chalcolithic period – see Sheridan 2012 b), possibly as early as the 25th century BC. Unfortunately, no radiocarbon date was securely associated with any of the Calanais sherds, and the stratigraphic data reveal only that:

— ASH 37 had been deposited later than the Grooved Ware pot ASH 61, and before the insular-style Beaker pottery as described in 18.7.5;
— The sherds of ASH 37 and 38 found in 810, and of ASH 39 found in 812, are in contexts that are interpreted as contemporary with or slightly later than the building of the green clay platform and its associated light timber structure;
— The sherds of ASH 37 and ASH 39 in pit 813 had been deposited during the build-up of plough soil 141 which is believed to have ceased sometime before – probably well before – 1690 BC (see 7.3.2–7.3.3); and
— ASH 38 had been deposited before the chamber tomb was constructed.

Furthermore, the two radiocarbon dates from Calanais that fall within our 'candidate' 2500–2250 BC horizon – SUERC-11590 and -11591 (Chapter 23.10.2 Radiocarbon Dates) – cannot be linked with the international Beaker sherds, as they represent residual material in plough soils relating to the dilapidation of the chambered cairn.

As far as the contextual and stratigraphic data are concerned, with the exception of the two pieces found in the basal level of the cairn, the sherds are not linked with any of the structures (such as the pre-cairn timber structure/s) and not a single sherd is demonstrably in its original place of deposition. (The presence of a few sherds inside the area occupied by the Enclosure does not imply any contemporaneity with that structure; see Chapter 24.13 on the dating of the Stage 2 Enclosure.) The degree of disturbance to ASH 37–39 is reflected in the fact that, in most cases, pottery of earlier and later date had been found

in the same contexts. And while it is tempting to view the oval pit 813 – in which sherds of ASH 37 and ASH 39 were found – as a potential grave, but if it was it was much later and associated with Beaker ASH 42 (see Chapter 7.8.5).

What can we say, then, about the deposition of these four pots? The fact that a greater percentage of each vessel was present (as far as ASH 37–39 are concerned) than had been the case with the Early/Middle Neolithic pottery suggests that these may originally have been deposited as complete pots. The concentration of sherds of ASH 37–39 in Area BV and its southern extension could be taken to indicate that they had been deposited outside the Ring, in its SE quadrant area. It is indeed possible that they had been deposited in one or more grave which lie/s outside the excavated area. The possibility that there may have been some graves (in addition to the later Beaker grave containing ASH 42, discussed below) is discussed in Chapter 24.12.10. They may have been set into the area between BIV/BV and the Ring, or that south and east of stone 30 of the East Row, outside BI/BIV/BV, which were not excavated. Alternatively, as suggested in 7.10, one cannot rule out the possibility that the light timber structure inside the Ring had been used for funerary purposes, and that the Beakers had been disturbed during clearing out of this structure prior to cairn construction. What one can say is that it is unlikely that any of these early Beakers had been grave goods for interments in the chamber tomb, since at least one of these pots demonstrably predates the tomb's construction.

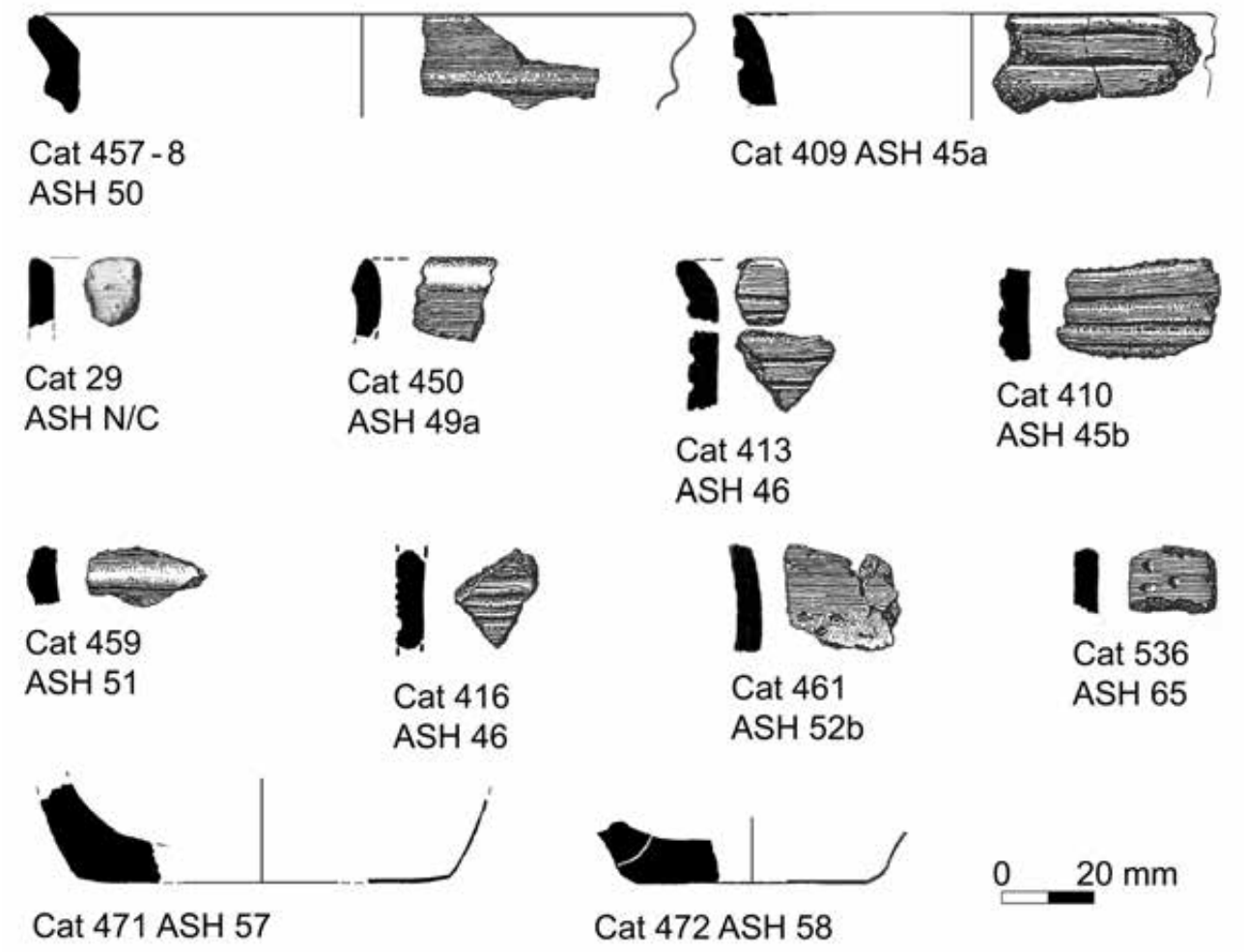
Whether or not the international Beakers had been grave goods, their proximity to the Ring suggests that their deposition had been determined by the presence of the Ring. In other words, if they had been grave goods for one or more pit-dug grave, the juxtaposition of the grave/s with the Ring evokes the kind of deliberate placement as seen in the grave of the 'Amesbury Archer' (although in the latter case, the grave lies at a considerably greater distance from the Stonehenge circle: see Fitzpatrick 2011). If the Calanais international Beakers had been deposited in a non-funerary context, again this implies deliberate structured deposition that respects a by-then ancient sacred site. A parallel for this is offered by the deposition of a potful of barley grains (together with the Beaker that had probably contained them) on an ancient Early Neolithic long mound at Eweford, East Lothian (Lelong & MacGregor 2007, 90 and fig. 4.21).

18.7.4 Miscellaneous fine and 'domestic' Beakers

Most of the Beaker sherds from Calanais fall within this category, the vessels encompassing Henshall's catalogue numbers ASH 41, 43–60, 63, 65–8 and 70–72, plus numerous sherds from among her ASH 76 and 79 categories and a few that she had not classified. It is hard to be certain about how many vessels are represented, because there are overlaps in fabric types between Beaker and Early/Middle Neolithic sherds, and some 135 small featureless sherds have had to be listed in the Catalogue under headings such as '[E/MN] corky or Beaker' (see Technical Note 18.7.6). Not only is there textural overlap: there is also some spatial overlap in the distribution of Early/Middle Neolithic and Beaker pottery, especially in Area D. Similarly, in several cases it is impossible to be sure whether the sherds in question are from 'domestic' Beaker or much later pots (see Chapter 18.7.7 and Technical Note 18.7.7) The description and discussion that follows focuses on those sherds that are deemed to be definitely, probably or possibly Beaker (excepting those which are covered in sections 18.7.1–18.7.4 and 18.7.10–18.7.12). The sherds in question are listed in Technical Notes 18.7.6 and 18.7.7. If one then takes a conservative estimate of the minimum number of vessels represented among those listed sherds, restricting the criterion of acceptability to 'feature' sherds (e.g. rims, cordons and bases, and decorated sherds), and excludes those where there is uncertainty about the identification, one arrives at a figure of 45 (comprising 27 'fine' pots and of 18 'domestic' pots, as defined below). However, if one accepts every individual entry in the lists as a discrete pot, the total rises to 93 (60 fine, 33 'domestic') – although this may be an over-estimate, since the small size of many of the pieces makes it impossible to tell whether sherds listed in different entries could belong to the same pots.

As with the Early/Middle Neolithic pottery, the vessels discussed here are highly fragmented, with most pots represented by single (or a few) sherds constituting less than 2% of the overall vessel. (The exception is a large 'domestic' Beaker, Cat422–449 and 857–61 (ASH 48), but even here, less than 10% of the pot is represented.) Reconstruction of overall pot shapes and decorative schemes is therefore hampered. However, it is clear that a range of vessel sizes and fabrics is represented, and a distinction can be made between thin-walled, fine-textured and generally small to medium-sized pots (with estimated rim diameters of 100–200 mm) – henceforth referred to as 'fine' – and others that are generally slightly thicker-walled and/or larger, and/or coarser-textured. The latter – which include one pot with an estimated rim diameter of 280–300 mm (Cat 468, ASH 55) – have been labelled in the Catalogue as 'domestic Beaker'. However, it should be emphasised that all the Beakers described here probably formed part of the same ceramic repertoire, with the 'fine' pots simply representing the smaller and finer component. (See Gibson 1982, 69–76 for a discussion of Beaker domestic assemblages.) Whether they had actually been used at Calanais in a domestic context will be considered below.

In terms of situating these pots within our understanding of Beaker pottery in general, it should be noted that they do not fit comfortably within the existing Beaker classificatory schemes, which were largely constructed with funerary Beakers in mind; the closest comparanda in Clarke's 1970 scheme are late Northern British Beakers. However, as will



Illus 18.20 Miscellaneous fine Beakers. All drawings except Cat 29 by Tom Borthwick; Cat 29 by Marion O'Neil

be seen below (18.7.9), the Calanais assemblage finds several points of similarity with non-funerary Beaker assemblages in the Western Isles.

18.7.5 The fine Beakers

The 'fine' Beakers (listed in Technical Note 18.7.6, and see Illus 18.20) range in size from an estimated rim diameter of 100 mm (Cat 409, ASH 45a) to just over c 200 mm (Cat 459, ASH 51), with most falling towards the lower end of that range. Wall thickness ranges between just 4.3 mm (Cat155, ASH 11) and 8.5 mm (Cat 416, ASH 46) – with base sherd thickness of up to 10.6 mm (Cat 472, ASH 58). Most are of fabric type 3 (i.e. containing very few inclusions), but fabrics 1a and 2 (and, in two instances, gritty fabric 4) are also represented. The surfaces had been carefully smoothed and either wet-smoothed or coated with a thin slip; in some cases (e.g. Cat 415, ASH 46) the surfaces had been polished to a low or medium sheen. Rims are rounded (Cat. 457–8, ASH 50), gently squared-off (Cat 29, ASH NC) or slightly pointed (Cat 409, ASH 45a; Cat 450, ASH 49a) and upright or slightly everted. Definite or possible sub-rim cordons on the outside of the neck were noted on seven sherds, from six or seven pots (Cat 450, ASH 49a;Cat 451, ASH 49b;Cat 457, ASH 50; Cat. 459, ASH 51; Cat 896, ASH 76 crb; and Cat 918–9, ASH 76 crb, these last from one or two pots). These cordons – a widespread feature on Beaker pottery – may have been decorative, but they could also have facilitated the tying of a flexible cover.

The neck sherds belonging to the fine Beakers indicate curving, splaying necks akin to those seen among the early, international-style Beakers ASH 37–39. One definite, and gentle, carination is present in the assemblage – a burnt sherd Cat 672 (ASH 79) – and there are two other possible carination sherds (Cat 932, ASH 76 crb, and Cat1004, ASH 76 crb). The base sherds are, naturally, flat; Cat 469–70 (ASH 56) are from a base, around 80 mm in its diameter, with an internal omphalos (raised area) at the centre, while Cat 472 (ASH 58) has a pedestalled base, above which the belly kinks out.

The decorative repertoire on these fine Beakers is very narrow, consisting principally of horizontal incised lines around the neck of the pot. In some cases, these are deep grooves (e.g. Cat 409, 410 and 413, ASH 45a, 45b and 46); in others, they are shallow (e.g. Cat 415, ASH 46). In one instance (Cat 416, ASH 46), the lines run in two directions (horizontal plus diagonal) – a common motif on Beaker pottery, with Hebridean parallels including sherds from Northton, Harris (e.g. Gibson 2006, fig. 3.23, 14) and Sligeanach, South Uist (Sheridan 2012c, fig 11.11,10).

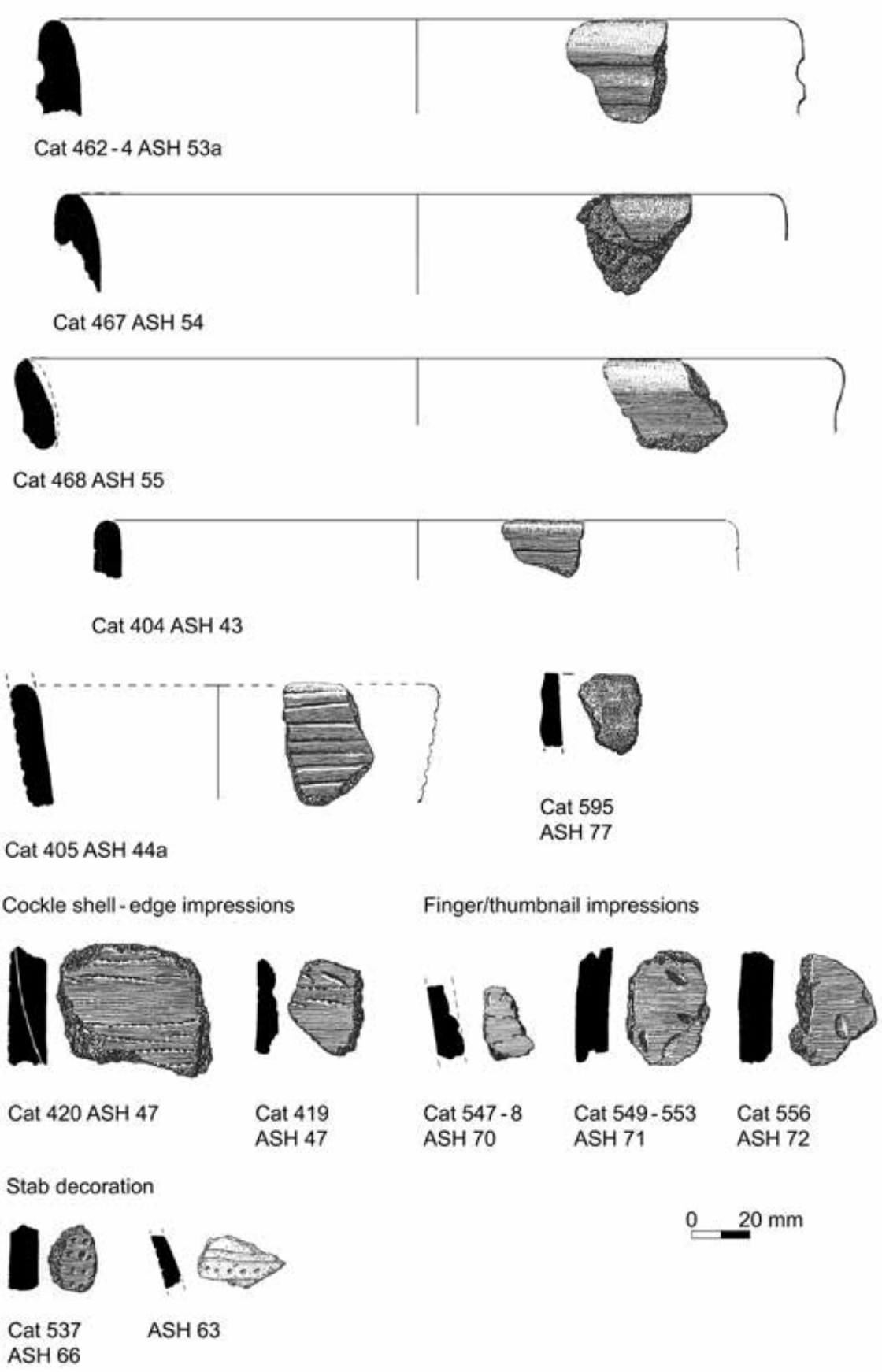
Impressed decoration is present on Cat 536, ASH 65; Cat 541–2, ASH 67 and Cat 543, ASH 68 (with Cat 541–3 possibly all from the same pot) and in each case it consists of random dot-stab impressions, some roughly circular. These pots had not originally been classed as Beakers by Henshall and indeed, as pointed out below, we cannot rule out the possibility of an Early/Middle Neolithic date for these sherds; but there are parallels for the use (albeit rare) of dot-stab impressions on Beaker pottery (e.g. at Rosinish, Benbecula: Shepherd 1976, fig. 11.3.4).

What is striking about the decoration on the fine Beakers – and also the 'domestic' Beakers – is the absence of cord- and comb-impressed decoration: this sets these pots apart from the early, international-style Beakers ASH 37, 38 and 40 described above, with their cord impressions, and from Beaker ASH 42 (described below in 18.3.14–16), with its comb-impressed decoration.

The presence of thin blackish organic residue on the exterior of fine Beaker sherds Cat 450 (ASH 49a) and Cat 457–8 (ASH 50) provides a clue as to these pots' original contents, although it is hard to be certain whether this represents burnt-on material, from the use of the pots as cooking pots, or material that has simply spilt onto the exterior and had evaporated. Similarly, it is unclear whether the burning that may well have been suffered by Cat 672 (ASH 79) – a very thin, fine pot – had resulted from the pot having lain in a hearth after breaking from use as a cooking pot.

18.7.6 The 'domestic' Beakers

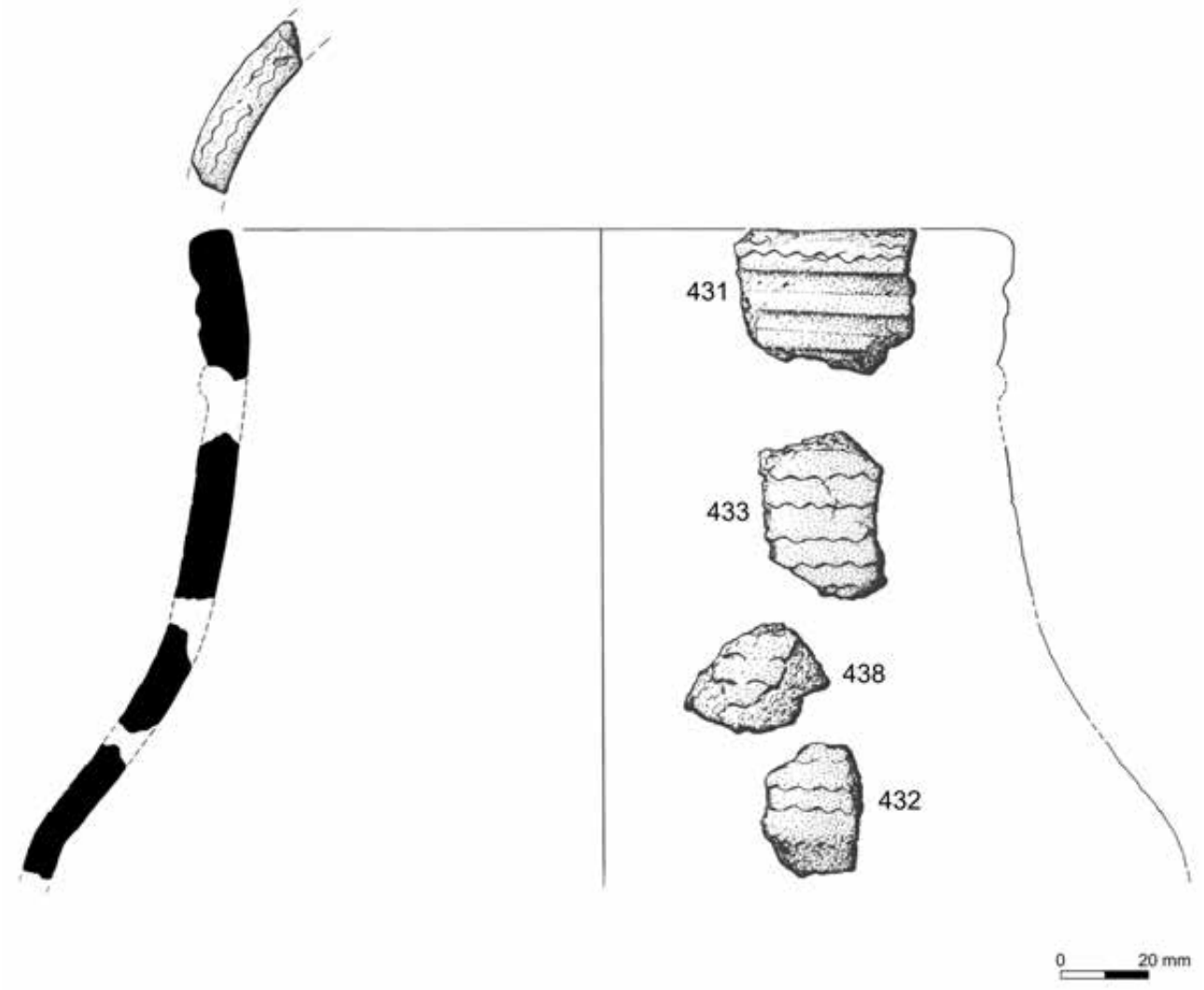
The 'domestic' Beakers (listed in Technical Note 18.7.7 and see Illus 18.21 and 22) are generally larger, with estimated rim diameters up to 280–



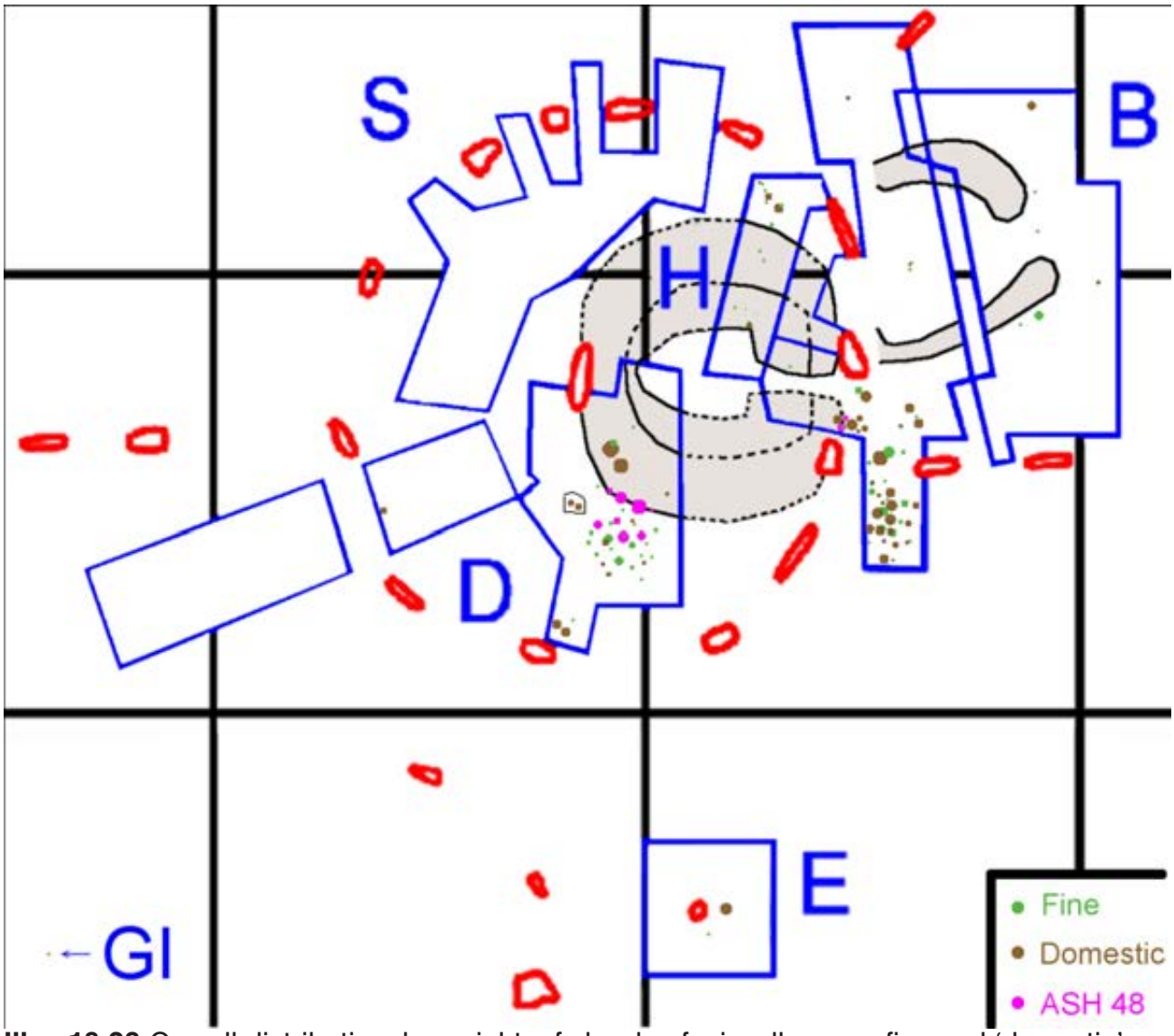
Illus 18.21 Miscellaneous 'domestic' Beakers. All drawings except Cat 524 and Cat 547–8 by Tom Borthwick; others by Marion O'Neil

300 mm (Cat 468, ASH 55), and they are also thicker-walled, with thickness ranging up to 16.4 mm (Cat 462–3, ASH 53). However, a few fairly small pots have been included in this category, on the grounds that they are either thicker-walled than the 'fine' pots, or else that that they have a gritty fabric that sets them apart from most of the fine pots. Overall, the fabric of these 'domestic' Beakers varies, with fabric types 1, 1a, 2, 3 and 4 all represented – so some pots are gritty, some corky, and others have very few inclusions. Some pots have fairly large lithic inclusions, and the stone used includes crushed quartz and sharp sand. Despite the large size of most of these pots, care had been paid to achieving smooth surfaces, and they had been wet-smoothed or, in some cases possibly slipped. Parts of the exterior of the pot represented by Cat 422–449 and 857–61 (ASH 48) had been polished to a low sheen.

The rims on the 'domestic' Beakers are either rounded or gently squared off, and upright or flaring (as in Cat 468, ASH 55, Illus 18.21). Some sense of the overall shape of one of the 'domestic' Beakers is provided by the sherds belonging to ASH 48 (Illus 18.22): this unusually-shaped vessel has a funnel-like neck with minimally-everted rim, and below this the body swells out, with a gentle carination at the top of the belly. (See 18.11.5, entry 3, for a detailed description of this pot.) Indeed, it may not be the only large pot with a funnel-like neck. If Cat 405 (ASH 44a) and 406 (44b) genuinely belong to a single pot, then this implies that the 140 mm wide neck swelled out to a globular belly, possibly as wide as c 230 mm.



Illus 18.22 Large 'domestic' Beaker jar ASH 48. Drawing by Marion O'Neil



Illus 18.23 Overall distribution, by weight, of sherds of miscellaneous fine and 'domestic' Beaker. (See Illus 18.16–19 for plots of the early, international-style Beakers and Illus 18.25 for the plot of Beaker ASH 42) For a breakdown of pottery weight by context and area, see Technical Note 18.7.8

Indeed, it is conceivable that the pots represented by Cat 462–5 (ASH 53a–b), Cat 466–7 (ASH 53b & 54) and Cat 468 (ASH 55) had also had upright (or minimally-everted) funnel-like necks above a globular belly and narrow base; this form of domestic Beaker is known from elsewhere (e.g. Cluntyganny, Co. Tyrone, Ireland: Brennan et al. 1978, fig. 3).As with the 'fine' Beakers, decoration mostly consists of horizontal incised lines on the neck, starting just below the rim, but these lines are in most cases wider and shallower than those on the 'fine' Beakers, producing a corrugated effect. However, on Cat 405 (ASH 44a), the lines are narrow. One pot that appears to have a shallow incised 'V' (Cat 671, ASH 79) is not certainly a Beaker, and may be of later date; see below regarding its stratigraphic position.

Impressed decoration is also present on the 'domestic' Beakers, with two pots having shell-edge impressions: cockle, in the case of Cat 417–421 (ASH 47), and some other marine shell with a wavy edge in the case of Cat 422–438 and 857–861, ASH 48). In the former, the impressions are arranged in horizontal and diagonal lines; in the latter, as horizontal lines, extending below the neck grooves and also present on the rim top. Finger- or thumbnail impressions are present on two or three pots, and in each case the nail

has been dragged into the clay. On Cat 547–8 (ASH 70) the nail impressions are arranged into horizontal lines, while on Cat 549–53 (ASH 71) and Cat 554–6 (ASH 72 – conceivably the same pot as ASH 71), they are accompanied by oval stab impressions in a more random design. A pair of oval stab impressions on Cat 549–53 suggests 'rusticated' decoration, as seen on large domestic Beakers from elsewhere in Britain (and beyond). Two other 'domestic' Beakers have stab impressions: Cat 537–9 (ASH 66) has irregular rows of circular impressions, while Cat 524 (ASH 63) – a sherd formerly considered by Henshall as a possible candidate for Grooved Ware – has lines of small dot-stabs interspersed with untidy, horizontal incised lines on the neck of a fairly small, gritty pot.

That some of the 'domestic' Beakers had been used as cooking pots is suggested by the occasional presence of black, burnt-on encrusted residue (e.g. on the exterior of Cat 462–4 (ASH 53a)). A rimsherd from a very large 'domestic' Beaker (Cat 468, ASH 55) is burnt, which suggests that it may have lain in a hearth after the pot had broken.

Other hints of pots' former contents are given by the black staining (rather than burnt-on encrusted material) on the outside of the neck of ASH 48, although analysis would need to be undertaken to determine what this material had been. Indeed, lipid analysis of absorbed residues might be able to shed some light on the use of these 'domestic' Beakers.

18.7.7 Distribution of the miscellaneous fine and 'domestic' Beakers (PJA/JAS)

As the overall distribution plot of the fine and 'domestic' Beakers reveals (Illus 18.23), this pottery has two main areas of concentration, in the southern part of Area B and in Area D, with a few sherds in H, and scatters elsewhere – including the outlying areas E and G1. Area E produced one sherd of a small, fine Beaker (Cat 984, ASH 76 crb) plus three conjoining (and now refitted) rimsherds from a large 'domestic' Beaker cooking pot (Cat 462–4, ASH 53a), quite possibly the same pot as is represented by Cat 465 (ASH 53b) in BVSX, around 10 metres to the NNE. Test Pit G 1 produced one sherd (Cat 639, ASH 79) that is thin and fine enough to be from a fine Beaker, together with thicker sherds that could conceivably be from domestic Beaker/s, but an Early/Middle Neolithic date for all these sherds cannot be ruled out.

As Illus 18.23 shows, there is a general similarity between the distributions of the 'fine' and the 'domestic' Beakers, which tallies with the idea that the different vessel types formed part of the same overall repertoire. However, if one sets to one side for the moment the (atypical) distribution of sherds from 'domestic' Beaker ASH 48 – see below – then there are proportionately many more sherds of fine Beaker than of 'domestic' Beaker in Area D south of the cairn. This is not immediately clear from Illus 18.23, because the fine sherds are generally lighter than those from 'domestic' Beakers and the dots are therefore small.

With both fine and 'domestic' Beaker sherds, there is a concentration of finds in BV/BVSX/BVWX. This corresponds to the area where many of the sherds from the fine international Beakers ASH 37–39 were found, and also to where the grave with Beaker ASH 42 was found (see 18.3.14–16), suggesting that the area to the SE of the Ring was a focus for Beaker deposition. (Whether or not any of this deposition was associated with small, enigmatic stone 'enclosures' in BIV and BV cannot be determined; see Chapter 7.8.3) The paucity of sherds in the area of the earthen Enclosure in Area B (as shown on Illus 18.22–24) suggests that there is not any particular association with that structure; the relationship to the chambered cairn is discussed below.

In terms of the contextual and stratigraphic distribution of the fine and 'domestic' Beaker pottery, with the exception of the few sherds from contexts 730, 733 and 885 (which relate to immediate pre-cairn and early cairn contexts and can be attributed to Phases 7 and 8– see below), none of the sherds came from a context that is demonstrably earlier than the chambered cairn. By contrast, a great deal of the miscellaneous fine and 'domestic' Beaker pottery comes from contexts that post-date the construction of the chambered cairn. Some relate to the disturbance/dilapidation and secondary capping of the cairn (Table 18.7),

others to plough soils relating to Phase 10 and Phase 11 ground-working, especially plough soil 141 in BVSX (which had disturbed at least one probable burial including Beaker ASH 42) and long-lived plough soils 315 and 344 in DI, to the south of the cairn. The plough soil finds will have been residual; how the sherds made their way into the site will be discussed below.

Table 18.7 Beaker sherds from the capping, disturbance and dilapidation of the chambered cairn

Context	Area	Cat	ASH No	Beaker type
708 capping	HII	1031	76 crb	fine
768 rooty soil in upper part of cairn	HII	27–29	NC	fine
318.3 cairn disturbance	DI	420–1	47	dom
326 cairn disturbance	DI	432–449	48	dom

As for the small number of putatively Beaker sherds from immediately pre-cairn and primary cairn contexts (i.e. 730, 733 and 885; see Table 18.8), in the case of the very thin, fine, probably burnt sherd Cat 672, it is conceivable that this Beaker, with its gentle carination, had been as early as the international-style Beakers described in 18.3.8. (Indeed, there may be other early Beakers among the fine sherds but, lacking diagnostically early features, they are hard to identify.) Sherds Cat 541–2 (ASH 67) are from a thin, fine pot with dot-stab decoration – and although this could indeed be a fine Beaker, the fact that one of the Early/Middle Neolithic rim flanges (Cat 534–5, ASH 64, Illus 18.7) also had dot-stab decoration reminds us that we cannot rule out an earlier date for these sherds, even though that kind of decoration is rare in a Hebridean Neolithic context. As for Cat 671 (ASH 79), this is unusual in the Calanais assemblage as it seems to have an incised V on its exterior, and indeed Henshall had wondered whether it could be of late (i.e. post-Early Bronze Age) date. While this seems impossible on stratigraphic grounds, nevertheless that sherd remains unusual, and its identification as Beaker is tentative. Finally, little can be said about Cat 736 (ASH 76) other than that it is a small sherd from a thin fine pot, paler in colour than most of the Early/Middle Neolithic and Beaker sherds but not necessarily burnt.

Table 18.8 Miscellaneous Beaker sherds from immediate pre-chambered cairn and primary cairn contexts

Context	Area	Cat	ASH No	Beaker type
Bottom fill 730 of slot 773 of latest of pre-cairn timber structures	HII	671		
672	79			
79	Dom			
fine				
733 fill of outer part of cairn (possibly disturbed)	HII	541–2	67	fine
Dark green fill 885 below passage north wall, like the fill of slot 883, the continuation of the slot on Area H	BIVWX	736	76	fine

As indicated above, the distribution of sherds from 'domestic' Beaker ASH 48 stands out as being different from the rest of the pottery discussed in this section for three reasons. First, it forms a cluster in Area DI (Illus 18.23), an area which is otherwise dominated by finds of fine Beaker, even though some other 'domestic' Beaker sherds, including those from the cockle shell-impressed

Beaker ASH 47, were also found in DI. Second, even though less than 10% of the pot is represented, this is nevertheless a significantly greater proportion than noted for the other 'domestic' and fine Beakers discussed in this section, and it raises the possibility that this might have been deposited as a complete pot. Thirdly, the sherds were found in stratigraphically late contexts, with several coming from the Phase 10 ploughsoil 315, which covers much of Area DI to the south of the cairn. Some had clearly been moved during Victorian disturbance, since many sherds were found in context 326. It may be that the Victorian workers came upon the sherds of this pot while cutting through 315 in their re-building of the cairn's kerb, and tossed the sherds against the cairn; the grey gritty material that constitutes 326 is quite unlike the plough soil 315.

18.7.8 Discussion of the miscellaneous fine and 'domestic' Beakers (JAS, PJA)

The assemblage finds parallels in vessel shape, decorative technique and decorative style among the numerous finds of Beaker pottery in the Western Isles (Parker Pearson et al. 2004, fig. 18). One of the geographically closest assemblages comes from the multi-period settlement site of Dalmore in the sand dunes around 10 km to the north of Callanish (Ponting &Ponting 1984a; Sharples 1983; T. Cowie pers. comm.); note also the presence of incised Beaker at Breasclete, even closer to Calanais (Johnson 2006b). The Dalmore assemblage includes several vessels featuring horizontal incisions below the rim (and indeed elsewhere) and includes a vessel with rusticated decoration. The large Beaker assemblage from the settlement at Northton, Harris (Gibson 2006) also includes numerous vessels with horizontal linear incised decoration, especially on the neck(e.g. ibid.,, fig. 3.9), along with more complex incised designs (ibid., e.g. fig. 3.6). The Northton Beaker assemblage also includes sherds with dot-stab impressed decoration (ibid., fig. 3.35, 6–9) and shell-impressed decoration (ibid., fig. 3.34, 1–7)– the latter a feature noted at several Beaker find spots on or near the coast in various parts of Scotland and elsewhere, including Holm of Papa Westray North, Orkney Islands (Henshall 2009). At Calanais the use of shell to decorate the pots, together with the frequent presence of quartz/ite (including micaceous quartz/ite) as a filler, suggests that the pottery had been made locally.

Further Hebridean comparanda for the use of incised linear decoration comes from the machair settlement site at Sligeanach, South Uist (Sheridan 2012c, fig. 11.11); here, as at Northton, the horizontal lines are accompanied by more complex designs.

In terms of vessel shape, the use of a funnel- or collar-shaped neck above a broad, sinuous belly on 'domestic' Beakers is readily paralleled (e.g. at Northton: Gibson 2006, fig. 3.6, 3.8, 3.9; and at a settlement at Machair Mheadhanach, South Uist: Hamilton et al. 2012, fig. 10.1,1).

As regards the likely date of the Calanais pottery, the fact that a considerable amount comes from cultivation soils (e.g. contexts 141 and 160) relating to a time when the chambered cairn was being robbed or had become dilapidated might be taken to suggest a date towards (or past) the end of the third millennium, at least for most of this material. Indeed, it may be that the dates AA-24962 (3555±50 BP, 2030–1750 cal BC at 95.4% probability from birch charcoal from 344), AA-24956 (3580±45 BP, 2020 to 1880 cal BC cal BC at 95.4% probability Pomoideae sp charcoal (sample 54/80) from an ard mark cut into green clay B123) and AA-24968 (3575±45 BP, 2040–1770 cal BC at 95.4% probability, willow charcoal from 738 – see Chapter 23.10.2 Radiocarbon), provide a reasonable estimate for the age of the pottery, although it must be remembered that both the sherds and the charcoal are probably residual. Taking a minimalist view, all that can be stated in terms of the available dating evidence from Calanais is that the Beaker pottery is likely to have been deposited at some time between Phase 8 and Phase 13 in the overall phasing scheme for the site.

There is some, albeit limited, comparative dating from other Hebridean Beaker find spots. The Northton assemblage was associated directly with only one date from each of the two midden layers, namely 3604±70 BP (BM-706, 2150–1750 cal BC at 95.4% probability) for the lower, Beaker I midden and 3481±54 BP (BM-707, 1950–1660

cal BC at 95.4% probability) for the upper, Beaker II midden; in each case, the date was determined from animal bone, probably a bulked sample rather than single entity sample. There is also a terminus ante quem of 3395±50 BP (AA-50316, 1880–1530 cal BC at 95.4% probability), provided by human remains from a corbelled cist dug into the upper Beaker midden (Simpson et al. 2006). The closeness of the BM-706 Northton date and the AA-24968 Calanais date should, however, be noted. The dates from other sites at Rosinish and the Udal are severely compromised by the fact that they have been determined from shell (Sheridan 2007c, Appendix 6). At Sligeanach, there are radiocarbon dates within the bracket c 2200–1900 cal BC, and these may well relate to the incised Beaker sherds; See Sheridan 2012c, 231 for a discussion of the dates in question.

How did the fine and 'domestic' Beakers come to be deposited at Calanais? With the exception of the large 'domestic' Beaker ASH 48, the degree of fragmentation and abrasion is comparable with that seen for the Early/Middle Neolithic pottery, and given that so many of the sherds were found in plough soils, it is tempting to interpret this as meaning that – as with the Early/Middle Neolithic pottery – these Beakers were brought in as sherds, rather than as complete pots. If this is correct, then might we be seeing a repeat of the Early/Middle Neolithic practice of importing sherds, among midden material, that originated as pots that had been used (for cooking, inter alia) in a nearby settlement? This is indeed a possibility, as is their subsequent moving around as a result of ploughing. However, as PJA has argued elsewhere (24.11.5, 24.14.2, 24.14.3), we may additionally be dealing with the purposive, ceremonial deposition of basket loads of soils-with-sherds. And in the case of ASH 48, it may be that this was brought in as a complete pot, perhaps as a ritual offering.

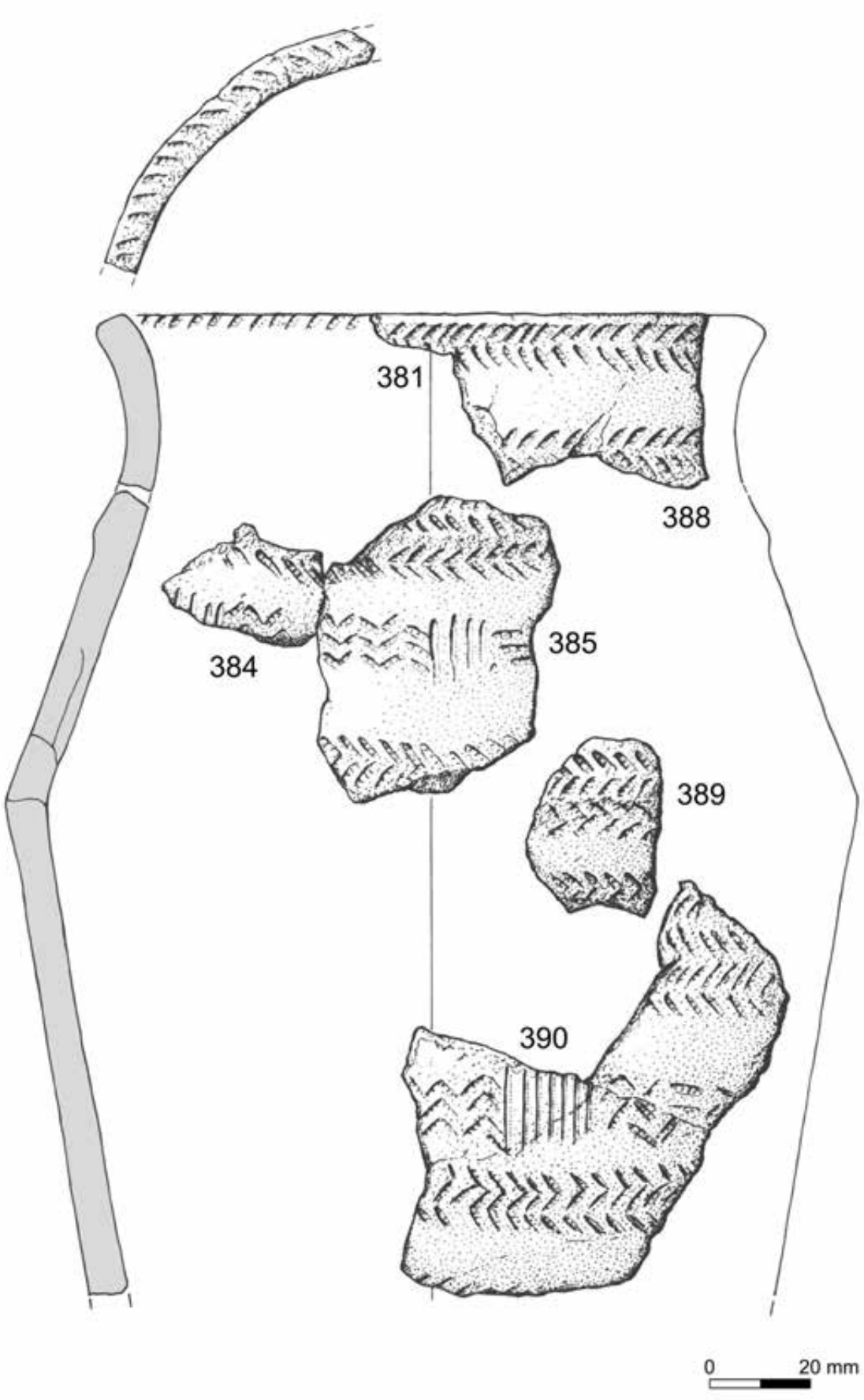
Additional observations concerning the taphonomy of these Beaker sherds are as follows:

— There is nothing in the spatial and stratigraphic distribution of the sherds to indicate that any of the pots had been deposited inside the chamber tomb (as complete pots, accompanying interments), and then dumped outside during the tomb's clearance;
— Likewise, there is no evidence that any of these pots had been buried in a grave (as is argued below in the case of Beaker ASH 42);
— As noted above, there are no grounds to link the pottery with the use of the Enclosure, and there are no unequivocal signs that people had been living on the site (as opposed to ploughing its soils and probably making ritual deposits), so the pots from which the sherds came must have been used elsewhere.
— The distribution pattern of the Beaker sherds appears to respect the existence of the chambered cairn (while encroaching on the cairn), rather than the shape of the Ring. That said, it may be that the paucity of Beaker sherds on the cairn simply means that the cairn could not be used for cultivating the land. Furthermore, the focus on deposition to the south-east of the chamber entrance and at the south-east side of the Ring continues a practice that extended back to pre-cairn times (see 18.3.6 and 18.3.10) and may mean that this area had a special significance in terms of the cosmology of the people. (See 24.x.x for discussion of cosmology.)

18.7.9 Beaker ASH 42, from the possible grave

Along with the early, international style Beaker ASH 39, this is the least incomplete of all the Calanais Beakers, with an estimated 15% of the pot present, represented by 27 sherds from the rim, neck, carination and belly (Illus 18.24; Cat 374–382, 384–398, 401–403; see 18.11.5, entry 3). Many of these sherds survive to a greater size than in any of the other Calanais pots, and indeed the largest sherd in the whole assemblage (Cat 385) belongs to this pot. Furthermore, the sherds are generally less abraded than the other Beaker sherds. These facts suggest that the pot may have been deposited whole, and was subsequently disturbed.

Pot ASH 42 differs in several respects from the other Beakers from Calanais: it is a tall, angular bipartite jar with a well-defined carination lying just above 2/3 of the estimated height of the pot; it has comb-impressed decoration – a feature not seen



Illus 18.24 Beaker ASH 42. Drawing by Marion O'Neil

on any of the other Calanais Beakers, although it does occur on the Food Vessels – and its decoration includes panels (metopes) featuring vertical lines and herringbone decoration.

The rim is flattish-rounded and everted, with an estimated rim diameter of 135 mm. Below this, the neck is fairly straight, with a cordon just under half way down. The neck-belly junction is marked by a fairly crisp carination, with the estimated diameter of the pot at this point 170 mm. Below this, the belly tapers evenly towards what would have been a flat base; the diameter at the lowest surviving part of the belly is 140 mm. The pot may originally have stood as high as 260 mm, making this a tall, slender jar. Wall thickness ranges from 7.3 mm to 9.6 mm; scrape-marks and facets on the interior suggest that its wall had been thinned and shaped by scraping. The surfaces had been carefully smoothed and probably slipped, and the exterior of the neck had been polished to a medium sheen before the decoration was applied.

The presence of bands that are matte on the neck may indicate that the pot had been wrapped during the polishing process. The decoration consists of impressions made by a short (6 mm), square-toothed comb along with vertical lines that had either been incised or (more probably) impressed. The rim-top has comb impressions arranged in a radial, herringbone design and the pot's exterior has bands of horizontal herringbone comb impressions interspersed with plain zones; there are with two bands of metopic design, one on the lower neck, the other on the belly, featuring panels of vertical herringbone interspersed with panels of vertical incised/impressed lines.

The exterior of the pot is mid-brown and dark greyish-brown on the neck, and slightly reddish mid-brown elsewhere; the core is mid to dark grey-brown; and the interior is a light to medium grey-brown.

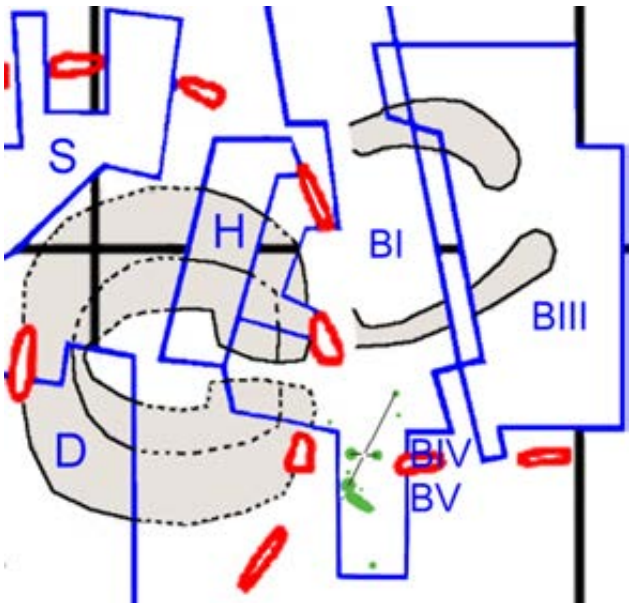
The fabric (type 1a) is virtually free of inclusions but there are some corky voids, clearly visible on the interior, and some glittery mica platelets.

18.7.10 Location of Beaker ASH 42 (PJA/JAS)

The remains of Beaker ASH 42 were found only in BIV/BV, the trench south-east of the chambered cairn passage entrance (Illus 18.25). The fact that many of its sherds were found in the immediate vicinity of the putative grave 894, with its traces of a crouched skeleton (see Chapter 7.5.5), suggest that the sherds had originally been deposited as a complete pot in that grave, as a grave good; the proximity of two finds of barbed and tanged arrowheads (CAT. 218-9, see 17.3.6) suggests that these, too, had been grave goods.

The sherds of ASH 42 were almost exclusively found around and in the ground-worked layers (134, 139, 141, 160.2) which had disturbed the putative grave, and it is likely that this cultivation activity had been responsible for the breakage of the pot and the dispersal of its sherds, with the furthest-flung sherds being found around 2 m away from the main concentration. In the case of Cat 388–92 from context 141, these sherds were found very close to the decayed human bone in the putative grave.

Of the pieces not found in these ground-worked layers, three sherds (Cat 401–3) were found in the (poorly recorded) upper black fill of the slot 837 in BVSX (equivalent to the upper black plough soil 141 elsewhere). One sherd (Cat 382) was



Illus 18.25 Beaker ASH 42 sherds by weight; the oval green area corresponds to the sherds found in 141. The lines indicate conjoins; there were other conjoins among sherds found closer to each other

Table 18.17 ASH 42 sherds: context, location, weight. Ordered in rough stratigraphic order, starting with the earliest

Cat	Area	Ctxt	Location	No shds/frgs	Wt g
374 Con-joins	BV	134	Soil in stones running from nr Ring to by East Row	2 conjoin	Est. 9
375	BIV	139	Dark soil below 139	1	Est. 3
376	BIV	139	Dark soil below 139	1	1
377	BIV	139	As Cat 376	1	1
378–9	BIV	139	As Cat 376	2 con-join	5
380	BIV	139	As Cat 376	1	2
387	BVSX	141	Plough soil	1	2
386	BV	141	Plough soil	1	1
388–392	BVSX	141	Plough soil	10	77
385	BV	813	Scrape/ shallow pit inter-leaved in 141	1	25
394–398	BVSX	813	As Cat 385	5	1
401–403	BVSX	837	Prob equivalent of 141 filling top of slot at S end of BV	3	3
382	BIV	814	Black soil-filled scrape, covering area running from W of E row stone 30	1	3
393	BVWX	160.3	Thin dark soil nr ch tomb passage	1	2
384	BIV	867	Patch of charcoal & iron pan N of E row stone 30	1	5
381 con-joins 388	BIV	160.2	BIV/BV, not well stratified	1	See 388

found in a black soil-filled scrape 814, similar to 813 but broader and shallower, covering an area running from the west of East row stone 30. One sherd (Cat 384) was found in another intrusion 867 north-east of the putative grave; this is part of a series of intrusions, all very close to the turf and much confused by iron pan; 867 is likely to be the fill of the latest of the intrusions. A further sherd (Cat 393) came from 160.3, a thin black soil near the chamber tomb passage, which may originally have been earlier than the green sandy clay 812 but was left open and subsequently formed a surface when the cairn chamber and passage was in use.

18.7.11 Discussion of Beaker ASH 42

As with the Beakers described in the previous section, this pot does not sit comfortably within the pre-existing Beaker classificatory schemes, although the herringbone metopic (panelled) design and use of comb impressions are characteristic of Clarke's 'Northern' Beakers (1970), while the angular bipartite shape is reminiscent of some of his 'Final Southern' Beakers (e.g. Kerrera Island, Argyll & Bute; Ashgrove, Methilhill, Fife and Linlathen, Angus: ibid., figs. 980, 1016, 1018). This may simply highlight the shortcomings of Clarke's scheme; once again, more meaningful and closer comparanda are to be found in other, domestic, Beaker assemblages from the Hebrides. That from Dalmore includes similarly-shaped pots with comb-impressed, metopic herringbone designs (T. Cowie pers. comm.), while at Northton, similar designs are found on pots with more sinuous profiles, from both phases of the Beaker occupation (e.g. Gibson 2006, fig. 3.7.5, 3.21.3). A further sinuous 'domestic' Beaker with panelled, herringbone decoration is known from Machair Mheadhanach, South Uist (Hamilton et al. 2012, fig. 10.1,1), and there is also a sherd with a panel of herringbone decoration from another of the South Uist machair settlements at Sligeanach (Sheridan 2012c, fig. 11.11, M 34). Further examples are known from Rosinish, Benbecula (Crawford 1977, fig. 54.1–2; Shepherd 1976, fig. 14) and Rudh'an Dunain, Skye (Henshall 1972, 310, SKY 7.3). Indeed, it has been noted (Hamilton et al. 2012, 200) that 11 out of the 13 examples of Beakers with herringbone metopic decoration from Britain noted in Clarke 1970 come from Scotland; examples are also known from Ireland and Germany.

Beaker ASH 42 differs from all the other Calanais Beakers in its shape (i.e. tall, slender bipartite jar) and in the technique and style of its decoration (i.e. the use of comb impression, of the herringbone motif and of metopic design). Indeed, it might be argued that its angular bipartite shape is reminiscent of the Food Vessel ASH 75 (see 18.3.17); furthermore, like that pot – and in contrast to the other Beaker pottery as discussed in 18.3.11–13 – ASH 42 appears to have come from a funerary context, even though it resembles 'domestic' pots and may have started its life as such. This raises the question of its chronological relationship to the fine and 'domestic' Beaker pottery from Calanais discussed above: is ASH 42 contemporary with the Beakers discussed in 18.3.11–13, or is it closer in date to the Food Vessel ASH 75?

Elsewhere – as at Northton, for example – the use of the herringbone metopic design occurs alongside the liberal use of incised horizontal line decoration, including on the same pots (e.g. Gibson 2006, fig. 3.6). At that site, the pots in question (from the lower of the Beaker middens) are broadly associated with the date of 3604±70 BP (BM-706, 2150–1750 cal BC at 95.4% probability). And at Sligeanach, the sherd with herringbone metopic decoration came from a context dated (from a single cattle bone) to 3665±45 BO (OxA-9006, 2200–1910 cal BC at 95.4% probability). In theory, then, on the basis of these analogies Beaker ASH 42 could be no later than the fine and 'domestic' Beaker as discussed in 18.3.11–13.

Unfortunately, there is no independent dating evidence from Calanais that could shed light on this question. There are no associated radiocarbon dates, and the fact that the putative grave underlies the uppermost part of ground-working context 141 (in which numerous sherds of the 'miscellaneous' fine and 'domestic' Beakers were found) cannot be taken to indicate that ASH 42 pre-dates those pots, given that their sherds are residual. In terms of the site's overall phasing, the putative grave belongs within the range Phase 9–12 and post-dates the construction and use of the cham-

bered cairn. In terms of its date, all that we can say, on the basis of dated comparanda elsewhere in the Hebrides, is that ASH 42 is likely to date to between the 22nd century BC and c 1750 BC.

18.7.12 The Food Vessels

Sherds from one definite (ASH 75) and one probable (ASH 74) Food Vessel were found, with the latter represented by five sherds, including two pairs of conjoining sherds (Cat 558–562), found in Area C.

Pot ASH 75 (Illus 18.26, Cat 563–72; 576–8; 580–3; 585–94; 912 and 1024–9; 18.11.5, entry 5) is represented by 32 sherds, constituting less than 10% of the pot. The vessel seems to have been a large, bipartite jar, with an angular, internally-and externally-bevelled rim; a straight neck; a shoulder, positioned around 2/3 of the estimated height of the vessel and marked by a low, horizontal cordon; a slightly curving belly; and a fairly broad, flat base with a low pedestal. The estimated diameter at the rim, shoulder and base is c180 mm, c 252 and c 100 mm respectively and the estimated height is c 260 mm. The wall thickness is mostly 10–12 mm, narrowing to 7.6 mm at the base and increasing to 18.5 mm at the broadest part of the rimThe pot's surfaces had been carefully smoothed and slipped. Decoration is present on both of the rim bevels and on the exterior of all the body sherds, down to the bottom of the wall; it may well have been continuous, but not enough of the pot's profile is present for one to be sure of that.

With the exception of the diagonal incised lines on the interior rim bevel, the decoration is all impressed, with three tools having been used: a point (e.g. a sharpened piece of bone), impressed at a slight angle to create tear-shaped and more irregular marks; a piece of whipped cord; and a comb with long rectangular teeth. The external rim bevel has short diagonal whipped cord impressions; below that, the decoration is arranged in alternating bands of whipped cord and stab impressions – the former in horizontal and diagonal lines – with comb impressions around the lower belly. The motifs include herringbone on the belly, if not also on the neck. (See18.11.5, entry 5 for a detailed description of the decoration.)

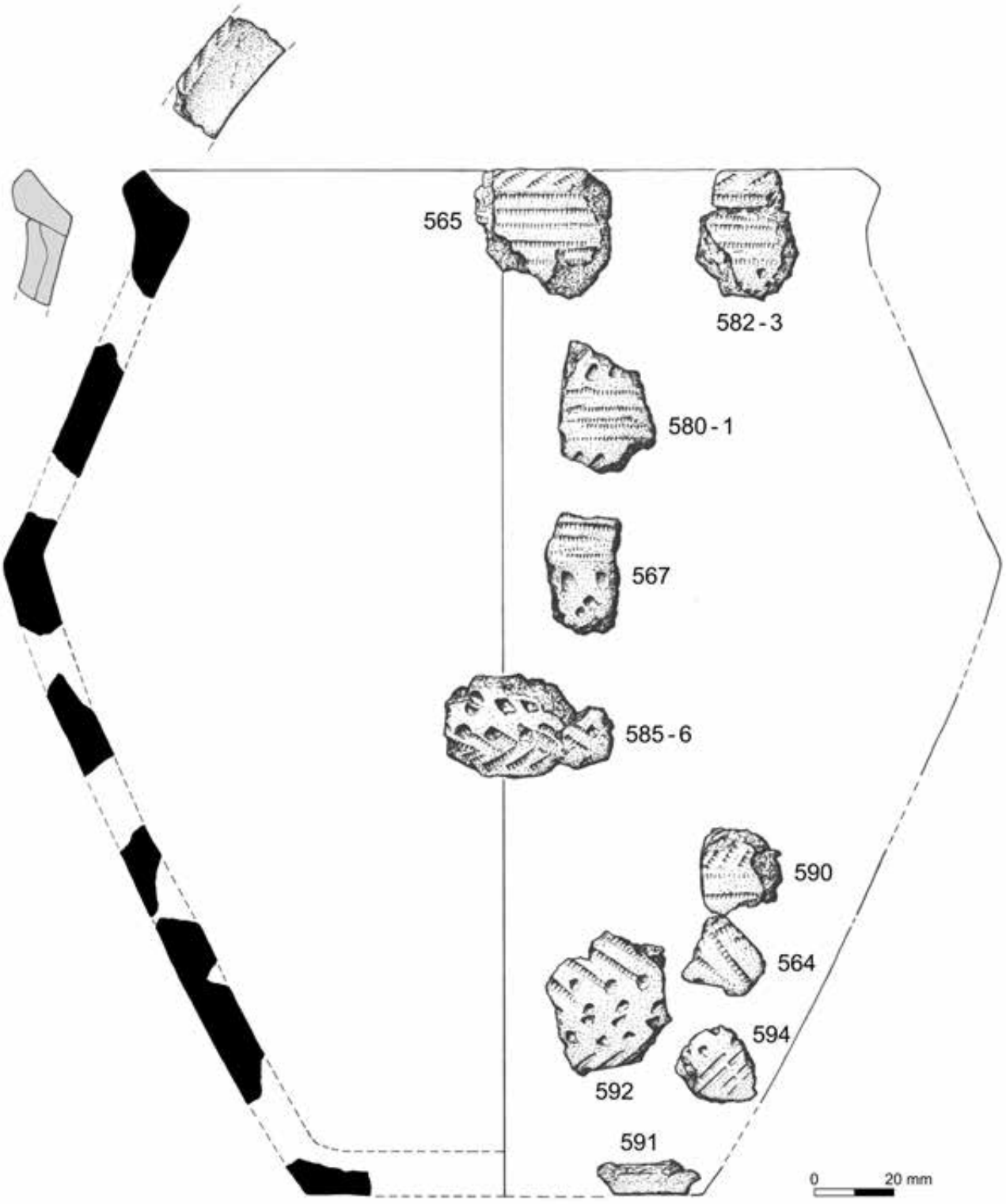
The surfaces are mostly dark brown, and the core is blackish-brown. The fabric (type 5) is compact, hard and slightly laminar, with subangular and rounded fragments of a black-brown stone and large, subangular fragments of a fine-grained speckled crystalline stone, up to 7 x 6 mm in size and at an estimated density of c 10–15%. The latter – a distinctive stone – is apparently only found in this pot. The sherds are generally slightly abraded.

The second, possible Food Vessel (Illus 18.27) is represented by two pairs of conjoining (and now refitted) sherds; Cat 558–9 may come from the lower belly, and 560–1 may come from a flat base. The decoration on Cat 558–9 consists of horizontal lines of oval stab impressions. The fabric is of type 3; the sherds are small and heavily abraded.

18.7.13 Distribution of the Food Vessels (PJA)

The sherds belonging to ASH 75 were found in Areas BI, H, BV, DII, BIWX and B (Illus 18.28, Table 18.18; see also Appendices 3, 11 and 12). The largest concentration of ASH 75 sherds was from the cairn capping 708 on Area H, with one sherd from 712, possibly washed down from 708. The next largest concentration was near the east edge of the Ring in BI and BIWX, with two sherds from the fill of the cast of a removed slab 125 and one unstratified but probably in downwash from the damaged secondary cairn. Another sherd came from disturbed green sandy clay 810.1 north of East Row stone 30 and one came from the disturbed pit 813 which was preceded and succeeded by ground-working. Sherds were also found in superficial soils and clays north and east of the enclosure, in the area of the enclosure, and near East Row Stone 31.

Most of the sherds were found within the enclosure and in secondary capping of the cairn on Area H (Illus 18.32). In Chapter 24 it is suggested that the pattern may reflect robbing of the cairn to build the second or third version of the enclosure and subsequently robbing of the parts of the enclosure walls to fill up the secondary cairn. As for ASH 74, this was found in Area C at some distance from the main focus of the Calanais excavations. The find spot has been interpreted as a small clearance cairn (Chapter 8.3.4 Area C), with



Illus 18.26 Food Vessel ASH 75. Drawing by Marion O'Neil

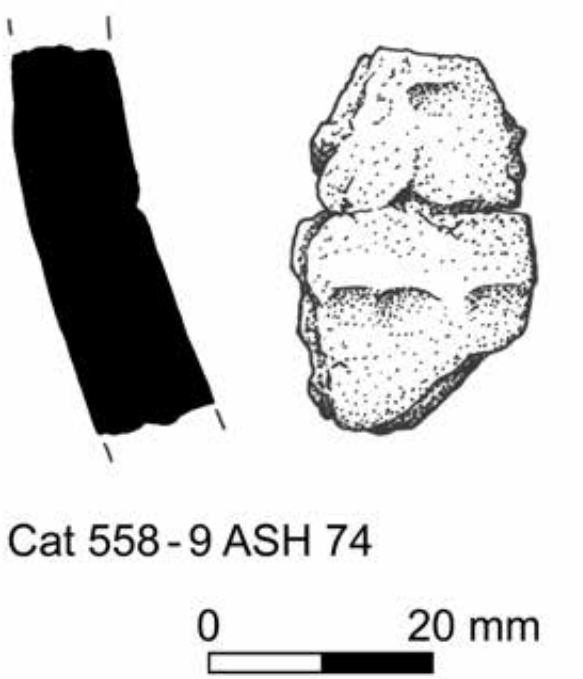
the presence of the sherds possibly indicating that they had been in a cultivation soil and deposited, perhaps along with weeds, on the heap.

Table 18.18 ASH 75 sherds and fragments

Cat	Area	Ctxt	No shds/	
frgs	Wt g			
563	BI	120	1	5
564	BI	125	1	4
565	BIWX	125	1	15
566	BI	167	1	4
567	BI	810.1	1	9
568–72	BIII	117	4	7
576	BIIISX	117	1	2
577	BIIISX	117	1	1
578	BIINE	112	1	<1
580–1	BIN	130.1	2	9
582–3	BIWX	9999	2	11
585–8	BV	813	4	12
589	DII	313	1	6
590	HII	708	1	4
591	HII	708	1	3
592	HII	708	1	12
593	HII	708	2 con-joined	8
594	HII	712	1	4
912	DI	315	1	<1
1024–9	HII	708	6	3

18.7.14 Discussion of the Food Vessels (JAS)

What distinguishes ASH 75 from the Beakers from Calanais are its bevelled rim shape, the use of whipped cord and the use of a comb with long rectangular teeth (as opposed to the short-toothed comb as seen on ASH 42); all these features are characteristic of Food Vessel pottery. As for ASH 74 – which Audrey Henshall had originally classed as 'possibly Grooved Ware' – its identification as Food Vessel is based on the rows of stab impressions, which echo the impressions on ASH 75 and are also found on Food Vessel pottery elsewhere (e.g. at Kilellan, Islay: Cowie 2005, illus 60,9, and Sligeanach, South Uist: Sheridan 2012c, fig. 11.12,48). By contrast, this motif is not common on Grooved Ware.

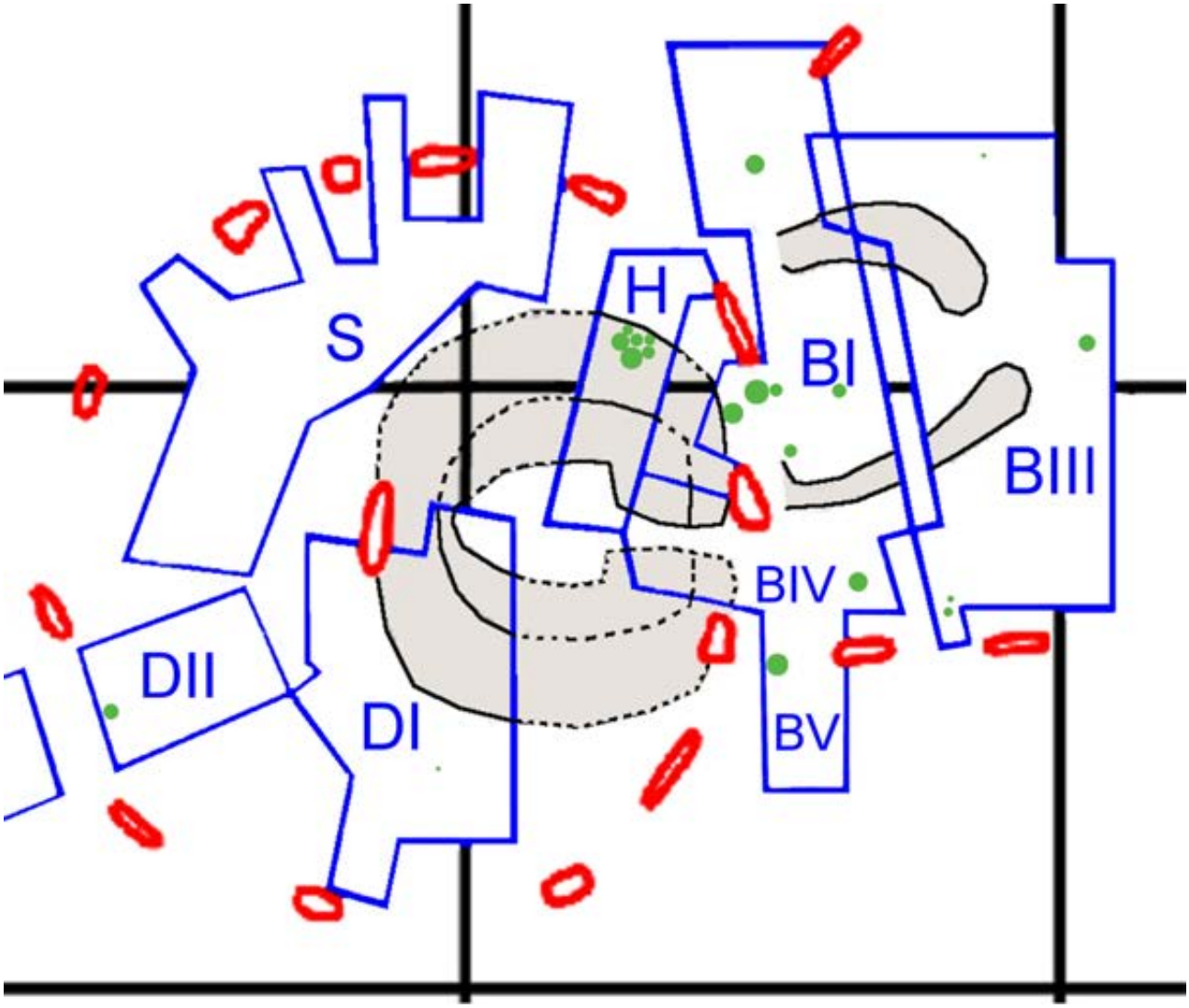


Illus 18.27 Possible second Food Vessel, from Area C: Cat 558–559 (ASH 74). Drawing by Marion O'Neil

Food Vessel pottery is known from several settlements and a few funerary contexts in the Hebrides, and comparanda for aspects of these two vessels (such as the rim shape of ASH 75 and the use of whipped cord as a decorative technique) can be found, for example, at Kilellan and Ardnave on Islay (Cowie 2005; Ritchie and Welfare 1983); at Dalmore, not far from Calanais (T. Cowie pers. comm.); and at Sligeanach, South Uist (Sheridan 2012c, fig. 11.12, 1). The dating of the Food Vessel tradition leaves much to be desired (as discussed in Sheridan 2004b), especially as far as Hebridean finds are concerned, but from a Scotland-wide perspective the tradition seems to have appeared during the 22nd century BC – overlapping with Beaker use – and to have continued in use during

the first quarter of the second millennium BC, with some evidence suggesting localised persistence into the second quarter of that millennium. The closest parallels for the Calanais pots appear to date within the 2150–1750 BC bracket, to judge from the radiocarbon date of 3590±60 BP (GU-3517, 2200–1745 cal BC at 95.4% probability) obtained from charcoal – admittedly mixed species, and including oak – from the Food Vessel midden at Kilellan. Unfortunately, at Ardnave, the date obtained for the Period 4 hearth, contemporary with Food Vessel use, has such a wide standard deviation (3230±120, GU-1272) that its calibrated date range is hopelessly wide. The same is true of the dating of the possibly later Food Vessel pottery in the Hebrides (at Traigh Bhan, Islay and at Cnip: Ritchie and Stevenson 1982; Close-Brooks 1995): for example, the date for unburnt human bone from a fairly plain Vase Urn from Traigh Bhan, GU-1379, started at 3005±105 BP and its standard deviation was adjusted upwards by Ashmore to ±145, giving a 95.4% probability calibrated date range of 1550–800 cal BC.

The evidence from Sligeanach is not of much help, either. Trench A, which produced both Beaker and Food Vessel pottery, the latter stratified above the former, produced a date (inter alia) of 3665±45 BP (OxA-8921, 2200–1910 cal BC at 95.4% probability from cattle bone, but the bone could well be residual from the earlier, Beaker activity. Another trench at Sligeanach (K) produced a date (from carbonised barley grains) of 3490±40



Illus 18.28 Distribution by weight of ASH 75 sherds. The largest spot, in Area BIWX, represents 15g and the smallest, in DII and the NE part of Area B are nominally 0.5g

BP (OxA-8926, 1930–1690 cal BC at 95.4% probability) for a context containing Food Vessel pottery, but the vessel in question is undecorated and does not offer a good parallel for the Calanais Food Vessels (Sheridan 2012c, 234).

As far as dating evidence from Calanais is concerned, the fact that several sherds were found in the secondary capping of the chambered cairn suggests a post-Phase 8 date for the deposition of ASH 75. Other sherds come from contexts relating to a period of late ploughing (probably Phase 12), but the sherds are likely to be residual in those contexts. As argued above, the deposition pattern suggests that the sherds were spread around during the robbing of the cairn to construct the Stage3 or Stage 4 enclosure – a possible terminus post quem for which is offered by a date, from willow charcoal, of 3575±45 BP (AA-24968, 2040–1770 cal BC at 95.4% probability: see 23.10.2 Radiocarbon). Unfortunately, the fact that the sherds from the cairn capping were found not far from carbonised wheat and barley grains that have been radiocarbon dated to c 1600–1400 BC (see Chapter 23.14.1 Radiocarbon) does not indicate that the latter provide a date for the deposition of ASH 75; all may have been residual. Given our present understanding of the overall dating of Scottish Food Vessel pottery, we can only guess that the Calanais Food Vessels are most likely to date to the first three centuries of the second millennium.

How and why did ASH 75 and ASH 74 come to be deposited at the site? In the case of ASH 74, as indicated above, it could be that the sherds had been present in plough soil, and were subsequently dumped in a clearance heap; but the palynological dating of the mound is earlier than the date of the pottery, so it looks instead as if the sherds may have been a ritual offering inserted into the mound. As for ASH 75, the fact that 32 sherds from this vessel were found raises the possibility that it might originally have been deposited as a complete pot. Might it have been used for funerary purposes, either as a grave good or as a cinerary urn, for a secondary interment on top of the cairn? There are no bones, unburnt or calcined, that would support such a view, and the disturbed nature of the cairn makes it impossible to judge whether there had been a hollow containing human remains. Perhaps the pot could simply have contained an offering (of which no trace remains), placed on the cairn, with its sherds subsequently being moved around when the enclosure was rebuilt.

18.8 Post-Early Bronze Age (possibly Iron Age and/or later)

In her report on the Calanais pottery, Audrey Henshall drew attention to a number of sherds (ASH 77–80), virtually all undecorated, that appeared not to fit with the rest of the assemblage; these she classified as 'probably Iron Age or later'. The sherds in question derived from several different areas. Most are small and not particularly diagnostic; they had been separated out as they appeared not to fit with the rest of the assemblage in terms of fabric and/or finish and/or vessel shape.

The thorough re-evaluation of the assemblage (by JAS), and the reassessment of the stratigraphic evidence (by PJA), has allowed some of these sherds to be re-attributed to an Early/Middle Neolithic or Beaker date, while others have been relegated to the category of 'ambiguous or indeterminate date'. Thus, for example, ASH 77 (Cat 595, Illus 18.21) – a rimsherd of hard, slightly gritty fabric with a sharply squared-off rim and a corrugated exterior – has been reclassified as 'possible 'domestic' Beaker', on both stratigraphic and typological grounds. Stratigraphically, it came from fills 376 among a setting of stones under clay 369, the lowest part of plough soil 315 on Area DI, south of the cairn, and must be mid 2nd millennium or earlier in date. Typologically, even though it is grittier than Beakers of comparable thickness, it could theoretically have come from a small 'domestic' Beaker (with rim diameter of c 150 mm) with a corrugated, collar-like neck. Therefore, even though possible comparanda exist among mid-first millennium AD 'Dun Cuier Ware' (e.g. Lane 2007, fig. 6), an Early Bronze Age date seems more likely in this case.

Just as some of Henshall's 'Iron Age or later' sherds have been re-attributed to an earlier date, a few sherds that do not belong within ASH 77–80 appear to be candidates for a late date. These include at least some of the pottery found in Area A, where nine sherds from five pots (plus one 'sherd'

that may actually be compacted peat – Cat 1108) were found. Four of these sherds (Cat 673–4, of which three sherds conjoin and have been refitted) had formerly been thought to come from a wheel-thrown pot. These sherds were examined by Dr David Caldwell, who concluded that the pot had not been wheel thrown but could be of Medieval or later date. Of the other sherds from Area A, Cat 597 is of a bright brick-orange colour, not seen in any of the other Calanais pottery, and a post-Medieval date is suspected. Similarly, Cat 749 stands out as being different from the prehistoric Calanais pottery in having a black coating on the exterior that resembles abraded glaze; again a post-Medieval (or ?Medieval) date is suspected. The other sherds from Area A are of ambiguous or indeterminate age.

The 'probably late' pottery also includes sherds (Cat 752–7 and 759–61, ASH 76 Unc (?dom Beaker), not illustrated) from a very large pot, around 320 mm in diameter at one point (and therefore significantly larger than the pre-1500 BC Calanais pots), whose coil joints include the distinctive 'tongue and groove' form as seen in post-Roman Iron Age 'Plain Style' Hebridean pottery. According to Alan Lane's study of mid- to late-first millennium AD Hebridean pottery (Lane 2007), this 'Plain Style' pottery came into use around the middle of the 6th century AD and continued in use after Viking pottery appeared in the Hebrides during the 10th century. It featured the use of bucket-shaped and tripartite vessels, with simple or everted rims, built using slab-coils joined in a 'tongue and groove' technique. (See also Parker Pearson 2012, 405–7, fig. 20.8, for examples of this type of pottery from South Uist.) The sherds in question were found in BVSX contexts 141 and 812.1 and in DI, in 369. The two contexts in BVSX were respectively a plough soil and a layer below it disturbed by ploughing and by at least one modern intrusion, while that in DI was below plough soil 351 and disturbed by ploughing, and possibly by Victorian activities. Despite the modern intrusions the occurrence of 1st millennium AD pottery is slightly surprising. It implies that, locally, peat was absent or very shallow until after then.

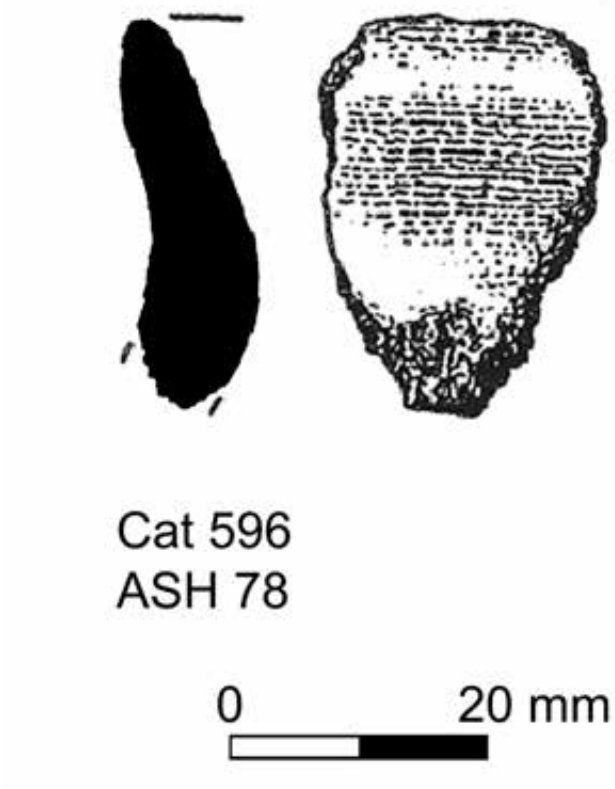
A further candidate for 'Plain Style' pottery is the sherd and fragment (Cat 614–5) that forms part of an odd mixture of pottery found in context 859, the fill of the socket of a broken vertical slab flanking the passage in BVWX. The sherd (Cat 614) may be from just above the flat base of a large, uneven-walled coarseware pot, with a very hard but not gritty fabric. The pot's diameter at this point is c 250 mm. The exterior surface is uneven, with hollows and marks of burnt-out organics. This sherd cannot be accommodated comfortably within the Neolithic, Chalcolithic or Early Bronze Age ceramic repertoire at Calanais, but is reminiscent of 'Plain Style' pottery; it is too small to be diagnostic, however. Other 'late-looking' sherds came from the same context: Cat 602, 603–4 and 607–9 (from among ASH 79) come from a large pot – with a neck diameter of c 210 mm – of a hard, non-gritty, laminar fabric that is harder than that seen on the pre-1500 BC pottery at Calanais. Even through the pot could conceivably be an unusually hard domestic Beaker, the fact that this context has also produced Cat 614–5 suggests that there had been some late disturbance here.

Sherd Cat 599 (ASH 79, not illustrated), from BIIISX context 117, is reminiscent of post-Medieval 'craggan' pottery. Its curvature suggests that this is the upper belly and lower neck area of a large, globular-bellied pot (whose diameter at this point is possibly c 250), of hard but not gritty fabric. It is hard to reconcile the vessel shape with pots of Early/Middle Neolithic, Chalcolithic and Early Bronze Age date. From the same context, but in BIV, came Cat 600, a spall from a large pot with a particularly hard, virtually inclusion-free fabric that is harder than anything seen among the Early Bronze Age and earlier pottery and it is strongly suspected to be of post-Medieval date.

Finally, sherds from two other pots also stand out as being different from the pre-1500 BC pottery from Calanais. The first pot is represented by Cat 596 (ASH 78, Illus 18.29), reportedly from context 320 in DV. This is a pointed, steeply sloping everted rim from a very gritty, quartz-tempered, fairly thin-walled pot; it is too small to allow an estimation of rim diameter. Unlike the angular everted rims seen on some Early/Middle Neolithic Hebridean Incised jars, this rimsherd is undecorated; it is also grittier than Hebridean Incised pottery. While the stratigraphy of layer

320 suggests that it should pre-date the 1st millennium BC, there are problems with the recording of the sub-area and context and it is possible that this sherd did not come from 320 but from a later level. The eversion of the rim is reminiscent of that seen on some Hebridean Iron Age pottery, although it is not as markedly kinked as the Iron Age examples. (Cf. Parker Pearson 2012, figs. 20.7–9).

The second pot in question is represented by Cat 605–6 (ASH 79, not illustrated), from context 813 in BIVSX. These sherds are from an unusually large pot, whose diameter may be as large as 330–350 mm: as with the aforementioned pot represented by Cat 752–7 and 759–61, this is far larger than any of the pre-1500 BC pots. The sherds are also harder than those of the pre-1500 BC pots. While this pot could theoretically be an unusual 'domestic' Beaker, it seems more likely that it is of much later (albeit indeterminate) date.



Illus 18.29 Post-Early Bronze Age (possibly Iron Age or later) rimsherd (Cat 596, ASH 78). Drawing by Tom Borthwick

18.9 Pottery of ambiguous or indeterminate date

This large category of material has already been alluded to (e.g. in discussing the overlap in fabric and spatial distribution of Early/Middle Neolithic and Beaker pottery). Even though it has been possible to reduce the size of Henshall's 'Unclassified' category, inevitably many sherds and fragments are so small and featureless that they defy all attempts at categorisation and dating. See the Catalogue for 'Indeterminate' entries.

18.10 Conclusions

The Calanais assemblage clearly encompasses material from the Early/Middle Neolithic, the Late Neolithic, the Chalcolithic and the Early Bronze Age periods (in differing quantities), and includes a small number of sherds that are likely to belong to the more recent past. With a large part of the assemblage, the small size of the sherds has made confident attribution to a particular period difficult, although it is likely that many of the sherds of 'ambiguous or indeterminate' date belong either to the Early/Middle Neolithic or to the Early Bronze Age period of Beaker use.

The ways in which the pottery came to be deposited at Calanais varied over time. The earliest material is most likely to derive from a pre-stone circle settlement in the area, and to have been brought in – either accidentally, or as a deliberate act of referencing the ancestors – among material used to level the site after the Ring's erection. (See Section 18.3.3 for a fuller discussion of the taphonomy of this pottery.) The Grooved Ware probably relates to rituals associated with the stone ring. It is unclear how the early, international-style Beaker pottery was used – whether as grave goods, or for some other purpose – but it seems to predate the construction of the chambered cairn. The 'miscellaneous' fine and 'domestic' Beaker pottery seems mostly to have been brought in from a putative settlement elsewhere, while Beaker ASH 42 appears to have been buried as a grave good. Little can be said about the possible use of the Food Vessels; and as for the small amount of post-Early Bronze Age pottery, this will have related to several discrete episodes of activity.

What is clear is that there are no Early to Middle Bronze Age urns, in contrast to nearby Breasclete, where a thick-walled urn with a flat rim, undecorated but for transverse lines on the inner part of the rim top, has been dated to c 1730–1500 cal BC at 95.4% probability (Neighbour 2005). Nothing in the Calanais assemblage approaches this; and indeed, this may provide indirect confirmation that the Calanais Food Vessel belongs within the first quarter of the second millennium. Whatever had been the changing uses of Calanais, it does not seem to have been used for funerary purposes after the Early Bronze Age.

In seeking to understand the pottery from Calanais, it has been necessary to regard it within the broader context of activities in the Hebrides and beyond. The presence of other sites that have produced comparable Early/Middle Neolithic, Chalcolithic and Early Bronze Age pottery in the area reminds us that the activities at Calanais were part – albeit a spectacular part, in the case of the erection of the stone monument – of the life of the broader community. Further excavation in the area may help to shed more light on the pattern of Neolithic and Early Bronze Age landscape use.

Chapter 18.11 Pottery Catalogue

18.11.1 Explanation, key to headings and abbreviations, and initial comments

Cat No: Running number given to each individual sherd and fragment: included for ease of museum cataloguing. The character _ is used to separate runs of numbers, rather than –, to facilitate automatic sorting.

ASH [= Audrey Shore Henshall]: No (given in bold, to ease differentiation from Cat). In some, but by no means all cases the numbers denote individual vessels. Henshall's groupings were as follows:

ASH 1–10: 'Early Neolithic, undecorated, corky fabric' (Note: Henshall's 'Early Neolithic' is given in the Catalogue as 'Early/Middle Neolithic (E/MN)' as this term more accurately conveys the date of the pottery.)

ASH 11: 'Early Neolithic, undecorated, corky fabric; small wall sherds, probably mostly from the pots represented by 1 to 10'

ASH 12–18: 'Undecorated, probably or possibly Early Neolithic type, non-corky fabric'

ASH 19–36: 'Sherds with incised decoration, generally rather harsh gritty fabrics'

ASH 37–60: 'Beaker sherds, and sherds with Beaker-derived features, fabrics very variable and described individually'

ASH 61–75: 'Grooved Ware and miscellaneous sherds with impressed decoration'

ASH 76: 'Unclassified. Numerous small undecorated sherds of Beaker or other late Neolithic [sic] types, some probably belonging to pots already listed'. (Note: this is actually a misnomer, as the ASH 76 category includes some sherds thought to be Early Neolithic.) These sherds were not individually catalogued, but were grouped as follows:

'Unclassified' (listed below as '76 Unc')
'Unclassified (?Early Neolithic type)' (listed below as '76 Unc ?EN')
'Unclassified (? Fine Beaker)' (listed below as '76 Unc ?fine Bkr')
'Unclassified (?domestic Beaker, cf. 43, 44, 71–74)' (listed below as '76 Unc ?dom Bkr')

'Crumbs' (grouped by find areas) (listed below as '76 crb'). Note: most of these are sherd size, rather than crumbs as defined below (see 'No of sherds').

ASH 77–80: 'Sherds probably Iron Age or later'

Henshall also had 81.271 as 'Puzzling. Not listed'

There are also some sherds that were not mentioned by Henshall, but which share the same small finds numbers as other sherds that had been allocated an ASH number and had been bagged with them, even though they do not belong to the same pot. MJ had listed these separately as 'NC' (not catalogued), and they are listed below

as 'NC', their entries being placed immediately below the ASH-numbered entries for those small finds numbers.

As is clear from the JAS comments column, in a few cases the Henshall attribution can be questioned: for example, the ASH 10a (81.220) sherds are from a Hebridean Incised shouldered bowl (although Henshall had recognised the presence of 'an impression' on the carination). Where such discrepancies exist, the JAS identification is given under 'date' and 'type'.

Note: there are several empty bags, plus a couple of 'query' bags, and two bags of pottery found in 1988. These are listed at the end of the Catalogue, along with any additional material not listed by ASH (= 'NC').

The entries are ordered as per the ASH order (with 'NC' entries interspersed as explained above) and, within that, by excavation area and context, except that her ASH 76 'Unclassified' material is listed at the end. These are followed by miscellaneous 'NC' material and by the finds from Area S, found 1988. Problems and queries are listed at the end of the Catalogue, and there are also lists of non-pottery material (including charcoal) which had been assumed formerly to be pottery. The entries can be re-sorted by the reader, by period, context etc.

Find No: Original finds numbers such as 80.2 and 80.20 have been converted to 80.002 and 80.020 to allow sorting. The following entries include more than one find number and if the Table is sorted by 'Find no' one of the numbers will be out of order.

80.180 & 80.038
81.036 & 81.344

Area: In some cases the area as specified in the Catalogue differs from that given on the original finds bags; this is because some areas (e.g. H) were subdivided after initial recording; some areas were re-named; and in some other cases, the original site notebooks make it clear that the find in question was from a different area. The Catalogue version is the definitive version, and this has been entered on the new storage bags.

Context (Ctxt): Again, there has been some renumbering and the Catalogue version is the definitive one. Example: because test pit G in 1980 duplicated context numbers from another area, PJA has consistently changed '600' type context numbers to '1300' type numbers. Similarly, BV 1980 is corrected to BIIISX to avoid confusion with the 1981 BV.

Date: E/MN = Early/Middle Neolithic; Chalco = Chalcolithic; EBA = Early Bronze Age. Note: the attribution of small featureless sherds of corky fabric to the E/MN can only be tentative, as it is known that the same fabric occurs with the Grooved Ware and with some of the Beaker pottery; but given that there is a preponderance of corky sherds among the E/MN assemblage, and given that most of the small Corky sherds have been found in the same areas as indubitably E/MN pottery, there is a good chance that these small sherds also date to that period.

Pot type: Heb Inc = 'Hebridean Incised' (= one element of the Hebridean E/MN ceramic repertoire). 'Corky' and /Non-corky' refer to ASH's division of the Early / Middle Neolithic undecorated pottery by fabric.

No of sherds: where 'F' listed, this refers to fragments (i.e. pieces whose largest dimension is less than 10 mm). 'Crumb' = piece smaller than 5 mm in greatest dimension. Crumbs not given Cat. No. 'cj' = conjoining (but not refitted)

Weight: Measured to nearest gram, with values of 0.5 or greater rounded up. (Note: this occasionally results in discrepancies between the overall weight of multi-piece finds and individual weights.) Weights below 1g recorded as <1.

Dimensions: L = length; W = width; Th = thickness; ERD = estimated rim diameter (in the case of rim sherds large enough for the pot's rim diameter to be estimated). Note: as there are so few pots whose rim diameters can be estimated, this dimension is given in the 'Description and comments' section. One or two asterisks after Th denotes that sherd is a spall – i.e. one or both surfaces is missing. Maximum dimensions given (except

where one part of a sherd, e.g. rim, is significantly thicker than the rest); when more than one sherd present, largest sherd's dimensions given.

Location on pot: differentiates between 'feature' sherds (i.e. rims, necks, carinations/shoulders (= 'car', 'shld'), bases) and sherds from other parts of the body – listed as 'body' and in most or all cases from the belly.

Deco?: presence/absence of decoration; decoration described in final column. Note: the presence of one or more cordon is counted as decoration

Fabric:

1. Fairly hard, corky (with voids mostly between 0.5mm and 3.5 mm in their largest dimension, but occasionally much larger voids are present); often also sparse, mostly sub-angular lithic inclusions present, generally no larger than 4 mm in their largest dimension (although with occasional exceptions); variety of stone types can be present in individual sherds, with mica platelets occasionally present. Overall density of voids and inclusions < 5%, usually 3% or sparser; some sherds look much less corky than others. Can be laminar fabric.

   a. Hard, sparse and small corky sockets (density 3% or less), no other obvious inclusions apart from minute mica platelets

2. Hard, slightly sandy, with a few corky voids; abundant mica platelets on surface. Can include larger sub-angular lithic inclusions of various minerals, up to c 4 mm in greatest dimension. Density c 5% or less

3. Fairly hard, non-corky and non-sandy, sparse lithic inclusions (3% or sparser); inclusions can be angular and up to c 4.5 mm in maximum dimension. Mica platelets can be present.

   a. As 3 but very hard

4. Hard, gritty (= ASH's 'harsh gritty'): angular & sub-angular fragments, mostly of quartz/ite, some with integral mica; can be up to 5.7 x 5.7 mm but generally smaller than 2 x 2; density 5–7%.

   a. As 4 but inclusion density >7% and up to c 25%

5. (seen only in ASH 75): sub-angular and rounded fragments, up to 7.8 x 5.4, of fine-grained speckled stone, creamy-coloured with blackish mineral inclusions, at density of 7–10%.

Surface finish: pol = polished; E= exterior; C = core; I = interior; sl = slight. Note that 'smoothed' denotes surface smoothing probably by wet-smoothing, creating a slip-like effect. (ASH had suggested that many of the sherds had been covered with a fine slip; it can be hard to distinguish between that and well-executed wet-smoothing.) In some (and perhaps numerous) cases, wear through abrasion against the plastic bags in which the sherds have been stored is clearly evident – and is particularly clear when the sherds are examined under a binocular microscope.

Surface deposits: bl = black; encr = encrustation

Wear (= degree of abrasion): 1 = fracture surfaces fresh or slightly abraded; 2 = medium abrasion; 3 = marked abrasion

Ref: indicates where the sherd/pot has been specifically mentioned in the excavation narratives.

Ill.: refers to illustration in Ch 18

Description and comments: gives details of feature sherd form and nature and location of decoration, plus comments by JAS and PJA. Note: 'thin' refers to thinness of the walls, rather than to the overall shape of the pot.

Appendix: This gives summary descriptions of the pots where a relatively detailed description that is too long for inclusion in individual sherd entries can be provided.

Note that the pottery was re-bagged by JAS in 2011, and the previous bag labels (complete with identifications as to pot type/date, mostly by MJ, now superseded) have been placed within the new bags so as to preserve the history of recording. All details have been checked by JAS and updated.

18.11.2 The catalogue

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
1	81.119	HI	738	E/MN	Corky	1	5	27.4	18.5	8.4	Rim	N	1	E: pol low sheen; I smoothed; sheen on part of I is post-depositional	E med brown, black stain C grey-brown I mostly stained black	Sm patch thin bl encr on I; bl staining on E & I	1	12.4.1	Y	1	Rim: pointed, steep E bevel, slightly inturned. ERD c1 60 mm. From small, fine pot, evidently used for cooking to judge from the (probably) burnt-on organic residue. Large oval socket in core near rim tip is much larger than the corky voids; would need to check whether it might be a cereal impression. Part of E spalled off; trowel scar on E.
2	81.111	HII	732	E/MN	Corky	1 + 1 crb	3	22.0	19.0	6.6	Rim or rim flange	N	1	E/lower surface: pol med sheen; I/upper surface pol low sheen	E/lower: black C bl-brown I/upper: dark grey-brown	None	1	7.5.6	Y	2a	Either a gently everted rim with faceted-rounded top, or else part of broad rim flange; either way, increases in thickness from 4.3 at top/outer edge to 6.6 at fracture edge. Thin-walled, fine pot. Slight curvature of sherd (plan view) might suggest that it is a rim (with ERD possibly c 230), but does not rule out possibility of it being a flange. Probably broken along joint line. Both surfaces curve gently. Faceting of edge caused by use of tool

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																					(spatulate bone tool or pebble) to shape it. Large subrectangular inclusion socket on E/lower side, much larger than the corky voids.
3	81.120	HI	738	E/MN	Corky	1	1	20.2	19.9	5.1	Rim or rim flange	N	1	E/lower & I/upper: pol low sheen (but also some prob bag polish on I)	Bl-brown through out	None	3	12.4.1	N	2b	2 conjoined sherds. Most of I spalled off, and spalled surface abraded. Similar shape to ASH 2a, but not necessarily the same pot; thin-walled, fine. If rim, gently everted, and with shallow E bevel. Surfaces gently curving. Too small to estimate diameter.
4	81.377	BIVWX	859	E/MN	Corky	1	3	26.7	21.5	7.1	Rim or rim flange	N	1	E/lower: pol low sheen	E bl-brown with bl encr; C dark brown.	Thin bl encr on E	2	7.3.1; 7.11.5, 7.11.5	N	2c	Rim/rim flange; similar shape to ASH 2a and ASH 2b but probably doesn't belong to either. I spalled off and abraded. If rim, everted and faceted (with additional faceting on E); ERD c 230. If rim flange, would again be from broad flange. E/lower surface curves. Fairly fine and thin.
5	81.377	BIVWX	859	E/MN	Corky	1	<1	14.0	9.2	4.5*	Body	N	1	E smoothed	Light brown through out	None	3	7.3.1; 7.11.5; 7.11.5	N	NC	Featureless, abraded body sherd, from a different pot from Cat. 4

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6	81.331	HII	770	E/MN	Corky	1	3	23.0	19.7	7.5	Rim	N	1	Smoothed	Light brown through out.	None	2	12.5.10	Y	3	Rim from thin-walled, fine pot; ERD c 220 mm. Upright, flattish, faceted on top and E from use of tool (cf. Cat. 2) to shape it. E curves gently inward below rim. Broken along ring joint (shape: inverted, sloping U). Corky voids variable sizes; a couple of large sockets present.
7	81.331	HII	770	E/MN	Corky	1	1	19.9	13.5	6.1	Body	N	1	Smoothed but pitted with some large corky voids and E sl uneven	E blackish-brown; C & I dark brown	None	2	12.5.10	N	NC	From thin-walled, fine pot; not same pot as ASH 3 (Cat. 6)
8	81.331	HII	770	E/MN	Corky	1	2	18.9	14.7	8.3	Body	N	1	Smoothed	Edark brown; C dark grey-brown; I blackish-brown	None	2	12.5.10	N	NC	From slightly thicker but fine pot; not same pot as ASH 3 or Cat. nos 7 or 9
9	81.331	HII	770	E/MN	Corky	1	<1	11.1	7.5	5.1*	?Rim	N	1	Smoothed but E slightly uneven	E dark grey-brown, reddish; C salmon pink and dark grey	None	3	12.5.10	N	NC	Small, heavily abraded and probably burnt sherd. If this is from a rim, then rim is flattish-topped and narrow, with small blob of clay on rim top. Too small and too heavily abraded to be sure. Not same pot as any of the pots with

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																					this Small Finds No
10	80.154	DI	315	E/MN	Corky	1	2	27.8	15.3	6.3	Rim	N	1	Smoothed but E sl uneven	E & I light brown; C black-brown	None	1	9.3.6	Y	4	Rim from thin-walled, fine pot; similar rim shape to ASH 1 (Cat. 1). Upright, pointed, with steep E bevel; ERD c 200 mm. Poss broken along diagonal ring joint. Long narrow scratch on rim bevel: from smoothing of surface?
11	81.424	BIII	815	E/MN	Corky	1	2	18.3	11.8	7.6	Rim	N	1 but minimally corky	Rim pol to v low sheen on E; I smoothed. Some bag pol on E	I & E light brown; C darker brown	None	2	7.10.8	N	5	From thin-walled fine pot. Rim upright, rounded, with gentle facet on E. Too small to estimate rim diameter. Less corky than other pots. F no given as 813 on bags. Conflict between Area and context in Finds Book. Day Book mentions 815 in BIII on the relevant day but not 813. Found 9.5.81
12	81.424	BIII	815	E/MN	Non-corky	1	2	18.2	16.7	7.2	Poss rim	N	1 but minimally corky, and soft	Smoothed	E buff with reddish tinge; C & I as E but sl. redder	None	3	7.10.8	N	NC	From small thin-walled fine pot, possibly a cup, burnt (hence colour and softness). Given narrowing of wall, is most likely to be from a rim with E rim bevel and gently pointed top than from a carination. Too small for ERD but prob between 100 and 130

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																					mm. Not from same pot as ASH 5 (Cat. 11)
13	81.424	BIII	815	E/MN	Non-corky	1	1	16.5	16.3	5.5	Poss car	N	1a	Smoothed	E med brown; C & I med brown with sl reddish tinge	None	3	7.10.8	N	NC	Small sherd from thin-walled, fine pot; may be very gentle carination. Too small to estimate diameter at this point. Not from same pot as ASH 5 (Cat. 11) or Cat. 12
14	81.452	BIV	877	E/MN	Corky	1	5	30.0	23.1	9.8	Rim flange or rim	N	1	One surface (underside, if rim flange; E if rim) pol to low sheen; other smoothed	Top/I med to drk brown; C med grey-brown; underside/E dark brown, with tiny patch of black staining	Tiny patch of black staining on underside/E	2	7.16.1	Y	6	From large, fine pot. Minimal curvature and rapid thickening away from edge suggest that this is perhaps more likely to be part of a broad rim flange than a rim. Outer edge rounded; upper surface (if flange) very gently convex and lower surface slightly dished. If it is a rim, then everted. Diameter hard to assess but at least 300 mm. Find No wrongly given as 81.425 in ASH Cat. and on the sherd, but ASH had queried the numbering. Hard to judge which is the I surface but it's most likely that the polished surface is E, so rim would be minimally everted. Found 27.5.81

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15	80.172	DI	315	E/MN	Corky	1 + 3 crbs	2	23.8	18.5	6.0	Rim	N	1	Pol to low sheen on E (although may be bag pol); I smoothed	E black; C & I sl red-brown	None	2	9.3.6	Y	7a	From small, thin-walled, fine pot. Rim pointed, upright; ERD c 140 mm. Low smoothing facet on E. Fragment of charcoal also present in bag; now bagged separately
16	81.074	DI	352	E/MN	Corky	1	3	19.0	24.2	6.8	Rim flange or rim	N	1	Smoothed; sl pol on one side - ?bag wear	One side (top/E) dark orange-brown; other & C blackish	None	2	9.3.16	N	7a	From thin fine pot; hard to tell whether it is a rim flange or a gently everted rim. Edge rounded. One surface (E, if it is a rim) kinks up/out close to fracture end. If it is a rim, too small to estimate rim diameter. Not from same pot as Cat. No 15 (ASH 7a)
17	81.284	DIV	375	E/MN	Corky	1	1	19.7	11.6	6.2	Rim	N	1 but minimally corky	Smoothed	E black-brown; C & I med brown	None	1	9.3.20	N	7b	Rim pointed, upright. Could well be from same pot as Cat. No 15 (ASH 7a, 80.172). Part of E spalled off
18_26	81.229	HII	768	E/MN	Corky	9	19 (6,4, 4, 3, 1,1,1 ,2 x <1	26.1	21.7	9.5	Rim; body	N	1	Smoothed; low sheen on E & I of several sherds may be due to bag polish	E dark brown; C & I black-grey	None	2	12.3.4	Y	8	Rim with rounded gentle peak at I; ERD c 250. From fairly fine, large pot. Two of the body sherds had broken along ring joint lines, and several of the sherds are spalls. One frag charcoal also present; now bagged separately
27	81.22	HII	768	Prob	Prob	1	<1	15.1	9.9	4.1*	Body	N	3	Smoothed	E med	None	2	12.3	N	NC	Featureless spall – it's

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	9			Chalco/ EBA; less likely to be E/MN	fine Beaker										brown; C med grey			.4			probable that the I is missing – from fine, prob thin-walled pot. Not same pot as ASH 8 (Cat. no 18–26). Could be fine Beaker or else particularly fine E/MN non-corky
28	81.229	HII	768	? Chalco. EBA	?Fine Beaker	1	<1	10.5	7.6	3.6*	Body	N	3	Smoothed	E med-brown; C grey-buff	None	3	12.3.4	N	NC	Spall from very fine, prob thin-walled pot; could be fine Beaker
29	81.229	HII	768	Prob Chalco/ EBA?	Prob fine Beaker	1	1	12.2	14.4	5.9	Rim	N	2	Smoothed	Blackish-brown through out	Possibly tiny patches blackish encr on I	3	12.3.4	N	NC	Rim, gently squared off with top sloping very slightly towards I.Thin and fine enough to be from a fine Beaker, and rim shape accords with Beaker. Too small to estimate rim diam.
30_38	81.239	DI	369	E/MN	Corky	7 + 2F + sev crbs	10 (6,3, 1,1, <1 x 5)	34.5	24.5	7.0	Body	N	1	Smoothed; pol to low sheen on E	E blackish-brown; C dark grey-brown; I light to med brown.	None	2	9.3.16	N	9	Includes 2 refitted sherds. From thin, fine pot; largest sherd (from belly) may have broken along ring joint. Est diam at this point: 150. Found 13.5.80. ASH note: '1981-239 bag mislaid [sic]with C20'
39_43	81.239	DI	369	E/MN	Corky	4 + 1F	4 (3, 1, 1, <1 x 2)	20.8	27.7	9.1	Car or rim; body	N	1	Smoothed; poss bag pol on I	E med brown (light grey immed below surface)	None	2,3	9.3.16	Y	9	Unclear whether largest sherd is from carination or rim and neck; from fairly fine pot. Uncertain whether all the other

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															; C mid-grey; I dark grey-brown						sherds and frag belong to this pot, but may do. Includes one pair of refitted sherds. If a rim, then externally-bevelled, slightly inturned, tip missing. If a carination, is gentle. Too small to estimate diameter. Sherds may belong to >1 pot. Found 13.5.80. ASH note: '1981-239 bag mislaid [sic]with C20'
44_47	81.060	HI	707	E/MN	Corky	4F incl 2 cj	1	14.0 cj	9.0	4.2*	Rim	N	1	Smoothed	I med brown; C blackish	None	2	12.4.1	N	10a	Spalls. Rim represented by spall from interior; rim slightly expanded to I
48_53	81.220	HII	747	E/MN	Heb Inc	5 & 1F, crbs	7 (3,2, 1 x 2, <1 x 2)	22.0	17.3	8.8	1 neck-&-shld; rest body	Y	1	Smoothed	E dark brown to black-brown; C & I dark grey	None	2	12.5.6	N	10a	May all be from one pot, but not same pot as Cat.Nos 44–47 (ASH 10a). Neck-&-shoulder sherd (Cat. 48), from shouldered bowl, with stab decoration above the shoulder and an incised line immediately below. Sherd is a spall, bulging at the spalled surface, suggesting that the ridge/shoulder had been applied.
54	80.166	BI	173	E/MN	Corky	1	<1	14.5	7.8	5.9*	Rim	N	1	Pol to low sheen on	E (or I) med	None	2	7.14.1	18.3	10b	Rim spall: flattened-

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														surviving surface	brown; C dark brown						rounded and expanded, with peak to E or I. Hard to tell whether surviving surface is E or I. Broken along ring joint. Possibly same pot as Cat. Nos 44-47 (ASH 10a) but in both cases, too small to be sure. Original bag says 'f.173 under f.160 on f.101. This look [sic] a bit like s…..' [illegible]
55	81.372	B	130	E/MN	Heb Inc?	1	12	35.3	44.6	9.3	Body	N	1	Smoothed	E & I light-med brown; C grey-brown	None	1	7.10.7	N	11	2 refitted sherds. Hackly fracture. From fairly large pot. Indentation on E could be incised decoration. From Area B, but sub-area not recorded. Original Finds Book Ctxt is '130?'
56	81.404	BIWX	855	E/MN	Corky	1	1	20.5	13.2	7.3	Body, poss immed below rim	N	1	Smoothed; I has low sheen, poss through wear	E & I dark brown, C blackish	None	2	7.5.2	N	11	Poss broken along ring joint. E partly spalled off. Found 21.5.81
57	81.445	BI	856	E/MN	Corky	1	1	18.9	15.5	6.3*	Body	N	1	Smoothed; prob bag pol on I	C dark brown, I black	None	2	7.5.1	N	11	E spalled off; probably from fine pot. Inner, original find bag labelled 'westward ext of B1. Find No 8 & 7' Found 21.5.81

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58	81.445	BI	856	E/MN	Corky	1	1	16.4	13.1	5.3	Body	N	1	Smoothed	E black-brown, C dark brown, I grey-brown	None	2	7.5.1	N	11	From very thin, fine pot. Inner, original find bag labelled 'westward ext of B1. Find No 8 & 7'. Found 21.5.81
59	81.436	BIWX	855	E/MN (?)	Corky (but see under fabric)	1	5	26.1	24.0	7.4	Body; E flat, I curving	N	2	Smoothed; I pol to med sheen	E & C red-brown; I grey-brown	None	2	7.5.2	N	11	Fabric very slightly grittier than that seen in other E/MN sherds; can't rule out a post-Neo date. One fracture surface partly runs along ring joint. Found 21.5.81
60_61	81.496	BIWX	855	E/MN	Corky	1, 1F, sev crbs	2	20.8	17.1	7.1	Body, poss neck just below rim (E kinks out)	N	1	E smoothed; I uneven	E mid-brown with black patch; C & I light grey-brown	Patch of v thin encr on E	2	7.5.2	N	11	I surface bulges out at one point where an internal lithic inclusion protrudes. Found 8.6.81; bag says 'Inner black s/infill'. PJA adds 's/infill means slot infill.
62	81.371	BII	860	E/MN	Non-corky	1	1	11.8	14.7	5.8	Body	N	3	Smoothed, poss pol to low sheen on E	E & part of C mid-brown; rest of C & I black	V thin black residue on I	1	7.10.7	N	11	ASH had had it as part of her '11' (i.e. corky) sherds but fabric is not corky. From thin-walled, fine pot. Found 22.5.81
63	81.621	BII/III	130	E/MN?	Corky ? Heb Inc	1 + 1 frag	1	18.8	20.0	4.2*	Body	See comments	1	Smoothed	E med brown; C black-brown	None	2	7.10.7	N	11	I spalled off. Possibly decorated: 2 large voids are natural, and horizontal line could be trowel scratch, but diagonal depression could be incision or impression rather than

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																					natural feature. May therefore be Heb Inc. Found 13.5.81
64	80.126	BIV	114	E/MN	Corky	1	2	22.9	13.6	7.2	Body	N	1	Smoothed	E & C med brown; I black	V thin black stain on I	3	7.2.4	N	11	Broken along ring joint, creating 'false rim'. Found 14.5.80
65	80.221	BIV	134	E/MN	Corky	1	7	37.2	27.0	7.6	Body	N	1	Smoothed	E light red- and orange-brown; C & I blackish	None	3	7.4.2	N	11	Found 20.5.80
66	81.410	BIV	866	E/MN	Corky	1	1	16.5	14.9	6.0	Body	N	1	Smoothed	E & C red-brown; I blackish	None	3	7.16.1	N	11	Bag says 'f. 866, layer 160, find No 9'. Found 26.5.81 E heavily abraded. Prob broken along ring joint
67	81.459	BIVWX	878	E/MN	Corky	1	4	29.0	27.7	6.6	Body	N	1	Smoothed	E & C med-brown; I light brown	None	2	711.3	N	11	Part of E spalled off. Found 29.5.81
68	80.069	BIIISX	140	E/MN	Corky	1	3	23.6	22.1	5.3*	Body	N	1	Smoothed	C & I mediu m brown	None	2	7.4.2	N	11	E spalled off. Bag says 'BV f.140 SF 69' as does Finds Book. PJA adds, 'BV 1980 has been changed in the report to BIIISX to avoid confusion with the 1981 BV.' Found 16.5.80
69_76	81.393	BVSX	141	E/MN	Corky	6 + 2 frgs+ 2 crb	11 (4,	26.5	14.4	10.9	Body	N	1	Smoothed	E & I Dark brown	None	2 & 3	7.8.3	N	11	All prob from same pot; relatively thick-walled, but carefully-

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							2,2, 3 x 1)								(E sl red-brown on one sherd), C grey-brown						smoothed surfaces. 5 sherds are spalls. One 'false rim' ring joint; lgst sherd has poss trowel gouge. One buff-coloured sherd probably burnt, or else just heavily leached
77_81	80.155	DI	315	E/MN	Non-corky	4 & 1F	6	30.3	35.7	7.2	Body	N	3	Smoothed	E & I dark brown; C grey-brown	Poss trace of v thin dark brown encr on I	3	9.3.6	N	11	Had originally been one sherd; currently consists of 3 refitted sherds plus conjoining sherd & frag – so no need to split weight into constituent sherds.
82	80.059	DI	315	E/MN but see comment	Corky but see note	1	7	33.6	23.5	9.0	Body	N	2	Smoothed	E mid brown; C dark grey; I mid – brown, sl greyish	None	2	9.3.6	N	11	Broken along two ring joint lines; one line is shiny, possibly from trowel damage. Fabric: minimally corky; fairly abundant sand-sized grains, density 5–7%. From fairly large pot: diam at this point c 210. Note: some of the domestic Beaker sherds resemble this in fabric and thickness
83_92	81.093	DI	315	E/MN	Corky	6 + 4F + crbs + incl	8 (3, 3 x 1, rest <1	23.8	19.0	10.5	Body	N	1 but not v corky	Smoothed	E & I dark brown, C buff & grey-brown	Poss v thin blackish encr on I and/or E but may just be sediment	3	9.3.6	N	11	All prob from one pot. Friable and relatively thick. Note on bag: 'Lg crystal was part of fabric and fell out'. Not crystal but angular matte rock frag (= deliberately-added lithic inclusion), dark grey-

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																					brown,10 x 7.5 mm. Found 7.5.81
93_113	80.109	DI	321.2C	E/MN	Corky	14 & 7F & crbs	10 (2 x2, 4 x 1, rest <1)	27.6	21.0	8.2*	Body	N	1	Smoothed	E & I dark brown, C light and dark grey-brown	None	2	9.3.8	N	11	All from one pot; all spalls. Friable. May be from same pot as 525_530 and possibly 924_926 despite differences in fabric.
114_115	81.245	DI	352	E/MN	Corky	2	14 (9,5)	32.7	28.6	12.3*	Body	N	1 but soft	I smoothed; E uneven but heavly abraded	C grey-brown to red-brown; I reddish-buff	None	3	9.3.16	N	11	Abraded body sherds from relatively thick pot; E spalled off and abraded
116	81.245	DI	352	E/MN	Corky	1	2	23.1	17.4	6.8	Body	N	1 but soft	Smoothed	E & I light brown, sl pinkish; C med grey	None	3	9.3.16	N	11	Body sherd; poss broken along joint line (broad V-shape)
117	81.252	DI	369	E/MN	Corky	1	4	25.3	26.7	9.9	Body	N	1	Smoothed	E mid-brown; C grey-brown to bl-brown; I bl-brown.	Patch of thin bl encr on I	2	9.3.16	N	11	From belly of fairly fine pot; much of I spalled off
118	81.252	DI	369	E/MN	Non-corky	1	4	21.4	17.6	11.7	Body	N	2	Smothed	Eor I&C light red-brown, I or C grey-brown	None	3	9.3.16	N	11	Featureless body sherd

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119	81.272	DI	369	E/MN	Corky	1	4	27.8	24.1	7.5	Body	N	1	Smoothed	E grey-brown with dark-brown patch (plis peat); C + I mid grey-brown	None	2	9.3.16	N	11	Much of I spalled off. Found 16.5.81
120	81.262	DI	374	E/MN	Corky	1	2	19.0	18.5	5.8	Body	N	1 but min. corky	E & I pol to med sheen	E dark brown; C & I blackish	Minute trace of black encr on I	2	9.3.16	N	11	Thin, fine pot; poss broken along ring joint. NB: poss than some of the sheen on the I is from plastic bag storage rather than polish. Found 16.5.81
121	81.269	DI	374	E/MN	Corky	1	2	20.7	18.0	5.2	Body	N	1 but min. corky	E pol to med sheen	E dark brown; C & I black	Thin bl encr on I	2	9.3.16	N	11	Thin, fine; could well be from same pot as 81.262
122	81.298	DI	376	E/MN	Corky	1	2	16.4	16.4	6.6	Body	N	1	Pol to low sheen on E; smoothed I	E black-brown; C & I dark brown	None	2	9.3.14	N	11	Most or all of I spalled off. Poss from same pot as 81.262 and 81.269. Found 19.5.81. On original bag, says 'hearth'. PJA adds: Context 376 was originally interpreted as a hearth but may have been a burial setting.
123	81.367	DI	914	E/MN	Non-corky	1	2	25.8	13.6	5.2	Body	N	3	Smoothed	E light red-brown; C & I orange-brown,	Tiny patches of v thin encr on E	2	9.3.5	N	11	Thin, fine, slightly laminar. Found 5.6.81

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															with some dark grey in C						
124	80.141	DII	316	E/MN	Corky but see under fabric	1	8	33.4	26.6	10.8	Body	N	2	Smoothed	E + C dark grey-brown; I med grey-brown	None	2	9.3.4	N	11	Poss broken along ring joint
125_128	81.241	DV	344	E/MN	Corky	4	4 (3 x 1, 1 x <1)	21.5	14.5	6.5*	Body	N	1	None visible	E & I dark brown; C grey-brown to bl-brown	None	3	9.3.6	N	11	All spalls, heavily abraded, all from one pot; one broken along ring joint. Found 8.5.81
129	81.058	HI	707	E/MN	Corky	1	3	24.1	18.8	7.7	Body	N	1	E pol to low sheen; I smoothed	E med-brown; C & I dark brown	None	3	12.4.1	N	11	Some polishing of abraded fracture surfaces from friction against plastic bag
130	81.106	HI	725	E/MN	Corky	1	2	22.3	20.4	5.8	Body	N	1	E & I pol to low sheen	E & C med-brown; I black-brown	None	2	12.4.1	N	11	Poss broken along ring joint. Voids examined under microscope at x50; material in one is very friable, rotten, blackish mineral. Probable 'bag-polish' and trowel-smoothing on I. Shallow scratches on E are almost certainly not deliberate decoration
131_132	81.102	HI	735	E/MN	Corky	2	3 (2,)	24.3	19.3	11	Body	N	1	I pol to low sheen; E	E dark brown; C light	None	3	12.3.1	N	11	Conjoining spalls from laminar-fabric pot. Th measured with

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
														smoothed but abraded	grey; I blackish						both spalls placed together. Found 23.5.80
133	81.102	HI	735	E/MN	Corky	1	2	15.6	16.1	7.6	Body	N	1	I smoothed; E abraded	E med brown; C & I dark brown	None	3	12.3.1	N	11	Abraded body sherd from different pot from Cat. Nos 131 and 132
134_138	81.214	HI	738	E/MN	Corky	5	9 (8, 1, <1x2)	43.2	29.8	8.6	Body	N	1	Smoothed	E & I light brown; C light grey-brown	None	3	12.4.1	N	11	2 conjoining sherds had been refitted. Others are spalls from same pot. Much of E of conjoined sherds spalled off. Laminar fabric. Light colour suggests possibly burnt
139	81.122	HI	739	E/MN	Corky	1	1	19.8	15.5	4.1*	Body	N	1	None visible	I black-brown; C black-brown & buff	Tiny patches of v thin blackish encr on I	2	12.4.1	N	11	Spall. Bag says 'f.738/739'
140_141	81.128	HI	739	E/MN	Corky	2	1 (1, <1)	14.2	12.8	4.7	Poss rim + body	N	1	Smoothed	Buff through out	None	3	12.4.1	N	11	Both from same pot. V thin, fine pot. Possible rimsherd has gently pointed top but is otherwise rounded, and minimally everted. Softness & light colour may indicate that sherds have been burnt.
142	81.156	HI	739	E/MN	Corky	1	1	20.3	10.2	7.7	Body	N	1	Smoothed	E & I med brown; C sl orange-brown	None	3	12.4.1	N	11	Bag says '?rimsherd' but is actually a false rim (ie broken along convex ring joint). Trowel gouge on edge

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
143_154	81.154	HI	746	E/MN	Corky	10 + 2F + crbs	10 (2, 1 x 9, <1 x 2)	16.7	12.6	8.5*	Body	N	1	Smoothed.	Dark brown throughout.	None	2 & 3	12.7.6	N	11	Body sherds (incl several spalls) from pot with laminar, friable fabric. Also present in bag: 1 frag charcoal, 1 rounded frag stone. Now bagged separately
155	81.154	HI	746	? Chalco/ EBA	? fine Beaker	1	1	15.0	12.3	4.3	Body	N	1a	Pol to v low sheen on E; smoothed I	E & I light brown C grey-brown		3	12.7.6	N	11	Body sherd from thin, fine pot, possibly fine Beaker: cf. ASH 55 and ASH 15: Beaker/Beaker-like sherds from Area H
156	81.037	HII	712	E/MN	Corky	1	2	22.0	21.6	5.0*	Body	N	1	Insufficient surface surviving	C: dark greyish brown	None	3	12.3.3	N	11	E & most of I spalled off; E abraded; but may well have been from a thin-walled pot
157	81.038	HII	712	E/MN	Corky	1	3	28.1	17.8	6.3	Body	N	1	Smoothed	Med brown throughout	None	2	12.3.3	N	11	
158	81.040	HII	712	E/MN	Corky	1	1	15.2	14.3	7.2*	Body	N	1	Smoothed	I & C dark brown	None	2	12.3.3	N	11	Could be from same pot as 81.38 but too small to be sure. Large rectangular voids on I are indeed voids, not decoration. E and part of I spalled off: laminar fabric
159	81.681	HII	728	E/MN	Corky	1	2	22.8	16.0	5.3	Body	N	1	Smoothed	E blackish, C & I black-brown.	None	2	12.5.2	N	11	From thin, fine pot. Original small finds bag says 'f.738' but Finds Book has "f 728 T. 28 say?". "T.28 say?" may refer to a temporary finds number.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
160	81.681	HII	728	E/MN	Corky	1	2	19.0	11.0	8.7	Body	N	3	Smoothed	Med grey-brown throughout	Sm patch v thin bl encr on I	3	12.5.2	N	11	Featureless body sherd from thicker pot than Cat. no 159
161	81.078	HII	728	E/MN	Corky	1	1	13.1	12.7	5.1*	Body	N	1	Smoothed	C med grey-brown; I dark brown	None	3	12.5.2	N	11	E spalled off
162_165	81.668	HII	730	E/MN	Corky	3S, 1F	3 (1,1, 2 x <1)	20.3	12.3	5.2*	Body	N	1 (min corky)	Smoothed	Light brown throughout, C greyish in parts. Frag: C black, E & I med brown	None	3	12.6.4	N	11	All spalls; poss burnt. Frag soft, friable
166_167	81.109	HII	732	E/MN	Corky	2	9 (9,1)	37.9	30.8	8.0	Body	N	1	Smoothed	E med grey-brown; C & I dark grey-brown	Patch of thin blackish encr on I	2	7.5.6	N	11	Both sherds from same pot. Total of weights seems to exceed 9 but is due to scales measuring to whole grams
168_171	81.113	HII	732	E/MN Or Chalco/ EBA	Corky or fineBkr	2 + 2F+ crb	2 (2 x1, 2 x <1)	16.0	13.9	5.1*	Body	N but see comments	1 (min corky)	Smoothed	E & I light red-brown; C light grey	None	1	7.5.6	N	11	All from the same pot; all spalls. One sherd has very shallow, thin horizontal incision but unclear whether this is decoration. Not like incisions on Heb Incised ware; if deliberate, might it be from a Beaker? Friable. Prob thin, fine pot.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
172	81.113	HII	732	E/MN	Corky	1	2	19.5	18.0	6.1	Prob from splaying neck	N	1	Pol to low sheen on E & I	E black-brown; C dark to med grey-brown; I med grey-brown	None	1	7.5.6	N	11	From thin fine pot but probably not same pot as other 81.113 sherds. Large rectangular void in one fracture surface.
173	81.115	HII	732	E/MN	Corky	1	3	28.5	21.6	6.3	Body	N	1 but min corky; hard	E pol to low sheen	E light reddish-brown; C: as E, plus light grey	None	3	7.5.6	N	11	Most of E and all of I spalled off. 2 sherds refitted. Laminar but notably hard fabric
174_175	81.096	HII	732	E/MN	Corky; one sherd Heb Inc	2	2 (1,1)	23.2	16.7	6.1*	Body	Incised line on one sherd	1	Smoothed	Decorated sherd: E & I blackish brown; C dark grey brown. Other sherd: C grey-brown; I light brown	None	2	7.5.6	N	11	The 2 sherds are possibly from same pot; all of E spalled from one sherd, most of E spalled from the decorated sherd..
176	81.146	HII	733	E/MN	Corky	1	4	28.0	23.4	7.3*	Body	N	1, min. corky	E pol to med sheen; I sl uneven	Dark grey-brown through out	None	2	7.5.6	N	11	I spalled off. Shallow scratches (not decoration) on E, in 2 directions
177	81.148	HII	733	E/MN	Corky	1	2	21.1	17.6	6.8*	Body	N	1, min. corky	I pol to low sheen	I dark grey-brown;	Patch of thin bl encr	3	7.5.6	N	11	E spalled off

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															C med grey-brown	on I					
178	81.097	HII	733	E/MN	Corky	1	3	23.5	20.4	8.0	Body	N	1	Smoothed; some 'bag-polish' on I	E med-brown; C dark grey-brown; Idark brown	None	2	7.5.6	N	11	
179_180	81.215	HII	747	E/MN	Corky	2	2 (2, <1)	18.9	17.5	5.6	Body	N	1 (min. corky)	Smoothed	E blackish-brown; Cmedium to dark grey-brown; I med grey-brown	None	2	12.5.6	N	11	Thin, fine. Both from same pot. Larger sherd prob broken along ring joint
181	81.321	HII	769	E/MN	Corky	1	4	29.6	28.3	6.8*	Body	N	1	E pol to low sheen	E med brown; C dark grey-brown	None	2	12.5.10	N	11	I spalled off
182_195	81.322	HII	769	E/MN	Corky	14	6 (1 x 4, <1 x 10)	16.7	13.4	6.9	1 rim; rest body	N	1	Smoothed	Rim: E & I red-brown; C dark grey-brown. Others: various shades of brown	None	2	12.5.10	N	11	From fairly fine, thin-walled pot. Rim upright, gently pointed. Several of the sherds are spalls; several broken along joint lines (curving diagonal joints).
196_197	81.322	HII	769	E/MN	Non-corky	2	3	21.1	15.2	5.9	Neck, body	N	3	Smoothed	E med brown;	None	2	12.5.10	N	11	From thin, fine pot.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
							(2,2)								C mid grey-brown; I dark grey-brown						Not same pot as Cat. nos 182–195 or 198–200.
198_200	81.322	HII	769	E/MN	Corky	3	2 (1,1, <1 x 11)	16.5	13.5	10.4*	Body	N	1 but soft	Smoothed but abraded	Dark grey-brown through out	None	3	12.5.10	N	11	Heavily abraded featureless sherds
201_202	81.323	HII	769B	E/MN	Corky	2	2 (1,1)	17.2	12.7	5.3*	Body; 1 spall prob from rim	N	1 (min. corky); rim spall 3	Rim spall: E pol to med sheen; other: prob bag pol on I	E med brown; I dark grey-brown	None	3	12.5.10	N	11	2 spalls from fairly fine pot with laminar fabric; I of rim spalled off. Rim has shallow and narrow E bevel. Apparent variation in fabric is minor; both spalls may well be from same pot.
203	81.323	HII	769B	E/MN	Corky	1	5	26.4	21.6	10.8	Body	N	1	Smoothed; I sl less smooth than E	E & I mid brown; C mid brown and dark grey	None	3	12.5.10	N	11	Belly sherd from fairly fine pot, slightly laminar fabric; part of E spalled off. Prob not same pot as Cat. No 201–202; not same pot as Cat. No204–206
204_206	81.323	HII	769B	E/MN	Corky	2 + 1F	1 (1,1, <1)	17.2	11.5	5.2**	Body	N	1a	No surfaces present	C dark grey, dark brown, light to mid brown	None	2	12.5.10	N	11	3 featureless spalls from pot with laminar fabric. Not same pot as Cat. No 201–202 or 203
207_217	81.326	HII	769	E/MN	Corky	10 + 1F + crbs	13 (2 x 3, 2, 5	19.3	18.8	8.5	Body	N	1	Smoothed; E & I pol to low	E light brown; C dark	None	2 &3	12.5.10	N	11	May all be from one pot (except perhaps the most abraded,

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
							x 1, 2 x <1)							sheen on 2 sherds	grey-brown; I black-brown; one blackish through out						black sherd). Friable, laminar. Oldest bag says 'f.769 general from …[illegible] of layer D'
218_219	81.349	HII	770	E/MN	Corky	2	8 (6, 2)	32.1	22.0	11.2	Body	N	1	E Smoothed	E med brown; C light to dark grey-brown	None	2	12.5.10	N	11	I spalled off both sherds. Both from same pot. Large sherd contains large (7 x 5 mm) subangular quartz inclusion
220	81.695	HII	787	E/MN	Corky	1	1	22.2	14.0	4.6*	Body	N	1 (min)	Smoothed	E light brown; C blackish	None	2	12.6.4	N	11	I spalled off. NOTE: ASH has this as coming from B, and the bag says B4Wx/H, rather than HII. PJA adds, ' The original finds book has B4etc crossed out and replaced by H' . Found 1.6.81
221	80.003	G1	1306	E/MN	Non-corky	1	4	27.0	27.3	6.5*	Neck & rim	N	3	Smoothed	C light brown (plus brown peat); I med brown	None	2	13.2.1	Y	12	From fine pot with laminar fabric; E spalled off. Slightly everted rim; rim top and E missing. Est diam at this point c 200 mm. Note: the bag says 'Site G f.606', but because test pit G in 1980 duplicated context numbers from another area, PJA has consistently changed '600' type context numbers to '1300' type numbers. E spalled

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					off. Fairly hard. One shiny lithic inclusion
222	81.239	DI	369	E/MN	Non-corky	1	3	18.5	21.5	8.5	Rim	N	2	Smoothed	E blackish brown; C mid grey-brown; I med grey-brown	V thin bl encr on E	3	9.3.16	Y	13	Rim rounded, upright. Too small to estimate rim diameter. ASH note in bag: 'Found with ASH 9'
223	81.213	HI	738	E/MN	Non-corky	1	3	19.2	21.7	8.2	Rim	N	2	Smoothed	E pinkish-brown; C mid grey-brown; I dark grey-brown	None	2	12.4.1	N	14	Rim rounded, slightly flaring. Too small to estimate rim diameter. ASH note: found with ASH 15 (Cat. 226, 227; 81.213)
224_225	81.213	HI	738	E/MN	Non-corky	2	3 (2,1)	22.3	16.1	5.5	Rim flange; body	N	3	Smoothed; low sheen prob due to bag pol	E & I blackish; C light to med grey-brown	V thin black encr on E	2	12.4.1	N	15	From thin, fine but fairly large pot with flanged rim; edge gently squared off. Superficially resembles rim of fine Beaker but flatness of sherd suggests that it is more likely to be an E/MN fine flanged pot.
226_227	81.213	HI	738	E/MN	Corky	2	5 (3,2)	24.5	25.1	7.6	Body	N	1	Smoothed	E med brown; C dark grey; I mid grey-brown	None	2,3	12.4.1	N	NC	Mentioned in ASH's catalogue under 15 but not part of the pot represented by Cat. 224–5. From belly of fairly thin-walled, fairly fine pot
228	81.213	HI	738	E/MN	Non-corky	1	4	21.5	28.1	6.1	Body	N	1a	Smoothed	E light brown	None	2	12.4.1	N	NC	Curving belly sherd from small, fine, thin-

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															with grey-brown areas; C buff; I light grey-brown						walled pot; possibly a cup
229	81.213	HI	738	E/MN	Non-corky	1	7	30.8	24.7	10.8	Body	N	3	Smoothed; poss pol to low sheen on E, or else bag polish	E mid brown; C mid brown & grey-brown; I mid-brown, sl reddish	None	3	12.4.1	N	NC	Abraded belly sherd from fairly fine pot
230	81.213	HI	738	E/MN	Non-corky	1	2	20.3	19.4	5.6*	Body	N	3	Smoothed	C grey & light brown; I med brown	None	3	12.4.1	N	NC	Abraded spall from fine pot
231	81.213	HI	738	E/MN	Heb Inc	1	2	16.6	13.9	10.6	Body	Y	3	Smoothed	Edark grey-brown; C light grey with bright redlayers close to E & I surfaces; I light red-brown	None	3	12.4.1	N	NC	Body with incised herringbone design, horizontal
232	81.434	BIV	846	E/MN	Non-corky	1	4	23.8	21.7	8.7	Rim or rim	N	2	Smoothed but	E/underside	None	2	7.14.1;	N	16	Either rim or rim flange, with rounded

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
											flange			I/upper surface sl uneven. Patches of sheen on E /underside not due to deliberate polish but to combination of trowel mark and bag polish	blackish - brown; C dark grey & med brown; I/upper surface med brown			7.8.8			edge and one slightly concave surface, from not particularly fine pot. If rim, slightly everted. Had split vertically, prob along joint plane, and pieces had been refitted. Slight hollow on one surface probably caused by running a thumb around the pot . Cannot estimate rim diam. Found 23.5.81
233	81.434	BIV	846	E/MN	Non-corky	1	29	54.2	45.6	9.9	Neck or belly	N	3	Smoothed	E light-med grey-brown; Cmed-dark grey-brown; I dark grey-brown	None	2	7.14.1; 7.8.8	N	NC	Mentioned by ASH in her listing of ASH 16, but from different pot. From large, fine, hard pot; diam at this point c 230. Broken along ring joints. Largest of the E/MN sherds. Found 23.5.81
234	81.434	BIV	846	E/MN	Non-corky	1	9	27.2	26.6	10.5	Body	N	3	Smoothed; low sheen on E prob due to bag pol	E & C light to mid brown; I mid-brown	None	2	7.14.1; 7.8.8	N	NC	Mentioned by ASH in her listing of ASH 16, but from different pot; may possibly be from same pot as Cat. 233. Hard, fine fabric. Prob broken along ring joint. Found 23.5.81
235	80.043	BII/III	156	E/MN	Non-corky	1	1	18.3	11.0	10.7	Rim	N	2	Smoothed	E dark grey-brown; C dark	None	3	7.2.8, 7.3.8	N	17	Rim from fairly fine pot. Flattish on top, rounded on E,

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															grey; I med-brown						expanded to E. Prob broken along ring joint. Too small for estimating rim diam. Bag says ' Site B NE Ext f.111 [SF] 43'. Original finds book says '10/5/80 B2 in top 156 under peat NE' PJA adds: 'In the text I have assigned it to 156 but explained that it might be safer to suppose it was in the overlying peaty material 111. It should be recorded in the catalogue as 156 but with similar comment. Some finds ascribed to 111 in previous version of Catalogue have been moved to other contexts after checking finds book'. Found 10.5.80
236_237	80.133	BIIISX	117	E/MN	Non-corky	2	4	24.6	20.2	8.8	Rim or poss rim flange	N	3	Smoothed	E + I light to mid-brown; C mid-grey	None	Abraded	7.4.2	Y	17a	2 conjoining and refitted sherds from fine pot; broken along ring joint. Either rim – rounded & slightly everted, with curving I surface – or rim flange with convex upper surface. Too small for reliable ERD. PJA adds, 'B 5-3. This was recorded in the original finds book as

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					80.133 from context 117 (the generally highest old plough soil on Area B) and as from B5-3. In 1980 B5 was used for a small slot extension southward of BIII near the medial baulk and the annotation B5-3 undoubtedly means that the sherd came from close to the general southern boundary of B3 and the start of the 1980 trench B5 has been changed in the report to BIIISX to avoid confusion with the 1981 BV.'
238	80.163	BI	154	E/MN	Non-corky	1	2	19.6	19.3	5.5	Body	N	3	Smoothed	E + I light brown; C dark grey	None	2	7.9.10	N	18	Thin, fine pot. Found 27.5.80.
239_242	80.176	BI	120	E/MN	Non-corky	3+ 1F	4 (2,1, 1)	27.6	14.1	6.7	Body	N	3	Smoothed. Low sheen on E+I but could be post-depositional	Black-brown through out	None	3	7.2.2, 7.6.3	N	18	Found 23.5.81, second trowelling. Bag just gives Area as 'B'
243	81.494	BI	164	E/MN	Non-corky	1	5	30.8	21.1	7.3	Body	N	2	Smoothed; E rough but partial loss of surface	E light brown; C blackish; I dark grey-	None	3	7.17.7	N	18	

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															brown						
244	81.437	BII	112	E/MN	Non-corky	1	6	33.0	20.0	8.9	Body	N	3	Smoothed; E low sheen	E & part of C mid brown, rest of C & I blackish	None	2	7.2.6	N	18	
245_246	81.484	BIVWX	881	E/MN	Non-corky	2	3 (2,1)	17.9	17.7	8.1*	Car; body	N	2	Smoothed	E light brown; C light grey-buff	None	3	7.15.8	N	18	Both sherds possibly burnt. Larger sherd is gentle carination; pot not particularly fine or thin
247	81.484	BIVWX	881	E/MN	Non-corky	1	3	18.8	20.5	6.5	Body	N	3	Smoothed	E mid-brown, C & I blackish	Sm patch of bl encr on I	3	7.15.8	N	18	Belly sherd from thin fine cooking pot
248	81.677	BIVWX	891	E/MN	Non-corky	1	9	32.8	33.0	8.6	Body	N	3	E smoothed; I pol to low sheen	E light brown; C light brown & mid grey; I blackish	None	3	7.11.3	N	18	1 fragment cramp (fuel ash slag) or cramp-like material (not metalworking slag) present in bag. Now separated out. Found 6.6.81. Original finds bag says 'base sherd' but isn't from a base.
249	81.411	BV	141	E/MN	Non-corky	1	2	22.3	13.7	5.7	Body	N	2, markedly sandy	Smoothed	E dark brown, C & I blackish-brown	None	2	7.8.3	N	18	Finds Book says 'B'; corrected to 'BV' by PJA
250_256	81.456	BV	810	E/MN	Non-corky	7	8 (2 x 2,1 x 5)	18.0	15.7	5.1	1 rim, rest body	N	3	Smoothed	E & I mid reddish-brown; C grey-brown	None	3	7.12.1	N	18	From thin, fine pot. Rim prob upright, flattish on top, curving to E, gently squared off to I; too sm for ERD. Broken along joint line. Other

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					sherds may well be from this pot; largest sherd has very slightly undulating E.
257	81.456	BV	810	E/MN	Non-corky	1	2	17.2	19.5	6.5	Body	N	1a	Smoothed	E & I reddish mid-brown; C mid grey-brown	None	3	7.12.1	N	18	Featureless body sherd from thin fine pot, not necessarily the same pot as Cat. nos.Cat 250–256
258_263	81.456	BV	810	E/MN	Non-corky	6	8 (2,1 x 5)	20.3	12.4	9.2	Body	N	2	Smoothed	E & C mid brown; Idark grey-brown	None	3	7.12.1	N	18	From fairly fine pot, thicker than Cat. nos 250–256 and 257; four of the sherds are spalls
264	81.408	BV	813	E/MN	Non-corky	1	7	29.8	22.7	8.9	Body	N	2	Smoothed	E & I dark brown C mid grey-brown	None	2	7.8.5	N	18	Poss broken along ring joint. Part of I spalled off. Found 26.5.81 (Find No 8). Bag says 'f.814/layer 160'. PJA adds: 'Plans 18/81, 19/81 and 20/81 and the original finds book conflict and it is conceivable that the sherd came from similar black feature 814 or even black layer 160'
265	81.387	BVSX	141	E/MN?	Non-corky	1	3	17.3	18.5	9	Body	N	3	Smoothed	E dark orange-brown, C & I blackish	None	3	7.8.3	N	18	Dragged fingernail impression on exterior – more likely to be accidental, perhaps relating to manufacture, than decoration. Note from ASH in bag: 'found with flat base'. (This is

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					in ASH 59B, Cat. 484; not from the same pot, even though shares same SF No– as do Cat. Nos.Cat 485–7).
266	81.405	BVSX	141	E/MN	Non-corky	1	4	20.2	19.5	9.4	Body	N	2	Smoothed	E mottled dark brown & black-brown; C & I blackish	None	2	7.8.3	N	18	From fairly fine pot; most of I of larger sherd spalled off, prob along ring joint (diagonal). Found 9.5.81
267	81.405	BVSX	141	E/MN	Prob fine Heb Inc	1	2	16.2	19.5	8.0*	Rim	Y	3	Smoothed	E mid brown; C mid-brown & grey-brown	None	3	7.8.3	N	18	Sherd from rim and upper neck (I & top of rim spalled off) from fine pot. Rim prob rounded, upright and expanded to E. Deco = very faint diagonal incised lines immediately below rim. Cf. the fine Heb Inc pots ASH 32–35, Cat. nos 309, 311–316
268_269	81.464	BII/III	111	E/MN or Chalco/EBA	Non-corky or ?Beaker	1 + 1F	1 (1 + <1)	18.3	17.4	4.8	Body	N	3	Smoothed; I has low sheen but could be from bag-wear	E & I black-brown, C black	None	1	7.2.8	N	18	Original finds bag says ' Site B backfill, 2 sherds Beaker'. Had subsequently been claimed to be peat but on microscopic inspection is clearly thin fine pottery. Could possibly be Beaker but too small to be sure. There are some sherds which are

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					of E/MN date (eg from ASH 15) that are as thin and fine as these
270_272	81.289	DI	315	E/MN	Corky	1 + 2F + crbs	2 (1, <1 x2)	16.0	15.0	7.2	Body	N	1	Smoothed	E dark brown; C mid grey-brown; I black-brown with orange patch	Bl encr on I	2 & 3	9.3.6	N	18	From thin-walled pot with friable, laminar fabric
273_276	81.289	DI	315	E/MN	Non-corky	4	38 (16,11, 8,3)	35.6	34.8	13.3	Body	N	3	Smoothed	Variable. Largest sherd: E orange-brown, C orange-brown & med grey, I dark grey	Bl encr on I of lgst sherd	3	9.3.6	N	18	From large, relatively thick-walled pot/s. Largest sherd broken along ring joint. Found 16.5.81
277	81.157	HI	738	E/MN	Non-corky	1	3	17.0	20.7	7.3	Body	N	3	Smoothed	E dark reddish-brown; C mid grey; I grey-brown	None	3	12.4.1	N	18	Part of E spalled off along ring joint plane
278	81.211	HI	738	E/MN	Non-corky	1	9	35.8	18.8	12.5	Body	N	3	Smoothed	E & I dark brown; C dark grey-	None	2	12.4.1	N	18	Relatively thick; from large pot. Broken along ring joint

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															brown						
279	81.104	HII	736	E/MN	Non-corky	1	3	17.7	16.4	9	Body	N	3	Smoothed	E dark brown; C & I dark grey-brown	None	2	12.5.4	N	18	Part of E worn off. Original bag says 'f.732/736'.See also ASH 38 (AOC Beaker): the beaker sherd had been taken out of the bag and is stored with ASH 38; is not from the same pot as Cat. 279 sherd
280	80.160	FVI	622	E/MN	Heb Inc	1	3	24.5	15.8	5.5* (9.3* max)	Rim	Y	3	Slightly uneven E; I has horizontal undulations. Poss polished to low sheen on I and med sheen on E, but may be partly or mostly due to bag wear	Brown	None	2	11.9.4	Y	19	Flanged rim, outermost part of flange missing; top stepped, with outer part higher than inner. Each part decorated with row of oval diagonal stab impressions. Undulations on I surface may be non-decorative. Sherd broken along ring joint.
281	81.360	DI	910	E/MN	Heb Inc	1	4	24.0	19.7	7.9	Rim flange	Y	3	Smoothed. Sheen due to bag-wear	E (top) & C pinkish brown; I (bottom) grey-brown	None	2	9.5.2	Y	20	Rim flange, broken along ring joint. Outer edge rounded; top flattish, underside sloping. Fairly broad flange (over 19.7 wide). Top decorated with 1 row of herringbone jab impressions. Original bag says 'cairn base 30.5.81. X=7.04;

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					Y=8.45 .96BD'
282	81.067	BII/III	112	E/MN	Heb Inc	1	13	43.3	37.8	8 (max 8.9)	Rim-neck-car-upper belly	Y	2	Smoothed; horizontal wipe marks on I. Sheen on I and E due to bag-wear	E mid brown; C mid grey; I blackish grey	None	3	7.2.6	Y	21	From globular jar. Rim gently pointed; rim and neck inturned, sloping down to gentle carination; belly will have been deep. Fairly large pot: est diam at carination at least 240. Neck decorated with fairly closely-spaced diagonal incised lines. Much of E abraded off. Glittery inclusions are of quartz/ite, of gold-coloured mica and of a black mineral. Speckled white (quartz/ite) & black stone type present. Note: see also 'ASH 76 crb' for another sherd and frag with the same Small Find No Found 6.5.81.
283	81.487	BIVWX	889	E/MN	Heb Inc	1	7	33.9	23.1	11.1*	Rim	Y	4	Smoothed	E med brown; C med brown & med grey	None	3	7.15.11	Y	22	Upright collared rim from fairly small, probably deep-bellied pot; ERD c 150 mm. Rim top rounded; collar concave, terminating in rounded projection. I spalled off. Incised, roughly vertical lines on collar; shallow, short diagonal incised lines on bottom of

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					collar, where it projects. Sherd had broken and the 2 pieces glued back together in 1980s
284	80.161	FI	651	E/MN	Heb Inc	1	4	31.0	18.5	6.7	Rim	Y	4	Smoothed. Bag polish on I	E & C blackish-brown; I dark brown	None	2	11.7.1	Y	23	Upright, internally-bevelled rim from medium-sized pot; ERD 180–190 mm. Bevel is steep; tip of rim missing. Closely-spaced diagonal incised lines on bevel and on E, latter deep. Found 23.5.80
285	80.168	BIIISX	160.1	E/MN	Heb Inc	1	6	29.7	19.1	9.5	Rim	Y	4	Smoothed	E & I dark brown, C dark grey-brown	None	2	7.11.5	Y	24	Upright, flanged rim (with flange angled upwards to E; tip missing) from pot similar in shape and size to ASH 23 (but definitely not from that pot). Much of E spalled off. ERD c 150 mm. Closely-spaced diagonal incised lines on rim flangel and on E, latter steeply sloping. Original bag says 'B5 f.160 around foot of S31. Trowelling from N–S S Ext. 26.5.80'. BV 1980 has been changed in the report to BIIISX to avoid confusion with the 1981 BV One lump of charcoal + 1 natural pebble also present;

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					now bagged separately.
286	80.168	BIIISX	160.1	E/MN	Non-corky	1	<1	16.9	13.8	4.4*	Body	N	3	Smoothed	Mid to dark brown through out	V thin black encr on I	3	7.11.5	N	NC	Heavily abraded spall from fine pot; not same pot as Cat. 285. Finds Book said B5. BV 1980 has been changed in the report to BIIISX to avoid confusion with the 1981 BV
287	81.431	BVSX	812.1	E/MN	Heb Inc	1	5	34.4	14.0	8.2 (max 11.1)	Rim	Y	3	Smoothed; poss some bag-polish on top of rim	E dark brown & black; C dark grey; I blackish-brown	V thin bl encr on E	2	7.12.1	Y	25a	Minimally everted, rounded, beaded rim; ERD 180–200. Poss broken along diagonal ring joint. Shallow incisions in untidy herringbone pattern on top of rim. Note: sherd from Beaker ASH 38 had also been in this bag; now moved to join other ASH 38 entries.
288_293	81.145	BVSX	812.1	E/MN	Heb Inc	3 + 3F + crbs	6 (5, rest <1)	32.9	26.8	7.5	Poss neck	Y	3	Smoothed; some bag-wear on E	E med brown; C light to med grey	None	2	7.12.1	Y	25b	All are spalls from one pot, medium-sized: est diameter at ?neck c 170. On E: Incised lines, roughly horizontal, with diagonal lines below, slight overlap of lines. Found 9.5.81
294	81.165	BI	810.1	E/MN	Heb Inc	1	10	35.2	26.5	10.6	Body	Y	3	Smoothed	E med brown (light orange-brown just	Bl encr on I	3	7.12.2	Y	25c	Prob from belly of medium-sized pot; est diam at this point c 160. Incised herringbone lines on E. Found 13.5.81.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															below surface); C & I blackish						
295_296	81.675	BI	835	E/MN.	Heb Inc	2	3 (3,1)	22.7	20.6	4.7*	Body	Y	3	Smoothed; low sheen on E but unclear whether due to bag-wear	E med brown; C med grey	None	3	7.6.8	N	25d	Both sherds from same pot; and may be same pot as ASH 25c. I spalled off & abraded. Incised herringbone lines on E. Found 13.5.81
297	80.169	BI	167	E/MN	Heb Inc	1	6	21.4	18.9	10.5	Rim	Y	4	Smoothed	E blackish-brown; C dark red-grey-brown; I dark grey	None	3	7.6.8	Y	26	From large pot, ERD at least 200 mm and possibly much larger; possibly carinated bowl. Rim rounded and markedly everted; thick; broken along ring joint. Shallow diagonal incised lines on underside of rim on E; possibly also some incised decoration on I of rim. Found 27.5.80
298_299	80.184	DI	320	E/MN	Heb Inc	2 cj	15 (15, <1)	44.8	33.7	10.6	Body; possibly from ridged jar	Y	4	Smoothed; I uneven (pocked)	E med brown with reddish areas; C med grey; I light brown	None	3	9.3.12	Y	27a	From lg pot; diam at this point poss c 260. Slight concavity of E suggests that sherd may be from between 2 low ridges on a deep-bellied, ridged jar. E decoration: broad, deep incised lines, diagonal, with opposed diagonal lines on one part (but not herringbone design).

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					Lily Linge comment May 1980: '320 (though in area still with base of Ardmarks [sic] filled with 315 material'
300	81.025	E	1108	E/MN	Heb Inc	1	9	33.4	26.1	11.1	Poss rim & neck	Y	4	E (where survives) smooth	E dark brown, c& I dark grey-brown	None	3	10.3.1	N	27b	Most of E spalled off; I heavily abraded; abrasion makes it hard to be sure whether this is from rim and neck area, but may well be. From same pot as Cat. 302 (ASH 28, 81.30). Broad diagonal shallow incised line on E. Note: ASH refers to 27b comprising 3 sherds, but only 2 are present (ie Cat. Nos 300 & 301)
301	81.031	E	1108	E/MN.	Heb Inc	1	6	32.1	23.5	7.7*	Body	Y	4	I smoothed	C&I dark grey-brown	None	3	10.3.1	N	27b	Prob same pot as other ASH 27b sherd and as Cat. 302 (ASH 28, 81.30)
302	81.030	E	1108	E/MN	Heb Inc	1	14	35.1	37.5	11.4	Rim & neck	Y	4	Smoothed; I undulating	E med brown; C & I dark grey-brown		2	10.3.1	Y	28	Sherd = 2 refitted sherds, from rim and neck of large jar (ERD c 220 mm) with short concave neck and flattish, slightly everted rim (whose top has been abraded away; will have had deep belly. Broad diagonal incised lines on neck. Undulation on I is from horizontal finger

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					smoothing. Same pot as Cat. 300 and 301. Bag says 'E NW'
303_304	81.030	E	1108	E/MN	Corky	2	2 (2, <1)	16.7	18.4	8.5	Body	N	1	Smoothed	C dark grey-brown; I black	Cat. 303: thin bl encr on I & poss E	3	10.3.1	N	NC	Abraded spalls from fine corky pot.
305	81.081	E	1112	E/MN	Heb Inc	1 + crbs	5	23.3	21.5	8	Body	Y	3	Smoothed	E mid-brown; C mid-brown & blackish; I blackish to dark grey	Thin bl encr on I	2	10.3.1	N	28	Not same pot as the other ASH 28 sherd; from thinner, finer pot. Prob from the belly. Shallow incised herringbone design.
306	80.220	G1	1306	E/MN.	Heb Inc	1	2	28.0	25.8	6.1*	Neck or inter-ridge hollow	Y	4	Smoothed	E blackish-brown; C buff, stained brown by peat	Sm patch bl org encr on E	2	13.2.1	Y	29	Prob from ridged jar, medium to large: est diam at this point c 180. Diagonal incised lines in hollow; on ridge, raised area created by gouging then scraping up with finger/thumbnail. In ASH report mistakenly says 80.22
307	81.402	BVSX	812.1	E/MN	Heb Inc (but impressed)	1	9	31.4	30.3	10.7	Prob belly just under carination	Y	4 (but not v abundant incls)	Sm; I sl uneven but partly spalled	E med brown, buff just below surface; C& I blackish-brown	None	3	7.12.1	Y	30	Much of E spalled off. Est diam of pot at this point c 130. On E: deep stab impressions, sub-rectangular, in a row

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
308	81.374	BVWX	859	E/MN	Heb Inc	1	18	41.0	35.6	12.6 (max 14.1)	?neck	Y	4 (but not v abundant incls)	Smoothed	E buff & light grey-brown; C med grey; I light reddish-brown	None	3	7.3.1; 7.11.5; 7.11.5	Y	31	Slight concavity of E suggests from neck of large jar; est diam at this point c 240. Diagonal incised lines on E. Sherd had split along lamination plane (which may correspond to a ring joint plane) and the halves refitted. Found 21.5.81
309	81.370	BII	112	E/MN	Heb Inc	1	1	21.7	16.7	7	Body	Y	3	Smoothed; poss pol to mid sheen E + I but poss bag-polish.	Blackish through out	Microscopic traces thin bl encr on E	2	7.2.6	Y	32	Thin fine pot with deep horiz incised grooves and diagonal lines below; same pot as ASH 32 (81.398, Cat. 311). Fine Heb Inc bowl. Found 20.5.81
310	81.370	BII	112	E/MN	Corky	1+ crbs	<1	17.8	14.8	6.7	?Rim	N	?1	Smoothed but inclusion socket on E	E orange-red, C grey-brown	None	3	7.2.6	N	NC	From different pot from Cat. 309 and 311. Burnt; soft and friable. From thin, fine pot; may be upright, rounded rim but too abraded to be sure. Too small for diameter to be estimated.
311	81.398	BII	112	E/MN	Heb Inc	1	2	12.6	21.2	7.4	Body	Y	3	Poss pol to mid sheen E + I but poss bag-polish	Blackish through out	None	2	7.2.6	Y	32	From same pot as Cat. 309, ASH 32. 5 deep horizontal incised grooves. Found 20.5.81. Bag says f.112/123. PJA adds: In finds list as 112 pre-peat soil or 113 probably Ministry grit

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					or base of introduced turf.
312	81.196	BI	814	E/MN	Heb Inc	1	2	15.8	19.5	5.5	Body	Y	3	Smoothed; poss polished to low sheen	E blackish; C & I dark grey	None	2	7.8.8	N	33	Thin fine pot with incised lines, not quite parallel. Fine Heb Inc.
313_314	81.490	BI	164	E/MN	Heb Inc	2	3 (2,1)	23.3	15.4	6.2	Body	Y	3	Smoothed	E mid brown; C & I blackish	None	2	7.17.7	N	34	Both sherds from same vessel; prob different pot from Cat. nos 309 & 311. Fairly small, thin fine pot – est diam at this point (belly) c 140). Widely-spaced horizontal incised grooves (c 8.5 mm apart). Fine Heb Inc. ASH referred to 34 as comprising 2 sherds (ie Cat. Nos 313 and 315) but it's clear that Cat. 314 belongs to same pot as 313. Found 8.6.81; bag says 'layer 164 foot of stone 44. PJA comment: This is probably an error for 'Stone 43'; same error occurred in a sketch in the site notebook.
315	81.492	BIWX	870	E/MN	Heb Inc	1	2	18.3	20.5	6.5	Body	Y	3	Smoothed	E med brown; C dark grey; I grey-brown	None	2	7.17.7	N	34	Not same pot as Cat. 313–4. Comprises 2 refitted sherds. Thin fine pot with very shallow parallel incised lines, fairly widely spaced, prob horizontal, one cut by

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					a scratch. Found 8.6.81. Bag says 'green packing clay'. Fine Heb Inc.
316	81.501	BIVWX	824	E/MN	Heb Inc	1	2	20.3	22.3	4.7	Body	Y	3	Smoothed	E mid brown; C & I mid grey-brown	None	2	7.11.3	N	35	From thin fine pot with parallel incised diagonal lines. Fine Heb Inc. Found 30.5.81. Bag says 'north passage wall, high in turf, kept by MP'
317	81.489	BI	164	E/MN	Heb Inc	1	3	20.4	16.1	7.7	Body	Y	4	Smoothed	E light brown; C & I dark grey		3	7.17.7	N	36	Shallow incised diagonal lines on E. Found 8.6.81. Bag says 'foot of stone 44'. PJA comment: This is probably an error for 'Stone 43'; same error occurred in a sketch in the site notebook. Note: ASH's category 36 described as 'A number of small sherds with incised lines, presumably mainly parts of the pots listed 19–35'
318	80.169	BI	167	E/MN	Heb Inc	1	6	28.4	21.8	9.6	Body	Y	3	Smoothed. Linear hollow on I, from burnt-out grass or similar organic material	E & part of C med brown, reddish; rest of C & I dark grey-brown	Thin bl encr on I	2	7.6.8	N	36	Fairly thick belly sherd, poss broken along ring joint, with diagonal incised lines on E. Other sherds from 80.169 are in ASH 26 (Heb Inc rim, Cat. 297) and ASH 75 (Food Vessel, Cat. 566). Found 27.5.80
319	80.16	BI	167	E/MN	Non-	1	<1	14.7	9.2	5.2	Body	N	3	Smoothed	E med	Thin bl	3	7.6.	N	36	Small sherd from very

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
	9			or Chalco/ EBA	corky OR poss fine Beaker										brown; C & I black-brown	encr on I		8			thin, v fine pot – possibly Beaker, or else v thin E/MN non-corky pot. Too small to tell which.
320	81.455	BII	112	E/MN	Heb Inc	1	6	25.7	27.7	9.4	Body	Y	3	Smoothed but E sl lumpy in parts	E blackish; C mid grey; I dark grey	V sm patches of bl org encr on E	2	7.2.6	N	36	From belly of lg pot with deep incised herringbone on E; diam at this point c 200 mm.
321_325	81.455	BII	112	E/MN	Heb Inc	1 + 4F, crbs	3 (3, <1 x 4)	21.7	18.3	6.6	Body	Y	3	Smoothed	E med brown; C: med grey; I: grey-brown	None	3	7.2.6	N	36	From belly of thin pot of laminar fabric. Deco: horiz or diag incised lines on E.
326	81.518	BIII	9999	E/MN	Heb Inc	1	3	17.7	25.9	8	Body	Y	4	Smoothed; I rough from abrasion	E & I light brown; C dark grey	None	3	7.5.13	N	36	Shallow incised herringbone on E. Found 29.5.81
327	80.028	BII/III	112	E/MN	Heb Inc	1+1F	1	14.9	13.0	8.4*	Body	Y	3	Smoothed	E med brown; C blackish	None	3	7.2.6	N	36	Horiz or diag incised lines on E. Diag. ring joint plane visible in section; part of sherd had spalled away along this plane. PJA comment: Area originally called 'B2NE'. Bag says 'soil, final stones on circular bank'
328	80.119	BIV	134	E/MN	Heb Inc	1	3	23.4	17.5	8.6	Body	Y	3	Smoothed	E blackish; C & I dark brown	None	3	7.4.2	N	36	Single faint shallow incised ?horiz line on E. Had broken along ring joint. ASH included note: 'found

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					with flat base' [which is ASH 59a]. ASH 59A (= parts of 3 pots) doesn't belong to same pot as this sherd.
329	81.418	BV	813	E/MN	Heb Inc	1	7	32.5	24.7	8.2	Body	Y	4	Smoothed interior; E rough	E med brown; C & I dark grey-brown	None	3	7.8.5	N	36	From fairly large pot; diam at this point c 230. Diagonal horizontal incised lines on E. Found 26.5.81. Bag says 'f.814 (layer 160) find No 7' PJA comment: Plans 18/81, 19/81 and 20/81 and the original finds book conflict and it is conceivable that the sherd came from similar black feature 814 or even black layer 160.
330	81.251	D	9999	E/MN	Heb Inc	1	5	28.2	21.0	7.2	Poss neck, or else belly	Y	4	Smoothed	E med brown; C & I dark grey-brown	None	2	9.2.1	N	36	Prob from just above carination; diameter at this point c 130. Incised diagonal lines, fairly widely spaced (c 8.5 mm)
331	80.153	DI	315	E/MN	Heb Inc	1	5	26.1	14.9	10.9	Body	Y	3	Smoothed	E med brown; C & I med brown & dark grey	None	2	9.3.6	N	36	From large, fairly thick-walled pot; diagonal incised lines on E. (Had broken along one such line.)
332	80.153	DI	315	E/MN	Heb Inc	1	3	23.4	14.2	7.9	Body	Y	3	Smoothed; bag pol on E	E & I dark brown; C dark grey-	None	2	9.3.6	N	36	Belly sherd from thinner pot than Cat. no 331; diagonal incised lines on E

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															brown						
333	80.099	DI	315	E/MN	Heb Inc	1	3	21.8	14.2	9.5	Body	Y	4	Smoothed	E & I dark brown; C dark grey	None	3	9.3.6	N	36	Broad diagonal incised line on E
334_338	80.124	DI	318.3	E/MN?	Heb Inc?	3 + 2F, crbs	All <1	17.7	12.8	5**	Body	Y	3	Indistinct	E mid-brown, C light brown & light grey	None	2	9.2.12	N	36	All friable spalls. Diagonal incised line on E. Bag says 'from between stones I4 and I6'. PJA adds 'Layer III'. Note: other pottery from this context as domestic Beaker, and one cannot rule out the possibility that these spalls could conceivably be Beaker, even though the Beaker pottery tends not to be friable.
339	81.239	DI	369	E/MN	Heb Inc	1	2	16.8	12.0	11.1	Body	Y	4	Smoothed	E & I dark brown; C mottled dark brown, red-brown & grey-brown	None	2	9.3.16	N	36	Narrow incised herringbone lines on E. Found 13.5.80 Other sherds from 81.239 are ASH 9 and ASH 13 and are bagged separately as ASH 9 & ASH 13.
340	81.264	DI	374	E/MN	Heb Inc or non-corky	1	2	25.0	16.4	5.6*	Body	Y	3	Smoothed	E med brown; C buff	None	3	9.3.16	N	36	Abraded spall from fine pot. On E, shallow scratch-like lines; uncertain whether they are deliberate decoration, but if they are, they

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					may belong to a very loose herringbone design. Alternatively, could be E/MN non-corky
341	80.047	DIII	309	E/MN	Heb Inc	1	3	17.7	19.7	10.1	Body	Y	3	Smoothed	E light brown; C&I blackish	None	3	9.9.2	N	36	Prob broken along ring joint. 1 short incised line or else stab impression.
342	81.382	BV	813	Chalco/EBA	Beaker, AOC	1	4	28.0	30.2	6.5	Neck	Y	3	Smoothed; pol to med sheen on E	Dark brown, sl reddish through out	Small black stain on I	2	7.8.5, 7.12.4	Y	37	Gently splaying neck from thin, fine AOC Beaker with fairly closely-spaced horizontal lines of twisted cord impression on E. (4–4.5 mm apart) Poss scrape marks on I. Tiny mica platelets make surfaces slightly glittery.Trowel damage to edge. NB: conjoins with Cat. 350 (81.416) from ASH 38., but joint surface too abraded to allow secure refitting. Says 'f.173' on bag. PJA comment: that feature No is wrong; finds book has 81.382 as in 813 (black hole). 173 may be a Temporary Finds Number since Find 81.173 came from BV 813 and related plans have similar Finds numbers on them. Found 13.5.81

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
343	81.396	BV	813	Chalco/ EBA	Beaker, AOC	1	5	35.7	29.0	5.9	Neck (upper neck)	Y	3	As 342.	E dark reddish-brown; C light brown; I light grey-brown	None	2	7.8.5; 7.12.4	Y	37	From upper neck of same pot as at 342 (81.382) and probably conjoins with Cat. 346 (81.179) but joint surface too abraded to be certain (or to allow refitting). Est diam at this point c 160. Horizontal lines of twisted cord impression, but blank area at top, where neck starts to splay more markedly. Found 13.5.81 '(No 2)'
344_345	81.396	BV	813	Prob Chalco/ EBA	Prob Beaker	2	4 (3,1)	20.5	22.4	5.2*	Body		3	Smoothed	E & I dark grey-brown; C light grey & buff	None	3	7.8.5	N	NC	Abraded spalls from fine pot, probably not from same pot as Cat. 342, 343 and 346; have more inclusions than that pot. Also have more inclusions than ASH 38 and 39, so probably not from those Beakers either. For other sherds with Small Find No 81.396, see under ASH 39 and 72
346	81.179	BV	810	Chalco/ EBA	Beaker, AOC	1	9	34.4	48.1	5.5 (max 6)	Rim-&-neck	Y	3	As 342 & 343	Dark brown	Discontinuous thin blackish stain on E	2	7.12.1; 7.12.4	Y	37	From same pot as Cat. 342 and 343; probably conjoins with Cat. 343 (81.396) but joint surface too abraded to be certain (or to allow refitting) . Rim gently squared off; upper neck splays. ERD c 180 mm. Uppermost

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					22.7 mm of E undecorated, then closely-set lines of horizontal twisted cord impressions; on I, immediately below rim, 3 lines closely-set twisted cord impressions. On E, impressions very slightly smudged. Max width of impressions: c 0.6; cord would have been S-twisted (making Z-twist impressions). Bag says 'BV'.
347	81.176	BV	810	Chalco/ EBA	Beaker, AOC	1	4	29.8	22.6	6.8	Rim-&-neck	[Y]	3	Smoothed; E pol to low sheen	E & I dark reddish-brown; C dark grey	None	3	7.12.1; 7.12.4	Y	38	Rim-&-neck sherd from thin fine Beaker; ERD 130 mm. Rim heavily abraded (so shape not clear from this sherd), and much of I spalled off and heavily abraded. NB Conjoins (loosely) with Cat. 348 (81.619) but joint too abraded to allow refitting. Abundance of tiny mica platelets makes E glitter. No decoration (although clear from other sherds from this pot that there had been 3 rows of narrow twisted cord impressions on I just below rim). Broken along ring joint.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					Found 13.5.81
348	81.619	BVSX	837	Chalco/EBA	Beaker, AOC	1	4	31.2	23.8	5.7 (max 6.5)	Rim-&-neck	Y	3	Smoothed; E pol to low sheen. Some bag-polish on I	As Cat. 347	None	2	7.12.4; 7.19.3	Y	38	Rim-&-neck sherd from same Beaker as Cat. 347 (ASH 38); ERD 130 mm. Had previously been refitted with one of the two rimsherds from 81.104 (with which it conjoins) but glue had failed; has now been re-refitted. Also NB Conjoins (loosely) with Cat. 347 (81.176) but joint too abraded to allow refitting. Rim gently squared off; upper neck splays slightly. Broken along ring joint. 3 rows of fine twisted cord directly below rim on I; max width of cord impressions 0.6. Decoration abraded and poss slightly smudged. Finds bag says '4'. Found 13.5.81
349	81.431	BVSX	812.1	Chalco/EBA	Beaker, AOC	1	1	15.3	11.2	5.7	Upper neck	Y	3	I smoothed but abraded	E & I red-brown; C dark grey	None	3	7.12.1; 7.12.4	N	38	This sherd had been bagged in with ASH 25a, and shares the SF number, but is clearly from Beaker ASH 38: three lines of fine twisted cord impressions, from just below rim on I. Most of I abraded off; is a

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					heavily abraded spall.
350	81.416	BVWX	160.3	Chalco/ EBA	Beaker, AOC	1	1	10.5	19.0	4.4	Neck	Y	3	Smoothed	E & I med brown; C buff & mid grey-brown	None	3	7.12.4, 7.14.1	Y	38	NB DOES NOT BELONG WITH BEAKER ASH 38; CONJOINS WITH Cat. 342 (81.382) from ASH 37, and is stored with ASH 37. Heavily abraded neck sherd. Horizontal lines of twisted cord impressions on E. Another sherd from 81.416 is in ASH 79
351_352	81.104	HII	736	Chalco/ EBA	Beaker, AOC	2	3 (2,1)	15.4	19.1	6.2	Rim	Y	3	Smoothed	E light & med brown; C dark grey & med brown; I grey-brown	None	3	12.5.4	Y	38	2 heavily abraded rim sherds from same pot as Cat. 347–349; ERD 130. One had previously been refitted with Cat. 348 (81.619), with which it conjoins, but glue had failed; now re-refitted. Much of E abraded off. Broken along ring joint. 3 rows of fine twisted cord directly below rim on interior. Another sherd from 81.104 is in ASH 18 (Cat. 279); not from same pot as these sherds. Note also: there is another sherd from ASH 38 is Cat. 846

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
353	81.170	BII	112	Prob Chalco	Beaker, Early International	1	<1	12.7	13.0	4.7	Car	Y	1a	Pol to med-high sheen on E and to low-med sheen on I	E & C blackish-brown; I dark brown	E: Some of the impression hollows are caked with blackish-brown, cracked material: org residue or ?? peat	2	7.12.4	N	39	Small carination sherd from thin fine low-carinated Beaker: see Appendix, entry 1 for overall description. Carination gentle, rounded; short horizontal lines of cockle shell impression on & immediately below carination; below this, traces of shallow incised lattice design on belly.
354	80.039	BI	107	Prob Chalco	Beaker, Early International	1	1	16.5	15.5	5.9	Neck	N	1a	Pol to med sheen on E & I	As 353	None	3	7.2.2; 7.12.4	N	39	Upper neck of the thin fine Beaker as described in Appendix, entry 1 PJA adds, 'In area of 120, enclosure'
355	80.115	BI	117	Prob Chalco	Beaker, Early International	1	3	18.1	23.9	5.3	Neck;	Y	1a	E pol to med to high sheen, I to med sheen	E + I dark brown with thin traces of orange (?peat) on I; C grey-brown	None	2	7.4.7; 7.12.4	Y	39	Neck of thin fine Beaker as described in Appendix, entry 1 and has 2 rows of discontinuous lines of shell impression (with modern scratch marks in them from where sediment had been cleaned out).
356	80.115	BI	117	Prob Chalco	Beaker, prob Early Internat	1	2	21.1	11.3	6.6	Base-belly junction (or ?	N	3	E & I pol to med sheen	E mid-brown; C & I mid grey-	None	3	7.4.7		39 but see comm	Probably from the base-belly junction of a small flat-based pot. Fabric has several tiny

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
					ional						car)				brown					ent	lithic inclusions. Not from the same pot as Cat. 353–355 etc (ie ASH 39) but might well belong to ASH 38
357	80.144	BI	120	Prob Chalco	Beaker, Early International	1	2	21.2	22.2	6.3	Rim-&-upper-neck	N	1a	Smoothed; E pol to low sheen, I to med sheen	E sl reddish brown; C blackish; I dark brown	None	3	7.2.2, 7.6.3	N	39 but see comment	Rim-&-upper neck from thin fine Beaker; not from ASH 39 but could well be fromASH 38, or (slightly less likely) poss ASH 37. Has same thickness and fabric as ASH 37 and 38, and colour is closer to ASH 38 than to ASH 37. Bag says 'at S end of f.120 in mixed material next f.133 rubbly green'. Sherds from 4 other pots share this small find no and are listed below (as 'NC')
358	80.144	BI	120	Chalco/ EBA	Beaker	1	<1	12.4	11.7	4.7*	Body	N	3	I smoothed; E spalled off	C dark grey-brown; I dark brown	None	3	7.2.2, 7.6.3	N	NC	Small abraded sherd from thin fine pot; E spalled off. May well be Beaker; can't rule out possibility that it's from ASH 39
359	80.144	BI	120	Prob Chalco/ EBA	Prob Beaker	1	1	13.0	15.0	8.8	Poss neck	N	3	E & I uneven from abrasion	E buff; C blackish; I grey-buff	None	3	7.2.2, 7.6.3	N	NC	Heavily abraded sherd, possibly from neck. Could be from 'domestic' Beaker. Voids in E are from decay of white ? sandstone

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
360	80.144	BI	120	?E/MN	Non-corky	1	4	23.6	15.4	11.4	Poss neck	N	4 but incls not abundant	Smoothed	E light grey-brown; C med grey-brown; I buff	None	3	7.2.2, 7.6.3	N	NC	Fabric similar to that seen on Heb Inc sherds (although no decoration on this sherd)
361	80.144	BI	120	Chalco/EBA	Beaker	1 + crumb	<1	15.4	8.8	6.3	Body	N	2	Smoothed	Dark grey-brown through out	None	3	7.2.2, 7.6.3	N	NC	Tiny sherd from thin fine pot, prob Beaker. Doesn't seem to belong to ASH 37, 38 or 39.
362_363	81.305	BIWX	9999	Prob Chalco	Beaker, Early International	1 & 1F	3 (3 + <1)	24.6	22.4	5.8	Neck & ?neck	N	1a	E pol to med sheen; I smoothed	E blackish-brown; C dark grey; I med brown & blackish	Patches of thin bl encr on I at neck	2	7.12.4	Y	39	Splaying neck from the thin fine Beaker as described in Appendix, entry 1, terminating at rim; most of E spalled off
364	80.185	BNW	9999	Prob Chalco	Beaker, Early International	1	<1	17.3	6.7	5.7	Rim	N	1a	Smoothed; E pol to low sheen;	E blackish brown; C dark grey; I dark brown	None	2	7.12.4	Y	39	Rim from the thin fine Beaker as described in Appendix, entry 1. ERD c 170. Gently squared off; slight narrow faceting (from use of tool to shape the rim). Much of I spalled off, prob along ring joint
365	80.185	BNW	9999	Poss Chalco/EBA	Poss dom Beaker	1	2	20.5	12.3	7.4*	Body	N	3	I smoothed but sl uneven	C dark grey; I buff	None	3	7.4.5	N	NC	From different, thicker pot from the rimsherd Cat. 364; similar to Cat. 359 but not from same pot. ? Domestic Beaker; too small and abraded to

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					allow firm ID
366	80.061	BV	117	Prob Chalco	Beaker, Early International	1	4	29.5	27.4	5.6	Neck	Y	1a	Pol to med sheen on E & low sheen on I	E blackish-brown; C blackish; I dark brown	None	2	7.2.6, ; 7.12.4; 7.4.2	N	39	From upper neck of the thin fine Beaker as described in Appendix, entry 1. Most of I spalled off. Broken along ring joints at top & bottom. Short stretches of shell impression forming a roughly horiz, discontinuous line. ASH had divided the contents of the 80.61 bag, putting one sherd in with 39 (because it clearly belongs to that pot) and leaving the rest in her 'crumbs' category
367	81.448	BV	812	Prob Chalco	Beaker, Early International	1	3	30.3	16.9	4.7 (max 5.3)	Neck	Y	1a	Pol to med to high sheen on E; low sheen on I	E blackish-brown with traces of orange (?peat and/or iron-rish post-dep encr; C blackish-grey; I med brown, with	Thin bl encr on E; thin traces of peat on I	2	7.12.47.12.2	N	39	Neck from the thin fine Beaker as described in Appendix, entry 1, at the neck's point of greatest inflection. Traces of horizontal stretches of shell impression on E. ASH had divided the contents of the 81.448 bag, putting one sherd in with 39 (because it clearly belongs to that pot) and leaving the other sherd and frag in her 'Unclassified (fine Beaker?)

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															thin traces of orange ?peat						category
368	81.174	BV	813	Prob Chalco	Beaker, Early International	1	4	30.9	30.2	5.0 (max 5.5)	Neck, car, belly	Y	1a	Pol to med-high sheen on E; I smoothed	E black-brown; C blackish; I mid brown, v sl reddish	None	2	7.8.5, 7.12.4	N	39	Lower neck-car-upper belly sherd from the thin fine Beaker as described in Appendix, entry 1. Short stretches of roughly horiz shell impressions immediately above & below and on carination, and trace of incised lattice design on belly.
369	81.396	BV	813	Prob Chalco	Beaker, Early International	1	2	26.8	16.0	4.9 (max 5.3)	Neck	Y	1a	Pol to high sheen on E; low sheen on I	E blackish-brown; C & I dark grey-brown	V thin bl stain on E	2	7.8.5, 7.12.4	N	39	Neck from the thin fine Beaker as described in Appendix, entry 1. Slight, shallow spalling of E. Short stretches of horizontal shell impression.
370	81.137	BVSX	141	Prob Chalco	Beaker, Early International	1	11	43.8	49.4	4.8 (max 5.5)	Neck, car, belly	Y	1a	E pol to med-high sheen, I to low-med sheen	E & C blackish-brown; I med brown, v slightly reddish	None	2	7.8.3, 7.12.4	Y	39	Relatively large sherd from neck, car & belly of the thin fine Beaker as described in Appendix, entry 1. NOTE: conjoins with, and now refitted to, Cat. 371 (81.392); had already comprised 2 refitted sherds. Had broken along ring joints. Long, gently

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					curving neck; gentle rounded car; gently convex belly. 2 rows of short stretches of shell impressions around mid neck as discontinuous, roughly horiz lines; further rows in area of carination; incised lattice design on belly. Est car diam c 130.
371	81.392	BVSX	141	Prob Chalco	Beaker, Early International	1	2	19.0	20.6	5.3 (max 5.5)	Neck	Y	1a	AS 370	As 370	None	2	7.8.3, 7.12.4	Y	39	Neck sherd from the thin fine Beaker as described in Appendix, entry 1. Conjoins with, and now refitted to, Cat. 370 (81.137). Short stretches of shell impression. Had broken along ring joint
372	80.048	DIII	309	Chalco/ EBA	Beaker, poss AOC	1	4	24.2	19.7	8.8	Body	Y	4 but mostly v small incls	Smoothed but grits protrude through I	E & I med brown, sl greyish; Cdark grey	None	3	9.9.2	N	40	Belly sherd with 2 parallel lines of fine, loosely-twisted cord impressions up to 0.7 mm wide and set c 6 mm apart on E; may have been an AOC Beaker. Pot thicker than ASH 37–39 and distinctly gritty. Had broken along ring joints top and bottom; top also has trowel smear. See also Cat. No 917, which may be

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					from this pot
373	81.156	HI	739	Chalco/EBA	Beaker	1	6	26.0	22.3	9.4	Body	Y	4	Smoothed	E light greyish-brown, pale orange immed below surface; C med grey; I med brown	Sm patches of thin brown encr on I; unclear whether this is post-depositional	2	12.4.1	Y	41	Belly sherd, poss from 'domestic' Beaker, thicker-walled than ASH 37–39. Lots of minute mica flecks on E. On E, 2 horiz, prob finger/thumbnail impressions close to one edge of sherd and single similar but deeper impression close to other edge; sherd too small to reeal overall design. Some confusion over provenance/labelling: one original bag said 'Calanais 80 DI base of 315' and another, 'Calanais 81 DI f.315', yet the other sherd from 81.156 (and bagged separately by ASH) is listed as HI, 739. In ASH's 1981 finds lists she has '156 41 DI'. PJA confirms that the Finds Book has only '12 May H739 pot', and that HI is correct for 81.156.
374	80.116	BIV	134	Chalco/EBA	Beaker	2	12	40.4	45.6	8.5	Upper belly	Y	1a	Smoothed	E med brown, sl reddish C & I med	None	2	7.4.2; 7.8.6	N	42	2 conjoining (and now refitted) sherds from upper part of belly of large Beaker as described in Appendix, entry 2;

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															brown						note that one sherd from 80.131 (Cat. 375)conjoins and had already been refitted – so weight and dimensions are is that of all 3 sherds. (Note: sherd Cat. 376 from 80.131, and possibly also the spall Cat. 377 from 80.131, probably also conjoin but joints jot strong enough to be refitted. Decoration: comb impressions, each 5.5–6 mm long, in herringbone arrangement on E. Possible diagonal strap joint along L H edge. Found 20.5.80
375_377	80.131	BIV	139	Chalco/EBA	Beaker	3	2 (1,1)	16.3	15.6	5.6*	Upper belly	Y	1a	Smoothed	As Cat. 347	None	2 & 3	7.6.1; 7.8.6	N	42	3 sherds (but one (Cat. 375) refitted to Cat. 374 and its weight included in that for Cat. 374) from neck of large Beaker as described in Appendix, entry 2. The 2 loose sherds here (of which Cat. 377 is a spall) probably also refit to Cat. 374–5 but joints not strong enough to be refitted. Herringbone comb decoration on E. Found 15.5.80

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
378_379	80.128	BIV	139	Chalco/EBA	Beaker	2 refitted, 1F, crbs	5	21.5	31.8	9.6	Neck below cordon	Y	1a	Pol to med sheen on E, low sheen on I	E & I med brown, sl greyish; C dark grey	None	2	7.6.1; 7.8.6	N	42	2 conjoining spalls (now refitted) plus crumbs that are bound to conjoin as well; from lower part of neck of large Beaker as described in Appendix, entry 2. Deco: herringbone comb impressions. Broken along ring joint at bottom edge, and also spalled diagonally along ring joint
380	80.129	BIV	139	Chalco/EBA	Beaker	1	2	14.7	19.6	6.3*	Body	1a	I pol to low sheen	C mid grey-brown; I dark grey-brown	None		3	7.6.1; 7.8.6	N	42	Spall from large Beaker as described in Appendix, entry 2.
381	80.183	BIV	160.2	Chalco/EBA	Beaker	1	See	18.0	10.8	7.5	Rim	Y	1a	E pol to low sheen; I smoothed	E dark grey-brown; C dark grey; Imed grey-brown	None	2	7.8.6	Y	42	Rimsherd large Beaker as described in Appendix, entry 2. (Refitted to 81.141 – so see Cat. 388 for overall weight). Prob broken along ring joint; prob trowel smear. Rim gently squared off; top of rim decorated with impressed comb herringbone design, made with short stretches (max 6 mm).Bag says 'f.160', but corrected to 160.2

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					by PJA. Original bag says found '19.5.81' but given finds number is a full 1980 one the date is wrong; 1980 Finds Book says rimsherd 183 found 29.5.60 [sic]. Note that reference to a rim is correct. Note also 1981 Finds book has 183 BIV 814 Pot 15/5/81 which reduces the likelihood that Cat. 381 was found in 1981.
382	81.184	BIV	814	Chalco/EBA	Beaker	1	3	28.1	14.6	7.7	Neck at cordon	Y	1a	E pol to med sheen, I to low sheen	E dark grey-brown; C dark grey; I mid grey-brown	None	2	7.8.8; 7.8.6	N	42	Sherd from area of neck cordon on large Beaker as described in Appendix, entry 2. Prob broken along ring joint at top edge. Sherd with same SF No but from diff pot listed below (as 'NC')
383	81.184	BIV	814	Prob Chalco/EBA	Prob Beaker	1	1	16.7	15.6	5.5	Body	N	3	Smoothed; bag-polish on I	E mid-brown; C & I dark grey-brown	None	2	7.8.8	N	NC	Sherd from thin fine pot, undecorated; probably Beaker
384	81.161	BIV	867	Chalco/EBA	Beaker	1	5	31.7	21.4	8.3	Lower neck, below cordon	Y	1a	E pol to med sheen (discontinuous); I smoothed	E dark grey-brown; C dark grey; I light grey-brown	None	2	7.14.1; 7.8.6	Y	42	From large Beaker as described in Appendix, entry 2. Conjoins Cat. 385 (81.200) and has now been refitted to it. Decoration:

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					herringbone comb impression immediately below cordon and in metope; slightly sloping incised lines in adjacent metope
385	81.200	BV	813	Chalco/ EBA	Beaker	1	25	47.3	62.6	7.3 (max 9.5)	Lower neck	Y	1a	E: bands of polish to high sheen interspersed with smooth, matte bands; I smoothed; poss pol to low sheen	E med brown, sl reddish and med grey-brown; C med grey; I light grey-brown	None	2	7.8.5; 7.8.6	Y	42	From large Beaker as described in Appendix, entry 2. Conjoins Cat. 384 and is now refitted (although dimensions and weight are just for Cat. 385). NB Other sherds from 81.200 belong to Food Vessel ASH 75
386	81.390	BV	141	Chalco/ EBA	Beaker	1	1	10.5	13.9	8.1	Body	Y	1a	E pol to low sheen; I smoothed	E & I light to med brown; C med grey	None	2	7.8.3; 7.8.6	N	42	From large Beaker as described in Appendix, entry 2. Bag and Finds Book say 'B'; corrected to 'BV' by PJA
387	81.139	BVSX	141	Chalco/ EBA	Beaker	1	2	12.2	16.3	8.7	Body	N	1a	Smoothed	E med brown, sl reddish; C & I med grey-brown	None	3	7.8.3; 7.8.6	N	42	From large Beaker as described in Appendix, entry 2.
388_3392	81.141	BVSX	141	Chalco/ EBA	Beaker	10 + crbs	77 (41, 14, 8,	75.5	85.5	7.5 (max 9)	Rim-&-upper neck	Y	1a	E pol to high sheen at neck, med	E dark grey-brown at rim	None	2	7.8.5; 7.8.6	Y	42	Sets of refitted conjoining sherds (with rim sherd set 388 including refitted

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
							1,1) 387 is 14				(388), carination & upper belly (389), belly (390), body (391–2)			sheen at carination & low sheen on belly; I pol to low sheen on neck; otherwise smoothed	& neck; med brown, sl reddish around car & on belly; C med to dark grey-brown; I light brown, light greyish in places & dark greyish on parts of belly						Cat. 381, 80.183), from large Beaker as described in Appendix, entry 2. Very slight faceting on I at neck suggests possible scraping of neck. Decoration: herringbone comb impressions on rim top, neck, on and around carination and on parts of belly, with metopic zone on belly featuring panels of herringbone comb impression interspersed with vertical incised lines. Note: another sherd from SF 81.141 is listed under ASH 79
393	81.189	BVWX	160.3	Chalco/ EBA	Beaker	1	2	23.4	16.7	7.6	Body	Y	1a	E pol to low sheen; I bag-pol	E Light brown; C & I dark grey	None	2	7.8.6	N	42	From large Beaker as described in Appendix, entry 2. Herringbone impressed comb decoration plus poss comb-impressed horiz line on E. Bag says 'f.160', corrected to 160.3 by PJA
394_398	81.160	BVSX	813	Chalco/ EBA	Beaker	4+ 1F	c 1 (all <1)	13.5	9.6	4.9*	Rim; body	Y	1a	Smoothed; pol to low sheen (E & I)	Grey-brown through out	None	2	7.8.5; 7.8.6	Y	42	From large Beaker as described in Appendix, entry 2, including small rimsherd with herringbone comb impressions (plus

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					trowel-smear). 2 sherds from different pot, but with same SF No, are described below (as 'NC'); and see also ASH 79 for another sherd with same SF No PJA adds 'The finds Book has the context as 812 but the nearby entry for Find 81.162 was immediately corrected from 812 to 813, and 81.160 is shown as from 813 on Plan 18/81. 81.160 was almost certainly from context 813.
399_400	81.160	BVSX	813	Chalco/ EBA or E/MN	?Beaker or ? E/MN non-corky	2	4(3,1	28.6	18.9	6.9	Rim; body	N	3	Smoothed	E & C buff, I light brown	None	2	7.8.5	N	NC	Rounded, upright rim from thin, fine but fairly large pot; ERD 260–270 mm. Burnt; hard to tell whether it's Beaker or E/MN non-corky pottery. Part of E & I spalled off. PJA adds 'The finds Book has the context as 812 but the nearby entry for Find 81.162 was immediately corrected from 812 to 813, and 81.160 is shown as from 813 on Plan 18/81. 81.160 was almost certainly from context 813.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
401_403	81.414	BVSX	837	Chalco/EBA	Beaker	3	3 (2,1, <1)	18.2	14.4	8.6	Neck	Y	1a	E pol to med sheen; I smoothed	E light brown; C & I med grey-brown	None	3	7.19.3;7.8.6	N	42	From large Beaker as described in Appendix, entry 2. Cat. 400 poss broken along ring joint; comb-impressed herringbone design on E
404	81.250	DII	336	Chalco/EBA	Beaker	1	6	27.9	19.6	10.6	Rim	Y	4	Smoothed	E light brown (buff immediately below surfact); C light rown (colour obscured); I light grey-brown	None	3	9.3.4, 9.9.3	Y	43	Rounded upright rim from fairly large 'domestic' Beaker; ERD 210–240 mm. Two, possibly three shallow horizontal lines on E below rim
405	81.443	BI	100	Chalco/EBA	Beaker, dom	1	15	30.8	42.3	10.5	Neck or abraded rim	Y	2 but mica not abundant	Smoothed	E med brown, sl reddish; C med brown & dark grey; I med grey-brown	None	2	7.2.4	Y	44a	ASH described this as a neck sherd broken neatly along a ring joint, to produce a 'false rim'. That may well be the case. Diameter at this point c 140 mm; see below, Cat. NoCat 406; 'domestic' Beaker. Decoration = horizontal incised lines (=shallow grooves) on exterior, up to c 2 mm wide, closely set (maximum distance between lines

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					at mid-width: 5.5 mm. Note: In ASH report, on sherd, and on one of the 2 bags in which sherd had been stored, says 81.445. On original find bag, says 'Call 81 445 [and also says 443 in triangle], Site B topsoil from Victorian drain clear out'. PJA comment: the correct find No is 81.443; 81.445 was from BIWX 856.
406	81.198	BV	837	Chalco/ EBA	Beaker, dom	1	13	43.1	30.1	10.1	Body	N	2 but mica not abundant	Smoothed	E med brown, sl reddish; C dark grey; I med grey-brown	None	3	7.19.3	N	44b	Belly sherd, possibly but not necessarily from same pot as Cat. 405; diameter at this point could be as large as c 230, but this does not debar it from being from the same pot as 405, since it could have had a globular belly. Found 13.5.81
407	81.620	BV	814	Chalco/ EBA	Beaker, dom	1	11	30.9	27.7	10.1	Prob base	N	2 but mica not abundant	Smoothed but I sl uneven	E light brown withg buff and blackish area; C & I blackish	None	2	7.8.8	N	44c	Slight curvature towards one edge of E plus flatness of sherd suggests that it may be a base plate of a large, 'domestoc' Beaker, but not necessarily from the same pot as Cat. 405/406.
408	81.620	BV	814	Prob Chalco/	Prob Beaker/ poss	1	1	17.7	13.2	6.1	Body	N	3	Smoothed	E blackish-brown;	Patch of thin blackish	3	7.8.8	N	NC	From thin, fine pot. Thin and fine enough to be Beaker, and it

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
				EBA; or E/MN	E/MN non-corky										C light grey, obscured by sediment; I greyish-brown with orange sediment	encr on E					probably is, but can't rule out possibility that it's E/MN
409	81.399	BIV	863	Chalco/EBA	Beaker	2 refitted	7	43.1	22.4	7.2	Rim	Y	3	Polished to medium sheen on E & I (but possibly some bag polish as well as deliberate polish)	E medium brown & blackish; C dark grey; I med brown	None	2	7.16.2	Y	45a	Rim (comprising two conjoining and refitted sherds) from small, fine, thin-walled Beaker with deeply-incised horizontal lines (grooves) from immediately below neck, downwards; lines up to 3.6 mm wide and set c 5.8 mm apart. Rim pointed, rounded on I and minimally everted. ERD 100 mm. Found 23.5.81. Consolidated?
410	81.447	BI	100	Chalco/EBA	Beaker	1	6	34.6	19.8	7.3	Neck	Y	3	High sheen on E (but prob due to consolidant); smoothed on E.	E dark – reddish-brown; C med grey; I grey-brown	possibly black-brown staining on I	2	7.2.4	Y	45b	Neck from same Beaker as 409 (ASH 45a), with deep incised horizontal grooves on E (max W 2.9 mm; 5.7 mm apart); diam at this point c 100. Sherd looks to be consolidated. Broken along ring joint.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					Sherds from 2 other pots share the same SF No and are listed below (as 'NC')
411	81.447	BI	100	Prob Chalco/EBA or else ? E/MN	prob Beaker or else poss E/MN Non-corky	1 (=2 refitted)	8	31.5	37.5	7.8*	Neck or belly	N	2	Smoothed	Dark grey-brown through out	None	3	7.2.4	N	NC	2 conjoining & refitted sherds. Hard to tell whether this is a neck sherd or the I of a belly sherd; virtually all of one surface spalled off. Could have been from a thin-walled Beaker with gently-splaying, undecorated neck.
412	81.447	BI	100	? Chalco/EBA or E/MN	?Beaker or E/MN Non-corky	1	3	25.0	20.2	7.1	Body	N	3	Smoothed	E grey-brown; C buff & dark grey; I dark grey	412: poss patches of v thin bl encr on E	3	7.2.4	N	NC	Abraded body sherd, with most or all of I spalled off; could be E/MN but can't rule out possibility that it's Beaker.
413	80.096	DI	315	Chalco/EBA	Beaker	1	2	21.5	16.3	6.5	Neck	Y	3	E pol to med sheen; I to high sheen	E dark reddish-brown; C dark grey; I dark grey-brown	None	2	9.3.6	Y	46	Small neck sherd which could possibly be from the same pot as Cat. 409 (ASH 45a) and 410 (ASH 45b), or else same pot as Cat. 414 (ASH 46), which is from same context as Cat. 413. Grooves are more similar to those on Cat. 409 and 410, however. E decorated with deep horizontal incised lines (grooves), up to 3.3 mm wide and set 5.4 mm apart.
414	80.17	DI	315	Chalco/	Beaker	1	1	11.8	15.0	7.1	Rim	Y	3	E pol to	E	None	3	9.3.	Y	46	Rounded, slightly

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
	5			EBA										med sheen although poss some bag-polish	blackish-brown; C blackish; I dark brown			6			everted rim from thin fine Beaker; too small to estimate rim diameter. E has fairly shallow incised horizontal lines – one complete line and one truncated line present. W of complete line 2.7 mm. See comments in Cat. 413 regarding whether that sherd is from the same pot as this, or not.
415	80.157	DI	315	Chalco/EBA	Beaker	1	2	18.1	21.5	6.1	Neck	Y	3	E pol to med sheen; I pol to low sheen	E dark red-brown; C mid brown & dark grey; I grey-brown	None	2	9.3.6	Y	46	Curving neck sherd from thin, fine Beaker with splaying neck, decorated on E with closely-set, shallow, roughly-horizontal incised lines (grooves), up to 1.9 mm wide and set c 2 mm apart (at mid-point of grooves). Probably not from same pot as Cat. 414 rim (which has different E colour).
416	80.097	DI	315	Chalco/EBA	Beaker	1	2	17.1	18.3	8.5	Body	Y	3	Medium sheen on E & I but could be bag-polish	E blackish-brown; C dark grey; I med brown	None	3	9.3.6	Y	46	Body sherd from fairly thin fine pot but definitely not from the same pots as the others listed under ASH 46.. E decorated with shallow incised lines, one running horizontally (and shallower than the others), and the others diagonal to that, and

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					not reaching as far as the horizontal line.
417_418	80.072	DI	315	Chalco/EBA	Beaker	2	6 (6,1)	25.2	31.6	7.9*	Prob neck	Y	4	Smoothed	E dark reddish-brown & grey-brown; C light grey & red-brown	None	2	9.3.6	Y	47	Sherd spalled along ring joint. E decorated with roughly horizontal impressions of cockle shell edge, in two untidy lines, with a row of deeper, diagonal shell-edge impressions above. From same pot as other sherds in ASH 47; overall <10% of the pot present
419	80.083	DI	315	Chalco/EBA	Beaker	1	3	20.0	14.6	10.8	Rim	Y	4	Smoothed	E blackish; C dark grey & mid brown; I mid grey-brown	None	3	9.3.6	N	47	Rimsherd, lacking its tip but had probably been gently pointed, from same pot as other sherds in ASH 47. Decoration on exterior: cockle shell-edge impressions, featuring horizontal line nearest to rim tip and, below this, a horizontal impression with a diagonal impression below. Sherd looks to have been consolidated.
420	80.067	DI	318.3	Chalco/EBA	Beaker	1	31	43.8	53.5	13.2	Body	Y	4	Smoothed, although some inclusions protrude	E purplish-brown, pinkish just below the suface; C mediu	Patch of thin black-brown encrustation on I	3	9.2.12	N	47	Belly sherd from same pot as other sherds in ASH 47. and from same position on pot as Cat. 421. Large, relatively thick-walled domestic Beaker cooking pot; diam at this point c 240 mm.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															m grey; I purplish-brown and darker brown						Decoration on exterior: cockle shell-edge impressions, arranged in sets of horizontal lines with a blank zone in between. Part of E spalled off along ring joint. Inclusions mostly quartz/ite and a shiny white mineral (?feldspar); mica also present. Surfaces glittery.
421	80.140	DI	318.3	Chalco/EBA	Beaker	1	34	53.2	49.0	13.5	Body	Y	4	Smoothed, although some inclusions protrude	E medium brown, sl purplish; C light to dark grey; I medium brown	None	2	9.2.12	Y	47	Belly sherd from same pot as other sherds in ASH 47. and from same position on pot as Cat. 420. Part of I spalled off along ring joint; rest of joint clearly visible running diagonally across section. One angular quartz/ite inclusion is 5.7 x 5.7 mm.
422	81.195	BIVWX	859	Chalco/EBA	Beaker	1	6	28.0	24.7	11.4	Rim & neck	Y	2	E & I polished to low to med sheen, although probably also some bag polish	Reddish- and greyish-brown; C light to mediun grey; I light grey-brown	None	2	7.3.1; 7.11.5	N	48	Rim sherd from large, unusually-shaped 'domestic' Beaker as described in Appendix, Entry 3. Rim squared off and slightly everted; ERD 190 mm. Rim top and E immediately below rim decorated with wavy edge of seashell, arranged as 2 concentric lines on

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					rim top and 2 horizontal lines on exterior. Below these, wide and deep horizontal groove. One large socket of burnt-out organics (possibly grass or straw) on rim-top. Note: in addition to the sherds listed below, Cat. Nos.Cat 857–861 from ASH 76 'crumbs' also belong to this pot.
423_424	81.379	BIVWX	859	Chalco/EBA	Beaker	2 cj	8 (7, 1)	21.3	33.5	10.9	Rim & neck	Y	2	E & I polished to low to med sheen	As 422	None	3	7.3.1; 7.11.5	N	48	Rim sherd from same Beaker as 422 as described in Appendix, Entry 3, and from same side of pot as Cat. 422; 3 sub-rim horizontal grooves visible. ERD 190 mm. The smaller sherd, a spall, conjoins with the other sherd and may have spalled off along a ring joint.
425	80.079	DI	326.1	Chalco/EBA	Beaker	1	2	16.3	17.25	8.5	Prob neck	Y	2; incls fairly abundant	Smoothed	Mid grey-brown through out, sl greyer in C	None	3	9.2.13	N	48	From Beaker as described in Appendix, Entry 3. Most of I spalled off; prob broken along ring joint. 3 lines of horizontal shell-edge impressions.PJA adds '315 on bag and in typed catalogue, but 326 according to plan

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					80.13 PJA'
426_427	80.086	DI	315	Chalco/EBA	Beaker	2	2 (1,1)	15.0	16.2	8.6*	Body	Y	2	Smoothed	E grey-brown, sl reddish; C dark grey; I grey-brown	None	3	9.3.6	N	48	2 small abraded sherds from Beaker as described in Appendix, Entry 3. One has 2 lines of shell-edge impressions
428_429	80.088	DI	315	Chalco/EBA	Beaker	1 & 1F	4 (4, <1)	22.1	24.7	8.2	Neck?	Y	2	Smoothed; E pol to low sheen	E mid grey-brown with black stain; C dark grey; I grey-brown	Thin black stain on E	2	9.3.6	N	48	From Beaker as described in Appendix, Entry 3. Three lines of shell-edge impressions on E of sherd; stain probably relates to pot's contents
430	80.093	DI	315	Chalco/EBA	Beaker	1	6	28.0	30.3	9.5	Car	Y	2, incls fairly abundant	Smoothed; E pol to low sheen, but enhanced by bag-polish	E purple-brown; C & I med-dark grey-brown	Small patch of thin black stain on E	2	9.3.6	N	48	From Beaker as described in Appendix, Entry 3. Carination & area immediately above; diam at this point could be as great as 260 mm, but hard to be sure. Gentle carination. Horiz lines of shell-edge impressions; those on carination are smudged. Had broken along a line of impressions.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
431	80.120	DI	315	Chalco/ EBA	Beaker	1	18	42.7	35.3	11.4	Rim & neck	Y	2	Smoothed; E pol to med sheen, I to low sheen	E blackish & dark brown; C & I dark grey-brown	None	2	9.3.6	Y	48	Rim from Beaker as described in Appendix, Entry 3; ERD 190 mm. Two deep sub-rim grooves and traces of a third present on E, along with shell-edge impression as per other rim sherds from this pot. Broken along ring joint. Several corky-like sockets where stone inclusion has decomposed away; traces of the stone present elsewhere.PJA comment: Finds Book has 'Base of 315 (dragged in plough furrow)'
432_437	80.123	DI	326	Chalco/ EBA	Beaker	6	33 (11, 6,6,6 ,4, <1)	28.4	37.8	10.2	Neck (incl one just above kink in neck), car	Y	2	Smoothed; E pol to low or med sheen on some sherds	E mid grey-brown, purplish on some sherds; blackish on one; C light-dark grey-brown; I purplish -brown	Patch of black staining on 1 neck sherd	2	9.2.13	Y	48	From Beaker as described in Appendix, Entry 3. Two of the sherds comprise 2 refitted sherds (so original total had been 8). Carination gentle; neck straight. Shell-edge impressions smudged on some sherds. Sherd that may come from just above kink is the one with the black stain on the E.
438	80.186	DI	326	Chalco/ EBA	Beaker	1	5	33.1	25.6	8.8	Neck (prob)	Y	2, incls fairly	Smoothed; poss pol	E purplish	Poss small	3	9.2.	Y	48	From Beaker as described in

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
													abundant	to low sheen on E	-brown; C mid-brown & grey-brown; I mid grey-brown	patch of black staining on E		13			Appendix, Entry 3. Sherd kinks markedly and is most likely to have come from an inflection on the neck; the only other place where it could have originated is at the bottom of the wall, at a pedestalled base; but is most likely to be from neck. Much of I spalled off along ring joints. Shell-edge impressions smudged
439_449	80.186 see comment	DI	326	Chalco/ EBA	Beaker	10 & 1F	19 (7, 2,2,2 ,2,2, 1,1, rest <1	35.5	30.8	8.3*	Body incl belly	Y	2, incls fairly abundant	Smoothed; poss pol to low sheen on E of some sherds	E purplish -brown; C light to mid grey-brown; I grey-brown	None	2 & 3	9.2.13	N	48	From Beaker as described in Appendix, Entry 3. Includes markedly curving sherd (exterior spalled off) that is probably from globular belly. One sherd comprises 2 refitted sherds. Older find bag says 'Calanais 1980 DI 326 186 [in triangle] 79 [in triangle] this No already taken'. Count as SF 80.186
450	81.199	BIVWX	859	Chalco/ EBA	Beaker Early	1	2	16.0	17.6	6.6	Rim	Y	1a	Smoothed; poss pol to low sheen on E but bag-polish on E & I	E black-brown & black; C & I bl-brown	Patch of v thin blackish encrustation on E below	2	7.3.1; 7.11.5	Y	49a	Rimsherd from thin fine Beaker with low, rounded cordon immediately below rim. Rim gently pointed; rim & neck everted. Broken along ring joint.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																cordon					
451	81.612	BIVSX	141	Chalco/EBA	Beaker	1	1	16.4	16.7	5.7*	Neck	Y	1a	Smoothed; possibly pol to low sheen on E	E blackish-brown; C light grey-brown	None	2	7.8.3	N	49b	Definitely Beaker; not same pot as Cat. 450 unless that pot has a second cordon lower down on its neck (which is unlikely). Neck sherd from thin fine Beaker, undecorated except for a low, gently ridged cordon on the E. Sherds from a different pot with the same SF No listed below (as 'NC')
452_456	81.612	BIVSX	141	?E/MN or Chalco/EBA	E/MN (?Heb Inc) or Beaker	5	6 (2,2,1,1,1)	22.0	12.5	6.8	Body	N	4	Smoothed but inclusions protrude	Med grey-brown through out	None	3	7.8.3	N	NC	Sherds markedly more abraded than Cat. 451 and may well be residual gritty E/MN pottery. Fabric most closely matches that for Heb Incised pottery (although these sherds undecorated), but possibility that the sherds are from another Beaker cannot be ruled out.
457_458	80.159	DI	332	Chalco/EBA	Beaker	2	5 (4,1)	39.9	20.1	7.1	Rim, body	Y	3	Smoothed	E black-brown & dark brown; C & I light-mid brown	Small patch of thin bl encr on E of rim and on E of body sherd	3	9.3.12	Y	50	Rimsherd = 2 refitted sherds; ERD 140 mm. Other sherd could be from same pot. From small thin fine Beaker. Rim rounded and everted; prominent narrow horizontal cordon below rim on E. I uneven; possibly

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					partly spalled off. No decoration other than cordon
459	80.171	DI	318.3	Chalco/EBA	Beaker	1	4	32.0	16.3	8.4	Prob neck	Y	3	Smoothed; low sheen on E but poss partly due to bag polish	E dark brown; C med-dark brown; I med brown – grey brown	None	3	9.2.12	N	51	Probably from neck of thin, fine Beaker, medium to large (diam at the point c 200). Low, fairly broad cordon, prob just below rim
460	80.087	DI	315	Chalco/EBA	Beaker	1 + 2 crumbs	3	25.6	23.5	5.8	Neck	N	1a	Smoothed; pol to low sheen on E & I but some bag pol	E dark brown; C & I dark grey-brown	None	2	9.3.6	Y	52a	Sherd = 4 refitted sherds. Curving, splaying neck of thin, fine Beaker; diam at this point poss 110–130. Friable. On E, a few relatively large sockets of leached-out inclusions
461	81.614	BIVSX	141	Chalco/EBA	Beaker	1	2	25.5	16.7	5.9	Neck	N	1a	Smoothed; pol to low sheen on E	E blackish-brown; C mid grey-brown	None	3	7.8.3	N	52b	Curving neck sherd (= 2 refitted sherds), prob from same pot as 52a. I spalled off
462_464	81.036 & 81.344	E	1108 & 1112	Chalco/EBA	Beaker	2 & 1F	19 (18 + 2 x <1)	46.0	41.1	16.4	Rim	Y	1	Smoothed; E pol to low sheen but some bag pol	E black-brown; C dark brown & black-brown; I dark brown	Patch of thin bl encr on E in groove + poss specks on I of rim	2	10.3.1	Y	53a	81.36 refitted to 81.344; overall, 3 refitted sherds. Loose sherd + frag from same pot. Rim of large, relatively thick-walled domestic Beaker (cooking pot); ERD 250 mm. Rim rounded and gently everted. Two deep horizontal grooves

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					below rim on E, creating cordon-like corrugated surface. E slipped or wet-smoothed; traces of horizontal smoothing marks on E. Poss cereal impression on E
465	81.231	E	1112	Chalco/EBA	Beaker	1	2	15.0	19.6	10.7	Neck	Y	1	Smoothed; patch of low sheen = bag pol	Blackish-brown through out	Poss tiny patches of thin bl encr on E	3	10.3.1	Y	53a	From same pot as 462–4 (ASH 53a). From neck, with deep groove and cordon-like feature. I spalled off
466	81.194	BVSX	141	Chalco/EBA	Beaker	1	15	33.7	34.1	15.5	Rim	Y	1	Smoothed; low sheen on part of E	E dark brown & black-brown; C mid-dark grey brown; I orange-brown	None	2	7.8.3	N	53b	Rounded, everted rim from large, relatively thick-walled domestic Beaker (ERD 230–250 mm), with deep horizontal groove below rim on E, creating cordon-like feature. Definitely from same pot as ASH 54 and possibly from same pot as ASH 53a, even though sub-rim groove is narrower and I is more orange-brown
467	81.044	DV	344	Chalco/EBA	Beaker	1	11	38.3	33.3	15.4	Rim	Y	1	Smoothed; pol to low sheen on E	E blackish-brown; C dark grey-brown; I light	None	2	9.3.6	Y	54	2 refitted sherds. Rim from same pot as ASH 53b and possibly same pot as ASH 53a; ERD 230–250 mm. Horizontal smoothing marks on E. Much of E

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															orange-brown						spalled off. Found 5.5.81
468	81.064	HI	707	Chalco/EBA	Beaker	1	14	42.5	31.8	13.4*	Rim	N	4 but inclusions not v abundant	Smoothed	E dark brown & blackish-brown; C reddish-brown, buff & grey-brown	Small patch of thin bl encr on E	3	12.4.1	Y	55	Rim from v large domestic Beaker (cooking pot); ERD 280–300 mm. Rounded, everted. I spalled off and scar surface abraded. Horizontal wipe scratch just below rim
469_470	81.444	BVSX	141	Chalco/EBA	Beaker	2	14 (9,5)	51.9	38.0	9.2*	Base	N	1a	Smoothed	C dark grey-brown; I dark brown	None	3	7.8.3	N	56	Flat base of thin fine Beaker; E spalled off. Omphalos (ie I thickens gently towards centre). Est base diam c 80. Part of junction with bottom of wall present: gentle junction
471	80.078	DI	315	Chalco/EBA	Beaker	1	8	28.5	29.4	10.5	Base	N	2 but not abundant mica	Smoothed; patch of low sheen on I	E dark grey-brown & mid brown; C mid brown & blackish-brown; I med brown	None	3	9.3.6	Y	57	Flat base from fairly fine, fairly small Beaker; est base diam c 80. Wall splays gently. Wall-base junction gentle on E and continuous curve on I
472	80.180 & 80.038	DI	315 & 315	Chalco/EBA	Beaker	1	10	46.5	23.1	10.6	Base	N	3	Smoothed; E pol to low sheen	E + I dark brown; C dark	None	2	9.3.6	Y	58	80.180 refitted to 80.38. Base & bottom of wall from small fine thin-walled Beaker.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															brown & blackish-brown						Gentle pedestal, above which wall kinks out. Wall narrows to 5 mm. Wall-base junction gentle on E and continuous curve on I
473_475	80.119	BIV	134	Chalco/EBA	Beaker	3	30 (27,2,1)	51.3	38.0	12.4	Base, body	N	4 but incls not v abundant	Smoothed, although inclusions protrude through surfaces	Dull greyish-brown through out	None	3	7.4.2	N	59a	Base from fairly large, flat-based domestic Beaker, although base diam hard to estimate. Wall probably splays widely. The two small body sherds may belong with this pot. Another sherd with this SF No is in ASH 36 (Cat. 328, E/MN Heb Inc). Sherds from 2 other pots share the same SF No and are listed below (as 'NC') Found 20.5.80
476_479	80.119	BIV	134	Chalco/EBA or E/MN	Beaker or Corky	5	6 (2,2,1,1,<1)	23.1	18.5	8.1	Base or neck just below rim, body	N	1	Smoothed	E & I mid grey-brown; C mid grey	None	2	7.4.2		NC	Mostly spalls from friable pot. It's unclear whether one of the sherds is from a flat base or from the neck immediately below the rim; the interior kinks at one edge. If the former, then pot is most likely to be a Beaker; if the latter, most likely to be E/MN. Note: one of the 5 sherds has accidentally not been given a Cat. No

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
480_483	80.119	BIV	134	Chalco/EBA	Beaker	4	16 (7,6, 2,<1)	31.7	28.3	7.3	Body	N	2	Smoothed	E & I light to mid grey-brown; C mid grey-brown	None	2–3	7.4.2	N	NC	One of the sherds = 2 refitted sherds. Lower body sherds from small, thin fine pot (Th c 5.5); one sherd is from immediately above flat base. Most likely to be a fine Beaker. Diam at this point c 100. Wall splay angle c 45 degrees.
484	81.387	BVSX	141	Chalco/EBA	Beaker	1	13	37.7	26.5	11.5	Base	N	4 but not abundant incls	Smoothed but incls protrude from surfaces	C dark grey brown, orange-brown nr E; I mid-brown	None	3	7.8.3	N	59b	2 refitted sherds; may have spalled along joint plane. Prob from same pot as Cat. Nos.Cat 473–5. Est base D c 110. E spalled off and scar surface abraded; may have broken along ring join. Original finds bag also has SF no 135, but SF 387 added to it See also Cat. NoCat 265, under ASH 18, and below, under 'NC', for other sherds with same SF No
485_487	81.387	BVSX	141	Prob Chalco/EBA	Prob Beaker	2+ 1F + crbs	3,1, <1	24.7	18.8	12.1	Poss base	N	3	Smoothed	E yellow-buff; C & I med brown		3	7.8.3	N	NC	Probably a base sherd; too small to estimate base diam. May well have broken along ring joint/s
488	80.030	BIII	121	Chalco/EBA	Beaker	1	9	30.5	29.1	10	Base	N	3	Smoothed; low sheen on E poss	E & I dark brown; C dark	None	3	7.4.11	N	60	Flat base at junction with bottom of wall (although E of bottom of wall spalled off);

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
														from bag pol	grey-brown						fine Beaker. Est base diam poss c 80. Wall-base junction prob gentle on E and continuous curve on I. Worn trowel gouge marks on I.
489_491	81.433	BIV	866	Late Neo	GW	3	c 7 (c 3, c3, c1)	28.5	23.8	8.0	Upper body and lower body	Y	1	Smoothed; very low sheen on E & I	E light brown with orange tinges; C met to dark grey; I light brown to blackish brown	None	2, 3	7.16.1	Y	61	Three out of 30 sherds that belong to thin, fine,tub-shaped Grooved Ware pot (see Appendix, Entry 4 for overall description). Sherds refitted to others from 81.446 and 81.449, so weights are only estimated. (Overall weight of all parts of this pot: 79g) Note: unlike most other Catalogue entries where sherds have been refitted, each sherd from this pot has been given its own Cat. NoCat, and the largest of the sherds has been measured as though it were free-standing. Sherds broken along ring joints. Horizontal smoothing striations at bottom of I of lower body sherd, where it starts to kink in to form the base. Decoration: incision and false-relief wavy line (as described in Appendix, Entry 4)

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					Found 25.3.81
492_495	81.421	BIV	877	Late Neo	GW	4	c16 (c 7, c 4, 3, 2)	35.8	23.3	9.8	Base, upper body	Y	1	Smoothed; very low sheen on E & I	E orange-brown (uppoer body), med-brown, sl orange (base); C dark grey; I blackish-brown	Possible patch of v thin blackish encr on I of upper body sherd	2,3	7.16.1	Y	61	Four out of the 30 sherds that belong to thin, fine, tub-shaped Grooved Ware pot (see Appendix, Entry 4 for overall description). Two of the sherds refitted to others from 81.446, so weights are estimated. Est base diam c 110. Base-wall junction gentle on E. Most of I of base spalled off, including along clay joint planes. Upper body sherd decorated with horizontal incised grooves. Can't tell whether encrustation had been burnt on (through use as cooking pot) or represents final traces of evaporated former contents of pot. Note: one sherd NOT belonging to this pot has the same small find no and is described separately below (as 'NC', Cat. NoCat 496) Found 27.5.81
496	81.421	BIV	877	Prob E/MN	Non-corky	1	6	28.4	25.0	8.4	Body	N	4 but not very gritty	E smoothed & pol to low sheen;	E mid brown; C light grey-	Small patch of thin black	3	7.16.1	N	NC	Definitely not from the Grooved Ware pot; may be E/MN Non-corky pottery.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
														I uneven, with inclusions protruding	brown; I light brown	encr on E					Abundant mica flecks on E
497_514	81.446	BIV	877	Late Neo	GW	17	c 45 (c 21, 6, c 6, 3, 2, c2, c2, 2, 1)	28.5	27.6	6.8	Rim, body, base	Y	1	Smoothed; very low sheen on E & I	E med brown, with varying shades of orange; C med-dark grey; I blackish-brown	Band of v thin black-brown encr around mid-height of body	2,3	7.16.1	Y	61	Eighteen out of 30 sherds that belong to thin, fine tub-shaped Grooved Ware pot (see Appendix, Entry 4 for overall description). Refitted to others from 81.421 and 81.433. Rim gently pointed, with decoration on E (false relief wavy line) and on I (horizontal incised line). ERD c 186 mm. Body slopes in fairly straight line towards base. Several sherds broken along ring joints. Some abrasion to E surface on upper part of body. Found 27.5.81
515_519	81.449	BIV	877	Late Neo	GW	5	c 9 (4, c2, c1, 1,1)	31.6	21.7	5.7	Body, base	Y	1	Smoothed; very low sheen on E & I	E light orange-brown; C med grey; I blsckish	Patch of v thin bl-brown encr on I of body sherd	2,3	7.16.1	Y	61	Five out of the 30 sherds that belong to thin, fine tub-shaped Grooved Ware pot (see Appendix, Entry 4 for overall description). One refitted to 81.433. See also 'NC' below (Cat. 520) for sherd from probable Beaker, with same SF No. Found

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					27.5.81
520	81.449	BIV	877	Chalco/ EBA?	Beaker?	1	11	31.4	44.2	9.8	Neck	N	2	Smoothed; pol to low heen on E	E dark grey brown with black encr; Emed grey; I light brown	Thin black encr on E	3	7.16.1	N	NC	Same Small Find No as sherds from Grooved Ware pot ASH 61, but definitely not from that pot. Curving, splaying neck, most probably from fairly large 'domestic' Beaker; diam at this point c 190
521	81.197	BIV	877	Late Neo	GW	1	2	31.3	8.9	7.4	Body	N	1	Smoothed; low sheen on I	E & part of core light orange-brown; rest of C light grey; I dark grey	None	3	7.16.1	N	61	Narrow body sherd belonging to thin, fine tub-shaped Grooved Ware pot (see Appendix, Entry 4 for overall description). Found 1.6.81 PJA adds: Finds Book has BIVWX 787 but Ctxt 787 was in Area H and 877 is certainly correct.
522	81.154	HI	746	E/MN	Heb Inc	1	3	28.3	15.2	7.4	Rim flange	Y	1a	Smoothed; pol to low sheen on upper and underside of flange	E (= top) blackish-brown; C mid grey-brown; I (= underside) dark brown	None	2	12.7.6	Y	62	Rim flange from large, thin, fine Hebridean Incised pot; est rim diameter may be as large as 300 mm. Edge of flange rounded, with slight lip on underside. Upper surface decorated with incised lines, 2 roughly concentric with edge of flange, the third diagonal. Had been in

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					ASH's 'Grooved Ware and miscellaneous' category, and Cat. 523 had been included within ASH 62 even though it is from a different pot. Cat. 523 now listed below as 'NC'
523	81.154	HI	746	Prob Chalco/ EBA	Prob Beaker	1	1	16.4	13.1	8.3	Base	N	1a	Smoothed	E light brown; C light grey; I dark grey-brown	None	2	12.7.6	N	NC	Small sherd from junction between wall and base of flat-based pot, probably a domestic Beaker; wall-base junction fairly sharply defined on I. Had been in ASH's 'Grooved Ware and miscellaneous' category. Definitely not from the same pot as Cat. NoCat 522, with same SF No.
524	80.113	DI	321.2 B	?Prob Chalco/ EBA	Prob. Beaker	1	3	29.6	16.9	6.5	Body	Y	4	Smoothed but inclusions protrude through E & I	Dark brown through out, sl greyish in places	None	2	9.3.7, 9.3.8	Y	63	Decorated sherd from thin-walled but gritty pot, originally likened by ASH to Grooved Ware pot ASH 61 on the basis of its decoration. ASH argued, from slight kink on I, that it could be from just above the base of a flat-based pot, with diagonal decoration, but this kink is actually due to a projecting lithic inclusion, and the

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					slight concavity of E suggests rather that the decoration runs horizontally and that this is from the (slightly splaying) neck of a fairly small pot (diam at this point c 150). Decoration: 2 slightly wavy lines, plus 2 bands of linear dot stabs, separated by a further incised line. Could be a fine if gritty Beaker, although the deco doesn't match that on the other Beakers from this site. See below, under 'NC' (Cat. Nos.Cat 525–530 and 531–533), for other sherds with same small find No from different pots
525_530	80.113	DI	321.2B	Prob E/MN	Corky	4 + 2F + crumbs	5 (2, 1, <1 x 4)	20.3	18.2	6.8*	Body	N	1	Smoothed	E med brown; C light to dark grey; I med brown	None	2,3	9.3.8	N	NC	Mostly spalls, not all definitely from a single pot; friable, with hackly fracture. May be from same pot as 93_113, and possibly 924_926 despite differences in fabric.
531_533	80.113	DI	321.2B	Prob E/MN	Corky	1 + 2F	2 (1, <1 x 2)	13.2	19.5	6.9*	Body; ? rim	N	1	Smoothed	E med brown, sl reddish; C mid grey	None	3	9.3.8	N	NC	Spalls from fairly fine pot; undulation of E suggests that sherd may be from rim, with horizontal thumb-smoothing hollow

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					below it.
534_535	81.089	BISX	107	E/MN	Heb Inc	2	3	25.4	13.9	7.9	Rim flange	Y	3	Smoothed; poss pol, but patches of high sheen prob due to bag pol	E (ie upper surface) black-brown; C dark grey; I (ie underside) dark brown	None	1–2	7.2.2	N	64	Sherd comprising two refitted sherds, forming outer edge of rim flange, from large flanged-rim pot; ERD c 250 mm. (ASH had ID'd it as an everted rim but it makes more sense as a rim flange.) Row of small deep irregular stab impressions on upper surface, concentric with edge. On underside, smoothing facets from tool used to smooth the surface. One of the 2 constituent sherds had broken along ring joint
536	80.111	DI	321.2A	Prob Chalco/EBA	Prob Beaker	1	2	17.8	14.6	5.6	Body	Y	1a (but with few or no mica flecks)	Smoothed & poss pol but areas of high sheen on E & I are from bag pol	E & I dark brown; C dark grey	None	3	9.3.8	Y	65	Prob belly sherd from small, fine, thin-walled pot; diam at this point c 150. Decoration on E: fairly random, roughly circular and irregular-shaped stab impressions, not very deep. Most likely to be from a fine Beaker. Note: in ASH pottery report, says 80.11, but this must be a typo error
537	80.061	BV	117	Chalco/EBA	Beaker	1	4	16.8	23.2	9.9	Body	Y	2 (glittery mineral	Smoothed	E & I dark brown;	None	3	7.4.2	Y	66	Body sherd with curving I, possibly from near base of

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
													not necess mica)		C dark grey						small 'domestic' Beaker; diam at this point c 120. E decorated with close-set rows of small, roughly circular stab impressions. Found 15.5.80
538	81.397	BV	810	Chalco/ EBA	Beaker	1	5	22.0	23.7	9.6	Body	Y	2 (not abundant mica)	Smoothed	E & I dark brown; C dark grey	None	3	7.12.1	Y	66	Belly sherd from same pot as Cat. 537, and probably further up the belly; diam at this point c 150. Stab decoration not as linear as on Cat. 537 and 539. Found 13.5.81
539	81.191	BVSX	141	Chalco/ EBA	Beaker	1	9	35.5	26.6	10.4	Body	Y	2	Smoothed	E light brown, reddish in parts; C dark grey; I dark brown	None	3	7.8.3	Y	66	Belly sherd from same pot as Cat. 537 and 538; prob further up belly than both of those sherds. Diam at this point c 170. Small circular stab impressions, some deep, in irregular rows. A second sherd with the same Small Find No, but from a different pot, is described separately below (under 'NC', Cat. No 540)
540	81.191	BVSX	141	Prob Chalco/ EBA	Prob Beaker	1	1	17.4	12.2	7.6	Body	N	2 but v few corky hollows	Smoothed	E & I red-brown; C dark grey	None	3	7.8.3	N	NC	Very small, heavily-abraded body sherd from thin fine pot, probably a fine Beaker; broken along ring joint
541_5	81.14	HII	733	Prob	Prob	2	1 (1,	16.7	11.6	5.5*	Body	Y	3	Smoothed	E dark	None	3	7.5.	N	67	2 small and abraded

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
42	7			Chalco/ EBA	Beaker		<1)								brown; C buff			6			body spalls from fine pot with same kind of roughly circular stab decoration as seen on pots ASH 65 and 66, but from a different pot
543	81.083	HI	735	Prob Chalco/ EBA	Prob Beaker	1	2	17.7	16.0	8.2	Body	Y	2	Smoothed	E med brown; C med grey; I grey-brown	None	3	12.3.1	N	68	Small abraded body sherd from pot with similar kind of decoration to that seen on ASH 65, 66 and 67; not identical to ASH 67 but could possibly have come from the same pot. Impressions slightly angular; fairly randomly spaced. One relatively large angular fragment of black shiny mineral visible in fracture surface
544	81.614	BIVSX	141	E/MN	Heb Inc	1	1	18.6	15.6	4.2	Rim flange	Y	3	Smoothed	Dark brown through out	None	2	7.8.3	Y	69	Rim flange from thin, fine, medium-sized pot; ERD 160–200 mm. Decoration: 2 rows of short concentric incised lines. On underside, very faint diagonal lines, but unclear whether these are decoration or impressions of grass. Another sherd from SF No 81.614 is Beaker ASH 52b
545_546	81.614	BIVSX	141	E/MN	Non-	1 + 1F	<1 x 2	16.3	12.6	4.5	Body	N	3	Smoothed; low	E & I med	None	3	7.8.3	N	69	From thin fine pot, not the same pot as

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
				or Chalco/ EBA	corky or Beaker									sheen prob due to bag pol	brown, sl greyish; C grey-brown						Cat. 544; could well be fine Beaker, although given the thinness and fineness of the rim flange Cat. 544, can't rule out E/MN date.
547_548	80.085	DI	315	Chalco/ EBA	Beaker	2 refitted+ 1 crumb	3	18.2	25.8	9.5	Neck	Y	3 but sl gritty	Smoothed; I uneven as mostly abraded away	E med brown; C dark grey; I grey-brown	None	3	9.3.6	N	70	2 refitted sherds from gently-splaying neck of 'domestic' Beaker; probably small to med-sized, but sherd too small to estimate diameter at this point. Decoration on E: horizontal lines of what are probably finger/thumbnail impressions.
549_553	81.043	DV	344	Chalco/ EBA	Prob Beaker	5 refitted+ 2 crbs	11	29.0	39.5	12.2	Body	Y	3	Smoothed	E Buff to mid-brown; C buff to dark grey-brown; I mid grey-brown	None	3	9.3.6	Y	71	5 refitted sherds from large pot (diam at this point c 200) with 'rusticated' decoration featuring sparse, roughly oval impressions of varying depth on E, including one pair, and another impression probably made by impressing a finger or thumbnail, and draggingt. Most likely to be 'domestic' Beaker, given sparseness of decoration and fact that other probable Beakers also have impressed decoration. Had split vertically along joint plane

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
554	80.042	BIII	117	Chalco/EBA	Prob Beaker	1	2	17.5	12.2	9.4*	Body	Y	3	Smoothed	E black-brown; C med grey-brown	Poss v thin bl encr on E	3	7.4.11	Y	72	Small abraded body sherd from large pot with deep, roughly oval jabbed impression on E. Probably 'domestic' Beaker; same pot as Cat. 555 and 556, and similar pot to Cat. Nos.Cat 549_553; could conceivably be from same pot, but cannot be sure. Note: other sherds with same SF No had been listed by ASH under ASH 75, and some of these belong to that Food Vessel (Cat. Nos.Cat 567_571) but others (Cat. Nos.Cat 573_5) are from E/MN fine corky pot. In the Finds Book is the following: 80.42 general spread of pot 10/5/80 B3 in 117 (under 103 stones)
555	81.396	BV	813	Chalco/EBA	Prob Beaker	1	2	22.9	12.1	9.2*	Body	Y	3	Smoothed; slight sheen due to bag pol	E black-brown; C med grey-brown	None	3	7.8.5	Y	72	Small abraded body sherd from large pot with part of a deep, roughly oval jabbed impression on E. Probably 'domestic' Beaker; same pot as Cat. 554 and 556, and similar pot to Cat. Nos.Cat 549–553; could conceivably be from same pot, but

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					cannot be sure. 13/5/81. JAS adds: There are 4 entries for 81.396: one under Beaker ASH 37; one under Beaker ASH 39; one under Beaker (dom) ASH 72; one under 'NC' (not previously catalogued), All BV 813
556	81.178	BV	810	Chalco/ EBA	Prob Beaker	1	11	33.3	35.2	11.5	Poss neck	Y	3	Smoothed; slight sheen due to bag pol	E black-brown; C med grey-brown; I med brown	Patch of thin blackish encr on E	3	7.12.1	Y	72	Gently curving sherd, probably from neck of large pot (diam at this point c 200), prob 'domestic 'Beaker, with deep, roughly oval stab impressions on E (i.e. 'rusticated' decoration), including at least one made by impressing a finger or thumbnail and dragging; broken along ring joint. Same pot as Cat. Nos 554 and 555, and similar pot to Cat. Nos.Cat 549–553; could conceivably be from same pot, but cannot be sure. Found 13.5.81
557	81.613	BIVWX	100	?? E/MN or else indet	?Heb Inc or indet	1	7	24.8	31.0	10.1	Body	Y	3	Smoothed	E mottled buff & mid-brown;	Patch of v thin blackish encr on	3	7.2.4	N	73	Body sherd; diam at this point c 160; part of E spalled off and abraded; part of I spalled off, prob along

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															C dark grey-brown; I mid grey-brown	I					joint plane. 2 very faint incised lines, nearly vertical, on E. Not easily identifiable as to type; incisions seem too shallow to be normal Hebridean Incised, and there's nothing that obviously suggests ('domestic') Beaker. Safest to regard it as ??Heb Inc or else 'Indeterminate'
558_562	80.024	C	208	?EBA	?FV	5 (incl 2 x 2 refitted)	14.5 (7,6, <1)	34.7	22.6	10.4	Body & ?base	Y	3	Smoothed	E buff; C dark grey; I mid grey-brown	None	3	8.3.2	N	74	Two pairs of conjoining body sherds from fairly large pot (diam at point of Cat. Nos 558–9 c 200). Cat. Nos 558–9 possibly from lower part of body: I kinks in as though approaching a flat base. Cat. Nos.Cat 560–1 might be from a flat base; part of E heavily abraded, so can't be sure. Cat. Nos 558–9 have decoration on E: closely-set oval impressions in a horizontal line, plus longer oval impression above that. Decoration is reminiscent of that seen on the Food Vessel ASH 75.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
563	80.143	BI	120	EBA	Food Vessel	1	5	26.6	16.4	10.7	Body	Y	5	Smoothed (note: this pot probably slipped; applies to all sherds from this pot)	Dark brown through out	None	3	7.2.2	N	75	Body sherd from large Food Vessel as described in Appendix, Entry 5. Had split, probably along joint plane. Decoration = row of deep triangular stab impressions on E. Contains distinctive type of lithic inclusion, apparently only seen in this pot: creamy-coloured and black fine-grained speckly stone, occurring as sub-angular and rounded fragments, deliberately added as filler; up to 7 x 4 mm
564	80.136	BI	125	EBA	Food Vessel	1	4	22.7	21.0	11.1	Body	Y	5	Smoothed	Dark brown through out	None	3	7.15.5	Y	75	Body sherd from large Food Vessel as described in Appendix, Entry 5. Decoration: whipped cord herringbone design. Contains one particularly large fragment (7.2 x 6.1) of the distinctive lithic inclusion as described under Cat. No 563
565	81.389	BIWX	125	EBA	Food Vessel	1	15	34.8	30.9	18.5	Rim	Y	5	Smoothed but I bevel sl uneven	E med brown; C med-dark grey; I med-	None	3	7.15.5	Y	75	Upright rim from large Food Vessel as described in Appendix, Entry 5, with inward-sloping I bevel and steep,

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															dark brown						narrow E bevel. ERD c 180mm. I bevel slightly uneven, with 2 shallow depressions that don't look like deliberate decoration. E bevel has short diagonal stretches of whipped cord; below that, E of neck decorated with horizontal lines of whipped cord. Found 25.5.81. Original finds bag has comment by Peter Strong: 'This pot is important cos it's the only one today, and it comes from underneath the fill of f.125 ie from under the robbed stone which was there once. And I like it too.' 'Original Finds Book has only B for Area but it must be BIWX
566	80.169	BI	167	EBA	Food Vessel	1	4	20.1	19.1	10.4	Belly	Y	5	Smoothed	Dark brown through out	None	3	7.6.8	Y	75	From belly of large Food Vessel as described in Appendix, Entry 5; from same area as Cat. Nos.Cat 592 and 594. Decoration: diagonal lines of impressions made by a comb with long rectangular teeth. Other sherds from 80.169 are in ASH 26 (Cat. 297) and ASH

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					36 (Cat. 318, 319)
567	81.166	BI	810.1	EBA	Food Vessel	1	9	20.4	30.5	11.4	Shoulder	Y	5	Smoothed	E dark brown; C & I dark grey-brown	None	3	7.12.2	Y	75	Shoulder-neck-belly sherd from large Food Vessel as described in Appendix, Entry 5. Neck immediately above shoulder is markedly thinner (7.9) than upper belly immediately below shoulder (11.4). Decoration: horizontal, close-set lines of whipped cord impressions on neck and shoulder; on upper belly, close-set deep stab impressions, roughly triangular.
568_572	80.042	BIII	117	EBA	Food Vessel	3 + 1F, 2 crbs and detached lithic incl	7 (3,3, rest <1)	23.4	18.1	12.5	Body	N	5	Smoothed	Dark brown through out	None	2,3	7.4.11	N	75	Mostly abraded spalls from large Food Vessel as described in Appendix, Entry 5; only sherd with both surfaces intact has most of E spalled off, hence absence of decoration. The detached lithic inclusion (7.8 x 5.4) is of the distinctive stone noted in other sherds from this pot. Another sherd with same SF No is listed under ASH 72
573_575	80.042	BIII	117	E/MN	Corky	3	4	21.0	10.8	6.4*	Rim;	N	1	Smoothed	E mid-brown;	None	3	7.4.11	N	NC	Abraded sherds of fairly small, thin fine

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
							(2,1,1)				body				in places light brown & light grey; C med grey; I med brown						E/MN pot with upright, externally-expanded (ie near-flanged) rim; ERD c 160 mm. Top and I of rim abraded; rim top slopes inwards. Rim and one of the body sherds partly burnt to light brown/light grey colour
576	80.133	BIIISX	117	EBA	Food Vessel	1	2	14.8	18.4	10.0	Shoulder	Y	5	Smoothed	E med grey-brown; C blackish; I black-brown	None	3	7.4.2	N	75	Shoulder sherd from large Food Vessel as described in Appendix, Entry 5. Decoration on E: horizontal & roughly horizontal, closely-set lines of whipped cord impressions
577	80.061	BIIISX	117	EBA	Food Vessel	1 + crb	1	18.4	8.8	9.4	Rim		5	Smoothed	E & I dark brown; C blackish-brown	None	2	7.4.2	N	75	Rimsherd from large Food Vessel as described in Appendix, Entry 5. E rim bevel and part of I rim bevel present. Diagonal whipped cord impressions on E bevel, with horizontal wh cord impressed lines below. I bevel has one deep diagonal ?incised line; unclear whether this is supposed to be decoration, but if it is, it's random, in contrast to decoration elsewhere. This sherd doesn't conjoin with

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					any of the other rimsherds from this pot
578	80.029	BIINE	112	EBA	Food Vessel	1	<1	14.2	7.9	9.1*	Rim	Y	5	Smoothed	E & I dark brown; C blackish	None	2	7.2.6	N	75	Rimsherd from large Food Vessel as described in Appendix, Entry 5. Decoration: diagonal lines whipped cord impression on E bevel. Doesn't conjoin with the other rimsherds from this pot
579	80.029	BIINE	112	Prob Chalco/ EBA or else E/MN	Prob dom Beaker or else Non-corky	1	8	33.3	25.9	10.8	Body	N	3	Smoothed but E cracked	E & I dark brown; C dark grey	None	3	7.2.6	N	NC	Slight kink in I, and slight thickening of the sherd at this point, suggest that this is likely to be from the lower belly of a flat-based pot as it approaches the base – in which case it's likely to be a 'domestic' Beaker, and the diam at this point is c 180. If it's not that, then will be E/MN non-corky
580_581	80.056	BIN	130.1	EBA	Food Vessel	2	9	25.7	33.3	10.4	Neck	Y	5	Smoothed	Dark brown through out	None	3	7.10.2 , 7.5.11, 7.7.2	Y	75	2 refitted sherds (so wt & dimensions are for both together) from large Food Vessel as described in Appendix, Entry 5. Gently curving E. Decoration on E (top to bottom): diagonal

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					deep short lines of whipped cord impressions; horizontal lines of same; deep, roughly triangular impressions
582_583	81.307	BIWX	9999	EBA	Food Vessel	2	11	25.3	32.3	13.7	Rim & upper neck	Y	5	Smoothed	E med-brown; C med-grey; I dark grey-brown	None	3		N	75	2 refitted sherds from rim and upper neck from large Food Vessel as described in Appendix, Entry 5, showing how pot constructed: rim added as separate section, and upper neck has near-vertical joint plane. Decoration: as other rim and neck sherds; I bevel has diagonal shallow and deep incised lines - ? irregular decoration. Doesn't refit with other rimsherds from this pot
584	81.307	BIWX	9999	Prob E/MN	Non-corky	1	8	36.5	23.0	9.5	Body	N	3	Smoothed	E & part of C med brown with light brown patches on E; rest of C & I: black	Rel thick black encr on I	3		N	NC	Probably from round belly of E/MN cooking pot, non-corky

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
585_588	81.200	BV	813	EBA	Food Vessel	4 + 2 crbs	12 (11 + <1 x 3)	44.9	27.3	10.8	Body; poss base		5	Smoothed	E med brown; C dark grey; I dark grey-brown	None	2	7.8.5	Y	75	2 sherds refitted; prob from lower belly just above base, from large Food Vessel as described in Appendix, Entry 5. One small sherd has wall-base junction (curving) on I. ASH note says there's a conjoin with base sherd 81.21 but it's hard to make out
589	80.031	DII	313	EBA	Food Vessel	1	6	22.9	27.1	11.1	Neck	Y	5	Smoothed	E light to med brown; C dark grey; I dark brown	None	3	9.3.4	Y	75	Neck sherd from large Food Vessel as described in Appendix, Entry 5. Decoration on E: horizontal lines impressed whipped cord. Several large rounded and subangular lithic inclusions of the distinctive type noted in other sherds from ASH 75
590	81.017	HII	708	EBA	Food Vessel	1	4	21.7	22.3	11.1	Body	Y	5	Smoothed	E med brown; C dark grey; I dark brown	None	2	12.2.8	Y	75	From either neck or belly from large Food Vessel as described in Appendix, Entry 5. Broken along joint, with joint plane long, diagonal, curving surface. Decoration on E: whipped cord impressions in horizontal lines with diagonal lines

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					(probably herringbone) below. Note: the ASH list had accidentally entered this as 81.13, but it's definitely 81.17: Finds Book entry specifies '81.17 3.5.81 H pot – decorated 708'. For 81.13 (from same context), see under '76 crb'.
591	81.021	HII	708	EBA	Food Vessel	1	3	26.9	18.8	7.6	Base	N	5	Smoothed	E & C dark brown	None	2	12.2.8	N	75	Base sherd from large Food Vessel as described in Appendix, Entry 5: flat on E, base-wall junction rounded, with mini-pedestal before belly splays out. Only small amount of wall E surface survives, hence absence of decoration. Note: ASH included a note in the 81.200 (Cat. No 584–7) bag saying there was a conjoin between one of those sherds and this one, but it's hard to make out
592	81.006	HII	708	EBA	Food Vessel	1	12	32.6	36.6	10.0	Belly	Y	5	Smoothed	E med-dark brown; C & I blackish-brown	None	2	12.2.8	N	75	Belly sherd from large Food Vessel as described in Appendix, Entry 5. Diam at this point may be c 225, as

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					shown in the illustration; could be up to 240. Probbroken along ring joint. Decoration on E, top to bottom: diagonal lines of whipped cord impressions; closely-set deep jab impressions (with deepest parts towards their upper edges; diagonal lines of impressions made with a long rectangular-toothed comb (as seen on Cat. Nos 566 and 594)
593	81.007	HII	708	EBA	Food Vessel	2	8	31.5	32.0	10.8	Shoulder	Y	5	Smoothed	Dark brown through out	None	2	12.2.8	N	75	2 refitted shoulder sherds from large Food Vessel as described in Appendix, Entry 5. Part of E spalled off along joint line, showing that shoulder added as separate section. Decoration on E: close-set deep jabs (which would have been immediately below the shoulder)
594	81.034	HII	712	EBA	Food Vessel	1	4	19.6	22.3	11.7	Belly	Y	5	Smoothed	E med brown; C & I dark brown	None	3	12.2.8; 12.3.3	Y	75	Belly sherd from large Food Vessel as described in Appendix, Entry 5; from same area as Cat. NoCat 566 and 592. Decoration: deep stab

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					impressions and diagonal lines of impressions made with comb with long rectangular teeth
595	81.278	DI	376	Indet; ?? Chalco/ EBA	Indet; ?? Beaker	1	4	21.1	27.2	8.1	Rim	Poss	4	Smoothed but inclusions protrude. E undulating	E mottled pink-brown and grey-brown; C grey-brown; I pinkish-brown and buff	None	3	9.3.14	Y	77	Upright, sharply squared-off rimsherd from small, fairly thin-walled pot with hard, gritty fabric. (Rim diameter estimation can only be approximate as sherd is too small for reliable diameter estimation: ERD poss c 150 mm.) Unclear whether the undulation of the E represents deliberate decoration or just horizontal sub-rim smoothing with a fingertip. Grittier than Beakers of comparable thickness from Calanais but stratigraphy suggests that the sherd could be mid-2nd millennium BC or older – in which case Beaker is the least unlikely ceramic type. Found 18.5.81
596	81.233	DV	320	Indet; ?? E/MN	Indet; ?? non-corky	1	5	22.0	30.6	9.0	Rim	N	4a; not particularly hard	E pocked from loss of sand-sized inclusions;	E blackish-grey; C & I dark	None	3	9.3.12	Y	78	Pointed, steeply sloping everted rim from very gritty, fairly thin-walled pot. (Inclusions are of

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
														inclusions project through E & I	grey-brown						quartz.) Too small to estimate rim diameter reliably. Had been attributed to 'Iron Age or later' category by ASH, probably on account of its grittiness. PJA notes, however: 'The stratigraphy of layer 320 suggests that it should pre-date the 1st millennium BC, but there are problems with the recording of the sub-area and context and it is possible that this sherd did not come from 320 but from a later level." This rim form is known from E/MN deep carinated jars, usually of Hebridean Incised ware, but there is no decoration on this. The fabric resembles a grittier version of that seen in the Heb Inc pottery from Calanais. The eversion of the rim is reminiscent of that seen on some Hebridean Iron Age pottery, although it is not as markedly kinked as the Iron Age examples. Found 4.5.81

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
597	80.013	AI	001	Prob IA or later	Indet	1	8	30.5	23.1	11.3	Body	N	3	Smoothed	E & part of C bright brick-orange; rest of C dark grey; I dull orange-brown	None	3	6.2.2	N	79	Belly sherd, probably from fairly large pot of hard but not gritty fabric. The bright colour is unique in the Calanais assemblage; together with the other sherds from Area A, there are no grounds for arguing for a pre-Iron Age date for this sherd.
598	81.070	BII	112	Indet	Indet	1	4	20.8	27.4	10.5	Body	N	3	E & I sl uneven; some bag pol	E black-brown; C black-grey; I grey-brown	None	3	7.2.6	N	79	Small featureless body sherd from pot with hard, non-gritty texture. E less carefully smoothed than is the case with the E/MN, LN and Chalco/EBA pottery from Calanais. Sherd too small to be diagnostic. Found 6.5.81
599	80.060	BIIISX	117	Indet; post-EBA, possibly ?post-Medieval	Indet; ? craggan	1	12	34.0	43.1	8.4	?upper belly and lower nexk	N	3	Uneven E & I	E buff; C dark grey; I dark grey-brown	None	3	7.4.2	N	79	Curvature of sherd suggests that this is the upper belly and lower neck area of a large, globular-bellied pot (est diam at this point possibly c 250), of hard but not gritty fabric. It's hard to reconcile the shape with an E/MN or Beaker date; it looks rather like craggan pottery. Found 15.5.80. Note: BV

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					1980 has been changed in the report to BIIISX to avoid confusion with the 1981 BV)'
600	80.062	BIV	117	Indet; post-EBA	Indet	1	6	34.4	21.2	7.9*	Body	N	3a	Smoothed; some bag polish	E light brown; C dark grey	None	3	7.2.6; 7.3.2	N	79	Spall from large pot with particularly hard, virtually inclusion-free fabric. Harder than the E/MN, Chalco/EBA and EBA pottery from Calanais (hence ASH's attribution of it to 'Iron Age or later'. Of indeterminate date. Found 14.5.80. PJA comment: Finds Book has 117 (134) meaning pre-peat plough soil 117 amongst line of stones 134'
601	80.117	BIV	139	Indet but see comment	Indet	1	10	42.3	24.6	9.7	Body	N	4	E uneven; I smoothed; inclusions protrude through both surfaces	E & I med brown; C dark grey	None	3	7.6.1	N	79	Featureless body sherd from large pot with hard, gritty fabric. Cannot rule out possibility that it had been a particularly hard example of E/MN non-corky pottery, or of domestic Beaker, but may well be post-EBA. Found 20.5.80
602	81.380	BIVW	859	Indet; ??	?? dom	1	18	44.5	43.4	11.1	Poss neck	N	3	Slipped on E and	E& C blackish	None	2	7.3.1;	N	79	Gently curving sherd

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
		X		Chalco/ EBA	Beaker									poss I; v low sheen on E prob due to bag polish	-brown; I sl grey-buff			7.11 .5			probably from neck of large pot; diam at this point c 210. Hard, non-gritty, laminar fabric; part of I spalled off along ring joint (which is steep and diagonal). Given its stratigraphy (see below) and the shape of the sherd, the least unlikely pot type is domestic Beaker (undecorated), although the fabric is harder than that seen on other Calanais Beaker pottery. From same pot as Cat. 603–4 (81.386) and probably also Cat. Nos.Cat 607–609 (81.141-906-384). Found 21.5.81. PJA comment: Context is putatively later 3rd.early 2nd millennium façade stone socket but disturbance in the Iron Age cannot be ruled out.
603_604	81.386	BIVWX	859	Indet; ?? Chalco/ EBA	?? dom Beaker	2 refitted	13	39.6	33.1	11.0	Neck	N	3	Slipped on E and poss I	E& C blackish -brown; I sl grey-buff	None	2	7.3.1; 7.11 .5	N	79	Sherds refitted; dimensions and weight are for the two together. From same pot as Cat. NoCat 602 (81.380)) and probably also Cat. Nos.Cat 607–609

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					(81.141-906-384). Found 21.5.81
605_606	81.160	BIVSX	813	Indet; ?? Chalco/ EBA	?? dom Beaker	2 refitted	9	35.5	28.0	12.0	Body	N	3	Smoothed but abraded	E light brown; C dark grey; I dark grey-brown	None	3	7.3.1; 7.8.5	N	79	Refitted body sherds from large pot; diameter at this point may be as large as 330–350. Each sherd broken along ring joints at top and bottom; narrow rings used. E colour reminiscent of that seen on domestic Beaker, although cannot rule out an earlier or later date. Hardness of fabric may well be what encouraged ASH to place this within her 'Iron Age or later' category. PJA adds 'The finds Book has the context as 812 but the nearby entry for Find 81.162 was immediately corrected from 812 to 813, and 81.160 is shown as from 813 on Plan 18/81. 81.160 was almost certainly from context 813.
607	81.141	BVSX	141	Prob Chalco/ EBA	Prob dom Beaker	1	Est 15	47.4	39.2	10.4	Neck	N	3	Smoothed; E probably slipped, and possibly	E & C blackish-brown; I light brown	Patch of thin blackish-brown encr on E,	3	7.8.3	N	79	One of three refitted sherds (Cat. Nos.Cat 607–609, 81.141-906-384) from gently curving neck of large pot, probably a

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
														also I. V low sheen probably due to bag polish		extending across parts of Cat. 608 and 609 as well as part of 607					domestic Beaker, of hard, non-gritty fabric. Diameter at this point (roughly at the bottom of this individual sherd) c 220. Overall size and weight of refitted sherds: 57.1 x 70.8 x 10.4, 33g. Weight of the individual sherds estimated. Refitted along joint lines; joint between Cat. Nos.Cat 608 and 609 is diagonal. Shallow fingertip impression on E; not decorative and probably relates to manufacture. Part of I spalled off. Abundant tiny mica flecks on E. Cat. Nos.Cat 602–604 are probably from the same pot. From plough soil (141) cut into by and covering the putative grave containing Beaker ASH 42. PJA adds: 'Context should be pre-Iron Age although possibly affected by late disturbance'
608	81.906	BVSX	141	Prob Chalco/ EBA	Prob dom Beaker	1	Est 6	44.5	15.0	11.2	Neck	N	3	Smoothed; E probably slipped, and possibly	E & C blackish-brown; I light brown	Patch of thin blackish-brown encr on E,	3	7.8.3	N	79	One of three refitted sherds (Cat. Nos.Cat 607–609, 81.141-906-384) from gently curving neck of large,

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
														also I. V low sheen probably due to bag polish		extending across parts of Cat. 608 and 609 as well as part of 607					non-gritty pot, probably a domestic Beaker, of hard, non-gritty fabric. See Cat 607 for further details
609	81.384	BVSX	141	Prob Chalco/ EBA	Prob dom Beaker	1	Est 12	54.3	22.9	9.0	Neck	N	3	Smoothed; E probably slipped, and possibly also I. V low sheen probably due to bag polish	E & C blackish-brown; I light brown	Patch of thin blackish-brown encr on E, extending across parts of Cat. 608 and 609 as well as part of 607	3	7.8.3	N	79	One of three refitted sherds (Cat. Nos.Cat 607–609, 81.141-906-384) from gently curving neck of large, non-gritty pot, probably a domestic Beaker, of hard, non-gritty fabric. See.Cat 607 for further details
610	81.384	BVSX	141	Indet; could be Chalco/ EBA	Indet; could be dom Beaker	1	2	18.9	14.4	10.1*	Body	N	3	E smoothed	C dark grey; I med brown	None	3	7.8.3	N	79	Featureless body sherd; E spalled off. Could be from a domestic Beaker (by analogy with Cat. Nos.Cat 607–609). Found 9.5.81 From plough soil (141) cut into by the putative grave containing Beaker ASH 42. PJA adds: 'Context should be pre-Iron Age although possibly affected by late

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					disturbance'
611	81.416	BVWX	160.3	Indet; could be Chalco/ EBA	Indet; could be dom Beaker	1	4	29.8	14.6	8.2	Body (belly)	N	4	Smoothed	E med brown; C dark grey; I dark grey-brown	None	3	7.14.1	N	79	Belly sherd from small, fairly thin-walled fine-gritty pot; diam at this point c 170. Slightly grittier than the grittiest definite domestic Beaker from Calanais, but nevertheless may be this type of pottery. Broken along ring joints at top and bottom. Another sherd from 81.416 is from Beaker ASH 38
612	81.416	BVWX	160.3	Indet; could be Chalco/ EBA	Indet; could be dom Beaker	1	5	33.9	17.8	9.2	Body	N	4	E pocked by abrasion; E smoothed but with slight irrecularities; some bag pol	E pinkish-light brown; C med grey; I mid grey-brown	Hint of tiny patch of v thin blackish encr on I at one end	3	7.14.1	N	79	Featureless sherd from pot with fairly hard, gritty fabric; different pot from Cat 611 – less gritty. By analogy with Cat. 611, could possibly be a gritty domestic Beaker. Another sherd from 81.416 is from Beaker ASH 38
613																					Null entry: no pottery allocated this number, by mistake
614_615	81.403	BVWX	859	Post-EBA: ? IA or later	Indet; ?? 'Plain Style' pottery	1 + 1F	19	34.9	58.0	11.5	Body	N	3a but with a few small corky voids	E uneven; I smoother	E med brown; C dark grey; I dark grey-	None	3	7.2.4' 7.3.1; 7.11.5	N	79	Body sherd, possibly from just above (flat) base, of large, uneven-walled coarseware pot, with very hard but not

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															brown						gritty fabric. Diameter at this point: c 250. Broken at narrow end (= bottom?) along joint. Exterior uneven, with hollows and marks of burnt-out organics. Cannot be accommodated comfortably within Neolithic, Chalcolithic or EBA ceramic repertoire at Calanais; is reminiscent of 1st millennium AD, pre-Viking Plain Style pottery from Hebrides, although sherd too small to be diagnostic. PJA adds: from socket of facade stone
616	80.154	DI	315	Prob E/MN	Non-corky	1	16	56.3	35.6	7.7	Body	N	4, with a few corky voids	Smoothed but most of E rough from abrasion	E black-brown with buff patch; C & I dark brown	Patch of thin black encr or staining on one surviving area of E	3	9.3.6	N	79	Belly sherd from large pot with fairly hard but laminar, gritty fabric, comparable to the gritty non-corky E/MN sherds. Lamination may be partly due to use of pot for cooking, which would also explain buff patches on E. Prob same pot as Cat 620 (81.247) and may well be from rounded base.
617	80.17	DI	315	?E/MN	Non-	1	8	30.7	20.9	10.8	Body	N	4	Smoothed	E & C	Thin bl	3	9.3.	N	79	Belly sherd from a

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
	4				corky/ Heb Inc										dark red-brown; I black	encr on I		6			large pot with hard sandy-gritty fabric; grittier than most of the E/MN Non-corky sherds and slightly grittier than the grittiest Heb Inc sherds, but could belong to either category. If latter category, would be from undecorated part of pot.
618	80.065	DI	318.3	?E/MN	? Heb Inc	1	16	40.0	34.0	10.4	Body	N	4a	I poss slipped but both surfaces uneven (E abraded), with inclusions protruding and with socket for burnt-out organic inclusion on E	E med brown; C dark grey; I dark grey-brown	None	3	9.2.12	N	79	Belly sherd from large pot with hard, very gritty fabric; most of E abraded off. Grittier than E/MN non-corky and Heb Inc sherds, but could conceivably belong to Heb Inc category, as a particularly hard and gritty version; would be from undecorated part of pot.
619	80.065	DI	318.3	Prob E/MN	Prob Heb Inc	1	2	16.9	18.7	7.6	Body	Y	3 but sl soft	Smoothed	E med brown; C & I med grey-brown	Hint of blackish staining on I	3	9.2.12	N	79	Small sherd from thin-walled, fairly fine pot with shallow incised and jabbed decoration on E: 2 incised lines converging on oval stab-mark. Most likely to be from fine Heb Inc bowl.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
620	81.247	DI	360	Prob E/MN	Non-corky	1	14	54.1	34.2	10.2	Body	N	4 with a few corky voids	Smoothed	E blackish-brown; C dark brown & dark grey; I med brown, sl reddish	None	3	9.4.3	N	79	Belly sherd from large pot with hard, gritty fabric; probably same pot as Cat. 616 (80.154) and may well be from rounded base. Virtually all of E had spalled off.
621	81.247	DI	360	?E/MN	Non-corky/Heb Inc	1	18	42.7	33.8	12.3	Body	Prob N	3 with some large voids& numerous mica flecks	Smoothed	E light brown & buff; C dark grey; I blackish-brown	None	3	9.4.3	N	79	Belly sherd from large pot with hard fabric; diam at this point c 190, but may be from low on belly. Several irregular-ly shaped depressions on E may well be void for lithic inclusions, rather than decoration.
622	81.246	DI	374	Indet ; ? Chalco/ EBA or later	Indet; ?? dom Beaker	1 + crbs	13	38.0	47.7	8.1	Body (? base)	N	3	E & I prob slipped but uneven	E dark brown; C & I blackish-brown	Patches of thin bl-brown encr on E & I	3	9.3.16	N	79	Large sherd, either from wall or possibly flat base of large cooking pot; fabric slightly soft and friable. Flatness of E suggests that this may be from a flat base; if it is, then might possibly be from domestic Beaker, although surfaces seem a little uneven for that; pot may be later than that.
623	81.246	DI	374	Prob E/MN	Corky	1	21	50.8	40.1	10.2	Body	N	1 (corky and sl gritty)	Smoothed	E dark brown with	None	3	9.3.16	N	79	Large belly sherd from large pot with fairly

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															lighter brown patches; C blackish-brown; I dark brown						hard, corky yet slightly gritty fabric; diameter at this point c 220
624	81.246	DI	374	?E/MN	Corky	1	10	38.2	27.4	12	Body	N	1; hard	I smoothed; E uneven as abraded	E orange-buff; C dark grey; I blackish	None	3	9.3.16	N	79	Belly sherd from large pot; fabric corky but harder than 'standard' E/MN corky pottery. At least one possible cereal impression in core. Tentative ID as E/MN
625	81.246	DI	374	?E/MN	Corky	1	1	18.2	12.8	7.7	Body	N	1, soft	Smoothed	E mid grey-brown; C buff; I reddish-buff	None	3	9.3.16	N	79	Small, heavily-abraded and possibly burnt sherd; friable, soft, slightly corky fabric. May be E/MN Corky pottery
626_630	80.036	FVIII	613	?E/MN	Non-corky	5 (incl 2 x 2 refitted)	5 (3,2, <1)	32.5	21.7	5.8*	Body	N	4	Smoothed	Blackish-brown throughout	Thin bl encr on I	3	11.8.1	N	79	Thin spalls (including 2 x 2 refitted) from belly of gritty cooking pot; E spalled off. Friable. Could be E/MN non-corky
631	80.001	G1	1306	Prob E/MN	(slightly) corky	1	6	26.4	25.7	10.0	Body	N	1a	Smoothed	E buff & red-brown; C med grey; I dark grey	Microscopic traces of thin bl encr on I	3	13.2.1	N	79	Belly sherd, prob from fairly large pot; laminar, minimally corky fabric, not very hard. E prob burnt from use as cooking pot. May well be E/MN. Context

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					formerly known as 606
632_635	80.002	G1	1306	Prob E/MN or ? Chalco/ EBA	Non-corky or ?dom Beaker	4 (incl 3 refitted)	6 (6, <1)	34.0	30.0	5.3*	Body	N	3	Smoothed	C dark brown & med brown; I blackish-brown	Small patches of v thin bl-brown encr on I	3	13.2.1	N	79	3 sherds refitted; dimensions & weight based on refitted sherds. Spall from large pot of fine fabric; most likely to be E/MN but can't rule out possibility of dom Beaker
636_637	80.004	G1	1306	Prob E/MN or ? Chalco/ EBA	Non-corky or ?dom Beaker	2	4 (3,1)	23.4	17.1	8.6	Body	N	3	Smoothed	E & part of C light brown; rest of C & I blackish	Bl encr on I	3	13.2.1	N	79	Belly sherds from thin, fairly fine pot; could be either E/MN non-corky or dom Beaker. Possibly from same pot as Cat. 638 even though thinner; could be from different part of a large pot of variable wall thickness
638	80.005	G1	1306	E/MN or ? Chalco/ EBA	Non-corky or ?dom Beaker	1	9	30.5	30.9	10.9	Body	N	3	Smoothed but inclusions protrude through E	E & part of C light brown; rest of C & I blackish	Bl-br encr on I	3	13.2.1	N	79	Belly sherd from large pot, poss same pot as Cat. Nos 636–7, even though thicker; may be from lower belly. Cooking pot.
639	80.005	G1	1306	Prob Chalco/ EBA	Prob fine Beaker	1	1	15.8	12.4	6.5	Body	N	3	Smoothed	E light brown; C & I black	Thin bl encr on I	2	13.2.1	N	79	From thin fine pot, most prob fine Beaker
640	80.006	G1	1306	Prob E/MN	Non-corky but see	1	14	47.6	42.1	8.5	Belly	N	3 but with a few	Smoothed; E has voids	E light to dark brown;	None	3	13.2.1	N	79	From cluster of 24 sherds (plus frags and crumbs) from 3 or

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
					comment								corky voids		C dark grey & dark reddish-brown; I dark grey-brown						more pots, weighing 126 g overall. Prob from bottom of belly of large, round-based E/MN pot; most of I spalled off. Colour suggests had been used for cooking. Hackly fracture. One large angular lithic inclusion 7.4 x 6.7; otherwise a very few corky voids, plus hollows from burnt-out grass or similar organic material on E.
641_648	80.006	G1	1306	Prob E/MN	Non-corky	8	28 (7,7,5,3,3,2,1,1)	32.4	17.8	10.2*	Body	N	3	Smoothed - I wet-smoothed or slipped - but E uneven: abraded, and inclusions protrude	E light brown; C blackish; I bl-brown	Tiny patch of thin bl encr on I of 1 sherd	3	13.2.1	N	79	From cluster of 24 sherds (plus frags and crumbs) from 3 or more pots, weighing 126 g overall. Mostly spalls from belly of large pot; where both surfaces present, Th is 11. Poss >1 pot represented. Could be E/MN
649_670	80.006	G1	1306	Prob E/MN	Non-corky	15S (incl at least 5 conjoining), 7F, crbs	84 (46,10,7,6,5,5,2,2,2,<1)	70.0	63.3	13.1*	Belly	N	4 with a few corky voids	I smoothed; E uneven: abraded, and inclusions protrude	E light brown; C & I bl-brown	Bl encr on I	3	13.2.1	N	79	From cluster of 24 sherds (plus frags and crumbs) from 3 or more pots, weighing 126 g overall. Conjoining sherds not refitted so as to avoid contaminating them for future lipid analysis. Dimensions and weight given for the 5 conjoining

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					sherds overall. Belly sherds from large, thick-walled cooking pot, sl. Friable. Could well represent coarse end of E/MN non-corky ceramic spectrum
671	81.351	HII	730	Prob Chalco/EBA	Prob dom Beaker	1	4	21.2	25.8	9.4*	Body	Poss	3a	Smoothed	E buff; C buff & grey-buff; I light grey	None	3	12.6.4	N	79	From fairly fine pot, possibly from carination area; possible decoration = shallow incised 'V' on E. Virtually all of I spalled off, leaving tiny area of I; much of E also spalled off, along joint.
672	81.351	HII	730	Prob Chalco/EBA	Prob fine Beaker	1	2	17.3	19.8	6.2	Prob car	N	3 but soft	Smoothed	E & I pale buff; C buff & grey-buff	None	3	12.6.4	N	79	Gentle carination plus adjacent parts of neck and upper belly of very thin, very fine pot, prob fine Beaker. Very sparse sand grain inclusions. May well be burnt (hence colour and softness of fabric)
673_674	80.018	AII	002	Prob Medieval or later	-	4 (incl 3 refitted)	12 (10,2)	41.9	25.9	8.9*	Body	N	3a	I smoothed, with fine wiping striations	C buff & light grey; I mid-grey	None	3	6.2.2	N	80	3 sherds are refitted (note: unique Cat. No not here given to each sherd); dimensions & weight are of refitted version. Distinctive fabric and colour, not exactly matched elsewhere in Calanais assemblage. Not wheel-thrown but likely to be Medieval or post-Med.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
675	80.020	AI	001	Indet; prob post-EBA	Indet	1	11	48.1	29.5	6.7	Body	N	3a	Smoothed	Dark brown through out, with blackish areas on I	Poss that blackish areas on I could be from staining from pot contents	3	6.2.2	N	76 Unc	Belly sherd from a medium-sized, thin-walled, fine and hard-textured pot; diam at this point est c 180. Recent diagonal scratch on I. Of comparable thickness to Beaker but harder; most likely to be post-EBA, possibly significantly later. Found 3.5.80
676	81.493	BIWX	871	?E/MN	Non-corky	1	9	25.2	30.8	12.2	?Rim	N	3	I fairly smooth; E abraded & uneven	E grey-buff & light brown; C mid-grey; I light brown	None	3	7.18.1	N	76 Unc	Possibly neck and rimsherd from large, relatively thick-walled pot; ERD poss c 210, but sherd too small to be sure. If it is a neck & rimsherd, rim prob rounded and gently everted. Poss at thick, relatively coarse end of E/MN repertoire. PJA 'adds Finds book has Area as simply 'B' but Area of 871 is BIWX.'
677	80.192	BI	149	? Chalco/ EBA	?fine Beaker	1	1	16.3	14.6	5.0*	?Rim	N	3	I smoothed; some bag pol; E spalled off	C & I blackish-brown	None	3	7.2.9; 7.6.8	N	76 Unc	Possibly a rim from a thin fine Beaker; E spalled off and rim top abraded, but seems to be gently squared-off, upright or minimally everted rim, whose top slopes inward.
678	81.450	BI	814	?E/MN or Chalco/ EBA	Non-corky or dom Beaker	1	13	41.5	30.1	9.6	Body; poss car	N	2 but mica not v abundan	E & I slightly uneven; on I, due	E & I med-brown & grey-	None	2–3	7.8.8	N	76 Unc	Belly sherd from medium-sized pot (diam at this point c 180); part of E spalled

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
													t	to abrasion	brown; C dark brown (obscured by sediment)						off, prob along joint line. Change of slope along one edge of E may indicate presence of gentle carination, but sherd is abraded at this point. If it is carinated, could be either E/MN or dom Beaker.
679_680	81.442	BII	850	?E/MN	Non-corky	2 refitted	5	26.4	25.1	7.6	Body	N	3	E abraded; I partly obscured by encr, but smoothed	C dark grey-brown; I blackish-brown with light brownb patches	Blackish-brown encr on I	3	7.10.5	N	76 Unc	2 refitted and heavily-abraded sherds from belly of cooking pot; deep hollow on E surface of core not necessarily the bottom of a stab impression. Could be E/MN
681_682	81.412	BIII	112	? E/MN	Non-corky	1 & 1F	3	17.3	16.9	9.8*	Body	N	4 but not very hard	E abraded; I smoothed	C buff & dark grey; I dark grey-brown	Tiny patch thin blackish encr on I	3	7.2.6	N	76 Unc	Heavily abraded belly sherd of slightly gritty pot; could well be E/MN
683	81.451	BIII	112	E/MN or Chalco/EBA	Non-corky or dom Beaker	1	18	37.9	28.3	12.6	Body	N	3	E smoothed: I has hollows that may have resulted from smoothing process (dragging inclusions across clay)	E med brown; C dark grey-brown; Imed brown, reddish	None	3	7.2.6	N	76 Unc	Belly sherd from fairly large pot; diam at this point c 190. Hard, with mica or other sparkly flecks on E & I. Could poss be either E/MN non-corky or dom Beaker

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
684_687	81.451	BIII	112	?E/MN	Non-corky	4 & 1F	5 (4,1, <1 x 3)	24.4	23.3	9.3*	Body	N	2	Too abraded to tell	Yellow-buff through out	None	3	7.2.6	N	76 Unc	Burnt and heavily-abraded sherds; one (which conjoins with fragment) is a thin spall that resembles stone, but is probably pottery. On largest sherd, some sediment attaching, and much of one surface spalled off. Very soft and friable. This could be E/MN non-corky pottery but is too degraded to be certain; unlikely to be Beaker. Note: fragment not assigned a catalogue number.
688	81.423	BIV	865	Indet; ?? E/MN	Indet/non-corky	1	7	30.6	25.7	9.0	Body	N	3a	E & I sl uneven	E med brown; C & I black	None	3	7.16.2	N	76 Unc	Markedly hard and with very few inclusions. Cannot rule out possibility that it's non-corky E/MN but could be post-EBA; unlikely to be Beaker
689	81.306	BIWX	9999	?E/MN	?corky	1	3	25.2	19.4	6.4*	Body	N	1	Smoothed; low sheen on E either deliberate or due to bag pol	Dark greyish brown throuth out	None	3		N	76 Unc	I spalled off. Some large sockets in core from where organic inclusions have burnt out. Could well be E/MN
690	80.026	BIIISX	112	Prob E/MN	Non-corky/Heb Inc	1	3	24.3	19.2	7.1*	Body	N	4	Smoothed	C grey-brown; I med brown, slightly greyish	None	3	7.2.6	N	76 Unc	Abraded sherd; E spalled off. Fabric compatible with sherds of undecorated non-corky E/MN and with Heb Inc. Note:

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					'BV 1980 has been changed in the report to BIIISX to avoid confusion with the 1981 BV.
691	80.130	BIIISX	117	E/MN or Chalco/EBA	Corky/Beaker (fine or dom)	1	3	19.8	23.	8.6	Neck	N	1a	Smoothed	E med brown; C dark grey; I buff	None	3	7.4.2	N	76 Unc	Gently curving neck sherd ; abrasion along lower edge gives the impression of the presence of a gentle carination, although there may originally have been one. Could either be from a fairly fine E/MN pot, minimally corky, or else from a Beaker; in terms of thickness and fabric it would be intermediate between 'fine' and 'domestic' Beaker. Sherds from both types of Beaker have been found in the same layer. Note: 'BV 1980 has been changed in the report to BIIISX to avoid confusion with the 1981 BV.
692	80.130	BIIISX	117	E/MN or Chalco/EBA	Non-corky/dom Beaker	1	6	25.5	23.2	9.9	Prob neck	N	3	E & I slightly uneven	E light brown; C blackish ; I buff	None	3	7.4.2	N	76 Unc	Est diam at this point: c 210. Could be either E/MN non-corky or dom Beaker Note: 'BV 1980 has been changed in the report to BIIISX to avoid confusion with the

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					1981 BV.
693	81.524	BV	141	Prob Chalco/EBA	Prob fine Beaker	1	4	24.1	16.9	6.0	Body	N	3 but slightly sandy	Smoothed	E reddish-brown; C dark grey; I med grey-brown	None	3	7.8.3	N	76 Unc	Belly sherd from small, fine, thin-walled pot; diam at this point 110. From fine Beaker.
694	81.413	BV	160	? Chalco/EBA	?Beaker	1	2	23.5	15.4	5.7	Body	N	4	Smooth but inclusions protrude	E light brown; C med grey; I light grey	None	3	7.14.1	N	76 Unc	Uncertain whether this represents the full original thickness of the sherd; possible that the I had spalled off. If it is a thin pot, then is thin enough to be fine Beaker but fabric is rather gritty for that. Identification as Beaker is tentative.
695_696	81.422	BV	160	Indet; E/MN or Chalco/EBA	Corky or Beaker	2 & crb	3	15.3	17.9	8.0	Body	N	1a	Sl uneven; inclusions protrude	E & I buff; C dark grey	None	3	7.14.1	N	76 Unc	From thin-walled pot; either thin E/MN or Beaker (prob domestic)
697	81.438	BVWX	160.3	Indet; could be E/MN or Chalco/EBA	Indet	1	1	17.5	15.0	5.6*	Body	N	3	Smoothed	C grey-brown and dark grey; I grey-brown	None	3	7.14.1	N	76 Unc	Featureless spall
698	81.438	BVWX	160.3	Poss Chalco/EBA	Poss Beaker	1	2	17.0	13.2	8.0	Body	N	2	Smoothed; some inclusions protrude through E	E light brown; Cdark grey; I dark brown	None	3	7.14.1	N	76 Unc	Small, abraded belly sherd from thin-walled, probably fairly small pot, most likely Beaker – poss thin dom Beaker

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
699_703	81.376	BVSX	812.1	Indet; could be E/MN or Chalco/ EBA	Indet	4	3 (1,1, <1 x 2)	21.7	11.6	6.1*	Body	N	3	Smoothed	C mid grey; I or E grey-brown	None	3	7.12.1	N	76 Unc	Featureless spalls. Surviving surface of largest spall is curving, but it's unclear whether it's the I surface (eg from a belly) or the E (in which case it's from a neck). Note: an extra catalogue number added in error. Note (JAS: that note must have been added by PJA; it's unclear what is meant, as the catalogue numbering is OK.)
704	81.378	BVSX	812.1	E/MN or Chalco/ EBA	Non-corky or fine Beaker	1	1	17.8	15.0	5.5	Body	N	1a	Smoothed	E & I dark brown; C mid brown	None	3	7.12.1	N	76 Unc	From small, very thin-walled and fine pot. Could be very fine E/MN but perhaps more likely to be fine Beaker
705	81.428	BVSX	812.1	Prob E/MN	Corky	1	6	32.2	25.7	7.4	Body	N	1	Smoothed but sl uneven	E mid-brown, black at edge where surface abraded; C blackish; I light brown	None	3	7.12.1	N	76 Unc	Belly sherd from large pot. Most of I spalled off along near-vertical ring joint. Burnt-out grass impression on E
706	80.181	DI	315	Prob Chalco/ EBA	Prob dom Beaker	2 (refitted) & 2F & 2 crbs	3	28.8	23.7	4.1*	Neck	N	1a	Smoothed	E blackish, with bl-brown encrustation;	Fairly thick black-brown encr on E	2	9.3.6	N	76 Unc	Spalls (of which 2 are refitted) from gently-curving neck of fairly large pot, most probably domestic Beaker; cooking pot.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															Cmed grey & med brown						Had previously been mis-numbered as 81.121 in Cat. Now accidentally given just one Cat. No, rather than 4. Finds Book records this from the base of 315.
707_708	81.234	DI	315	E/MN or Chalco/ EBA	?corky or dom Beaker	2	3	20.7	10.9	9.9*	Body	N	1 (but see comment)	Smoothed	C med grey; I dark brown	None	3	9.3.6	N	76 Unc	Small abraded sherd, with E spalled off; perhaps more likely (from fabric) to be E/MN than Beaker. Although closest in fabric type to 1 (corky), it's only minimally corky. One small frag charcoal also present and now bagged separately
709	80.125	DI	318.3	E/MN or Chalco/ EBA	Corky or dom Beaker	1	8	35.3	27.4	9.2	Body	N	2	Smoothed but E sl uneven	E light brown; C med grey; I med grey-brown	None	3	9.2.12	N	76 Unc	Belly sherd from large pot; diam at this point c 250. Could be either E/MN or dom Beaker; perhaps more likely to be former.
710	81.235	DI	320	Prob E/MN	Non-corky	1	9	34.6	28.8	7.1	Body	N	3	Sl uneven E & I	E buff and med brown; C dark grey-brown; I blackish-brown	Blackish encr on I	3	9.3.12	N	76 Unc	Probably from lower part of belly of fairly large, round-based E/MN cooking pot
711	80.222	DI	326	Prob E/MN	Non-corky	2 refitted	7	37.1	29.7	7.8*	Body	N	3	Smoothed	C light grey; I	None	3	9.2.	N	76 Un	2 refitted sherds (but only given one Cat.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															med grey			13		c	No). Large spall from belly of fairly large pot, most probably E/MN round-based pot
712	81.259	DI	369	E/MN or Chalco/ EBA	Non-corky or dom Beaker	1	3	19.1	14.2	11.2	Body	N	3	Smoothed; some bag pol to I	E yellow-buff; C buff & light grey; I blackish	V thin bl encr on I	3	9.3.16	N	76 Unc	Small sherd from cooking pot (with E & C burnt); too small to be diagnostic, but could be either E/MN or dom Beaker
713	81.259	DI	369	Prob E/MN	Non-corky	1	1	19.9	16.1	5.2*	Body	N	2 but not rich in mica	I uneven from recent scratches	Pink-grey-brown through out	None	3	9.3.16	N	76 Unc	Small abraded spall; fabric and surface finish suggests more likely to be E/MN than Beaker
714	81.300	DI	376	Indet; could be E/MN or Chalco/ EBA	Corky or poss dom Beaker	1	6	25.4	25.2	6.8	Body	N	1 but minimally corky	Smoothed; E has harline cracking	Elight brown & light grey; C light to dark grey; I light to dark grey-brown	Small patch v thin blackish encr on I	3	9.3.14	N	76 Unc	Heavily abraded, burnt sherd from fairly small pot. Broken and abraded along ring joint.
715	80.032	DII	313	?E/MN	?corky	1	2	24.9	17.1	7.0*	Body	N	1 but minimally corky	Smoothed	C dark grey-brown; I blackish	Patch of thin bl encr on I	3	9.3.4	N	76 Unc	Small abraded sherd from cooking pot; E spalled off. May be E/MN
716	81.090	DV	344	Prob E/MN	corky	1	4	25.8	22.6	6.3*	Body	N	1 but minimally corky	Smoothed	C light grey-brown; I med brown	None	3	9.3.6	N	76 Unc	Abraded spall from belly of fairly large pot; E spalled off. May be E/MN
717	81.01	E	1108	Indet;	Corky/d	1	5	26.7	22.4	9.5	?neck	N	1 but	Smoothed	E	Bl encr	3	10.3	N	76	Possibly from neck of

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
	5			could be E/MN, Chalco/ EBA or later	om Beaker/ other								minimally corky		blackish; C dark grey; I light brown	on E (if sherd is neck)		.1		Unc	fairly large cooking pot (diam here c 210); nost of I spalled off and heavily abraded. If it is a neck sherd, then is most likely to be dom Beaker. NB: definitely from 'E', even though ASH had it as 'F' in her bag list and it appeared as 'F' in previous version of this Cat.
718	81.011	HI	707	E/MN	Heb Inc	1	6	23.2	31.7	10.7	Car	N	4	I smoothed; E abraded & inclusions protrude	E med brown; C dark grey-brown; I med grey-brown	None	3	12.4.1	N	76 Unc	Even though most of the E has spalled off, curvature of E indicates that this is a ridge-carination and inter-ridge hollow from a large ridged pot, Heb Inc ware. Diam at this point c 260
719	81.117	HI	707	E/MN or Chalco/ EBA	Non-corky or dom Beaker	1	5	27.5	17.5	9.0	Body	N	2	E & I abraded and incls protrude	E med grey-brown; C med grey; I grey-buff	None	3	12.4.1	N	76 Unc	Heavily abraded belly sherd from fairly large pot; diam at this point c 200
720	81.118	HI	707	Chalco/ EBA or E/MN	Dom Beaker or corky	1	5	23.0	21.8	9.0	Body	N	2 but corky voids fairly numerous	Smoothed but abraded	E & C buff & light grey, sl pinkish; I med and dark grey-brown, sl	Band of thin bl-brown encr on I	3	12.4.1	N	76 Unc	Heavily abraded belly sherd from cooking pot, with abundant mica. Other sherds with abundant mica tend to be from Beakers, so it is most likely that this is a domestic Beaker, although an E/MN date cannot be ruled

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															pinkish						out
721	81.063	HI	707	?E/MN	Non-corky	1	2	17.0	17.9	7.0*	Body	N	4	Incls protrude	C mid grey; I grey-brown	None	3	12.4.1	N	76 Unc	Heavily abraded spall from gritty pot; could well be E/MN
722	81.159	HI	743	Prob E/MN	Heb Inc	1	5	27.3	18.9	10.0	Body	Poss	2	Incls protrude	E light brown; C light grey-brown; I reddish-buff	None	3	12.10.4	N	76 Unc	Heavily abraded belly sherd with hint of one or more very shallow diagonal incised line on E, so likely to be Heb Inc
723	81.020	HII	708	Indet; ? E/MN	Corky	1	4	22.3	16.3	9.6	Body	N	3	Abraded	Mid-brown through out	None	3	12.2.8	N	76 Unc	Featureless, heavily abraded sherd; large parts of E spalled/abraded away, and has deep sockets from where lithic inclusions have fallen out. Could possibly be at coarse end of E/MN spectrum
724	81.039	HII	712	E/MN or Chalco/EBA	Non-corky/fine Heb Inc or fine Beaker	1	2	14.3	19.0	5.5	Body	N	3	Smoothed; E & I pol to low sheen	E & I dark brown; C grey-brown	Patches of thin bl encr on E	2	12.3.3	N	76 Unc	From thin, fine pot, either E/MN fineware (which could be undecorated or fine Heb Inc: cf. ASH 32–35) or fine Beaker
725	81.076	HII	728	Prob E/MN	Non-corky	1	2	18.9	18.1	8.3	Body	N	2	Had been smoothed; abraded	Dark grey-brown through out	None	3	12.5.2	N	76 Unc	Heavily abraded belly sherd; most of E & I abraded off. Most likely to be E/MN
726	80.050	BI	107	Prob E/MN	Corky	1	2	20.1	18.1	6.7	Body	N	1	Smoothed	C mid to dark grey; I dark	None	3	7.2.2	N	76 Unc ?	Abraded spall (E spalled off) from fairly fine pot; could well be

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															brown					EN	E/MN. PJA adds, 'In area of 120, enclosure' Found 13.5.80
727_728	80.057	BIN	130.1	E/MN	Non-corky	2	5 (4,1)	29.4	19.4	7.3	Body	N	2 but mica not v abundant	Smoothed; E slightly pocked from loss of inclusions	E light brown, sl pink-grey; C light to dark grey; I dark grey	Patches of v thin blackish encr on I	2	7.10.2, 7.5.11	N	76 Unc ? EN	Belly sherd from fairly thin-walled, fine cooking pot Found 10.5.80
729	80.138	BIN	131	E/MN	Corky	1	9	33.6	25.7	11.1	Body	N	1 but minimally corky	Smoothed; E pol to low to med sheen	E med to dark brown; C dark grey; I med brown	Patch of thin bl encr on E	3	7.7.1	N	76 Unc ? EN	Belly sherd from fairly thick-walled but fine pot with polished, micaceous E; most likely to be from a fine, E/MN round-based pot. Minimally corky. One fairly deep oval socket on E may be from burnt-out seed (prob not cereal grain); second, shallower oval depression on E. Found 22.5.80
730	80.138	BIN	131	E/MN or poss Chalco/EBA	Corky or poss fine Beaker	1	1	16.6	16.3	4.9*	Prob neck & carination or rim	N	2 but sl soft	Smoothed	E dark brown; C med grey; I med brown	None	3	7.7.1	N	76 Unc ? EN	Small sherd from thin-walled, fairly fine pot despite presence of a couple of relatively large lithic inclusions. Hard to identify confidently due to absence of most of I, spalled off and heavily abraded; there is just a tiny

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					patch of what could be the I surface, and if it is, this suggests that the sherd is more likely to be from the neck and rim (in which case it would be an E/MN fine pot, with an upright, outward-sloping rim) than the neck and gentle carination (of an E/MN pot or a fine Beaker). One other possibility – less likely – is that it is from an E/MN rim flange. On balance, it seems most likely that this is of E/MN date, as ASH had suggested. Found 21.5.80 See also Cat. 729 for comment from PJA regarding context.
731	80.139	BII	123	E/MN or poss Chalco/ EBA	Corky or poss dom Beaker	1	3	28.9	24.6	6.0	?neck	N	1 but minimally corky	Smoothed (but sl undulating E) & prob pol to low sheen on E, but also some bag pol on E & I	E blackish-brown; C med grey-brown	Small patches thin bl-brown encr on E	2	7.16.6	N	76 Unc ? EN	Spall (with I spalled off), prob from neck of large pot (diam at this point est c 230); could well be a fine E/MN pot. Cannot rule out the possibility that it is from a fairly finely finished domestic Beaker. Found 21.5.80
732	80.139	BII	123	Chalco/ EBA or ?	Beaker or ? non-	1	4	25.6	24.8	6.1	Body	N	1a	Smoothed but E sl rough	E & I dark grey-	None	3	7.16.6	N	76 Unc ?	Puzzling as E is flat whereas I is slightly curved; might be from

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
				E/MN	corky										brown; C dark grey (concealed by sediment)					EN	a base of a thin but not especiallyfine Beaker. Fabric and finish comparable with that seen on E/MN sherds, but curvature is hard to reconcile with an E/MN date. Found 21.5.80
733_734	81.435	BIV	877	?E/MN and ? Chalco/EBA	Corky and ? dom Beaker	2	9 (4, 4)	26.3	21.8	6.8	Body	N	2	Smoothed but abraded and inclusions protrude	E & C buff; I sl reddish-buff	None	3	7.16.1	N	76 Unc ? EN	Not certain whether both sherds are from same pot, but both are probably burnt. One sherd narrows markedly, as if had been just above base of a flat-based pot (in which case it would be a dom Beaker). Both are too small to be diagnostic Found 27.5.81
735	81.454	BIVWX	885	?E/MN or Chalco/EBA	Non-corky or dom Beaker	1	3	21.3	16.4	8.4	Body	N	3	Smoothed; low sheen on I relates to labelling of sherd	E buff; C buff & light grey; I light brown	None	3	7.15.9	N	76 Unc ? EN	Small abraded sherd from fairly fine pot, lighter in colour than most of the E/MN and Beaker pottery; could be from a fairly fine E/MN pot or a relatively fine domestic Beaker. Found 3.6.81
736	81.454	BIVWX	885	Prob Chalco/EBA	Prob fine Beaker	1	1	13.5	13.7	6.9	Body	N	3	Smoothed	E light reddish-brown; C light grey; I light grey-brown	None	3	7.15.9	N	76 Unc ? EN	Small sherd from thin fine pot, most likely to be fine Beaker. Like Cat. 735, paler than most E/MN and Beaker pottery but not necessarily burnt. Found 3.6.81

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
737	81.190	BV	810	E/MN	Corky	1	2	21.3	12.2	8.6	Prob rim	N	1 but minimally corky, and soft	Smoothed	E light orange-brown; C buff & light grey; I light grey	None	3	7.12.1	N	76 Unc ? EN	Burnt sherd, broken and abraded along ring joint and with most of E spalled/abraded off. Probably from a rim (in which case it would have been rounded and minimally everted) but the presence of a hollow along its top suggests that the sherd had extended further than its present limit
738_740	80.064	FV	615	Poss E/MN	Non-corky	2 & 1F	7	27.0	29.0	11.2*	Body	N	3	Smoothed	E med brown; C light brown & dark grey	None	3	11.8.1	N	76 Unc ? EN	Could be from large E/MN pot; I spalled off and abraded. Abrasion to ring joint along one edge gives the false impression of the presence of a carination. Found 15.5.80
741_742	80.064	FV	615	Poss E/MN	Non-corky	2	3 (2,1)	27.0	29.0	11.2	Body	N	3	Smoothed but incls protrude through I	E & I med grey-brown; C med grey	None	3	11.8.1	N	76 Unc ? EN	From thin, fine, probably large pot; fabric slightly laminar, with part of the I having spalled off since excavation. Could be E/MN but too small to be diagnostic. Found 15.5.80
743	80.223	AI	001	? Chalco/ EBA or post-	?fine Beaker or indet	1	3	20.6	17.8	7.1	Body	N	3a	Smoothed	E med brown with thin black	Thin black stain in band across	3	6.2.2	N	76 Unc (? fine Bkr	Small sherd from thin, fine, prob fairly large pot. While this could be a fine (or fine domestic) Beaker, the

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
				EBA											stain; C & I mid-brown and grey-brown	E				)	other pottery from Area A looks to be post-EBA, so the possibility that this, too, is relatively late must be borne in mind
744	81.162	BV	813	Chalco/ EBA	Fine Beaker	1	3	15.1	22.5	6.0	Neck	N	3	Smoothed; E may have been pol to low or med sheen, but there is extensive bag polish	E blackish-brown; C dark brown; I med grey-brown	None	3	7.8.5	N	76 Unc (? fine Bkr)	Neck sherd from thin, fine, fairly small pot; diam at this point may be c 160. Most likely to be fine Beaker, although can't rule out possibility that it's from a very fine E/MN pot (cf ASH 32–35). Very similar to Cat. 747 Found 13.5.81
745	81.448	BV	812	Chalco/ EBA	Fine Beaker	1	2	17.3	14.5	6.1	Body	N	3	Smoothed	E dark grey-brown; C & I dark grey	None	3	7.12.2	N	76 Unc (? fine Bkr)	Small, very abraded sherd (with most of I spalled/abraded off) from thin fine pot, most probably fine Beaker. ASH had divided the contents of the 81.448 bag, putting one sherd in with 39 (because it clearly belongs to that pot) and leaving the other sherd and frag in her 'Unclassified (fine Beaker?) category Found 14.5.81
746	81.448	BV	812	E/MN	Heb Inc	1F	1	9.3	7.5	5.9*	Rim	Y	3	Smoothed	E light brown; C dark grey	None	3	7.12.2	Y	76 Unc (?	Fragment of rim of thin fine pot, originally suspected to

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																				fine Bkr)	be Beaker but actually more likely to be the tip of an E/MN rim flange, with incised diagonal lines on its top. Friable Found 14.5.81
747	81.676	BIII	9999	Chalco/EBA	Fine Beaker	1	2	18.5	19.0	5.9	Neck	N	1 but minimally corky	Smoothed; E prob pol to low sheen but extensive bag pol	E black-brown; C & I dark grey	None	3		N	76 Unc (? fine Bkr)	Curving neck sherd from thin fine Beaker; diam at this point c 150. Broken along ring joints at top and bottom, showing use of narrow ring/strap. Very similar to Cat. 744. Found 29.5.81
748	80.121	DI	315	Chalco/EBA	Fine Beaker	1	2	17.5	17.7	7.2	Neck	N	3	Smoothed; poss pol to low sheen E & I	Ereddish-brown; C dark grey; I med brown	None	2	9.3.6	N	76 Unc (? fine Bkr)	Small neck sherd from thin fine Beaker. Virtually free of inclusions but one large angular inclusion projects from core.
749	80.012	AI	001	Post EBA and could be Medieval or later	Indet	1	6	25.4	20.0	10.6	Body	N	3	E has trace of surface covering that looks like abraded glaze; I sl uneven	E dark brown with black coating; C & I orange-buff	Glaze-like material on E; is not organic residue	3	6.2.2	N	76 Unc (? domBkr)	Small, abraded belly sherd; diam at this point c 170. The external coating and the texture is not characteristic for domestic Beaker, and since the other pottery from Area A looks to be post-EBA and possibly relatively recent, this may well be too. Not wheel-thrown. Found 1.5.80

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
750_751	81.392	BVSX	141	Poss Chalco/EBA orE/MN	Dom Beaker or corky	2	10 (9,1)	32.1	32.6	11.5*	Body	N	1	Smoothed but E pocked by corky voids	E med brown; C light grey	None	3	7.8.3	N	76 Unc (? do mB kr)	Either neck of large domestic Beaker or belly of E/MN pot; given that both fine (ASH 39) and dom (ASH 79) Beaker have come from the same context, it's quite possible that this is a dom Beaker. If it is a neck, diam at this point c 200. I spalled off and abraded. Found 1.5.81 Note from ASH in bag says 'Beaker sherd of B3 with these' – but this probably refers to the sherd from ASH 39 that shares the same Small Find No.
752_755	81.392	BVSX	141	? Chalco/EBA or ? post-EBA – poss 1st millennium AD?	Dom Beaker or much later pot type	4 (incl 2 refitted)	9 (7, 1,1)	28.3	25.4	11.9	Body	N	2	Smoothed (but I rough); E poss pol to low sheen but also bag pol	E med brown; C med grey; I med grey-brown	None	3	7.8.3	N	76 Unc (? do mB kr)	From very large pot; diam at this point could be as large as c 320. Distinctive tongue and groove ring joint shown by socket for missing ring. (Sherd had split vertically from the top of this joint, and had been refitted.) This is a technique NOT seen in the other Calanais Beaker pottery but IS known from much later, post-Roman Iron Age 'Plain Style' Hebridean pottery.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					However, given the presence of fine and domestic Beaker pottery in this context, the possibility that this is a domestic Beaker cannot be ruled out. From same pot as Cat. 756 and Cat. 759–761 Bag says 1.5.80 as find date but this is a 1981 find; no date for it in Finds Book but finds entered near to it in the Finds Book range in date from 9 to 25 May 1981
756_757	81.425	BVSX	812.1	? Chalco/ EBA or post-EBA – poss 1st millennium AD?	Dom Beaker or much later pot type	1	14	37.2	34.5	11.4	Body	N	2	E smoothed and pol to low sheen; I rough	E med brown; C med grey; I med grey-brown	None	3	7.12.1	N	76 Unc (? do mBkr)	From same pot as Cat. 752–755 and 759–761. Had split vertically and been refitted. Not a tongue-and-groove joint but clearly from the same pot
758	81.616	BV	160	? Chalco/ EBA	?dom Beaker	1	6	26.2	21.7	9.0	Body	N	1a	Smoothed but some inclusions protrude	E med to dark brown; C dark grey; I med brown	None	3	7.14.1	N	76 Unc (? do mBkr)	Body sherd, flat on E and slightly curving on I. Might be from a flat base but too small to be diagnostic. Could be dom Beaker; can't rule out possibility of a later date
759_761	81.238	DI	369	? Chalco/ EBA or	Dom Beaker or much later pot	3	10 (8,1, 1)	31.0	25.4	10.1	?Neck & body	N	1	E smoothed and poss pol to low	E med brown; C & I med	None	3	9.3.16	N	76 Unc (?	May well be from same pot as Cat. 752–757, but from

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
				post-EBA – poss 1st millennium AD?	type									sheen; I rough	grey-brown					do mB kr)	narrower part of pot; est diam at this point c 270. Smallest sherd has broken along joint line, leaving narrow hollow as if from tip of tongue-and-groove joint
762_764	81.238	DI	369	Indet	Indet	2 & 1 F & crbs	5 (4,1, <1)	26.3	17.9	11.0*	Body	N	1a but soft	I abraded	CBuff-light brown through out	None	3	9.3.16	N	76 Unc (? do mB kr)	Featureless body sherds, burnt; soft and friable. Impossible to identify as to date.
765	81.255	DI	376	Prob Chalco/ EBA	Prob dom Beaker	1	6	25.6	21.1	10.5	Body	N	2	Smoothed	E dark grey-brown; C & I pinkish-brown	None	3	9.3.14	N	76 Unc (? do mB kr)	Belly sherd, broken along joint line; diam at this point c 200. Could well be dom Beaker
766	81.255	DI	376	E/MN or Chalco/ EBA	Corky or dom Beaker	1	4	24.1	22.2	9.9*	Body	N	1 but minimally corky	Smoothed	C med grey; I blackish	Thin black encr on I	3	9.3.14	N	76 Unc (? do mB kr)	Abraded spall from belly (E spalled off) of cooking pot. AS likely, if not more so, to be E/MN than dom Beaker
767	81.461	BI	100	E/MN or Chalco/ EBA	Corky or dom Beaker	1	3	18.6	15.9	9.7	Body	N	1 but minimally corky	Smoothed	Light brown through out	None	3	7.2.4	N	76 Crb	Minimally corky, and with one large buff fine-grained inclusion 5 x 4.5
769_770	81.636	BI	107/100	Prob E/MN	corky	2	2 (2, <1)	21.8	16.2	9.3*	Body	N	1 but minimally corky	Smoothed	C buff & mid-grey; I mid grey-brown	None	2	7.2.2	N	76 Crb	Spall from belly of pot with laminar, minimally-corky fabric; not certain whether second sherd if from same pot.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					Laminar like E/MN sherd Cat. 55 (ASH 11)
771	80.145	BIII	142	Chalco/ EBA	Fine Beaker	1	1	15.9	13.8	5.6	Neck	N	3	Smoothed	E med brown, sl reddish; C & I dark grey	None	3	7.10.8	N	76 Crb	Small neck sherd from fine Beaker; probably a fairly small pot, but sherd too small to estimate diameter. One frag charcoal in bag; now bagged separately. Found 23.5.80. PJA adds 'Finds Book does not record Area but it must be BIII.'
772_777	80.052	BI	112	Indet; ? E/MN	Non-corky	4 (incl 2 refitted)& 2F	1 (1, <1 x 5)	15.8	13.8	4.8**	Body	N	1a	Smoothed	E Blackish-brown; C dark grey & dark grey-brown	None	3	7.2.6	N	76 Crb	From fine but laminar pot; could well be E/MN. Short linear socket for bunt-out organic on 1 sherd should not be confused with decoration
778_780	80.053	BI	112	?E/MN	Non-corky	1& 2F & crbs	2 (2; rest <1)	15.7	17.6	8.1	Body	N	3 but soft as burnt	Abraded	E buff; C light to med grey	None	3	7.2.6	N	76 Crb	Very soft & friable; burnt. Most likely to be E/MN but too degraded to be diagnostic. Note: 2 of the crumbs are actually fragment-sized (ie >5mm) but not given Cat. Nos of their own.
781_783	80.167	BI	165	Prob E/MN	Corky	2 & 1F & 1 crb	2 (1,1, <1)	16.9	17.0	6.2*	Body	N	1	Smoothed (but pitted)	C med grey-brown; I light brown	None	2	7.4.17	N	76 Crb	Spalls from pot with laminar fabric, most likely to be E/MN. Found 24.5.80

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
784	81.164	BI	810.1	E/MN or Chalco/ EBA	Non-corky or dom Beaker	1	4	24.6	22.7	6.7*	Body	N	1a	Smoothed; low polish on parts of I prob due to bag pol	Clight brown; I blackish	Patch of v thin blackish encr on I	3	7.12.2	N	76 Crb	Abraded belly spall from cooking pot. Found 13.5.81
785	81.309	BIWX	852	E/MN	Heb Inc	1	2	18.4	17.7	6.4*	Body	Y	3	Smoothed	E dark brown; C dark grey-brown	None	3	7.5.2	N	76 Crb	Spall, probably from fairly large pot, with laminar fabric; may have broken along ring joint. One shallow linear incision on E; horizontal if, as suspected, sherd had broken at top along ring joint.
786	81.417	BIWX	852	E/MN	Corky	1	3	26.3	22.8	8.5	Body	N	1	Smoothed; some bag pol	E dark brown; C as E, and grey-brown; I blackish-brown	None	3	7.5.2	N	76 Crb	Belly sherd One natural pebble present. Original find bag labelled 'find No 4'.
787_789	81.617	BIWX	855	E/MN	Corky	3	2 (1,1, <1)	15.0	15.1	6.8	Body	N	1	Smoothed but pitted	E & I med brown; C dark grey	None	3	7.5.2	N	76 Crb	From thin, fine corky pot of laminar fabric; friable. Found 22.5.81. 'Find No 10'
790_793	81.465	BIWX	855	E/MN	Corky	2 refitted & 2F & crb	1 (1, <1)	20.5	15.2	5.2*	Body	N	1	Smoothed but pitted & inclusions protrude	C dark grey, I dark grey-brown	None	2	7.5.2	N	76 Crb	Spalls from fine corky pot with fairly abundant mica flecks and laminar fabric. Dimensions and weight are those of refitted sherds. Bag says 'slot fill'. Found 26.5.81

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
794_795	81.072	BIWX	117	E/MN or Chalco/ EBA	?corky or Beaker	2	<1 (<1 x 2)	10.4	8.0	3.9	Body	N	1a, soft	Smoothed	B buff through out	None	3	7.4.7	N	76 Crb	Two small, abraded sherds, too small to be diagnostic but could be either E/MN or Beaker.
796	81.088	BISX	107	E/MN or Chalco/ EBA	Corky or dom Beaker	1	2	17.1	18.2	7.6*	Body	N	1 but minimally corky	Smoothed	C mid grey; I dark brown	None	3	7.2.2	N	76 Crb	Belly sherd, prob from small pot; E spalled off.
797_801	81.388	BIN	131	E/MN or Chalco/ EBA	?corky or ?fine Beaker	5	4 (1,1, 1,<1 x 2)	15.7	13.5	7.1*	Body	N	1a	Smoothed but abraded	E med brown; C dark grey	None	3	7.7.1	N	76 Crb	Abraded spalls; could be either E/MN or Beaker. Note: one piece (shiny, with black mineral fragments) might be rotten stone rather than pottery. Area given as BII on original find bag. Found 13.5.81
802	81.192	BII	112	E/MN or Chalco/ EBA	Non-corky or dom Beaker	1	4	27.8	6.3	9.7	Body	N	3	Smoothed	E med brown; C & I blackish, with light brown patch on I	Thin blackish encr on I	3	7.2.6	N	76 Crb	Belly sherd from fairly small pot; diam at this point c 160. Hard fabric. Found 16.5.81
803	81.419	BII	112	Indet	Indet	1	<1	9.2	8.1	4.2**	?body	N	Indet	None visible	Med brown	None	3	7.2.6	N	76 Crb	Not definitely pottery; from context that had produced charcoal (including from this small find no: 2 pieces now removed from the pottery bag). If it is pottery, it's so abraded that it's impossible to say

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					anything about it.
804	81.453	BII	112	Indet	Indet	1	<1	12.4	7.9	2.7**	Body	N	1a?	No surface present	Mid brown, greyish in places	None	3	7.2.6	N	76 Crb	Small, abraded spall; wholly undiagnostic. 2 frags charcoal also in bag, now bagged separately. Found 28.5.81
805_807	81.069	BII	112	E/MN or Chalco/ EBA	Non-corky or dom Beaker	3	2 (1,1, <1)	18.6	10.7	5.3*	Body	N	3	Smoothed	E & I dark brown (on sherd with both surfaces), C dark grey	None	2	7.2.6	N	76 Crb	From thin-walled, fine pot; too small to be diagnostic. Found 6.5.81
808	81.084	BII	117	?E/MN	?non-corky	1	2	18.1	18.5	7.7	Body	N	2	I abraded	C light grey & buf; I light grey	None	3	7.4.10	N	76 Crb	Heavily abraded spall, burnt; could be E/MN but impossible to be sure
809	81.311	BII	130	?E/MN	Non-corky	1	2	19.6	14.0	7.0*	Body	N	2 but not abundant mica	Smoothed	C dark red-brown & mid-grey; I med brown	None	3	7.10.7	N	76 Crb	Abraded spall, stone-like; indet but could possibly be E/MN. Found 16.5.81
810_812	81.055	BII	803	?E/MN	Non-corky	3	<1 (<1 x 2)	12.5	9.8	3.1*	Body	N	3	Smoothed	E dark grey-brown; C dark grey	None	2	7.10.5	N	76 Crb	3 small spalls from laminar-fabric pot; could be E/MN but too small to be diagnostic. Found 4.5.81

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
813	81.441	BII	860	Indet	Indet	1	<1	12.5	7.4	4.7	Body; ??rim	N	Indet	Obscured by abrasion & sediment	E & I buff; C dark grey	None	3	7.10.7	N	76 Crb	Heavily abraded piece; either a rim (rounded, everted) from an exceptionally thin pot or possibly a piece of soft stone. Indet. Found 21.5.81
814_816	80.165	BIII	112	? Chalco/ EBA	?Fine Beaker	3 refitted	1	15.8	8.2	4.7	Prob neck	N	3	Smoothed	E reddish-brown; C mid grey; I dark grey	None	3	7.2.6	N	76 Crb	Small sherd, probably from neck of thin fine Beaker; laminar fabric. One sherd; had split into 3 spalls and now refitted. Found 27.6.80
817_826	81.460	BIII	112	E/MN	?Heb Inc	4S, 6F, crbs	3 (1, <1 x 9)	15.0	11.5	5.2*	Body; carination	N	2 but not mica-rich	Obscured by abrasion	E buff; C light grey	None	3	7.2.6	N	76 Crb	Small, mostly featureless spalls. Largest has curving E and fairly sharp carination: from carinated bowl or jar (or, less likely, ridged jar).Too small and degraded to be diagnostic. One piece of charcoal had also been in the bag; now separated out. Found 1.6.81
827	81.566	BIII	112	?E/MN	Non-corky	1	1	12.6	11.3	5.4*	Body	N	1a	Smoothed but inclusions protrude	Mid grey-brown through out	None	3	7.2.6	N	76 Crb	Heavily abraded spall (E spalled off); could be from E/MN but too small to be diagnostic. Found 13.5.81
828	80.055	BIII	121	Poss Chalco/ EBA	Poss fine Beaker	1	1	11.8	15.2	5*	Body	N	3	Smoothed; sheen on I is from	C dark greyish brown;	None	3	7.4.11	N	76 Crb	Small, heavily-abraded sherd from thin fine pot, possibly

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
														application of label	I blackish						fine Beaker. Found 10.5.80
829_831	80.177	BIII	142	?E/MN or ?? Chalco/EBA	Non-corky or ??dom Beaker	3	2 (1,1, 1)	15.3	11.6	4.9*	Body	N	3	Smoothed	Variable between the sherds; measured sherd: C med brown; I black-brown	Patches of very thin blackish encr on I	3	7.10.8	N	76 Crb	Two abraded spalls and sherd with both surfaces, not necessarily from same pot. Too small to be diagnostic. Found 23.5.80
832	81.085	BIII	142	Indet	Indet	1	1	13.7	10.9	6.7	Body	N	1a but no mica and soft	Abraded	E & I light orange-brown; C dark grey-brown	None	3	7.10.8	N	76 Crb	Small, heavily-abraded soft sherd, probably burnt, from thin, fairly fine pot. Too abraded to be diagnostic. Found 7.5.81
833_835	80.118	BIV	134	?E/MN	Non-corky	3 incl 2 conjoining	3 (2,1, <1)	18.4	18.1	7.0*	Body	N	2 but not mica-rich	Smoothed	Dark greyish brown through out	None	3	7.4.2	N	76 Crb	From laminar, friable pot; largest sherd is from belly, with gently-curving E. Could be E/MN. Found 19.5.80
836_840	80.127	BIV	139	?E/MN	?corky	4 + 1F +crb	5 (3,1, <1 x 3)	19.7	14.7	8.7*	Body	N	1 & 2	Smoothed	C grey-buff; I purplish-brown	None	3	7.6.1	N	76 Crb	Found 15.5.81. Bag says 'Pot from Mark's box S. side ditch'. From more than one pot; one sherd is thin (7.1). Largest sherd is of fabric 2
841	81.485	BIVWX	889	?E/MN or ?? Chalco/EBA	Non-corky or dom Beaker	1	1	17.5	11.5	8.0	Body	N	2 but not mica-rich	Obscured by sediment & abrasion	E light reddish-brown with creamy sediment; C	None	3	7.15.11	N	76 Crb	Small burnt sherd from fairly thin pot. Creamy-coloured sediment adhering to E is probably related to burning of sherd.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															dark grey & bright orange; I buff						Soft. Too small and abraded to be diagnostic.
842_844	81.458	BIVWX	887	E/MN	corky	3 cj	3 (2, 1, <0.5)	24.4	20.8	5.2	Body	N	1 but soft and minimally corky	Smoothed but pitted	E light brown; C + I dark grey	None	3	7.15.5	N	76 Crb	Heavily abraded and possibly scorched belly sherd; the 3 pieces conjoin but have not been refitted. Soft and friable. Found 1.6.81.
845	80.063	BIIISX	116	E/MN	Heb Inc	1	2	19.7	14.4	7.2	Body	Y	3a	Smoothed	E grey-brown; C med grey	None	3	7.4.2	N	76 Crb	Spall from hard, probably fairly large pot, broken along joint line; very faint incised line, prob horizontal, only visible under raking light. PJA adds: context given as 117/116 in Finds list. 116 is a mass of head-sized stones and 117 is the soil which overlies and fills it in BIII south extension, the small trench which cuts across the East Row near Stone 31. Found 14.5.80 PJA adds, 'from 117 amongst 116 head-sized stones'
846	80.061	BV	117	Prob Chalco	Beaker, Early International	1	1	10.2	9.7	7.0	Car	Y	3	Smoothed	E & I mid-brown; C dark grey	None	3	7.4.2	N	76 Crb	NB Belongs to ASH 38 (Cat. Nos 347–349, 351–352), AOC Beaker, and is now stored with ASH 38. Decoration: horizontal lines of

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					faint twisted cord on carination; one line slightly smudged. Found 15.3.80
847_855	80.061	BV	117	E/MN or Chalco/EBA	Non-corky or ?dom Beaker	4 & 5F	2 (1, 1, <1 x 7)	14.1	10.1	6.7*	Body	N (one has ?deco)	3	Smoothed	E or I dark grey-brown (light brown on one sherd); C dark grey	None	2	7.4.2	N	76 Crb	Spalls, indeterminate. One has parts of 2 depressions that may represent stab/incised decoration; too truncated to be sure. Found 15.3.80
856	80.070	BIIISX	139	?E/MN	Non-corky	1	1	15.4	17.3	8.0*	Body	N	3	Smoothed	C light orange-brown; I blackish	Black encr on I	3	7.4.2	N	76 Crb	Spall from belly of cooking pot; could well be E/MN. One frag charcoal in bag; now bagged separately (but mislaid). Found 16.5.80 PJA adds, 'Not ascribed to 139 in Finds Book but to M.H.B. 117; meaning of M.H.B unknown'
857_861	81.606	BV	837	Chalco/EBA	Beaker	5	1 (all <1)	16.0	8.5	5.8*	Body	Y (1 sherd)	3	Smoothed	E mid brown; C mid grey-brown	None	3	7.19.3	N	76 Crb	PART OF BEAKER ASH 48: all spalls, but one has faint shell-edge impression of the type seen only on ASH 48. Stored with the sherds from ASH 48. Frags of charcoal in bag are now stored separately. Found 14.5.81

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
862	81.430	BV	874	Prob Chalco/ EBA	Prob Beaker (fine or dom)	1	1	13.4	12.3	8.1	Body	N	2 but not abundant mica	Smoothed	E & I dark brown; C med grey	None	3	7.13 .2	N	76 Crb	Small abraded body sherd from fairly thin, fairly fine pot; may well be Beaker but cannot rule out possibility of E/MN non-corky. Found 23.5.81
863_864	81.618	BVWX	859	Indet	Indet	2F & crb	<1 (<1 x 2)	9.0	6.5	4.8**	Body	N	3 but soft	None visible	Bright orange-brown through out	None	3	7.3.1; 7.11 .5	N	76 Crb	Burnt and heavily-abraded fragments, wholly undiagnostic. Insofar as some of the E/MN pottery has been burnt, an E/MN date cannot be ruled out. Found 20.1.81
865_867	81.618	BVWX	859	E/MN or Chalco/ EBA	Non-corky or Beaker	3F & crb	<1 (<1 x 3)	9.0	6.2	2.5*	Body	N	3	Smoothed	One buff through out; onehas buff C and light grey-brown E or I; one is med grey through out	None	2,3	7.3.1; 7.11 .5	N	76 Crb	Featureless spalls; could be E/MN or Beaker but too small to be diagnostic. Found 20.1.81
868	81.486	BVWX	872	?E/MN	Non-corky	1	2	16.9	20.5	7.0	Poss rim	N	2 but soft	Smoothed but inclusions protrude	E buff & light grey; C dark grey; I buff	None	3	7.17 .2	N	76 Crb	Possibly a rim from a small, thin, fairly fine pot; ERD c 130 mm. Heavily abraded and probably scorched (hence surface colour

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					and softness), so it's hard to be sure whether this is actually a rim or a sherd that has broken and been abraded along a joint line. If it is a rim, it's upright and externally bevelled, sloping down from a peak. Found 5.6.81. PJA adds 'Ctxt number 872 does not belong in BVWX although stratigraphically identical green clay to BIWX 872 did occur there.'
869	81.137	BVSX	141	Chalco/ EBA	Fine Beaker	1	1	14.0	15.0	4.5	Neck	N	2	Smoothed	E & I med brown, sl reddish; C light grey	None	2	7.8.3	N	76 crb	Markedly curving neck from small, thin, fine Beaker with everted rim; broken along joint, so rim missing. Too small to estimate diameter at this point. Another sherd with the same Small Find No is in Beaker ASH 39, but Cat. 869 doesn't seem to belong to ASH 39. Found 9.5.81
870	81.383	BVSX	141	Prob Chalco/ EBA	Fine Beaker	1	2	20.2	13.3	6.6	Body	N	2	Smoothed but inclusions projecting	E med reddish -brown; C & I med grey	None	3	7.8.3	N	76 Crb	Belly sherd from small, thin fine pot; est diam at this point c 150. Fine Beaker but fine-gritty fabric

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
871	81.383	BVSX	141	E/MN or Chalco/ EBA	?Corky or fine Beaker	1	1	16.0	13.2	5.4*	Body	N	2 but not abundant mica and is sl soft	Smoothed	E med brown; C med grey	None	3	7.8.3	N	76 Crb	Abraded spall from either fine E/MN pot or fine Beaker
872_874	81.162	BVSX	813	?E/MN or Chalco/ EBA	Non-corky or Beaker	2 refitted & 1F	2 (2, <1)	21.4	16.0	5.8*	Body	N	3	Smoothed but long hollow where organic inclusions (?grass) has been burnt out	C buff & light grey; I grey-brown	None	3	7.8.5	N	76 Crb	2 sherds refitted; dimensions and weight given as refitted. Spalls from fairly fine pot; could be E/MN but can't rule out possibility that it's Beaker. Cf. Cat. 744, another SF 81.162, listed under 'ASH 76 Unclassified (?fine Beaker)'; that is probably from a fine Beaker, but not same pot as this. From 813 according to Finds Book, though the entry was hastily corrected from 812.
875_877	81.175	BV	812	E/MN or Chalco/ EBA	Non-corky or Beaker	3	1 (1, <1 x 2)	14.7	8.6	8.4*	Body	N	3 but soft	Smoothed	E & I (of sherd with both surfaces) mid brown; C mid grey	None	3	7.12.2	N	76 Crb	Small, heavily-abraded sherds; one is from thin fine pot, broken along ring joint. Too small to be diagnostic but could be fine E/MN or fine Beaker
878	81.193	BVSX	812.1	?E/MN or ?? Chalco/ EBA	?Non-corky or ??dom Beaker	1	2	19.8	10.9	12.7	Poss rim	N	3 but soft	Smoothed but inclusions protrude	Light brown to buff through out	None	3	7.12.1	N	76 Crb	At first sight this looks to be a base sherd (Beaker) but curvature and position

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					of fracture surfaces don't tally with that interpretation. More likely to be rim – everted and broken and abraded along a joint line – from an E/MN non-corky pot. Large fragment spalled off from one side.
879	81.373	BV	812	Prob Chalco/EBA	Prob dom Beaker	1	3	31.8	15.8	8.1	Body	N	4 but soft	Smoothed but heavily abraded & inclusions protrude	E pale grey; C dark grey; I light brown	None	3	7.12.2	N	76 Crb	Belly from small, fairly thin-walled pot with fine-gritty fabric; est diam at this point c 160. Most likely to be dom Beaker but can't wholly rule out possibility that it's E/MN
880	81.375	BVSX	812.1	Poss E/MN	Non-corky	1	3	19.6	22.5	7.1	Body	N	3 but fairly soft	Smoothed but heavily abraded	E buff C blackish-brown; I dark grey-brown	None	3	7.12.1	N	76 Crb	Heavily abraded belly sherd. E curves as if from a carination but narrows to a point so it's more likely that this is a sherd whose E has spalled along a curving joint plane. Poss E/MN but too small and abraded to be diagnostic
881_883	81.409	BVSX	812.1	? Chalco/EBA	?fine Beaker	1 + 2 F (F refitted)	1 (1, <1)	17.1	11.9	7.5*	Body, poss neck	N	3 but fairly soft	Smoothed	E med brown; C dark grey	None	3	7.12.1	N	76 Crb	Abraded body sherd and 2 refitted frags from fine, prob. fairly thin-walled pot. If the surviving surface is the E, then is from neck, probably of a fine Beaker. Original find

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					bag also says '15'. 1 piece natural stone . 1in bag; now bagged separately.
884_894	81.432	BVSX	812.1	Prob Chalco/ EBA; ?? E/MN	Prob Beaker (fine or dom); ?? non-corky	5 + 6F + crbs	7 (2,2, 2,1, rest <1)	13.9	23.7	6.6	Body	N	3	Smoothed	E & I dark brown; C blackish	None	2,3	7.12 .1	N	76 Crb	Small sherds from thin fine pot; could be fine or dom Beaker. Sherds too small to estimate diameter. Largest sherd: much of E spalled off along curving joint plane. Cannot rule out the possibility that it's E/MN non-corky pottery but most likely to be Beaker.
895	81.615	BVSX	812.1	Prob Chalco/ EBA	Prob Beaker	1	3	23.7	21.7	5.7	Prob base	N	3	Smoothed but E slightly pocked	E med brown; C dark grey	None	3	7.12 .1	N	76 Crb	Spall, probably from a flat base as E is very flat. If this is correct, then not E/MN and most probably from a Beaker (either fine or dom)
896	80.102	DI	315	Chalco/ EBA	Prob fine Beaker	1	1	18.5	13.0	7.0	Poss neck	Poss	1a	Smoothed	E black-brown; C dark grey; I mid-brown	None	3	9.3. 6	N	76 Crb	Small, heavily-abraded sherd from small fine pot, most probably fine Beaker; broken and abraded along diagonal joint. E has very gentle low ridge; probably not a carination but resembles the low horizontal cordon-like features seen on some other Calanais Beakers (especially ASH 49a, 49b and 51,

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					although it doesn't belong to these). Also cf. Cat. 918, 919.
897	80.151	DI	315	Prob Chalco/EBA	Prob fine Beaker	1	1	17.6	13.3	6.7	Body	N	1a	Smoothed	E & C blackish-brown; I dark brown	None	2	9.3.6	N	76 Crb	Small body sherd from small thin fine pot, most probably a fine Beaker, of slightly laminar fabric; part of E spalled off. Too small to estimate diameter at this point.
898	80.173	DI	315	Chalco/EBA	Fine Beaker	1	1	18.5	9.0	6.3	Body	N	1a	Smoothed	E light brown; C light to mid grey; I med-brown	None	3	9.3.6	N	76 Crb	Body sherd from small, thin, fine pot, broken and heavily abraded along joint. Diameter at this point c 150; most likely to be fine Beaker.
899	80.076	DI	315	Chalco/EBA or ? E/MN	Dom Beaker or non-corky	1	2	23.0	11.7	8.2	Poss base	N	4	Smoothed	E dark brown; C & I dark grey	None	3	9.3.6	N	76 Crb	Abraded sherd from fairly thin-walled pot with fine-gritty fabric. Flatness of E suggests it could be from a flat base, in which case it is most likely to be a fine or dom Beaker. If it's not from a base, then can't rule out the possibility that it's from a fine, non-corky E/MN pot.
900	80.077	DI	315	E/MN	Heb Inc	1	1	12.2	20.1	6.0*	Body	Y	3	Smoothed	E med brown; C dark grey	None	3	9.3.6	N	76 Crb	Spall; most of E and all of I spalled off. Shallow linear incision on E, of kind seen on Heb Inc pottery. Fabric consistent with Heb Inc.
901_909	80.092	DI	315	Indet; ?? E/MN	Indet	5 & 4 F & crbs	4 (1,1,	19.8	16.7	11.0*	Body	N	1a but soft	Smoothed	Variable;	None	3	9.3.6	N	76 Crb	Spalls, possibly from more than one pot;

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
							1,<1 x 6)								largest sherd buff through out						several heavily burnt. Too degraded and small to be diagnostic but can't rule out possibility of E/MN date
910	80.094	DI	315	E/MN or Chalco/ EBA	Non-corky or Beaker	1	1	18.7	9.5	7.0*	Body	N	4 (fine-gritty)	Smoothed but abraded	E med brown; C dark grey	None	3	9.3.6	N	76 crb	Small abraded sherd, sandy fabric. Could be Beaker (fine or dom) but can't rule out possibility of it being E/MN
911	80.098	DI	315	Indet	Indet	1	2	16.1	17.1	3.9*	Body	N	3	Smoothed	C mid grey-brown; I dark brown	None	3	9.3.6	N	76 crb	Thin spall from belly; too small to be diagnostic but could conceivably be E/MN or Beaker. Trowel scar on core surface
912	81.047	DI	315	EBA	FV	1F	<1	9.1	7.9	4.9*	Body	Y	No incls visible	Smoothed	E dark grey-brown; C dark grey	None	2	9.3.6	N	76 crb	Small spall from Food Vessel ASH 75: fragment of whipped cord impression in herringbone pattern on E, along with shallow incised line, pointing towards the 'V', which is either decoration or a scratch. Now stored along with ASH 75. The same Small Finds No comprised an additional 7 sherds and 1 fragment (of probably E/MN and Beaker pottery), described below, and 2 unusual pieces, possibly natural stone

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
913	81.047	DI	315	Chalco/EBA or poss E/MN	Dom Beaker or ? non-corky	1	4	23.3	16.1	11.3	Body	N	3 but incls v sparse	Smoothed	E & I med reddish-brown; C dark grey	None	3	9.3.6	N	76 crb	Small belly sherd from pot with est diam of 180–200 at this point. Could be dom Beaker but cannot rule out possibility of it being E/MN. Lithic inclusions include speckled creamy and black stone. See Cat. 912 regarding the other pottery sharing this Small Find No.
914_915	81.047	DI	315	Indet; ? E/MN	?non-corky	2	4 (3,1)	18.6	16.3	7.6*	Body	N	4 but soft	Uneven	E med grey-buff; C med-grey	None	3	9.3.6	N	76 crb	Heavily burnt spalls, wholly undiagnostic but can't rule out possibility that they date to the E/MN
916	81.047	DI	315	Prob E/MN	Corky	1	2	20.9	17.9	7.2*	Body	N	1	Smoothed but with large corky voids	C mid grey and brown; I dark grey-brown	None	3	9.3.6	N	76 crb	Spall from belly of corky pot; E/MN
917	81.047	DI	315	Chalco/EBA	Beaker, Internat or other	1	1	14.6	18.0	8.8	Poss neck	Poss	3 but soft	Smoothed but abraded	E med brown, sl reddish; C dark grey; I red-brown & grey-brown	None	3	9.3.6	N	76 crb	Surfaces abraded but hint of possible presence of horizontal twisted cord on slightly concave E (2 lines visible); whether there had also been any on the I is unclear, as the abraded condition and presence of label obscures detail. Fairly thin-walled but not as thin and fine as the AOC Beakers ASH

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					37 and 38, and doesn't belong to either. Soft and friable. MAY BE FROM ASH 40: is not dissimilar in fabric and thickness.
918_919	81.047	DI	315	Prob Chalco/EBA	Prob fine Beaker	2	2 (2,1)	16.0	16.7	6.5	Prob neck	Y (one or both sherds)	1a	Smoothed; poss pol to low sheen on E of on esherd and I of the other	E (of one sherd) blackish-brown; C buff (dark grey on other sherd); I (of one sherd) dark brown	None	3	9.3.6	N	76 crb	Two spalls, probably from neck of one or two fine Beaker/s. Smaller sherd has undulating E surface, suggesting a very low, rounded horizontal cordon (similar but not identical to Cat. 896); larger sherd is either a wider, bolder cordon or else the inside of a splaying neck as it turns into a rim.
920_921	81.047	DI	315	Not definitely pottery		2	2 (1, 1)	15.2	13.8	5.9	Not def pottery	N	See comment	-	E med brown; I black	Thin bl encr on I	2 & 3	9.3.6	N	76 crb	2 markedly hard pieces, not definitely pottery. The larger piece, with black encrustation on one surface, may have been burnt or at least was in contact with burnt material. Can't rule out possibility that these are indeed sherds, just hard. Too small to be diagnostic.
922	81.249	DI	320	? Chalco/EBA	?Fine Beaker	1	1	13.3	8.7	6.7	Body	N	3	Smoothed	E med-brown, sl reddish; C & I dark grey	Poss v thin brownish encr but may be peat	2	9.3.12	N	76 crb	Very small sherd from thin fine pot, most probably a fine Beaker.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
923	80.111	DI	321.2	?E/MN or Chalco/EBA	Non-corky or dom Beaker	1	7	24.1	21.0	13.0	Body	N	4	Smoothed but inclusions protrude	E & I light brown; C light grey-brown	None	3	9.3.8	N	76 crb	Heavily abraded belly sherd from large, thick, gritty pot
924_926	80.111	DI	321.2A	?E/MN or ? Chalco/EBA	Non-corky or Beaker	3	2 (1, <1 x 2)	16.8	14.1	4.9*	Body	N	2	Smoothed	C med grey; I grey-brown	None	3	9.3.8	N	76 crb	3 spalls of fairly fine but laminar pottery; could be E/MN or Beaker. Note: 2 frags quartz had also been in this bag but are now bagged separately. May possibly be from same pot as 525_530 and 93_113 despite differences in fabric.
927	81.242	DI	333	Indet; ?? Chalco/EBA	Indet; ?? dom Beaker	1	2	13.8	24.2	10.0*	Body	N	3	Smoothed	Dark grey-brown, sl reddish through out	Poss patch of v thin brown encr on I	2	9.2.13	N	76 crb	Belly sherd, prob from fairly small pot with hard fabric; I spalled off; could possibly be dom Beaker
928_931	81.295	DI	352	Indet; ?? E/MN	Indet	3 & 1F & crbs	5 (2,2, 1,<1	16.5	15.7	8.1	Body	N	3 but soft	Heavily abraded	Pale grey-buf through out (with brownish sediment on one surface of one)	None: sediment not organic encrustation	3	9.3.16	N	76 crb	Heavily bunt and abraded spalls, undiagnostic but can't rule out possibility that they could be E/MN. Original finds bag says 'X 2.75 Z 7.00 1.12 BD' and has context as 359, but Finds Register has context as 352
932	81.254	DI	360	Chalco/EBA	Fine Beaker	1	1	16.9	12.3	7.0	Poss car	N	2 but soft	Smoothed	E & I dark	None	2	9.4.3,	N	76 crb	From thin fine Beaker; is either

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															brown; C dark grey			9.4.8			gentle carination or (less likely neck and edge of rim, or base). Broken along ring joint. Area given as DV on original finds bag. PJA adds: Layer 360 was restricted to DI but a very similar layer 362 was found in the adjacent DIV and it is conceivable that it came from there.
933_934	81.348	DI	365	?E/MN or ? Chalco/ EBA	Non-corky or dom Beaker	2	3 (3,1)	20.5	14.6	12.7	Body	N	2 but sl soft	Smoothed	E & I medium brown, reddish; C med to dark grey	None	3		N	76 crb	The 2 sherds are not necessarily from the same pot. Larger sherd is from fairly thick but fine pot, friable.
935	81.256	DI	369	Indet; could be E/MN or Chalco/ EBA	?Non-corky or Beaker	1	<1	12.2	7.7	4.1*	Body	N	3	Smoothed	C dark grey; I dark grey-brown	None	3	9.3.16	N	76 crb	Small abraded spall; indet but could be E/MN or Beaker
936_938	81.265	DI	369	Indet	Indet	3F	<1 (all <1)	7.7	5.8	3.7*	Body	N	3 but soft	Abraded	C buff; I or E light brown	None	3	9.3.16	N	76 crb	Three tiny heavily abraded and quite possibly burnt fragments. Found 16.5.81
939	81.237	DI	369	Prob Chalco	Prob fine Beaker	1	3	24.8	17.7	5.9	Body	N	3	Smoothed	E med brown; C med grey; I dark brown	None	3	9.3.16	N	76 crb	Sherd, poss from belly of small thin fine pot; diam at this point c 130. Fact that it narrows considerably to one corner raises the question of whether E has broken

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					and been heavily abraded along joint plane; can't be sure. This had been included by ASH in her '18', as '81.369', but there had been confusion between the context number (369) and the SF No (237), and in her list of crumbs, ASH had included it as ?237.
940_944	81.237	DI	369	Prob E/MN	Corky	5	6 (2, 2, 1,1, <1)	23.7	17.3	8.2	Body	N	1	Smoothed but corky	E & I dark brown with red-brown peat stain; C med grey	None	2,3	9.3.16	N	76 crb	From corky pot, probably E/MN. One sherd not definitely part of this pot; has a light brown C and shallow irregular depressions on E which look a little like decoration but are probably unusually-shaped inclusion voids.
945	81.263	DI	374	Indet	Indet	1	5	33.2	28.5	11.8	Body	N	Prob 3	Heavily abraded	Surface & C pinkish-buff	None	3	9.3.16	N	76 crb	Very friable, probably thoroughly burnt sherd, with peat matrix adhering and helping to hold it together. Can't rule out possibility that it's E/MN but is undiagnostic
946_952	81.268	DI	374	Indet	Indet	2S & 5F & crbs	1 (all <1)	12.6	8.2	3.7**	Body	N	3	None visible	Mid brown & mid grey	None	3	9.3.16	N	76 crb	Small featureless spalls; indet. Found 16.5.81

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
953	81.282	DI	374	? Chalco/ EBA	Poss Beaker, fine	1	1	11.7	11.7	7.9	Body	N	3	Smoothed	E mid-brown, reddish; C mid brown-light grey-dark grey; I black	Thin bl encr on I	3	9.3.16	N	76 crb	Small body sherd from fairly thin-walled, fairly fine pot; texture and exterior colour suggest that it's most likely to be from a Beaker. Found 17.5.81
954	81.276	DI	377	Prob Chalco/ EBA	Prob fine Beaker	1	1	14.4	11.7	7.7	Body	N	3	Smoothed but heavily abraded	E med brown; C light grey-brown; I light brown	None	3	9.3.16	N	76 crb	Small abraded body sherd from thin fine pot, most probably a fine Beaker. Broken and heavily abraded along joint.. Found 19.5.81
955	81.285	DI	385	Prob Chalco/ EBA	Prob fine Beaker	1	1	19.6	12.2	6.3	Body	N	1(?)	Smoothed ; some bag pol	E med brown; C & I dark grey	None	3	9.3.16	N	76 crb	Small belly sherd from small thin fine pot, most probably fine Beaker; laminar fabric and unclear whether it's also corky; a few large inclusion sockets. Found 16.5.81
956_960	81.366	DI	396	Indet	Indet	1 & 4F & crbs	1	12.9	8.0	5.3*	Body	N	3 but soft	None visible	E or I dull orange; C light grey	None	3	9.10.3	N	76 crb	Abraded and thoroughly burnt, friable; undiagnostic. Original finds bag says 'X 4.46 Y 6.60 1.18 BD' Found 3.6.81
961_962	80.040	DII	310	?E/MN or Chalco/ EBA	Non-corky or Beaker	2 refitted	1	19.3	15.9	3.9*	Body	N	2 but fairly soft	Smoothed	C dark grey; I dark greyish brown	None	2	9.2.2	N	76 crb	2 refitted parts of spall (dimensions and weight being for the 2 together); could be either E/MN or Beaker
963_964	80.041	DII	310	?E/MN or	Non-corky or	2 refitted	3	27.9	16.2	6.7	Body	N	2 but soft and	Abraded	E & I dark	None	3	9.2.2	N	76 crb	2 refitted, heavily abraded sherds of

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
				Chalco/ EBA	Beaker								not mica-rich		brown; C dark grey						thin, fine-gritty pot (dimensions and weight being for the 2 together); could be either E/MN or Beaker
965	80.033	DII	313	Indet; could be E/MN or Chalco/ EBA	Non-corky or Beaker	1	1	15.7	12.7	5.6*	Body	N	2	Smoothed	E dark greyish brown; C light grey-brown	None	3	9.3.4	N	76 crb	Small abraded sherd (I missing), possibly from thin fine pot; could be Beaker but can't rule out possibility of being E/MN
966	80.034	DII	313	Indet; could be E/MN or Chalco/ EBA	Non-corky or Beaker	1	1	14.8	10.4	5.7*	Body	N	3	Smoothed	E dark brown; C dark grey	None	3	9.3.4	N	76 crb	Small spall of laminar fine pot; could be either E/MN or Beaker
967	80.034	DII	313	Indet; could be E/MN or Chalco/ EBA	Non-corky or Beaker	1	<1				Body	N	3	Smoothed		None	3	9.3.4	N	76 crb	Small spall of laminar fine pot, same as Cat. 966; could be either E/MN or Beaker
968	80.034	DII	313	Indet; could be E/MN or Chalco/ EBA	Non-corky or Beaker	1	<1				Body	N	3	Smoothed		None	3	9.3.4	N	76 crb	Small spall of laminar fine pot, same as Cat. 966 and 967; could be either E/MN or Beaker
969_970	80.035	DII	313	Indet	Indet	2	1 (1, <1)	14.3	10.8	8.7*	Body	N	See comment	None visible	E mid brown, C dark grey	None	3	9.3.4	N	76 crb	2 featureless spalls, one dominated by a single large blackish subangular lithic inclusion, occupying most of area. Undiagnostic.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
971_973	80.027	DIII	303	E/MN or Chalco/ EBA	Non-corky or Beaker	3 incl 2 refitted	3 (2,1)	30.3	18.8	6.0*	Body	N	2 but not abundant mica	Smoothed	I blackish-brown; C dark grey	Poss v thin brownish encr on I	3	9.2.2	N	76 crb	3 spalls (2 refitted; dimensions & weight as refitted) from belly of fairly fine, laminar pot; could be E/MN non-corky or ?dom Beaker
974	81.243	DIV	370	Indet	Indet	1	1	13.0	10.5	7.6*	Body	N	2 but soft	None clearly visible	E & ?I light brown; C dark grey	None	3	9.2.6	N	76 crb	Small, friable sherd from fine pot; hard to tell what area on the pot is represented.
975	81.042	DV	340	Prob Chalco/ EBA	Prob fine Beaker	1	2	20.2	16.9	3.9*	Prob neck	N	2	Smoothed & pol to low sheen	E	None	2	9.6.2	N	76 crb	Spall, probably from the neck of a thin fine Beaker. If it's not from the neck, then the surviving surface would be the I and it would be from the belly. Found 5.5.81
976_982	81.665	DV	340	Prob E/MN	Corky	4 (incl 2 cj) & 3F & crbs	3 (1, 1, <1 x 5)	18.9	19.6	5.8*	Body	N	1 but soft	Smoothed	E dark brown; C dark grey-brown	None	2	9.6.2	N	76 crb	Spalls of a very friable corky pot; prob E/MN. Two sherds conjoin but are too fragile to be refitted. Original finds bag says 'X = 4.66 Y = 7.20' Found 11.5.81
983	81.045	DV	344	E/MN or Chalco/ EBA	Non-corky or Beaker	1	2	26.5	14.9	7.4*	Body	N	2	Smoothed	E dark brown; C dark grey-brown with peat staining	None	3	9.3.6	N	76 crb	Spall from fine pot; line on E is not necessarily decoration; could be burnt-out grass or similar organic. Could be E/MN or Beaker. Found 5.5.81
984	81.033	E	1108	Prob Chalco/ EBA	Prob fine Beaker	1	1	18.6	15.7	6.0	Body	N	2 but mica not abundan	Smoothed	E & I dark brown;	None	3	10.3.1	N	76 crb	Belly sherd from small thin fine pot; est diam at this point c 100.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
													t		C med grey-brown						Most of E spalled off. Most likely to be a fine Beaker
985_987	80.179	FV	647	E/MN or Chalco/EBA	Non-corky or Beaker	1 & 2F	1 (1, <1 x 2)	14.5	13.0	7.5	Body	N	3	Smoothed	I mid brown; C mid grey	None	2	11.9.8	N	76 crb	Spalls (incl 2 refitted); E spalled off, prob along curving joint. Found 23.5.80
988	80.178	FV	631	Indet	Indet	1F & crb	<1	<10			Body	N	3	Smoothed	C mid grey; I mid brown	None	3	11.9.10	N	76 crb	Featureless spall; indet.
989	80.071	FV	631	Indet	Indet	1F	<1	<10			Body	N	Indet	None visible	Mid grey & mid brown	None	3	11.9.10	N	76 crb	Featureless spall – may be a detached lithic inclusion with tiny bit of clay matrix attached. Indet.
990	80.106	FVI	622	E/MN or Chalco/EBA	Fine Heb Inc or Beaker	1	1	14.0	9.4	4.4	Body	N	3	Smoothed	E blackish-brown; C mid grey; I mid-brown, reddish	None	3	11.9.4	N	76 crb	Body sherd from very thin fine pot with shallow incised linear decoration featuring 2 roughly parallel lines, each ending in roundish terminal. Either fine Heb Inc or fine Beaker.
991	80.106	FVI	622	E/MN or Chalco/EBA	Fine Heb Inc or Beaker	1F	<1	<10			Body	N	3	Smoothed	C mid grey; I mid-brown, reddish	None	3	11.9.4	N	76 crb	Spall from same pot as Cat. 990. May well belong to same sherd but too fragile to try refitting
992	81.062	HI	707	Chalco/EBA	Fine Beaker	1	1	14.9	11.1	5.5*	Prob base	N	1	I smoothed	C dark grey-brown; I blackish	None	3	12.4.1	N	76 crb	Small spall, prob from flat base of thin fine Beaker (as suggested by sharply curving I); E spalled off

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
															-brown						
993	81.067	HI	707	?E/MN	Corky	1F	<1	<10			?Neck immed below rim	N	1	Smoothed	E blackish-brown; C dark grey-brown	None	3	12.4.1	N	76 crb	Small, abraded fragment that may be from neck immediately below an everted rim. Can't rule out possibility that it is from inside of base of flat-based Beaker, but curvature (such as can be seen) suggests it's more likely to be from a neck
994	81.067	HI	707	Prob E/MN	Corky	1	<1	10.5	7.6	3.5*	Body	N	1	Smoothed but corky voids	C dark grey-brown; I dark brown	None	3	12.4.1	N	76 crb	Abraded spall of corky fabric.
995	81.202	HI	738	Indet	Indet	1	1	14.5	12.4	8.9*	Body	N	3	None visible	Light grey and light brown	None	3	12.4.1	N	76 crb	Burnt, irregular-shaped piece of pottery with most of surfaces and body spalled away and abraded. Undiagnostic.
996	81.207	HI	738	E/MN or Chalco/EBA	Non-corky or dom Beaker	1	1	15.9	8.7	10.4	Body	N	2 but not abundant mica	Smoothed	E med brown; C dark grey; I blackish-brown	None	2	12.4.1	N	76 crb	From fairly fine pot; could be either E/MN or dom Beaker
997	81.207	HI	738	Prob E/MN	Corky	1	4	22.8	19.7	11*	Body	N	1	Heavily abraded	C grey-brown; I light brown	None	3	12.4.1	N	76 crb	Heavily abraded spall, prob from fairly large pot; could be plain, corky or could be from Heb Inc pot (despite absence of decoration; E spalled off)

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
998	81.121	HI	739	Chalco/ EBA or poss E/MN	Fine Beaker or non-corky	1	1	15.1	13.7	5.7*	Base or rim flange	N	1a	Smoothed	E dark brown & blackish -brown; c med grey-brown	Linear thin blackish encr on E	3	12.4.1	N	76 crb	Small abraded spall (I spalled off), either from flat base of small fine Beaker, or else possibly from E/MN rim flange. Seems more likely to be base, with splaying wall and gentle wall-base angle. Too small to estimate base diam.
999	81.149	HI	739	Indet; ? E/MN	Indet	1	1	17.5	12.9	4.7*	Body	N	1a but soft and no mica	Abraded	E grey-buff; C grey & med brown	None	3	12.4.1	N	76 crb	Abraded burnt spall (conjoins with Cat. 1000 but is too fragile to refit); friable. Indeterminate but can't rule out possibility of E/MN date
1000	81.149	HI	739	Indet; ? E/MN	Indet	1	1	17.3	11.0	5.2	Body	N	1a but soft and no mica	Abraded	C grey & med brown; I med brown	None	3	12.4.1	N	76 crb	Abraded burnt spall (conjoins with Cat. 999 but is too fragile to refit); friable. Indeterminate but can't rule out possibility of E/MN date
1001	81.149	HI	739	Indet; ? E/MN	Indet	1F & crbs	<19	<10			Body	N	1a but soft and no mica	No surface present	Light brown	None	3	12.4.1	N	76 crb	Small fragment from same pot as Cat. 999 and 1000
1002	81.150	HI	739	Prob E/MN	Corky	1	2	23.3	18.6	6.0*	Body	N	1	Smoothed	C light brown; I blackish -brown	Patch of thin blackish encr on I	3	12.4.1	N	76 crb	Spall from belly of corky pot, possibly fairly large; E spalled off. Prob E/MN
1003	81.152	HI	739	Prob E/MN	Corky	1	2	18.5	15.8	7.8*	Body	N	1	Smoothed but corky	Cmed grey; I med brown	None	3	12.4.1	N	76 crb	Spall from belly of corky pot; E spalled off.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
1004	81.155	HI	748	Chalco/ EBA	Fine Beaker	1	1	13.2	11.0	6.6*	Car or base	N	1a but see comment	Smoothed	E & C buff	None	3	12.4.1	N	76 crb	Small abraded sherd from fine, prob thin-walled Beaker; either from neck and gentle carination, or else from flat base and bottom of wall. Virtually inclusion-free but one angular frag of quartz/ite.
1005_1006	81.057	HI	707	E/MN?	corky	2 refitted & crb	1	18.8	12.8	6.8*	Body	N	1a	Smoothed	Cmed grey & med brown; I light brown	None	3	12.4.1	N	76 crb	Abraded spall (E spalled off; 2 refitted pieces) from belly; could be E/MN but too small to be diagnostic. Minimally corky.
1007_1020	81.230	HII	768	Prob E/MN	corky	7 & 7F	7 (2,1, 1,1,< 1 x 9)	17.6	14.6	9.9*	Body	N	1	Smoothed but corky	E dark brown; C light grey	None	3	12.3.4	N	76 crb	Small abraded spalls, not necessarily all from a single pot but some clearly from a fairly large, fairly thick-walled pot. Bag says '[small find no] 230 (part of) pot frags some decor[ated]' – but none is decorated and there is no sign of other pottery with same Small Find No PJA notes: the 'part' may refer to charcoal removed from the bag and subsequently mislabelled as from Context 767.
1021	81.059	HII	706	Indet	Indet	1F	<1	7.8	7.3	5*	Body	N	3	Smoothed	E dark brown; C dark grey	None	3	12.2.6	N	76 crb	Small heavily weathered spall; undiagnostic.

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
1022	81.018	HII	708	?E/MN	Corky	1	1	18.4	10.7	6.9	Body	N	1 but not very corky	Smoothed	E grey-brown; C reddish grey-brown; I reddish mid brown	None	3	12.2.8	N	76 crb	Abraded spall of slightly corky fabric; could be E/MN but can't rule out possibility that it could be Beaker. Most of E spalled off.
1023	81.019	HII	708	E/MN or chalco/ EBA	Corky or Beaker	1	1	14.2	11.9	5.8*	Body	Poss	1	Smoothed; sheen on E not original	E dark brown; C grey-brown	None	3	12.2.8	N	76 crb	Spall with curving exterior reminiscent of the low, rounded cordon-like features seen on some of the Beaker pottery; but cannot rule out the possibility of an E/MN date.
1024_1029	81.008	HII	708	EBA	Food Vessel	3 &3F	3 (2, <1 x 5	18.0	15.6	6.4**	Body	Y (one frag)	3 (see comment)	Smoothed (on decorated frag)	C (and E of smallest frag) blackish-brown	None	2,3	12.2.8	N	76 crb	Smallest frag has the distinctive (and unique, for the Calanais assemblage) whipped cord impression as seen on the Food Vessel ASH 75, and the other pieces (all spalls) are consistent with this pot, even though none happens to contain the distinctive lithic inclusion seen in that pot. (There are several sockets where such inclusions may well have existed.) Without the decorated fragment, these sherds and frags would have been

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					classed as '?E/MN or Beaker'. NOW STORED WITH ASH 75
1030	81.013	HII	708	Prob E/MN	Corky	1	1	14.5	12.3	5.4*	Body	N	1	Smoothed	C & I med grey-brown	None	3	12.2.8	N	76 crb	Spall from belly of corky pot with carefully-smoothed I (E spalled off). Most likely to be E/MN but cannot rule out possibility that it's Beaker
1031	81.009	HII	708	Chalco/ EBA	Fine Beaker	1	1	14.0	12.1	7.6	Base	N	3	Smoothed	E mid brown, sl reddish; C & I mid brown	None	2	12.2.8	N	76 crb	Small sherd from base-wall junction of thin fine Beaker, prob small pot but sherd too small to estimate base diam. Junction clearly defined; wall splays slightly.
1032_1033	81.218	HII	747	E/MN or ? Chalco/ EBA	Corky or ? fine Beaker	2 refitted	1	15.8	12.9	5.1*	Body	N	1	Smoothed	C mid grey; I mid brown	None	3	12.5.6	N	76 crb	2 refitted spalls (E spalled off) from fine pot with small corky voids.
1034	81.217	HII	747	E/MN	Corky	1	1	16.2	12.8	8*	Body	N	1	Smoothed	C light grey & mid brown; I blackish-brown	Poss traces of v thin blackish encr on I	3	12.5.6	N	76 crb	Spall from corky pot; E spalled off.
1035	81.219	HII	747	E/MN	Corky	1	1	18.3	18.2	6.0*	Body	N	1	Virtually no surface visible	C mid brown & mid grey-brown	None	3	12.5.6	N	76 crb	Spall from corky pot; all of one surface, and virtually all of other surface, spalled off
1036_1038	81.135	HII	733	E/MN or	Non-corky or	1 & 2F &crb	1 (1, <1 x	13.3	11.5	5.7*	Body	N	4	Abraded	E or I light	None	3	7.5.6	N	76 crb	Abraded sherd & frags from fine-gritty

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
				Chalco/ EBA	Beaker		2)								brown; C med grey						pot
1039	81.325	HII	769	E/MN or Chalco/ EBA	Non-corky or dom Beaker	1	1	15.1	12.4	8.2	Body	N	3	Smoothed	E & part of C med brown; rest of C med grey; I med and dark grey brown	None	2	12.5.10	N	76 crb	Small sherd; could be E/MN or dom Beaker. Too small to be diagnostic.
1040_1043	81.330	HII	770	E/MN	Heb Inc	4	4 (2, 1, 1, <1)	17.5	15.3	7.7	Body	Y on one of the sherds	1a (with some large voids)	Smoothed	E dark grey; C dark brown; I med brown	None	3	12.5.10	N	76 crb	3 spalls and one sherd with both surfaces but laminar and about to spall. One of the sherds (not the largest one) has a linear incision on its E of the kind seen on Heb Inc pottery.
1044_1048	81.520	JI	9999	Indet	Indet	5F	<1 (all <1)	9.0	7.0	4.7	Body	N	3	None visible	Dark reddish-brown	None	2		N	76 crb	Featureless scraps, friable – not definitely pottery. Also present (but now bagged separately): charcoal & fragments of natural iron pan, and it's possible that at least one of the pieces of 'pottery' is also iron pan
1049_1103	88.no No	S	1213	E/MN	Corky	31 & 24 F & crbs	43 (9,6, 5,3,2 ,2,1, 1,1,1	38.5	28.3	9.0*	Body; 1 sherd from rim	N	1	Smoothed but pitted with corky voids, some large	E med brown to dark grey brown;	Thin blackish-brown encr on I and	2,3	14.13.1	N	NC	All the sherds, fragments and crumbs are prob from a single pot, of corky fabric; a medium-sized

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
							,1,1, 1,1,< 1 x 41)								C dark grey & buff; I (where present) mid to dark brown	hints of blackish staining on E					cooking pot. (Largest sherds may well be from lower part of round belly, so will not give a reliable estimate of diameter.) Most pieces are spalls but where both surfaces present, Th is 9.3. Rim is represented by a spall from its inner edge, which is squared off fairly sharply. One spall has a markedly curving I and might also be from the rim area, in which case a flanged (or otherwise externally-expanded) rim is possible. Found 13.5.88. Also present, and now bagged separately: 1 piece quartz & 3 other pieces of stone, all prob natural, plus charcoal
1104_1105	81.271	DIV	375	E/MN	Prob corky	2	3 (2,1)	23.5	16.0	12.4	Body	N	1	Smoothed	E med brown; C light brown; I med brown, slightly reddish	None	3	9.3.20	N	NC	ASH had had it as 'Puzzling. Not listed' Smooth shiny area across core is trowel damage which has smeared the clay while the sherd was still damp in the ground. This is a sherd (plus a spall) from a fairly thick-walled pot, of slightly corky fabric, which lies within the overall range of

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					thickness and fabric for E/MN pottery. Finds bag says '6.52 from X 7.36 from Y' Found 16.5.81
1106	81.024	E	1108	E/MN	Heb Inc	1	12	33.4	36.4	11.7	Ridge or car	Y	4	Smoothed but some incls protrude and I sl uneven	E mid brown; C & I mid grey-brown	None	3	10.3.1	N	NC	From large, slightly coarse pot; either a carination or (more likely) a ridge and inter-ridge hollow from a Heb Inc ridged jar. Most of E spalled off, and no sign of decoration where E survives). Est diam at this point 270. From ESE sector of D, layer 8. Not previously catalogued. Sherd had been mis-bagged with SF 31 (presumably 80.31), f.1108.
1107	81.026	E	1108	Indet; could be E/MN or Chalco/EBA	Non-corky or dom Beaker	1	2	14.4	16.7	8.4*	Body	N	3	Smoothed but abraded	C blackish-brown; I med grey-brown	None	3	10.3.1	N	NC	Previously suspected to be peat, but is clearly pot.
1108	80.014	AI	001	Indet	Indet	1	2	21.1	25.1	9.0*	Neck?	N	3	E crazed; I abraded	E mid-brown (but stained by sediment); C dark grey	Unclear whether crazed material on E is organic residue, but is likely	3	6.2.2		NC	Previously suspected to be peat, and it is not 100% definite that it is not compacted peat with a few lithic inclusions. If it is pottery, then curvature suggests that it is from the neck of a pot with either everted

CatNo	Find No	Area	Ctxt	Date	Pot type	Shd Nos	Wt g	L mm	W mm	Th mm	Location on pot	Dec	Fab-ric	Surface finish	Colour	Surface organics	Wear	Ref	Ill.	ASH	Description & comments
																					neck or globular belly. Too small, and identification too insecure, to guess likely date
1109	81.315	DIV	316	Indet	Indet	1F	<1	9.7	7.4	5.3*	Body	N	Indet	Smoothed	E & C red-brown	None	3	09/03/04	N	NC	ASH had specified 'not listed in Catalogue' and 'minute rim fragment'. Too abraded to tell whether it had indeed been a rim fragment; probably from a fine pot. Could be E/MN or Beaker. One abraded charcoal fragment also present and now bagged separately. Finds bag says 'X 6.58m Y 7.06m 1.08 BD' '1' Found 20.5.81
1110	81.065	HI	707	E/MN	Corky	1	<1	12.9	8.0	7.4	Rim	N	1	Smoothed	E med brown; C light to med brown; I blackish-brown	None	3	12.4.1	N	NC	Rim rounded; just tip of rim present. From thin fine pot. ASH had suspected that it might belong to ASH 3 but it does not. Too small to estimate rim diam. Trowel damage to core.

18.11.3 Notes

The following are 'problem' cases:

Cat. No	ASH	Find No	Area	Ctxt	Ref	Ill.	Description & comments
	NC	81.186	BIN	131	7.3.7		No other ref to this sherd. Not seen by JAS. Only reference is in finds book, where it is recorded as being pot, but from BII, 131. Not listed in the ASH and MJ versions of the Catalogue.
	NC	80.170	DI	318.3	9.2.12		Frag rim sherd Not present
	NC	81.341		100			PJA note: Omitted pottery finds 81.341 Grooved ware from Victorian drain [which is context 100] according to finds book. JAS note: Pottery not seen and ID as Grooved Ware should be treated with caution
	NC	81.301	DI	374	9.3.16		Empty bag. Bag says 'Hebridean?'
	NC	81.420	BVSX	812			Empty bag
	NC	81.318	DV	365	9.3.18		Empty bag . Bag had torn and been sellotaped, but contents must have fallen out some time ago and are not locatable.

The following were recorded as pottery in the Finds Register but have not appeared in any version of the Catalogue; no pottery with these finds numbers has been seen:

Find No	Area	Ctxt	Comment
81.52	BII	803	
81.53	BII	803	
81.98	DI chamber	356	2 sherds
81.112	HII	732	
81.124	HII	732	
81.134	HII	333	assorted sherds
81.140	BVSX	141	
81.216	HII	747	
81.244	DI chamber	357	This is the only pottery fragment in the Victorian chamber deposits which might be prehistoric
81.296	DI	352	"frags pot"
81.297	DI	352	"frags pot"
81.324	HII	769B	
81.429	BII/III	130	

Note also: 81.279, context 374 and 81.281, context 388 had initially been called 'pot' in the Finds Register; each entry had a note 'reuse this', but the finds numbers do not seem to have been reused. It is unclear whether the other finds numbers listed above relate to material that had initially been classed as pottery and then reclassified/discarded.

18.11.4 Non-pottery

The following items, originally thought to be pottery, are now known not to be pottery:
81.185 (BIII, 112, found 14.5.81): 1 piece of natural rotten sandstone; had previously been listed under 'ASH 76 crb'
81.105 (HII, 732): 1 piece of natural stone. MJ had listed it under 'ASH 76' even though it had not appeared in ASH's bag list for 76
81.703 (S, 357) is leaf or other plant matter, probably not very old
81.677 (BIVWX, f.891): fuel ash slag (cramp-like): definitely not metalworking slag
80.17 (Area A, 001) had been listed in finds book as pottery but is definitely glass.
1 piece in 81.388 (BIN, 131, Cat. 801) may be stone
2 pieces quartz in 80.111
At least 2 pieces of iron pan concretion in 81.520
1 frag quartz & 1 piece natural rotten stone in 81.401
1 frag quartz & 3 pieces other stone, all prob natural, from Area S (1988)
The following is a list of charcoal fragments found in pottery bags; they have now been separated out:
80.145 (B, 142)
81.401 (BII, 112; no pottery in the bag, but 1 frag quartz and one natural piece of rotten stone)
81.415 (BII, 112; no pottery in the bag)
81.419 (BII, 112)
81.453 (BII, 112)
80.168 (BIII, 160.1)
81.460 (BIII, 112)
81.606 (BV,837)
80.172 (DI, 315)
81.234 (DI, 315)
81.294 (DI, 352; no pottery in the bag)
81.315 (DIV, 316)
81.154 (HI, 746)
81.229 (HII, 768)
81.323 (HII, 769B)
81.520 (J, including one large flat piece 35 x 30.2)
88.noNo (S, no context)

18.11.5 APPENDIX: Summary Descriptions of Selected Pots

1: ASH 39 early, international-style beaker

ASHNo	Description	Cat. Nos.	SF No	Areas	Contexts
39	Thirteen sherds from the rim, neck, carination and belly of a fairly small, fine, thin-walled, low-carinated Beaker; around 15% of the pot is present. (No base or lower belly sherds present.) Rim gently squared off; neck long and gently flaring; carination gentle and rounded, lying at roughly 1/3 of the vessel's height. ERD: c 165mm; estimated carination diameter c 130 mm; estimated height c 120 (shown in drawing as 118); wall thickness 4.7–5.9. Surfaces very carefully smoothed (slipped and/or wet-smoothed); exterior polished to medium to high sheen; interior polished to low to medium sheen. Possible faint horizontal scrape marks on interior (where wall thinned by scraping). Several sherds have broken along ring joints, indicating use of fairly narrow straps on neck. Largest sherd has straight, vertical fracture line along RH side. Sparse decoration, comprising roughly horizontal short stretches of shell impression, forming 2 discontinuous lines on neck, spaced around 9 mm apart; in places, one line immediately above carination; untidy, slightly diagonal line on carination and another line immediately below carination. Below this, shallow incised criss-cross lattice design on belly. The decoration had been partly smudged by the final pot-smoothing process. Exterior blackish-brown; core dark grey; interior medium brown, slightly reddish, becoming darker brown at upper neck. Patches of very thin black staining on both surfaces may represent residue left by evaporation of pot's contents (although some deliberate blackening of the exterior may have occurred. Note: it does not represent material burnt on by use of pot for cooking). Virtually inclusion-free; slightly corky interior. Beaker type: European (Clarke 1970); step 1–2 (Lanting & van der Waals 1971); Low Carinated (Needham 2005). Findspots are in 2 widely separated sets of contexts in and near the enclosure: BV/BVSX and BI, BIWX,BII and BNW.	353	81.170	BII	112
		354	80.39	BI	107
		355	80.115	BI	117
		358 poss	80.144	BI	120
		362_363	81.305	BIWX	9999
		364	80.185	BNW	9999
		366	80.61	BV	117
		367	81.448	BV	812
		368	81.174	BV	813
		369	81.396	BV	813
		370_371	81.137+	BVSX	141
			81.392		

2: ASH 42 Beaker of type paralleled in north British domestic Beaker assemblages

ASHNo	Description	Cat. Nos.	SF No	Areas	Contexts
42	Twenty seven sherds – including some fairly large examples – from the rim, neck, carination and belly of a tall bipartite jar; around 15% of the pot present. Flattish-rounded everted rim, concave upper neck, low rounded cordon just under half way down neck; lower neck is straight and slopes out to gently pointed carination. Belly straight and slopes inwards. Estimated rim diameter (ERD) 135 mm; estimated carination diameter 170 mm; diameter at lowest surviving part of belly 140 mm. Extant height as reconstructed: 193 mm; may originally have been as tall as 260 mm. Thickness 7.3–9.6. Rim top and most of exterior decorated with comb impressions in herringbone pattern and with incised vertical lines; square-toothed comb c 6 mm long used. Herringbone design on rim top. Below, bands of horizontal herringbone interspersed with plain zones, and with two bands of metopic design, one on lower neck, other on belly, featuring panels of vertical herringbone and panels of vertical incised lines. Exterior mid-brown and dark greyish-brown on neck, slightly reddish mid-brown elsewhere; core mid to dark grey-brown; interior light to medium grey-brown. Surfaces carefully smoothed and possibly covered with thin slip (or else wet-smoothed prior to decoration, and exterior of neck polished to medium sheen, although with bands of matte as though pot may have been partly wrapped during polishing. Some hairline cracking to exterior surface. Inclusions very sparse (<3%) and small, although there are plenty of tiny glittery mica flecks. No obvious traces of organic residue. Closest comparanda are with domestic Beaker assemblages from the Hebrides. Possibly associated with the putative grave.	374	80.116	BV	134
		Conjoins			
		375	80.131	BIV	139
		376	80.131	BIV	139
		377	80.131	BIV	139
		378	80.128	BIV	139
		379	80.128	BIV	139
		380	80.129	BIV	139
		381	80.183	BIV	160.2
		382	81.184	BIV	814
		384	81.161	BIV	867
		385	81.200	BV	813
		386	81.390	BV	141
		387	81.139	BVSX	141
		388_392	81.141	BVSX	141
		393	81.189	BVSX	160.2
		394_398	81.160	BVSX	812
		401_403	81.414	BVSX	837

3: ASH 48 'Domestic' beaker

ASHNo	Description	Cat. Nos.	SF No	Areas	Contexts
48	Sherds from the rim, neck, carination and belly of large 'domestic' Beaker jar of unusual shape; ERD 190 mm; thickness 7.6–11.3 mm; < 10 % of pot present. Rim squared off and minimally everted; neck probably fairly long and straight, sloping outwards then possibly kinking out towards a gentle carination, whose diameter may be as much as 260 mm. Would have been a deep jar; a single spall from the belly suggests that the latter had been globular. Decorated on rim top and exterior: 3 or more deep and wide grooves under rim, up to 5.7 mm wide and spaced around 7.8 mm apart (between the mid-points of the grooves); otherwise impressions of wavy edge of seashell, arranged as 2 concentric lines on rim top; two lines immediately below rim and above the grooves; and as horizontal lines, spaced up to c 7.5 mm apart, probably over the whole of the exterior. Surfaces carefully smoothed prior to decoration, and parts of the exterior (and interior of neck) polished to a low to medium sheen prior to decoration. Post-decoration smoothing has smudged the shell-edge impressions on parts of the pot. Exterior medium brown, slightly orange/reddish-brown or purplish in places and blackish on part of the upper neck and rim; core medium grey and light grey; interior medium to dark grey-brown. Small patches of thin black staining over parts of the exterior of the neck. Some breakage along ring joints. Slightly gritty, with mostly sand-sized inclusions, varying in their distribution within the paste; density up to c 5–7%.	857_861	81.606	BV	837
		422	81.195	BVWX	859
		423_424	81.379	BVWX	859
		425	80.79	DI	315
		426_427	80.86	DI	315
		428_429	80.88	DI	315
		430	80.93	DI	315
		431	80.120	DI	315
		432_437	80.123	DI	326
		438	80.186	DI	326
		439_449	80.186	DI	326
		857_861	81.606	BV	837

4: ASH 61 Grooved Ware

ASHNo	Description	Cat. Nos.	SF No	Areas	Contexts
61	Sherds from the rim, body and base of fine, thin-walled, tub-shaped Grooved Ware bowl, with gently-pointed rim, fairly straight, slightly splaying wall and flat base; wall-base junction gentle on E and I. ERD c 186; EBD c 110; EHt 132; Th 5–10.2. Around 15% of the pot is present. Decorated over most of E and with single horizontal incised line immediately below rim on I. Deco on E: horizontal and diagonal incised lines, plus bands of horizontal and diagonal false-relief wavy line, with oval stab impressions accentuating the wave. Diagonal lines probably form triangles and/or lozenges. Many breaks along ring joints, and spalling of I of base along joints. E medium brown with varying degrees of orange; C generally mid to dark grey; I med-brown to blackish. Corky fabric, with slightly hackly fracture at base. Band of thin black-brown encrustation on I at mid-height; this may represent remains of evaporated contents, rather than burnt-on residue. Sherds vary from fairly to heavily abraded.	489_491	81.433	BIV	866
		492_495	81.421	BIV	877
		497_514	81.446	BIV	877
		515_519	81.449	BIV	877
		521	81.197	BIVS	877

5: ASH 75: Food Vessel

ASHNo	Description	Cat. Nos.	SF No	Areas	Contexts
75	Small sherds from the rim, neck, shoulder, upper belly and lower belly of a large bipartite Food Vessel jar; less than 10% of the pot represented. The rim has a broad internal bevel and a narrow external bevel; the neck is straight; the shoulder positioned around 2/3 of the height of the pot; and the belly curves in towards a fairly broad flat base, with a mini-pedestal. ERD c 180; estimated max diameter (at shoulder) 252; estimated base diameter c 100; estimated Ht 260. Th mostly 10–12 mm, narrowing to 7.6 mm at base and increasing to 18.5 mm at the broadest part of the rim. The exterior, from the E rim bevel to the bottom of the wall, is decorated with whipped cord and stab impressions; the I rim bevel has untidy diagonal incised lines. The E rim bevel has short diagonal whipped cord impressions; below that, E of neck decorated with horizontal lines of whipped cord, then diagonal deep short lines of whipped cord impressions, then horizontal lines of same, then deep, roughly triangular stab impressions. Shoulder decorated with horizontal & roughly horizontal, closely-set lines of whipped cord impressions; immediately below it, 2 rows of stab impressions. Further down belly, top to bottom: diagonal lines of whipped cord impressions; closely-set deep jab impressions (with deepest parts towards their upper edges); diagonal lines of impressions made with a long rectangular-toothed comb. Lower belly has stab impressions. There may well have been herringbone whipped cord impressions on the belly, if not also the neck. Surfaces mostly dark brown with blackish-brown core. Distinctive lithic inclusion, apparently only present in this pot: fine-grained crystalline stone, creamy matrix with dark mineral inclusions giving it a speckled appearance. These occur as large sub-angular and rounded fragments up to c 7 x 6 mm.	563	80.143	BI	120
		564	80.136	BI	125
		565	81.389	BI	125
		566	80.169	BI	167
		567	81.166	BI	810
		568_572	80.42	BIII	117
		576	80.133	BIIISX	117
		577	80.61	BIIISX	117
		578	80.29	BIINE	112
		580_581	80.56	BIN	130.1
		582_583	81.307	BIWX	9999
		585_588	81.200	BV	813
		589	80.31	DII	313
		590	81.17	HII	708
		591	81.211	HII	708
		592	81.6	HII	708
		593	81.7	HII	708
		594	81.34	HII	712
		912	81.47	DI	315
		1024_1029	81.8	HII	708

19. Soils

I Maté and P J Ashmore

19.1 Introduction

The core of this chapter is based on notes made by Ian Maté in 1980 and 1981. He provided advice on soils during excavation, directed the excavation of two archaeological Areas, E and F and dug three soil test pits G1, G2 and J. They are described in Chapters 10, 11 and 13. His draft excavation accounts and soil notes included comments on soils in other areas, which have been incorporated here as appropriate.

Inadequate time was made available to him during post-excavation for a programme of laboratory analyses. Pressure of other duties prevented his converting his soil records into a final account. P J Ashmore takes complete responsibility for errors and omissions in what follows.

19.2 Some soil-forming factors

Bunting defines the main factors influencing soil formation as parent materials, organisms, climate, relief and time (1969, 22-6). They will be considered here in that order

19.2.1 Parent materials

The rock under Calanais is banded acid gneiss, part of a formation which stretches north-south in a broad swathe along the middle of South Lewis (Fettes et al 1992). They include foliated quartz feldspathic, hornblendic and biotitic gneisses (Phemister 1948). Although rock outcrops in places on the Calanais ridge, most of the ground is covered by soil or peat over stiff green clay. On most of the excavation areas the clay was an important parent material for the soils, and they frequently contained small stones derived ultimately from the local rocks.

The foliation of gneiss aids its physical disintegration (Bunting 1969, 31). Disintegrating stones in some levels of test pits at Calanais (e.g. the A1 horizon in G2) commonly had a greenish tinge. Parts of the clay, where large areas were exposed in Area DIII, contained ghost rocks, again greenish.

Undisturbed green clay at Calanais lay around outcrops of rock with well-preserved mineralogies. The clay varied in both colour and texture. However no in-situ oxidisation of the undisturbed green clay was observed at Calanais. It may be a glacial till, as assumed during excavation, and if so it must have formed in a largely oxygen-free environment. By way of contrast orange and brown clays at the base of the archaeological succession at Calanais suggested oxidation of iron.

Other parent materials important to formation of some of the soils around the stone setting at Calanais were introduced by cultivators. In the 19th century cultivation beds they included peat and probably also seaweed and shell-sand from nearby shorelines. They may have included manure and compost. While it is not certain how important these materials were to earlier cultivation systems one explanation for the thickness of the soils above buried turf lines in some excavation trenches is that soil and clay were spread on the ground from a variety of sources including fresh green clay from pits and soil from nearby fields. The relatively soil-rich component seems to have arrived not so much because of a wish to improve cultivation but because of a practise of depositing artefact-rich material, for obscure but presumably ritual reasons.

19.2.2 Flora and micro-fauna

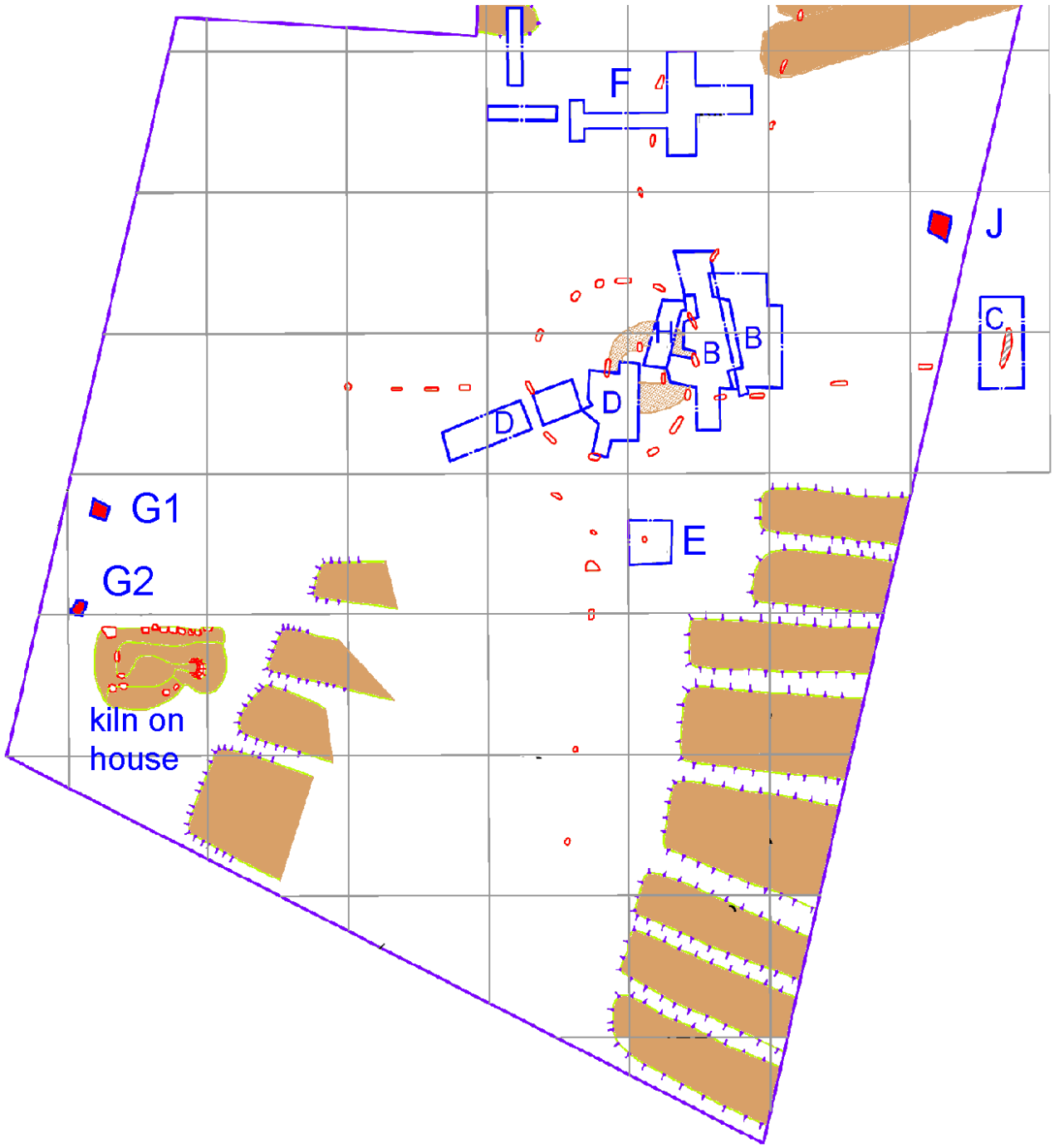
The vegetation cover at the time of excavation is described in detail in Chapter 20: Vegetation. In a c. 10m radius area round test pits G1 and G2, crossed by the fence defining the area in the care of the State, was extremely diverse, containing several communities. The area immediately west of the western test pits may be described as a "flush" in that nutrients draining from or leached from higher areas will have been relatively concentrated there.

More generally the boggy depressions in the area around the western test pits supported a flora of impeded drainage and even stagnation, with sphagnum hummocks, although other plants indi-

cated a reasonable nutrient supply. On the grazed cultivation bed outside the fence surrounding the area in the care of the State there was a closely grazed sward with a different plant community indicating a still acid but drier richer area.

The vegetation survey did not specify the cover close to test pit J. In general the area round it was dominated by Juncus patches and, to a lesser extent, Scirpus tussocks. Its general surroundings were much affected by trampling and broken up by paths, but the test pit lay in an area without obvious traces of early modern agriculture.

A few earthworms were seen in the top layers of Test Pit G1. In excavation Area B immediately east of the Ring earthworms were noticed in superficial layers interpreted as modern soft landscaping. Their presence was noted or deduced from superficial soil structure on Areas E and F, which had been cleared



Illus 19.1 Location of test pits G1, G2 and J, and excavation areas except Areas A and S

of deep peat more than a few decades earlier than the excavation areas in and near the Ring. Their presence was not otherwise recorded.

Once the deep peat which covered the place until the 19th century had been removed worm re-introduction could have happened either by the portage of worm eggs on sheep and cattle hooves (J C C Romans, pers. comm. 1980) or because of the proximity of improved land. Without the artificial disturbance and improvement of the soils represented by Victorian (and possibly earlier) cultivation beds the soil characteristics of the place would probably be more acid.

19.2.3 Local climate

Lewis has a mild Atlantic climate. Warmed by the Gulf Stream its temperature range is small, and the evapotranspiration rate is lower than total precipitation.

19.2.4 Relief and elevation

The excavation areas at Calanais were all on the ridge between Cnoc an Tursa, an outcrop of gneiss at its south end, and Calanais village c. 0.15 km further north (Chapter 4 Illus 4.1). The ridge sloped up north to south at an average of 3° to a height of c. 27m above sea level. Its top was almost flat east-west. Flat ground continued well to the east beyond the excavation areas before falling sharply into a north-south valley, but to the west it fell sharply within the area in care (Chapter 3 Illus 3.1). Overall it may be a crag and tail formation (Cnoc an Tursa and the ridge).

The position chosen for test pits G1 and G2 was to the west-south-west of the Ring on a gently sloping area below a low cliff of bare Lewisian gneiss. It is believed that they were far enough from the outcrop for the higher part of the profile to be only indirectly affected by rocks eroded from it. Test pit J was on flat ground to the east of the stone setting (Illus 19.1).

19.2.5 Time for soil development

At the height of the last glaciation Lewis was probably covered by an ice sheet up to 400m thick and extending from the Scottish mainland some tens of kilometres into the sea west of Lewis (Lambeck 1995a, 84-5, Fig 2). By about 15,000 to 13,000 BC it had retreated to the mainland, leaving Lewis exposed. Thus soils have had about 15,000 years to develop.

The site as a whole, including the area in which Test Pit J was dug, was covered by c.1.5 metres of peat till the beginning of the 19th century (MacCulloch 1819) and the last deep peat was removed from around the Ring in 1857 (Innes 1860). The area around Test Pits G1 and G2 may also have been covered by peat from the 1st millennium BC until the post-medieval period. During this c. 2.5-millennium period the only soil changes will have been those caused by sub-peat processes. However the effects of such processes were not apparent within the area cleared in 1857. Some signs of incipient podsolisation at the eastern edge of Area B may have been connected to the survival of a shallow layer of peat after 1857.

19.3 Test Pits

The test pits were dug manually. Pits G1 and G2 were subsequently used as latrine pits.

Test Pits G1 and G2 were on what appears from air photographs CUP RA84 and RA85 of 1955 to have been a squarish pre-modern cultivation area (not shown on Illus 19.1) next to a house shown seemingly in use on a sketch drawn in 1857 (Innes 1960). In essence soils may have developed before peat covered them in the 1st millennium BC (near the start of pollen sub-zone CaN-3e), but they seem likely to have been actively modified in the 19th century AD. Test pit J was in an area where no cultivation beds were visible.

19.3.1 Profile of test pit J

The Munsell colour chart was used to describe colours in the other test pits, but not in this profile. There were no formal layer codes. But test pit J had probably the most representative profile of the three. Like nearly all of the excavation areas, it will not have been subject to slumping or creep which might have disturbed the A and C horizons (Bunting 1969, 72); nor slope-wash which might have distorted the ratio of A to B+C; the

other test pits were not far from the base of a steep slope. Test Pit J shows what the area within and around the Ring would probably have been like if no building had taken place there and only the upper metre of peat had been removed in 1857.

A pollen spot sample (2036) from Layer 4 (presumably context 1341: uncemented green subsoil) was attributed to the transition of zone CaN-3a to CaN-3b when the human impact temporarily declined, which happened at some time between 2560 and 2200 cal BC.

In summary, Test Pit J revealed nearly 0.5m of peat. The lower 0.2m of this was disturbed and included dried peat lumps, except for the basal part which included an orange band and a 1cm thick layer of dark grey amorphous peat. It probably represents the remains of cut peat, with that above it formed after cutting. Below that were three layers of roughly the same thickness (5cm to 8cm): dark brown very humus rich clay with some charcoal over medium brown sandy silty clay with about 10% of small stones over green-brown silty clay. Under the latter was a 2 cm thick layer of loose green subsoil over a thin root mat. Under that again was cemented green subsoil. In brief the sequence can be described as peat re-growth over cut peat overlying a well-developed cultivation soil. Judging by the archaeology of the nearby Area C (Illus 19.1) the soil was worked over at various different dates spanning many centuries. The earliest phase on Area C included cultivation beds but there is no evidence relating to similar beds from Test Pit J.

19.3.2 Profiles of Test Pits G1 and G2

The profiles are described in Chapter 13: Test Pits G and J. In Test Pit G1 nearly 0.4m of modern and putatively ancient peat overlay about 0.5m of sandy clay which in turn covered sandy clay with abundant boulders. This contained prehistoric pottery and was thus an anthropogenic layer, possibly of the 3rd or 4th millennium BC. Under that was little-disturbed light green olive natural parent sandy clay.

In Test Pit G2, below a thin litter layer, 26cm of peat overlay 11cm of very dark greyish brown soil and 13cm of slightly lighter-coloured soil. On the surface of the uppermost soil stones up to 0.2m long seemed to define the re-entrant angle of a dry-stone structure. Thus the layer will have shown anthropogenic influence. The soils overlay a discontinuous root mat. Under that was 10cm of light green sandy clay above green sandy clay with dark staining. Flooding prevented observation of its base.

A pollen spot sample 2060 from layer 3 (presumably context 1340: uncemented compact green-brown silty clay) is described in Chapter 21: Pollen. It was assigned to straight after the clearance which marked the transition of zone CaN-2d to CaN-3a, which happened at some time between 2980 and 2510 cal BC.

21.3.3 Discussion of the results from the test pits

The dominance of precipitation over evapotranspiration on Lewis should lead to acid soil processes, but the very high clay content of the soils prevented strong podzolization where they were neither directly nor indirectly disturbed. The local presence of earthworms together with horizon differentiation suggests a weakly acidic soil.

Roadside cuttings in the area around Calanais displayed (almost invariably sloped) peaty gleyed podzols with iron pan and ochreous B horizons were fully developed. Also, where stone content was higher in part of the profile, humus penetration was marked leaving no obvious ochreous horizons, with an A horizon extending down to meet a green B/C or B1 one (notation depending on whether the soil derived from glacial till derived from Lewisian Gneiss or directly from the gneiss.

Pit G1 fits into the humus penetrated profile but abundant pottery and charcoal in the A2/B1 layer suggests anthropogenic disturbance prior to peat development. The sherds were of types possibly attributable to the 4th or 3rd millennium BC.

Pit G1 can therefore be considered to have a non-representative profile. Post-peat profile development has not established an ochreous horizon, but the stones would militate against this. The post-peat disturbance shows a wormed 'Hebridean black soil' or improved land, where presumably imported soil or sand with seaweed

Table 19.1 Layers in Test Pit J

Context	Depth	Colour	Description
1331	0 -2 cm		Litter layer; medium brown wet under grass
1332	2 - 8cm		Very wet medium brown peat, fibrous with fleshy roots
1333	8 - 11cm		Slightly dark fibrous peat
1334	11 - 14cm		Dark brown fibrous peat with grits and dried peat lumps. Regeneration layer.
1335	14 - 27cm		Orange brown fibrous peat
1336	27 - 48cm		Medium brown peat becoming orange brown downwards with a 20mm orange band at bottom. Mixed disturbed peat with grits and dried peat lumps.
1337	48 - 49cm		Orange band 0-2cm above it. Dark grey brown amorphous peat. Sharp boundary to:-
1338	49 - 55cm		Layer 1. Dark brown very rich humus rich clay with red brown fine roots; a few fleshy roots and abundant very fine fibrous roots and no mottle. Cemented, imbricated non-greasy, <1 cm rotted stones along with quartz grits and some charcoal. Sharp irregular and occasionally abrupt boundary to:-
1339	55 - 60cm		Layer 2. Medium brown slightly sandy silty clay with a slight yellow green tinge and diffuse indistinct dark brown mottles. Cemented but not as much as above. It contained 20% 2-6cm stones and 10% <1cm green stones all rotted but mineralogy retained. Abrupt lower horizon to:-
1340	60 - 68cm		Layer 3. Uncemented although very compact green brown silty clay with some white rotted stones less than 1cm in diameter at the top. Vertical fine fibrous roots very common
1341	68-70cm		Layer 4. Uncemented green subsoil. Pollen sample 2036 (Technical Note 13.4.2)
	70 cm		2mm root mat.
1342	70 downwards		Green clay loam; with a much cemented top surface.

and the floors and thatches of black houses are incorporated, the only visible remainder being the unstained quartz sand grains.

A Victorian date can be assumed for the lowest layer of peat above soils in Pit G2, or possibly a date in the first millennium BC when peat started to form near the main stone setting. There is no evidence for the date of the dry-stone wall-base on the surface of the uppermost soil.

Analysis of the pollen in the uncemented green subsoil of Pit J suggests that it was exposed to pollen rain between 1800 and 1500 cal BC, following cultivation in the immediate vicinity. On Area C some 10m to the SSE of test pit J the transition from soil to peat probably took place 500 to 1000 years later, between 920 and 400 cal BC (Chapter 8: Area C). If a similar date applies to Pit J basal peat then the intervening c. 0.2m of soils in that

profile probably reflect cultivation in the second and early first millennia BC, including all of pollen sub-zone CaN-3c when there were low levels of tree pollen and relatively high levels of grasses and heathers. They may have seen their main use during the cereal pollen value maximum seen in Leobag peat column CN3, at some time roughly between 1500 and 1200 cal BC.

19.4 Peat on the excavation areas

19.4.1 Ancient peat

Peat dating to the 1st millennium BC or earlier was found on several areas. Underneath Lady Matheson's Path on Area E the base of pre-clearance peat had been preserved. This was black and amorphous and had dried out forming a well developed crack system. It also survived in Area C below modern peat and above mineral soils, as a thin skim above a plough soil on Area E, and at the extreme edges of Areas B and D. On Area C basal peat was dated to between 920 cal BC (the earliest limit for the end of pollen sub-zone CaN-3d) and 400 cal BC (the latest limit for the radiocarbon date (GU-1403 2640+/-110) for humic acid from the peat.

It may not have been the earliest surviving peat at Calanais. There was a stone filled hollow on the northern side of Area E with a peaty fill (1013) subdivided into lenses. These layers might have been of any period after the immediately post-glacial one.

19.4.2 Modern peat

Modern peat seemed to have developed on Area E since the site was cleared in or before 1857, although it may have been in whole or part old peat broken up by grass roots and re-wormed to form a mull horizon (A0). It contained mineral material (mainly quartz grains). It covered the whole Area, except over the bedrock and Lady Matheson's Path where trampling by visitors had prevented its development. It had developed extra thickness around Stone 35a; this phenomenon occurred round some other stones at Calanais as described in the vegetation report (Chapter 20).

Lady Matheson's Path on Areas E and D was the only major post-peat feature at Calanais. On Area E it was built up with material derived from the indurated B3 horizon or lower, and formed the path and a thin line of recognisable degradation products spreading out across the site.

19.5 Compositional groups

Several distinct compositional groups were identified.

1. The simplest group consisted of green clay and its oxidised brown equivalent. It is supposed that thin green layers were not exposed to the sky for great lengths of time, and were not subsequently turbated, or they would have become brown. Thick unturbated layers may have retained a green core even if exposed to the air for a long time.

2. Turf lines, which commonly had a dark grey or black compressed litter layer above a lighter grey, soft textured material, were also usually fairly simple, though there was a surprising amount of textural variation between different examples. The possibility that they were in fact colloidal organic layers forming in soils below their contemporaneous surfaces was rejected because they were not diffuse and most of them seemed to form the top layer of soil development sequences. All the coherent and extensive occurrences of these layers indicated surfaces which had been open to the sky for a considerable time. In addition, patches of redeposited turfs resulting from human activities were found in both relatively early and relatively late soils.

3. The third compositional group consisted of mineral soils. Many of these had been worked over. The earliest surviving soils were related to cultivation beds and ploughing took place sporadically throughout the history of the place. Below the thickest and latest pre-peat soils, outside the cairn on Areas B, D and H, ard marks were visible.

4. Peaty soils of the early modern period (although a pit to the north of the cairn did contain a few lumps of peat, and some of the small features under the cairn are described in the original site record as containing peaty material).

5. Well developed mottled 'spotted dick' soils were most common on Area F, although they occurred under shallow peat elsewhere.

6. Ashy layers and dark clay layers were found on Area E near the gneiss bedrock.

7. Highly iron enriched layers disrespecting the other stratigraphy were found mainly on Area B where they probably reflect the prior presence of large amounts of organic-rich material such as thin turfs.

19.5.1 Compositional group 1: green clay and its oxidised equivalents

Green clay formed the natural base under all of the excavation areas apart from Area E where gneiss was exposed under thin soils.

Area DIII at Calanais was opened to allow inspection of relatively undisturbed clays outside the Ring. It included a roughly 2m wide roughly north-south band of lighter grey-green, stiffer, flakier clay suggesting that superficial subsoil layers may still contain useful information about local variations in clay formation processes. Details are provided in Chapter 9: Area D.

Other evidence for variations in the green clay came from the pit of the central monolith on Area D. The bottom of the green clay mound and the upper fill of the socket were quite variable; from west to east on section 102B (Chapter 9.8.8 Illus 9.142) the fills were brown-grey (presumably reflecting clay already modified by soil processes), green-yellow clay, stony fibrous green clay and simply green clay.

On each of Areas DI and DII a small pile of bright orange clay survived under a cultivation ridge and similar highly oxidised iron-rich clay also survived at the base of the succession. Their formation cannot have been due to downward movement of iron from higher levels and they were thus distinct from Compositional group 7.

The excavation of pits for standing stones of the Ring led to survival of a thin skim of turf and clay spoil in several areas. When the stones were erected large packing stones were used. The combined volume of the standing stone bases and the packing stones was a large proportion of that of the pits. Some 4 to 7 cubic metres of green clay was thus left over, the exact amount depending on a series of assumptions described in Chapter 24: Discussion. The preferred interpretation is that this clay and turf changed to a 30-40mm thick soil as a strong turf line formed on it.

Green clay also occurred in thicker layers. The preferred interpretation is that it was gained from borrow pits outwith the excavated areas spread out to provide a roughly level surface. On Area H it was over a layer referred to for convenience as a 'green clay platform'. Where sealed by the cairn it retained its colour. Elsewhere on Areas B, D and H the colours of similar clay spreads had been changed by soil processes to colours varying between greenish-grey, yellow-green and yellow brown.

The compositional group thus showed many minor variations, some due to differences in the parent material and some reflecting stages of conversion by soil processes.

19.5.2 Compositional group 2: turf lines

Table 19.2 Turf lines on Area F

	Munsell	Texture	Stones	Charcoal
620	7.5 YR 3/2 when moist	furry	0	X
631	Brown	soft furry	0	*
622	Dark brown	greasy	0	*
646	10 YR 2/1 black when moist & 10 YR 3/4 dark yellowish brown when dry	humus-rich	0	*

Turf line 646, humus-rich, stone and grit-free, was clearly visible in the side of stake-hole 644, and the fact that it was not present in the face of

the half section of the stake-hole confirms that the turf line was not a relatively recent colloidal pan. It provided a reference example for other buried turf lines (631, 622 & 620) on Area F. All were brown-black, non-stony and had a texture relatable to organic contents. Three of them lay only in hollows and over charcoal rich spreads.

Thin, black, greasy to velvety or furry textured layers were found on various excavation areas at Calanais. They had often been buried by spreading or dumping of clay, and in Area DII turfs including their litter layers had been stacked upside down, probably to form cultivation beds, in the fourth or early third millennium BC.

At least three thin black layers at the southern edge of Area D are shown in Illus 19.2. The top of the sequence in Table 19.3 was the basal 4cm of a 2nd millennium BC plough soil (315). The descriptions were provided by Dr S J P Bohncke (Chapter 21: Pollen).

Table 19.3 Turf lines in Area D

Depth in Kubiena box (cm)	Description
0-1	Humus-rich grit with recent root infiltrations
1-4	Humus-rich grit
4-5	'turf line' strong humus-rich
5-10	Humus-rich grit
10-11	'turf line' black humus-rich
11-13	Humus-rich grit
13-4	'turf line' black humus-rich

Similar sequences were preserved in Kubiena box profiles on Areas D (Chapter 9) and H (Chapter 12). They are discussed in Chapter 21: Pollen.

The visible turf lines largely consisted of the decayed litter layers of ground surfaces. On Areas B, D and H they were separated from each other by varying amounts. At some times they joined each other. At some times they were truncated by subsequent activities, particularly cultivation.

On Area S which was excavated only to an arbitrary shallow depth to allow soft landscaping, two old turf lines were identified (Chapter 14). In many places there was nothing between them. Their excavator commented as follows.

'… sterile and without visible charcoal or coarse material, [some] may have to be explained as peaty surface layers laid down after abandonment but before any development of topsoil. To say that they are buried turf layers needs more explanation … [they] may have been formed from the growth of something like moss over infertile subsoil during periods of disuse.'

Indeed, sphagnum spores were abundant in turf line 758 under the green clay platform on Area H (Chapter 12: Pollen). They may indeed reflect moss growth on top of an abandoned plough soil, which may have contributed to the strong black colour of this 'turf line'. However other turf lines contained much less evidence for moss growth and the clear soil developments associated with them suggest that they developed in pastureland.

Survival of turfs and turf lines seems to have depended on their being covered by clay-rich material. Despite local variations, overall there do seem to have been three successive turf lines in many places. One formed on the early cultivation beds referred to above after they had been somewhat flattened. One formed after the Ring had been set up, presumably on top of clay displaced from the pits dug to contain the orthostats. Where it survived this turf line was commonly the best defined at Calanais. Another formed on top of clay

Illus 19.2 Litter layers at the western edge of Area D (Film PO 10)

purposefully spread within the Ring at a later date. This latter was commonly very thin and patchy. It seems likely that it was commonly removed during excavation along with overlying dark soils and it was observed mainly in section. Other much more local turf lines formed in small areas where either local piles of clay or clay-rich silting in depressions had protected them.

19.5.3 Compositional groups 3-5: mineral soils

The main soil cover at Calanais showed a poor differentiation of the profile on most of the archaeological areas and no sharp contrast between the A and B layers. For instance, in some parts of Area E the A horizon was a gritty sandy clay (10 YR 2/1 black - 7.5 YR 3/2 dark brown) with rotted stones, continuous down to the indurated B3 horizon.

Poor differentiation was especially apparent on Area B east of the Ring where two mineral soil layers, 112 and 117, covered much of the area. In general soil layer 112 underlay 117 but elsewhere they were impossible to distinguish from one another. In the eastern part of Area B they were all that lay between modern topsoil and green clay parent material. In general they were lighter in colour than the top layers of an 'average' soil profile on Area F described below, probably because they were less humus-rich. These soil layers reflect cultivation at several periods before peat covered the place, along with development subsequent to removal of peat cover, and in truth their development was probably highly complex, with a series of developments modifying or removing the traces of earlier ones.

Below a thin layer of surviving basal peat in the north-east corner of Area B a mottled podzolised layer (156) survived at the top of mineral soil layer 112. Similar layers survived on thinly peat-covered Areas E and F. At the end of the East Row on Area C successive mineral soil layers 203 and 205 were similarly poorly differentiated, but they must have reflected only pre-peat cultivation and development because they were overlain by basal peat and a rapidly grown thick layer of modern peat. Their similarity to 112 and 117 on Area B suggests that the latter were predominantly a pre-peat development. Thus survival of a podzolised layer was a feature of areas covered for about a century and a half by a thin (rather than a thick) layer of relic peat.

Area E contained the edge of a ploughed layer (1012) directly under amorphous basal peat. It included gritty sandy clay, orange clay lumps and peat all mixed. Some pottery and flint came from it. It may reflect the original composition of some of the mineral soils described above.

On Area F, which lay some 10m north of the Ring, the top layers of an 'average' soil profile under the peat were well-typified by layer 613, an A1 humus-rich, illuviated, slightly cemented soil layer, very dark grey (10 YR 2.5/1) when dry, black (10 YR 2/1) when moist. No green minerals survived. This was the pre-peat surface where it was undamaged by the reintroduction of worms and roots.

Layer 613 lay over a generally similar A2/B1 soil layer (615) which was humus rich and possibly iron enriched, dark yellow brown (10 YR ¾) when dry and very dark brown (10 YR 2/2) when moist. It contained more colloidal humus than 613. It contained very weathered stones which had green minerals surviving when they were over 20 mm in diameter.

Although in general soil layer 615 overlay or is presumed to have overlain green clay, in parts of Area F, it overlay a buried topsoil / turf (631), a slight, probably natural depression (626) in the subsoil filled with brown rooty material, less gritty than surrounds, a possible ard mark (627), and a dark brown rooty clay. It seems likely that soil layer 615 was part of a plough soil which had incorporated earlier anthropogenic layers.

This short sequence had the characteristics of S. Limbrey's Bh, though much compressed and indurated. In poorly drained soils of the potential podzol areas of Scotland a similar sequence has been observed both above and below iron pans. An intricate discontinuous greasy humus pan was discernible in places, but was not visible in the side profile.

Below this pre-peat soil sequence was, in places, a stony yellow-green mottled clay-sandy clay (the Munsell colour chart did not cover these soils). It was partially indurated. The stones were very weathered, and often crumbly. Under that again was an altered version of the natural cemented green clay (623). It was green with mottles, stony

clay heavily imbricated by brown loose humus, and less well cemented than the layer above.

As already described, on Area H inside the Ring north of the cairn a thin mineral soil 756 survived. It overlay a weakly developed litter layer representing the pre-existing old ground surface and was overlain by a more strongly developed one which probably represents a ground surface which was stable for a considerable period of time. It was a 30-40mm thick layer of medium grey-green loam with inclusions of yellow-brown sandy clay and very brown greasy clay. It contained 10% rotten stone and some turf-like lumps and patches. It was not greasy when rubbed. It included decayed turfs, probably from excavation of the nearby Ring stone pit and it seems to show that when unaffected by ground-working mineral layers at Calanais could retain inhomogeneities reflecting their original makeup for long periods.

19.5.4 Compositional group 6 Ashy layers and dark clay layers

Ashy and dark clay layers survived only near the gneiss bedrock in hollows on Area E. Some variants of the native green clay had an ashy appearance when dry and more generally the ashy and dark clay layers may have reflected post-glacial processes. Although it is fair to say that their age and origin is not understood they were a very minor component of the compositional groups at Calanais.

19.5.5 Compositional group 7: highly iron-enriched layers

Iron pans survived in well-developed form only in two situations.

1. The vicinity of the wall of the enclosure east of the Ring on Area B. Often they had invaded stake holes.

2. Below organic-rich dark soils southeast of the passage entrance on Area B.

The iron pan reflected wet, somewhat acid soils with impeded drainage, allowing the migration of iron downwards, bleaching the upper soils and enriching lower soils. The origin of this iron-panning was not due to general conditions at Calanais because there was none in the other excavated sites nor in test pits G and J.

The iron pans associated with the enclosure wall probably resulted from the presence of humic acids in the subsequently bleached soils. One interpretation is that there was a turf component to the enclosure, which is interpreted as having three phases, the last two of which each had a stone wall-base. Perhaps the underlying bank was composed of turfs with a high organic content. Indeed, under the stone wall-base some of the iron pan seems to have formed round the edges and sides of stake holes. A stake and turf construction may be inferred. Perhaps a putative superstructure on the stone wall-base was turf-built.

I am grateful to Clare Wilson, then of Stirling University, for the following comments of March 2006 on the above observations. What follows is a summarised version.

Two factors may be at work. Firstly organic-rich turf acts a physical and chemical barrier to iron being translocated down-profile, and on some sites the chemistry suggests some down-profile leaching of iron but not enough to form a pan. Secondly, bacteria feeding on the organic matter in the turf, together with increased wetness (building a bank or a cairn raises the water table and the organic matter itself acts a bit like a sponge) can lead to a highly anaerobic environment promoting localized redistribution of iron. Perhaps the wooden stakes

Illus 19.3 Iron enrichment including panning in stake holes at the southwest end of the enclosure Film 1981-7-25

may have acted in the same way, or perhaps compaction at the edge of the stake holes meant these depressions already had a tendency to be wetter.

Care has to be taken when iron pans seem to have formed along deposit boundaries, as close inspection at some times shows that the iron pans have slowly migrated taking as they go colour, structure, and essentially the boundary, with them.

The iron pans below the dark soils southeast of the passage entrance may have resulted from a local concentration of burial-related organic-rich material.

19.6 Soil processes

Three kinds of soil processes were well represented, particularly on Area H: accretion, removal and modification in situ.

1. Accretion included the addition of material to parts of the area. For instance, agricultural rigs were created at an early stage, clay mounds were placed round the bases of imported standing stones, clay was laid to form a base for light timber structures found under the chambered cairn, imported stones were piled up to form the chambered cairn and peat grew to a depth of 1.5 m over the area.

2. Removal included for instance the digging of furrows between the early rigs, digging of holes for the Ring stones and slots for the late kerb stones, the dilapidation of the cairn, the cleaning out of the chamber both in the second millennium BC and in the early modern period; and peat cutting.

3. Modification in situ included spade cultivation of the old rigs in an episode of relatively flat cultivation, ploughing with an ard, growth of turf lines, chemical weathering (although not, on most parts of Calanais, iron panning) and bioturbation.

19.7 Summary description

Despite removal and modification processes of various kinds the vertical stratification in and around the Ring at Calanais was generally well preserved. Large areas were left unexcavated, and basal layers were left in many of the excavation areas.

The substrate of the place was mainly green clay showing local variations, and less frequently gneiss.

The soils included imported material; indeed some spreads may have been little modified since importation, particularly but not exclusively green clay characteristic of the local drift. Others may have included a melange of ritual deposits and, possibly, soil improvers.

Turf lines were well preserved. Their varied appearance reflects varying composition; some were moss-rich, others herb and grass rich. It seems likely that their development times also varied considerably.

The upper soils showed clear signs of sub-aerial weathering and in some parts of the area sub-peat weathering had left distinctive traces.

20. The Vegetation Survey

20.1 Introduction

Alan Fairweather and Marion Wade-Evans carried out the survey. The text here is largely that produced by them (Technical Note 20.1).

A brief overall description of the vegetation was produced in 1980. The main survey was undertaken in 1981. A subjective overall view of the site was taken. In all about 20 areas with different communities from their neighbours were discernible (Illus 20.1). Species occurrences and their relative frequencies were recorded. In the time available it was not possible to write a detailed comparative description of each of the 20 areas discerned but a general account of broad areas are given.

50 species of flowering plants were recorded as growing on the site (Table 19.1). Some species in addition to those identified were not seen at full expression complete with inflorescence so specific attribution could not be made. Gramineae identifications were aided by Hubbard, (1954) and flora by Keble Martin (1965); the most important aid to plant community identifications was McVean & Ratcliffe (1962).

20.2 Factors affecting the vegetation

Areas tended to merge from one community to the other and the differences were rarely clear cut. They owed more to varying abundance of dominant species than to the existence of totally different communities.

Most species were present in most areas and those that were infrequent or rare within the survey area as a whole did not form a very significant part of any one community. (Exceptions to species absence versus dominance were Calluna vulgaris, Ciprus Caespitosus, Juncus squarrosis, and Juncus effusis).

20.2.1 Previous agricultural use.

The mixed nature of the vegetation covering the area investigated and the comparatively rich nutrient status is in large part attributable to agriculture. The making and cultivating of cultivation beds probably involved the incorporation of seaweed, dung and shell sand (most probably at the same time) and not only improved nutrient status but changed local topography.

20.2.2 Peat stripping

Before cultivation (the visible remains of which probably belong in the 18th and early 19th centuries, peat was stripped from the site and the activities involved in this operation, including soil disturbance, trampling, soil peat mixing and exposure have contributed to the current vegetation mosaic.

20.2.3 Grazing

The grazing regime has had a considerable affect in that most of the site shows evidence of having been closely grazed by sheep until shortly before 1980 with a very high and ubiquitous incidence of Plantago lanceolata, Hypochaeris radicata, Bellis perennis and an almost complete absence of Polygala spp.(Milkwort). It is not detrimental to the maintenance of a close sward to allow grazing to continue; indeed now that sheep have been excluded the site could soon revert to a coarser rank growth of tussocks requiring mowing and reseeding etc.

20.2.4 Victorian and later repairs

Conservation of the archaeology involved the introduction of turf composed of Festuca species, Poa Plantago maritima and other species associated with a turf from a seaside or machair. This was especially noticeable on the cairn itself.

20.2.5 Disturbance by visitors

Visitor presence and pressure has caused a good deal of soil compaction and wear on the site round the stones and the cairn and on both formal (Lady Matheson's Path) and informal paths between entrances and points of interest. This was shown by the dominance of Plantago lanceolata and Poa species, with other trampling-resistant species present.

In addition visitor pressure has led to some soil disturbance (puddling) and impeded surface drainage with localised peripheral effects. Close to paths an expected enrichment of the vegetation was observed, probably because of nutrient import on footwear and more rapid freeing of nutrients in solution by surface disturbance. This effect is most noticeable on vegetation growing on a base-poor soil as that at Calanais. It is not so easily seen on richer swards.

20.2.6 Archaeological investigations

These have caused very significant effects. The most obvious is deturfing (1980 excavation and current) and heavy trampling and sward cover by spoil tips etc.

The long term effects of this disturbance will probably favour a better growth and richer vegetation mat as soil and subsoil and peat are mixed in back fill, and the replacement of turf will physically change the natural succession of colonisation of returfed areas favouring finer and lower growing species. Adequate drainage and restriction of trampling will help in this respect.

20.3 The vegetation

The vegetation areas are shown on Illus 20.1. They are described from south to north.

20.3.1 Area 16A

The south end of the site, bounded by a dry stone wall, was found to have a flora reflecting a rich nutrient status as shown by the presence of Dactylus glomerata, Lolium perenne, and Festuca pratensis, and a lush growth of other species and a notable absence of Scirpus and Calluna. This was probably because of the enrichment of the soil by leached material from the wall surface and former use of the wall as shelter by sheep and consequent enrichment from faeces and urine.

20.3.2 Area 16

On the west side of the site above test pit G1 and G2 an area of early modern cultivation beds showed a good cover of species indicating a relatively high nutrient status (but not as high as 16A) The dominant grass was Anthoxanthum odoratum with a scatter of Angelica sylvestris and Rumex acetosa whilst Agrostis app were well grown.

Area 17 and 17A to 17D

The early modern cultivation beds showed a comparatively high nutrient status reflected by a good growth of Anthoxanthum and Agrostis with Molinia present but not in tussock form. The richness of growth became more obvious as the beds went southwards, (for instance 17C was richer than 17A). 17a was more acid as shown by a relict patch of Calluna vulgaris and by the dry poor appearance of species growing in shallow soil.

20.3.3 Area 18

The path running northwards from the S end was readily distinguishable and showed an expected dominance of Plantago lanceolata and P maritima, both species resistant to trampling. The latter species may reflect turfs imported from a seaside or maritime environment for repairs.

20.3.4 Area 4

This area to the southwest of the Ring was in marked contrast to early modern cultivation beds, paths and the Ring. It was an example of a relict moorland community under heavy trampling and grazing pressure (surviving in area with increasing fertility?). It had typical heath mosaic associations with Calluna vulgaris (very poorly grown and worn down) Scirpus caespitosis and Juncus squarrosis tussocks with detritus mats of undecayed vegetation between them. Few other species were present, and those like Potentilla erecta confirmed an acidophilous community.

20.3.5 Area 14

This area to the northwest of the Ring was very similar to 4 but Calluna faded out and there were more Scirpus tussocks because these are more resistant to heavy trampling than Calluna.

20.3.6 Area 19

The area of the stone circle was heavily trampled. By each stone leached material from their faces had enriched the ground at their bases where a richer growth and less acidophilous species were found e.g. Poa, Festuca etc.

Within the circle the cairn had been covered in turf from machair or near the sea. This was much worn and trampled.

20.3.7 Area 13

The returfed 1980 Area F trenches showed poor recovery because of surface puddling and heavy traffic. They were poorly vegetated.

20.3.8 Area 15

The slope from the plateau to the western bluff had a flora typical of shallow soil acid moorland with Calluna, Eriophorum angustifolium and Festuca vivipira (the presence of E angustifolium is somewhat anomalous as although it is very acid-tolerant it is usually found in very wet situations in peat cuttings). The area showed a sharp and dramatic transition to deeper soil and a greener community including Agrostis and Anthoxanthum.

20.3.9 Area 20

This area lay to the north of Area 15. It was heavily trampled with frequent patches of Juncus squarrosus and Scirpus, with Juncus effusis in evidence. It was an area of impeded drainage with an acidophilous flora.

20.3.10 Area 11

This area lay on early modern cultivation beds between the east entrance to the site and the Avenue and Ring. It was much affected by trampling and broken up by paths. It was dominated by Juncus squarrosus patches and Scirpus tussocks increased in frequency. There does not seem to have been much distinction between the parts of this area identified topographically as probable cultivation beds and the area immediately to their south.

20.3.11 Area 12

Area 12, in the middle of the Avenue to the west of Area 11 was dominated by Molinia caerulea (ubiquitous throughout the site but dominant here although not in tussocks) and Nardus stricta. There were fewer tussocks of Scirpus.

Area 3

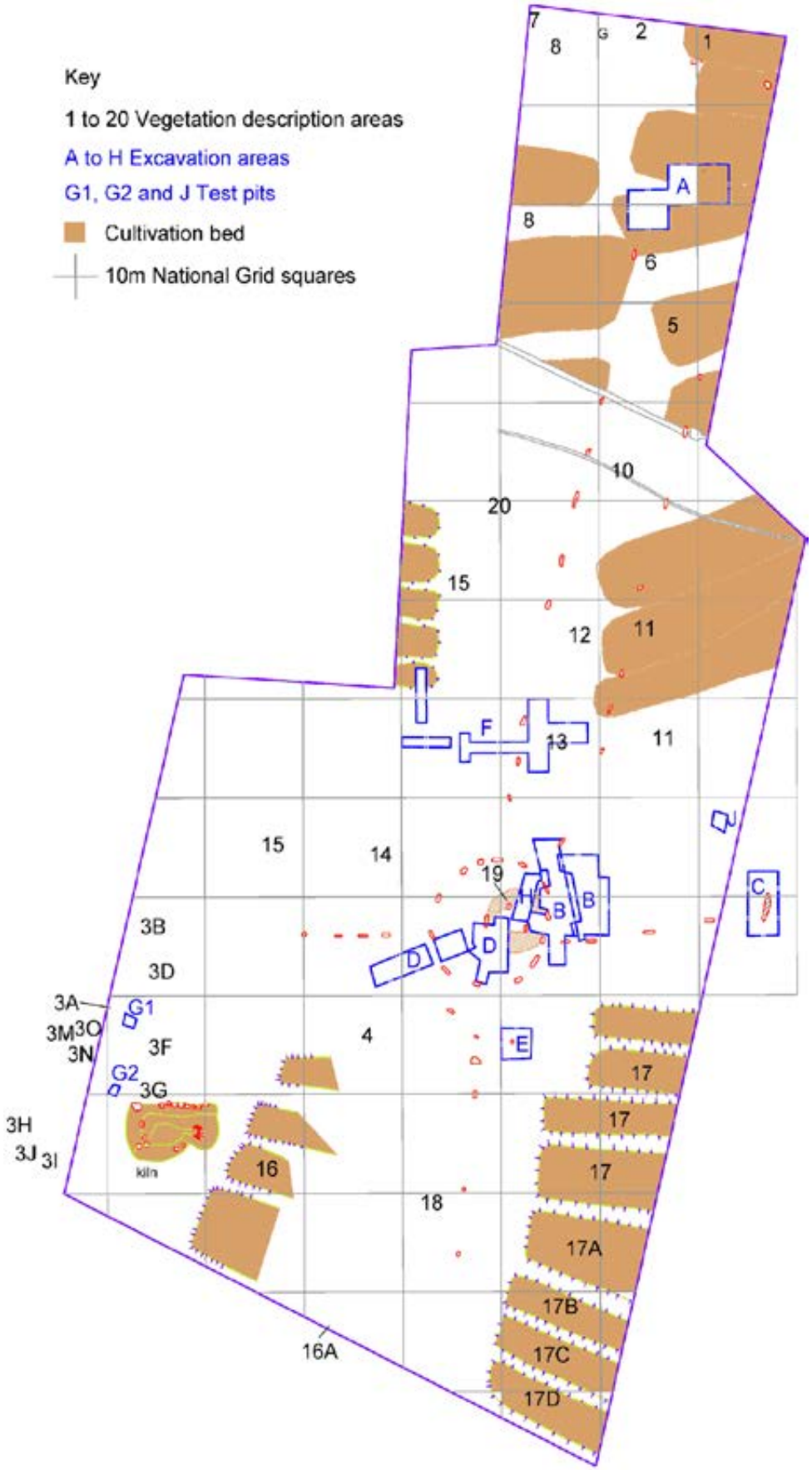
This area surrounded the test pits G1 and G2 and was approximately 10m in radius. It was extremely diverse within a comparatively small area and for this reason was divided into several facies (zones or communities).

20.3.12 Area 3A

This area lay just inside the fence. It bore a good lush growth of bent grass (Agrostis tenuis) with Yorkshire fog and creeping soft grass (Holcus lanatus and Homollis) with common rush (Juncus conglomeratus). Beside this dominant area were frequent tussocks of Molinia caerulea in the damp area. This abundance, with the moss Thuidium tameriscinum, indicated a damp acid area with a moving but high water table rarely drying out. Other species such as Viola riviniana (violet), Hieracium species and Leontodon and Centaurea nigra showed a reasonable high nutrient status (confirmed by the presence of Holcus species). This area with 3B may be described as a "flush", in that nutrients draining from higher areas became relatively concentrated or were regularly replenished by leached material.

20.3.13 Area 3B

The boggy depressions in the area supported a flora of impeded drainage and even stagnation (c.f. mosses of impeded drainage in surrounding hill land). Prime among these were sphagnum hummocks (S papillosum?) which in time may dominate and raise vegetation level above nutrient supplying ground water making a base poor ombrogenous bog. Within this area however, Viola, Festuca and Juncus conglomerata indicated a reasonable nutrient supply.



Illus 20.1 The vegetation areas

20.3.14 Area 3C

The edge of the cultivation bed within the fence was similar to Area 3A but more dominated by Molinia with Scirpus tussocks. Other species represented were Agrostis and Hieracia sp. The impression is of a Molinia facies representing a high but moving water table with an inflow of nutrients. Scirpus tussocks were an apparent relict of the former acid peat community generally represented throughout the site.

20.3.15 Area 3D

This area was a flat cultivation bed surface near test pit G2 dominated by Molinia with abundant Agrostis tenuis and a high incidence of Plantago lanceolata with a mix of occasional Senecio jacobea, Angelica sylvestris, Succisa pratensis and Hieracea species, indicating improved nutrient status. An abundance of Thuidium tamariscinum, and other mosses showed a high water table and relatively acid conditions but the other species mentioned above showed relative nutrient availability.

20.3.16 Area 3E

The 'ditch' at the edge of the cultivation bed showed an expected flora indicating a high water table and poor base status but with some influx of nutrients. It included frequent Thuidium tamariscinum moss and other moss species encountered in acid moorland conditions. Sphagnum species hummocks wee initiating in the ditch with Molinia and Juncus conglomerata, indicating very restricted water flow and a high water table. The slopes of the ditch had small plants of Calluna vulgaris with Festuca rubra and Deschampsia flexuosa all in all demonstrating an acidophilous association.

20.3.17 Area 3F

Numerous species were represented in this area (see Table 19.1). The variety reflected the topography of the area and thus the variable edaphic conditions mainly because of water table variations and nutrient flow concentrations and/or impedance. The overall picture was of acid ground water flow and more acid free-draining high points. The slow or impeded drainage flow was in the lower areas and allowed a build up of nutrients with a greater number of species existing in close proximity, although not really forming a community per se, more a mosaic of communities.

20.3.18 Area 3G

This area was much more trampled and bore a mat of undecayed vegetation, indicating low biological activity. The mass of the mat was made of Agrostis tenuis through which Holcus mollis and H lanatus occurred, indicating previous close grazing and a reasonably high nutrient status. In addition Plantago lanceolata was present confirming a sward kept very short by grazing or trampling.

20.3.19 Area 3H

This area lay outside the fence on a raised early modern cultivation bed. It had a closely grazed sward with distinct composition including much more Holcus mollis, Anthoxonthum odoratum, Plantago lanceolata and Bellis perennis. The species present indicated a drier richer area but still acid and obviously very closely grazed.

20.3.20 Area 3I

This area lay on the edge of a cultivation bed. It was characterised by Polytrichum (moss) species with some dark bare ground sparsely colonised by Hypochoeris radicata (Catsear) and P lanceolata. This was a very acid surface unmodified by vegetational colonisation.

20.3.21 Area 3J

The flora of this area was dominated by Molinia tussocks raised above the high water level and supporting species of drier habitat within and on top of the tussocks, for example Festuca rubra and Potentilla erecta. Again this was an acid area but reasonably rich with some presence of Anthoxanthum odoratum.

20.3.22 Area 3K

The association in this area was dominated by Juncus effusis tussocks and there were fewer grass species and much more moss indicative of a high water table. The area below the rocky bluff above the test pit was very rich in comparison to the other areas. There was a lush growth of Rumex acetosa, Festuca and Agrostis with Viola species growing in rock clefts. This indicated a nutrient flush zone. This area was often used by male diggers in 1980 and 1981 to urinate and the growth observed was in large part because of this.

20.3.23 Area 2

This area was a raised green area by Stone 19 at the north end of the Avenue. It had a freer draining soil with higher nutrient status, indicated by the greater presence of Trifolium repens and its effect (nitrogen fixation) on other plants in this area. The south-facing base of the stone was dry in appearance compared with the north side.
This was an example of a phenomenon typical of all stone base areas not trampled or disturbed by excavation. The stone face intercepts more rain and the consequent run-off leaches small but significant amounts of nutrients down into the soil at the stones base. This enrichment effect is most apparent in soils that are nutrient deficient. The effect is speeded up by the absence of lichens (a similar and more striking effect is noticed at the base of the north-facing wall at the south end of the monument), slow water flow on the stone surfaces and thus slow washing effecting the abundance and dominance of rosette-forming and low growing species. Bellis perennis, Hieracia, clover and P lanceolata indicated the pressures keeping the sward short i.e. grazing and/or trampling.

20.4 Discussion

The whole site could be described as a Molinietum, i.e. a community consistently containing an abundance of Molinia caerulea although not always forming tussocks. This was probably because of frequent disturbance and heavy grazing and trampling pressure.

The communities are best described as a superimposition on the Molietum. Molinia itself is indicative in general of a high but moving water table on acid land.

Areas 4, 14 and acid 15 (described above) with Calluna, Molinia, Scirpus, and J squarrosus forming a mosaic gave the nearest approximation to the probable site vegetation before peat cutting cleared it (compare Calluna etc. land in surrounding district).

20.5 Calanais species list

Latin name	Common name
Agrostis tenuis	Bent grass
Agrostis canina	Bent grass
Angelica sylvestris	Angelica
Anthoxanthum odoratum	Sweet vernal grass
Bellis perennis	Daisy
Calluna vulgaris	Heather
Carex species	Sedges
Centaurea nigra	Knapweed, hard heads
Cynosurus cristatus	Crested dog's tail grass
Dactylis glomerata	Cocks foot grass
Eriophorum angustifolium	Bog cotton
Cardomine pratensis	Cuckoo flower
Dactylorhiza maculata	Heath orchid
Deschampsia flexuosa	Wavy hair grass
Festuca rubra	Red fescue
Festuca vivipira	Viviparous fescue
Festuca pratensis	Meadow fescue
Hieracium species	Hawk bits
Holeus mollis	Creeping soft grass
Holcus lanatus	Yorkshire fog grass
Juncus effuses	Soft rush
Juncus conglomeratus	Common rush
Juncus squarrosis	Health rush
Leontodon autumnalis	Autumn hawk bit
Luzula pilulifera	Woodrushes
Luzula multiflora	Woodrushes
Luzula campestris	Woodrushes
Lolium perenne	Perennial rye grass
Molinia caerulea	Purple moor grass
Nardus stricta	Moor mat grass
Pedicularis sylvatica	Louse wart
Plantago lanceolata	Ribwort plantain
Plantago maritima	See plantain
Poa annua	Annual meadow grass
Poa pratensis	Meadow grass
Poa trivialis	Meadow grass
Potentilla erecta	Tormentil
Potentilla anserina	Pig weed, silver weed
Polygala vulgaris	Milkwort
Ranunculus acris	Buttercup
Ranunculus repens	Buttercup
Senecio jacobea	Ragwort
Succisa pratensis	Revels bit scabious
Viola riviniana	Violet
Scirpus caespitosus (Trichophorum cespitosum)	Deer grass
Trifolium repens	White clover
Thudium tamariscinum	Moss
Sphagnum species	Sphagnum moss
Polytrichum species	Moss
Athyrium felix-femina	Lady fern

21. Palaeoenvironment

S J P Bohncke, P J Ashmore and R Tipping

Illus 21.1 The main stone setting and the peninsula of Callanish Leobag

21.1 Introduction

21.1.1 Introductory note by P J Ashmore

A full draft report on the Calanais palaeoenvironment was prepared by Dr S Bohncke in 1982. My long delay in producing the Calanais excavation report meant that it became impossible for him to revise his draft. Dr Tipping has added some discussion in collaboration with Dr Bohncke. I have added dating information, illustrations showing where spot samples were taken, archaeological context and discussion.

21.1.2 Research into the prehistoric environment of the Calanais area

Much exploration of the past environment around Calanais has been undertaken over the past few decades (see Chapter 21.3.14). In the Callanish Leobag project three pollen columns were obtained within a few metres of each other from blanket peat (Bohncke 1988, fig. 2). The pollen source areas, the area from which most pollen comes, is small, probably only tens to a few hundreds of metres around. CN1 and CN3 share the same pollen source area. Columns CN1 and CN3 were radiocarbon-dated in detail (Table 21.1; Bohncke 1988). The pollen contents of CN1 and CN3 at time intervals relevant to this project were re-analysed by Dr Bohncke for this report (Section 21.3).

21.1.3 On-site spot samples from Calanais

57 spot samples taken during the 1980 and 1981 excavations at Calanais were analysed to help create a refined bio-stratigraphic dating of the features discovered and to resolve correlation problems, to assess 'turf lines' and plough-turned layers and to throw light on the origin of the material in some layers. Some of the turf lines discovered then were sampled in Kubiena boxes taken in 1981 (Areas E and H) and in partially re-opened excavation trenches in 1982 (Area D).

21.1.4 Treatment of the pollen samples

The sub-samples taken from the peat columns CN3 and CN1 at Callanish Leobag were treated with KOH and subsequently acetolysed according to Faegri and Iversen (1975). The samples taken from the Kubiena boxes and the spot samples from the excavation site were treated in the same way; but for the removal of sand and clay particles a separation in heavy liquid (bromoform-alcohol

Illus 21.2 The peninsula of Callanish Leobag from the main stone setting at Calanais [Cal 1981 Large Format 8]

mixture, specific gravity 2) followed by a night in 40% HF was added to the preparation method. The residue was mounted on a slide embedded in glycerine jelly and sealed with paraffin wax.

The spot samples from the 1980 and 1981 excavations at Calanais had suffered from desiccation. This may have affected the condition of the pollen. The spot samples and samples from Kubiena boxes sometimes gave problems in this respect due to the poorer preservation of the pollen. Some pollen appeared to have shrunk, which made the identification of pollen of the Cerealia type difficult.

21.1.5 The pollen diagrams and tables

The pollen sum used for the construction of pollen-diagrams and tables is of total land pollen (%tlp), excluding pollen of aquatic plants ands spores of mosses and ferns. A pollen sum of at least 500 was sought, to allow confidence that species occurring in low frequencies could still be recorded.

21.2 Dating

21.2.1 Introduction

C14 assays are from 1.0cm or 2.0cm thick peat slices except GU-1234, from a 6-7cm thick chunk. Mid-depths are listed in Table 21.1. Bohncke (1988) reported three uncalibrated C14 assays from peat for the 64cm thick column of CN1 (samples GU-1170, -1171 and 1095). Two additional assays are reported in Table 21.1. Bohncke (1988) lists nine assays from peat at CN3 and two from Betula (birch) wood. In Table 21.1 these assays (GU-1150 and -1151) are regarded as separate, from a small distance away, dating the late stage of a Betula carr.

In Table 21.1 the errors quoted by the laboratory for the first eight assays and the last have been corrected by multiplying by 1.4 and then increasing the result to +/-110 if less (Ashmore et al 2000). The errors attached to ages in the main sequence from pollen profile CN3 did not

21.3.2 The radiocarbon ages

Table 21.1 The radiocarbon ages

Description	Lab Code	Lab Age	Lab Error	Corr Error
Betula wood from a late stage of natural carr formation	GU-1150	5110	90	126
Betula wood from a late stage of natural carr formation	GU-1151	5180	90	126
CN1: peat from 18.0cm below the top	GU-1289	2440	80	112
peat from 19cm below the top	GU-1170	2355	65	110
peat from 48.0cm below the top	GU-1290	2960	95	133
peat from 49.0cm below the top	GU-1171	3220	65	110
peat from 64.0cm below the top, at the base	GU-1095	4810	60	110
CN2: peat from 30cm below the top	GU-1235	255	65	110
CN3: peat from 10cm below the top	GU-1986	3010	50	
peat from 15cm below the top	GU-1987	3430	55	
peat from 19cm below the top	GU-1988	3890	55	
peat from 23cm below the top	GU-1989	4005	60	
peat from 27cm below the top	GU-1990	4225	65	
peat from 30cm below the top	GU-1991	4525	60	
peat from 33cm below the top	GU-1992	4860	60	
peat from 37cm below the top	GU-1993	5035	60	
peat from 53.5cm below the top and 10cm above the base	GU-1234	7270	100	140

require correction. Calibrated dates are listed in Table 21.2.

21.2.3 Calibration and dating of the pollen diagrams from CN1 and CN3

The dates were calibrated using OxCal 3.10 (Bronk Ramsay 1995, 2005) and the 2004 calibration curve. Although the latter has been superseded the changes are fairly insignificant in the periods discussed here, particularly given the size of the errors attached to the dates. Pollen zone and sub-zone boundaries are defined in detail in Chapter 21.3.

In Table 21.2 the combined date for the boundary between subzones CaN3b and 3c, seen in both the CN1 and CN3 cores, was calculated using OxCal 3.10. The dates initially showed poor agreement (A=55.6%; Ac = 60%). After further calculation marginal agreement was reached (A=66.1%; Ac = 60%) for the calculated date shown in Table 21.2.

With one exception interpolated dates are based on adjacent dates in CN1 or in CN3 rather than the longer trend lines of age against peat depth. Thus each interpolation depends heavily on a single pair of dates which suffer all the imprecision inherent in single radiocarbon dates. But using more than the closest dates was rejected because it is likely that peat thickness per century varied within each column and therefore using longer trend lines would introduce new errors.

The exception is the transition between subzone CaN-3ai and CaN-3aii for which two methods were used. In Method 1 adjacent dates were used but that made the result very dependent on GU-1989; in Method 2 the calculation was based on GU-1988 and the interpolated date of the boundary between CN3 subzone 2d and CN3 3a; which in turn was based on GU-1989 and GU-1990.

The peat in the earlier part of column CN3 seems to have grown more slowly than that above about 37cm (Illus 21.3). Given the lack of check dates between 37cm and 53.5cm the interpolated dates and those projected back to the start of the column, based as they are on an assumption of even growth between the 37cm and 60cm levels (CN3 subzones 2a to 2b and 1 to 2a and the start of CN3 zone 1), must be regarded as unreliable. If that problem is ignored they imply that peat started to grow between two and three millennia after the end of the Younger Dryas (taken here as 9600 cal BC).

Table 21.3 Dates with severe interpretational problems, omitted from Table 21.2a

Description			late 2 σ cal BC	early 2 σ cal BC
Peat CN/IL from base of peat profile 65cm from top	3b CN1	GU-1095	3350 cal BC	3950 cal BC
CN3/119		GU-1235	1960 cal AD	1470 cal AD

Two assays have been left out of the analysis to date. Assay GU-1095 from the base of the CN1 column was much older than expected given the other dating information and the depth from which it was obtained (Illus 21.3). The sample may have been derived from soil that contained residual organic carbon, or it may represent early shallow local peat formation in an area of impeded drainage with, in effect, a discontinuity before the start of continuous peat growth. It might be suggested as an alternative that the basal peat grew very slowly but there is no suggestion of that at the nearby CN3 column in this period: assay GU-1095 has been ignored in what follows.

Assay GU-1235 (225+/65 BP) probably reflects post-medieval peat growth after cutting. This assay has also been ignored.

Illus 21.3 shows the preferred solution to matching the dating information from the CN1 and CN3 peat columns. It comprises two elements. 1. The coloured rectangles represent the 1 and 2 sigma (σ) C14 age errors (vertical) and date errors (horizontal); they are shown on the calibration curve and the true chronological scale along the bottom applies to them. The green rectangles are CN1 column dates and the orange ones are CN3 column dates.

Table 21.2 The one and two sigma dates for the radiocarbon ages and (in red) those calculated for zone and sub-zone boundaries

Description	Pollen sub-zones	CN1: peat depth	CN3: peat depth	Code	late 2 σ cal BC	late 1 σ cal BC	early 1 σ cal BC	early 2σ cal BC
Projected	3e-4	10			-86	17	516	564
Peat	3e	18		GU-1289	200	400	760	850
Peat	3e	19		GU-1170	150	200	750	800
Interpolated	3d-3e	25			262	340	859	921
Interpolated	3c-3d	30			424	519	993	1072
Peat	3c		10	GU-1986	1110	1130	1380	1410
Peat	3c	48		GU-1290	800	1010	1380	1500
Peat	3b-c	49		GU-1171	1200	1380	1640	1800
Calculated	3b-3c	-	-		1520	1520	1750	1880
Peat	3b-c		15	GU-1987	1600	1660	1880	1900
Peat	3a-b		19	GU-1988	2200	2290	2470	2560
Interpolated Method 1	3ai-3aii		22.5		2290	2445	2605	2865
Interpolated Method 2	3ai-3aii		22.5		2355	2455	2655	2770
Peat	3a		23	GU-1989	2300	2460	2620	2900
Interpolated	2d-3a		26		2510	2620	2840	2985
Peat	2d		27	GU-1990	2580	2670	2910	3010
Peat	2c-d		30	GU-1991	3020	3100	3360	3490
Peat	2c		33	GU-1992	3510	3530	3710	3780
Interpolated	2c cereal		35		3605	3650	3830	3875
Peat	2c		37	GU-1993	3700	3770	3950	3970
Interpolated	2b-c		38		3830	3905	4095	4120
Interpolated	2a-b		51		5525	5660	5980	6075
Interpolated	sharp Betula fall		52		5655	5795	6215	6225
Peat	2a		53.5	GU-1234	5850	6000	6340	6450
Projected	1-2a		55		6045	6205	6555	6675
Projected	charcoal appears		57		6305	6475	6845	6975
Projected	start		60		6695	6880	7280	7425

2. Thin blue vertical bars for the 2 σ ages of peat samples in CN1, arranged horizontally by peat depths (top green scale) and thin red vertical bars for CN3 ages (top pink scale). The age-bars are connected by straight lines and the areas between them coloured grey-green for CN1 and magenta for CN3.

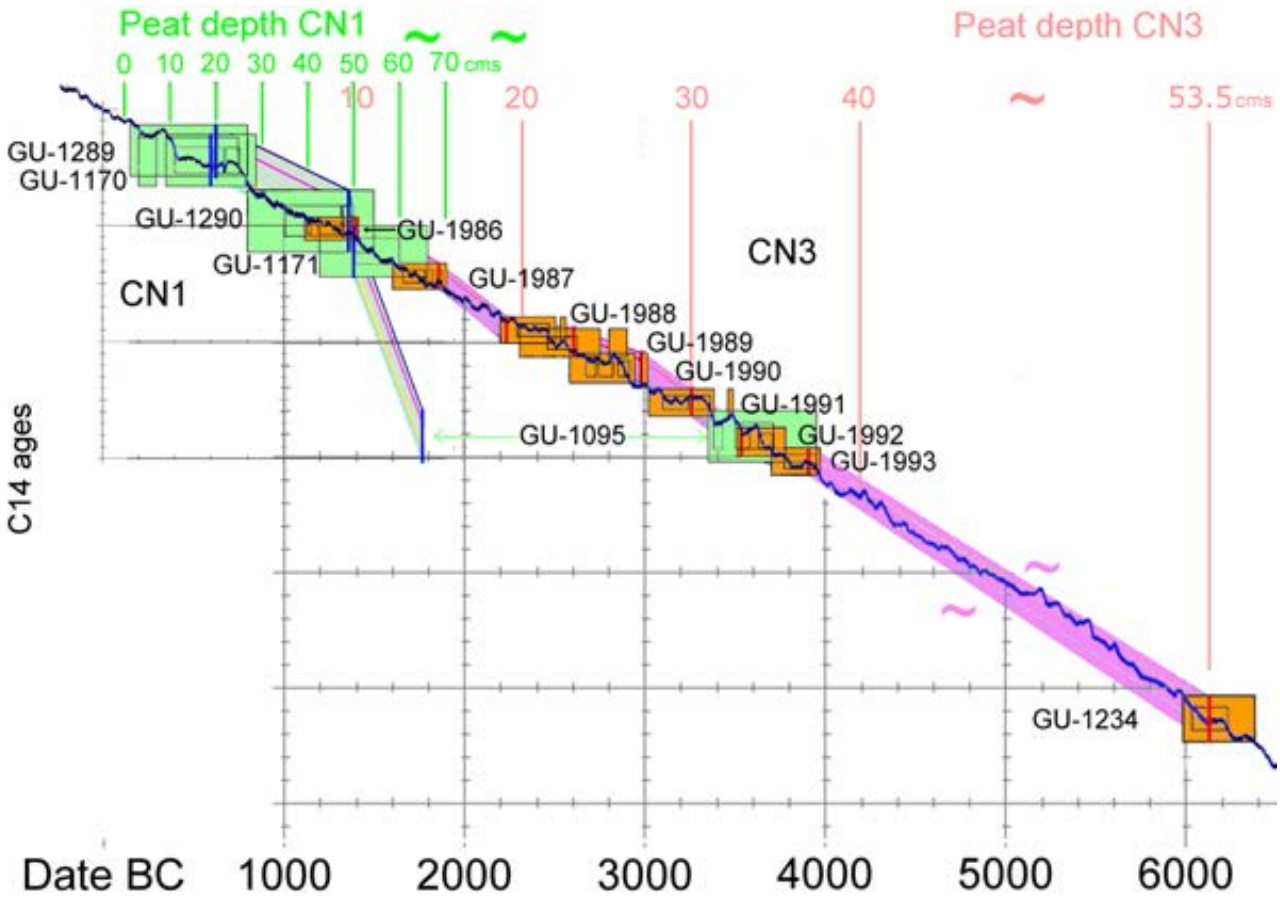
In constructing the diagram the horizontal positions of the blue and red age-bars were defined by the peat depth scales and the vertical positions fixed by the age scale (horizontal grid lines). The main constraint was that the age-bars had to fit within the corresponding coloured rectangles, which were in fixed date and age positions defined by the grid lines.

It is clear that the peat in CN1 was on average about three times as thick per century as the peat in CN3 above 37cm, perhaps because it had grown three times as fast or possibly because it was less compressed, or both. Between c. 6000 BC and 4000 BC the peat in CN3 grew on average more slowly than in the next 3500 years; as discussed below there may have been another variation in peat growth near the top of CN3.

With the (at best approximately right) assumption of even peat growth in most of CN1 and CN3 several subtly different matches were possible between the red and blue age bars and the corresponding sets of coloured rectangles representing C14 ages. The matches must be regarded as indicative rather than correct. Nevertheless, there are some severe constraints in making them.

Illus 21.3a shows the preferred compromise from a C14 dating point of view between dating and zoning information; but it does conceal a problem in matching CN1 and CN3. Correlation on palynological grounds indicates that the 15cm level in CN3 should correspond to the 50cm level in CN1.

Assuming slower peat growth in CN1 and in the upper 20cm of CN3 could remove that problem (Illus 21.3b). But if correct the C14 date GU-



Ilus 21.3a The dates from CN1 and CN3

1290 was too young by over 2 sigma and GU-1289 and GU-1170 were both rather 'young', although both just within the quoted 2 sigma limits.

Illus 21.4 shows the two pollen columns with CN1 and the part of CN3 between about 10cm and 37cm at approximately the same timescale as each other (assuming even peat growth in each column during the period covered). The two red lines, at 15cm on CN3 and at 50cm on CN1 represent the boundary between CN3 subzones 3b and 3c, used to correlate the two columns in the pollen analysis. This match is different from those shown in Illus 21.3a and 21.3b because it is based purely on a palynological assessment of human interference in the landscape.

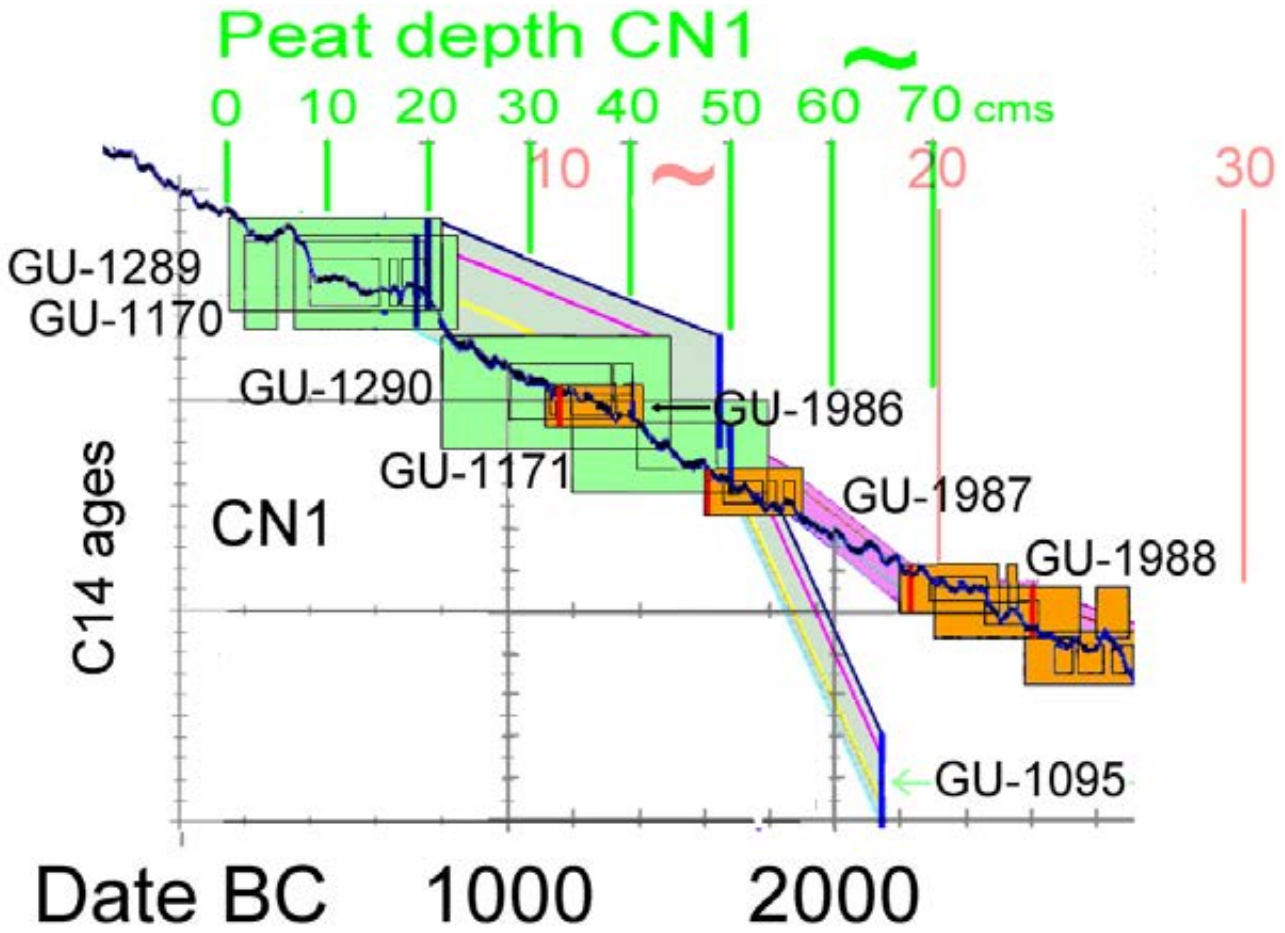
21.2.4 Dating of the Betula carr

Two dates were obtained for Betula carr (Tables 2.1, 21.2). They suggest that the trees were growing at some date between 4350 and 3700 cal BC, towards the end of CaN- subzone 2b, when there was birch regeneration (below).

21.2.5 Discussion

A richer set of radiocarbon dates would not have come amiss, to help capture variations in peat thickness per century. Interpolation of dates was based on an assumption that peat depth in each column did not vary between each pair of dated samples. The alternative of using peat growth rates averaged over longer periods would have been more risky (see Illus 21.3 and Table 21.2).

The dating information is unsatisfactory in another way. The measurement of the CN1 samples took place at a time when dating equipment required considerable further development and even those for the CN3 samples were not of the precision which could be expected for dates measured



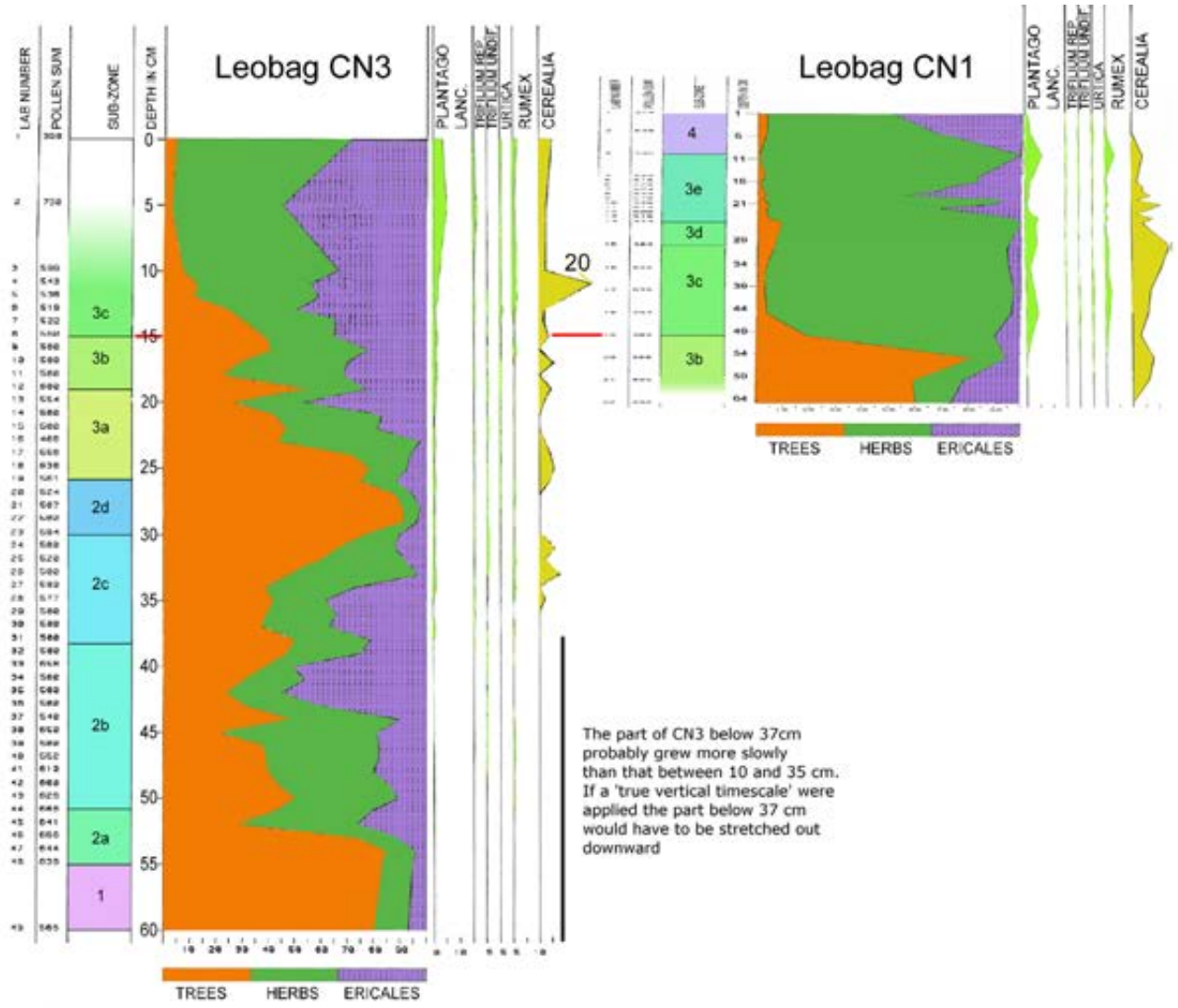
Illus 21.3b The top left part of Illus 21.3 with reduced peat growth rates for all of CN1 and the upper part of CN3.

today. That may have contributed to the fact that the dates for the CN3 subzone boundary 3b-3c, one from the CN1 column and the other from the CN3 column, were nearly significantly different from one another; there is only a bit better than 1 in 20 chance that the ages could have come from contemporaneous samples (Table 21.2).

The apparent conflict between dating and pollen-analytical information around the CN3 subzones 3b-3c boundary suggests that further intensive work at Callanish Leobag is desirable. The conflict does not affect the earlier period when most of the structures at Calanais were built but abundant modern dates would refine the chronology.

21.3 The Callanish-3 (CN3) and Callanish-1 (CN1) pollen columns

The 60cm deep CN3 peat column presented by Bohncke (1988) was re-analysed in 1cm intervals between 10 and 55cm. Likewise the 65cm thick pollen record at CN1 was re-analysed between 15 and 25cm. This refinement leads to a more detailed zonation of the successive stages of vegetation change in comparison with the originals of Bohncke (1988). The pollen diagrams are plotted against depth separately in Illus 21.6 and 21.7, but following chrono-stratographic and bio-stratigraphic correlation, the two share a common zonation scheme from CaN-1 to CaN-4: several



Illus 21.4 The CN1 and CN3 columns at approximately the same vertical timescale as each other

zones are sub-divided. Note that curves for pollen representing the heath communities, Calluna, other Ericaceae, Empetrum and Arctostaphylos were left out in error from Illus 21.6 and 21.7: they can be found in Bohncke (1988: figures 5a, band c). Their proportions at CN3 and CN1 are described in the text below.

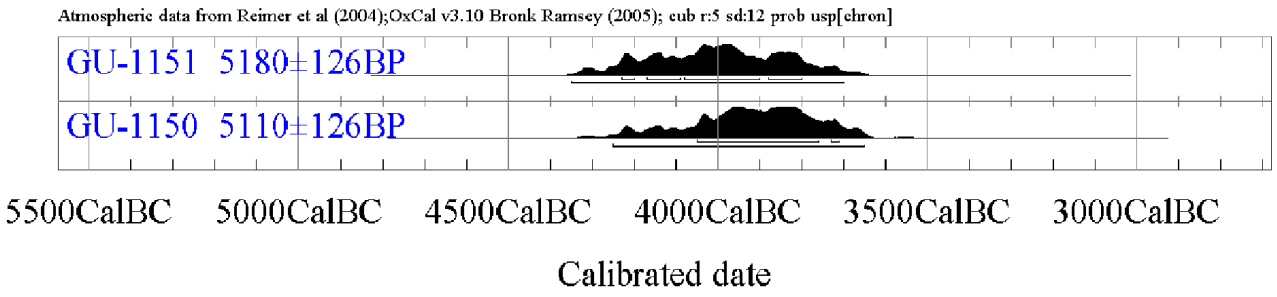
Glossary of common names for pollen types (taxa) reading left to right in Figures 21.6 and 21.7

Betula = birch
Quercus = oak
Corylus = hazel
Salix = willow
Populus = poplar / aspen
Alnus = alder
Pinus = Scot's pine
Ulmus = elm
Poaceae = undifferentiated grasses
Cyperaceae = sedges / rushes
Lonicera = honeysuckle
Melampyrum = cow-wheat
Potentilla-type = tormentils
Narthecium = bog asphodel
Pedicularis = lousewort
Polygala = milkwort
Succisa = devilsbit scabious
Ranunculaceae = buttercups
Brassicaceae = part of the cabbage family
Plantago lanc = ribwort plantain
Trifolium rep = clover
Urtica = nettles
Rumex acet = docks, sorrels
Cerealia-type = cultivated and some wild grasses
Anthoceras = hornwort
Asteraceae tub = part of the daisy family
Asteraceae lig = part of the daisy family
Chenopodiaceae = goosefoots
Spergula arv = corn spurrey
Convulvulus = field bindweed
Polygonum pers = redshank
Plantago mar = sea plantain
Triglochin = arrow-grasses
Pteridium = bracken
Sphagnum = bog-moss

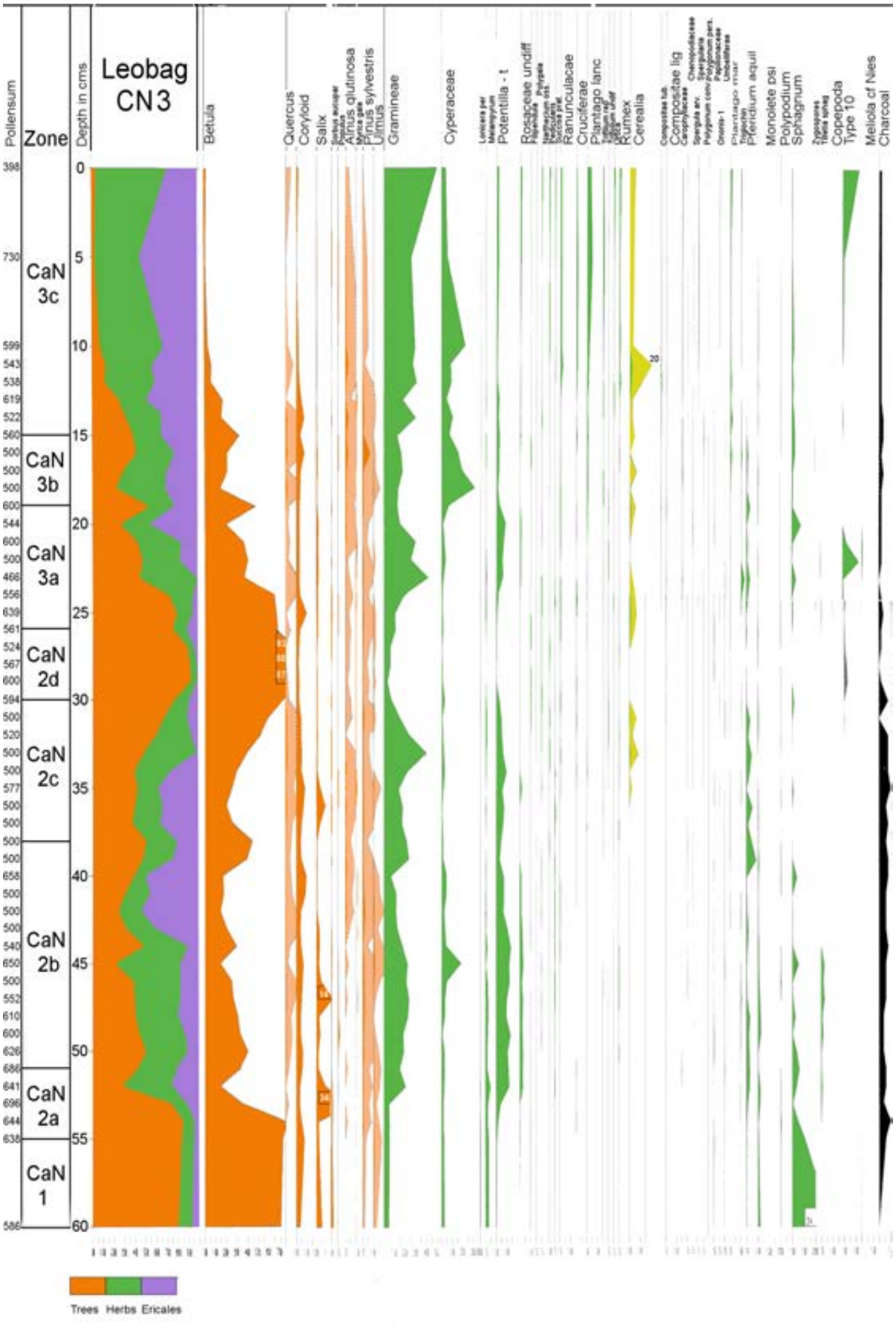
21.3.1 Zone CaN-1 (60-55cm at CN3; not present at CN1)

Zone CaN-1 is not directly dated. The abundance of Betula pollen and the very low representation of other tree pollen types with region-scale synchroneity (Corylus, Quercus, Ulmus: Birks 1989) restrict accurate age estimates. Projection backward of peat growth rates suggests that the record commenced in the last half of the 8th or the first third of the 7th millennium BC. Although there are uncertainties about peat growth rates its upper boundary is fairly close to the level dated by GU-1234 at 53.5cm (Table 21.1) and the projected date for its end at between 6675 and 6045 cal BC should be fairly accurate (Table 21.2).

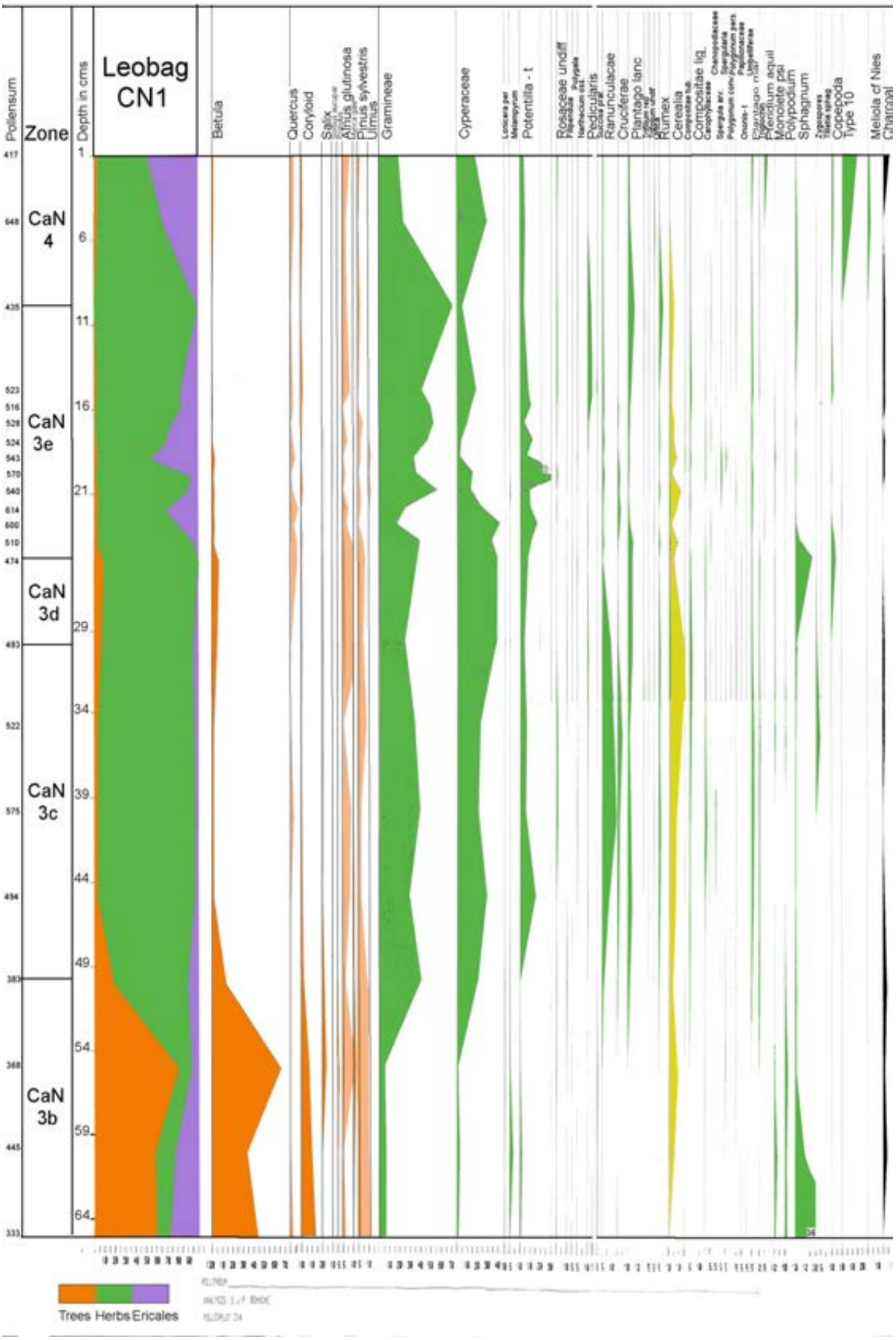
The zone is characterised by high arboreal pollen (AP) percentages, almost entirely of Betula (birch). There is no requirement to regard Coryloid pollen (cf. Corylus), Sorbus, Ulmus, Pinus or Quercus as having grown locally, athough Bohncke (1988) argues this for Sorbus and Corylus. With this lack of competition, Betula will have colonised all substrates, on mineral soils and on Sphagnum-rich peat as at CN3 itself. Salix (willow) is under-represented as a pollen type, so there were actually more willow plants than the pollen



Illus 21.5 The C14 assays for a late stage in formation of the Betula (birch) carr



Illus 21.6 The CN3 pollen diagram from Callanish Leobag



Illus 21.7 The CN1 pollen diagram from Callanish Leobag

count appears to suggest, and it grew alongside Betula. Melampyrum (cf. M. pratense in the Outer Isles) and Lonicera periclymenum are herbs of open woodland and scrub. Areas of open ground were very limited, supporting Gramineae and Ericaceae with some Cyperaceae, Filipendula, Succisa pratensis, Cruciferae, Umbelliferae and some ferns such as Pteridium aquilinum. Empetrum is better represented than Calluna (Bohncke 1988, fig. 5a) which suggests the development of dry heath at this time. Proportions of microscopic charcoal fragments increase.

21.3.2 Zone CaN-2 (55-26cm at CN3; not present at CN1)

The projected date for the start of CaN-2 is between 6675 and 6045 cal BC. The zone probably ends at some date between 2985 and 2510 cal BC. Zone CaN-2 zone is subdivided into four subzones, based on fluctuations in the Betula curve.

21.3.3 Sub-zone CaN-2a (55-51cm at CN3; not present at CN1)

This sub-zone probably started at some date between 6675 and 6045 cal BC. Betula percentages fall suddenly to 14% at 52cm, probably between 6225 and 5655 cal BC. Microscopic charcoal is relatively abundant above 54cm. There need have been no causal relation between the loss of Betula and burning because charcoal fragments may have become more common in the peat as the Betula canopy was reduced. In the same way, Quercus and Pinus pollen may be more common only because there was less Betula pollen. With Betula loss came the expansion of Salix, to 34% at 53cm. Open ground indicators like Gramineae increase, but perhaps only because the Salix canopy cover was less dense, not because there was more open ground. Consistent with this is the maintenance of the record for Melampyrum, though the abundant grains of Potentilla type, if of P. erecta (tormentil) suggest grassland that was rapidly established. Empetrum pollen is only rarely recorded. Calluna is more common. Local ground conditions around CN3 possibly became markedly drier with the reduction of Sphagnum.

21.3.4 Sub-zone CaN-2b (51-38cm at CN3; not present at CN1)

This sub-zone started at some date between 6075 and 5525 cal BC. Betula values fluctuate markedly. In the lower part of the subzone, as in subzone CaN-2a, this is inversely related to the abundance of Salix, possibly cyclic, affecting each generation of a species over the c 500 years between 53 and 47cm. Gramineae values rise slowly, as do those of Calluna and other, undefined Ericaceae. Potentilla and Melampyrum do not rise at all, indicating little increase in open ground. The species of Rosaceae recorded more commonly cannot be defined.

The occurrence of Tilletia sphagni reflects the local growth and probable abundance of Sphagnum on the peat surface, peaking at 45cm at the same depth/time as that of the highest values for Cyperaceae. These changes suggest a wetter peat surface then, but the subsequent loss of Tilletia sphagni and Sphagnum above 44cm, between 5375 and 4825 cal BC, suggests a dryer peat surface. Betula was adversely affected. The local Salix population disappeared. Melampyrum probably became more scarce because woodland in which it grew was reduced. Coryloid pollen, probably Corylus, increased modestly but no other tree type expanded significantly to take advantage of the ground surrendered by Betula and Salix: Ulmus and Alnus pollen are recorded contiguously but neither at proportions reflecting local colonisation. Grassland with Potentilla also declined from 45cm to 40cm. It was Ericaceous and Calluna heath that gained most from the shift to dryer ground, expanding greatly, the latter to 46 %tlp at the end of zone CaN-2b (Bohncke 1988).

The end of the continuous curve for Ulmus at 40cm probably reflects the reduction of Ulmus pollen from air masses over north west Europe at around 3800 cal BC. The recovery of Betula above 40cm, between 4700 and 4150 cal BC, coincides with an increase in Gramineae, and in Pteridium, a fall in Cyperaceae and the local absence of Sphagnum as the ground became drier. The Ericaceae increase towards the top of the subzone. Numbers of microscopic charcoal fragments fall at the start of the zone but remain comparatively common.

21.3.5 Sub-zone CaN-2c (38-30cm at CN3; not present at CN1)

This sub-zone starts only 1cm below the peat level dated by GU-1993, some time between 4120 and 3830 cal BC. Betula values fall briefly early in the zone. Salix was re-established as a dominant taxon for a short time before fading to become a low but constant background. Ericaceae also increased. Alnus may have become locally established but it was not a significant tree and could not resist the major recovery of Betula woodland after a time between 4000 and 3450 cal BC. This recovery can be demonstrated at CN3 from the C14 dated Betula wood (Section 21.2.4). To the dry grassland with Potentilla and Pteridium was added species of Cruciferae, Plantago lanceolata, Trifolium and Rumex. These indicate grazed grassland. The rise in Pteridium values may reflect the greater openness of Betula woodland under grazing. Cerealia-type pollen is recorded in contiguous levels from 35cm, at a date probably between 3875 and 3605 cal BC, until the end of the sub-zone. The abundance of Calluna heath declined, perhaps under grazing pressure or regular burning, in essence muirburn, converting heath to a grassy heath. Microscopic charcoal continues to be common, with a peak at the upper zone boundary (not clearly seen in Illus 21.6: see Bohncke 1988).

21.3.6 Sub-zone CaN-2d (30-26cm at CN3; not present at CN1)

This sub-zone started between 3490 and 3020 cal BC. Betula once more dominated the pollen source area because, presumably in the close vicinity. A dense canopy probably grew at CN3. This is likely to have been so dense that the representation of all other plant communities markedly suffered. Thus there appears to have been almost no grassland, grazed or not, no cultivation and less evidence for burning, but these may have persisted outside the Betula woodland if this did not spread to all soils.

21.3.7 Zone CaN-3 (26-0cm at CN3; 50-10cm at CN1)

This zone started between 2980 and 2510 cal BC and lasted until sometime between about 560 BC and 90 AD, although its end was not directly dated and the estimate relies on an assumption of even growth rates in the CN1 peat. It lasted for very roughly two and a half millennia and encompassed most of the human activities described in the archaeological report.

Based on the trends in the Betula, Corylus, Gramineae, Plantago lanceolata, Plantago maritima, Ranunculaceae, Cruciferae, and Rumex curves, and the absence of Ulmus pollen, an overlap is assumed between the top of the CN3 column and the base of the CN1 column (Illus 21.4); that there was some overlap is demonstrated by the radiocarbon dates (Illus 21.3). For the purpose of the zonation and interpretation data from both columns were used. Based on changes in the Betula curve and herbs five sub-zones are identified.

21.3.8 Sub-zone CaN-3a (26-19cm at CN3; not present at CN1)

This sub-zone started sometime between 2985 and 2510 cal BC. Sub-zone CaN-3a begins with a strong decline in Betula values as this woodland declined over, perhaps, 400 years or so. No tree or shrub taxa respond to this decline. Cerealia-type pollen is recorded at the lower zone boundary when Betula values were very high whereas indicators for grazed grassland, Gramineae and Plantago lanceolata increase some 300 years or so later as Betula values fall. With the re-emergence of a farmed landscape, charcoal fragments are sharply reduced in number. This suggests that burning need not be related to agriculture. Sphagnum became locally more abundant. Ericaceae steadily increase to form with Gramineae the majority of the heath and herb plant communities. The small peak in Triglochin may be from coastal marshes.

21.3.9 Sub-zone CaN-3b (19-15cm at CN3; 64-51cm at CN1)

The transition from CaN-3a to 3b took place between 2560 and 2200 cal BC. Columns CN1 and CN3 are only a small distance apart and share the same pollen source area.

With the exception of one anomalous peak early in the zone, Betula values continue to fall to

15% total land pollen. Increases in Coryloid pollen and in Quercus and Alnus may again reflect the easier influx from distant sources. The single peak in Pinus pollen is difficult to interpret. Calluna heath expanded from zone CaN-3a, with Empetrum. The Cyperaceae increase rather than the Gramineae, suggesting wetter ground conditions around CN3, and the slightly stronger representation of species within the Ranunculaceae may also reflect wetter soil, as does Sphagnum in the peat at both CN3 and CN1. Similar slight increases in Plantago lanceolata show that grazing continued, as did cultivation, seen in Cerealia-type pollen and associated weeds from the Cruciferae and Caryophyllaceae. The one record of Chenopodiaceae pollen may also indicate disturbed ground but it might fit with Triglochin and Plantago maritima as representatives of coastal marshes, their pollen blown inland at a time of increased storminess (Walker 1984), their pollen more 'visible' in this zone as woodland was diminished, or plants adventitiously colonising disturbed ground. Betula recovered to 32% towards the top of this sub-zone. Evidence for burning is constant but comparatively low.

21.3.10 Sub-zone CaN-3c (15-0cm at CN3; 50-30cm at CN1)

The transition from CaN-3b to 3c probably took place between about 1880 and 1520 cal BC.

Betula percentages declined under 10% for the first time at CN3. Betula trees probably ceased to grow at a date within the age range 2100 and 1750 cal BC. Ulmus pollen disappears from the samples, Pinus has a marked decline and Alnus, Corylus and Quercus declined more slowly. The regional and local landscapes were effectively treeless by mid-zone. Gramineae dominates the assemblage with 30%tlp, with Ericaceae of which Calluna exceeds 53% tlp. Potentilla type pollen is of less significance, possibly because soils continued to be wet, suggested by Cyperaceae, Narthecium ossifragum, Pedicularis, Ranunculaceae and Sphagnum. It is possible that woodland loss led to elevated soil water tables as evapo-transpiration became less effective. Components of the farmed landscape, Plantago lanceolata, Plantago maritima, Ranunculaceae, Rumex, Trifolium repens and Urtica in pasture and Cerealia-type, Cruciferae, Caryophyllaceae all became more abundant. Cerealia-type pollen was continuously present with a maximum at 11cm in the CN3 column: the 10 cm level was dated to between 1410 and 1110 cal BC and at an average peat growth rate calculated as between 230 and 690 years for the growth of the 5cm of peat between the 10 and 15cm levels of CN3, the Cerealia-type maximum probably lay at some time between 1500 and 1200 cal BC. Evidence for burning declines in the middle of the zone but recovers to former values.

Towards the end of this sub-zone Betula percentages increase a little together with Alnus and Pinus values, while the Ranunculaceae, Cruciferae, Caryophyllaceae and Plantago lanceolata decline.

21.3.11 Sub-zone CaN-3d (not present at CN3; 30-25cm at CN1)

The transition from CaN-3c to 3d probably took place between about 1070 and 420 cal BC. In this comparatively brief period tree pollen percentages increase slightly, especially Betula and Alnus local to CN1, and the Cyperaceae are more strongly represented, with Narthecium ossifragum and Sphagnum common, suggesting that wetter soils became more extensive, although the Ranunculaceae are all but extinguished by the upper zone boundary. Pasture seems to have been unaffected by these changes but Cerealia-type values decline, as do those of the Cruciferae.

21.3.12 Sub-zone CaN-3e (not present at CN3; 25-10cm at CN1)

The transition from CaN-3d to 3e took place sometime between 920 and 260 cal BC. The few trees growing locally, of Betula and Alnus, were lost, abruptly. Ericaceae was abundant. Charcoal fragments are not recorded from a time between 920-260 cal BC and 780-120 cal BC. Dry grassland spread at the expense of the Cyperaceae, and Sphagnum was lost from the peat at CN1. Plantago lanceolata values decline and are very low in mid-zone, and this can be seen for Plantago maritima also. Cerealia-type pollen is also increasingly

less well represented, particularly above 20cm, a time between 780 and 120 cal BC. Whilst there is some statistical distortion in mid-zone from the abundant pollen of local Potentilla-type plants, Cerealia-type pollen percentages remain low to the upper zone boundary. In mid-zone, however, within the age-range 850-190 cal BC and 660-1 cal BC, several bare or disturbed ground indicators are better represented, such as species in the Cruciferae family, the Compositae, Spergula, Spergularia and Polygonum. The creation of bare ground occurred seemingly without an accompanying crop. This might indicate settlement creating bare ground erosion of soil. These bare ground indicators are then in turn lost as indicators of pasture (Plantago lanceolata, Plantago maritima and Rumex pollen) rise.

21.3.13 Zone CaN-4 (not present at CN3; 10-1cm at CN1)

The transition to CaN4 took place sometime between 560 BC and 90 AD. The pollen of many herb species decline while those of Cyperaceae and Ericaceae increase. Many of these herbs are indicators of agriculture. Cerealia-type itself is not recorded by mid-zone.

21.3.14 The wider context

Lewis was not treeless in the Holocene. An open woodland of Betula, Corylus, Populus, Sorbus aucuparia and Salix grew in the early Holocene (Wilkins 1984; Edwards 1996; Fossitt 1996). At Callanish Leobag Betula was dominant but Corylus was common elsewhere (Fossitt 1996; Edwards Mulder, Lomax, Whittington and Hirons 2000). Close to Calanais, land around Loch na Beinne Bige (Edwards 1996) had a complete tree cover by c. 8000 cal BC.

Fossitt (1996) reported a sudden woodland decline at Loch Buialaval Beag, north west of Calanais, at c. 6650 cal BC. Areas with Calluna and Cyperaceae increased. Fossit sampled lake sediment which has a larger pollen source area than Callanish Leobag, and from this the loss of Betula trees at Callanish Leobag in subzone CaN-2a, between 6675-6045 and 6075-5525 cal BC, might have regional significance, but no similar feature is seen at Loch na Beirige Bige (Edwards 1996). Fossitt (1996) argued for a natural, perhaps climatically induced woodland decline of high magnitude and short duration. Bohncke (1988) suggested that the decline was possibly anthropogenic, by mesolithic groups manipulating plant communities to favour wild herbivores like deer, a model originally proposed for landscapes further south (Mellars 1976) and certainly plausible in the Western Isles (Edwards 2000). In 1988 there was no archaeological evidence on the Western Isles for Mesolithic communities. In 2005 Gregory and others reported such evidence, from Northton in Harris. The evidence is not, however, unambiguous. Five burnt Corylus nutshells 14C dated to 7060 to 6090 cal BC, lay within deposits that "are best interpreted" (Gregory et al 2005, 945) as anthropogenic midden deposits otherwise containing material of Neolithic age. It may be that burning was anthropogenic, though natural fires would not have been rare in northern Scotland (Tipping 1996). Work in 2010 however revealed a concentration of Mesolithic artefacts nearby in an old ground surface which also contained ecofacts including charcoal and other plant fossils (Bishop et al 2010, 178; 2011, 185). Burning increased, or was more easily recorded, at Callanish Leobag, sometime between 6975 and 6300 cal BC, becoming abundant at some date between 6675 and 6045 cal BC, but not at Loch Buialaval Beag. Faunal evidence for large wild herbivores, the other factor in explaining anthropogenic manipulation of woodland, is absent on Lewis in the Mesolithic period. Bennett et al (1992) and Edwards (1996) argued that absence of evidence was not evidence for absence in assigning Mesolithic-age vegetation changes on Shetland and the Outer Hebrides to grazing pressure.

Woodland did not recover at Loch Buialaval Beag (Fossitt 1996). At Callanish Leobag it did. From this comparison it is possible to argue that subsequent events affecting the Callanish Leobag woodland were small in spatial scale. Betula woodland continued to be disturbed in subzone CaN-2b, perhaps by hunter-gatherers (Bohncke 1988). The short-lived decline of Betula in subzone CaN-2c, at the Mesolithic-Neolithic transi-

tion was correlated by Bohncke (1988) with a similar though much larger and permanent event in west Orkney, which Keatinge and Dickson (1979) thought to have been climatically induced, more specifically from an increase in storminess. Melton (2008) has stratigraphic evidence for heightened storminess at this time on Shetland. Again there was complete recovery in woodland at Callanish Leobag soon after 3490-3020 cal BC.

Anthropogenic effects on plant communities close to Callanish Leobag are probably seen after 3490-3020 cal BC in subzone CaN-2c. Cerealia-type pollen is recorded from 3875-3605 cal BC, synchronous at the resolution of dating controls with the earliest C14 dated cereal pollen in southern Britain (Brown 2007). Herb diversity increased. Cereal growing at some time between 3875 and 3605 cal BC occurred at least from time to time during the next few centuries. However at Loch Buialaval Beag (Fossitt 1996) "Cereal-type" pollen is recorded from c. 6300 cal BC. In coastal locations such pollen can be from wild grasses: Fossitt (1996) argued, perhaps conservatively, that Cerealia were present on the Western Isles only from the late Iron Age. Similarly in coastal plant communities herbs such as Plantago lanceolata grow naturally that would elsewhere characterise grazed grassland (Brayshay et al 2000). Elsewhere in the Western Isles woodland decline, probably anthropogenic because asynchronous, commenced at around 4100 cal BC but at a slow and variable rate (Brayshay and Edwards 1996; Fossitt 1996). Edwards et al (2000) suggested that woodland decline on Lewis may have been somewhat synchronous at around 3950 cal BC. Grazing livestock is more likely than axe or fire to have created this mosaic, although burning might be implicated, directly or indirectly at Callanish Leobag, possibly in heath management for grazing animals domestic or wild (Edwards 1996). This slow and possibly small-scale woodland clearance is in stark contrast to the sediment record at Loch Olabhat on North Uist (Edwards et al 2000; Mills, Armit, Edwards, Grinter and Mulder 2003) where partial woodland loss 4000-3300 cal BC, with probable cereal growing, was followed 3700-3500 cal BC by extensive soil erosion. The interpretation is that erosion was initiated by turf-stripping for construction but soils continued to erode, apparently until the late Iron Age c. 400 cal AD.

Subzone CaN-3a started between 2985 and 2510 years cal BC; cultivation beds at Calanais were assigned to the transition between subzone CaN-2d and CaN-3a, when cereals reappeared, or when cereal pollen became more palynologically visible again with tree loss. They were followed by the central monolith, Ring and building of the chambered cairn at Calanais. Much of the subsequent building at Calanais was assigned to CaN-3a or 3b. Evidence for ground working, some with an ard, was found in several areas and cultivation may have continued until peat covered much of the ground around the stone setting at Calanais. During analysis of the excavation samples at Calanais (below: Section 21.4) it was possible to subdivide subzone CaN-3a into phase CaN-3ai in which there were indications of agriculture and phase CaN-3aii in which there were stronger indicators of pastoralism. The change from phase 3ai to 3aii happened sometime between about 2870 and 2290 cal BC. Around Loch Bharabhat (Lomax and Edwards 2000), north west of Callanish Leobag, woodland also declined, from c. 2700 cal BC, and from c. 2000 cal BC there was a major reduction in woodland, in particular of Betula. Calluna heath is much better represented, with other Ericaceae, Cyperaceae and Potentilla-type, characteristic of wet heath from, probably, the expansion of blanket peat. This change is seen at Callanish Leobag in subzone CaN-3b from 2560-2200 cal BC. At Sheshader in the far east of Lewis the expansion of farmed land, arable and pastoral, and a decline of woodland and scrub occurred from c. 2200 cal BC. Heath management by burning may have taken place. But the landscape was also evolving in a different direction, to spreading blanket peat described aptly by Newell (1988; 89) as "too wet, too deep and acid, too often burnt or grazed to have permitted the establishment of anything but ... moorland".

In sub-zone CaN-3c at Callanish Leobag the Cerealia-type pollen maximum occurred sometime between 1400 and 1100 cal BC. Charred barley and cereal plant macrofossil grains found at Calanais were dated to sometime between 1600 and 1400 cal BC, and they may reflect this agri-

culture. A basal peat pollen sample from Area C at Calanais was attributed to zone 3e and another sample from this basal peat produced a date (GU-1403: 2640+/-110) between 1050BC and 400 cal BC. This radiocarbon date places the basal peat or topmost soil or a mixture of them chronologically at the subzone boundary between CaN-3c and 3d in CN1; but the interpolated date for the start of subzone CaN-3e in CN1 at between 920 and 260 cal BC was not very different: most of the first few centimetres of peat at Calanais may indeed have formed in subzone CaN-3e.

The transition to zone CaN4 took place at some time between 560 cal BC and 80 cal AD. Ceral-type pollen values disappear briefly but recovered and strengthened during the rest of this zone suggests that the vegetation history of the area including Calanais and Leobag varied locally, although the general story was of sparse tree cover with fairly abundant herbs and heather. There was no evidence from the excavations at Calanais for any human activity.

21.4 The Kubiena box-samples from the excavation site

21.4.1 Introduction

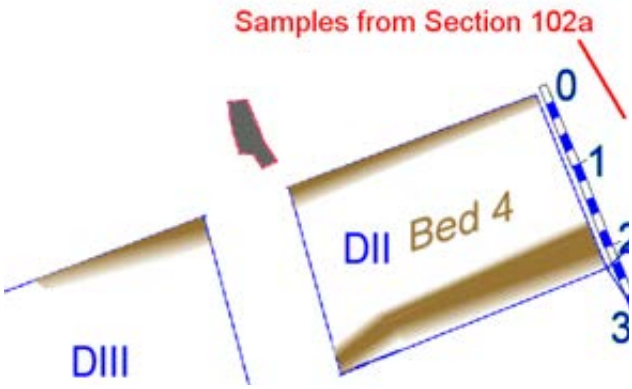
It must be kept in mind that organisms actively mix pollen of different ages in soils. This may not be a significant problem at Calanais, with its acid soils, but the mixing means short term fluctuations will be blurred. Hence short term fluctuations might not show up as clearly as in the peat columns.

Moreover due to the intensive human activity at the site of the stone circle a continual registration of the contemporary environment might periodically have been interrupted. Further, some material was dug up and dumped at higher stratigraphic levels without acquiring new pollen, as is for instance suggested by clods of grey clay with a pollen spectrum suggestive of the later 3rd millennium BC in the backfill of Victorian intrusions in the cairn.

The differences in palaeo-hydrological conditions between the promontory on which the stone circle is situated and the low lying Leobag peninsula will to a certain extent have influenced the specific composition of the samples. It is to be expected that the majority of the birch wood was located in low-lying areas like the site of Leobag, where birch wood was encountered in the peat. Hence a short regeneration phase of the birch wood would be registered more clearly in the peat columns from Leobag than in samples from the promontory.

The above meant difficulties might be encountered in attempting precise correlations between the pollen records of the Kubiena boxes from Calanais and the CN1 and CN3 columns from Leobag.

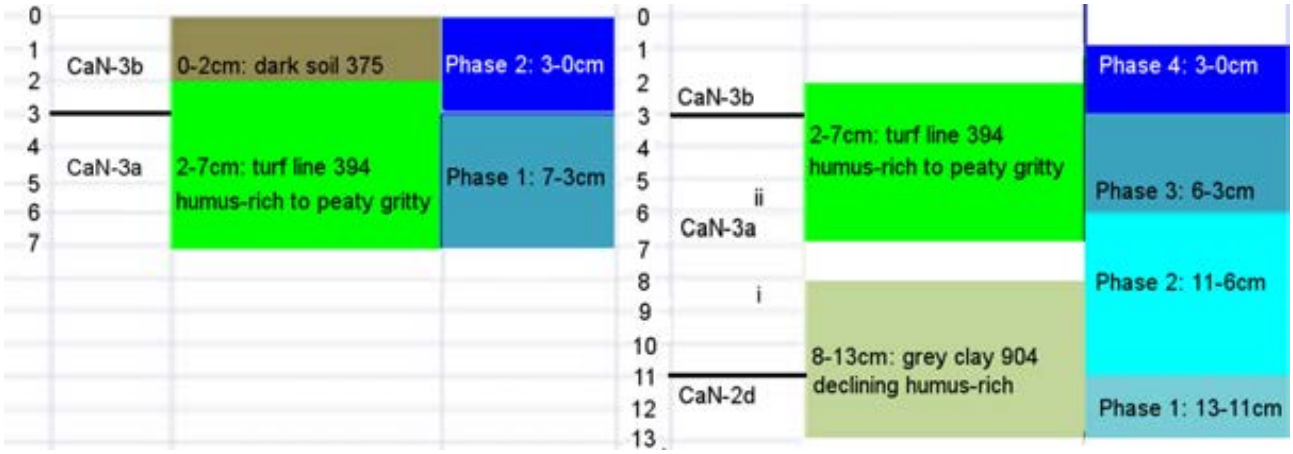
21.4.2 Area D sampling



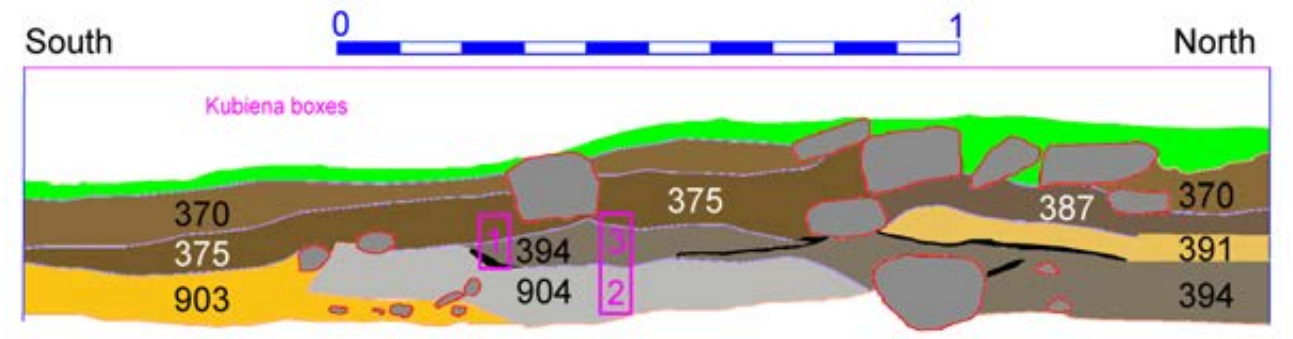
Illus 21.8 Sampling profiles against an interpretative reconstruction plan of cultivation beds. The scale is in metres.

In the baulks of Area D black humus rich layers were visible and interpreted as litter or 'mor' layers (layers of decayed organic matter), here referred to as turf lines. At most three successive turf-lines were visible in the areas sampled. It was hoped that pollen analysis would reveal the meaning of these turf-lines and secondly it was hoped that the pollen analyses would indicate their dates. For this purpose seven Kubiena box samples were taken from the trench edges. Three boxes were taken in an east facing baulk (Illus 21.8 Section 102a) and four were taken in the main north facing baulk (Illus 21.8 Section 105). In the laboratory, boxes 1 to 7 were stratigraphically sampled to provide three short profiles (Illus 21.9-13).

Illus 21.9 Section 102A with Kubiena boxes 1 and 3-2 marked



Illus 21.10 Section 102A with Kubiena boxes 1 and 3-2 [Film PO12]



Illus 21.11 Stratigraphy, phasing and zoning in Area D Section 102a

The columns are archaeologically interpreted as spanning the soils of cultivation beds (Illus 21.8), possible upcast from standing stone pit digging and overlying turf lines and soils. To fix the position of these profiles in time their pollen diagrams were compared with the Callanish Leobag columns CN3 and CN1.

21.4.3 Description of the samples: Section 102a

21.4.4 Zonation of the pollen diagrams from Section 102a

SECTION 102A BOX-1

Phase-1, 7-3cm
During this phase the Betula values declined to around 10% from a maximum of 19%. The pine curve remained above 1%. The Cerealia pollen curve was similar to that of Ericaceae. Pollen of Compositae liguliflorae was relatively abundant, while the Cruciferae pollen was more frequent in the bottom two samples. Towards the end of this phase Gramineae increased to around the 55% level and the Ranunculaceae become more frequent.

Phase-2, 3-0cm
A decline in Cerealia was registered which coincided with an increase in Ericaceae and a decline in Gramineae. At the transition to phase-2 Ulmus pollen appeared in the samples and the Betula curve stayed roughly constant, declining a little towards the end. During both phases Plantago lanceolata was relatively abundant.

SECTION 102A BOX 2-3

Phase 1, 13-11cm
The tree pollen percentages were high (max 82% at 11cm) mainly consisting of Betula and Corylus and to a much smaller extent Pinus, Alnus and Sorbus.

The non-tree pollen percentages were mainly formed by Gramineae. Ericaceae were almost completely absent. Fern spores were extremely abundant (Polypodium and Monolete spilate type).

Phase 2, 11-6cm
There was a strong decline in the Betula and Corylus curves, mirrored by a steep increase in Gramineae curve. Cerealia pollen was present during this phase and showed two successive maxima, together with the curve of the Compositae liguliflorae.

Fern spores declined strongly in the second half. Furthermore diverse herb vegetation was present including Plantago lanceolata Ranunculaceae, Cruciferae and Trifolium.

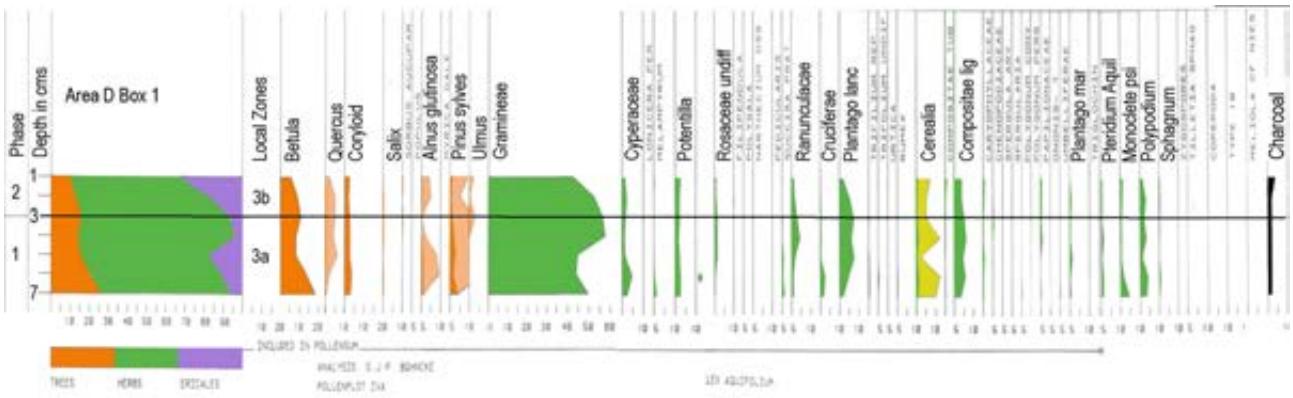
Phase 3, 6-3cm
This phase saw a decline in the Cerealia, Compositae liguliflorae and Gramineae curves in favour of the Ericaceae. The Betula curve declined a little more. Pinus was continuously present in values higher than 1%.

Phase 4, 3-0cm
Cerealia pollen returned, while Gramineae increased at the expense of the Ericaceae. Compositae liguliflorae pollen did not reach the same frequencies as in the preceding Phases 1 and 2. Betula stayed relatively low and Pinus values did not drop under 1%.

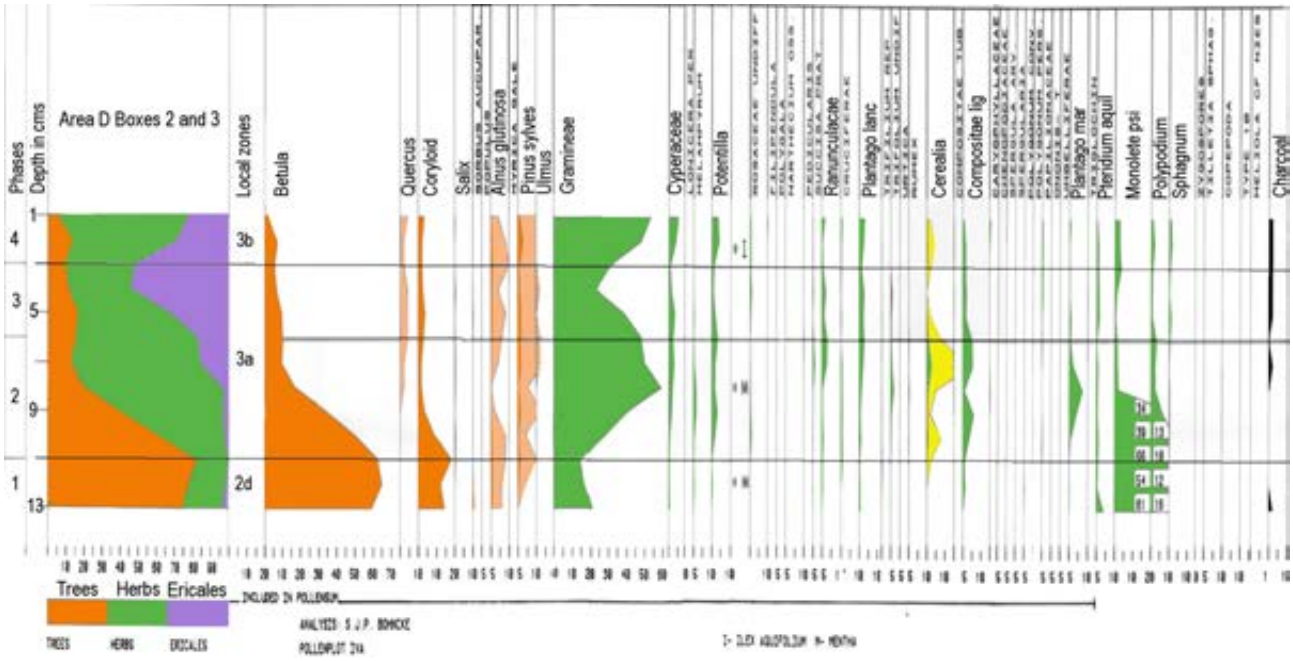
21.4.5 Description of the samples: Section 105

Sampling was undertaken on a cleaned-back face of Section 105 (Technical Note 21.4.5). The two columns were taken about 40cm apart from one another and the section shows that the turf lines in Boxes 4 and 5 did not connect with those in Boxes 6 to 7, suggesting a fairly complex stratigraphic relationship. That complexity was reflected in the results of pollen analysis (Illus 21.17). The reason may be that the section cut obliquely across the slope of a cultivation bed.

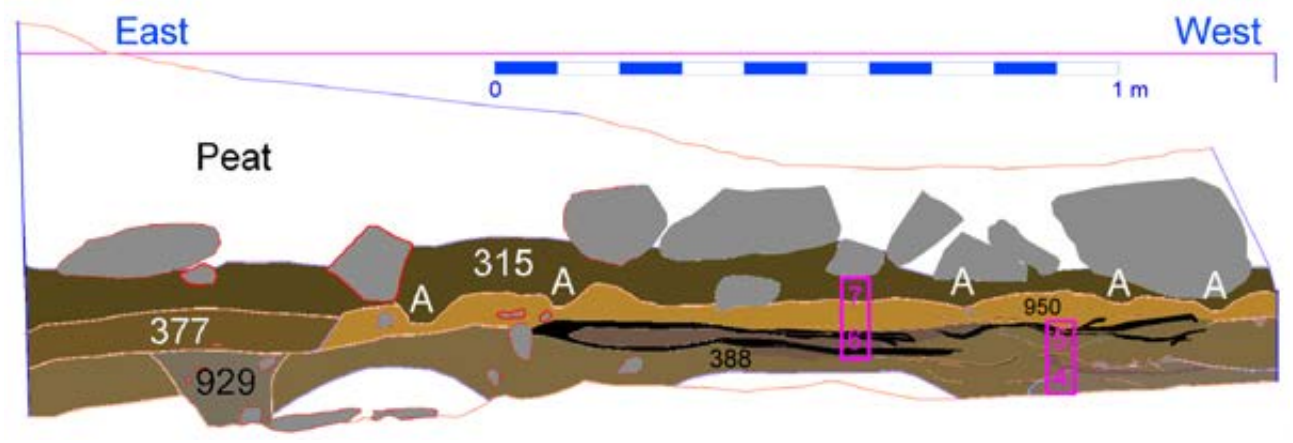
Boxes 4 to 5 are situated where a cultivation bed was truncated by later ploughing while boxes 6 to 7 were in the soils which had formed over the trough between that bed and Bed 2 to the north.



Illus 21.12 Area D Box 1 pollen



Illus 21.13 Area D Boxes 2 and 3 pollen



Illus 21.14 Part of section 105 with Kubiena boxes 5-4 and 7-6 marked

21.4.6 Zonation of the pollen diagrams from Section 105 on Area D

SECTION 105 BOX 4-5

Phase 1, 11-8cm
The tree pollen percentages were high (max 82%, 11cm) mainly consisting of Betula and Corylus and to a smaller extent Pinus, Alnus and Sorbus. The non-tree-pollen percentages were mainly formed by Ericaceae and Gramineae. Fern spores were extremely abundant (Polypodium and Monolete spilate type).

This description is the same as that for Box 2-3 phase-1.

Phase 2, 8-4cm
There was a strong decline in the Betula and Corylus curves, followed by a steep increase in the Gramineae curve. Cerealia pollen was present during this phase and showed two successive maxima, together with the curve of the Compositae liguliflorae. Fern spores declined strongly. Furthermore diverse herb vegetation was present including Plantago lanceolata Ranunculaceae, Cruciferae and Trifolium.

This description is much as for Box 2-3 phase-2 except that Ericaceae pollen, towards the end of this phase, were more abundantly present and that the Cerealia curve did not show a maximum immediately after the Betula and Corylus decline.

Phase 3, 4-2cm
This phase saw a decline in the Cerealia, Compositae liguliflorae and Gramineae curves in favour of the Ericaceae. The Betula curve declined a little. Pinus was continuously present in values higher than 1%.

This description is as for Box 2-3 phase-3, except that the decline in Gramineae was not so prominent and the Cerealia did not disappear altogether from the samples.

Phase 4, 2-0cm
Cerealia pollen returned, while Gramineae increased at the expense of the Ericaceae. Com-

Illus 21.15 Area D Section 105 with Kubiena boxes 4-5 [Film PO11]

Illus 21.16 Area D Section 105 with Kubiena boxes 6-7 [Film PO10]

positae liguliflorae pollen did not reach the same frequencies as in the preceding Phases 1 and 2. Betula recovered a little and Pinus values did not drop under 1%.

This description is the same as that for Box 2-3 phase-4.

SECTION 105 BOX 6-7

Phase 1, 14-10cm
Straight from the bottom of this column the NAP values dominated, mainly formed by Gramineae and Ericaceae. Cerealia-type pollen was continuously present and the Compositae liguliflorae pollen was relatively abundant. Moreover Plantago lanceolata, Ranunculaceae and Succisa pollen occurred in the samples.

Pinus formed a continuous curve and did not drop under 1% Betula fluctuated around 10%.

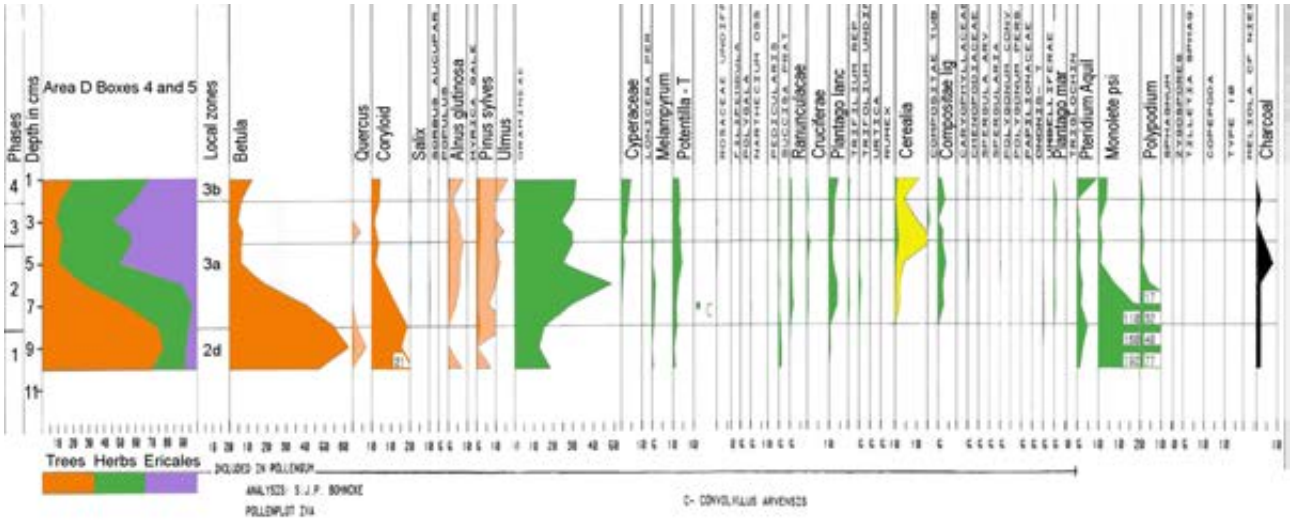
Phase 2, 10-8cm
A decline in the Cerealia, Gramineae and the Compositae liguliflorae was registered followed by an increase in the Ericaceae. Towards the end of this phase the Betula curve increased a little to 17% at the 8cm level.

Phase 3, 8-5cm
The Betula values declined sharply, while Gramineae increased strongly and Cerealia-type pollen returned, but the Compositae liguliflorae did not reach the high values of the preceding Phase 1. The Pinus curve dropped under 1% values for the first time.

Towards the end of this phase Gramineae curve dropped to values around 40%.

Phase 5, 5-0cm
Ericaceae restored to values around 30% and the Betula curve increased a little.

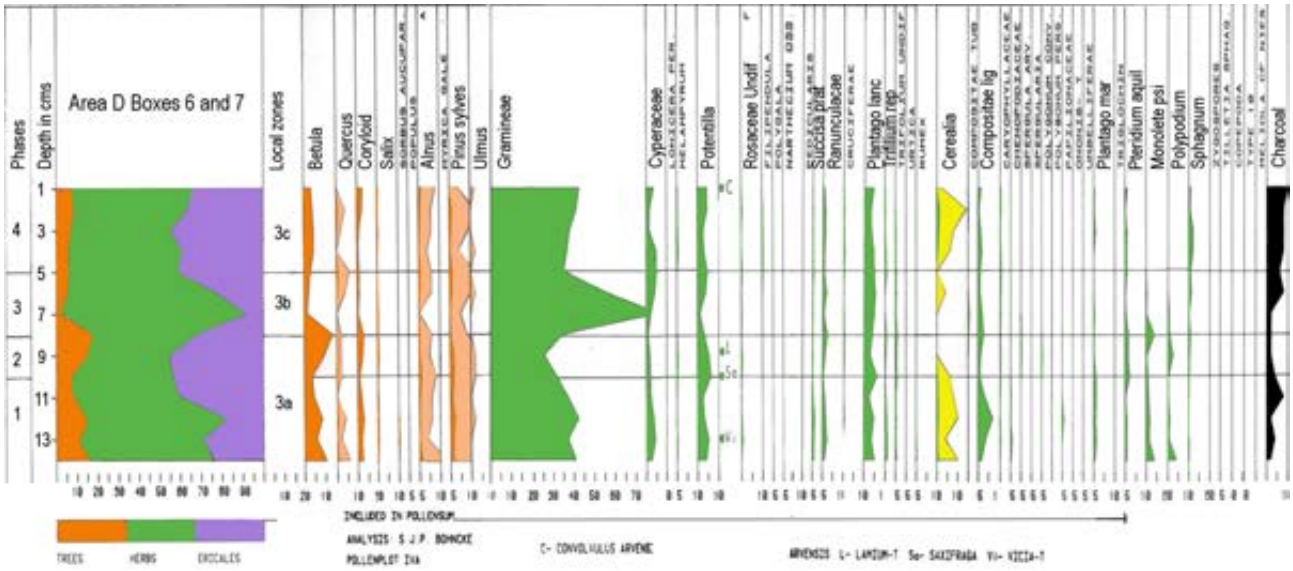
Illus 21.17 Stratigraphy, phasing and zoning in Area D Section 105



Illus 21.18 Area D Boxes 4 and 5 pollen

21.4.7 Interpretation and Correlation of columns D2-3 on Section 102a and D4-5 on Section 105

The pollen records of columns D2-3 and D4-5 both started off with relatively high Betula and Corylus percentages after which a clearance phase followed. This gives a firm indication for the start of both columns. Straight after the decline in the Betula and Corylus values the first Cerealia-type pollen appeared together with Compositae pollen of the Liguliflorae type and Plantago lanceolata. Subsequently during Phase D-2 Gramineae increased firmly and pollen of the Trifolium-type



Illus 21.19 Area D Boxes 6 and 7 pollen

and Trifolium repens appeared in the samples, after which the indicators for agriculture decline and Ericaceae increased strongly in phase D-3. Possibly during this phase cattle breeding was still practised since no decline was registered in the Plantago lanceolata, the Ranunculaceae and the Trifolium curves. Gramineae showed a temporary decline during this zone but recovered again in Phase D-4, together with Cerealia. Ericaceae declined, possibly as a consequence of increased agricultural activities.

In both columns the Betula curve did not decline below 10% and Pinus and Alnus pollen were relatively abundant. Pinus did not decline below 1% which means that both columns covered a period preceding the regional pine decline (+4000 BP, Bohncke 1988), but following the period with an abundant presence of Betula. This phase D-1 most likely correlates with the "regeneration" phase of birch registered in zone CaN-2d of column CN3. Phase D-2 and D-3 correlate with zone CaN-3a in column CN3 which was characterised as predominantly agricultural in its initial phase but cattle-dominated in its second half. D4, the phase with renewed agricultural influence must correlate with sub-zone CaN-3b. The regional pine decline in column CN3 started shortly after the beginning of zone CaN-3c. Here the Pinus percentages declined under 1%.

As already discussed in the introduction to the samples from the excavation site the short term regeneration phases of the birch at the end of zone CaN-3a and CaN-3b were hardly registered but the curve of the pine pollen, which formed a more regional component in the pollen rain, was in good agreement.

In column D4-5 there seems to be a correlation between the occurrence of the so called "turf-line" in the lithology and an increase in Ericaceae pollen. The fact that the curve of Ericaceae in column D4-5 showed two successive maxima but the curve in column D2-3 had only one peak is probably due to local influences.

21.4.8 Interpretation and Correlation of Column D6-7 on Section 105

Column D6-7 lacked the phase with relatively high Betula and Corylus percentages but started with a phase during which Betula values fluctuated around 10% and the Pinus curve did not decline under 1%. Among the herbs, Gramineae and Ericaceae were abundantly present. Pollen of the Cerealia-type and Compositae liguliflorae was present together with Plantago lanceolata, Ranunculaceae and Trifolium pollen, which can be interpreted to mean that both agriculture and cattle breeding was practised during phase-1 in column D6-7. In phase-2 Ericaceae increased at the expense of Gramineae. The Cerealia curve was interrupted but Plantago lanceolata, Ranunculaceae, Trifolium and Potentilla stayed present in

more or less equal percentages. The Betula values recovered to 17% at 8cm. At the start of phase-3 in column D6-7 a sharp decline in the Betula values was registered. Cerealia-type pollen reappeared in the samples and Gramineae increased sharply. Ericaceae pollen declined, possibly as a consequence of increased agricultural activity around the site. Together with the birch, Corylus, Alnus and Pinus declined. Pinus fell below the 1% level which coincided with the regional pine decline of around 4000 BP. This decline in the pine pollen marked the beginning of zone CaN-3c in column CN3. During phase-4 in column D6-7 the Cerealia curve increased but the Compositae liguliflorae did not reach the high values of Phase 1 in column D6-7. Ericaceae values recovered while Gramineae declined to around the 40% level.

Phase 3 correlated with zone CaN-3b. This fits in nicely with a correlation between Phase 1 and 2 in column D6-7 and zone CaN-3a in column CN3.

Column D6-7 contained three 'turf lines' and as in Column D4-5 there seems to have been a marked correlation between the occurrence of these turf-lines and peaks in the Ericaceae curve. Besides Ericaceae the turf lines seem to correlate with temporary declines in the Cerealia curve, which must be explained as temporary declines in agricultural activity around the site.

21.4.9 Interpretation and Correlation of Column D1

The relatively high Betula values and the continuous presence of Pinus pollen at values higher than 1%, together with the abundant presence of Compositae liguliflorae pollen places the start of the pollen registration in box-1 shortly after the birch and hazel decline in zone CaN-3a. Successively a stage during which agriculture was practised (presence of Cerealia and Compositae liguliflorae), a stage during which both agriculture and cattle-breeding (increase in Gramineae and Ranunculaceae) were practised and a stage (phase-2) during which agricultural activities declined and heather spread were registered in the samples. These three stages are also clearly registered in the CN3 column zone CaN-3a. The increase in Ericaceae marked the transition to zone CaN-3b.

21.4.10 Archaeological comment

The profiles sampled two cultivation beds, Bed 1 (Section 105) and Bed 4 (Section 102a).

Archaeological interpretation of the layers in Section 102a in Boxes 1 to 3 (Phases 2 and 1) was that cultivation bed 4 overlay a pre-cultivation soil. The earliest pollen phase in the boxes correlates with zone CaN-2d during which Cerealia-type pollen was absent at Callanish Leobag and although it is as likely to have been absent there because of increased tree cover as because of a cessation in cereal-growing, that at least does not conflict with, the archaeological interpretation of the lowest soil as not being part of the cultivation bed.

On Section 105 (Cultivation bed 1), as mentioned above, the layer at apparently the same level as gingery brown soil 320 which covered much of the ground outside the cairn on Area D was not labelled during section-drawing. It has been labelled 950 during post-excavation for reference purposes.

In essence Section 105 cut at a shallow angle along Bed 1. Indeed, that had been my interpretation from other evidence but I had not been able to interpret the detail until I took the pollen report fully into account. Thus the pollen in Boxes 6 and 7 which samples soils overlying the slope down into a trough between cultivation beds was at a higher stratigraphic level than the samples from Boxes 4 and 5.

The top 5cm in Box 7 (Phase 5) was taken from the lower part of plough soil 315. The archaeological dating for the plough soil is much the same as the CN3 column dating for late zone 3b to zone 3c, which fits well with the sequence in Box D7. It contrasts slightly with the zonation of a spot sample from 315 on the main part of DI to CaN-3b but variations within a plough soil can be expected.

Layer 950 on Illus 21.14 was apparently at the same stratigraphic level as ginger-brown clay 320 on the area south of the cairn, which was criss-crossed with ard marks. However clay 320 was not present close to the section in typical form in plan during excavation. A turf line (or at least a humus-rich band of material) appeared to be lie between the plough soil and the underlying layer 950, although it was not noticed during excavation.

The strata sampled in the two box columns below the upper turf line reflect material derived from Ring stone pits which cut through one or more cultivation beds. The sequence appears to reflect the following events. Spoil from the pits was dumped nearby, with, naturally, the material from cultivation beds underlying the spoil from digging through the natural green clay. The green clay is thought to have oxidised to gingery brown. There was some deposition of burial-related material in the nearby part of DI. Then the green or gingery brown clay was spread over that area, and the underlying more humic part of the spoil heaps was levelled out more locally.

Without the evidence from the pollen samples the cultivation bed might have been attributed to CaN-2c, the early cultivation phase attested in the pollen column at Callanish Leobag and more precisely it might have been supposed that creation of the cultivation bed started at the same date as formation of the 35cm level in Leobag column CN3, where Cerealia pollen first appeared. This dated approximately to between 3900 and 3600 BC. It might also have been supposed that use of the cultivation bed ended at the CaN-2c to 2d transition at between 3490 and 3020 cal BC.

The conclusion from the pollen in the Kubiena box profiles on Area D is however that use of the cultivation beds started right at the end of CaN-2d and thus the cultivation beds must date to the beginning of CaN-3a (starting between 2980 and 2510 cal BC at Leobag but interpreted from the archaeology as having started early in that range). The correlation of the turf lines with increases in Ericaceae provided powerful support for the idea that each of them represented formation of a turf line and a diminution in human farming activities near the place.

The detail of this interpretation could not have been developed without the evidence from the pollen-analysis of the Kubiena box samples from Area D. Thus they did, as hoped, greatly illuminate the interpretation of the archaeology.

21.4.11 Area H sampling

Please see illus 21.20 below.

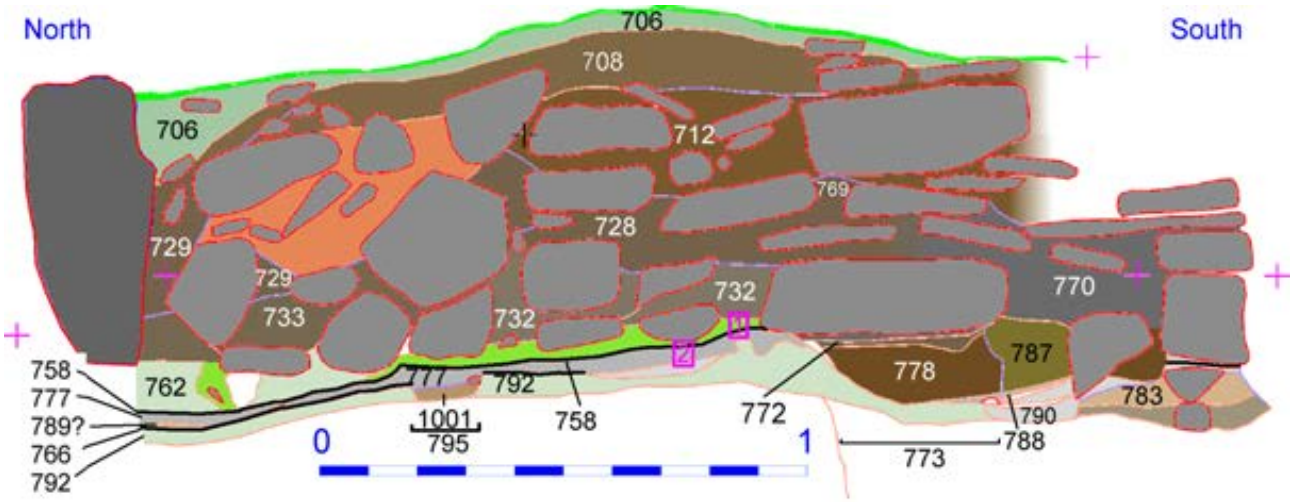
21.4.12 Description of the samples

21.4.13 Zonation of the pollen diagrams of area H

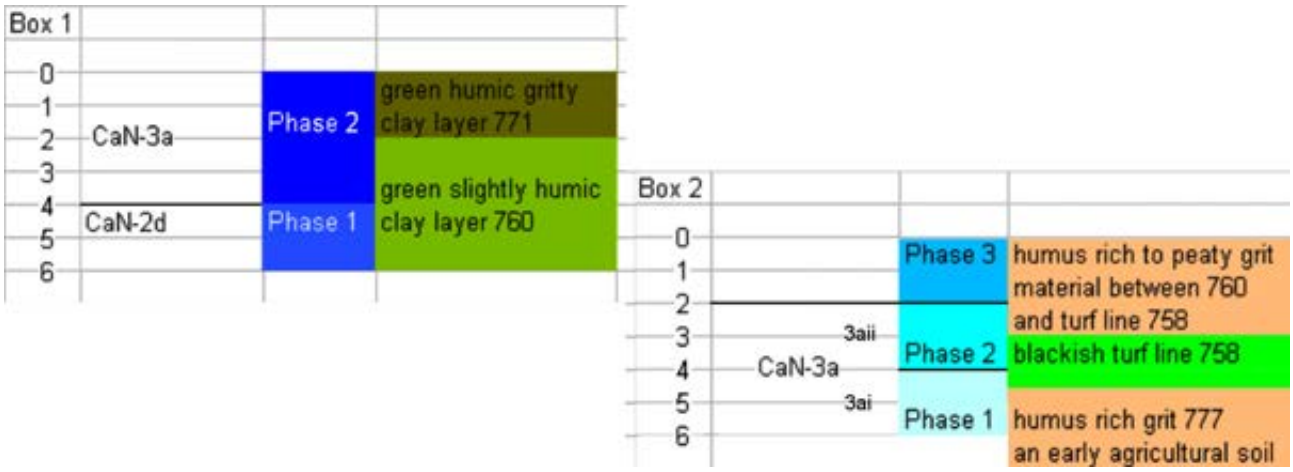
BOX-1 ZONATION

Phase 1, 6-4cm
This phase was characterised by high Betula and Corylus percentages, respectively max 54% and 31%, and relatively low NAP values. The herbs in this phase were dominated by Gramineae.
Phase 2, 4-0cm

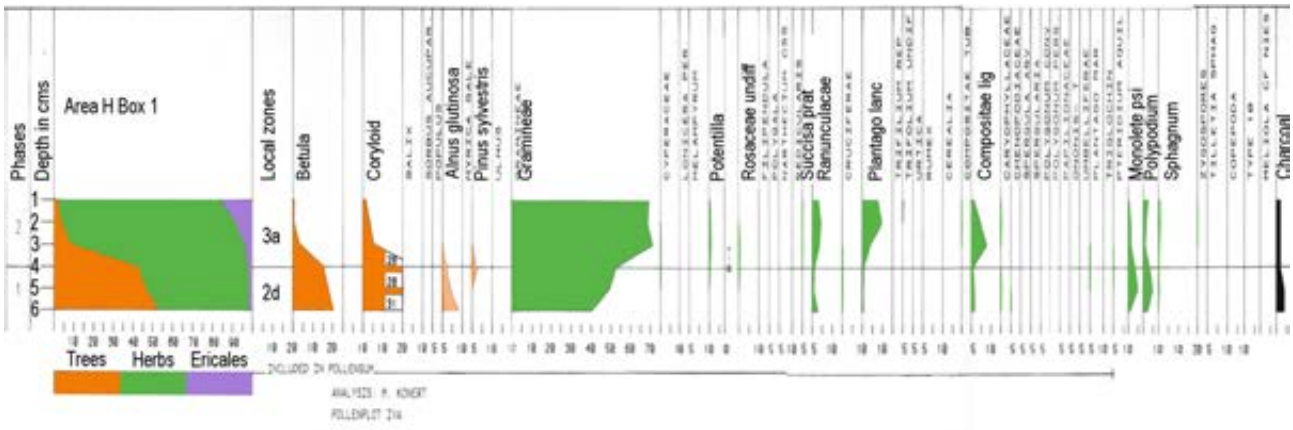
At the transition to Phase 2 Betula showed a strong decline, while Gramineae increased to values around 70%. Towards the top of box-1 Ericaceae began to increase. Furthermore Phase 2 was characterised by a firm increase in Plantago



Illus 21.20 Area H Section 33 with Kubiena boxes 1 and 2 marked [NMRS-DC38305



Illus 21.21 Stratigraphy, phasing and zoning in Area H



Illus 21.22 Area H Box 1 pollen

lanceolata, and Ranunculaceae and Compositae liguliflorae were relatively abundant. Cerealia pollen was absent from the samples.

BOX-2 ZONATION

Phase 1, 6-4cm
Betula values were beneath the 10% level and Pinus below the 1% level. Gramineae were abundantly present. Furthermore Plantago lanceolata, Cerealia and to a lesser extent Compositae leg and Ranunculaceae were present in the samples.

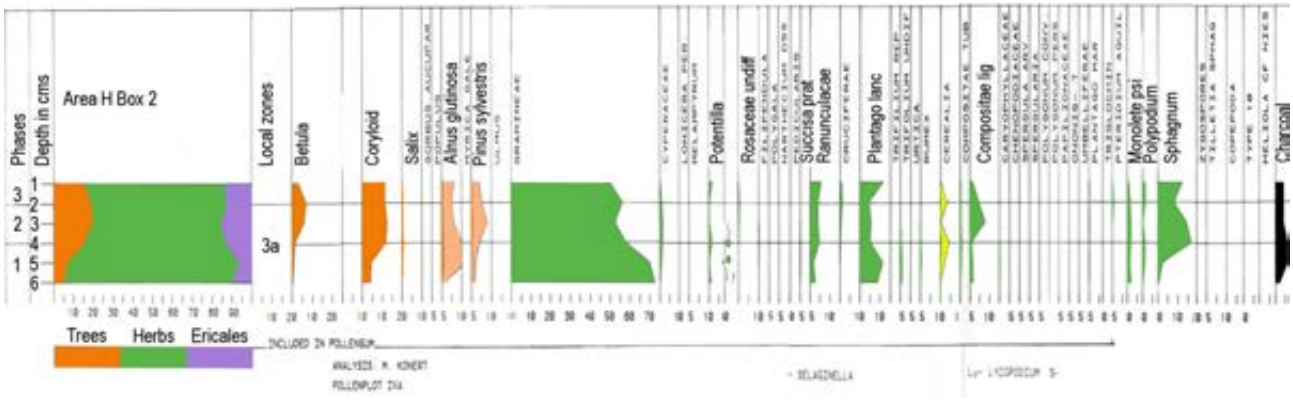
Phase 2, 4-2cm
Betula, Corylus and Pinus increased a little. Cerealia pollen was absent during this phase and Gramineae declined in favour of an increase in the Ericaceae. Sphagnum suddenly appeared in the samples.

Phase 3, 2-0cm
The Betula curve declined again, while Corylus maintained values around 10%. Cerealia pollen re-appeared and Gramineae increased a little, as did the Plantago lanceolata curve.

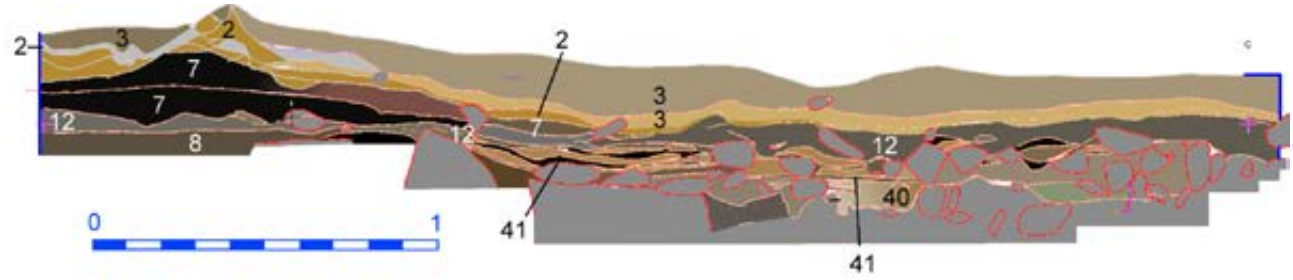
21.4.14 Interpretation and Correlation

BOX H-1

The strong decline in the Betula and Corylus values between Phases 1 and 2 followed by a sharp increase in the Gramineae and Plantago lanceolata curves was a marked phenomenon in the pollen record of CN3 and took place at the transition of zone CaN-2d to zone CaN-3a. The low Pinus values were unexpected for this stage in the vegetation development as was the absence of Cerealia pollen which was expected to increase together with the Compositae liguliflorae curve.



Illus 21.23 Area H Box 2 pollen



Illus 21.24 East-west section 8A on the south-facing baulk of Area E [NMRS DC38249A]

Illus 21.25 he sampling area on the west baulk [Film 1981.18.19]

BOX H-2

The low Betula and Corylus values in phase-1 together with Pinus percentages lower than 1% and an absence of Ulmus pollen indicated, for the start of this column, a period after the regional pine decline. The increase in AP values in Phase 2, mainly Betula and Corylus, together with a temporary decline in the Cerealia curve possibly correlated with sub-zone CaN-3d. On the other hand the Corylus curve did not attain values of around 10% during this zone in the CN1 column and also Gramineae were relatively high for this zone. The presence of Sphagnum spores in this zone could have been the result of local wet conditions and cannot be used for more regional correlations.

Another possible interpretation is that the increase of Corylus in Phase 2 was the same as that registered in the top of sub-zone CaN-3a, which also coincided with a decline in the Gramineae and Cerealia curves and a slight increase in Ranunculaceae. Ericaceae did not increase to such an extent as in Area D, but local wet conditions, as indicated by the presence of Sphagnum spores, might have prevented this regeneration. The 'turf-line' between the 3 and 4.5cm level, if this interpretation is right, coincided with the middle turf-line and coincided with a temporary decline in the agricultural activities, as indicated by the decline in the Cerealia curve.

The green clay can be dated to the first half of zone CaN-3a.

21.4.15 Archaeological comment

When the two pollen diagrams are correlated stratigraphically there appears to be a chronological inversion. The lower part of the green clay appears to contain pollen of the earlier zone CaN-2d but the underlying layers were zoned to CaN-3a in Box 2 (Illus 21.21). But the green clay had been freshly excavated from the native till. Dr Bohncke observed in his introduction the short period within which some deposits were exposed to the pollen rain means that variations need not have shown up in the master columns at Callanish Leobag. If the clay was rapidly spread out it would have acquired pollen representative of a short period. Slight timber structures were then erected on the clay and the sudden reduction in tree pollen between Box 1 zones 1and 2 might have a very local and anthropogenic explanation in the exploitation of local birch and hazel for wattle walls.

The sudden appearance of Sphagnum spores in Box 2 at the 4-2 cm level could, as suggested above, represent water-logging on the old turf line before the green clay was imported. It might even explain why the clay was laid.

Spot sample 2061 from the turf line immediately overlying the green clay under the cairn was zoned to CaN-3ai. The implication of the pollen evidence from the box column and spot sample is that the green clay platform was laid late in CaN-3ai and the overlying cairn was built early in CaN-3aii.

The pollen zone inversion is thus explicable within the archaeological interpretation. Indeed, although somewhat unexpected it could be said to fit uncannily well.

21.4.16 Area E sampling

No drawn record of the precise sampling point in Area E has survived. However it was almost certainly below the highlighted (white) Kubiena box on the timber above the section in Illus 21.25. Judging by the descriptions in Table 21.4 it must have been below both fibrous and amorphous peat, in the top of podzolised soil 1108.

21.4.17 Description of the samples

Table 21.4 Kubiena box from Area E

Box-1	0-3cm	Darker charcoal-rich humic clay perhaps 1112 or a variant
	3-7cm	Charcoal-rich humic clay with more fine grit, probably soil 1108.

21.4.18 Zonation of the pollen diagram of area E

In the pollen record three phases can be distinguished.

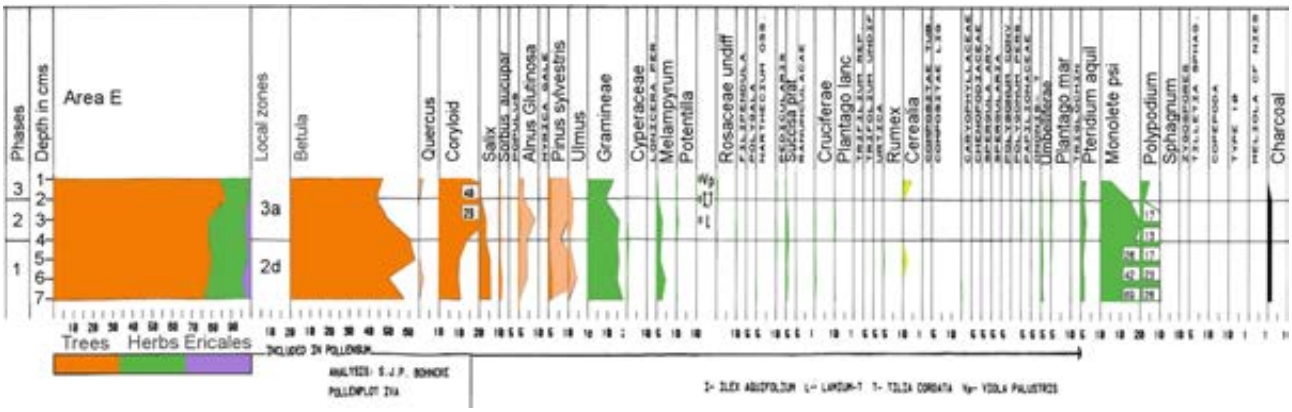
Phase 1, 7-4cm
The AP percentages were relatively high (75-80%) and consisted mainly of Betula pollen and to a lesser extent Corylus. Fern spores were abundant but the herb vegetation did not seem to be very diverse and consisted mainly of Gramineae and Melampyrum although Cerealia-type pollen and Plantago lanceolata did occur. Towards the end of this phase the Betula curve increased to around 60%. Ulmus pollen was present.

Phase 2, 5-2cm
This phase was characterised by a slight decline in the Betula values (min 40%) followed by a strong increase in the Corylus curve (max 40%). During this phase Cerealia was absent. The fern spores were still relatively abundant. Ulmus pollen was present.

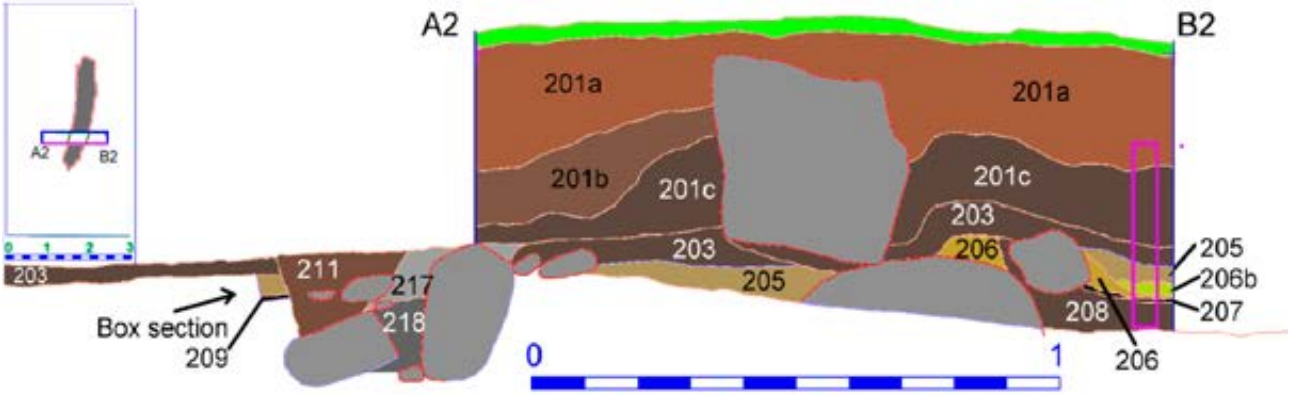
Phase 3, 2-0cm
The Corylus pollen curve declined a little. Gramineae were increasing. Cerealia reappeared in the samples.

21.4.19 Interpretation and Correlation

The presence of Ulmus pollen in the samples together with Pinus pollen around 1% and the relatively high Betula frequencies indicates that the registration started before the marked decline in the birch and hazel values, which characterised the beginning of zone CaN-3a. The increase of Corylus at the expense of Betula was a feature that occurred at the transition of zone CaN-2d to CaN-3a and can be explained as the effect of the opening up of the mixed birch and hazel forest by small-scale clearances. Due to the increase in



Illus 21.26 Area E pollen



Illus 21.27 Area C section sampled

liguliflorae in the forest Corylus flowered more strongly. Following the clearance agriculture was practised judging by the presence of Cerealia pollen. Box E shows the transition of zone CaN-2d to CaN-3a and possibly zone CaN-2c was also reflected in the bottom samples.

21.4.20 Archaeological comment

Area E lay at the edge of a cultivated area and a small cache of Hebridean and other pottery was found on the surface of soil 1108 which covered much of the trench. If the soil belonged to the end of CaN-2d rather than the start of CaN-3a, and the various darker patches lying on it (sampled in the 0-3cm level of the Kubiena box) belong to a period when agriculture was practised in CaN-3a that would fit the archaeological interpretation very well: the west edge of area E was just outside the cultivated area. As on Area C the darker deposits could represent the rotted remains of weeds with soil attached.

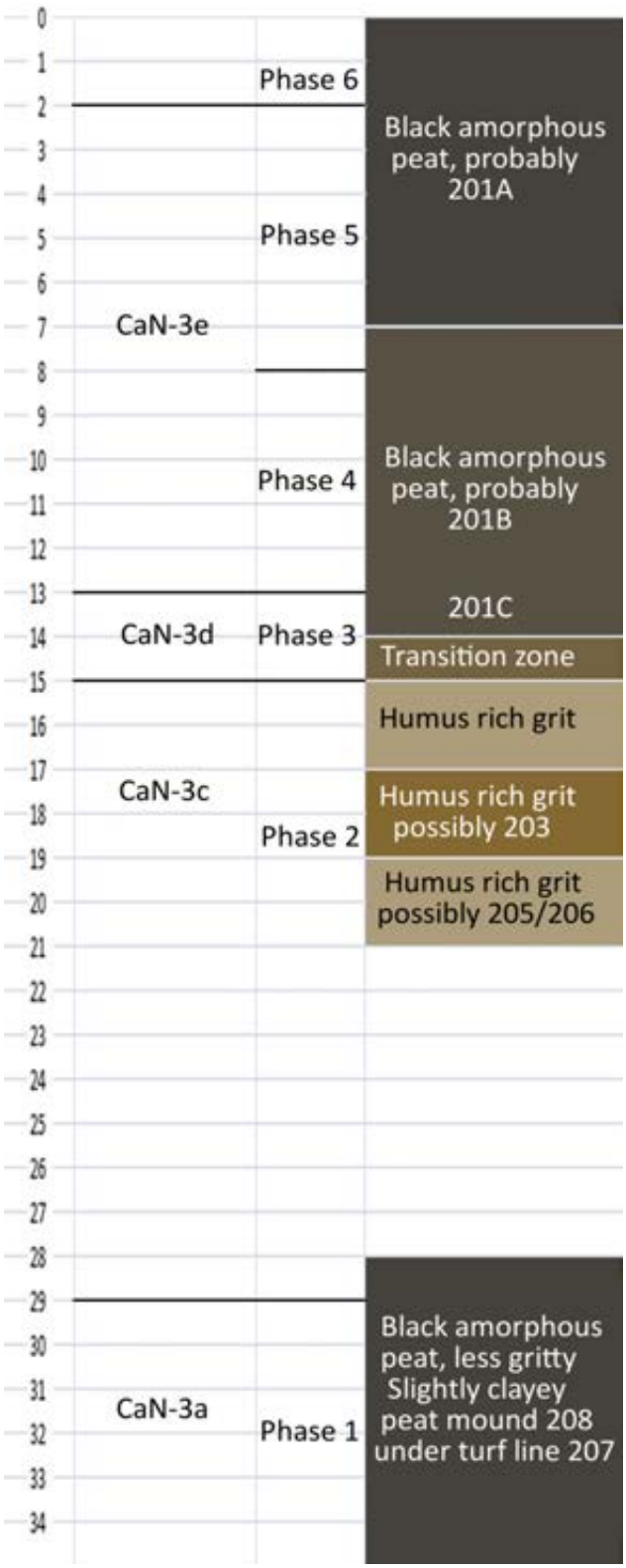
21.4.21 Area C sampling

In Area C in 1980 a baulk was left in the middle of the trench, encapsulating the fallen standing stone and related archaeology. It was sampled using 5 Kubiena boxes in a continuous column which covered the whole profile apart from the upper peat and turf (Illus 21.27). Box 2 was not available for pollen analysis.

21.4.23 Zonation of the pollen diagram

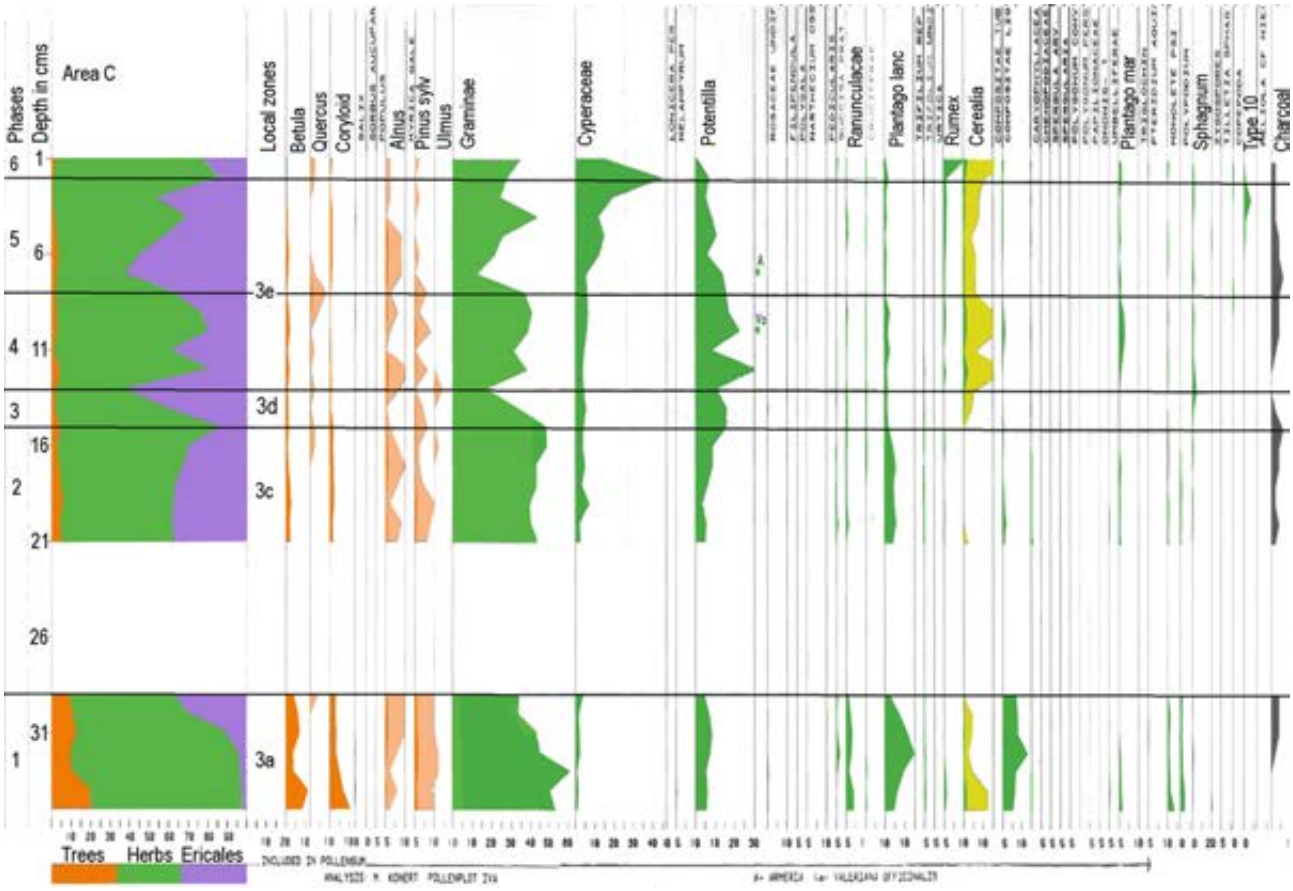
Throughout column C the Betula values stayed relatively low (e.g. below the 10% level) Pinus pollen was relatively abundant in box-1 but dropped under the 1% level in box-3 and subsequently declined slowly to form a discontinuous curve. Ulmus pollen occurred incidentally in the samples. The fluctuating presence of the different herb species was used as the main guideline to separate phases.

Phase 1, 35-28cm
This phase was characterised by the presence of high Plantago lanceolata, Cerealia and Compos-



21.4.22 Description of the samples

Illus 21.28 Stratigraphy, phasing and zoning in Area C



Illus 12.29 Area C Boxes 1 to 5 pollen

itae liguliflorae pollen percentages. Potentilla-type pollen was present and Gramineae were relatively abundant. Pinus pollen did not decline under 1%. Towards the end of this phase Ericaceae pollen increased strongly.

Phase 1 was followed by a period which cannot be assessed (the absent box 2 28-21cm). It included formation of a turf line

Phase 2, 21-15cm
During this phase Cerealia pollen was completely absent, while the Compositae liguliflorae pollen curve was relatively low. Both Ericaceae and Gramineae were dominant in the NAP.

Plantago lanceolata pollen was relatively abundant while the Ranunculaceae were less frequent than in the preceding phase. Trifolium pollen remained present in the samples.

Phase 3, 15-13cm
A temporary increase in the AP percentages was registered, together with a sharp increase in Ericaceae. Ulmus pollen was present. The Plantago lanceolata curve declined, while the Potentilla curve increased.

Phase 4, 13-8cm
A marked increase in the Cerealia curve and a further increase in the Potentilla curve, combined with a decline in the AP percentages formed the start of this phase. Gramineae and Plantago lanceolata recovered a little, while Ericaceae show a firm decline. The Plantago maritima curve was more prominent during this phase. Rumex pollen was continuously present but Trifolium species disappeared from the samples.

Phase 5, 8-2cm
The Cerealia curve declined again followed by a sharp increase in the Ericaceae. The Plantago lanceolata and the Potentilla curve showed a reduction. Gramineae, after an initial decline recovered again towards the end of this phase. The Cyperacea showed a sudden peak at the 2cm level.

Phase 6, 2-0cm
In this phase the Cyperaceae dropped suddenly and also Ericaceae showed a further decline. The Cerealia curve and the Rumex curve increased. Furthermore Plantago maritima was more frequent.

21.4.24 Interpretation and Correlation

Some traces of the Betula and Corylus decline were visible in the bottom samples Pinus pollen was relatively abundant. The sequence started off straight after the clearance phase registered in zone CaN-3a in the CN3 column. Also the presence of relatively high Gramineae values together with Plantago lanceolata and Compositae liguliflorae was characteristic of this zone. Within this zone CaN-3a the pollen assemblage of phase-1 was comparable with the stage during which both agriculture and cattle breeding was practised. The top of this phase was comparable with the Ericaceae increase at the transition of zone CaN-3a to CaN-3b. This increase in the heather in the samples from area D coincided with the middle turf-line.

Due to the absence of box-2 a complete registration of the successive zones within zone CaN-3 was impossible. It is difficult to establish how far zones CaN-3b and CaN-3c were represented in box-2; hence phase-2 was difficult to place in time. Anyhow the temporary increase in the AP percentages in phase-3 could possibly be compared with zone CaN-3d in CN1 column, starting between 1070 and 420 and ending between 920 and 260 cal BC.

The comparison of phase-4 and phase-5 with zone CaN-3e in column CN1 was more striking. The increase in agricultural activity as indicated in the Cerealia curve, together with the strong increase in the Potentilla and a more pronounced presence of Rumex and strong fluctuations in Ericaceae curve were features which also characterise zone CaN-3e. Moreover from this level onwards the Pinus curve became discontinuous in both column C and CN1. Another mutual feature was the increase in Rumex and Cerealia pollen and a decline in the Ericaceae. This feature in column CN1 marked the transition to zone CaN-4, perhaps between about 500BC and 200AD, and in Column C this increase formed the transition to phase-6.

Phase-6 possible correlated with the beginning of zone CaN-4 but other interpretations were possible. If the top part of column C represented the upper part of the remaining peat after the peat-cuttings in the 19th century AD than the sudden increase in the Cyperaceae could well have represented the level to which cutting took place, and after which peat accumulation started again. If so, the upper phase, phase-6, reflected the recent situation in the Calanais area. The cultivation bed system that was practised up to pre-modern times could have contributed to the presence of Cerealia pollen in the samples.

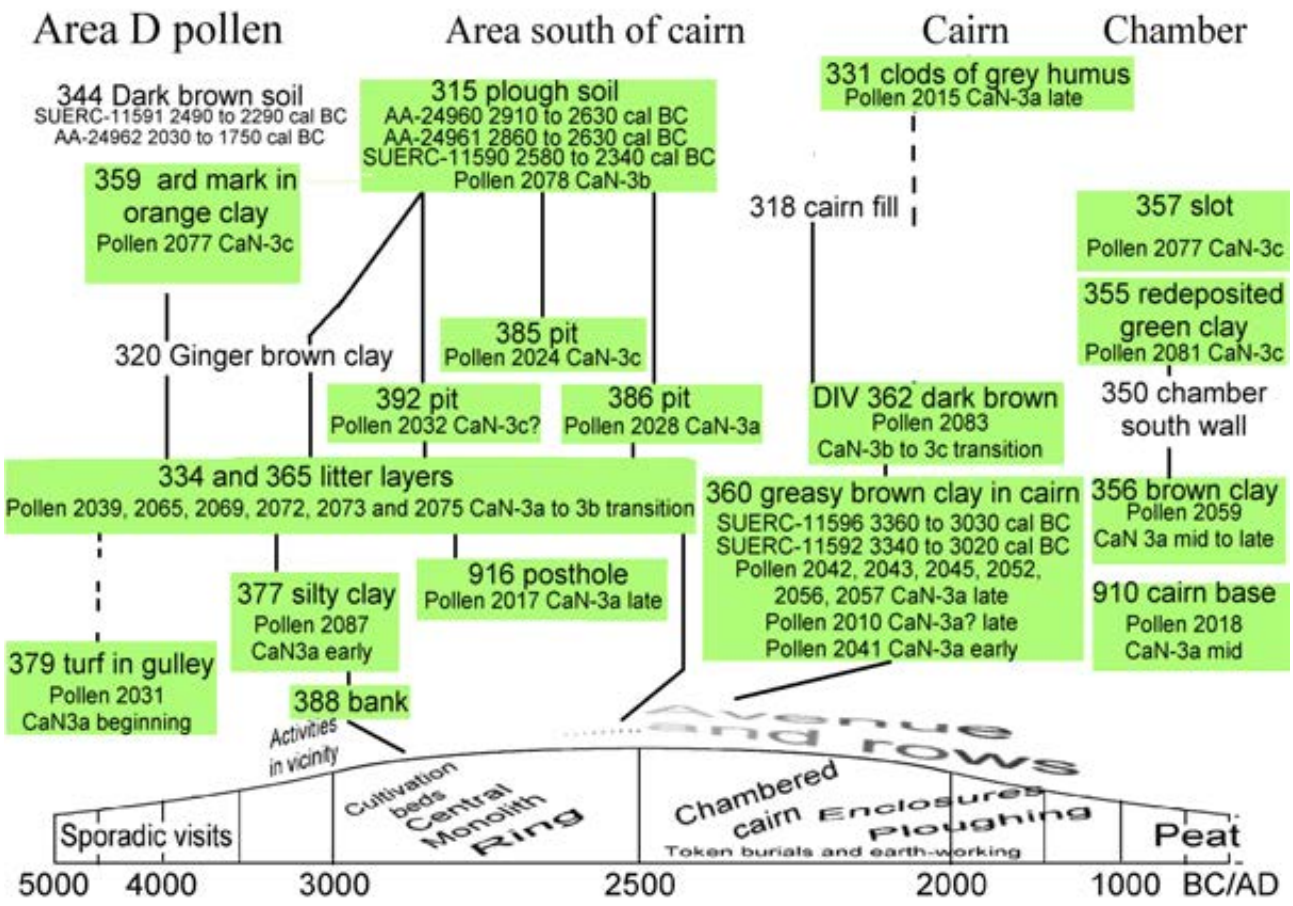
21.4.25 Archaeological comment

The Phase 1 context might have been a mound of peaty material brought from elsewhere. But the preferred archaeological interpretation is that it had been a mound of weeds with attached soil. The abundance of Plantago and Cerealia-type pollen in it supported that interpretation.

The mound contained Food Vessel pottery, which is somewhat unexpected given the palynological dating to sometime between the start of CaN-3a between 2980 and 2500 cal BC and its end between 2560 and 2200 cal BC. The Food Vessel tradition is supposed to have arisen slightly later, in the 22nd century BC.

The zoning of basal peat to the end of CaN-3d is supported by the zoning of basal peat pollen spot sample 275 from Area C to Zone 3e. The transition from 3d to 3e at between 920 and 260 cal BC seems likely to have occurred when peat started to grow without restraint. Along with a basal peat date of 1050 to 400 cal BC from sample Call80/54/244 (GU-1403 2640+/-110 BP) from the Area C east baulk it helps to narrow down the date of peat formation to between 920 and 400 cal BC (Chapter 8: Area C).

The pollen analysis suggests that all of the peat grew in prehistory; but the field interpretation was that peat 201c had been cut in a relatively modern period and that 201a and 201b represented re-



Illus 21.30 Contexts spot-sampled for pollen in Area D

newed growth. Local phases 5 and 6 have a pollen spectrum not very different from that in CaN-6 in pollen column CN2 at Callanish Leobag which may have a medieval to modern date (see discussion of Sample CN3-119 in 21.3.3 above). Perhaps a match with a much later zone in the CN2 column at Callanish Leobag or in the pollen columns from Calanais Fields should be explored.

21.4.26 Archaeological comment on Kubiena box samples as a whole

With few exceptions there was a good match between archaeological and palynological interpretations of the layers sampled in Kubiena boxes on all of the sites. The pollen provided considerable additional information, sometimes helping to discriminate between alternative archaeological hypotheses. The soil characteristics noted in Dr Bohncke's report were a useful supplement to the archaeological record.

21.5 Pollen analyses of the spot samples

The stratigraphic and descriptive information originally supplied to Dr Bohncke contained many errors. This section has therefore been rewritten extensively. Any resulting errors are the responsibility of PJA.

The intention was to fit the spot samples from the excavation site into the sequence on the base of their pollen characteristics. For this purpose, the successive stages as found in the Kubiena box-samples were used for comparison.

21.5.1 The stratigraphy of the spot samples from Area D

The spot samples from Area D came from a variety of contexts (Illus 21.30). The analyses have been grouped in roughly stratigraphic order from early to late. They show that the cultivation beds were open in early CaN-3a. Some of the subsequent old

turf lines south of the cairn pre-dated the cairn. The cairn itself was probably built in CaN-3aii which started between ended between 2470 and 2200 cal BC. The topmost old turf line continued to grow in the area south of the cairn after the cairn had been built. The upper plough soil was still in use in CaN-3c.

21.5.2 Spot sample from early cultivation beds on Area D

Table 21.5 Spot sample from 379

Area	Sample	Context	Field interpretation
D	2031	379	A displaced turf originally growing on clean green clay, in cultivation bed in Area DII

Pollen characteristics: The AP values were comparatively high (16%) and dominated by the presence of Corylus pollen (10.6%). 1.8% Pinus pollen was present. Furthermore the pollen from Plantago lanceolata and Compositae liguliflorae was relatively abundant, respectively 12 and 7.18%. Cerealia pollen was absent.

Correlation: The pollen assemblage of this sample can be correlated with levels from the beginning of zone CaN-3a. Here, after an initial clearance in the birch wood, there was a short term increase in the hazel pollen curve. At the same time the Plantago lanceolata and the Compositae liguliflorae increased firmly and there was a development towards the agriculture stage of zone CaN-3a.

Archaeological comment: This was one of the earliest turfs from the site, if its interpretation as a component of a cultivation bed is accepted. It may have been cut from turf which grew on an area previously stripped of soil. That stripping may have been associated with the digging of the curving ditch or (unknown) related features.

21.5.3 Spot sample from between cultivation beds and old turf lines on Area D

Table 21.6 Spot sample from 377

Area	Sample	Context	Field interpretation
D	2087	377	Chocolate brown, fine silty clay over 388 and under 365 but also upcast lying on 365.

Pollen characteristics: The AP percentage formed 11.2% of which 7.8% was Corylus. The NAP was dominated by Gramineae (47%) while Ericaceae were relatively low. Plantago lanceolata and Compositae liguliflorae were abundantly present. Cerealia was present.

Correlation: The above characteristics together with pine values of 1% points pointed to a correlation with an early stage in zone CaN-3a, where the Corylus was still high but where agriculture was practised, as indicated by the presence of Cerealia pollen and the relative abundant presence of Compositae liguliflorae.

Archaeological comment: The label 377 was used for a layer overlying the old cultivation beds, although as described in Chapter 9.3 pits had been dug in 377 and patches of clay of a very similar texture and colour lay over the top of the prevalent old ground surface 365. The correlation with an early stage in CaN-3ai is in accord with the archaeological interpretation

21.5.4 Spot samples from pits on Area D

Table 21.7 Spot sample from 916

Area	Sample	Context	Description
D	2017	916	Field interpretation: Post hole with stone packing and infill of brown clay with an ambiguous relationship to old turf lines 365, which it may have cut.

Pollen characteristics: Relatively low AP values, but Pinus remained at levels over 1% and Corylus was relatively abundant. The sample contained high Gramineae and Plantago lanceolata values.

Correlation: This sample belongs in the second half of CaN-3a during which there was an emphasis on cattle breeding.

Archaeological comment: The posthole lay on the northern side of cultivation bed 2, which was represented by 388. Its top had been disturbed and it is not clear whether it originally cut the main prevalent turf lines in Area D, but the pollen zonation suggests that its fill was roughly contemporary with use of the chambered cairn. Probably, then, it had been cut through the prevalent turf lines.

Table 21.8 Spot sample from posthole 392

Area	Sample	Context	Field interpretation
D	2032	392	Post hole, full of black, charcoal impregnated with an ambiguous relationship to old turf lines 365, which it may have cut.

Pollen characteristics: The AP value was low of which 0.8% was Pinus pollen. Gramineae and Ericaceae were both relatively high. Furthermore the Plantago lanceolata, the Ranunculaceae and the Compositae liguliflorae percentages were relatively low. Cerealia pollen was present along with 7% Potentilla pollen.

Correlation: The pollen contents of this sample were not very characteristic of any phase. The combined occurrence in relatively high frequencies of Ericaceae and Gramineae, together with the presence of Cerealia pollen and low pine values tentatively suggested a correlation with zone CaN-3c but other correlations were possible.

Archaeological comment: The relationship to OGS 365 was ambiguous; the post hole may have cut it. However the post hole definitely underlay layer 320, which was in Zone 3b, and the tentative correlation with CaN-3c cannot be correct unless layer 320 was wholly a result of post-depositional soil processes, which is not the preferred interpretation. Instead the lack of particular phase characteristics, perhaps caused by mixing of soils with pollen from different zones, should be emphasised. An alternative interpretation is that the upper part of the post hole was filled with material indistinguishable from 320 and was missed during excavation, but given the ambiguity of the pollen signature it is not preferred.

Table 21.9 Spot sample from posthole 385

Area	Sample	Context	Field interpretation
D	2024	385	Post hole with infill of black, greasy clay with a lens of OGS in the fill half way down (15cm deep). The post hole underlay 369 (base of 315). Over 388, possibly bank material.

Pollen characteristics: Low AP value. NAP was dominated by Gramineae (50%) and Ericaceae (33%). Cerealia pollen was present. Plantago lanceolata pollen was comparatively low.

Correlation: This sample was most likely to belong in zone CaN-3c.

Archaeological comment: This pit was found once the basal layer 369 of plough soil 315 was cleared away. Its attribution to CaN-3c contrasts with the attribution of a sample 2078 from the overlying plough soil 315 to CaN-3b. The pollen contents were also in contrast to those of Pit 386 which was in an apparently similar stratigraphic position. However these apparent anomalies fits adequately within the favoured interpretation that the area south of the cairn was used for placing small amounts of burial-related material (sometimes in pits and sometimes in small dumps and

in one case in a small stone setting) over a long period during which the ground was worked-over several times, ending in a period of cultivation. The lens of old ground surface in the backfill of the pit need only mean that it was cut through an old ground surface and re-filled with the material through which it had cut.

Table 21.10 Spot sample from posthole 386

Area	Sample	Feature	Field interpretation
D	2028	386	Post hole with black, greasy clay fill. Under plough soil 369 (315) Cuts chocolate brown layer 377 and cultivation bed 388

Pollen characteristics: Comparatively high AP values (13%), dominated by the Corylus. Pinus pollen was relatively abundant (2.2%). Both Ericaceae and Gramineae plentiful, 36% and 34% respectively Cerealia pollen was present together with relatively high Compositae liguliflorae values (3.4%).

Correlation: This sample correlated with the beginning of zone CaN-3a and was comparable with sample 2031 except for the presence of Cerealia pollen.

Archaeological comment: This zonation is at first sight surprisingly early, but the pit fill was very probably material dug up to create the pit and may have included part of a turf line equivalent to that which produced sample 2031.

21.5.5 Spot samples from D under the cairn

Pollen characteristics: Samples 2010 and sample 2041 differed appreciable from the others.

The following characteristics are valid for most of the samples. The AP values were relatively low. The NAP percentages were dominated by Gramineae, and Ericaceae were relatively low. Plantago lanceolata pollen was abundantly present. Furthermore Ranunculaceae and sometimes Trifolium pollen were present.

Sample 2010 showed extremely high Gramineae values while the Plantago lanceolata values were low and Ranunculaceae were absent. Sample 2041 contained AP values of 9.5% and the Gramineae were comparatively low (54%).

Table 21.11 Spot samples from layer 360

Area	Sample	Context	Field interpretation: A layer of greasy orange/ brown clay with quartz chips in the cairn near the outer face of the chamber wall which appeared to have been deliberately laid for the overlying course of cairn boulders.
D	2042	360	underneath stone U
D	2043	360	
D	2045	360	underneath stone Y
D	2052	360	related to sample 2056
D	2056	360	underneath stone Y
D	2057	360	underneath stone Q
D	2010	360	underneath stone V
D	2041	360	sealed by a stone in the cairn

Correlation: The low AP values occurred from the clearance in phase CaN-3a onwards. More specifically, the low Ericaceae values, combined with extremely high Gramineae values and an abundant presence of Plantago lanceolata and Compositae liguliflorae pollen, pointed to correlation with the second stage of zone CaN-3a. During this stage there was an emphasis on cattle breeding (see also the presence in the samples of Ranunculaceae and Trifolium pollen) while agriculture was less important or practised further away from the site. The absence or near-absence of Pinus pollen in the samples was remarkable, but in the main column CN3 Pinus was less frequent in the samples

ascribed to the second half of zone CaN-3a and only recovered during zone CaN-3b. The regional Pinus decline was registered in zone CaN-3c.

Sample 2010 possibly belonged to the same stage of zone CaN-3a but due to the over-representation of Gramineae pollen the percentages of the other species were suppressed and comparison was made difficult.

Sample 2041 possibly lay somewhat earlier in time because Corylus pollen was relatively abundant, which was characteristic of the first half of zone CaN-3a.

Archaeological comment: this clay was presumably scraped up from earlier clays in the surrounding area early in CaN-3aii to provide a bedding layer for the basal stones of the cairn. The two seemingly anomalous samples may reflect different earlier deposits.

Table 21.12 Spot sample from Context 910

Area	Sample	Context	Description
D	2018	910	Silty clay from the base of the cairn, above the green clay. Excavated out of sequence and excavation not completed.

Pollen characteristics: relatively low AP values, but Pinus remained at levels over 1% and Corylus was relatively abundant.

Correlation: the sample can be placed straight after the tree clearance in the middle of zone CaN-3a where Ericaceae increased at the expense of Gramineae.

Archaeological comment: This fits well with the zonation of most of the samples from 360 and increases the likelihood that the cairn was built in CaN-3aii

Table 21.13 Spot sample from clay 356

Area	Sample	Context	Field interpretation
D	2059	356	Taken from the clay between the stones at the base of the chamber wall

Pollen characteristics: The AP values were comparatively high (13%), of which 2.6% was Pinus pollen and 4.2% was Corylus pollen. Within the NAP Gramineae were dominant (54%) and Ericaceae were relatively low (14%). Cerealia pollen occurred in the samples. Plantago lanceolata and Compositae liguliflorae were plentiful.

Correlation: The relatively high Pinus values in this context pointed to an early stage within zone CaN-3a, but later in time than sample 2031 because Corylus pollen was less frequent. By way of contrast, the presence of 3.6% Ranunculaceae pollen and Trifolium pollen suggested a correlation with the second half of zone CaN-3a during which there was an emphasis on cattle breeding and the curves of Gramineae, Plantago lanceolata, Ranunculaceae and Trifolium increased.

Archaeological comment: This is interesting because it could be used to argue that the chamber wall was built significantly earlier than the outer cairn where basal layer pollen from 360 belonged in CaN-3aii. However the many samples from layer 360 included a sample 2041 belonging to CaN-3ai so it would not be safe to assume that sample 2059 proves that the wall and chamber were built at different times.

Table 21.14 Spot sample from cairn layer 362

Pollen characteristics: The AP percentage was very low and the NAP value was dominated by Gramineae (63%) and Ericaceae (28%). Compositae liguliflorae pollen was relatively abundant in this sample.

Correlation: The very low AP value together with an abundant presence of both Ericaceae and Gramineae pointed to a correlation with the CaN-3b to CaN-3c transition, where Cerealia

pollen was sometimes absent from the samples and where Gramineae were relatively high.

Archaeological comment: This is by far the latest zonation for any layer associated with the cairn. The transition from CaN-3b to 3c was dated to between 1900 and 1600 cal BC at Callanish Leobag. Particularly given its proximity to modern topsoil it seems most likely that it should be associated with the dilapidation of the cairn which took place during the period when the area south of the cairn was being used for deposition of burial material and ploughing.

Area	Sample	Context	Field interpretation
D	2083	362	This context underlay topsoil. It consisted of a dark brown gritty clay with much charcoal in fill of cairn overlying a layer of dark brown/black clay bedding (370), which in turn overlay the green clay capping (373) over stone paving around stone 29 clay near to central monolith.

21.5.6 Spot samples from old turf lines on Area D

Table 21.15 Spot sample from bifurcating old ground surfaces 365

Area	Sample	Context	Field interpretation
D	2065	365	This label was given to a sequence of (commonly two) turf lines found to the north of cultivation bed 388.
D	2073	365	as 2065
D	2069	365	as 2065
D	2039	365	as 2065
D	2072	365	as 2065
D	2075	334	Very similar old turf lines to the north of 388

Pollen characteristics of all the samples except 2039: The AP values were low but varied around 10%. Pinus pollen was relatively abundant (between 1.2 and 2.0%). Both Betula and Corylus pollen was comparatively frequent. Ericaceae was high, while Gramineae varied between 23 and 30%. Cerealia pollen was absent. Plantago lanceolata, Ranunculaceae and Compositae liguliflorae were present. Potentilla was present in sample 2072.

Pollen characteristics sample 2039: The AP percentage was low (4.6%). Pinus pollen occurred but did not reach more than 1%. Ericaceae pollen was abundantly present. Gramineae reached 27 to 30%. Cerealia pollen was present and Plantago lanceolata, Ranunculaceae and Compositae liguliflorae occurred.

Correlation of all the samples except 2039: The presence of Pinus pollen in percentages more than 1%, together with an absence of Cerealia pollen and a relative abundant presence of Ericaceae pollen, while Plantago lanceolata, Ranunculaceae and Compositae liguliflorae were present was characteristic of the pollen assemblages occurring at the end of zone CaN-3a, transition to zone CaN-3b. At this level the agricultural activities declined and Ericaceae increased.

Sample 2039 from the lower part of the sequence of OGS also seemed to date to the end of zone CaN-3a but perhaps slightly earlier than the other samples

Archaeological comment: The (commonly two) turf layers ran together in places and were very hard to distinguish during excavation. The turf lines underlay ginger layer 320 and the samples

in Kubiena boxes 4-5 and 6-7 suggested that they should date to CaN-3a (some to CaN-3ai and some to CaN-3ii). In places the two turf lines were separated by a thin layer of clay (see fig 21.9 above). The turf lines in the middle of Area DI were truncated by later ploughing. The pollen zonation suggested that it was the upper old ground surface which was sampled, and that the upper turf line continued to grow after the cairn was built until between 2560 and 2200 cal BC.

21.5.7 Spot sample from the late cultivation soil on Area D

Table 21.16 Spot sample from plough soil 315

Area	Sample	Context	Field interpretation
D	2078	315	Plough soil with ard marks

Pollen characteristics: The AP values were low (7%) and dominated by Corylus pollen (4.6%). The NAP was dominated by Gramineae and Ericaceae was relatively low. Cerealia pollen was absent. Compositae liguliflorae formed 1.8% of the pollen sum correlation: The high Gramineae values combined with low AP percentages, and the fact that the Plantago lanceolata reached 5.4%, suggested it most likely that the sample correlated with zone CaN-3b. During zone CaN-3c Ericaceae values were much higher and correlation with this zone was impossible.

Archaeological comment: This zonation fits well with the interpretation of the general sequence on Area D. The lack of cereal pollen fits the archaeological interpretation that the ground working on Area D, which included ploughing with an ard, was not related to cultivation but was part of a tradition of dealing with small ritual deposits made in the southern half of the Ring outside the chambered cairn.

Table 21.17 Spot sample from ard mark 359

Area	Sample	Context	Field interpretation
D	2077	359	A sample from an ard mark cut into reddish orange gritty clay 359 (=320) under 344 (=315) late ploughing level. Several ard marks were visible in this layer.

Pollen characteristics: AP percentage was low (5.4%) Both Ericaceae and Gramineae were abundant (45% respectively 36%). Cerealia pollen was absent but Plantago lanceolata (5.2%) and Compositae liguliflorae (1.4%) were present.

Correlation: This sample possibly correlated with zone CaN-3c where both Ericaceae and Gramineae were high and the Pinus curve declined under 1%.

Archaeological comment: This correlation suggests that that ploughing continued after the transition from CaN3b to 3c at some time between about 1880 and 1520 cal BC.

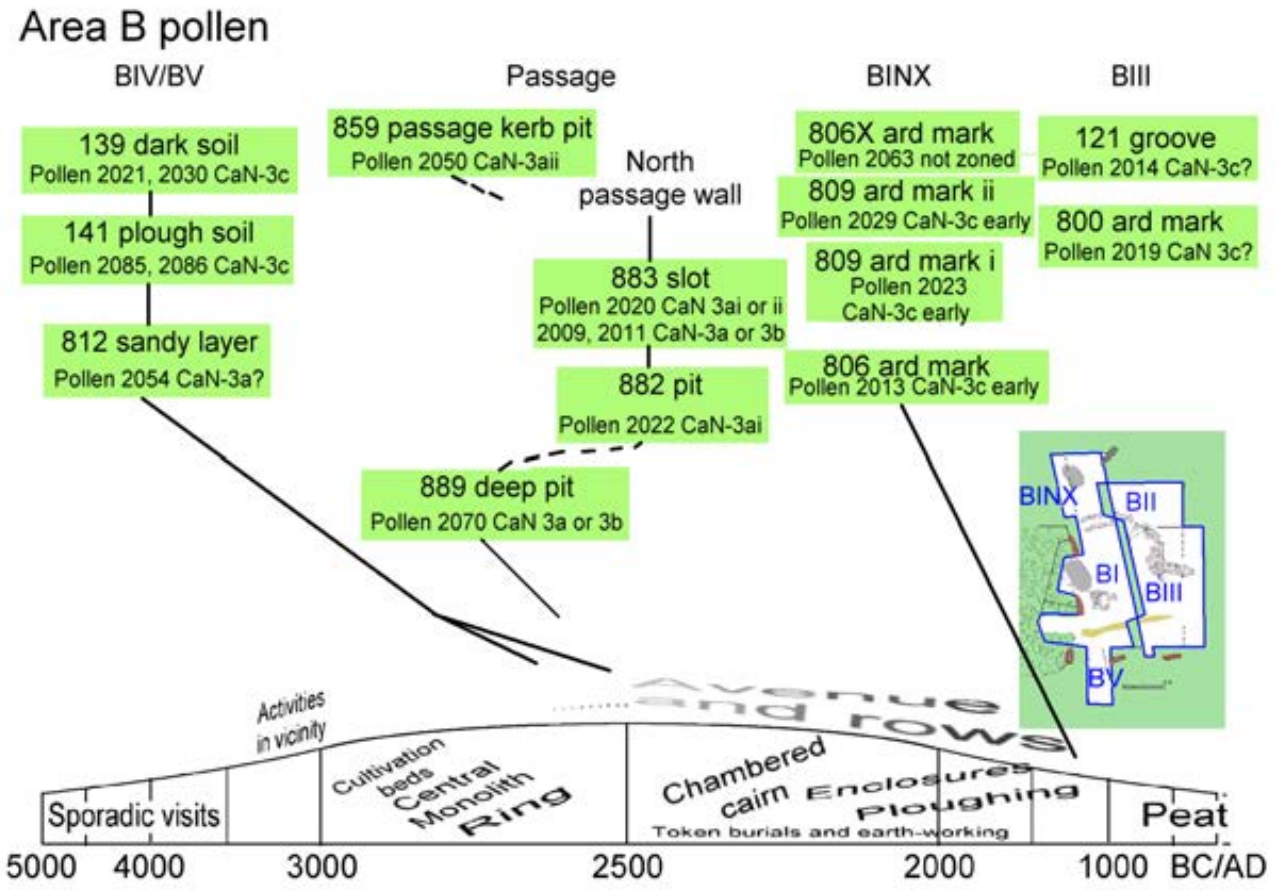
21.5.8 Spot samples from late contexts on Area D

Table 21.18 Spot sample from Victorian backfill 331

Area	Sample	Context	Field interpretation
D	2015	331	OGS Clods of grey humus within a Victorian intrusion.

Pollen characteristics: The AP percentage was low (4.6%). Pinus pollen occurred but did not reach more than 1%. Ericaceae were abundantly present. Gramineae reached 27 to 30%. Cerealia pollen was present and Plantago lanceolata, Ranunculaceae and Compositae liguliflorae occurred.

Correlation: These samples had many characteristics in common with the samples of the middle "turf-line"; but Pinus pollen was less frequent and Cerealia pollen was present. A correlation



Illus 21.31 Contexts spot-sampled for pollen in Area B

with the upper turf line seems unlikely due to the comparatively low Gramineae values and the relatively high presence of Compositae liguliflorae pollen. Possibly this sample correlates with the lower turf-line which should occur at the end of zone CaN-3a

Archaeological comment: These clods were dug up by Victorians to help back-fill a sondage into the cairn. No traces of the characteristics of turf lines were noted in the field records.

Perhaps a match with a much later zone in the CN2 column at Callanish Leobag or in the pollen columns from Calanais Fields should be explored.

Table 21.19 Spot sample from chamber clay 355

Area	Sample	Context	Field interpretation
D	2081	355	Redeposited green clay. in the chamber

Pollen characteristics: The AP value was very low (1.8%). The NAP percentage was formed mainly by Gramineae (26%), Ericaceae (35%) and Cyperaceae (25%). The relative abundant occurrence of Cyperaceae had no comparison with other samples from the excavation site, but could have resulted from the very local occurrence of sedges in the vegetation.

Correlation: The very low AP value together with the low values for Compositae liguliflorae and Plantago lanceolata, made a correlation with zone CaN-3c likely.

Archaeological comment: The 1857 clearance of peat led to removal of black (burial) deposits from the chamber and it looked during excavation as if the green clay 355 was redeposited after the Victorian intrusion. The suggested correlation is difficult to explain. Perhaps a match with a much later zone in the CN2 column at Callanish Leobag or in the pollen columns from Calanais Fields should be explored.

21.5.9 The stratigraphy of the spot samples from Area B

Please see illustration above.

21.5.10 Spot samples from Area B

Table 21.20 Spot samples from slot 883

Area	Sample	Context	Field interpretation
B	2009	883	Dark grey/green gritty charcoal rich material with burnt bone and rotted stone underneath the bottom course of the stones in the passage. This was part of the slot cut into the green clay platform under the cairn and contained charcoal much older than the date of the context.
B	2011	883	As sample 2009
B	2020	883	As sample 2009

Table 21.21 Spot sample from passage pit 886

Area	Sample	Context	Field interpretation
B	2070	889	Round pit and green clay upper fill from the middle of the passage in an ambiguous relationship with the green levelling under the cairn

Table 21.22 Spot sample from passage pit 881

Area	Sample	Context	Field interpretation
B	2022	882	Brown loamy soil with charcoal and poss. hazelnut shells within a dark feature (881) under the north passage wall.

Pollen characteristics: The AP values were relatively low and Pinus pollen was absent or only present in low percentages (0.2%). The NAP values in all the samples were dominated by Gramineae. Ericaceae varied between 7 and 15% and the Cyperaceae were virtually absent. Plantago lanceolata pollen was not very frequent in the samples except for sample 2020 (11.4%). Compositae liguliflorae pollen was relatively abundant in the samples but again sample 2020 formed an exception. Here by way of contrast the Ranunculaceae were frequently encountered in the sample. Furthermore sample 2011 contained relatively high Corylus percentages. In sample 2022 the AP values were low and NAP was dominated by Gramineae. Ericaceae was low and Plantago lanceolata was present (respectively 4% and 5%). Furthermore Compositae liguliflorae was relatively abundant.

Correlation: The relatively low AP and Ericaceae values together with an abundant presence of Gramineae made a correlation with two different zones possible, zone CaN-3a and zone CaN-3b. During zone CaN-3b the Pinus values generally recovered to more than 1% and Compositae liguliflorae pollen was less frequent. Also in the spot samples from area D that are correlated with zone CaN-3a low Pinus values do occur.

The samples hence reflect a stage straight after the clearance of birch wood in the middle of CaN-3a. In some of the samples the decline in the Corylus was still visible (e.g. 2011).

Sample 2020 should possibly be placed somewhat later in time during zone CaN-3aii where there is a tendency towards an emphasis on cattle breeding (high Plantago lanceolata and Ranunculaceae values).

In sample 2022 the extremely high Gramineae values combined with the presence of Plantago lanceolata and Compositae liguliflorae made a

correlation with zone CaN-3a most likely, although the AP percentages were low. The sample even contained Cerealia pollen which would place it in the first half of zone CaN-3a, where there was an emphasis on agriculture.

Archaeological comment: Most of the samples came from a slot 883 dug through the green clay platform under the cairn and associated with a slight wooden structure. The dating to the start of CaN-3aii is entirely credible given that the cairn itself seems to have been built after 2500 cal BC.

Sample 2022 came from shallow pit fill 882 overlying slot 883 in the passage. The pit should date to zone CaN-3aii, but the feature may have been partly or wholly filled with the older material through which it was dug.

Sample 2070 came from a pit 889 dug in the clay forming the base of the passage. It was filled with turfs and stones. Its stratigraphic relationship to 883 was ambiguous, as was its relationship to the green clay platform under the cairn because of erosion in the passage. The similarity of its pollen (sample 2020) to that in 883 suggests it too should post-date the green clay levelling into which 883 was cut, although the higher value for Plantago lanceolata and the lower value for Compositae liguliflorae pollen suggest that Pit 889 and slot 883 were not of exactly the same date as each other.

One possible interpretation is that the pit was dug first, and rapidly back-filled, while the slot was not finally filled until the slight structure based in it had decayed or been removed. Another is that, given the by then ancient charcoal incorporated in slot 883 the pollen in it was of mixed age.

Table 21.23 Spot sample from sandy layer 812

Area	Sample	Context	Field interpretation
B	2054	812	A distinct even sandy green layer with some pieces of charcoal which appeared to stretch right across trench BV.

Pollen characteristics: The AP values were low and the NAP was dominated by Gramineae. Ericaceae values were low and Plantago lanceolata was present (respectively 4 and 5%). Furthermore Compositae liguliflorae was relatively abundant.

Correlation: The extremely high Gramineae values combined with the presence of Plantago lanceolata and Compositae liguliflorae make a correlation with zone CaN-3a most likely, although the AP percentages were low.

Archaeological comment: Layer 812 seems to represent spreading of green clay between two episodes of deposition of burial-related material and ground-working. Its pollen contents contrast with those of an overlying dark plough soil 141, which was much richer in heather, but the underlying dark layer 160 was not analysed for pollen.

Table 21.24 Spot sample from kerbstone pit in passage 859

Area	Sample	Context	Field interpretation
B	2050	859	redeposited material in facade stone pit in passage

Pollen characteristics: AP value was low. Gramineae were relatively abundant (53%) and Ericaceae reached 16%. Plantago lanceolata, Compositae liguliflorae and Ranunculaceae were relatively abundant. Cerealia were absent from this sample.

Correlation: The abundant presence of Compositae liguliflorae and Gramineae, while Ericaceae were relatively high, was a feature of zone CaN-3a. The high Ranunculaceae and the absence of Cerealia pollen point to a correlation with zone CaN-3aii, when agriculture was declining around the site and cattle breeding became more important.

Archaeological comment: The zonation fits the archaeological interpretation.

Table 21.25 Spot sample from charcoal spread 139

Area	Sample	Context	Field interpretation
B	2021	139	Charcoal spread over soil, under a rough line of field stones (134) running from Ring stone 44 alongside the East Row
B	2030	139	as Sample 2021

Pollen characteristics: The AP values were low (4%). The NAP values were dominated by Ericaceae and Gramineae. The Plantago lanceolata reached high values (10.8 and 11.9%). Compared to the Ranunculaceae and Compositae, liguliflorae, Cruciferae pollen was relatively abundant.

Correlation: Both samples could be compared with zone CaN-3a but Ericaceae values were relatively high for this zone. A combination of both cattle breeding indicators (Plantago lanceolata, Ranunculaceae and Cruciferae) together with indicators for agriculture (Cerealia and Compositae liguliflorae) as is the case in sample 2021, points to a correlation with zone CaN-3c. Sample 2030 lacked Cerealia pollen but contained more Gramineae and Pinus pollen. This difference between the two samples can be explained by assuming that sample 2030 lay somewhat earlier in time, possibly the transition of zone CaN-3b to zone CaN-3c, before the regional pine decline.

Archaeological comment: The ascription of 2021 and 2030 to a relatively late pollen zone in CaN-3c suits the archaeological interpretation well, and there is no reason why the layer should not include diachronic material if, as suspected, it was not thoroughly mixed but a partially groundworked set of dumps.

Table 21.26 Spot samples from turf line and ard marks on Area B

Area	Sample	Context	Field interpretation
B	2013	806	Turf line (grey lens) in ard-marked area BINX
B	2063	806	ard mark X
B	2029	809	ard mark A in a group of ard marks in grey sand cut into yellow sand in BINX.
B	2023	809	ard mark B under F117
B	2019	800	ard mark from BIII, a different area from the others here.

Pollen characteristics: Of these samples 2013, 2023 and 2029 and 2063 can be compared with sample 2021 from the late (CaN-3c) charcoal-rich soil spread 139. Sample 2029 contains relatively high Pinus values and lacks Cerealia pollen, which makes this sample more comparable with sample 2030 from soil 139.

Correlation: Sample 2029 is likely to correlate with levels shortly after the transition of zone CaN-3b to zone CaN-3c, clearance at a stage just before the regional pine decline. The samples 2023 and 2013 both correlated with zone CaN-3c and possibly with an early stage during zone CaN-3c because of the relatively high Corylus values that are present in these samples.

Sample 2063 contained material from an ard mark cut into the same feature as 2013 but Ericaceae and Gramineae values differed appreciable. Also sample 2063 lacked Cerealia pollen and Cruciferae, which made it difficult to compare with any of the other ard mark samples.

Sample 2019 from context 800 lacked both the high Pinus value and relatively high Corylus percentage of the others but contains Cerealia pollen up to 0.8% and relatively high Cruciferae value. It too correlates with zone CaN-3c, but reflects a stage somewhat later in time where the Cruciferae have increased (see also column CN3).

Archaeological comment: Ard mark 800 was from a completely different part of the area and

may have a completely different history from the ard marks cut into 806 and 809.

The ard marks may be of various archaeological phases, but their general assignation to CaN-3c fits the overall interpretation of Area B.

Table 21.27 Spot sample from groove 121

Area	Sample	Context	Field interpretation
B	2014	121	Linear groove under 117 = natural brown fibrous layer. Within 117.

Pollen characteristics: The AP values were very low. Gramineae and Ericaceae formed the major contribution to the NAP values. Cerealia pollen was present in all the samples. Plantago lanceolata was relatively high (9.8%) as were Cerealia (0.8%). Cruciferae, Ranunculaceae and Compositae liguliflorae were present.

Correlation: Sample 2014 shows many comparisons with sample 2019 and can be placed in zone CaN-3c, after the regional pine decline.

Archaeological comment: Context 121 is from under or within brown fibrous layer 117 interpreted as a modern soil development within prepeat soils, and an allocation to CaN-3c or later is entirely credible.

Table 21.28 Spot sample from plough soil 141

Area	Sample	Context	Field interpretation
B	2085	141	From a plough soil in Area BIV to the east of the cairn.
B	2086	141	As Sample 2085.

Pollen characteristics: The AP values were very low. Gramineae and Ericaceae formed the major contribution to the NAP values. Cerealia pollen was present in both samples. Cruciferae, Ranunculaceae and Compositae liguliflorae were present. Compositae liguliflorae was very high.

Correlation: The high Compositae liguliflorae percentages present a problem with the proposed correlation with zone CaN-3c.

Archaeological comment: Context 141 was interpreted as equivalent to the late plough soil 315 on Area D and its assignation to CaN-3c matches the pollen evidence from Area D and fits the archaeological evidence from Area B.

21.5.11. The spot samples from Test Pit J and from Area C

Test Pits G2 and J were dug in 1981. Although there were some ambiguities in labelling of the samples it is most likely that no samples from G2 or the 1980 Test Pit G1 were analysed for their pollen.

Test pit J was in an area where no cultivation beds were visible. Area C was excavated to investigate a fallen stone, the pit in which it had been erected and any related archaeology. The samples taken for pollen analysis were a Kubiena box column from a temporary baulk across the fallen stone and the basal peat spot sample from the east baulk described below

Table 21.29 Spot sample from soil test pit J

Area	Sample	Context	Field interpretation
Probably G3=J; see Technical Note 13.4.2)	2060	Layer-3	1981 Soil test pit horizon NW profile.

Pollen characteristics: The AP value reached 20.6%. Betula pollen formed the major contribution to the AP percentage (13.4%), Corylus 5.4%. Gramineae were relatively high (56%), while Ericaceae only reach 5%. The Compositae liguliflorae were relatively abundant (6.2%). Plantago lanceolata and Ranunculaceae pollen were present, the Cerealia were absent.

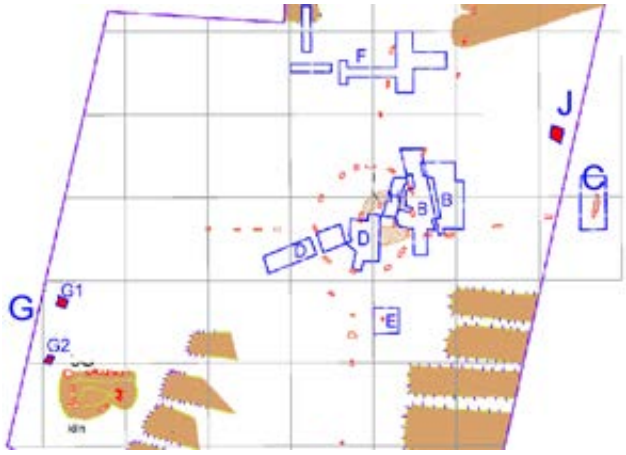
Correlation: The relatively high AP percentages, mainly birch, and high Gramineae values indicate a correlation with an early stage in zone CaN-3a during which the Betula values were still declining and hazel was present. This sample falls straight after the clearance which marks the transition of zone CaN-2d to CaN-3a.

Archaeological comment: If this is from G2 Layer 3 as both Bohncke and the original Soil Sample list have it the sample is from black peat. The overlying layer was black peat with some quartz grains and charcoal. The assignation to just after the CaN-2d to CaN-3a is slightly surprising given the !st millennium BC date of the basal peat on the other side of the stone setting and at the Calanais Fields project where peat grew, in round terms, from 500 BC to 800 AD and from 250 BC to after 1700 AD. But Pit G2 was on what appeared from air photographs CUP RA84 and RA85 of 1955 to have been cut into a squarish pre-modern cultivation area. Peat and other material may have been dug up elsewhere and dumped on this area and modified in the 19th century AD.

If this sample is actually from G3 (=J) as the AOC Macroplant Bag record has it, it was from a very compact green brown silty clay. But that would mean an inversion because the pollen in Sample 2036 from Layer 4 is assigned to the transition of zone CaN-3a to CaN-3b. That too would be somewhat surprising.

Table 21.30 Spot sample from soil test pit J

Area	Sample	Context	Field interpretation
G3 = J	2036	Layer-4	B1g horizon in the pit.
Layer 4 is described as uncemented green subsoil.			



Illus 21.32 The location of the test pits and Area C

Pollen characteristics: Very low AP percentage. NAP was dominated by Ericaceae while Gramineae were relatively low (29%). Plantago lanceolata pollen occurred in low frequencies. Ranunculaceae, Compositae liguliflorae and Cerealia pollen were present.

Correlation: The strong increase in Ericaceae in this sample suggests a correlation with the transition of zone CaN-3a to CaN-3b when the human impact temporarily declines.

Archaeological comment: A B1g layer (sample 2036) is the gleyed form of an illuviated subsoil in which fine material has derived from organic-rich higher layers. That is not incompatible with the field description of Pit J Layer 4 as uncemented green subsoil.

Table 21.31 Spot sample from Area C

Area	Sample	Context	Field interpretation
C	275?	201	See Archaeological comment below

Pollen characteristics: 6.2% AP. NAP was dominated by Ericaceae and Potentilla-type pollen. 0.4% Cerealia was present. All the other herbs occur in low percentages.

Correlation: The high Potentilla values, in combi-

nation with the other pollen characteristics make this sample fit in zone CaN-3e (see also Area C Kubiena box pollen diagram).

Archaeological comment: This sample, recorded as Sample 201 in the draft pollen report, is very probably sample 275 from context 201, basal amorphous peat on Area C, taken as a possible C14 sample. Another basal peat sample Call80/54/244 produced a date (GU-1403 2640+/-110 BP) between 1050 and 400 cal BC from humic acid. The basal peat sample age from Area C is not significantly different from two Zone 3e ages from the Leobag CN1 column when they are considered as a group. The two Zone 3e peat sample ages were GU-1289: 2440+/-112 BP and GU-1170: 2355+/-110 BP which dated to between 850 and 200 cal BC and to between 800 and 150 cal BC respectively. Interpolation between those dates and earlier dates suggests that the 3d to 3e transition took place between 920 and 260 cal BC (Table 21.2). Combining this information with that from the basal peat date suggests unrestricted peat growth started between about 920 and 400 cal BC.

21.5.12 Spot samples from Area H

Area H was dug in 1981. It was designed to explore the cairn and allow repairs to the chamber wall. The old ground surfaces to the north of the cairn were complex and truncated, and the stratigraphic correlation between those at the north end of the site and those close to the cairn was ambiguous.

Table 21.32 Spot sample from token burial 736

Area	Sample	Context	Field interpretation
H	2026	736	Reddish-yellowish clay with a few fragments of burnt bone (Day Book 6) in an area of discoloured stone in the outer cairn.

Pollen characteristics: 15.6% AP of which 10.8% was Corylus. Gramineae dominated in the NAP and Ericaceae reached 25% Cerealia pollen was absent from the sample. 2.2% Pinus was present.

Correlation: The relatively high Corylus and Pinus percentage, together with a dominant occurrence of Gramineae in the NAP are characteristics of the beginning of zone CaN-3ai.

Archaeological comment: This is an extremely interesting context, a possible token burial deposit'. It contained a rim sherd of AOC beaker, a 'neolithic' sherd and a single piece of hazel charcoal (sample 2243) produced an age AA-24967 (4050+/-45 BP) which calibrated to between 2860 and 2470 cal BC. That is somewhat too early for any beakers in Britain or on nearby parts of the continent. The analysis suggests a zone, CaN-3ai, dated to much the same period as the cairn but too early for the sherd. The archaeological interpretation of the complex evidence from stratigraphy, radiocarbon and artefacts is that the cairn must have been built fairly soon after 2500 BC and the token burial must have contained pollen-bearing material old at the time.

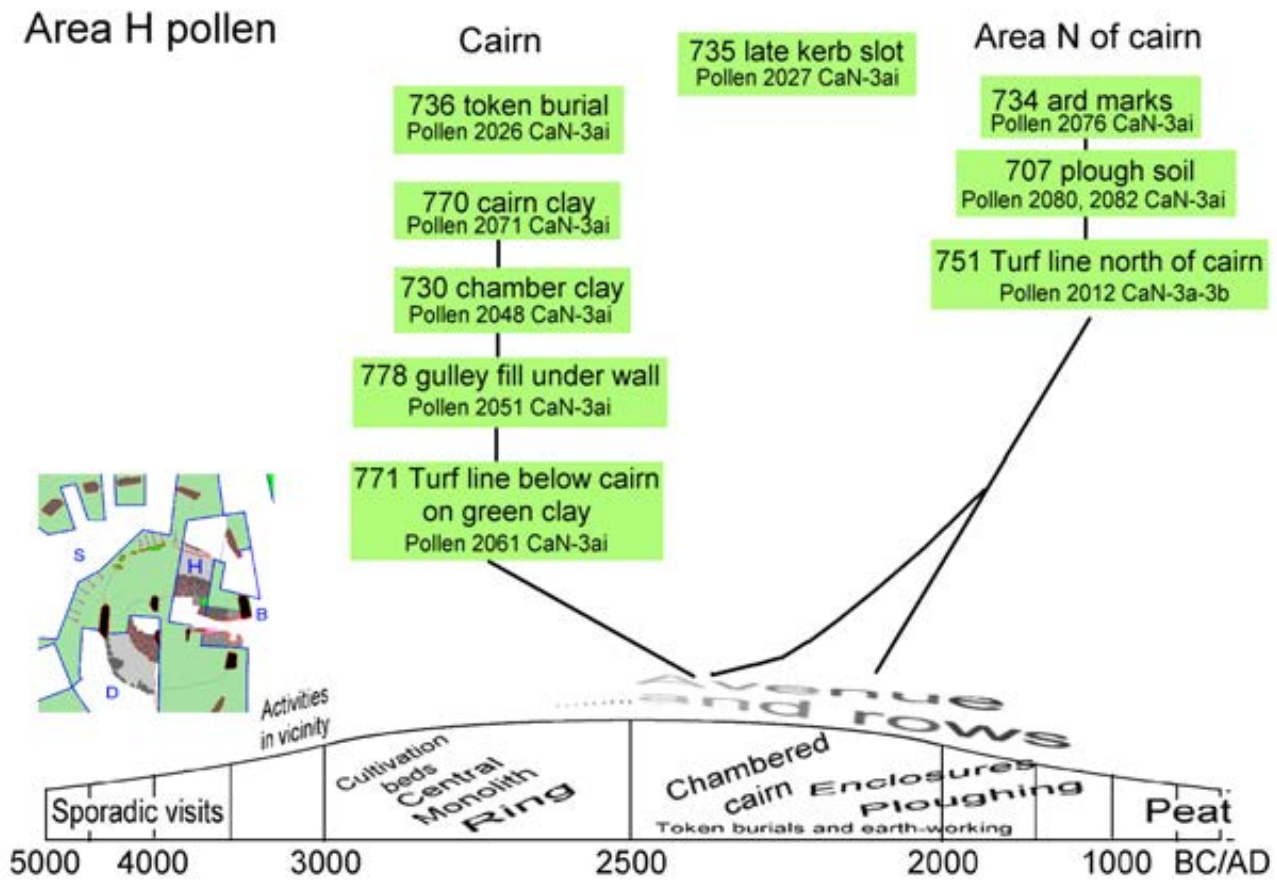
Table 21.33 Spot sample from slot fill 730

Area	Sample	Context	Field interpretation
H	2048	730	Charcoal-rich greyish green brown sandy clay within slot 773 cut into the green clay platform.

Pollen characteristics: 9.4% AP of which 3.2% was Corylus. The NAP was dominated by Gramineae (62.8). Ericaceae was at 13.8%. Cerealia were present.

Correlation: quite like sample 2027 from context 735; probably CaN-3ai, like sample 2027

Archaeological comment: The context was a slot cut by erosion in the chamber. It was filled before the cairn was built.



Illus 21.33 Contexts spot-sampled for pollen in Area H

Table 21.34 Spot sample from slot fill 778

Area	Sample	Context	Field interpretation
H	2051	778	Slightly gritty, humic rich clay with ochre from a slot underneath the cairn; cutting the green clay platform. The fill included charcoal of earlier age.

Pollen characteristics: The AP was relatively high (12.8%) the majority derived from Corylus and Betula. Pinus pollen was present (1.4%) within the NAP Ericaceae were present in relatively low values (14.4%). Gramineae reached 58%. Cerealia pollen was absent.

Correlation: The relatively high Corylus and Pinus values point to a correlation with the middle part of zone CaN-3a close in time to sample 2026 (CaN-3ai).

Archaeological comment: The pollen could go with the date of filling of the context or with clay of the same date as the charcoal (from the same sample 2051 and context 778: A charred hazel nut shell (sample 2051) provided a date SUERC-11617; (4425+/-35 BP) of between 3330 and 2920 cal BC.

Although the zone CaN-3i is only loosely dated it does appear to be significantly later than the dates quoted above. Therefore the pollen in the clay may have been dominated by pollen of the period when the context was filled. One possible implication, if the cairn was, as argued above, built after 2500 cal BC, is that the light structure built on the platform was significantly earlier than the cairn. In that case the clay in the token burial deposit sampled by Sample 2026 might have included clay picked up from the area of the (by then destroyed) light timber structures.

Table 21.35 Spot sample from kerb trench 735

Area	Sample	Context	Field interpretation
H	2027	735	Dark grey brown gritty clay in later kerb slot

Pollen characteristics: 9.8% AP of which 7% was Corylus. The NAP was dominated by Gramineae (69%). Cerealia were present in this sample (0.8%).

Correlation: This sample contains a pollen assemblage with all the characteristics of the first half of zone CaN-3a, the stage during which there was an emphasis on agriculture. The only problem with this correlation is that the Compositae liguliflorae could be expected to have shown higher values.

Archaeological comment: The interpretation of the context was fairly ambiguous and the pollen zonation does not resolve the ambiguities. The pollen reflects the material through which the slot was cut rather than pollen characteristic of the period when the slot was dug. The implication is that the work was done when there was little pollen rain, as for example during winter.

Table 21.36 Spot sample from turf line 751

Area	Sample	Context	Field interpretation
H	2012	751	turf line north of the cairn

Pollen characteristics: Low AP value, Pinus pollen absent equal percentage Ericaceae and Gramineae (43%). The Compositae liguliflorae are relatively high.

Correlation: The relatively high Ericaceae value together with an absence in the Cerealia and in the indicators for pasture land (Ranunculaceae and high Plantago values) indicates a correlation with the middle turf-line at the transition of zone CaN-3a to zone CaN-3b.

Archaeological comment: This zonation is inexplicable unless the sample was taken from an area where the turf line was not covered by imported green clay 750 in the middle of CaN-3a and continued to grow until the transition to CaN-3b at some time between 2560 and 2200 cal BC. This will be discussed further with Samples 2076, 2080 and 2082 below.

Table 21.37 Spot sample from chamber wall fill 770

Area	Sample	Context	Field interpretation
H	2071	770	Very dark grey clay lower infill of chamber wall.

Pollen characteristics: This sample showed relatively high AP values of which Betula and Corylus contributed the most. Only 0.6% Pinus pollen was present. 47% Gramineae and 40% Ericaceae were present in this sample. The relatively high Ericaceae percentages are remarkable; sample 2071 would be very comparable to sample 2061 from the turf line immediately below 771 if it wasn't for them.

Correlation: Likely to correlate with an early stage in zone CaN-3a but the high Ericaceae possibly indicated a development towards the middle "turf-line" at the transition of Zone CaN-3a to CaN-3b.

Archaeological comment: The chamber wall was built at the start of CaN-3aii. The clay in the wall contained highly residual potsherds. The high Ericaceae values represent an evanescent event or use of imported material zoned to CaN-3ai.

Table 21.38 Spot sample from turf line 77

Area	Sample	Context	Field interpretation
H	2061	771	Turf line underneath the chamber wall and above the green clay platform

Pollen characteristics: Relatively high AP value (13.4%) mainly formed by Betula and Corylus pollen. Gramineae were abundantly present (55%) while Ericaceae values were low (16%).

Correlation: The relatively high AP value combined with the high Gramineae percentage and low Ericaceae percentage points to an early stage in zone CaN-3a.

Archaeological comment: This thin OGS-like layer is of considerable interest because it was either an incipient turf line before the cairn was built or composed of material which silted / washed down through the cairn.

The overlying clay layer 770 of the chamber wall was zoned to CaN-3a to 3b in spot sample 2071 and although that was probably later than the date of cairn building it was sufficiently different from this sample to suggest that 771 was indeed an incipient turf line forming on the green clay platform under the cairn.

Spot sample 2061 came from the turf line immediately overlying the green clay under the cairn. The implication of the pollen evidence from the box column and spot samples is that the green clay platform was laid late in CaN-3ai and the overlying cairn was built early in CaN-3aii which fits the archaeological interpretation that the cairn was built soon after the middle of the millennium fairly well.

Table 21.39 Spot samples from ard mark 734 and plough soil 707

Area	Sample	Context	Field interpretation
H	2076	734	Ard mark 3; Broad ard mark light green gritty sandy clay. Cuts 707= plough soil (ard mark layer)
H	2082	707	plough soil a slightly greasy clay with charcoal flecks and rotted stones at a higher level than OGS 771
	2080	707	as 2082

Pollen characteristics of 2076 and 2082: The relatively high AP values were mainly caused by the relatively high Corylus percentage. Both Gramineae and Ericaceae were relatively abundant, although Gramineae were twice as frequent. Cerealia was absent from both samples. Compositae liguliflorae was relatively abundant like the Ranunculaceae. Pinus pollen was present in low values.

By way of contrast sample 2080, from the same plough soil as 2082, had: low AP values, and 1.2% Pinus. But as in 2082 Corylus pollen was relatively frequent (4.6%). Gramineae pollen was very abundant (64%). Compositae liguliflorae pollen was frequently encountered in the sample. Cerealia pollen was present.

Correlation of 2076 and 2082: The high AP values point to a correlation with the earlier half of zone CaN-3ai where Corylus showed a brief increase. The relatively high Compositae liguliflorae values seem to confirm this correlation. Sample 2082 seems somewhat later than 2076 judging from the declining Corylus values.

Correlation of 2080: After the successive Betula and Corylus decline near the middle of zone CaN-3a a stage follows during which Gramineae increase together with the Compositae liguliflorae and to a lesser extent the Plantago lanceolata. This sample fits nicely in mid zone CaN-3a.

Archaeological comment: Mid CaN-3a is surprisingly early for the ploughing which should be late Can 3a, CaN-3b or later.

The ard mark 734 cut the plough soil 707 in a way that suggests that it was significantly later than the plough soil, but the pollen from the ard mark had earlier characteristics. The pollen must have come from the layers cut by the ard rather than being contemporaneous with ploughing.

A likely source for mid CaN-3a pollen is the clay fills of the cairn. It was robbed of stones and one scenario supported by the pollen inversion is that cairn material was pulled down onto this area and the clay fill component left when the stones were removed formed part of the plough soil 707. Perhaps also the pollen may have derived partly from green clay 750 which was imported to this area towards the end of CaN-3ai (Illus 21.34).

These contexts are stratigraphically higher and significantly later than turf line 751 (sample 2012),

which is placed at the CaN-3a /3b transition (Illus 21.33, 21.34). The zonation of the turf line appears anomalous. However a clue to possible resolution comes from the analysis of Kubiena box sampling on Area D. There what appeared during excavation as a pair of turf lines was shown to be far more complex because some of the turf lines lay on an old cultivation bed and others on deposits which had filled the trough between two cultivation beds. There were parts of two cultivation beds north of the cairn on Area H with a trough between them. Clay 750 lay in the trough and sealed most of turf line 758 which also survived best there. The turf lines in the north section may, as on Area D, have been more complex than the record suggests. There is thus an abstract possibility that the sample actually came from the higher turf line 771 (Illus 21.34).

But only future excavations and spot and Kubiena box pollen sampling of the various turf lines and related strata north of the cairn can resolve this problem.

21.5.13 Discussion of the spot samples

It is a pity to end on that note, because by and large the spot samples fitted in well with the interpretation of the excavation results. However, it is fair to say that the spot samples, unlike the Kubiena box profiles, rarely tested the archaeological interpretations or refuted alternative interpretations. For instance those relating to ploughing on Area H can be interpreted as representing old material pulled down from the cairn, which would incidentally help to explain where the soil came from. But a result in CaN-3b could have been explained equally easily and probably in much the same way but with more ploughing occurring.

As Dr Bohncke remarked in his original draft, spot samples can reflect a very short period of time during which the pollen rain could have been different from the average for the century or so represented by each cm of the reference pollen column CaN-3a.

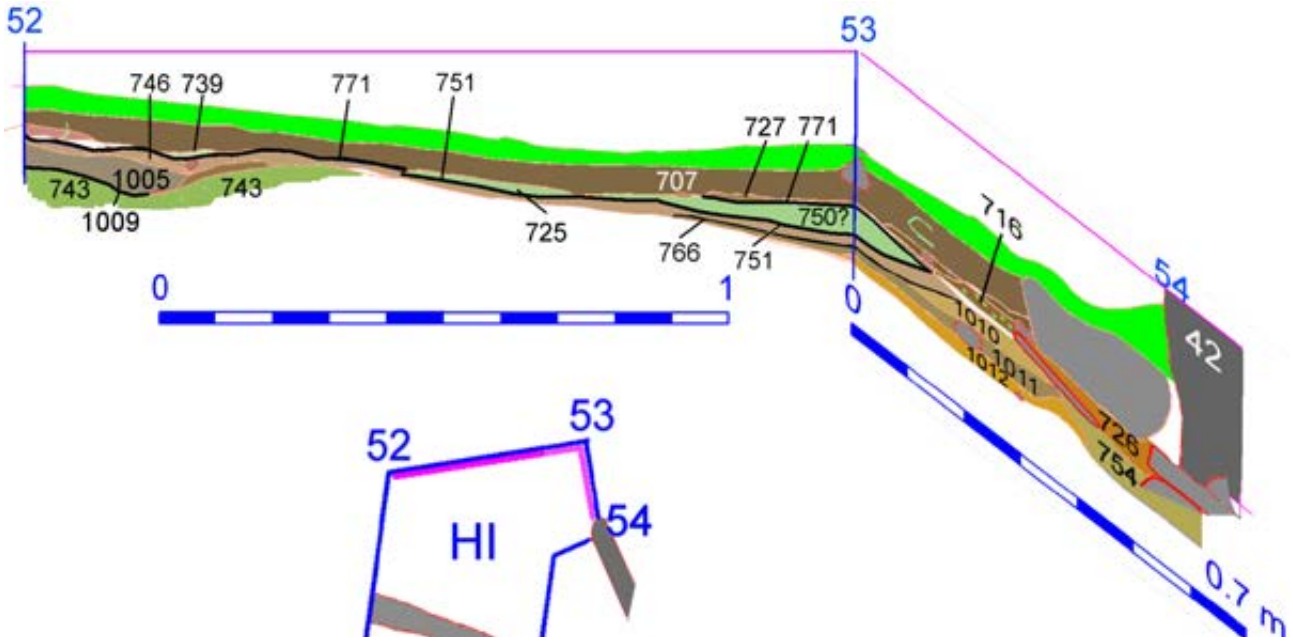
There was also always a potential problem of residual pollen where human activities had disturbed earlier layers or had led to dumping of clay derived from early levels above 'later' strata. Nevertheless the spot samples did often make a very significant contribution to interpretation, for instance showing that turf line 365 had continued to grow outside the cairn after it had been built.

25.6 Discussion of the pollen analysis from an archaeological perspective

P J Ashmore

Before the pollen analysis was conducted I and others were concerned that old pollen might have been mixed into later contexts, vitiating analysis. The truth probably is that the earlier contexts, including the early turf lines represented in the Kubiena boxes, did contain pollen representing the contemporaneous vegetation fairly accurately; but many of the later contexts dating to after the green clay platform under the cairn, and particularly the ground-worked soils of the late 3rd and 2nd millennia BC probably contained a significant component of residual pollen.

One of the several examples which allow this fairly optimistic conclusion about the pollen in the earlier strata is provided by archaeological consideration of the pollen from a turf line751 in Area H, another part of which (758) was immediately below the green clay platform in a Kubiena box column. Here I quote from Chapter 12.7.4. "A pollen sample (2012) from turf line 751 had a high proportion of heather pollen (43%) which, together with an absence in cereals and in the indicators for pasture land led to an interpretation that it went with the transition of zone CaN-3a to zone CaN-3b at some time between 2560 and 2200 cal BC (Chapter 21: Pollen). No pollen samples from the overlying green clay 750 were analysed, but a spot sample from the overlying plough soil 707 had pollen characteristic of sub-zone CaN-3ai. This suggests either a reversal, with older pollen in plough soil 707 than in turf line 758, or mixing of pollen of various zones in the soil (highly likely, given that it was a plough soil) or local conditions producing a very different mix of plants to that found at the same time at Calanais Leobag. Of course, all three effects may have been present. But inspection of the pollen diagrams from Leobag suggests that there was a peak in heather of about the same percentage as



Illus 21.34 Perspective section 13 [NMRS DC38285]

in turf line pollen sample 2012 during CaN-3aii close to the junction with CaN-3ai, and that cereal was absent at the junction between CaN-3ai and 3aii [Chapter 21 Illus 21.3). It is entirely credible that the pollen in sample 2012 belonged around that time. Such a reinterpretation would accord with the pollen evidence from under the cairn where 758, the same turf line as 751, belonged to the junction between CaN-3ai and CaN-3aii."

What I found encouraging in analysing this and some other apparent problems from an archaeological perspective is that re-inspection of the reference pollen column at Leobag immediately allowed a natural interpretation where previously there seemed to be problems.

Any future excavation at Calanais should employ a much more extensive and systematic sampling strategy. Pollen counts should be much higher. Degradation of pollen should be recorded (Tipping 2000). Very detailed recording and characterisation of turf lines, with input from soil scientists, will be essential. If possible, samples should be analysed before completion of a campaign of excavation to allow feedback to archaeological interpretation, and to allow supplementary sampling.

However as it turned out, by and large, the pollen did not seem to share the deep residuality which was such a common occurrence with pottery and charcoal at Calanais, with Phase 3 material in Phase 7 contexts. Archaeological interpretation and dating was usually straightforward. The Kubiena box samples were particular useful in discriminating between possible dates for the near-basal cultivation beds. More generally the zonal dating of these short profiles and of the spot samples was more in line with artefactual dating of the chambered cairn to after 2500 BC than were the radiocarbon dates. It might have been possible to relate the Kubiena box profiles to each other and the spot samples to the profiles without the nearby reference pollen columns. But they obviously helped dating and interpretation. Analysing more than one column seems essential to show how much local variation there was. The strategy for future columns should be analysis of contents and dates of ranging-samples followed if the preliminary data is promising by pollen sampling and radiocarbon dating at closer intervals than in the existing columns so that short term variations in pollen rain and peat growth rates can be captured better. If possible several columns covering the same period should be analysed to allow a better assessment of the catchment area.

21.7 Pollen tables for the spot samples

Table 21.40 Spot samples from B

TRENCH NUMBER	BIV	BIV	BV	BV	BV	BIV WX	BIVWX	B IV WX
SAMPLE	2021	2030	2085	2086	2054	2070	2009	2011
CONTEXT	139	139	141	141	812	889	883	883
CONTEXT TYPE	dark soil	dark soil	dark soil	dark soil	sandy layer	deep passage pit	passage slot	passage slot
TAXA								
PINUS SYLV	0.4	1.4	0.8	0.2	0.4	0	0	0.2
BETULA	1	0	0.4	0.2	1.4	3.8	1.2	4.4
ALNUS GLUT	0.6	0.4	0.8	0.4	0.4	0	0.6	0.4
CORYLUS	1	1.8	3.6	1.8	1	1.5	4.6	8.8
QUERCUS	0.8	0.2	0	0	0	0	0.2	0
TILIA	0	0	0	0.2	0	0	0	0
FRAXINUS	0.2	0	0	0	0	0	0	0
ULMUS	0	0	0	0	0	0	0	0
SALIX	0	0.2	0	0	0	0	0	0
SUM TREES	20	20	28	14	16	29	33	69
% TREES	4	4	5.6	2.8	3.2	5.3	6.6	13.8
GRAMINEAE	26.6	48.4	56	58.4	82.2	65.5	77.6	60.6

CYPERACEAE	5.4	4.2	0.2	0.2	0	0.5	0.2	0.4
ERICACEAE	22.6	19.2	22.2	22.6	3.2	14.9	6.6	10.8
CEREALIA	0.6	0	0.4	0.2	0	0.2	0	0.2
MELAMPYRUM	0	0	0	0	0	0	0.2	0.2
PLANTAGO LANC	10.8	11.8	3.8	5.8	5	4	2.6	3.2
PLANTAGO MAR	2	0.8	0.8	0	0	0	0	0.2
POTENTILLA	1.8	2	1.2	0.4	3.2	1.3	0.4	0.2
ROSACEAE	0	0	0	0	0.2	0	0	0
CRUCIFERAE	2.6	2.4	0.4	0.2	0.2	0	0.8	1.6
RANUNCULACEAE	2.2	1	0.6	3.2	1.8	1.3	0.4	0.2
COMPOSITAE TUB	0	0.4	0	0	0	0	0.8	0.4
COMPOSITAE LIGULIFLORAE	3	2.8	7.8	5.6	2.8	4.5	3.6	7.4
TRIFOLIUM TYPE	0	0	0	0.2	0.2	0.8	0	0
SUCCISA PRAT	0.6	1.2	0.8	0	0	0	0	0
CARYOPHYLLACEAE	0.8	1.4	0.2	0	0	0	0	0
CHENOPODIACEAE	0	0	0	0	0	0	0	0
RUMEX	0	0.2	0	0	0	0	0	0.4
SPERGULARIA	0	0	0	0	0	0	0	0.2
CHAMENERION	0	0	0	0	0	0	0	0
ALISMA	0	0	0	0	0	0	0	0
FILIPENDULA	0	0	0	0.4	0	0	0	0

SPERGULA	0	0	0	0	0	0	0	0
URTICA	0	0.2	0	0	0	0	0	0
UMBELLIFERAE	0	0	0	0	0	0	0	0
LILIACEAE	0	0	0	0	0	0	0	0
SUM HERBS	480	480	472	486	484	521	467	431
% HERBS	96	96	94.4	97.2	96.8	94.7	93.4	86.2
SPHAGNUM	0.2	0.8	3.8	1.8	0	0.5	4.4	6.4
PTERIDIUM	0	0	0.2	1.2	0	0	0	0
MONOLETE PSI	1.2	4.4	10	2.6	16.8	2.2	1.8	1.6
POLYPODIUM	0.6	0.6	0.8	0.6	0.6	1.3	1.4	0.6
LYCOPODIUM	0	0	0.2	0	0	0	0	0
OTHER TRILETE	0	0	0	0	0	0.2	0	0
SELAGINELLA	0	0	0	0	0	0	0	0
ZYGNEMATACEAE	0	0	0	0	0	0	0.2	0
SPYROGYRA	0	0	0	0	0	0	0.4	0.2
MOUGEOTICA	0	0	0	0	0	0.2	0.4	0.2
COPEPODA	0	1	0.6	0	0	0	0	0
CHARCOAL	+	+	+	+	+	+	+	+
ZONE	3c	3c	3c	3c	3a?	3a or 3b	3a or 3b	3a or 3b

Table 21.41 Spot samples from B

TRENCH NUMBER	BIV WX	BIVWX	BIVWX	B III	BIII	BINX	B INX	BINX	BINX
SAMPLE	2020	2022	2050	2014	2019	2063	2013	2023	2029
CONTEXT	883	882	859	121	800	806 ard X	806	809	809
CONTEXT TYPE	passage slot	passage 'pit'	passage kerb pit	linear groove	ard mark	ard mark	ard marked soil	ard mark	ard mark
TAXA									
PINUS SYLV	0.2	0.4	0	0.6	0.2	0	0.6	0.6	1.2
BETULA	1.4	2.2	4.6	1.8	1.2	1.6	1.6	1.6	0.4
ALNUS GLUT	0.4	1	0.4	0	0.2	0.4	0.8	0.2	0.4
CORYLUS	5.6	3.6	3.4	2	1.8	2.2	3.8	5	5.2
QUERCUS	0	0	0	0	0.2	0	0	0	0
TILIA	0	0	0	0	0	0	0	0	0
FRAXINUS	0	0	0	0	0	0	0	0	0
ULMUS	0	0.2	0	0.2	0	0	0	0	0
SALIX	0	0	0	0.2	0	0	0	0.2	0
SUM TREES	38	37	42	24	18	21	34	38	36
% TREES	7.6	7.4	8.2	4.8	3.6	4.2	6.8	7.6	7.2
GRAMINEAE	60.2	71.4	53.4	42.8	42.2	59.8	30.6	39.6	54.4

CYPERACEAE	0.2	1.6	1	3.8	6	0.8	2.6	3.2	0.6
ERICACEAE	12.8	7	16	26.2	25	20.8	48	29.8	17.4
CEREALIA	0	0.2	0	0.8	0.8	0	0.2	0.4	0
MELAMPYRUM	0	0	0	0	0	0	0	0	0
PLANTAGO LANC	11.4	4	7.8	9.6	10.4	8.8	8.6	8	12
PLANTAGO MAR	0.2	0.2	0	1	0.6	0.2	0.4	0.2	0.4
POTENTILLA	0.6	1	0.8	6.6	3.8	0.6	2	4	2
ROSACEAE	0	0	0	0	0.2	0	0	0.2	0
CRUCIFERAE	1.2	0.8	0.8	1	3.6	0	0.2	0.4	0.4
RANUNCULACEAE	0.6	1.4	6.2	6.6	3.8	0.6	2	4	2
COMPOSITAE TUB	0.6	0	0.4	0	0	0	0	0.2	0
COMPOSITAE LIGULIFLORAE	1.8	5	5.2	2.4	2.4	2.8	0.4	3	3.6
TRIFOLIUM TYPE	0.2	0.2	0	0	0.4	0.2	0.2	0.4	0.6
SUCCISA PRAT	0	0	0	0.2	0	0	0	0	0.4
CARYOPHYLLACEAE	0	0	0	0.2	0	0	0	0	0
CHENOPODIACEAE	0	0	0	0	0	0	0	0	0
RUMEX	0	0	0	0	0	0	0	0	0
SPERGULARIA	0	0	0	0	0	0	0	0	0.4
CHAMENERION	0	0	0	0	0	0	0	0	0
ALISMA	0	0	0	0	0.2	0	0	0	0
FILIPENDULA	0	0	0	0	0	0	0	0	0

SPERGULA	0	0	0	0	0	0	0	0	0
URTICA	0	0.2		0	0	0	0	0.2	0
UMBELLIFERAE	0	0	0	0	0	0	0	0	0
LILIACEAE	0	0	0	0	0	0	0	0	0
SUM HERBS	462	467	458	476	482	479	466	462	464
% HERBS	92.4	93.4	91.6	95.2	96.4	95.8	93.2	92.4	92.8
SPHAGNUM	3.8	3.4	11.2	0.2	0.2	0.4	0.4	0.4	0.2
PTERIDIUM	0.2	0.4	0	0	0	0	0	0	0.2
MONOLETE PSI	2.6	3.2	2.6	0.8	1.2	2.6	0.4	0.4	0.8
POLYPODIUM	3.6	1.8	2	0.6	0	0.8	0	1.4	1.2
LYCOPODIUM	0	0	0	0	0	0	0	0	0
OTHER TRILETE	0.2	0.2	0	0	0	0	0.2	0	0
SELAGINELLA	0	0	0	0	0	0	0	0	0
ZYGNEMATACEAE	0	0.2	0.2	0	0	0	0	0	0
SPYROGYRA	0.6	0	0.2	0	0	0	0	0	0
MOUGEOTICA	0	0	0	0	0	0	0	0.2	0
COPEPODA	0	0	0.2	0	0	0	0	0	0
CHARCOAL	+	+	+	+	+	+	+	+	+
ZONE	3ai or 3aii	3ai	3aii	3c?	3c?	not zoned	3c early	3c early	3c early

Table 21.42 Spot samples from D

TRENCH NUMBER	D II	D II	DI	DI	DI	DI	D0I	DI	D I
SAMPLE	2031	2087	2017	2028	2024	2032	2010	2015	2018
CONTEXT	379	377	916	386	385	392	360	331	910
CONTEXT TYPE	turf in cul-tiv. bed	clay under OGS	post hole	pit	pit	pit	cairn fill	cairn fill	cairn clay
TAXA									
PINUS SYLV	1.8	1	0.6	2.2	0.2	0.8	0	0.6	0.6
BETULA	2.8	2	1.2	2.8	0.2	1.3	1.2	1.4	2.8
ALNUS GLUT	1	0.4	0.2	0.8	0	0.5	0.4	0.2	1.6
CORYLUS	10.6	7.8	4.4	7	2.8	2.5	1.2	2.4	5.6
QUERCUS	0	0	0	0	0	0	0	0	0.2
TILIA	0	0	0	0	0	0	0	0	0
FRAXINUS	0	0	0	0	0	0	0	0	0
ULMUS	0	0	0.2	0.2	0.2	0.3	0	0	0
SALIX	0	0	0	0	0	0.3	0	0	0
SUM TREES	81	56	33	65	17	22	14	23	54
% TREES	16.2	11.2	6.6	13	3.4	5.5	2.8	4.6	10.8
GRAMINEAE	35	46.6	56.6	33.8	50.2	44.5	80.8	26.6	38.6

CYPERACEAE	1	4.8	0.4	3	5.2	6.5	0	7.4	0.2
ERICACEAE	23.2	13	17	36.4	32.6	30	9.6	46.2	30.2
CEREALIA	0	0.2	0	0.6	0.4	0.3	0	0.2	0
MELAMPYRUM	0	0	0	0	0	0	0	0	0
PLANTAGO LANC	12	6.6	10.2	4.6	3.4	3.5	1.2	6.4	15.2
PLANTAGO MAR	0	0.6	0.8	0	0	0.5	0	0.4	0.2
POTENTILLA	1.2	5.4	0.8	2.4	1.8	7	2.2	6	1.2
ROSACEAE	0	0	0	0.6	1	0	0	0	0
CRUCIFERAE	0.4	0.4	0.6	1.2	0.4	0	0.2	0	0.6
RANUNCULACEAE	1.8	2.8	0.3	0	0	0.5	0	0.2	2.2
COMPOSITAE TUB	0	0	0.8	0.2	0	0	0.4	0	0
COMPOSITAE LIGULIFLORAE	7.8	6.2	2.2	3.4	1.2	0.3	2.6	1.8	0.6
TRIFOLIUM TYPE	0.2	0.8	0.4	0.6	0	0.3	0	0	0.2
SUCCISA PRAT	0	1	0	0	0	0.5	0	0	0
CARYOPHYLLACEAE	0.8	0.4	0	0	0	0	0	0.2	0
CHENOPODIACEAE	0	0	0	0	0	0	0	0	0
RUMEX	0	0	0.4	0	0	0.5	0	0	0
SPERGULARIA	0	0	0	0	0	0	0	0	0
CHAMENERION	0	0	0.2	0	0	0	0	0	0
ALISMA	0	0	0	0	0	0	0	0	0
FILIPENDULA	0	0	0	0	0.2	0.3	0	0	0

SPERGULA	0	0	0	0	0.2	0	0	0	0
URTICA	0	0	0	0.2	0	0.3	0	0	0
UMBELLIFERAE	0.2	0	0	0	0	0	0	0	0
LILIACEAE	0	0	0	0	0	0	0	0	0
SUM HERBS	419	444	467	435	483	378	486	477	446
% HERBS	83.8	88.8	93.4	87	96.6	94.5	97.2	95.4	89.2
SPHAGNUM	1.6	0.2	1.2	1	0.4	0.5	0.2	0	0.6
PTERIDIUM	0	0	0	0	0	0	0	0	0
MONOLETE PSI	0.2	0.8	0.8	0.6	0	0.8	0.2	0.2	0.6
POLYPODIUM	0.8	1.8	0.2	1.6	0.6	0.5	0.2	0.4	1.6
LYCOPODIUM	0	0	0	0	0	0	0	0	0
OTHER TRILETE	0	0	0	0.2	0	0	0	0.2	0.2
SELAGINELLA	0	0	0	0	0	0	0	0	0
ZYGNEMATACEAE	0	0	0	0	0	0	0	0	0
SPYROGYRA	0	0	0	0	0	0	0	0	0
MOUGEOTICA	0	0	0	0	0	0	0	0	0
COPEPODA	0.4	0	0	0	0.2	0	0	0	0
CHARCOAL	+	+	+	+	+	+	+	+	+
ZONE	early 3a	early 3a	late 3a	3a	3c	3c?	?late?3a	?late?3a	3a

Table 21.43 Spot samples from D

TRENCH NUMBER	DI	DI	DI	DI	DI	D I	D I	D IV	D V
SAMPLE	2041	2042	2043	2045	2052	2056	2057	2083	2077
CONTEXT	360	360	360	360	360	360	360	362	357
CONTEXT TYPE	cairn clay	cairn clay	cairn clay	cairn clay	cairn clay	cairn clay	cairn clay	cairn clay	chamber slot
TAXA									
PINUS SYLV	0.4	0.2	0.2	1.2	0.2	0	0	0.4	0.8
BETULA	2.1	0.2	2	3.4	1	1.2	1.2	0.2	0.8
ALNUS GLUT	0.4	0.4	0	0.2	1	1.2	0.6	0	1
CORYLUS	6.7	1.6	1.2	2.8	3	2.8	2.4	1.2	2.8
QUERCUS	0	0	0	0	0	0.2	0	0	0
TILIA	0	0	0	0	0	0	0	0	0
FRAXINUS	0	0	0	0	0	0	0	0	0
ULMUS	0	0.2	0	0	0	0	0	0	0
SALIX	0	0	0	0	0	0	0.2	0	0
SUM TREES	54	13	17	38	26	27	22	9	27
% TREES	9.5	2.6	3.4	7.6	5.2	5.4	4.4	1.8	5.4
GRAMINEAE	53.6	68.4	74.4	63.8	73.8	67.8	54.8	63.2	44.6
CYPERACEAE	0	0	0.8	0.6	0	0.8	0.8	0.2	1.4

ERICACEAE	19.9	19	13	11.6	7.8	7.4	9.2	27.8	36
CEREALIA	0	0	0	0.2	0.2	0.2	0.2	0	0
MELAMPYRUM	0	0	0	0	0	0	0	0	0
PLANTAGO LANC	10.6	4.8	3	7	6.2	11.8	18.4	2.2	5.2
PLANTAGO MAR	0.2	0.2	0.2	0	0	0.4	1.6	0	0
POTENTILLA	0.2	1	0.8	0.2	0.4	1.2	4.2	0.6	4
ROSACEAE	0	0	0	0	0.2	0	0.2	0	0
CRUCIFERAE	0.2	0.2	0.4	0.4	0	0.2	0.4	0.2	0.4
RANUNCULACEAE	3.2	2.2	1	3.6	3.2	2.6	4.2	1	0.4
COMPOSITAE TUB	0.2	0	0	0.2	0.4	0.8	0	0	0
COMPOSITAE LIGULIFLORAE	2.5	1.2	3	4.2	2.2	1	1	3	1.4
TRIFOLIUM TYPE	0	0.2	0	0	0.4	0.2	0.2	0	0.6
SUCCISA PRAT	0	0	0	0	0	0	0.2	0	0.6
CARYOPHYLLACEAE	0	0.2	0	0.4	0	0.2	0.2	0	0
CHENOPODIACEAE	0	0	0	0	0	0	0	0	0
RUMEX	0	0	0	0	0	0.2	0	0	0
SPERGULARIA	0	0	0	0	0	0.4	0.2	0	0
CHAMENERION	0	0	0	0	0	0	0	0	0
ALISMA	0	0	0	0	0	0	0	0	0
FILIPENDULA	0	0	0	0	0	0	0	0	0
SPERGULA	0	0	0	0	0	0	0	0	0

URTICA	0	0	0	0.2	0	0	0	0	0
UMBELLIFERAE	0	0	0	0	0	0	0	0	0
LILIACEAE	0	0	0	0	0	0	0	0	0
SUM HERBS	513	487	483	462	474	473	478	491	473
% HERBS	90.5	97.4	96.6	92.4	94.8	94.6	95.6	98.2	94.6
SPHAGNUM	2.5	0.4	0.8	4.6	1.2	0	0	0.4	1.2
PTERIDIUM	0.5	0	0	0.2	0.2	0	0	0.2	0
MONOLETE PSI	1.2	0.4	0.4	2.6	0.8	16.8	1.4	0.8	0
POLYPODIUM	1.8	1.2	0.2	1.2	1	1.8	2.4	1	1
LYCOPODIUM	0	0	0	0	0	0	0	0	0
OTHER TRILETE	0	0	0	0.2	0	0	0	0.2	0.2
SELAGINELLA	0	0	0	0	0	0	0	0	0.2
ZYGNEMATACEAE	0	0	0.2	0	0	0	0	0	0
SPYROGYRA	0	0	0	0	0	0	0	0	0
MOUGEOTICA	0	0	0	0	0	0	0	0	0
COPEPODA	0.5	0	0	0	0.4	0	0.2	0.2	0.2
CHARCOAL	+	+	+	+	+	+	+	+	+
ZONE	?early 3a	late 3a	late 3a	late 3a	late 3a	late 3a	late 3a	bound 3b/3c	3c

Table 21.44 Spot samples from D

TRENCH NUMBER	D I	D	DI	D I	D I	D I	DI	D I	D I
SAMPLE	2081	2059	2039	2065	2069	2073	2072	2075	2078
CONTEXT	355	356	365	365	365	365	365	344	315
CONTEXT TYPE	chamber clay	wall clay	OGS	OGS	OGS	OGS	OGS	OGS	plough soil
TAXA									
PINUS SYLV	0.2	2.6	0.6	1.8	1.4	1.2	0.8	2	0.2
BETULA	0.2	4.8	3	5.2	5.8	4	5.4	3.2	0.4
ALNUS GLUT	0.4	1.4	0.6	0.2	0.6	0.6	0.2	1	0.8
CORYLUS	0.6	4.2	2.8	3.4	2.6	1.8	2.4	4.2	4.6
QUERCUS	0.6	0	0	0	0	0	0	0.2	0
TILIA	0	0	0	0	0.2	0	0	0	0
FRAXINUS	0	0	0	0	0	0.2	0	0.2	0
ULMUS	0	0	0	0	0	0.2	0.2	0	0
SALIX	0	0	0	0	0	0	0	0	0
SUM TREES	9	65	35	53	53	40	45	55	30
% TREES	1.8	13	7	10.6	10.6	8	9	11	7
GRAMINEAE	25.8	53.8	31.6	23.4	32.8	29.6	28.8	27.6	65.6

CYPERACEAE	25.2	1.6	2.8	2	4.4	4.2	2.6	2.8	1
ERICACEAE	35.4	14.2	47.2	50.8	38.2	55.8	49.8	55.8	18
CEREALIA	0	0.2	0.2	0	0	0	0	0	0
MELAMPYRUM	0	0	0	0	0	0	0	0	0
PLANTAGO LANC	2.2	8.2	3.6	5.8	4	2.8	3.6	7.2	5.4
PLANTAGO MAR	0.8	0.8	0.2	0.2	0.4	0	0	0	0.4
POTENTILLA	5.4	0.6	4.8	4	5.2	6	4	3.2	0.4
ROSACEAE	0.6	0.2	0	0	0	0	0	0	0
CRUCIFERAE	0.8	0	0.2	0.4	0	0	0.2	0.2	0
RANUNCULACEAE	0.2	3.6	0.4	0.8	0.2	1	0.2	0.6	0.8
COMPOSITAE TUB	0.2	0.2	0	0	0	0	0	0	0
COMPOSITAE LIGULIFLORAE	0.2	3	1.4	2.8	1.8	2	1	1.4	1.6
TRIFOLIUM TYPE	0	0.2	0.2	0	0	0	0	0.2	0.6
SUCCISA PRAT	0	0.2	0.4	0.2	0.8	0.4	1	0.2	0
CARYOPHYLLACEAE	0	0.2	0	0	0.2	0	0	0	0
CHENOPODIACEAE	0	0	0	0	0	0	0	0	0
RUMEX	1.4	0	0	0	0.2	0	0	0	0
SPERGULARIA	0	0	0	0	0	0	0	0	0
CHAMENERION	0	0	0	0	0	0	0	0	0
ALISMA	0	0	0	0	0	0	0	0	0
FILIPENDULA	0	0	0	0	0	0	0	0	0

SPERGULA	0	0	0	0	0	0	0	0	0
URTICA	0	0	0	0	0	0	0	0	0
UMBELLIFERAE	0	0	0	0	0	0	0	0	0
LILIACEAE	0	0	0	0	0	0	0	0	0
SUM HERBS	491	435	465	447	447	460	455	445	470
% HERBS	98.2	87	93	89.4	89.4	92	91	89	93
SPHAGNUM	0.2	5.4	0	0.2	0.2	0.2	0	0.4	7
PTERIDIUM	0.2	0	0	0	0	0	0	0	0.2
MONOLETE PSI	0.4	1.4	0	0	0	0	0.2	0	2.2
POLYPODIUM	0.2	1.2	1	0.4	0.8	0.2	0.4	0.6	6.6
LYCOPODIUM	0	2	0	0	0	0	0	0	0.2
OTHER TRILETE	0	0	0.2	0	0.8	0	0.4	0.6	0
SELAGINELLA	0	0	0	0	0	0	0	0	0
ZYGNEMATACEAE	0	0	0	0	0	0	0	0	0
SPYROGYRA	0	0	0	0	0	0	0	0	0.2
MOUGEOTIA	0	0	0	0	0	0	0	0	0
COPEPODA	0	0.2	0	0	0	0	0	0	1.2
CHARCOAL	+	+	+	+	+	+	+	+	+
ZONE	3c	mid/ late 3a	?upper 3a	3a/3b bound	3a/3b bound	3a/3b bound	middle turf line?	3a/3b bound	3b

Table 21.45 Spot samples from H

TRENCH NUMBER	H	H	H	H	H	H	H
SAMPLE	2012	2061	2026	2071	2027	2048	2051
CONTEXT	751	771	736	770	735	730	778
CONTEXT TYPE	OGS N of cairn	OGS on green clay	token burial	cairn clay	late kerb slot	fill in slot below cairn	fill in slot below cairn
TAXA							
PINUS SYLV	0	0.2	2.2	0.6	0.6	0	1.4
BETULA	0.8	6.8	1.6	6.4	1.2	5.2	3
ALNUS GLUT	0.6	0.4	1	1.2	1	1	1
CORYLUS	2.2	6	10.8	7.8	7	3.2	6.6
QUERCUS	0.4	0	0	0	0	0	0.4
TILIA	0	0	0	0	0	0	0
FRAXINUS	0	0	0	0	0	0	0.4
ULMUS	0	0	0	0	0	0	0
SALIX	0	0	0	0.2	0	0	0
SUM TREES	20	67	78	81	49	47	64
% TREES	4	13.4	15.6	16.2	9.8	9.4	12.8
GRAMINEAE	43.8	55.2	41.6	46.6	68.8	62.8	58.2

CYPERACEAE	0.8	0.6	1.4	0.6	1.2	0	0.2
ERICACEAE	43	15.8	24.8	39.8	7.4	13.8	14.4
CEREALIA	0	0	0	0	0.8	0.2	0
MELAMPYRUM	0	0	0	0	0	0	0
PLANTAGO LANC	3.4	8.8	8.8	7	6.2	7	7.2
PLANTAGO MAR	0.2	0.2	0.4	0	0.6	0.2	0.2
POTENTILLA	0.6	1.2	1.8	2.2	0.2	0.2	0.8
ROSACEAE	0	0	0	0	0	0	0
CRUCIFERAE	0	0.6	0.2	0.6	1	0.4	1
RANUNCULACEAE	0	2.8	2.4	3.8	1.2	2.8	3.2
COMPOSITAE TUB	0	0	0.2	0.2	0.8	0	0.2
COMPOSITAE LIGULIFLORAE	3.6	1.2	2	1.8	0.8	3	1.6
TRIFOLIUM TYPE	0	0.2	0	0.2	0	0	0
SUCCISA PRAT	0	0	0	0	0	0	0
CARYOPHYLLACEAE	0	0	0	0.2	0	0.2	0
CHENOPODIACEAE	0.2	0	0	0	0	0	0
RUMEX	0	0	0	0.2	1	0	0
SPERGULARIA	0	0	0	0	0	0	0.2
CHAMENERION	0	0	0	0	0	0	0
ALISMA	0	0	0	0	0	0	0
FILIPENDULA	0	0	0	0	0.2	0	0

SPERGULA	0	0	0	0	0	0	0
URTICA	0	0	0	0	0	0	0
UMBELLIFERAE	0	0	0	0	0	0	0
LILIACEAE	0	0	0	0	0	0	0
SUM HERBS	480	433	422	419	451	453	436
% HERBS	86	86.6	84.4	83.8	90.2	90.6	87.2
SPHAGNUM	0.2	6.2	5.6	7.6	6.2	2.4	4.6
PTERIDIUM	0	0	0.2	0	0	0	0.2
MONOLETE PSI	0.6	1.4	1	1.4	0.2	1.8	4.8
POLYPODIUM	0.6	0.8	1	1	0.2	1.8	4.8
LYCOPODIUM	0	0	0	0	0	0	0
OTHER TRILETE	0	0	0.2	0.2	0	0	0
SELAGINELLA	0	0	0	0	0	0	0
ZYGNEMATACEAE	0	0	0	0	0.2	0	0
SPYROGYRA	0	0	0	0	0	0	0
MOUGEOTIA	0	0	0	0	0	0	0
COPEPODA	0	0	0	0.4	0	0	0
CHARCOAL	+	+	+	+	+	+	+
ZONE	trans 3a 3b	early 3a	very early 3a	3a/3b	early 3a	early 3a	very early 3a

Table 21.46 Spot samples from H, C and G

TRENCH NUMBER	H	H	H	C	G III	GII
SAMPLE	2076	2080	2082	275	2036	2060
CONTEXT	734	707	707	201	1y4	lyr 3
CONTEXT TYPE	ard mark	plough soil	plough soil	basal peat	soil	soil
TAXA						
PINUS SYLV	0.2	1.2	0.4	0.2	0.2	0.8
BETULA	4.8	0.6	3.2	4.2	1	13.4
ALNUS GLUT	0.6	0.4	0	0.2	0.8	1
CORYLUS	14.2	4.6	8	0.6	1.2	5.4
QUERCUS	0	0	0	1	0	0
TILIA	0	0	0	0	0	0
FRAXINUS	0	0	0	0	0	0
ULMUS	0.2	0	0	0	0	0
SALIX	0	0	0	0	0	0
SUM TREES	101	34	58	31	18	103
% TREES	20.2	6.8	11.6	6.2	3.6	20.6
GRAMINEAE	45	64	49.6	3.8	28.8	56.4
CYPERACEAE	0.2	0.4	1	3	0.2	1.2

ERICACEAE	17.2	14.2	25	57.8	61.2	5.2
CEREALIA	0	0.2	0	0.4	0.2	0
MELAMPYRUM	0	0	0	0	0	0
PLANTAGO LANC	7	2.4	3.8	0.2	1.6	5.6
PLANTAGO MAR	0.2	0.6	0.4	0	0	0.4
POTENTILLA	0.6	1.4	0.8	26.4	0.6	1.2
ROSACEAE	0	0	0.2	0.2	0	0
CRUCIFERAE	0.4	1	0.8	0	0.2	0.4
RANUNCULACEAE	5.4	2.6	3.4	0	1.6	1.6
COMPOSITAE TUB	0.2	0.4	0.2	0	0	0
COMPOSITAE LIGULIFLORAE	2.6	3.4	2.8	0.8	1	6.2
TRIFOLIUM TYPE	0.4	0	0	0	0	0.2
SUCCISA PRAT	0	0	0	0.2	0	0.2
CARYOPHYLLACEAE	0	1	0.4	0.2	0.8	0.2
CHENOPODIACEAE	0	0	0	0	0	0
RUMEX	0	1	0.4	0.2	0	0
SPERGULARIA	0	0	0	0	0	0
CHAMENERION	0	0	0	0	0	0
ALISMA	0	0	0	0	0.2	0
FILIPENDULA	0	0	0	0	0	0
SPERGULA	0	0	0	0	0	0

URTICA	0	1.4	0	0	0.2	0
UMBELLIFERAE	0	0	0	0	0	0
LILIACEAE	0.2	0	0	0	0	0.4
SUM HERBS	399	466	442	469	482	397
% HERBS	79.8	93.2	88.4	93.8	96.4	79.4
SPHAGNUM	48.8	0	0	0.2	0	0.2
PTERIDIUM	0	0	0	0	0.2	0
MONOLETE PSI	4.4	0	0	0.4	0.8	5
POLYPODIUM	4.8	0	0	0	2.2	5
LYCOPODIUM	0	0	0	0	0	0
OTHER TRILETE	0	0	0	0	0.2	0.8
SELAGINELLA	0	0	0	0	0	0
ZYGNEMATACEAE	0	0	0	0	0	0
SPYROGYRA	0	0	0	0	0	0
MOUGEOTIA	0	0	0	0	0	0
COPEPODA	0	0	0	0	0.2	0.2
CHARCOAL	+	+	+	+	+	+
ZONE	early 3a	first half of 3a	earlyish 3a			

22. Macroplant

Robin Inglis and Anne Crone with additional material from P J Ashmore

22.1 Sample collection, storage and preparation

22.1.1 Introduction

During excavation a few pieces of charcoal were treated as small finds. The vast majority of the pieces of charcoal considered here were however from samples taken for soil or pollen analysis.

In 1983 Mr R McCullagh was commissioned by Historic Scotland to analyse a set of samples primarily for radiocarbon dating. In 2005 AOC Archaeology Ltd was commissioned by Historic Scotland to undertake processing and charcoal identification of the remaining samples retrieved during the excavations. Some of the samples had been processed soon after the excavation but the majority had been stored unprocessed in sealed plastic bags and cardboard boxes, at Historic Scotland stores at Croft an Righ in Edinburgh. During Phase 1 of this programme, the unprocessed samples were variously sieved and sorted, the nature of the sieving, wet or dry, depending on the size of the sample (see Methodology below). The data from Phase 1 was tabulated and following selection of key contexts by the excavator, Phase 2, a programme of charcoal and macroplant identification and preparation of samples for radiocarbon dating, was undertaken. This report draws together the results of Phases 1 and 2 and integrates them with the results of the earlier programme of charcoal analysis (McCullagh 1983).

22.1.2 Methodology

Slightly different methods of sample processing were used in each programme.

McCullagh (1983) processed dried samples of varying sizes. The sediment was treated in a bath of hydrogen peroxide (H2O2), which was used to break out the carbon component of the sample. This also results in bleaching of the organic material, and releases carbon dioxide which forms a white froth on top of the bath containing the charcoal fraction. Once treated the samples were poured over a bubbled water surface to separate the sediment fraction, the organic material that floated off being caught in a 2.00 mm and a 0.5 mm sieve.

In the recent programme undertaken by AOC the samples were assessed for their suitability for wet or dry sieving. A comprehensive inventory of all of the samples and their volumes was produced. Those with volumes greater than 2 litres were chosen for wet sieving. The exception to this was one 1.5 litre sample which was judged to contain large quantities of charcoal. The total assemblage consisted of 265 samples, of which 39 bulk samples were wet sieved. All sieving was undertaken using a Siraf style flotation tank which differed from the methodology applied in 1983 in that there was no pre-treatment. The samples were subjected to the manual manipulation of the sediment in a bubbling water bath, floating the organic material through sieves of 1 mm and 0.3 mm.

The remaining samples, i.e. those less than 2 litres, were dry sieved through a sieve stack containing a 4mm and a 1mm sieve. The different portions were then fully sorted for all artefacts and ecofacts. Any material recovered was then counted, and weighed by material type. The same process was applied to the dry residues resulting from the wet sieving process. All information was collated on a Microsoft Excel spreadsheet.

Following selection of key samples their charcoal contents were analysed. As many fragments as possible were identified as to species, up to a maximum of ten. Species identifications were made with reference to Schweingruber (1978). Single fragments of each species were weighed and then stored in gel capsules for subsequent radiocarbon dating. The condition of the charcoal was noted and recorded, together with size and number of growth-rings where relevant. This latter may provide insights into the size of wood available.

22.2 Results

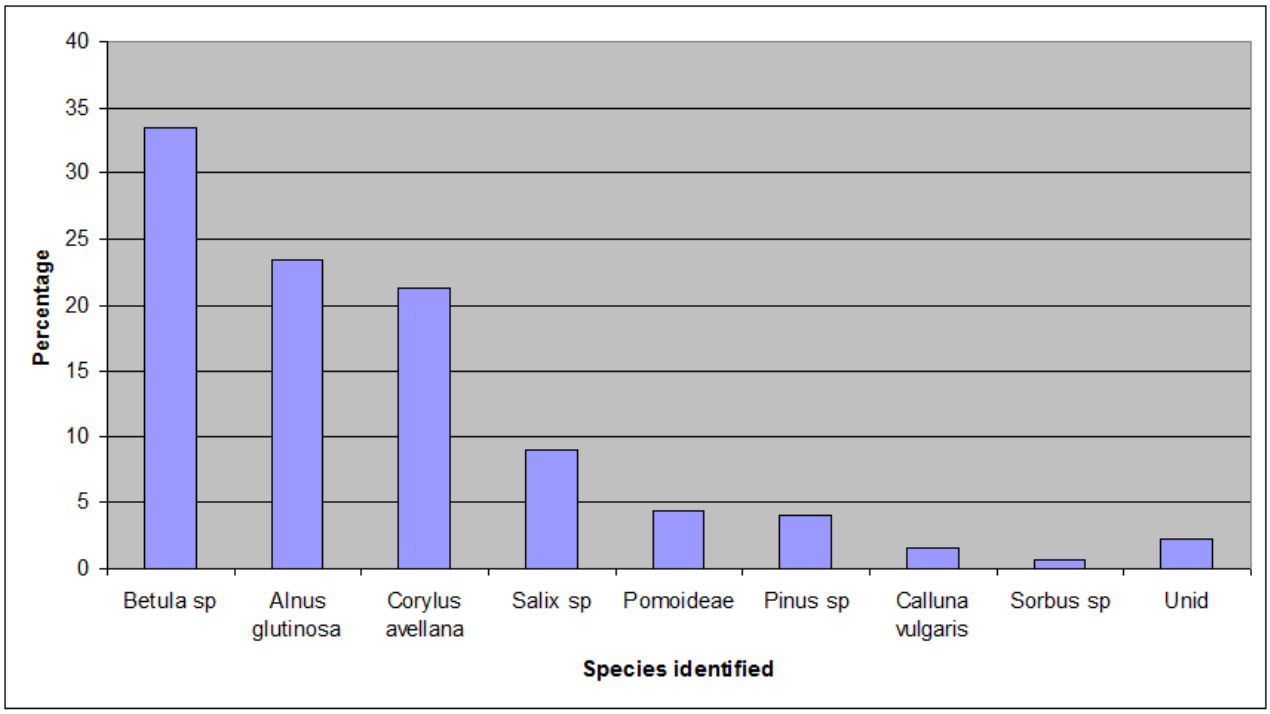
The results from AOC's sieving and sorting programme are presented in Table 1. Charcoal was present in 121 of the samples processed. However, only 14 samples have more than 4 g of charcoal present, with the bulk of the samples (82) containing significantly less than 1 g of charcoal. The largest quantity of charcoal retrieved was from sample 2007. It probably came from context 315 on Area D; the preceding sample 2006 which produced 9.5 gm of charcoal, was from this context and although sample 2007 was unlabelled apart from the sample number, 315 is one of the few contexts likely to have produced so much charcoal which yielded a total of 30.17 g. Despite the relatively small quantities of charcoal retrieved during this round of processing they compare favourably with those studied previously by McCullagh (1983), whose brief was to concentrate on potentially datable material.

Other material types retrieved during the sorting programme include fragments of flint, quartz, bone (including small mammal and fish bone), charred macroplant remains and some ceramics. The charred macroplant material consisted primarily of hazelnut shell, but one context, secondary capping of the cairn, contained three cereal grains, identified as barley and wheat (Table 4). At least three of the ceramic sherds have some form of linear decoration. Context 356, [2059], also contained a single insect fragment. Of the 265 samples processed 135 were sterile, in that they contained no significant artefacts or ecofacts.

The combined results of both programmes of charcoal analysis are presented in Table 2. The information is referenced by sample number and context/site number. The information is not presented by site as previous attempts at spatial analysis have not proved useful (McCullagh 1983). In all, 320 individual identifications have been made, totalling 57.69 grams. Figure 1 shows the overall species composition of the assemblage:

22.2.1 Species composition

Eight species were present, the most abundant of which were birch (33.44%), alder (23.44%) and hazel (21.25%). The only variation between the range of species identified by McCullagh (1983) and those identified during the AOC work is the absence of heather. Heather can be identified mac-



Illus 22.1 Species composition

roscopically but none was found despite close observation of each sample for condition, etc.

It should be noted that in many instances identification beyond genus has not been possible. This is due mainly to the small size and poor condition of many of the fragments under investigation (see below). So, for instance, we cannot identify the species of the pine. Pomoideae covers a wide range of tree/shrub type, from large fruit trees, such as apple, to small bushy shrubs, such as hawthorn.

22.2.2 Condition

The condition survey of the charcoal is presented in Appendix 3. The overall condition of the charcoal was very poor, and in some cases made species identification impossible. However, this provides some insight into the taphonomy of the charcoal, the degree of abrasion reflecting the nature of the context from which it was derived. For instance, those contexts with a concentration of highly abraded fragments may often represent plough soils (Ashmore pers comm). This not only gives an indication of the depositional environment but suggests that some of the charcoal may have come from the earlier layers and deposits disturbed by the plough.

Post-depositional processes had an effect on some charcoal. The different depositional and post-depositional environments altered the condition of the charcoal considerably. The charcoal in sample 277 from posthole 093 on Area A, dating to the first half of the fourth millennium BC, shows consistent amounts of heavy mineralization and abrasion, as does that in sample 278 from a dark layer 160 on Area B considerably confused by iron-panning. On the other hand while the charcoal in sample 2365, from gritty sandy clay 732 in the basal infill of the cairn on Area H, indicates a different depositional or post-depositional environment with consistent light mineralization and abrasion.

The weight of the majority of the charcoal pieces in the assemblage, despite the species, is 0.1 g or under, with a consistently small number of rings; with only 9 identifications having more than 10 visible rings. This points to small and young specimens being utilised on-site, and possibly indicates the poor growing environment for larger species / specimens on the Western Isles.

22.2.3 Radiocarbon-dated charcoal at Calanais (P.J Ashmore)

The selection of pieces of charcoal for dating reflected the survival of large fragments in interesting contexts. Hence the number of dates for each species (Illus 23.2) does not match their frequency of occurrence at Calanais (Illus 22.1). Alder was the only species (with more than one sample dated) restricted to a single short period, around the transition from pollen sub-zone 2c to 2d in the last third of the 4th millennium. Pollen evidence shows that it had begun to form a continuous curve at the end of sub-zone 2b (which occurred sometime between 4020 and 3750 cal BC) but was not particularly prominent in 2c or 2d (ending at some time between 2980 and 2510 cal BC). It has continued to grow in the area.

Pine, which it had been thought might prove either all very early or all very late, occurred in both the late 4th and the mid 3rd millennia BC. However, as described by Ann Crone below, many sub-peat pine stumps found under peat in Lewis dated to the 3rd millennium cal BC. While the general guideline that most Scottish archaeological pine turns out to be very early or late may remain true for most of Scotland it is not true for the area around Calanais.

No attempt has been made to correlate identified charcoal with pollen zonation of individual contexts. It was clear from analysis of some contexts that the pollen in them was of a different date from the charcoal because when soil and clay were moved about so was the charcoal in them; but sometimes the pollen reflected the period when the material was moved.

22.3 Discussion

The information gained from the charcoal analysis in this study reinforces the conclusions drawn from other palynological and carbonised assemblages for this region.

Illus 22.2 Sample materials by species and date

22.3.1 Carbonised assemblages from other Neolithic sites in the Western Isles (B A Crone)

Crone (1999) has previously summarised the current data for the Western Isles; her report is copied here in full apart from omission of the paragraph relating to Calanais (McCullagh 1983). At the domestic site of Bharpa Carinish, North Uist, a series of adjacent hearths and hearth deposits produced predominantly hazel (62%) and birch (35%) with a few fragments of willow and rowan (Sorbus aucuparia) (Crone 1993, 376). Much of the charcoal was small roundwood, between 5-40 mm in diameter. At Screvan Quarry, North Uist, a pit containing Neolithic pottery and other artefacts produced a charcoal assemblage which was predominantly birch (91%) (Downes & Badcock unpublished). Hazel, Ericaceae (ling and heather), Prunoideae (cherry) and Salicaceae (willow and poplar) were also present and it was noted that the charcoal appeared to originate from roundwood. The bulk of the charcoal assemblage from the Neolithic features at Allt Chrisal, Barra came from a kiln, or pottery clamp (Boardman 1995). Some 77% of the charcoal in this feature was birch, 10% was pine and alder, while hazel and Pomoideae (this group includes hawthorn, crab-apple and rowan) were also present. The charcoal assemblages from several other Neolithic features on the site were similar in composition although much smaller. It was noted that, throughout the entire assemblage, there was very little evidence for timber charcoal, small roundwood being the norm (ibid 153).

The records of earlier excavations tend to list the wood species simply on a presence/absence basis. At Eilean an Tighe, North Uist, an extensive ashy deposit produced primarily birch and hazel together with a few pieces of willow, all described as 'pieces of stem', or roundwood (Scott 1951a, 24). A single piece of Scots pine came from the 'byre' structure. At Northton, Harris, the Neolithic II deposits produced birch, hazel, willow and bog myrtle (Myrica gale) (Cowie pers comm). Scott recorded birch charcoal from the chamber floor of the cairn at Clettraval, North Uist (1935, 521) and willow, hazel, oak, pine and possibly birch charcoal from the cairn at Unival, North Uist (1948, 1)

22.3.2 Palynological and other evidence for the woodland resource of the Western Isles

Various travellers and writers have recorded the macroscopic remains of wood throughout the Western Isles, in intertidal peats and under blanket peat (Angus 1987). While these testify to the former presence of trees on the islands it is not possible, on these observations alone, to ascertain the extent and nature of the woodland or the chronology of its disappearance. A systematic study of the macroscopic remains of birch, pine and willow at forty sites on Lewis has provided some answers (Wilkins 1984). The pine was found as large in situ stumps, up to 0.5 m in diameter, and in two locations, a 'virtual forest of stumps' was recorded (ibid 254). Radiocarbon-dating placed many of the stumps in the 4th and 3rd millennium cal BC (Dickson and Dickson 2000, 37-39, 67). The birch usually occurred as small branches, no more that 80 mm in diameter, lying horizontally near the base of the peat. The birch was deposited in the peat at a much earlier date, in the 6th millennium cal BC. Ritchie (1985) has also radiocarbon-dated birch from intertidal deposits at Borve, Benbecula to 5700 ± 170 uncal BP. Roots, trunks and branches thought to be birch have been observed in inter-tidal peats closer to Eilean Domhnuill, at Vallay, North Uist but these have not been dated (Beveridge 1911, 6).

Early palynological work in the Western Isles tended to reinforce the belief that the islands were largely devoid of woodland from a very early date. However, what may be a treeless landscape to the palynologist may still contain sufficient exploitable woodland resources for the inhabitants. For instance, at Little Loch Roag, a low arboreal pollen count was interpreted as signifying a 'forestless' landscape throughout the Flandrian although a small amount of birch and hazel scrub was also postulated (Birks & Madsen 1979). Only 11 km away at Calanais Leobag, Bohncke found much higher arboreal pollen values and concluded that pockets of birch woodland, also containing hazel, willow, rowan and poplar, probably existed in sheltered valleys in the area (1988, 461); see also the next section 23.3.3 and Chapter 21: Palaeoenvironment. If such differences can exist between pollen sites so close together then the low arboreal

pollen counts from sites on or near the edge of the machair in North Uist, at Balemore (Hirons forthcoming), Balelone Farm and Loch Scolpaig (Mannion & Moseley forthcoming) may signify similar pockets of scrub woodland further inland.

In contrast, studies in South Uist suggest that up to half of the available landscape around Loch Lang was wooded in the Neolithic period and that the woodland was also species-rich (Bennett et al 1990). At Loch Lang the pollen record is dominated by tree and shrub pollen until 4000 BP. Birch and hazel dominated the woodland but oak (Quercus sp.), elm (Ulmus sp.), alder and ash (Fraxinus excelsior) were also present. Pine pollen was recorded but its status within the woodland is uncertain. At Askernish high pollen counts indicated the presence of birch-hazel scrub in the locality (Hirons 2003) and high proportions of tree pollen are also recorded for the earlier part of the Postglacial at the nearby sites of Loch an t-Sil and Loch Airigh (Edwards et al 1995).

In their reconstruction of the former woodland cover of Scotland McVean and Ratcliffe (1962 Map B) postulated birch woodland all along the eastern half of the Outer Hebrides. The palynological record tends, on the whole, to support this general picture but indicates greater species diversity on the southern islands, while the macroscopic evidence indicates that stands of pine probably punctuated the landscape.

This summary of the woodland resource available in the Western Isles presents the background against which the charcoal assemblage from Calanais should be viewed. Analysis of the Calanais assemblage indicates that the local woodland was similar in composition to that found elsewhere in the Hebrides, i.e. birch-dominated with significant quantities of hazel and alder.

22.3.3 The evidence from palynological analysis at Leobag (P J Ashmore summarising part of Chapter 21)

This section is mainly a summary of the results of palynological analysis at Leobag undertaken by Sjoerd Bohncke (Bohncke 1988 and Chapter 21). It includes some information from radiocarbon dating at Calanais (see Chapter 23)

From some ill-dated time between the late 7th and the early 5th millennium BC the lower areas round Calanais, some now submerged by the sea, contained pockets of birch woodland with subsidiary hazel, willow and rowan. In its understory were species such as Melampyrum, Lonicera and ferns. Sphagnum moss was abundant at Leobag (Pollen zone CaN-1).

From some ill-dated time between the second quarter of the 6th millennium BC and the middle of the 5th millennium BC there was some disturbance, perhaps caused by hunter gatherers burning woodland, leading to a patchwork of woodland and grassland mixed with heather. Towards the end of this phase herbs, dwarf shrubs and ferns showed a firm increase. Another remarkable feature of this period at Leobag was the abundance of willow straight after the birch decline (Pollen zone CaN-2a).

From some ill-dated time between the last half of the 6th millennium BC and the last half of the 5th millennium BC birch regenerated somewhat. Heather increased. Elsewhere wet grassland developed and sphagnum mosses were fairly abundant. There were some signs of continuing hunter-gatherer activity (CaN-2b).

At some time between about 4020 and 3750 cal BC elm began to form a discontinuous pollen curve. At most a few centuries later arable farming began to be practiced on a small scale, while pockets of birch woodland continued to flourish. Grasses increased and more diverse herb vegetation appeared (CaN-2c).

At some time between 3490 BC and 3020 cal BC until between 2980 and 2510 cal BC birch woodland regenerated strongly and it is thought that the area was not used for farming. Potentilla varieties and grasses declined. This period (CaN-2d) immediately preceded the building of cultivation ridges at Calanais itself.

The next period (pollen zone CaN-3a) saw the building of the cultivation beds, the stone setting and the chambered cairn. It began at a date between 2980 and 2510 cal BC with a strong decline in birch and the reappearance of cereals, followed by an increase in grasses. Hazel, oak, willow and rowan reacted with a slight increase. At the end of this period birch temporarily recovered.

During analysis of the excavation samples at Calanais it was often subdivided into CaN-3ai, in which there were indications of agriculture, and CaN-3aii in which there were stronger indicators of pastoralism. The transition from 3ai to 3aii may have coincided with building of the chambered cairn. The period ended at some time between 2560 and 2200 cal BC.

Between then and some date between 1900 and 1500 BC there was a phase (CaN-3b) of mixed arable and stock farming ending with a short term regeneration of birch woodland. Rowan disappeared from the area. It may be that this or the next period saw despoliation of the cairn.

In the next period (CaN-3c) birch pollen declined under 10% for the first time. Shortly afterwards elm pollen disappeared from the samples and pine showed a marked decline. Other tree species slowly declined. Grasses and heather increased again, and cereals were continuously present with a maximum at some time between 1500 and 1200 cal BC.

Towards the end of this sub-zone the Betula percentages increased a little together with the Alnus and Pinus values, while the Ranunculaceae, Cruciferae, Caryophyllaceae and Plantago lanceolata declined.

This period possibly ended between about 1000 and 350 cal BC. It seems likely that the end saw peat growth initiation at higher altitudes as well as an increased in peat growth at Leobag. It marked the end of archaeologically recorded activities at Calanais.

22.4 Appendices

22.4.1 Appendix 1 – Samples examined for dating material

22.4.2 Appendix 2 – Combined charcoal identifications

22.4.3 Appendix 3 – Condition survey from recent charcoal analysis

22.4.4 Appendix 4 – Macroplant identifications

22.4.5 Appendix 5 – Samples sent for radiocarbon

22.4.1 Appendix 1 Samples examined for dating material

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2347	Callanish 2340 - 2364		<0.1			1.27	1.27						
2348	Callanish 2340 - 2364		<0.1			0.08	0.08						
377	CSS 354 - 381		<0.2				0						
271	CSS 264-284		<0.5			0.86	0.86					0.9	
282	CSS 264-284		<0.5				0						
753	CSS 752-773		<0.5			0.22	0.22						
754	CSS 752-773		<0.5			0.2	0.2					1.3	
755	CSS 752-773		<0.5			0.49	0.49						
756	CSS 752-773		<0.5				0						
757	CSS 752-773		<0.5			0.05	0.05						
758	CSS 752-773		<0.5			0.05	0.05						
759	CSS 752-773		<0.5			0.07	0.07						

Sample	Box	Descrip-tion	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
760	CSS 752-773		<0.5			0.91	0.91						
762	CSS 752-773		<0.5			0.26	0.26						
704	CSS 752-773		<0.5			0.42	0.42	0.02					
765	CSS 752-773		<0.5			0.16	0.16		0.12				
771	CSS 752-773		<0.5			0.31	0.31						
2057	CSS 2049-2068		<0.5				0						
2059	CSS 2049-2068		<0.5			0.32	0.32	0.04					insect remains - n/a
2436	CSS		<0.5				0						
2456	CSS 2453-2553		<0.5			0.07	0.07						
2466	CSS 2453-2553		<0.5				0						
2477	CSS 2453-2553		<0.5				0						
2489	CSS 2453-2553		<0.5				0						
2494	CSS 2453-2553		<0.5				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2498	CSS 2453-2553		<0.5				0						
2511	CSS 2500etc		<0.5				0						
2512	CSS 2500etc		<0.5				0						
286	CSS 285-299		<0.5.			0.14	0.14						
752	CSS 752-773		0.5			0.24	0.24						
761	CSS 752-773		0.5			0.04	0.04						
767	CSS 752-773		0.5			4.26	4.26		0.08				
2037	CSS 2023-2048		0.5				0						
2056	CSS 2049-2068		0.5				0						
2491	CSS 2453-2553		0.5				0						
763	CSS 752-773		0.75			5.39	5.39						
769	CSS 752-773		0.75			0.46	0.46						
768	CSS 752-773		1			2.41	2.41						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
770	CSS 752-773		1			1.74	1.74						
772	CSS 752-773		1			1.29	1.29				0.15	0.33	
773	CSS 752-773		1			2.18	2.18						
2018	CSS 2009-2022		1			2.63	2.63	0.09					
2047	CSS 2023-2048		1			0.1	0.1						
2367	Callanish 2365-2367		1			0.61	0.61						
2457	CSS 2453-2553		1			0.55	0.55						
2473	CSS 2500etc		1				0						
2499	CSS 2500etc		1				0						
2547	CSS 2500etc		1				0						
2552	CSS 2453-2553		1				0						
2553	CSS 2453-2553		1				0						
267	CSS 264-284		1.5			0.12	0.12						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2480	CSS 2453-2553		1.5	Yes	6.65	0.31	6.96	0.02					
2554	CSS 2500etc		1.5				0						
284	CSS 264-284		2	Yes			0		0.04				
2068	CSS 2049-2068		2	Yes	3.92	0.57	4.49	0.04		0.39			
2161	Callanish 2365-2367		2	Yes	0.03		0.03						
2367	Callanish 2365-2367		2	Yes	1.62	0.32	1.94			3.18			
2356 - 2350	Callanish 2340 - 2364		3	Yes	3.05	0.26	3.31	0.07	0.2			0.24	
2458?	CSS 2453-2553		2	Yes	1.95	0.15	2.1						
2455	CSS 2453-2553		2.5	Yes	3.83	1	4.83						
2462	CSS 2500etc		3	Yes	12.33	1.02	13.35						
381	CSS 354 - 381		2.75	Yes			0						
2007	Callanish? 2007		5	Yes	4.08	26.09	30.17	0.12				3.06	

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2483	CSS 2453-2553		n/a				0						
2488	CSS 2453-2553	21	<0.5				0						
2550	CSS 2453-2553	1	1			0.12	0.12						
374	CSS 354 - 381	10/1 F15	<0.2			0.11	0.11	0.07					
358	CSS 354 - 381	10/1 NE, Middle Sample 1 Top Bank 331	<0.2			0.05	0.05						
357	CSS 354 - 381	10/1, NE, 331/2	0.2			0.06	0.06						
354	CSS 354 - 381	10/1, NE, F-336, Sample 6	<0.5			0.08	0.08						
375	CSS 354 - 381	10/1, NE, F-337	<0.5			0.05	0.05					11.81	
2049	CSS 2049-2068	123, Rabbit Root	0.5				0						
2433	CSS	20/5, 851, B1 NWx	<0.1				0						
379	CSS 354 - 381	24/07 C, Sub samples, 16-32	<0.1				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2426	CSS	36, Black Layer, C2	0.5				0						
2425	CSS	36, C/1 W, Bottom of Peat Layer	<0.5			1	1						Dessicated organic remains - 2.19
2428	CSS	36/02	1				0						
2427	CSS	36/C2, Black Layer	0.5			0.1	0.1						
2429	CSS	36/C2, Black Layer	0.75				0						
2083	CSS 2069-2090	362	<0.1				0						
2359	Callanish 2340 - 2364	362	0.5				0						
2358	Callanish 2340 - 2364	365, D1&5, 3 of 4	2.5	Yes			0						
2351	Callanish 2340 - 2364	383	1			3.02	3.02			11.48			
2354	Callanish 2340 - 2364	383	0.5			1.29	1.29				0.15		
2508	CSS 2500etc	40/4, 6,	<0.5				0	0.02					

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2471	CSS 2453-2553	40/7, 15	<0.5			0.36	0.36					1.36	
2472	CSS 2453-2553	40/7, 20	<0.5			0.2	0.2						
2053	CSS 2049-2068	846, B8	<0.5				0						
2432	CSS	887, B4 Wx	<0.5				0						
2070	CSS 2069-2090	889	1.5			0.02	0.02	0.04					
360	CSS 354 - 381	A 2, 19, 22	<0.5				0						
290	CSS 285-299	A1, 21, infill of 34	<0.5				0						
366	CSS 354 - 381	A1, 31, 15, under infill Layer 41	<0.2				0						
372	CSS 354 - 381	A1, 31, 16&17, Layer 42	<0.5				0						
296	CSS 285-299	A1, 4, layer 40, 19	<0.5				0						
280	CSS 264-284	A1, F-87, 24	<0.5				0						
281	CSS 264-284	A12, 23	<0.5				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
365	CSS 354 - 381	A2, 46, 14, Layer 47	<0.2				0						
295	CSS 285-299	A2, 9, 79	0.5				0						
368	CSS 354 - 381	A-F3, 26, Layer 10 Top	<0.2				0						
27	Callanish - Peter Strong	Ard mark Fill, Call 88, 13/05/88	0.5			0.1	0.1						
33	Callanish - Peter Strong	Ard mark Fill, Call 88, 13/05/88	0.5		0.59		0.59						
364	CSS 354 - 381	Area A, Fr 3, 27, Layer 10 bottom	<0.5				0						
2063	CSS 2049-2068	B/Wx	<0.5				0						
2029	CSS 2023-2048	B/Wx, 809, Ard mark A	<0.5			0.1	0.1						
2023	CSS 2023-2048	B/Wx, 809, Ard mark B	<0.5				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2025	CSS 2023-2048	B/Wx, Pit 154	0.5				0						
2013	CSS 2009-2022	B1 NW Ex, 806	0.5				0						
2033	CSS 2023-2048	B1 NW, 861, Charcoal	<0.1			0.48	0.48						
2034	CSS 2023-2048	B1 Nw, 862	<0.1				0						
264	CSS 264-284	B3, F-142, 43	1				0						
2019	CSS 2009-2022	B3, F-800	0.5				0						
2435	CSS	B3, Post hole 179, post pipe A	<0.5				0						
2431	CSS	B3, Post hole 179, post pipe B	<0.5				0						
2050	CSS 2049-2068	B4 Wx, 859	1			2.66	2.66						
2021	CSS 2009-2022	B4, 139	0.5				0						
278	CSS 264-284	B4, F-160, 34	2	Yes	0.53	0.24	0.77		0.19				

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2022	CSS 2009-2022	B4Wx, 882	1			0.07	0.07	0.03			0.11		
2011	CSS 2009-2022	B4Wx, 883	2	Yes	2.93	0.09	3.02			10.19	0.44	0.63	
2020	CSS 2009-2022	B4Wx, 883	1.5			0.57	0.57	0.1					fish bone - n/a
2054	CSS 2049-2068	B5, 812	0.5				0		0.07				
2085	CSS 2069-2090	B5, Sample 141	<0.5			0.15	0.15		0.03			0.12	
13	CSS	Bag 4, 13/05/88	3	Yes	1.45	0.15	1.6	0.07	0.6	3.67	0.08		
2165	Callanish 2365-2367	Barvas?	7	Yes			0			16.47	0.05		Fish Bone - 0.02 / shell - 38.86
2030	CSS 2023-2048	BH, 139	<0.5				0						
41	Callanish - Peter Strong	Black Charcoal Filled Feature, Call 88, 13/05/88	<0.5				0						
24	CSS	Black Layer at S 3/4	1			0.04	0.04						
24	CSS	Black Layer at S 4	1.5				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
28	CSS	Black Layer, 14/05/88	1.5				0						
31	Callanish - Peter Strong	Black Layer, Call 88, 13/05/88	3	Yes		0.02	0.02						
34	Callanish - Peter Strong	Black Layer, Call 88, 13/05/88	1				0						
7	Callanish - Peter Strong	Black Layer, Call 88, 14/05/88	1.5				0						
30	Callanish - Peter Strong	Black Layer, Call 88, 14/05/88	2	Yes			0						
2430	CSS	C/1 W, Organic Remains	<0.5			0.34	0.34						Dessicated Organic Remains - 0.84
35	CSS	Charcoal in root mess	<0.1			2.28	2.28						
2017	CSS 2009-2022	D1	3.5	Yes		0.19	0.19	0.07	0.03				
362	CSS 354 - 381	D1, 3/5, 13	1			0.74	0.74						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2078	CSS 2069-2090	D1, 315	<0.5			0.31	0.31						
293	CSS 285-299	D1, 315, 7	1.25			0.64	0.64						
289	CSS 285-299	D1, 326, 1	0.5			0.09	0.09						
2015	CSS 2009-2022	D1, 334, 1of2	2	Yes			0						
2073	CSS 2069-2090	D1, 334, 2 of 2	2.25	Yes			0						
2084	CSS 2069-2090	D1, 352	<0.5			0.16	0.16	0.06					
2081	CSS 2069-2090	D1, 355	<0.2				0						
2069	CSS 2069-2090	D1, 365, 2of 4	2.5	Yes	0.13	0.01	0.14						
2039	CSS 2023-2048	D1, 365, 4of4	2.5	Yes	0.13		0.13						
2090	CSS 2069-2090	D1, 374, ashy patch	<0.5				0						
2028	CSS 2023-2048	D1, 386, 292	<0.1			0.03	0.03						
2032	CSS 2023-2048	D1, 392	<0.1				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2024	CSS 2023-2048	D1, fill from 385, 291	<0.5			0.34	0.34						
287	CSS 285-299	D1, Layer 315, 11	1			1.16	1.16					1.33	
292	CSS 285-299	D1, layer 315, 2	1.25			0.42	0.42						
2031	CSS 2023-2048	D2, 290, 379	<0.5				0						
288	CSS 285-299	D2, 316, 3	1			0.03	0.03						
274	CSS 264-284	D2, F-316, 5	<0.5			0.13	0.13						
2077	CSS 2069-2090	D5, 359, Ard mark A-B	<0.5				0						
2441	CSS	E1, F-15, Ard mark Fill	<0.1				0						
2088	CSS 2069-2090	E21, Sample 2	<0.2				0						
2439	CSS	F 334, 302	<0.1				0						
2567	CSS	F 369. D1	4	Yes	2.29	0.82	3.11	0.02		9.13			
355	CSS 354 - 381	F. 335/5, 10/1 NE	0.5			0.47	0.47						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2014	CSS 2009-2022	F121, G3	0.5				0						
291	CSS 285-299	F130, B1, 35	1.25			0.05	0.05					4.98	
361	CSS 354 - 381	F-139, 42, Charcoal Spread	0.5			0.23	0.23						
273	CSS 264-284	F-145, B3, 37	1.5				0						
367	CSS 354 - 381	F-172, 33	1.25				0						
299	CSS 285-299	F20, Kilpatrick?, 16/3	0.5				0						
2089	CSS 2069-2090	F26, Tr E	<0.1				0						
270	CSS 264-284	F-31, 50	<0.5				0						
356	CSS 354 - 381	F-336, 3, NE 10/1	0.5				0	0.01	0.02				
359	CSS 354 - 381	F-388	<0.2				0						
297	CSS 285-299	F424	0.5				0						
294	CSS 285-299	F5, 8	0.75				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
283	CSS 264-284	F-627, 30, Ard mark	<0.5				0						
276	CSS 264-284	F-704, 51	<0.5				0						
369	CSS 354 - 381	Fv - 644, 12, Post hole Fill	<0.5			0.3	0.3					1.09	
2060	CSS 2049-2068	G3, layer 3, B?, NW profile	1				0						
2058	CSS 2049-2068	G3, layer 4, B2, NW profile	1				0						
2005	CAL 80/ BL/001	Half Sieved	3	Yes	0.9	0.29	1.19			1.57			
2175	Callanish 2365-2367	numerous small subsamples	n/a				0						
2500	CSS 2500etc	numerous small subsamples	n/a				0						
2501	CSS 2500etc	numerous small subsamples	n/a				0						
2502	CSS 2500etc	numerous small subsamples	n/a				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2505	CSS 2500etc	numerous small subsamples	n/a				0						
2062	CSS 2049-2068	Pit G3, layer 1, SE profile	1				0						
2055	CSS 2049-2068	Pit G3, Layer 3, SE profile	1				0						
2036	CSS 2023-2048	Pit G3, Layer 4, SE profile	1				0						
2046	CSS 2023-2048	Pit G3, Sample A1, NE profile	1				0						
2440	CSS	Pollen Sample, Site H, F-772, Sample 28	<0.1				0						
871	CAL 80/ BL/001	Pollen Unsieved, 1	1			0.05	0.05		0.12	1.49			
871	CAL 80/ BL/001	Pollen Unsieved, 2	1			0.38	0.38						
2497	CSS 2500etc	RC6	0.5				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2496	CSS 2500etc	RC6, 7	0.5				0						
378	CSS 354 - 381	Rest of label worn off	<0.5			6.01	6.01						
380	CSS 354 - 381	Rest of label worn off	<0.2				0						
2347	Callanish 2340 - 2364	Rest of label worn off	2	Yes	9.32	0.24	9.56			1			
2348	Callanish 2340 - 2364	Rest of label worn off	1.75			5.15	5.15						
2448	CSS 2447-	RO 15	1.75				0						
2453	CSS 2447-	RO 15	1.5				0						
2451	CSS 2447-	RO 15, 14	1				0						
2450	CSS 2447-	RO 15, 16	2.5	Yes			0						
2452	CSS 2447-	RO 15, 19	1.5				0						
2454	CSS 2447-	RO 15, 20	1.75				0						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2449	CSS 2447-	RO 15, 21	2	Yes			0						
2447	CSS 2447-	RO 15, 24	2.5	Yes			0						
2086	CSS 2069-2090	Sample 141, B5	0.5			0.25	0.25		0.11			0.49	
376	CSS 354 - 381	Sample 4, 020	0.5				0						
33	CSS	Second Bag, 13/05/88	3	Yes		0.24	0.24	0.04		1.58	0.18		
268	CSS 264-284	Site A1, F-A30, Layer 35, 20	<0.1				0						
2442	CSS	Site E, F-12	<0.1			0.14	0.14						
2360	Callanish 2340 - 2364	Site E, F-30, Sample 3	0.75			0.03	0.03						
371	CSS 354 - 381	Site F, F 629, 31	<0.5			0.05	0.05						
2080	CSS 2069-2090	Site H, 707	0.5				0						
2079	CSS 2069-2090	Site H, 714, Sample 1	<0.5				0					0.85	

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2027	CSS 2023-2048	Site H, 735, Sample 6	<0.5			0.06	0.06	0.01				1.02	
2040	CSS 2023-2048	Site H, 769, sample 22	2.5	Yes	1.2		1.2						
2367	Callanish 2365-2367	Site H, F.738, Sample 15	2	Yes	3.03	1.03	4.06	1	0.3	10.28			
2082	CSS 2069-2090	Site H, F-707, sample 4	<0.5			0.3	0.3					0.25	
2067	CSS 2049-2068	Site H, F-726, Sample 21	<0.5				0						
2048	CSS 2023-2048	Site H, F-730, Sample 32	1.5			1.65	1.65				0.02		
2353	Callanish 2340 - 2364	Site H, F-732, Sample 10	<0.5			0.92	0.92	0.03			0.02	0.57	
2363	Callanish 2340 - 2364	Site H, F-733, Sample 9	<0.5			0.04	0.04						
2076	CSS 2069-2090	Site H, F-734, sample 3	0.75			0.84	0.84						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2026	CSS 2023-2048	Site H, F-736, No.7	0.5			0.16	0.16		0.36				
2364	Callanish 2340 - 2364	Site H, F-746, Sample 13	0.5			0.56	0.56						
2352	Callanish 2340 - 2364	Site H, F-746, Sample 14	<0.5			0.11	0.11	0.03					
2355	Callanish 2340 - 2364	Site H, F-747, Sample 11	1			0.71	0.71	0.05					
2362	Callanish 2340 - 2364	Site H, F-757, Sample 17, Possible Chamber Floor	0.5				0						
2434	CSS	Site H, F-766, Sample 33	<0.2			4.54	4.54						
2438	CSS	Site H, F-766, Sample 33	<0.1			1.25	1.25						
2061	CSS 2049-2068	Site H, F-771, Sample 30	<0.5			0.55	0.55						

Sample	Box	Description	Vol (L)	Wet Sieved	>4mm Charcoal from flot	Charcoal from Retent	Total charcoal content	Charred Rmns	Lithic	Pot	Bone	Qutz	Other:
2038	CSS 2023-2048	Site H, F-772, Sample 29	1			1.64	1.64	0.16					
2051	CSS 2049-2068	Site H, F-778, sample 31	1			3.2	3.2	0.12					
2361	Callanish 2340 - 2364	Site H, Sample 18	0.75				0						
2016	CSS 2009-2022	Site H, Sample 24	3	Yes	5.35	0.12	5.47	0.28		1.22			
2071	CSS 2071	Site H, Sample 27	7.5	Yes	10.72	0.74	11.46	0.11		10.64			
13	CSS	Third Bag, 13/05/88	3	Yes	1.09	0.35	1.44			2.14		5.54	
13	Callanish - Peter Strong	Top Block, Cal 88, 13/05/88	4	Yes	0.66	0.07	0.73	0.07		0.98	0.05	0.19	

See Technical note 22.4.1 for errors

22.4.2 Appendix 2: combined charcoal identifications

Sample	Context	Alnus glutinosa	Betula sp	Calluna vulgaris	Corylus avellana	Pinus sp	Pom-oideae	Salix sp	Sorbus sp	Unid	Weight (g)
370	A17										0

Sample	Context	Alnus glutinosa	Betula sp	Calluna vulgaris	Corylus avellana	Pinus sp	Pom-oideae	Salix sp	Sorbus sp	Unid	Weight (g)
269	A18		1								1.2
370	A18	1	1		1						0.09
277	A93		5								0.25
4277	A93		5								3.17
164	B111				1						*
54	B123							1			*
132	B139										*
279	B139										
361	B139										not found
391	B141										
686	B141										
2255	B142										0.7
243	B149										
278	B160	1	1		6						0.33
215	B167									1	*
702	B167		1								*
2225	B806										
143	B815		1								*
2247	B846					2					0.4
2257	B854										
694	B881										*
698	B883		2								*

Sample	Context	Alnus glutinosa	Betula sp	Calluna vulgaris	Corylus avellana	Pinus sp	Pom-oideae	Salix sp	Sorbus sp	Unid	Weight (g)
2009	B883				1			4			1.1
2011	B883	6			4						0.82
678	B885	2	2								*
500	B889										*
248	D300		1								*
604	D300		1	1							*
213	D305		1								*
685	D315		2								*
687	D315				1						*
2006	D315		4		4			2			1.08
2006	D315		1	1	5	1	1	3			9.5
347	D318		1		1						*
226	D333		1								*
2075	D334										
684	D336		1								*
95	D344	4	1		2	1	1	1			0.52
95	D344		1	2		1		6			*
666	D344							2			*
690	D352		1								*
236	D359							1			*
257	D360									1	*
2010	D360									2	0.7

Sample	Context	Alnus glutinosa	Betula sp	Calluna vulgaris	Corylus avellana	Pinus sp	Pom-oideae	Salix sp	Sorbus sp	Unid	Weight (g)
2041	D360	1	3		1						6.5
2042	D360		1				1			3	c2.0
2043	D360						1				c2.0
2044	D360										0
2045	D360		4		5	1	2				5
2064	D360										c4.0
2066	D360										0.9
2068	D360	1	2		4		3				0.93
273	D361				1						*
2246	D361		1								0.9
689	D362		1								*
2039	D365				1						0.02
2065	D365										0
2069	D365		2		1						0.06
2045	D366	1	6		3						0.6
672	D369		1								*
678	D369		1					1			*
688	D369	2	1		1	5					1.5
693	D369		1								*
2567	D369	6			3	1					0.97
3688	D369					1					*
266	D375				1						*

Sample	Context	Alnus glutinosa	Betula sp	Calluna vulgaris	Corylus avellana	Pinus sp	Pom-oideae	Salix sp	Sorbus sp	Unid	Weight (g)
692	D375		1				-				*
2087	D377										0
2249	D379										0
2250	D379										0
592	D398	3									0.07
592	D398		1								*
2052	D360		1								0.9
2035	D908										*
253	F615		3								1.1
266	F630										0
259	F631										0.2
272	F639										0
258	F643				2						c1.4
373	F645										0
256	F648										*
256	F648				2						0.6
257	F649	2	5		1						2.6
260	F649										0
12	F708							1			*
14	H708		1								*
35	H712							1			*
82	H724							1			*

Sample	Context	Alnus glutinosa	Betula sp	Calluna vulgaris	Corylus avellana	Pinus sp	Pom-oideae	Salix sp	Sorbus sp	Unid	Weight (g)
2366	H728	2	8		3				2		c10
116	H732		1								*
2365	H732	5	2		3						0.38
2365	H732	6	4					1			6.1
674	H733		1								*
2243	H736				1						2.9
2367	H738	2	1				2				0.68
2367		3			2						0.28
123	H739							1			*
671	H740							1			*
2012	H751										0
2256	H795		2								2.1
230	H767							2			*
229	H768	1	3		1						*
324	H769		3								0.16
332	H769	2	2	1							*
2040	H769	6	3		1						0.59
2106	H769										
2357	H769										
321	H769		1								*
2356/0	H770	6	2		2						0.7
Third Bag	S13	2	3								0.24

Sample	Context	Alnus glutinosa	Betula sp	Calluna vulgaris	Corylus avellana	Pinus sp	Pom-oideae	Salix sp	Sorbus sp	Unid	Weight (g)
Top Block	S13	2			1		1				0.26
Bag 4	S13	3			2		2				0.42
	S33	5									0.17
TOTAL		75	107	5	68	13	14	29	2	7	57.69

22.4.3 Appendix 3: Condition survey from recent charcoal analysis

Sample	Context	Species	Weight (g)	Description
13	Bag 4 13/05/88	Alnus	0.17	Not roundwood, very twisted fragment, unclear over ring no.
13	Bag 4 13/05/88	Corylus	0.04	2-3 rings visible, not roundwood, abraded and rounded
13	Bag 4 13/05/88	Alnus	0.06	3-4 rings visible, not roundwood, very mineralised and abraded around fringes
13	Bag 4 13/05/88	Pomoidea	0.04	Small fragment with only 2 rings visible, well preserved, not roundwood
13	Bag 4 13/05/88	Alnus	0.06	2-3 rings visible, not roundwood, abraded and rounded
13	Bag 4 13/05/88	cf. Pomoidea	0.03	Very mineralised throughout, very abraded, unclear over ring no.
13	Bag 4 13/05/88	Corylus	0.02	2-3 rings visible, not roundwood, abraded and rounded, mineralised around fringes

Sample	Context	Species	Weight (g)	Description
13	Third Bag 13/5/88	Betula	0.04	Slightly mineralised, 3-4 rings visible, rounded and abraded
13	Third Bag 13/5/88	Alnus	0.07	Well preserved lightly abraded, not mineralised, 3 rings visible
13	Third Bag 13/5/88	Alnus	0.05	8-9 rings visible, not roundwood, mineralised throughout
13	Third Bag 13/5/88	Betula	0.03	5-6 rings visible, roundwood - 8-9mm diameter
13	Third Bag 13/5/88	Betula	0.05	Very mineralised, very abraded and rounded, 2-3 rings visible, not roundwood
13	Top Block Cal 88	Corylus	0.15	4-5 rings visible, very rounded and abraded, not roundwood
13	Top Block Cal 88	cf. Alnus	0.02	1-2 rings visible, mineralised around fringes, abraded and rounded
13	Top Block Cal 88	Pomoidea	0.05	4-5 rings visible, very rounded and abraded, mineralised throughout
13	Top Block Cal 88	Alnus	0.04	1 ring visible, well preserved, mineralised around fringes
33		Alnus	0.06	3-4 rings visible, not roundwood, very mineralised and abraded around fringes
33		Alnus	0.02	Very small fragment, very abraded, 3-4 rings visible
33		Alnus	0.01	1-2 rings visible, not roundwood, very abraded
33		Alnus	0.03	3-4 rings visible, not roundwood, very mineralised and abraded around fringes
33		Alnus	0.05	2-3 rings visible, not roundwood, abraded and rounded
95	D344	Alnus	0.05	Well preserved fragment, 5-6 rings visible.
95	D344	Pinus	0.09	Up to 7 rings visible, well preserved, not mineralised.
95	D344	Betula	0.06	Up to 3 rings visible, very abraded and mineralised.

Sample	Context	Species	Weight (g)	Description
95	D344	Corylus	0.03	Possible roundwood - up to 5mm radius - 5 rings visible, heavily abraded
95	D344	Alnus	0.03	Possible roundwood - 6-7 rings - 8mm diameter, abraded and rounded.
95	D344	Alnus	0.04	Possible roundwood - 5-6 rings - 8mm radius, abraded and fragmentary
95	D344	cf. Salix	0.06	Heavily mineralised fragment, possible roundwood - 5-6 rings - 8-9mm diameter
95	D344	Alnus	0.06	2-3 rings visible, heavily abraded and rounded, mineralised around fringes
95	D344	Pomoidea	0.03	3-4 rings visible, heavily abraded and mineralised
95	D344	Corylus	0.07	3-4 rings present, heavily abraded and rounded
256	F648			No fragments were identifiable
277	A93	Betula	0.06	2-3 rings visible, mineralised around fringes, heavily abraded and rounded
277	A93	Betula	0.05	Heavily abraded and rounded fragment, mineralised around fringes, 2-3 rings visible
277	A93	cf. Betula	0.08	3-4 rings visible, heavily mineralised, very twisted fragment
277	A93	Betula	0.02	2-3 rings visible, very friable, mineralised around fringes
277	A93	Betula	0.04	1-2 rings visible, very degraded and rounded, friable
278		Betula	0.07	1-2 rings visible, very soft and abraded, large parent fragment
278		Corylus	0.08	6-7 rings visible, very abraded and soft, not roundwood
278		Alnus	0.02	5 rings visible, possible roundwood - 5-6mm diameter, very soft and abraded
278		Corylus	0.02	Up to 3 rings visible, very soft and abraded fragment,
278		Corylus	0.04	2 rings visible, mineralised throughout, very abraded and soft
278		Corylus	0.03	Abraded around fringes, well preserved with up to 2 rings visible.
278		Corylus	0.04	*, very small fragment, up to 3 rings visible, very soft and abraded
278		Corylus	0.03	*, small and extremely abraded, 3-4 rings visible, not roundwood.
324	H769	Betula	0.11	8 rings visible, mineralised around fringes, very abraded
324	H769	Betula	0.03	5-6 rings visible, lightly abraded and mineralised

Sample	Context	Species	Weight (g)	Description
324	H769	Betula	0.02	Possible the same as fragment above
370	A18	Alnus	0.02	Extremely abraded and mineralised, 13 rings visible
370	A18	Betula	0.05	Up to 10 rings visible, extremely abraded and mineralised
370	A18	Corylus	0.02	3-5 rings visible, lightly abraded and mineralised around fringes
592	D398	Alnus	0.03	2-3 rings present, very rounded and abraded
592	D398	Alnus	0.02	2 rings present, mineralised around fringes, very abraded
592	D398	Alnus	0.02	*, 2 rings visible, mineralised around fringes, very abraded
688	D369	Betula	0.2	4-5 rings visible, very degraded and soft.
688	D369	Alnus	0.29	4-5 rings visible, very degraded and soft.
688	D369	Pinus	0.34	Up to 6 rings visible, quite angular fragment, some abraded edges.
688	D369	Alnus	0.32	5-6 rings visible, abraded and mineralised
688	D369	Pinus	0.05	3-4 rings present, mineralised around fringes,
688	D369	Pinus	0.08	3-4 rings visible, mineralised throughout
688	D369	Pinus	0.11	Possible from same parent fragment as above.
688	D369	Pinus	0.05	Possible from same parent fragment as above.
688	D369	cf. Corylus	0.06	Poor condition, soft and abraded, 2-3 rings visible, mineralised along fringes
2006	D315	Corylus	0.28	16-17 rings visible, possibly roundwood - 7mm radius, angular and mineralised
2006	D315	Betula	0.1	Mineralised around fringes, rounded and abraded, 3-4 rings visible.
2006	D315	Corylus	0.09	3-4 rings visible, abraded and rounded, very twisted internal structure.
2006	D315	Corylus	0.13	26 rings visible, Roundwood of 10mm radius, angular and mineralised around fringes
2006	D315	Corylus	0.11	25-26 rings visible, large and abraded, same as above?
2006	D315	Salix	0.08	11-13 rings visible, rounded and abraded, mineralised around fringes
2006	D315	Betula	0.11	2-3 rings visible, mineralised around fringes, heavily abraded and rounded

Sample	Context	Species	Weight (g)	Description
2006	D315	Betula	0.09	4-6 rings visible, mineralised around fringes, abraded and rounded
2006	D315	Salix	0.04	Possible roundwood - 3-4 rings visible - 8mm diameter, angular but abraded
2006	D315	Betula	0.05	11-12 rings visible, no mineralisation, angular but visible abraded
2011		Corylus	0.1	2 rings visible, mineralised around fringes, abraded and rounded
2011		Alnus	0.09	Not roundwood, 3 rings visible, mineralised and abraded, larger parent fragment
2011		Alnus	0.07	More than 7 rings visible, possibly roundwood - 7mm diameter, lightly abraded
2011		Corylus	0.13	Extremely abraded and mineralised fragment, approx 3 rings visible
2011		Alnus	0.1	Roundwood fragment - 5-6 rings visible - 10mm diameter, lightly abraded and mineralised
2011		Alnus	0.19	very abraded and rounded fragment, 1-2 rings present, mineralised around fringes
2011		Alnus	0.05	2 rings visible, possible roundwood - 3mm radius, well preserved
2011		Corylus	0.02	Possible roundwood fragment, 2 rings visible, 7mm diameter, mineralised throughout
2011		Alnus	0.04	Roundwood fragment - 5mm radius, 5-6 rings visible, mineralised throughout.
2011		Corylus	0.03	Not roundwood, 6-7 rings visible, mineralised throughout, heavily abraded.
2035	D908			No fragments were identifiable
2039		Corylus	0.02	Only fragment from context identifiable, roundwood - 6.5mm diameter - 3 rings
2040		Alnus	0.12	1-2 rings visible, mineralised around fringes, abraded and rounded
2040		Alnus	0.11	Up to 4 rings visible, not roundwood, mineralised along one edge towards centre
2040		Betula	0.08	Very soft and abraded fragment, 3-5 rings visible, extremely mineralised.
2040		Alnus	0.04	1-2 rings visible, very mineralised around fringes,
2040		Betula	0.03	2-3 rings visible, not roundwood, abraded and rounded
2040		Alnus	0.03	5-6 rings visible, not roundwood, very abraded and fragmentary
2040		Corylus	0.02	Possible roundwood - 4-5 rings visible - 7mm diameter, mineralised around fringes
2040		Betula	0.07	3-4 rings visible, not roundwood, very mineralised and abraded around fringes

Sample	Context	Species	Weight (g)	Description
2040		Alnus	0.05	Large and abraded fragment, 3-4 rings visible
2040		Alnus	0.04	*, Up to 6 rings visible, extremely abraded and mineralised
2045	D366	Betula	0.06	Rounded and abraded fragment, 3-4 rings visible
2045	D366	Corylus	0.11	large angular fragment, 3-4 rings visible, lightly mineralised
2045	D366	Betula	0.07	Lightly mineralised, 2-3 rings visible, rounded and abraded
2045	D366	Betula	0.04	Lightly mineralised, only 1 ring visible, lightly abraded and rounded
2045	D366	Betula	0.06	*, 9-10 rings visible, lightly mineralised and rounded, quite abraded.
2045	D366	Corylus	0.04	1-2 rings visible, angular but abraded fragment, lightly mineralised.
2045	D366	Corylus	0.05	Possibly same as above fragment.
2045	D366	Betula	0.07	*, 4-5 rings visible, angular but abraded fragment.
2045	D366	cf. Betula	0.04	3-4 rings visible, very rounded and abraded, mineralised along one edge.
2045	D366	Alnus	0.06	2-3 rings visible, very friable, abraded and rounded, mineralised around fringes.
2068		Alnus	0.14	Possible roundwood - 1mm diameter, & rings visible, abraded and soft.
2068		Pomoidea	0.11	3 rings visible - not Roundwood, edges abraded and mineralised, very soft.
2068		Corylus	0.11	10-11 rings visible, possibly roundwood - 8mm diameter, abraded and rounded.
2068		Corylus	0.1	Roundwood fragment - 5 rings visible - 12mm diameter, mineralised and rounded.
2068		Corylus	0.07	Possible roundwood - 6mm radius, extremely mineralised
2068		Pomoidea	0.08	Not roundwood, up to 6 rings visible, very abraded and rounded
2068		Betula	0.08	Not roundwood, up to 6 rings visible, extremely friable and soft, much abraded.
2068		Betula	0.04	Not roundwood, 3-4 rings visible, mineralised only round fringes.
2068		Corylus	0.06	9 rings visible, not roundwood, mineralised and abraded
2068		Pomoidea	0.14	2 rings visible, not roundwood, extremely mineralised,
2069		Corylus	0.03	Extremely abraded and soft fragment. 4 rings visible, mineralised along one side

Sample	Context	Species	Weight (g)	Description
2069		Betula	0.01	Very small and soft fragment, 1-2 rings visible.
2069		Betula	0.02	Very small and very mineralised fragment, 1-3 rings visible
2365	H732	Alnus	0.05	Possible roundwood of 4mm radius, unclear over no. of rings. Abraded and mineralised
2365	H732	Alnus	0.06	Possible roundwood of 5mm radius, well preserved and not mineralised.
2365	H732	Alnus	0.03	5 rings visible, mineralised around fringes, rounded and abraded.
2365	H732	Alnus	0.06	*, 8-9 rings visible, mineralised around fringes, not roundwood
2365	H732	Betula	0.03	3-4 rings visible, not roundwood, very mineralised and abraded around fringes
2365	H732	Corylus	0.04	5-6 rings visible, mineralised around fringes, well preserved
2365	H732	Alnus	0.02	3 rings visible, lightly mineralised, very abraded and rounded.
2365	H732	Corylus	0.03	Possible roundwood - 6mm radius - 4-5 rings visible, well preserved
2365	H732	Betula	0.04	Roundwood - 3-4 rings visible - 6mm diameter, mineralised throughout
2365	H732	Corylus	0.02	Roundwood - 2-3 rings visible - 3mm radius, mineralised around fringes
2367	H738, sample 15	Pomoidea	0.26	Very soft and mineralised, 10-12 rings visible, roundwood of 7mm radius
2367	H738, sample 15	Pomoidea	0.14	Possibly same as above fragment.
2367	H738, sample 15	Alnus	0.06	Roundwood fragment, 5-6 rings visible, 6mm radius, well preserved.
2367	H738, sample 15	Alnus	0.08	2-3 rings visible, well preserved, mineralised around fringes
2367	H738, sample 15	Betula	0.14	2-3 rings visible, not roundwood, well preserved, mineralised around fringes
2367		Corylus	0.08	7-8 rings visible, mineralised around fringes
2367		Corylus	0.07	7-8 rings visible, mineralised in places
2367		cf. Alnus	0.05	5-6 rings visible, very mineralised and abraded.

Sample	Context	Species	Weight (g)	Description
2367		Alnus	0.03	1-2 rings visible, not roundwood, abraded and mineralised around fringes
2367		Alnus	0.05	3 rings visible, very abraded and rounded, mineralised throughout.
2567		Alnus	0.26	3 rings visible - not roundwood, quite fragmented and abraded
2567		Alnus	0.14	4 rings visible, not roundwood, very abraded and soft
2567		Alnus	0.1	1-2 rings visible, mineralised around fringes, abraded and rounded
2567		Corylus	0.1	8 rings visible, well preserved and solid piece of charcoal, not roundwood,
2567		Corylus	0.12	Up to 4 rings visible, very abraded and twisted fragment.
2567		Alnus	0.02	2 rings visible, not roundwood, lightly mineralised
2567		Pinus	0.11	Well preserved lightly abraded fragment, 7 rings visible, not roundwood.
2567		Corylus	0.08	Possible roundwood, 2 rings visible - 10mm diameter, abraded, and soft
2567		Alnus	0.04	Not roundwood, 2 rings visible, extremely mineralised and abraded
2356/0		Alnus	0.11	6-7 rings visible, roundwood of 7mm radius, little mineralisation
2356/0		Betula	0.11	Extremely mineralised, 2 rings visible, large sections too distorted for clear view.
2356/0		Alnus	0.11	Very mineralised, up to 4 rings visible very abraded and rounded.
2356/0		Alnus	0.08	Very twisted and distorted fragment, very mineralised, up to 2 rings visible.
2356/0		Alnus	0.06	Possible roundwood fragment, up to 7 rings visible - 5mm radius,
2356/0		Betula	0.05	Extremely mineralised and abraded fragment. Up to 3 rings visible.
2356/0		Corylus	0.06	mineralised around fringes, up to 4 rings present, wide ring pattern
2356/0		Alnus	0.07	Very poorly preserved fragment, with up to 4 rings visible, very mineralised
2356/0		Corylus	0.02	Mineralised around fringes, up to 2 rings visible, rounded and abraded

Sample	Context	Species	Weight (g)	Description
2356/0		Alnus	0.03	Very mineralised and abraded fragment, 2-3 rings visible.

22.4.4 Appendix 4: macroplant identifications (Allan Hall)

The following material was submitted for identification and to check its suitability for AMS dating. In the 'Plant material present' column *indicates suitable material and quantity for dating, (*) those cases which are more marginal in quantity).

Context	Other labelling	Plant material present	Weight for dating (mg)
13	Bag 4 13/5/88, Callanish #24,28,33 (labelled 131 by ARH)	charred hazel (Corylus avellana L.) nutshell*	77
13	Top block Cal 88, 13/5/88, Callanish Peter Strong (labelled 132 by ARH)	ditto*	76
33	Second bag 13/5/88 Callanish #24, 28…	ditto (*)	37
336	356, 3, NE 1011 CSS 354-381	Specimen labelled as charred seed but material present comprised two fragments of (the same?) charred plant structure which may be an underground organ; there is probably not enough to date in any case	<10
374	10/1 F1 CSS 354-381	12 grains, probably all barley (Hordeum); weight is for 9 selected for dating*	61
704	CSS 752-773; in derivative lists supplied to specialists as from context 764, which must be a faulty transliteration of 704. 704 is the general label for the cairn outside the chamber wall. I distinctly remember putting grain from the late secondary capping of the cairn in sample bags (PJA).	3 barley and one wheat (Triticum) grain (*); also two charred ?seeds of unknown identity and a trace of wood charcoal	12
883	2011 B4Wx 883 CSS 2009/2022	charred hazel nutshell*	115
missing	2016 Site H, Sample 24 CSS 2009-2022	charred hazel nutshell*; also little wood charcoal	182
916	2017 D1, CSS 2009/2022	charred hazel nutshell (*); also a little wood charcoal	33
910	2018 DI CSS 2009-2022	charred hazel nutshell*	96

Context	Other labelling	Plant material present	Weight for dating (mg)
883	2020 B4Wx, CSS 2009-2022	charred hazel nutshell*	97
883	2022 B4Wx CSS 2009-2022	charred hazel nutshell (*)	39
735	2027 Site H, Sample 6 CSS 2023-2048	charred hazel nutshell (*)	12
772	2038 Site H, Sample 29 CSS 2023-2048	charred hazel nutshell*	151
778	Site H, 2051, Sample 31 CSS 2049-2068	charred hazel nutshell*	114
356	2059 D CSS 2049-2048	charred hazel nutshell (*)	34
360	2068 D CSS 2049-2068	charred hazel nutshell (*); also two fragments of a broken cereal grain, probably wheat	32
889	2070, CSS 2069-2090	a very little wood charcoal	
770	Site H, Sample 27, 2071 CSS 2071	charred hazel nutshell*	122
352	D1, 2084, CSS 2069-2090	charred hazel nutshell*	50
746	Site H, 2352, Sample 14 CSS 2340-2364	charred hazel nutshell*	61
732	Site H, 2353, Sample 10 CSS 2340-2364	charred hazel nutshell (*); also a little wood charcoal	37
747	Site H, 2355 Sample 11 CSS 2340-2364	charred hazel nutshell (*); also a little wood charcoal	34
missing	2480 CSS 2453-2553	Charred plant material, perhaps seaweed? (perhaps not suitable for dating, but if needed, weight is 21 mg)	
missing	2508 RL '82 40/4 6 CSS 2500 etc.	charred hazel nutshell (*)	26
369	D2567	charred hazel nutshell (*)	24
770	2356 H /0? CSS 2340-2364	charred hazel nutshell*	82

22.4.5 Appendix 5: Charcoal found in pottery bags in 2011

The following is a list of charcoal fragments found in pottery bags by Dr Sheridan; they have now (July 2011) been separated out.

Find no.	Area	Context
80.168	BIII	160.1
80.172	DI	315
81.234	DI	315
81.315	DIV	316
81.154	HI	746
81.229	HII	768
81.323	HII	769B

22.4.6 Appendix 6: Samples sent for radiocarbon dating

Sample No.	Context No.	Species
269	A18	Betula
4277	A93	Betula
2006	D315	Pinus
95	D344	Pinus
2045	D360	Pinus
2045	D360	Corylus
688/2567	D369	Pinus
688/2567	D369	Alnus
688/2567	D369	Corylus
592	D398	Alnus
256	F648	Corylus
13	Top Block	Corylus
2011	B4 Wx 883	Hazelnut Shell
2020	B4 Wx 883	Hazelnut Shell
Bag4	Strong 13	Hazelnut Shell
374 10/1 F1	704	Barley Seed
764	704	Wheat Grain
764	704	Barley Grain
2084	D1 352	Hazelnut Shell
2352	H764	Hazelnut Shell
2038	H772	Hazelnut Shell
2051	H778	Hazelnut Shell

The report and catalogue prepared by R McCullagh in 1983 is archived in the folder 'Calanais final resource files' in NMRS.

23. Radiocarbon Dating

23.1 Introduction

23.1.1 Measurement and calibration

The 39 radiocarbon dates discussed here were obtained in three batches. A basal peat date was measured around 1982 by the Glasgow University radiocarbon laboratory. 15 dates for charcoal, identified by Rod McCullagh, were obtained in 1997 from the Accelerator Mass Spectrometer at Arizona (AA-) (Ashmore 1997) and a further 23 from charcoal identified by Robin Inglis in 2006 were measured on the Scottish Universities Environmental Research Centre Mass Spectrometer at East Kilbride (SUERC-). Historic Scotland paid for all of the dates.

The age obtained around 1982 dated the humic acid from a slice of basal peat to the east of the main stone setting. Each of the 1997 and 2006 ages was obtained from a single piece of charcoal or charred hazel nut shell, to avoid the possibility of mixed charcoal of different periods producing a chronologically meaningless average age (Ashmore 1999, 2000). The charcoal came from short-lived species, apart from the pine (Crone, pers comm). The samples were all prepared at Scottish Universities Research and Reactor Centre in East Kilbride. The ages and dates are listed with their calibrations in Table 23.3 and plotted on Illus 23.1.

The calibrations here use the 2004 data set published by Reimer et al (2004) and were calculated using OxCal 3.10 (Bronk Ramsay 2005), set to cub r:5 sd:12 prob usp [chron].

23.1.2 Cautionary words

It is important to remember two things. Firstly, the dates were not for human activities such as the filling of a pit, but for a few years' growth of a plant, in most cases a tree or a shrub, charcoal from which was incorporated in the pit at some later date. The measured ages were not necessarily from the latest rings of the plant, and they averaged the radiocarbon age of each annual ring in the sample. Apart from the pine, the species dated at Calanais had natural lifetimes of no more than a century and in most cases significantly less (although coppicing can lead to survival of the bole of a tree or shrub for longer than normal). Only three of the samples had unusually negative dC13 values, which might have been a sign of having been from wood preserved in peat bogs prior to being burnt, but they were from hazel which unlike birch does not seem to occur often in deep peat. The high d13C levels may have another explanation.

Given the damp local climate the dated charcoal from Calanais probably did not result from wild fires. In that sense each date probably reflected human activity shortly after the death of the plant from which the charcoal was produced. But in most cases the charcoal probably lay somewhere other than its find spot for an appreciable time, before being turned up by ground-working or moved with its surrounding soil into a new place from which we sampled it. In what follows such samples have been called 'residual' (Ashmore 1999a).

Secondly, the 39 dates obtained reflect only a tiny fraction of the activities at Calanais. Given that several dates are indistinguishable from one another, the 38 dates (not including the peat date), spread over about 2000 years of goings-on, might represent one or two charring episodes every 2 to 10 generations.

Keep in mind also that although the one sigma limits have been included in the tables, to abide with the conventions of SAIR, about a third of the dated samples will have had true ages outwith them; and one or two of the ages probably have true dates lying outside the 2 sigma limits quoted here; there is only a 16.7% chance that all of them lie between the 2 sigma limits quoted.

23.2 Samples and their treatment

23.2.1 Selection strategies

There are basically two possible strategies for a dating programme. One is to select only samples

which relate directly to what one is interested in; for instance, collagen or bone apatite to measure the age of skeletal material, or a charred cereal grain to show when a particular species was being grown. The other is to obtain many dates with where possible more than one from each context, to get a set of termini post quem. In this second approach the main danger is that we have a natural tendency to forget that a sample may have been be very much older than the context in which it was found. Nevertheless termini post quem can be very useful. For instance, had the charred cereal grains in the cairn capping at Calanais produced modern dates they would have shown that the capping was modern.

In the end this dating programme included a mixture of both strategies. The dates of the charred cereals were of interest as part of the history of cereal growing irrespective of their stratigraphic position. Another part of the thinking was that it would be valuable to see whether the tendency for Scottish pine to have either a pre-4th millennium date or a fairly recent one applied in the Calanais area (Crone pers comm). But a major consideration in obtaining the 2006 age set was that not enough ages were measured in 1997 to allow an understanding of patterns of residuality.

23.2.2 Residuality

It is clear that some pieces of charcoal were found in contexts formed much later than the death of the plants providing the charcoal. The contexts with irrefutably residual charcoal, because they also contained significantly later non-intrusive charcoal, were:

— D315, a plough soil;
— D344, a plough soil;
— D398, green clay under the cairn.
— D360, a dirty clay under the cairn
— D369, a soil under plough soil 315.

There were also contexts with charcoal for which residuality was demonstrated by the existence of much later dates from stratigraphically earlier contexts. They included:

— H772 and H778, fills of slot 773 cutting the green clay under the chamber wall;
— B883, a gritty soil in what was probably the same slot;

Then there were contexts where the presence of residual charcoal was interpreted from general stratigraphy but could not be proved unambiguously.

— H746, the uppermost fill of a depression, immediately below turf line 771.
— D352, sandy clay outside the cairn;

23.2.3 Modelling and Bayesian analysis

In an early draft of this report Bayesian models were created based on a subset of the dates in the belief that each of them was of much the same date as its context. The models are listed in Technical Note 23.2.3. Using the inbuilt Bayesian methods of OxCal the conclusion was that the Ring was set up and the chambered cairn built between 2900 and 2600 cal BC. That estimate was widely publicised. But further consideration of the contexts and other dating information shows that even more of the charcoal fragments than supposed in selecting them for modelling were centuries old at the time that the contexts in which they were found were sealed. Amongst the most important examples is the piece of hazel charcoal (AA-24967, sample 2243/81) in a context H736 forming part of the primary build of the cairn. The context included a beaker rim sherd which cannot have been earlier than 2500 cal BC, at least a hundred years later than the Bayesian dating model suggested (and rather late for the radiocarbon date (2860 to 2470 cal BC) from H736 considered in isolation). And another date (2910 to 2630 cal BC) from a single piece of birch charcoal from the closely related context H732 (AA-24966, sample 116/81) was significantly different from that for sample 2243/81. If the piece of charcoal from 732 was residual it seems very possible that the one from 736 was too.

In essence it is impossible to guarantee that any samples from Calanais were of much the same

date as their contexts, except possibly a fragile heather twig (sample 132/80; AA-24957) in a late context. The simple Bayesian model was invalid, depending as it did on the assumption that a sample in a later context would always be younger than a sample in an earlier context. Attempts to use Bayesian techniques were abandoned.

23.3 Indirect dating

Analysis of pollen samples from Calanais and their comparison with radiocarbon-dated reference columns at Callanish Leobag produced a dating scheme which fitted well with a late date for the cairn and less well with the Bayesian dating model produced in the draft report. The reference columns there were zoned and radiocarbon-dated (Table 23.1). Then short Kubiena box columns from Areas C, D, E and H at Calanais were zoned by comparison with the Leobag columns; and spot samples were compared with these short profiles. That allowed dates from the Leobag columns to be applied (cautiously) to the pollen-sampled layers at Calanais.

The interpolated and projected dates were estimated from their nearest measured neighbours in the same peat column. Two different interpolation methods were used for some important subzone boundaries. The projected dates for subzone boundaries 1 to 2a-2b are less trustworthy than the others because of increased uncertainties about variations in rates of peat growth in the lower parts of CN3. The evidence from Leobag and the calculations underlying the dates in Table 23.1 are explained in Chapter 21: Palaeoenvironment.

Several of the most interesting layers sampled for pollen at Calanais were turf lines. These need to be interpreted with great care because a single turf line can grow for centuries; it reflects a process rather than an event. So stratigraphically a single turf line can have had a life interrupted by being covered by clay in one place, but ongoing elsewhere. Just to re-emphasise this point, because it is important in assessing the date of the Ring and the green clay platform under the cairn, a pollen sample in one part of a visually coherent turf line does not necessarily provide a date for a different part of that turf line.

Table 23.1 Pollen zone transition dates from Calanais Leobag

Description	Pollen sub-zones	Peat depth CN1	Peat depth CN3	Code	late 2 σ cal BC	late 1 σ cal BC	early 1 σ cal BC	early 2 σ cal BC
Projected	3e to 4 CN1	10			-86	17	516	564
Peat	3e CN1	19		GU-1289	200	400	760	850
Peat	3e CN1	20		GU-1170	150	200	750	800
Interpolated	3d-3e CN1	25			262	340	859	921
Interpolated	3c-3d CN1	30			424	519	993	1072
Peat	3c CN3		10	GU-1986	1110	1130	1380	1410
Peat	3c CN1	49		GU-1290	800	1010	1380	1500
Peat	3b-3c CN1	50		GU-1171	1200	1380	1640	1800
Calculated	3b-3c CN1/ CN3	-	-		1520	1520	1750	1880

Description	Pollen sub-zones	Peat depth CN1	Peat depth CN3	Code	late 2 σ cal BC	late 1 σ cal BC	early 1 σ cal BC	early 2 σ cal BC
Peat	3b-3c CN3		15	GU-1987	1600	1660	1880	1900
Peat	3a-3b CN3		19	GU-1988	2200	2290	2470	2560
Interpolated Method 1	3ai-3aii		22.5		2290	2445	2605	2865
Interpolated Method 2	3ai-3aii		22.5		2355	2455	2655	2770
Peat	3a CN3		23	GU-1989	2300	2460	2620	2900
Interpolated	2d-3a CN3		26		2510	2620	2840	2985
Peat	2d CN3		27	GU-1990	2580	2670	2910	3010
Peat	2c-2d CN3		30	GU-1991	3020	3100	3360	3490
Peat	2c CN3		33	GU-1992	3510	3530	3710	3780
Interpolated	2c cereal		35		3605	3650	3830	3875
Peat	2c CN3		37	GU-1993	3700	3770	3950	3970
Interpolated	2b-2c		38		3830	3905	4095	4120
Interpolated	2a-2b		51		5525	5660	5980	6075
Interpolated	Sharp birch drop		52		5655	5795	6215	6225
Peat	2a		53.5	GU-1234	5850	6000	6340	6450
Projected	1-2a		55		6045	6205	6555	6675
Projected	Charcoal appears		57		6305	6475	6845	6975
Projected	start 1		60		6695	6880	7280	7425

23.4 Dating Calanais

23.4.1 Introduction

The date probability distributions in Illus 23.1 are normalised by area; those with a small error are shorter and wider than those with a large one. What follows here is based on the individual dates within the framework of an interpretative phasing of the site. After a brief introduction to how the ages grouped together into clusters, they are discussed in the order of the phases in Table 23.2 rather than either purely chronological or stratigraphic succession.

Many of the dates from the Calanais samples can be grouped into two clusters (Illus 23.1). One cluster of 13 dates fell in the last third of the 4th millennium, their probability distributions spilling over into adjacent centuries. All of these were from charcoal old at the time it was deposited at Calanais. Another of 9 dates occupied a period from about 2900 to 2500 cal BC. In addition a group of 4 dates occupied the period between about 2000 and 1800 cal BC, spilling over into the preceding and succeeding centuries. 11 other charcoal dates ranged from the 6th to the mid 2nd millennia BC, with a basal peat date belonged in the 1st millennium BC.

Only two of the dates from pieces of charcoal at Calanais fell in the part of pollen sub-zone 2c (starting at some date between 4000 and 3750 cal BC and ending at some date between 3490 and 3020 cal BC) when cereals were grown somewhere near Calanais Leobag. They came from Areas A and F by the Avenue to the north of the Ring.

The group of 13 dates between about 3350 and roughly 2900 cal BC from Areas S, D, H and B in and next to the Ring demonstrated pre-Ring activity, perhaps at some distance from where the Ring was to be built. The dated charcoal belonged to the latter part of sub-zone CaN-2c when agriculture was practised around Leobag, or to sub-zone CaN-2d when there was no evidence for cultivation in the pollen columns at Leobag (Illus 23.1).

Only at the beginning of CaN-3a was there again evidence for cereal growing around Calanais itself. The on-site pollen sampling showed that pollen sub-zones 3a and 3b certainly included archaeological phases 5 to 10 and very probably most or all of phases 11 to 12.

Three dates from cereal grains found in the capping of the cairn fell in pollen zone CaN-3c, when agriculture was practiced continuously in the area around Leobag; in fact the cereal dates from Calanais agree (of course approximately) with those estimated for the cereal pollen maximum in Leobag peat column CN3.

23.4.2 Phasing summary

The interpreted phasing at Calanais is as follows.

Table 23.2 Archaeological phases

0	Pollen evidence for woodland clearance in CaN-2a and 2b at Calanais Leobag.
1	Forager activity in Avenue area?
2a	Foraging or early farming in Avenue area?
2b	Early farming in Avenue area and near Calanais Leobag.?
3	Early farming in Avenue area?
3	Deposition of charcoal and early to middle Neolithic pottery in settlements, later imported with soil found in the area of the later Ring.
4	Early ditch
5a	Cultivation beds and subsequent flatter cultivation
5b	Turf formation
6a	Monolith erection
6b	Ring erection
6c	Interrupted slot
7	Clay and soil imported with Phase 3 artefacts and charcoal. Green clay platform and light timber structures
8	Chambered cairn
9a	Enclosure Stage 1 building
9b	Enclosure Stage 2 building

0	Pollen evidence for woodland clearance in CaN-2a and 2b at Calanais Leobag.
10a	Ground working and burials
10b	Rows start now?
10c	Ground working and burials
10d	Avenue starts now?
10e	Ground working and burials
11a	Enclosure Stage 3 building
11b	Ground working including ploughing
12a	Enclosure Stage 4 building
12b	Ground working including cultivation
13	Kerb erection
14	Cultivation
15	Encroachment of peat
16	Disturbance
17	Peat growth and post-medieval peat clearance
18	19th excavations and presentation

23.5 Phases 1 to 3: Foragers and Early farmers

23.5.1 Phase 1 Forager activity in Avenue area?

SUERC-11588; 6295±35 and SUERC-11989 6245±35 came from a piece of birch charcoal (sample 269) from black greasy clay 018 at the bottom of possible posthole 015 on Area A. The posthole underlay beach pebbles 006 immediately to the east of the glacial erratic Q.

The ages were measured on the same piece of birch charcoal; the laboratory re-measured it because the first result was unexpectedly early. The ages can be combined to produce a calibrated date between 5305 and 5215 cal BC. The conclusion of discussion of Area A (Chapter 6) was that the birch charcoal was somewhat more likely to come from human activities than not, but that it might not provide a close TPQ for the context in which it was found.

The date fell in zone 2b. The birch pollen percentages at Calanais Leobag dropped suddenly in the latter part of zone 2a, perhaps reflecting human interference and recovered in 2b, although still subject to fluctuations. The birch charcoal from Area A at Calanais may reflect a human hand in those fluctuations even though the posthole may have been much later.

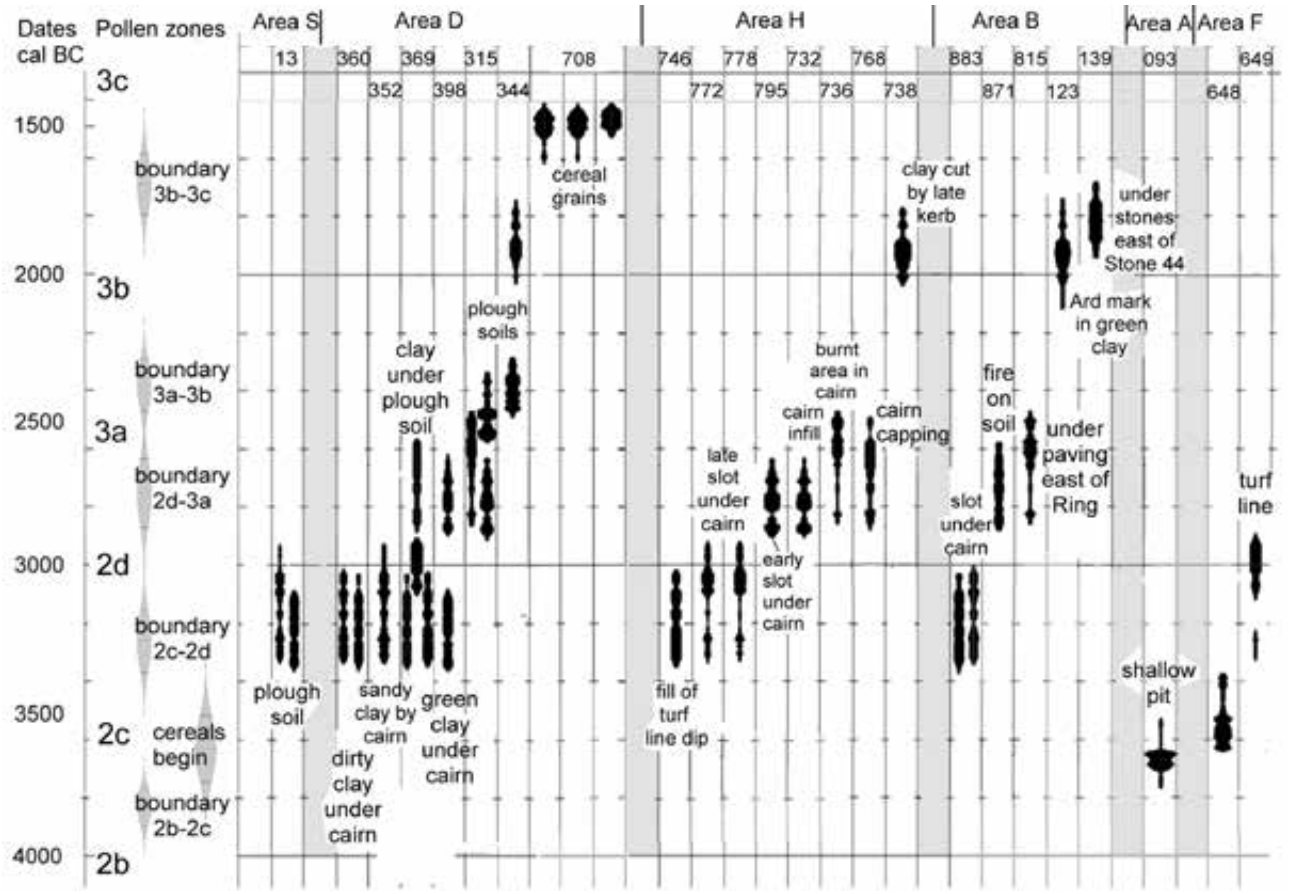
23.5.2 Phase 2a Early farming in Avenue area?

SUERC-11589; 4880±35 came from a piece of birch charcoal (sample 4277) from possible posthole (093) on Area A. This possible posthole underlay beach pebbles 006 immediately to the east of the glacial erratic Q. The age suggests the birch (if short-lived, or if the charcoal came from tree rings which grew shortly before death) was cut between 3720 and 3530 cal BC. It belonged to the early period of farming attested by cereal pollen in pollen sub-zone CaN-2c at Leobag. The charcoal may reflect farming activities in or near the Avenue area, even though the posthole from which it came could have been much later.

23.5.3 Phase 2b Early farming in Avenue area?

SUERC-11601; 4760±35 came from a piece of hazel charcoal (sample 256) from a dark greyish brown, slightly gritty clay (648) which was cut by a stake hole and overlay a ring of material filling a depression on Area F near the western side of the avenue. It was dated to between 3640 and 3380 cal BC. This fell mainly in the later part of Leobag pollen zone 2c in which cereal farming was still practised.

An attempt to combine SUERC-11589 (Phase 2a) and SUERC-11601 (Phase 2b) failed (Chi-squared 5.9 against an expected maximum of 3.8 if the ages were the same). Thus the activities reflected by the occurrence of charred wood on Areas A and F were very probably not of the same date as each other. It is of course possible that the charcoal in Area A (and indeed that in Area F) was residual so none of the dates need provide a close terminus quem for the contexts in which they were found.



Illus 23.1 The calibrated ages (one pair of early dates from Area A has been omitted)

23.5.4 Phase 3 Early farming in Avenue area?

There is no particular reason to suppose that a piece of hazel charcoal form Area F (sample 257/80) was as residual as the Group 3 dates considered below. It was found in a charcoal-rich layer 649 forming part of a turf line on Area F alongside the Avenue. It produced an age (AA-24965; 4385±50) which calibrated to between 3330 and 2890 cal BC. It could belong around the date of the transition of Leobag Pollen zone 2c to 2d, in the former of which cereal pollen occurred. It hints at the possibility that some of the clays with charcoal producing Group 3 dates inside the Ring were brought from the Avenue area.

23.5.6 Phase 3 Charcoal dated c. 3300-3000 BC inside the Ring

No constructional activities could be directly associated with a group of 13 dates which attest to the period of growth, in the last third of the 4th millennium, of those tree-rings which were charred. The charcoal all belonged in a period from about 3300 to 2900 cal BC, between a half and one millennium earlier than the contexts from which the samples came. An attempt to prove a null hypothesis that all of the pieces of charcoal could have had exactly the same age as each other failed, although only marginally.

The ages fell on the notorious calibration plateau in the last few centuries of the 4th millennium. In this period charcoal of very different true ages would have produced similar radiocarbon dates. Thus although the charcoal might have been produced over a fairly short period it could equally have come from the wood of plants which died centuries apart.

The context details in what follows are organised by stratigraphy rather than by age.

Group 1: charcoal from contexts under the chambered cairn. SUERC-11600; 4515±35 came from a piece of alder charcoal (sample 592) from a layer of green clay 398 onto which rested the

base layer of the cairn on Area D. This layer also contained a significantly later age SUERC-11598 (4390±35) which calibrated to between 2900 and 2620 cal BC.

Several ages came from contexts associated with a slot cut into the green clay under the cairn. SUERC-11607; 4490±35 and SUERC-11606; 4455±35 came from a piece of hazel charcoal (sample 2020) and from a charred hazel nut shell (sample 2011) from a dark grey/green gritty charcoal rich material 883 with rotted stone and a few tiny fragments of burnt bone under the bottom course of wall-stones in the passage in Area BIVWX. SUERC-11606 had a surprisingly low d13C value of -28 ppm more characteristic of peat than of wood charcoal. SUERC-11616; 4430±35 came from a charred hazel nut shell (sample 2038) from dark grey organic material 772 spilling out of the top of slot 773 under infill 770 of the chamber wall on Area H, while SUERC-11617 4425±35 came from a charred hazel nut shell (sample 2051) from the underlying slot fill, a slightly gritty, very humic clay 778.

SUERC-11596; 4495±35 from a piece of alder charcoal (sample 2045-2) and SUERC-11592; 4465±35 from a piece of pine charcoal (sample 2045-1), both came from a greasy orange/brown clay 360 under the chamber wall on Area D. The layer appeared to have been deliberately laid for the overlying course of cairn boulders. The green clay 398 which they overlay produced a much younger date as well as that described above. The cairn itself also produced two much younger ages, and it is clear that the charcoal in the greasy clay 360 was residual.

Group 2, charcoal from pre-plough-soil contexts south of the cairn. SUERC-11611; 4450±35 came from a piece of hazel charcoal (sample 2084) from a black, slightly sandy clay 352 on Area D, which developed into a series of small features outside the limit of cairn in the SW quadrant of the stone ring. It underlay the plough soil 315 and it overlay a roughly rectangular area of mottled black/brown clay 389. SUERC-11597; 4495±35 from a piece of pine charcoal (sample 688/2567-1), and SUERC-11599; 4475±35 from a piece of alder charcoal (sample 688/2567-3), came from soil 369 also at the base of the plough soil 315 on Area D.

All these dates came from samples in contexts overlying a turf line which had continued to grow until pollen zone 3b, which probably started between 2560 and 2200 cal BC and ended some date between 1900 and 1500 cal BC. This zonation matched a considerable amount of other evidence. Thus the clays containing the samples must have been moved from elsewhere along with the charcoal found in them. Almost all of the potsherds from these contexts were early or mid Neolithic but they included probable and definite beaker sherds interpreted as introduced during subsequent ground-working (Technical Note 24.4.4).

Group 3, charcoal from plough soil. Two samples from Area S; SUERC-11608; 4510±35 came from a charred hazel nut shell (sample Bag 4) and SUERC-11618; 4450±35 from a piece of hazel charcoal (sample Top Block). Although there was no stratigraphic connection between the soil on Area S and the plough soil 315 on Area D, which contained much later charcoal, they seem to have represented at least part of the same activities.

Group 4, charcoal from a depression. SUERC-11612; 4475±35 came from a piece of hazel charcoal (sample 2352) from sandy clay 746 above green clay 1005 filling a depression above a dip in turf line 1009 on Area H. It immediately underlay the locally uppermost turf line, although technically unrelated to more widely spread layers during excavation it was thought to be contemporaneous with turf line 771, possibly equivalent to a turf line on the green clay platform under the cairn.

23.5.7 Discussion of Phase 3 charcoal

The Phase 3 charcoal on Area F came from a coherent spread, making it likely that it was produced at much the same time as the context. Area F produced several pieces of Hebridean incised pottery and broadly speaking their date could have been much the same as that of the charcoal. The mineral soil there does seem to have been created partly by cultivation and a few ard marks survived. There is enough evidence to allow a suggestion that farming or some similar activity was undertaken in the Avenue area by people using Hebridean wares at some date in the centuries around 3000 BC, but not enough to prove the point.

If the activities which created abundant charcoal some date around the last third of the 4th millennium had taken place inside the Ring one might have expected some charcoal to have found its way into basal ditch fills, but they contained none. On the other hand if the dirty clays containing that charcoal were imported to the place just before the cairn was built, as seems most likely, they have no bearing on the absence of charcoal in the ditch fills. Maybe the dirty clays in the Ring came from near Area F, given the similarity of the date from Area F to the later ones in the dirty clays.

There was not enough evidence from Area S to absolutely preclude the possibility that the ploughing there had brought up pieces of charcoal from an in-situ 4th millennium context but it seems unlikely given the evidence from the other dates considered here. The same is true of the date from depression 746 on Area H.

Five of six pollen samples from dirty clay 360 under the cairn contained spectra characteristic of sub-zones 3ai, and the other of 3aii. Subzone 3ai started some date between 2980 and 2500 cal BC while subzone 3aii ended some date between 2560 and 2200 cal BC. The transition from 3ai to 3aii, although not directly dated, probably took some date between 2750 and 2300 cal BC. Perhaps the clay was moved some date close to that period.

The preferred explanation is that the charcoal came from reworking of old soils, perhaps in the Avenue area The other possibility is that the soil and the charcoal in it was taken from caches of 'ancestral' soils in chambered cairns, cultivation soils or domestic contexts, and brought to Calanais to connect outlying communities with the cairn.

23.6 Phases 4 to 5: Pre-Monolith activities

23.6.1 Phase 4 Early ditch

No radiocarbon dates were associated with the ditch, which was only superficially explored. There was no evidence that it was related in date to the Phase 3 samples. It underlay cultivation beds ascribed to the end of CaN-2d or more probably early CaN-3i so was definitely earlier than about 2500 cal BC (probably considerably earlier) and may for instance even have belonged in CaN-2c, which started at some date between 4115 and 3750 cal BC and ended some date between 3490 and 3020 cal BC.

23.6.2 Phase 5a Cultivation beds

The cultivation beds were not dated directly. Their soils contained pollen of CaN-3ai and they immediately overlay soils of CaN-2d. Overlying soils contained pollen ascribed to CaN-3aii and later. Their construction thus started some date between 2980 and 2500 cal BC and they had been abandoned before some date between 2770 and 2350 BC. There was some evidence for a period of levelling following their abandonment.

23.6.3 Phase 5b Turf formation

The turf which formed over the cultivation beds appears from the north section on Area D to have belonged near the start of pollen sub-zone CaN-3ai, at some date between 2980 and 2500. However, the turf lines in the south part of Area D were highly complex because some had formed on cultivation beds, subsequently truncated, and other in slowly filling troughs between the cultivation beds. The same may have been true of those in Area H. The soil above early turf line 766 under the cairn may have been spread from pits dug for the Ring stones and it surprisingly early pollen characteristics (most similar to CaN-2d) suggest that it included mostly residual pollen from the soils and clay through which the pits had been dug. A date for the underlying turf line of initial CaN-3ai (at some date between 2980 and 2500 cal BC) is credible.

23.7 Phase 6 Monolith, Ring and other early 3rd millennium constructions

23.7.1 Phase 6 Introduction

Phase 6 includes a slot, central monolith erection and Ring erection. Charcoal from these layers was dated to after 2910 cal BC (earliest 2 sigma limits). The youngest possible age for these activities, given the possibility that all of the charcoal was

significantly residual, is provided by the chambered cairn which must date to after 2500 cal BC given the securely stratified early International Beaker sherd in the cairn makeup.

23.7.2 Phase 6a Monolith erection

There was no charcoal which could be shown to go with erection of the central monolith. It was later than the cultivation beds so it was erected after c. 2980 cal BC. Its stratigraphic relationship to the other elements of Phase 6 is ambiguous. It was earlier than the chambered cairn.

23.7.3 Phase 6b Ring erection

In previous publications a piece of willow charcoal (sample 230/81; AA-24969; 4095±45) was ascribed to the generally clean green clay fill 767 of the pit of Ring stone 42 in Area H (Ashmore 1999a, 2000). A thorough check of primary and early post-excavation records in November 2011 showed that this sample came from secondary capping of the cairn.

Thus the only constraint on the earliest possible date for Ring stone erection is that it post-dated the cultivation beds and formation of the bottom turf line 766 on them. That means the Ring could date a century earlier than the previously suggested constraint, perhaps as early as 2980 cal BC, or in round terms 3000 BC.

23.7.4 Phase 6c Early slot on Area H (along with discussion of charcoal from a fire on Area B)

The interrupted truncated slot 795 on Area H may represent a light timber structure. It was later than abandonment of the cultivation beds because it cut turf line 766 above the earliest soil 792. But although not the preferred interpretation the slot may have been cut from higher up if its top had been destroyed by ground-working of soil 777, which is interpreted as forming in spoil above turf line 766 from the digging of the Ring stone pits.

The slot produced a date of between 2910 and 2630 cal BC from a piece of hazel charcoal (sample 2256/81; AA-24970; 4205±45). The date provides a terminus post quem for filling of the slot. Because an original upper part of the slot may have been destroyed (although that is not the preferred interpretation) it does not provide a secure terminus post quem for overlying soil 777. Its chronological relationship to the central monolith and Ring is unclear, again because it could have been cut through soil 777, but it must have been earlier than turf line 758, the green clay platform and the light timber structure built on top of it.

On Area B a piece of birch charcoal from part of charcoal concentration 871 was dated to between 2880 and 2580 cal BC (sample 2368/81; AA-24959; 4140±45). A fire had been lit on a cultivation surface then dug over at least once. The cultivation soil may have been the same as soil 792 on Area H which was cut by the slot of the early light timber structure, but there was some ambiguity in the relationship. The perils of collating turf lines in different parts of the site have been emphasised already, and the stratigraphy of Areas H and B around the base of Ring stone 42 was very complex. The concentration of many small pieces of charcoal 871 does suggest a higher than normal likelihood that the charcoal was not residual. It could represent a casual camp fire lit shortly before cessation of ground-working. But it may for instance represent the burning of the decayed remnants of a light timber structure such as that postulated to explain slot 795 and may thus be significantly older than the last use of the plough soil.

Charcoal (AA-24958 4065±45) from a shallow feature 815 under 'paving' inside the enclosure produced a date of 2860 to 2470 cal BC. However, the charcoal was residual, because the feature also contained glass fragments. The feature was not all that far away from the fire in the grey soil B871 which contained charcoal of an age which was not significantly different. It seems quite possible that that was where the charcoal originated.

23.7.5 Discussion of Phase 6 features

Technically there was no direct and unambiguous stratigraphic distinction between these features. The preferred interpretation is that the slot and the Ring pits were cut from the ground surface rep-

resented by early turf line 766. Some period must be allowed for creation and abandonment of the cultivation beds, which had the same dating limits. Overall a date for Ring building somewhere in the time span 2950 to 2650 BC seems most likely.

The monolith had the same stratigraphic relationship to the turf lines as did the Ring so it seems unlikely to have stood alone for a long period. Thinking more generally it would have been more difficult (but not impossible) to erect the monolith once the Ring had been set up. Given the preferred interpretation on rather general grounds that the monolith was erected before the Ring the inference (and I use that in a slightly pejorative sense) is that it was erected at most a few generations earlier than the Ring; but strictly speaking they could have been put up in a single extended operation.

23.8 Phase 7 clay spreading and light timber structures

Phase 7 includes the spreading of clay within the Ring and erection of a light timber structure or structures.

23.8.1 Phase 7 Clay-spreading

The several different materials spread inside the Ring included green clay. The preferred interpretation is that it was imported because the ground on which it was spread had become water-logged. The best preserved area of pre-cairn spread clay survived on Area H where its lower part contained pollen of sub-zone 2d overlying soil pollen-zoned to the later 3aii.

Less well preserved, and somewhat confused with the green clay of the mound round the base of the central monolith, was a layer of green clay 398 on which rested the base layer of the cairn in Area D. A piece of birch charcoal (sample 592/81) from this layer produced an age SUERC-11598 (4390±35) which calibrated to between 2900 and 2620 cal BC. Unfortunately, given how many pieces of charcoal from Calanais proved to be old when buried, and the fact that this age was significantly older than that from the stratigraphically earlier Ring pit, it seems all too possible that this too was residual. If it in fact had come from clay mound originally round the base of the central monolith, spread out subsequently, the same applies. It provides a TPQ for the cairn, but one probably 300 to 500 years earlier.

Clay 369 a layer of soil at the base of the plough soil 315 in Area D has already been discussed. It produced residual charcoal with Phase 3 dates. It contained 11 potsherds, mostly of early to mid Neolithic type and the exceptions may well have been intrusive given the number of ard marks at the same level. It also contained quartz artefacts. This contrasts with the more mixed assemblage including beaker pottery in the plough soil above.

It also produced a significantly later age (AA-24964; 4185±45) from a piece of hazel charcoal (sample 688/2567-2) which calibrated to between 3100 and 2910 cal BC. This age is not in a technical sense significantly different from that of a piece of willow charcoal in secondary levels of the chamber wall, albeit older.

23.8.2 Phase 7 Light timber structures

At the risk of becoming monotonous, I have to say that contexts 772, 778 and 883 forming the structured fill of the light timber structure which preceded the chambered cairn contained highly residual charcoal, ages from which were discussed along with others assigned to Phase 3.

23.9 Phase 8 Chambered cairn construction

The body of the cairn in Area H produced two dates. An age from a piece of birch charcoal (sample 116/81; AA-24966; 4210±50) from the infill 732 of the cairn provided a fairly unhelpful TPQ of between 2910 and 2630 cal BC for construction. A piece of hazel charcoal (sample 2243/81; AA-24967; 4050±45) came from a closely related context 736. Its field interpretation (not now the preferred interpretation) was a possible token burial in the cairn and the preferred interpretation is as an area scorched by a fire lit during cairn construction. It provided a TPQ between 2860 and 2470 cal BC. Although these two contexts should each date to the within a few days of each

other the ages are significantly different from one another (chi-squared = 5.2 against an upper limit of 3.8 if the two ages were the same). The older date was thus from residual charcoal. Even the younger of the two dates seems to have been from a piece of residual charcoal, for context 736 also contained a well-stratified all-over-corded beaker sherd which cannot be earlier than 2500 cal BC. It also contained a small body sherd of 'early to mid neolithic' type (PC18) emphasising that residual material had been included in this context.

23.10 The Phase 9 Stage 1 and Stage 2 enclosures and Phase 10 pit digging, ground working, and possibly the start of Row and Avenue building

Ground-working and ploughing seem to have occurred at several times after construction of the chambered cairn. A major episode of ploughing occurred after the Phase 9 Stage 1 enclosure had gone out of use. If it be accepted that the various soils labelled 112 on Area B were related to that ploughing of the Stage 1 enclosure bank then the East Row post-dated the ploughing.

23.10.1 Phase 9 Stage 1 and Stage 2 enclosures

There was no direct radiocarbon-dating or pollen-zonation evidence for dating this phase. The Stage 1 and Stage 2 enclosures were interpreted as later than the Ring and very probably, albeit not certainly, later than the chambered cairn.

Dark brown plough soil 315 in Area DI, labelled 344 in and near Area DV overlay abundant ard marks commonly filled with charcoal-rich material. It seems to have incorporated artefacts and perhaps also charcoal associated with dilapidation of the chambered cairn.

It is possible that some deposition of soil and associated occupation material from a nearby settlement of settlements took place when the Phase 7 light timber structures were in use, because two of five dates from the soil attested to incorporation of material earlier than the date of the cairn.

One from 315 came from a piece of hazel charcoal (sample 687/81; AA-24960, 4205±50) dated to between 2910 and 2630 cal BC. A piece of birch charcoal (sample 685/81 AA-24961, 4055, 50) dated to between 2860 and 2470 cal BC. It had an anomalously negative d13C value of -30.6. It may have derived from birch preserved in peat.

On the other hand these samples could represent material imported in soil offerings from earlier settlements, in which case they would belong to Phase 10a.

23.10.2 Phase 10a Pit digging and ritual deposition

Few of the pits in Area D south of the cairn were pollen-sampled or radiocarbon-dated, but some of them were first noted after removal of the Phase 6b turf line. It seems fairly likely that their tops were missed during excavation because the turf over them healed over fairly rapidly; although it remains a formal possibility that some were created even before turf formed over the clay spread during Ring-building that is not the preferred interpretation.

One of the pits cutting both of the old ground surfaces under spread clays on Area D contained pollen assigned to sub-zone CaN-3a (Pit 386 sample 2028).

A piece of pine charcoal (sample 2006; SUERC-11590, 3965+/-35) dated to between 2580 and 2340 cal BC. From plough soil 344 came another piece of pine charcoal (sample 95; SUERC-11591, 3915+/-35) dated to between 2490 and 2290 cal BC, and a piece of birch charcoal (sample 95/81; AA-24962, 3555+/-50) dated to between 2030 and 1750 cal BC.

The piece of pine charcoal (sample 95) dated to between 2490 and 2290 cal BC and the piece of birch charcoal (sample 95/81) dated to between 2030 and 1750 cal BC in the plough soil 315 could possibly belong with this phase. But this must remain speculation because ground working and pit digging continued sporadically for such a long time.

23.10.3 Phase 10a Ground working and burials

At least one small stone setting and other pits were found at the base of the plough soil. A pit was also

found in the body of the plough soil. Digging of small pits and ground-working continued south of the cairn in Area D to after 1800 cal BC, perhaps much later, judging by pollen characteristic of sub-zone CaN-3c in plough-truncated Pits 385 and 392. More generally the fancier artefacts in the plough soil are best explained as coming from burial deposits. The origin of the many small worn pieces of earlier styles of pottery is more open to speculation. The preferred interpretation is that they represent ancestral soils brought to Calanais from nearby settlements for ritual reasons, rather than deriving from pragmatic enrichment of the soil with baskets of local plough-soil which just happened to contain old pottery (see the discussion of Area E). Pit digging and ploughing must have lasted until some date, at earliest 1800 cal BC and possibly centuries later.

A piece of Pomoideae sp charcoal (sample 54/80; AA-24956 3580±45) dating to between 2120 and 1770 cal BC was found in an ard mark cut into green clay 123 on Area B. The clay was at the base of the local sequence and the charcoal appears to have dropped into the ard mark during ploughing. Although it may represent burning of undergrowth immediately prior to ploughing it was abraded and it seems more likely that it was lying around in the soil prior to ploughing.

23.10.4 Phase 10b Rows now?

There was no direct evidence for the dating of Stones 30, 31 and 33a of the East Row, but the pit for Stone 30 cut clay 812. Pollen in a sample (2054) from 812 suggested a date in sub-zone CaN-3a which ended some date between 2560 and 2200 cal BC, providing a terminus post quem of 2560 for erection of the stone.

A piece of well preserved heather charcoal from overlying layer 139 produced a radiocarbon date (AA-24957) between 1940 and 1690 cal BC. Because the heather twig was very fragile it seems very likely to have been contemporary within its context and the date thus suggests that Stone 30 had been set up before, perhaps well before, 1690 BC.

Two samples (2021, 2030) from this overlying layer 139 produced pollen characteristic of sub-zone CaN-3c which started between 1900 and 1500 cal BC.

Overall the evidence suggests that Stone 30 was erected some date between 2560 and 1690 cal BC. At first glance this suggests a theoretical possibility that it could have been set up before the Ring, because Stone 42 had a terminus post quem of between 2880 and 2490 cal BC. However the stratigraphy on Area B demonstrated that clay 182 was later than turf line 162 which post-dated the Ring. The dating does leave open the possibility that Stone 30 was erected before the chambered cairn, which must date to after 2500 cal BC, but the weight of the radiocarbon determination suggests a greater probability that it was erected after the cairn was built.

There was very little evidence to suggest when Stone 33a at the east end of the East Row in Area C was erected. It appears to have occurred after, perhaps well after, the transition of zone CaN-3a to CaN-3b at some date between 2560 and 2200 cal BC, because its pit was cut into mineral soil 205.

23.10.5 Phase 10c Ground working and burials

No dating evidence

23.10.6 Phase 10d Avenue starts?

Excavation of the area southwest of Stone 34, which has variously been regarded as part of the east side of the Avenue and as a stone erected with Stone 9 to mark an astronomical alignment, produced no useful radiocarbon or pollen dating evidence.

23.11 Phase 11 The Stage 3 enclosure and ground working

23.11.1 Phase 11a The Stage 3 enclosure

There was no direct radiocarbon-dating or pollen-zonation evidence for dating this phase.

Interpretation of an age (AA-24968 3575± 45) from a piece of willow charcoal in greasy clay 738 outside the cairn on Area H, together with the inverted pollen zonation of an old turf line 751 and

overlying soils led to a hypothesis that the material of the cairn body was pulled down onto area H and the stones removed for building elsewhere. Perhaps the stones were taken for the wall-base of the second enclosure. That would allow the age, which calibrated to between 2040 and 1770 cal BC, to provide a terminus post quem for the Phase 11a (second) enclosure.

23.11.2 Phase 11b Ground working

The state of the remains of the third stage enclosure strongly suggested robbing and ploughing before the third stage enclosure wall-base was laid out, but there was no direct radiocarbon-dating or pollen-zonation evidence for dating this phase.
23.12 Phase 12 The Stage 4 enclosure and ground working

23.12.1 Phase 12a Fourth Stage enclosure

No radiocarbon or pollen evidence was discovered for the date of this stage of enclosure. Stratigraphically it could have been part of Victorian or later site management, except that the lack of a southern side suggests that it was damaged by ploughing and robbing. If that be accepted its partial destruction may be related to the Phase 12b ground-working described below or to Phase 14 cultivation

23.12.2 Phase 12b Ground working

A piece of heather twig charcoal (sample 132/80; AA-24957 3495±45) dated to between 1940 and 1690 cal BC was in a charcoal-rich spread in context 139 on Area B alongside the east alignment of standing stones. It is unlikely to have been residual because of its fragility. Ploughing may been renewed north of the east alignment, with first burning of ground cover and then field clearance leading to creation of the line of dumped stones 134 which overlay charcoal spread 139. It must be emphasised that although I have interpreted the event which led to deposition as belonging after Phase 12, to explain destruction of the southern part of the Phase 12 enclosure, it could have gone with damage to the Phase 11a Stage 3 enclosure.

23.13 Phase 13 Secondary cairn and kerb slab erection

A piece of willow charcoal (81.230) from secondary chamber wall capping 768 was dated (AA-24969 4095±45) to between 2880 and 2490 cal BC. In earlier publications (Ashmore 1999a, Ashmore 2000) it had been wrongly ascribed to context 767 (Technical Note 12.8.5). Along with it were various pieces of pottery including Early to Middle Neolithic corky wares and three pieces probably from fine Beakers. The sherds suggest that the corky wares and probably also the charcoal were residual.

As described above, clay 738, laid down at the north edge of the cairn, contained a piece of willow charcoal (sample 203/81; AA-24968 3575±45 BP) dated to between 2040 and 1770 cal BC. The clay overlay olive-green clay 750, probably equivalent to the green clay under the cairn, and a turf line 758 into which were pressed the shallow impressions of the first kerb of the chambered cairn on Area H.

It was suggested above in the context of the enclosure (Phases 10 to 12) that the northern part of the cairn may have been used as a quarry for stone. The clays from the body of the cairn were left behind in the area north of the cairn, judging by the pollen content of the soils overlying greasy soil 738.

Clay 738 seems to have been deposited after removal of the early laid kerb. The later, large kerb slab on Area H was set into clay 738 and the date thus provides a terminus post quem for its erection of 2040 cal BC.

The cereal grains in the capping of the cairn (Phase 14 cultivation) may have been put there in turf added during the Victorian period but another possibility is that they were part of the fills put on the cairn when the kerb slab was erected. That would indicate a terminus post quem of about 1530 cal BC.

23.14 Phase 14 Cultivation and Phase 15 encroachment of peat

23.14.1 Phase 14 Cultivation

Three cereal grains dated at Calanais came from the capping 708 of the cairn 704 in Area H (Technical

Note 12.2.7). They all produced dates very similar to one another. A charred barley grain (sample 764-2 SUERC-11610 at 3220±35), a charred wheat grain (sample 764-1 SUERC-11609 at 3215±35 and a charred barley grain (sample 374 SUERC-11602 at 3195±35 BP) from 10/1 F15, dated to 1610 to 1410 cal BC, 1610 to 1410 cal BC and 1530 to 1400 cal BC respectively.

The context may represent filling up behind the massive kerb slab in the second millennium BC, or possibly Victorian capping of the cairn. The former explanation is preferred because of the lack of peat fragments below it. The grains probably came originally from a plough soil not far from the Ring. Given the widespread evidence for ploughing in various areas at Calanais it seems very possible that this cereal-growing and charring was local. Thus the grain dates hint at the period of some of the destructive ploughing in and around the Ring after the cairn had become dilapidated, although this has no direct support in the evidence.

The dates from the grains, all between 1525 and 1420, coincide (approximately, of course) with the cereal pollen maximum at Calanais Leobag in pollen zone CaN-3c, when agriculture was practiced continuously in the general area around Leobag.

23.14.2 Phase 15 Encroachment of peat

An age GU-1403 (sample Call80/54/244) from humic acid of basal peat on Area C suggests, after the error has been increased from ±65 to ±110 C14 years (Ashmore et al 2000) that peat was forming over the site at some date between 1050 and 400 BC with a two out of three chance that it was forming at some date between 930 and 550 cal BC.

The basal peat on Area C was attributed to Zone 3e through pollen analysis of spot samples. In the Kubiena box column the transition from soil to peat was assigned to CaN-3d. Two peat samples from sub-zone 3e in Leobag column CN1 were dated. After correction of the errors the ages were GU-1289 (2440±112 BP) and GU-1170 (2355±110 BP). Perhaps only because of the large errors attached to the dates the Leobag dates are not significantly different from GU-1403 when they are considered as a group.

The interpolated date for the start of CaN-3e in CN1, at between 920 and 260 cal BC, was not very different from that provided by the direct radiocarbon date for basal peat at Calanais, and most of the first few centimetres of peat at Calanais may indeed have formed in CaN-3e. Because the pollen zone boundary reflects a change in the local vegetation the true date for the start of peat growth at Calanais probably did lie between 920 and 400 cal BC (the earlier limit from the pollen zone 3d to 3e transition date and the later from the direct radiocarbon date GU-1403).

23.14.3 Discussion of the Phase 15 dates

Johnson and Flitcroft's excavations of a buried field system near Calanais farm in 1999 and 2000 to the south-west of the main setting at NB21253265 ((Flitcroft et al 2000, 102-3; Johnson et al forthcoming) produced peat initiation dates which were in a statistical sense significantly different from that for Calanais. The basal peat column dates at Calanais Farm suggest, in round terms, that peat started growing at around 500 BC (perhaps around the start of Leobag pollen zone transition CaN-3d to 3e much as at Calanais itself) and at some date after 250 BC. It is possible that peat growth at Calanais itself was diachronic, depending on land-use. Growth might, for instance, have started earlier on pasture than it did on cultivated areas. The evidence for 1st millennium AD activities at the Ring hints that steady growth of peat started later there than in the surrounding areas.

23.16 Phases 16 to 18: 1st Millennium AD disturbances, Peat growth and post-medieval peat clearance, and Post-peat excavation and presentation

There was no direct or indirect scientific dating for these phases at Calanais itself.

Phase 16 included possible disturbances of the cairn, their date suggested by finds of pottery ascribed to the 1st millennium AD in the passage and in disturbed levels of the chambered cairn.

Pollen column CN2 at Calanais Leobag which covered part of these periods of disturbance and Phase 17 peat growth was not radiocarbon-dated.

For Phase 18, historical information suggests that the setting was steadily cleared of peat from the late 18th century onward, culminating in final clearance of the central area in 1857. But there was no scientific evidence for more precise dating of the earlier stages of this process. Nor was there archaeological evidence for the date of the various display and conservation activities which affected the site after its clearance.

23.17 Conclusions

I believed until well into the post-excavation process that several well stratified samples from Calanais allowed Bayesian analysis (Technical Note 23.2.3). However the realisation that the cairn must date to after 2500 BC reinforced the idea that even the well stratified charcoal samples were significantly older than the contexts in which they occurred, the most likely exception being the fragile heather twig from near the East Row. This re-emphasises the point, alas still not respected in some modern archaeological publications, that it is absolutely crucial to treat the date of a sample even in a well-sealed context as providing nothing better than a terminus post quem for the context (Ashmore 1999, 2000).

Nevertheless the combination of direct radiocarbon dating, indirect radiocarbon dating via pollen sample zoning and, in the very important case of the cairn, the artefact dating has allowed a better chronological scheme for the central monolith, Ring and chambered cairn than existed before excavation. It has allowed indirect dating of the cultivation beds and turf lines revealed by excavation. It has narrowed down the period during which the East Row was set up.

There was no datable charcoal directly related to the various stages of enclosure, or the Avenue, nor were spot samples useful in producing pollen zone information for those structures. However, the barbed and tanged arrowheads in the entrance silts of the Stage 2 enclosure did reduce the range of likely dates for its use to somewhere within a few centuries of 2000 BC while a date from cairn-demolition activities which may have been associated with enclosure building provided a tentative terminus post quem of between 2040 and 1770 cal BC for the Stage 3 (first stone-based) enclosure. Its robbing may have coincided with cairn rebuilding for which it can be argued cereal grain in the cairn capping provides a terminus post quem of 1530 cal BC.

Comparisons with dates ascribed to other sites can be found in Chapter 24: Discussion.

23.18 Table of the radiocarbon ages, contexts and calibrations

Table 23.3 The samples and their ages and calibrated dates

Description	Code	Age	Error	d13c	1 sigma	2 sigma
A piece of birch charcoal (sample 269) from black greasy clay 018 at the bottom of possible posthole 015, the upper fills of which included a root mass 016 over dark brown fibrous peaty clay 017 which also contained charcoal (sample 370/380). This posthole underlay beach pebbles 006 immediately to the east of the glacial erratic Q on Area A of the 1980 excavations.	SUERC-11588	6295	35	-27.1	5315 to 5225 cal BC	5350 to 5210 cal BC
A piece of birch charcoal (sample 269) from black greasy clay 018 at the bottom of possible posthole 015, the upper fills of which included a root mass 016 over dark brown fibrous peaty clay 017 which also contained charcoal (sample 370/380). This possible posthole underlay beach pebbles 006 immediately to the east of the glacial erratic Q on Area A of the 1980 excavations.	SUERC-11989	6245	35	-27.2	5300 to 5210 cal BC	5310 to 5070 cal BC
A piece of birch charcoal (sample 4277) from possible posthole 093 on Area A. It measured 0.18 x 0.12 m and contained charcoal impregnated, loose humic clay 094. It cut a small patch of angular stones 095. This possible posthole underlay beach pebbles 006 immediately to the east of the glacial erratic Q on Area A of the 1980 excavations.	SUERC-11589	4880	35	-26.4	3695 to 3640 cal BC	3760 to 3530 cal BC
A piece of hazel charcoal (sample 256) from a very dark greyish brown, slightly gritty clay 648, with a little charcoal, on Area F which was cut by stake hole 644 and overlay a ring of material 646 filling a depression. The clay 648 abuts a stone 617 otherwise entirely surrounded by peat.	SUERC-11601	4760	35	-25.5	3640 to 3520 cal BC	3640 to 3380 cal BC
A piece of alder charcoal (sample 592) from a layer of green clay 398 onto which rested the base layer of the cairn on Area D. It overlay upper layer 095, one of several OGS under the cairn and chamber. The green clay 398 is interpreted as possibly redeposited parts of the capping over paving 381 around Monolith 29.	SUERC-11600	4515	35	-26.7	3350 to 3110 cal BC	3360 to 3090 cal BC

Description	Code	Age	Error	d13c	1 sigma	2 sigma
A charred hazel nut shell (sample Bag 4) from Area S 13, a dense dark grey and charcoal rich material at SE corner of the 1988 trench, appearing to extend under the baulks to S and E, which is to say towards the chambered cairn.	SUERC-11608	4510	35	-25.8	3340 to 3100 cal BC	3360 to 3090 cal BC
A piece of alder charcoal (sample 2045-2) from greasy orange/brown clay 360 under the core cairn forming the side wall on Area D in the SW quadrant of the stone ring. The layer here was generally about 0.06 to 0.1 m thick, with quartz chips, which appeared to have been deliberately laid for the overlying course of cairn boulders. However, it was very variable in composition and contained a piece of wood (257/81), which is presumably intrusive. Soil 360 also contained two sherds of pottery, one of "late prehistoric" type (although this identification is based on fabric alone), a flint 'microlith' (478/81), six pieces of quartz and a piece of chert (584/81). See also a very similar date SUERC-11592 (4465±35) from a piece of pine charcoal from the same layer	SUERC-11596	4495	35	-26.1	3340 to 3100 cal BC	3360 to 3030 cal BC
A piece of pine charcoal (sample 688/2567-1) from 369 at the base of the plough soil 315 on Area D. It contained 11 pottery finds, mostly of indeterminate affinities but including one plain early Neolithic sherd (Pottery Catalogue 13) and three with a corky fabric. It also contained quartz artefacts. This contrasts with the more mixed assemblage including beaker pottery in the plough soil above.	SUERC-11597	4495	35	-25.7	3340 to 3100 cal BC	3360 to 3030 cal BC
A piece of hazel charcoal (sample 2020) from a dark grey/green gritty charcoal rich material 883 with burnt bone and rotted stone. Under 824 = bottom course of wall-stones in passage in Area B4Wx. It overlay a dark feature 881 under the north passage wall. It may possibly be the same as fine green clay 887 which more generally underlay the passage wall. See also SUERC-11606 (4455±35 BP) from the same context.	SUERC-11607	4490	35	-25.3	3340 to 3090 cal BC	3350 to 3030 cal BC

Description	Code	Age	Error	d13c	1 sigma	2 sigma
A piece of alder charcoal (sample 688/2567-3) from clayey soil 369 at the base of the plough soil 315 on Area D. It contained 11 pottery finds, mostly of indeterminate affinities but including one plain early Neolithic sherd (Pottery Catalogue 13) and three with a corky fabric. It also contained quartz artefacts. This contrasts with the more mixed assemblage including beaker pottery in the plough soil above.	SUERC-11599	4475	35	-23.5	3330 to 3090 cal BC	3350 to 3020 cal BC
A piece of hazel charcoal (sample 2352) from sandy clay 746, the top fill of a depression sealed by the uppermost turf line 771 on Area H.	SUERC-11612	4475	35	-24.8	3330 to 3090 cal BC	3350 to 3020 cal BC
A piece of pine charcoal (sample 2045-1) from greasy orange/brown clay 360 under the core cairn forming the side wall on Area D in the SW quadrant of the stone ring. The layer here was generally about 0.06 to 0.1 m thick, with quartz chips, which appeared to have been deliberately laid for the overlying course of cairn boulders. However, it was very variable in composition and contained a piece of wood (257/81), which is presumably intrusive. Soil 360 also contained two sherds of pottery, one of "late prehistoric" type (although this identification is based on fabric alone), a flint 'microlith' (478/81), six pieces of quartz and a piece of chert (584/81). See also a very similar date SUERC-11596 (4495±35) from a piece of alder charcoal from the same layer	SUERC-11592	4465	35	-25.5	3330 to 3030 cal BC	3340 to 3020 cal BC
A charred hazel nut shell (sample 2011) from a dark grey/green gritty charcoal rich material 883 with burnt bone and rotted stone, under the bottom course 824 of wall-stones in passage in Area B4Wx. It overlay a dark feature 881 under the north passage wall. It may possibly be the same as fine green clay 887 which more generally underlay the passage wall. See also SUERC-11607 (4490±35 BP) from the same context.	SUERC-11606	4455	35	-28	3330 to 3020 cal BC	3340 to 3010 cal BC
A piece of hazel charcoal (sample 2084) from a black, slightly sandy clay 352 on Area D, which developed into a series of small features outside the limit of cairn in the SW quadrant of the stone ring. It underlay the plough soil 315 and it overlay a roughly rectangular area of mottled black/brown clay 389.	SUERC-11611	4450	35	-26	3330 to 3020 cal BC	3340 to 2930 cal BC

Description	Code	Age	Error	d13c	1 sigma	2 sigma
A piece of hazel charcoal (sample Top Block) from Area S 13, a dense dark grey and charcoal rich material at SE corner of the 1988 trench, appearing to extend under the baulks to S and E, which is to say towards the chambered cairn.	SUERC-11618	4450	35	-25.5	3330 to 3020 cal BC	3340 to 2930 cal BC
A charred hazel nut shell (sample 2038) from dark grey peaty material 772 under infill 770 of the chamber wall on Area H.	SUERC-11616	4430	35	-25.4	3310 to 2930 cal BC	3330 to 2920 cal BC
A charred hazel nut shell (sample 2051) from slightly gritty, humic rich clay with ochre 778 filling a linear feature 773 under the chamber wall on Area H.	SUERC-11617	4425	35	-24.9	3270 to 2930 cal BC	3330 to 2920 cal BC
A piece of hazel charcoal (sample 688/2567-2) from D369 at the base of the plough soil 315. It contained 11 pottery finds, mostly of indeterminate affinities but including one plain early Neolithic sherd (Pottery Catalogue 13) and three with a corky fabric. It also contained quartz artefacts. This contrasts with the more mixed assemblage including beaker pottery in the plough soil above.	SUERC-11598	4390	35	-27.9	3090 to 2920 cal BC	3100 to 2910 cal BC
A single piece of hazel charcoal (sample 257/80) related to a charcoal rich layer 649 forming part of a turf line 630) which preceded the soils of F615, F622 and 643, which may be late in development on Area F.	AA-24965	4385	50	-27.2	3090 to 2910 cal BC	3330 to 2890 cal BC
A single piece of birch charcoal (sample 116/81) from the infill H732 of the cairn under H 728 and above H 741; it is under H736 from which a date AA-24967 (4050±45 BP) has been obtained. It provides a TPQ for construction of the core cairn.	AA-24966	4210	50	-26.1	2900 to 2690 cal BC	2910 to 2630 cal BC
A single piece of hazel charcoal (sample 687/81) from a layer of dark brown soil D315 with abundant ard marks commonly filled with charcoal rich material, which seems to be associated with dilapidation of the chambered cairn. See also AA-24961, AA-24962 and AA-24963	AA-24960	4205	50	-25.4	2900 to 2690 cal BC	2910 to 2630 cal BC

Description	Code	Age	Error	d13c	1 sigma	2 sigma
A single piece of hazel charcoal (sample 2256/81) from an interrupted truncated slot H795 under the clays and soils under the cairn. It cuts the earliest soil 792 and although it may be residual it need not be. Provides a TPQ for the slot, and for overlying soil 777.	AA-24970	4205	45	-27.4	2900 to 2690 cal BC	2910 to 2630 cal BC
A single piece of birch charcoal (sample 592/81) from the layer of green clay D398 on which rested the base layer of the cairn. Presumably contemporary with erection of cairn, though maybe residual. Should provide a TPQ for the cairn.	AA-24964	4185	45	-26.1	2890 to 2670 cal BC	2900 to 2620 cal BC
A single piece of birch charcoal (sample 2368/81) from an area of charcoal concentration BI 871 which gave the impression that a fire had been lit on a cultivation surface then dug over once. The cultivation soil lay beneath the two main upper OGS of which one, very thin and hardly more than a litter layer, ran under the green clay under the cairn and over the green clay mound round the base of Ring Stone 43. It was cut by the (probably much later) socket of a late kerb stone.	AA-24959	4140	45	-26.3	2870 to 2630 cal BC	2880 to 2580 cal BC
A single piece of birch charcoal (sample 678/81) from the bottom part D369, at the base of the plough soil 315 on Area D. It contained 11 pottery finds, mostly of indeterminate affinities but including one plain early Neolithic sherd (Pottery Catalogue 13) and three with a corky fabric. It also contained quartz artefacts. This contrasts with the more mixed assemblage including beaker pottery in the plough soil above.	AA-24963	4115	45	-25.2	2860 to 2580 cal BC	2880 to 2570 cal BC
A single piece of willow charcoal (sample 230/81) from the secondary capping 768 of the chamber wall on Area HII. This charcoal was previously ascribed to fill H767 of an early pit H775, the primary pit of Ring stone 42; thorough analysis of records in November 2011 showed a very high likelihood that the error in labelling occurred when a find of potsherds and charcoal (81.230) was split up and the charcoal put in a new bag shortly before the charcoal was identified.	AA-24969	4095	45	-25.4	2860 to 2570 cal BC	2880 to 2490 cal BC

Description	Code	Age	Error	d13c	1 sigma	2 sigma
A single piece of birch charcoal (sample 143/81) from a shallow feature B815 in B120 (inner area of structure to east of stone ring). Under paving for which it provides a TPQ.	AA-24958	4065	45	-26.1	2840 to 2490 cal BC	2860 to 2470 cal BC
A single piece of birch charcoal (sample 685/81) from a layer of dark brown soil D315 with abundant ard marks commonly filled with charcoal rich material, which seems to be associated with dilapidation of the chambered cairn. See also AA-24960, AA-24962 and AA-24963	AA-24961	4055	50	-30.6	2840 to 2480 cal BC	2860 to 2470 cal BC
A single piece of hazel charcoal (sample 2243/81) interpreted as a possible token burial H736 in the cairn. It overlay H732 from which a date AA-24966 (4210±50) was obtained.	AA-24967	4050	45	-25.8	2840 to 2480 cal BC	2860 to 2470 cal BC
A piece of pine charcoal (sample 2006) from 315, a plough soil on Area D which was ard marked, had many beaker sherds in it and seems to be associated with dilapidation of the chambered cairn. The layer contained a residual Neolithic potsherd. See also AA-24963 (4115± 45) which is significantly later.	SUERC-11590	3965	35	-25.7	2570 to 2460 cal BC	2580 to 2340 cal BC
A piece of pine charcoal (sample 95) from a layer of dark brown/black clay 344 with charcoal and Beaker sherds found in the northern part of Trench DV inside the SW quadrant of the stone ring. One ard mark was noticed in it and there were abundant ard marks underneath it cutting into the tops of clay layers and the brown clay mound 340 round the base of Ring Stone 47. The layer 344 seems to be associated with dilapidation of the chambered cairn.	SUERC-11591	3915	35	-24.3	2470 to 2340 cal BC	2490 to 2290 cal BC
A single piece of Pomoideae sp charcoal (sample 54/80) from an ard mark cut into green clay B123; seemingly a clay early in the sequence, although it overlies at least one OGS. Appears to have dropped into an ard mark, rather than having been ploughed up from below; but it was abraded and this cannot be proved.	AA-24956	3580	45	-26.6	2020 to 1880 cal BC	2120 to 1770 cal BC

Description	Code	Age	Error	d13c	1 sigma	2 sigma
A single piece of willow charcoal (sample 203/81) from a green dark brown sandy clay H738 with charcoal and rotted stones. It came from under the cultivation soil with ard marks and beaker sherds 707 and it lies above green clay. It is cut by the trench for the later kerb.	AA-24968	3575	45	-25.8	2020 to 1880 cal BC	2040 to 1770 cal BC
A single piece of birch charcoal (sample 95/81) from a layer of dark brown clay D344 thought to be the equivalent of layer D315 which contained abundant beaker sherds and seems to be associated with dilapidation of the chambered cairn. Ard marks became progressively more visible as this layer was removed. The charcoal may have been in the underlying layer and have been brought up by ard ploughing, or may have been introduced at the time of ploughing. See also AA-24960, AA-24961 and AA-24963	AA-24962	3555	50	-27.2	1980 to 1770 cal BC	2030 to 1750 cal BC
A single piece of heather charcoal (sample 132/80) from a charcoal spread B139 under B134, the line of stones running from stone 44 (at B117, natural soil build-up). Its ultimate origin is uncertain. It could have come from clearing out of the chambered cairn. It gives a TPQ for the line of stone B134. Since it is a single twig it probably has not been moved around a lot.	AA-24957	3495	45	-25	1890 to 1750 cal BC	1940 to 1690 cal BC
A charred barley grain (sample 764-2) from the late capping 708 of the cairn. Given that the material probably came from somewhere nearby its original context was obscure. This sample was dated for the interest of the barley itself. The three cereal grains all produced dates very similar to one another: SUERC-11610 at 3220±35, SUERC-11609 at 3215±35 and SUERC-11602 at 3195±35 BP.	SUERC-11610	3220	35	-25.7	1520 to 1445 cal BC	1610 to 1410 cal BC
A charred wheat grain (sample 764-1) from the late capping 708 of the cairn. Given that the material probably came from somewhere nearby its original context was obscure. This sample was dated for the interest of the wheat itself. The three cereal grains all produced dates very similar to one another: SUERC-11610 at 3220±35, SUERC-11609 at 3215±35 and SUERC-11602 at 3195±35 BP.	SUERC-11609	3215	35	-25.1	1515 to 1440 cal BC	1610 to 1410 cal BC

Description	Code	Age	Error	d13c	1 sigma	2 sigma
A charred barley grain (sample 374) from 10/1 F15, from the late capping 708 of the cairn. Given that the material probably came from somewhere nearby its original context was obscure. This barley grain was dated in its own right. The three cereal grains dated at Calanais all produced dates very similar to one another: SUERC-11610 at 3220±35, SUERC-11609 at 3215±35 and SUERC-11602 at 3195±35 BP.	SUERC-11602	3195	35	-23.7	1495 to 1435 cal BC	1530 to 1400 cal BC
Humic acid fraction of basal peat sample Call80/54/244 overlying soil in Area C, collected in May 1980. The error of ±65 quoted by the laboratory has to be increased to ±110, on the advice of the laboratory (Stenhouse M pers comm).	GU-1403	2640	110	-29.3	930 to 550 cal BC	1050 to 400 cal BC

24. Discussion and Conclusions

24.1 Introduction

The excavations reported here produced a lot of new information and raised fresh questions. A few existing uncertainties were resolved. For instance, it was confirmed that the chambered cairn was later than the Ring; the Ring was probably set up in the first quarter of the 4th millennium and the cairn was built in the second half of the 3rd because it has a (typologically early) Beaker sherd incorporated in it and probable Beaker sherds under it. The original form of the chamber was different from that recorded after peat was cleared from the Ring in AD 1857. The central area of the setting probably ceased to be used for ritual deposition not long after 1800 BC, judging by evidence from pollen.

Other questions, like the chronological relationship of the Central Monolith to the Ring, and the Avenue and Rows to the central constructions, received only partial answers. Erection of the stone at the west end of the East Row probably dated to somewhere between 2560 and 1690 cal BC; the early part of this range is preferred and the stone may have been put up before the chambered cairn was built. Stone 35a to the southeast of the Ring was probably not part of the pre-peat setting and thus the idea of a southern avenue received no support.

We did not prove whether the Ring was built piecemeal or largely in a single operation. That said, the balance of probability is that the Ring was a single short-period construction apart possibly from one stone (Ring stone 52). But the discovery of two pits interpreted as having held Avenue stones close to one another on the line of the west side of the Avenue suggested that it had a more complex history than supposed a few decades ago.

24.1.1 Ancient meanings and modern ideas

It is difficult to assess whether what archaeologists notice and record about prehistoric structures is what was important to those who built them. It is nearly as tricky to gauge what underlies modern ideas about ancient meanings. During the last decade and a half there have been several attempts to understand why a considerable effort was spent on creating large monuments in Britain during the 4th and 3rd millennia BC. Richards has suggested that banks and ditches embodied a microcosm of surrounding landscapes and more abstractly Brophy has followed others in proposing that the re-ordering of a set of materials into a relationship with the landscape gave the building of large structures a special meaning (Richards 1996, 331; see also Richards 1993; Brophy 2000, 68; Thomas 2007, 262-3).

I must admit to some unease with these and similar ideas even though on the whole they are as good as many of the notions adduced in the 1970s and 1980s to explain why monuments were built. They have properly been developed from ethnographic studies showing that many non-western societies meld geography and culture (for a summary see Ruggles 1999, 120 and associated notes). Yet looked at from a different perspective they are reminiscent of the 18th and 19th century speculations of Stukeley, Toland, Pinkerton and others. Where those authors used the monuments to make religious or political points related to the controversies of their times, many modern interpretations seem to relate to current debates about the environment; the subtext is that people in the deep past linked their environment and their culture intimately, providing precedents for us to do the same.

Even if the interpretations of many modern authors are influenced more by their own social environment than by those of the monument-builders, that does not mean that their arguments are unfounded or unappealing. But the intentions behind building will probably not have been related solely to a desire to create a link between the natural and social worlds. Nor need the aims of all of the individuals involved have been identical. Monument-building may have played a subtle or an overt part in establishing or maintaining social rank, social alliances and interpersonal dominance. Another reason for their construction may have

been to provide a focus for group identity. Yet another may have been to establish rights to the land or at least to its resources. And there are many other motives which might have played some part, including religion, a desire to realise cosmologies, bragging, or conspicuous consumption. Or they may have been built to foster a sense of belonging in an area or to a social group.

Other ideas tentatively ascribed to ancient people show less relationship to modern fashions. Bradley (2000) thought that the creation of the Balnuaran of Clava cairns near Inverness in the centuries around or soon after 2000 BC might have been a reaction to a lack of pre-existing visible ancestral monuments. He suggested that people dealt with this by making analogues to the by then ancient cairns further north, some of which were re-used in this period (Bradley 2000, 230-1). Where meaning could not be laid on earlier structures it was always possible to create new 'ancestral places'. This is an ingenious and appealing idea, but it poses the question of what people were doing around Inverness before 2000 BC, and why they changed only then. Had they previously rejected or ignored the idea of imbuing landscapes with cultural meanings, or had they been content to use natural features or structures which are invisible in the current archaeological record for those purposes?

It is obviously wrong, however, to deny ideas to our ancestors because they are similar to modern ones. Bradley suggested other aspects of stone circles which do seem to reflect both modern and ancient concepts. Writing of the Recumbent Stone Circles of Aberdeenshire he proposed that they were architectural devices embodying particular beliefs. The grading of the stones might refer to the importance of the south-western sky, and the use of red and white stones might even have stood for the moon and the bonfires lit within the rings. More generally, architectural traditions were statements about the concerns of particular communities. They also provided the physical framework within which those ideas could be expressed in public ceremony (Bradley 2005, 114).

Similarly Thomas, in discussing Holm and Holywood timber alignments in south-west Scotland, which seem to have been burnt down and replaced more than once, emphasised the likely importance of both creation and destruction of monuments along with public acts associated with them (Thomas 2007, 262-3).

Jones and Thomas (2010) have suggested that some small chambered cairns were rebuilt or built anew as a result of cultural stimuli imported by the people who introduced Beakers along with other exotic objects after about 2500 BC. The Clava cairns may be one aspect of this. But an example particularly relevant to Calanais is the southern chamber of the by then ancient chambered cairn at Embo in east coast Sutherland, considered below in the discussion of the Calanais chambered cairn.

Richard Bradley's and Julian Thomas's ideas are speculative. So in a somewhat different way are those of Jones & Thomas. The latter in my judgement currently have too high a proportion of speculation to pertinent fact, and although they cannot be dismissed they should be treated with caution. But the ideas put forward by Bradley and by Julian Thomas strike a good balance between descriptions of what was found during excavation in the context of local and distant comparanda with an attempt to understand how the monuments were used within a local social context. It is a balance between ancient facts and modern ideas which I hope to emulate in discussing Calanais. For instance, in considering the landscape around Calanais, I shall discuss whether the building of stone rings and rows may have been the result of a ritualising or codifying of previously more fluid beliefs.

24.1.2 Comparing the structures at Calanais with those elsewhere

In seeking comparanda for Calanais the issue of distinguishing related developments from coincidentally similar ones arises (Tilley 1998). To what extent can findings at a distant monument be used to increase understanding of why Calanais was built?

Were Britain and Ireland mosaics of areas where people felt such strong local identities that social connections between those areas were severely impeded? Did similar-looking structures and other artefacts in different areas have very different meanings to the locals? Ian Kinnes suggested 27

years ago that the 'Neolithic' in Scotland should be treated as diverse only within an overall common tradition (Kinnes 1985). Quite what that means in practise is hard to define. Suppose (leaving aside the factor of earlier forager populations) we could demonstrate that around 4200 to 3800 cal BC there were two different networks of contacts between groups of people for whom farming was an important part of subsistence, one up the west coast and the other up the east Sheridan (2009) has suggested there may have been even more. Then the common ancestor of the traditions of east and west would probably lie further back in prehistory than if there were a single network, and the common elements in the various regional traditions in Scotland would be weaker, perhaps considerably so.

There is another problem in describing what those overall traditions might have been; the degree of similarity between different sets of structures in different parts of Scotland may have been exaggerated. Barclay, in particular, has argued that there is a considerable bias in our understanding of the period in Scotland because descriptions of sites in Highland Scotland have been applied to those in the rich agricultural lands (Barclay 1992, 3-14; 1996, 61; Barclay and Maxwell 1998, 1; Barclay 2000). His underlying proposition was that throughout 4th millennium BC Scotland the lowlands were overall richer than the highland and island areas where stone monuments survive as prominent features. Lowland monuments should not be interpreted mainly through a highland lens.

Yet another complication is that it would be wrong to regard lowland and highland Scotland as coherent units; both were patchworks of local environments and there are for instance some apparently favoured areas in the Highlands, such as that round Loch of Yarrows in Caithness (Davidson & Henshall 1991), and unfavoured areas in the lowlands, such as the stiff sandy clays east of Haddington in East Lothian (Lelong and MacGregor 2007, 6). Recent work in the Kilmartin Valley has shown that it contained timber-built features of types generally regarded as more typical of the lowlands (Ellis C 2000, 16; 2002, 145; Ellis and Crone pers. comm.; Cook et al 2010).

There is still another difficulty in assessing how similar or different lowland and highland communities were; it is not clear whether, in general, stone-built cairns, rings and linear settings should be seen as equivalent to timber and earth ones. It has been argued instead that stone was thought more suitable for monuments associated with ancestors and timber for monuments used by the living (Parker-Pearson & Ramilsonina 1998). But Thomas (2007, 262-3) citing ideas from Tilley (1996) has suggested that in the 4th and 3rd millennia BC stone may not have been regarded as an inert substance; the differences we perceive between stone and timber monuments may be greater than those recognised by their builders. So use of stone or timber may after all mainly reflect the ease with which they could be obtained. Or, given that several of the large early timber structures so far excavated in Scotland seem to have been purposefully burnt down, stone structures may have been a consequence of a change in beliefs from a concentration on the acts of creation and destruction towards building structures for the descendants, perhaps reflecting a change towards a greater sense of ownership of territories.

24.1.3 Testing ideas about regionality

It is important to be clear what problem (Popper 1976, 132-5) we wish to solve here by exploring evidence for regionality. That problem lies in judging whether comparisons between structures at Calanais and apparently similar structures in other regions are valid. What criteria do we have for judging that?

The best criterion is probably the quantity of (apparent) similarities found between the material cultures of two areas, the degree to which different strands of evidence match up. There are immediately two problems. The first is the circularity involved in using apparent similarities and differences to judge whether those similarities and differences are valid. The second is that the database of well excavated sites, of distinctive artefacts and ecofacts and of highly distinctive unexcavated sites is too small to attach satisfactory measures of probability to statistical analyses.

Nevertheless, at this stage of enquiry, and accepting that errors will take a lot more data to iron out, the best approach is to allow the quantity of

similarities and differences to serve as a proxy for the degree to which communities at various distances from each other exchanged people, goods or ideas. If there was a lot of contact at a given time (as measured by the finding of similar structures, artefacts and ecofacts in them) then comparisons between the Calanais area and other places are more likely to be valid than if there were very few dealings.

We can start by noting that it has long been accepted by most of those studying Scottish prehistory that there were regional variations at many different scales in Scotland during the 'Neolithic' (Scott 1951; Piggott 1954; Henshall 1963; Megaw and Simpson 1979; Kinnes 1985; Armit & Finlayson 1992; Sharples 1992, Barclay 1992, 1997, 2000, 2003; Ashmore 1996, 2003; Brophy 2006; Bishop et al 2009). Theoretical approaches to defining that regionality at least in neighbouring countries have taken many forms. For example, J G D Clarke framed his 1975 study of early prehistoric Scandinavia within four different types of territory: sites, the area covered by a group in its annual movements, larger socially linked areas and areas within which people had similar technologies (Ballin 1999, 101; Clarke 1975). Madden (1983) explored three different models in her study of social networks in Southern Norway between about 8500 and 2000 BC. She looked at undifferentiated networks, networks differentiated by distance and networks differentiated by social boundaries (Ballin 1999, 102; Madden 1983, 191-200).

But pragmatically the interpretations of the nature and extent of the social phenomena which artefact distributions represent often cannot be formally tested by the data. For instance the scales of the geographical distributions of stone axes vary considerably in Scotland (Ritchie and Scott 1988, 87), as they do in England and Wales (Cummins 1979, 8-11). That cannot be explained completely by fieldwork biases, by differences in the quality of the stone and by geography; complex social factors no doubt played a role. The latter are suggested, for instance, by the different natures of the distributions of axe-hammers made of picrite and those found in the same area but made from other stones, the one falling off with distance from source and the other evenly spread over the same area ((Hodder and Orton 1976, 107).

Less theoretically based studies with a high descriptive component can be illuminating. The evidence provided by plant remains found on Scottish sites dating from the first signs of farming to the middle of the 3rd millennium BC suggests that people in different parts of Scotland used different proportions of domestic and wild plant foods (Bishop et al 2009, 56). Food production is an activity which must have affected the time available for others and the experiences undergone during different kinds of food procurement will have been dissimilar to one another. Major differences in food procurement strategies will often have spilled over into other cultural practices. For instance cereal production allowed longer term food storage - although that does not mean that people always took advantage of that as well as they might - and its concentration in fewer hands; although see Stevens & Fuller 2012 for an argument that cereal storage techniques may not have been adequate in parts of the British Isles during the 4th and 3rd millennia.

Those and other approaches called into question simple ideas of regional differences and showed that it is unclear whether artefacts and structures indicate a significant proportion of the cultural differences between different areas. David Clarke has argued that pragmatically prehistorians should develop a set of narratives based on differences rather than similarities: firstly narratives about individual sites such as Skara Brae, secondly small areas rich in artefacts such as Culbin Sands, Glenluce Sands and Little Ferry with their many flint arrowheads, contrasting them with superficially similar areas with far fewer artefacts, and lastly regional and national narratives (Clarke 2004. 46-48). None of these, he suggested, should have priority over the others. Underlying this was his belief that it is essential to study the material from many angles before embarking on grand theories.

Brophy's review in 2006 of Scotland's 'Neolithic', while tending to focus on structures rather than artefacts, showed the advances in understanding since Ian Kinnes reviewed it 21 years earlier (Brophy 2006). Brophy concluded that rough regional traditions can be detected, that regionality is best defined by the everyday and mundane and

that the concept of regionality works both at the level of local and wide scale patterns. That said, he did not think that regions should be assigned fixed boundaries. He thought that networks involving the movements of ideas, objects and people, and connection-sets of exchange and obligation, were the mechanisms which drove 'Neolithic' society (Brophy 2006, 38). As should be apparent from some of my own publications I am broadly in accord with this position (Ashmore 1996, 2003).

Thus regionality need not imply a neat little-changing partition of Scotland into inward looking areas. For that matter much the same may be true of (chest of drawer) chronological divisions. Barnett might have been right in supposing that architectural variations between small ritual/ceremonial/funerary monuments could mask a countrywide and multi-period similarity in the ideas which gave rise to them (Barnett 1998, 8-13).

That said, a recent study of the late prehistoric period (1500 BC onward) in the Eastern Netherlands using a richer database of excavated sites and artefacts than is available for Scotland has demonstrated the need for regionally specific models (Beek 2011, 25, 43-5). Its main conclusion was, much as Barclay argued for Scotland, that to lean too heavily on research results from one region to explain those of another carries a risk that the specific characteristics of the latter will be overlooked. Beek also argued that some important changes occurred almost simultaneously across large parts of north-west Europe, most likely reflecting radical ideological changes (Beek 2011, 45).

Until many such studies have been completed the practical answer to the problem of assessing whether comparisons between structures in the Calanais area and those in other parts of Scotland is that one should be very wary. But despite the existence of very real regional differences, too much emphasis on restricting comparisons to local phenomena, ignoring links to distant places, may force one to seek local explanations for change when its true motor was change elsewhere. Even if 'local' or 'regional' approaches could be argued to have produced the major successes in Neolithic studies there is much to be said for the leavening provided by broader studies (Thomas 1998, 37-8).

24.1.4 Regionality and Connexions

Taking 'success' here in the limited sense of creation and retention of a rich material culture, the success of people at Calanais in the 3rd and early 2nd millennia BC was probably dependent on the existence of low-cost two-way links between productive groups of people at geographically various locations . Judging by its architectural features and the artefacts found there the people of Calanais seem to have been well-connected to distant places. Conversely failure to maintain a rich material culture at Calanais during the rest of the second millennium BC probably reflected loss of those links. Paradoxically the pollen evidence suggests more local success in cereal cultivation after the loss of cheap long-distance links. Maybe changes in ideas amongst the other peoples of the lands bordering the Irish Sea, rather than local transformations, led to impoverishment of the Calanais people's material culture. Perhaps people in this wider area stopped thinking it worth their while to travel long distances to visit religious centres, for instance. Severing even one or two long distance links might drastically change connectivity; only local links might survive (Appendix 8).

Bradley has described what may be a Scottish example of such behaviour. He saw similarities between the Clava Cairns and some western Scottish and Irish sites, and suggested that the area of the Clava cairns was in a pivotal position in relation to (land-based or coast hugging) communications in the north (Bradley 2000, 228-30). He drew an analogy with the same area in the early medieval period, noting the proximity of the important fortified sites at Burghead and Kineddar and the abundance of stray finds from the nearby Culbin Sands. He proposed that then and also in the late 3rd and early 2nd millennia BC Culbin Sands was a place where specialised artefacts were made and exchanged. In the terms of network theory the activities at Culbin Sands formed a node which both attracted many two-way low cost-benefit connections fostering long distance links.

Bradley pointed out that while the Culbin Sands contain abundant late 3rd and early 2nd

millennium material along with similarly rich sets of medieval artefacts, little survives from other prehistoric periods. Changes in the environment may have been a factor but perhaps in both cases the collapse of the activities which produced the finds was accelerated by the innate characteristics shared by all complex networks. Culbin may itself have 'failed' or some other place crucial to Culbin's 'success' may have ceased to provide linkage.

Whatever the reason for Culbin's success and failure the growth or decline of its links with distant places may have caused (or been caused by) changes to other parts of the social network in Scotland, possibly including those related to Calanais.

So even though regionality was a prominent feature of the 4th and 3rd millennia in Scotland, it is dangerous to interpret local phenomena in isolation from wider changes; distance alone should not be treated as a criterion for rejecting distant comparanda. Despite the dangers of assuming connections when none existed (Tilley 1998) it is quite as dangerous to assume that changes at Calanais took place independent of those in other regions.

24.1.5 Travelling

The amount of long term connectivity between Calanais and other areas must have been linked to the real and the perceived cost of travel. It seems unlikely that much non-local travel was by land. Accounts of how quickly people could move along rough tracks carrying a load vary, but in the 18th century a packman with a full load could be expected to travel about 10 miles (16km) a day. There were also limits on how far people could travel without procuring new supplies of food. In the early 20th century Chinese packmen carrying food for famine relief could not travel more than 75 miles (120 km) without consuming all that they carried (Scott 1951, 23).

This sort of statistic is important particularly when considering whether a route including Loch Broom and the modern-day A835, or the Great Glen, might have seen frequent use for travelling between the Western Isles and north-east Scotland. It is roughly 50 miles (80 km) along the route of the A835 from the head of Loch Broom to Inverness; it might have taken 2 to 4 days to walk, depending on conditions. The modern Great Glen Way walkers route is 79 miles (127 kms) long between Fort William and Inverness (www.great-glenway.com) and can fairly easily be traversed (without a heavy load) in 5 to 6 days. Paddling a canoe along the Caledonian Canal including Loch Lochy, Loch Oich, Loch Ness and Loch Dochfour normally takes at least 3 days (www.scottishcanals.co.uk). Some portages will have been required in prehistory, increasing the effort and time for travelling.

By way of contrast, travel by sea may have been relatively low-cost. Nobody knows what sorts of boats foragers and subsequently farmers used in Scotland in the 4th millennium Log boats are a possibility and there are more than 3500 European examples of which around 550 are known to be prehistoric. The vast majority come from inland sites. The earliest known is a slightly contentious small log boat from Pesse in the Netherlands, dated to between 8250 and 7750 cal BC (GrN-6257 8825+/-100 BP) although they seem to have become common only towards the mid 4th millennium BC (McGrail 1987, 86). The log boat from Brookend township, Lough Neagh, Ireland, the closest known 6th millennium log boat to Calanais, has been dated to between 5490 and 5246 cal BC. The earliest radiocarbon-dated Scottish log boat is from Catherinefield, Locharbriggs, Dumfries and very vaguely dated to between 2900 and 1600 cal BC; SRR-326 3754 +/- 175, corrected to +/- 175 to acknowledge larger than quoted errors).

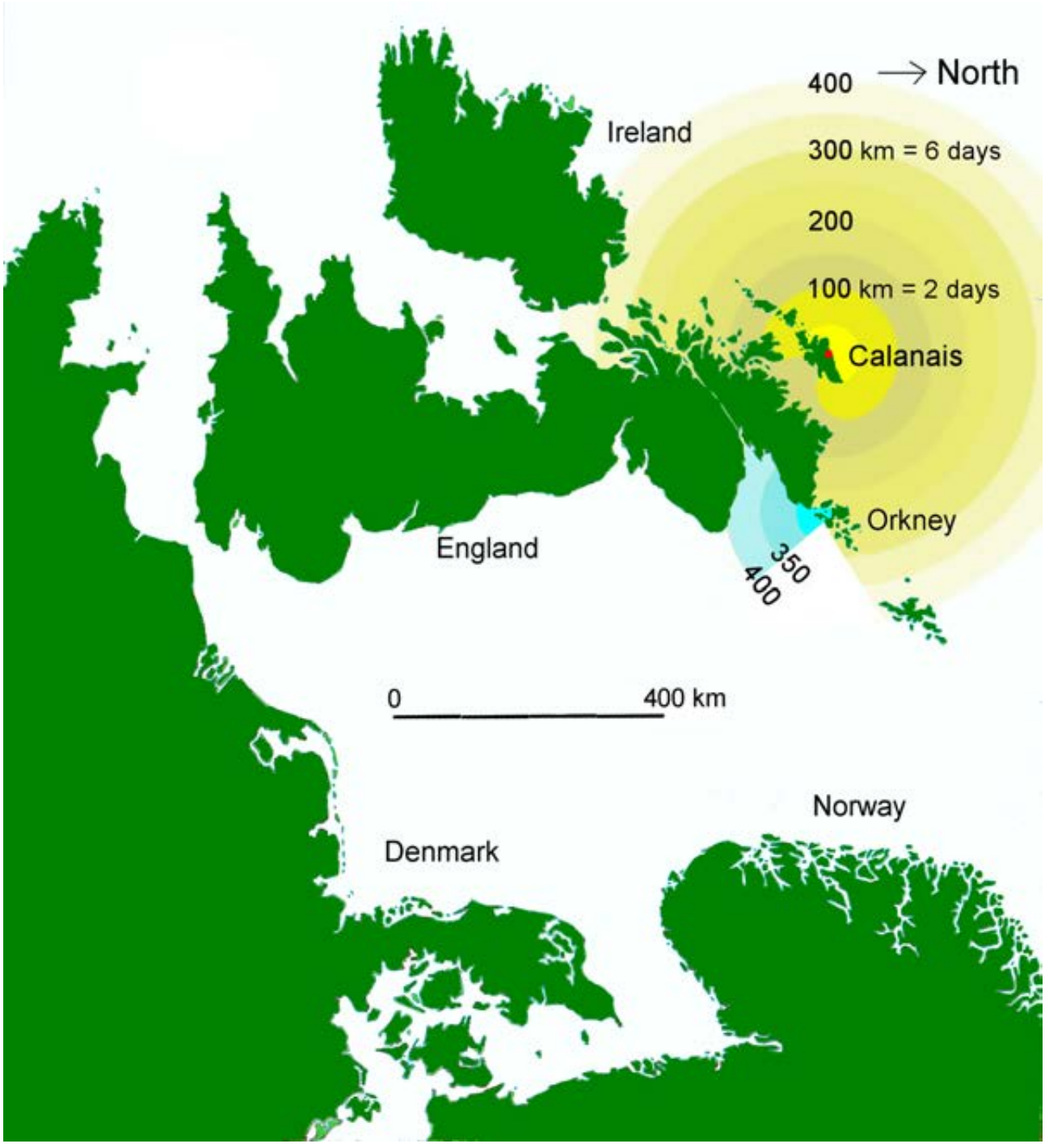
Plank-built boats seem to be a phenomenon of the mid 2nd millennium BC and so far have been found only in the east and south of Britain (Megaw and Simpson 1979, 295; Champion 1999, 104-5).

Skin boats are a strong possibility given the use of curraghs in historically recorded periods. Their absence from the prehistoric Scottish record probably reflects only the fact that exceptional conditions are required for survival of recognisable remains.

Historically recorded curraghs had wickerwork sides and ribs covered with cow-hide. They could be 7 or 8m long and up to 2m wide. They could

carry 9-10 people, and Irish seamen in the 1970s regarded two cows and 21 sheep as a good load to take to sea. Their sailing versions had long lifting bows and could probably accomplish as much as 145 km a day (90 miles; Bowen 1972, 36-7). On Severin's Brendan Voyage 10 oarsmen could make an average of 74 km a day (McGrail 1987, 184). According to Fridjof Nansen (1893) a fully laden umiak (skin boat) crewed by women with their children and enough equipment to make them self-sufficient could routinely travel 50 English miles (80 km) a day.

Given the lack of 4th millennium and earlier evidence from Scotland, it is impossible to know how advanced boat-building technology was. Boats may not have had sails, or if they did the



Illus 24.1 Travelling to and from Calanais

sails may have been markedly less efficient than those of 20th century curraghs. However, if historically recorded paddled or oared skin boats were routinely used to travel 75 to 80 km a day it seems reasonable to suppose that similar boats dating to before 2000 BC could routinely be used to travel at very least 50 km a day. As the examples quoted above suggest, much shorter journey times than this 'routine' figure would have been possible on direct long distance journeys (see also Garrow and Sturt 2011, 62, quoting Callaghan and Scarre 2009).

24.1.6 Travelling to and from Calanais

Illustration 24.1 is an attempt to provide a basis for assessing how many days it usually took to get from Calanais to other places by sea. The model proposed here is that most journeys involved several short legs, an idea recently discussed afresh by Garrow and Sturt (2011, 62). Therefore the conservative figure of 50km a day has been used.

Admittedly, winds and currents will have meant that the time taken had only a loose relationship with distance. Further, the seaways between north-east Ireland and south-west Scotland are particularly perilous because the tidal streams running on either side of Ireland meet there and particularly at spring tides dangerous races could extend well offshore. The Kyles of Skye also present hazardous conditions (Scott 1951, 32, quoting the West Coast of Scotland Pilot 6th edition).

Scott considered that the main prehistoric route from southern areas past the Western Isles ran west of Skye to the Uists and thereafter up the Minch, to the east of the islands (ibid 33). Indeed, early modern settlements favour the east rather than the west coast of Harris although in South Lewis the east coast has little settlement. Similarly the west coast of South Lewis, north of Scarp is fairly bleak for 20 km or so. But on the west coast, once the headland at Ard More Mangersta has been navigated the area round Loch Roag supports many townships. Even north of Calanais where the west coast can hardly be described as gentle there are sandy bays such as Dalmore and Barabhas.

Given the changes in the coastline described below finding safe havens along a western route may have presented different difficulties to those of today. But the differences between the western seaways of c. 6000 to 3000 BC and those of today may have been much slighter than those on the east coast of Britain (Garrow and Sturt 2011, 63-65). It seems possible that, in summer at least, the sea-route along the west coast of Lewis might sometimes have been preferred. Burl (2000, 94) suggested that the central monolith at Calanais could have served as a landmark for seamen. His idea that the group of stone rings at Calanais and that at Machrie Moor on Arran 'may have resulted from the arrival of crews from southern Scotland, Ireland and England taking shelter on the long voyage to the Orkneys.' has gained additional force from the discovery of a grooved ware pot at Calanais remarkably similar to one at Stones of Stenness in Orkney.

On Illus 24.1 a secondary centre in Orkney has been added to allow a better assessment of the time it would take to get to eastern Scotland by sea from Calanais. Any one of the havens on the Caithness coast might have provided a more economical stopover on a long voyage shortening journeys by a day or so; Orkney has been chosen because of demonstrable links between it and Calanais in the early 3rd millennium BC. Using the conservative figure of 50km a day travel times in fair conditions would have been as follows.
All of the landing points on the west coast of Lewis and Harris were within a day's travel.

— All of the landing points in the Western Isles north of Benbecula, North Skye and most parts of the facing mainland were less than two days away from Calanais.
— The rest of Skye and the west coast mainland north of it could easily be reached in three days.
— It would have taken about 5 days to get to Orkney, the south end of the Great Glen or most of the southern Hebrides, which were roughly the same distance away as each other.
— An 8 day voyage could get people to Shetland, Antrim or the Rhinns of Galloway, and via Orkney to the south coast of the Moray Firth.
— A 10 day voyage would get people to the Isle of Man and nearby parts of Ireland and England, and via Orkney most of the coast of Aberdeenshire.

— A 12 day voyage would get them to the Forth, and to north Wales or the east coast of central Ireland.

But it would be too simple to conclude that connection would always have been fairly easy. On top of the perennial hazards of sea travel, mutual hostility may have prevented people from passing close by some communities, or making overnight stop on some parts of the coast.

The 50km a day routine voyaging rate used here is much less than the 'long distance' rate used by Callaghan and Scarre (2009); they suggested that a voyage between Brittany and Orkney might have taken only 12 days (Garrow and Sturt 2011, 62). Urgent journeys, or non-stop journeys designed to avoid trouble with other communities, may have been completed in half the times listed above.

A sea and land route including Loch Broom would have included one or two days sea travel and around 4 days overland, a total of 5 or 6 days; it would have required a safe boat-storage spot near the head of Loch Broom. The Great Glen route might have taken a leisurely 5 days by sea and 3 or 4 along the Great Glen waterways, 8 or 9 days in all. Even if done at haste the trip would have taken 4 or 5 days.

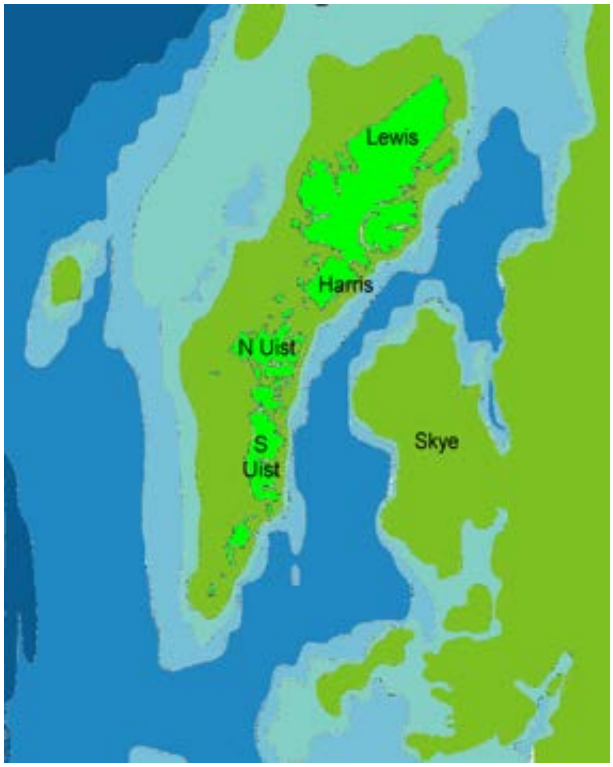
My impression from the figures discussed above is that links beyond the Western Isles and Skye, even by sea, cannot be described as low-cost in a modern every-day sense. However, time may have been a less important factor in judging cost than it is for industrial and post-industrial societies today; cost is measured against aspirations; religious or acquisitive motives could have made an extended effort seem good value. As suggested above, one reason why network links failed after the early 2nd millennium may have been that belief systems changed.

24.2 Before Calanais was built: the end of the last glacial period in the Western Isles

It seems proper to provide a sketch of the major climatic and geographical changes in the area around Calanais after the peak of the last glaciation, for their effects rumbled on throughout the period in which Calanais was built and used.

24. 2.1 Warming

During the last glaciation the Western Isles were probably largely or completely covered by ice (Lambeck 1995a, 85; Lambeck 1995b Figs 3a, 3b; Gilbertson et al 1996, 10 Fig 2.4). At some date around 17,000 cal BC ice may still have covered the Minch, but the long island itself may have been largely ice-free, with a western coast line considerably to the west of the present day one (16000 BP Lambeck 1995b, Fig 3c). But the relationship between land and sea levels will have been complicated because sea rise during the main ice-melting will have been opposed by land rebound for mainland Scotland and the Inner Hebrides (Ballantyne 2004, 35).



Illus 24.2 The Great Western Island at some date between 12,500 and 11,000 cal BC (after Lambeck 1995a, Figure 2d and Gilbertson et al 1996)

By about 12,000 cal BC the mainland of Scotland was also ice-free (Bell and Walker 1992; Lambeck 1995b, Fig 3e). On Illus 24.2 the present Western Isles are laid against a background of land approximately as it was at some date in the warm

period between about 12,500 BC and 11,000 cal BC when a human presence is first attested in Scotland (Ballin et al 2010, 344, 357). The modern submarine contours are shown at 20m, 50m and 100m.

I shall refer to this as the Great Western Island.

12.2.2 A cold snap

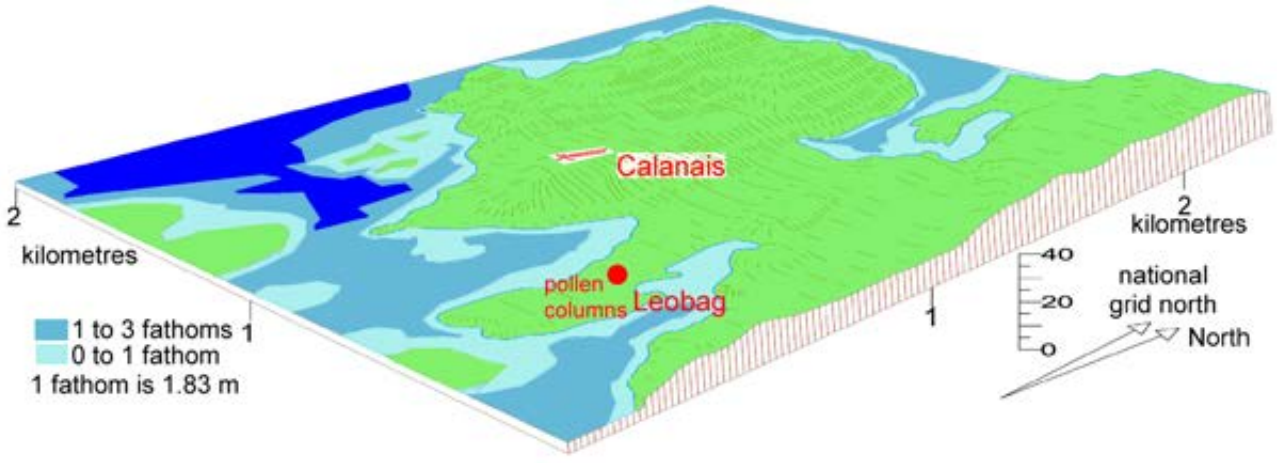
Another very cold period (the Younger Dryas) started around 11,000 and ended about 9600 BC; an ice sheet reappeared in Scotland during this period and land and sea falls and rises kept pace with one another along much of the western seaboard of Scotland; the Main Late-glacial Shoreline formed. After the end of the Younger Dryas earthquakes of magnitude 6.5 to 7.0 may have been fairly common as the land adjusted to removal of the weight of ice above it, persisting with a gradual reduction in intensity until the first millennium BC (Ballantyne 2004, 34), a factor not often considered in studies of the possible mindsets and beliefs of those living then in western Scotland.

24.2.3 New warming and new vegetation

By about 9250 cal BC ice-fields and permafrost had disappeared from Scotland, except in mountainous areas, and the land bore tundra vegetation. Temperatures regained their present levels around 8500 cal BC. By c. 7500 cal BC Lewis was not grossly different in shape from what it is now (Lambeck 1995 Figs 3g, 3h) although some areas which are now shallow sea were still dry land. Absolute sea level rise culminated in a period of very rapid world-wide sea rise around 6000 cal BC (7000 BP; Buchanan 2004, 35). Around this time Britain was severed from the continent (ibid 35).

Relative sea rise along the coasts of the Great Western Island continued locally for several millennia after 6000 BC judging by the inundation of field walls at Leobag near Calanais (Illus 24.3; Bohncke 1988; Cowie forthcoming). More generally in the Western Isles there are many archaeological sites between low and high tide mark (Ritchie 1979).

After a date somewhere between 6000 and 5500 BC birch and willow seem to have varied in a complementary fashion for about 500 years. Grass and heather became more abundant although the scarcity of some other species suggests that there was little increase in open ground. At some date between 5375 and 4825 cal BC, birch suffered a set-back and willow almost disappeared; woodland around Calanais Leobag. was reduced. Hazel increased modestly. No other tree type expanded significantly to take advantage of the ground surrendered by birch and willow. Dry grassland declined and heath expanded greatly (Bohncke 1988). After a wetter phase, the recovery of Betula from a date between 4700 and 4150 cal BC coincides with an increase in grasses and bracken, a fall in sedges and rushes and the local absence of



Illus 24.3 Modern sea depths around Calanais, illustrating the effects of lower sea levels

Sphagnum as the ground became drier (Chapter 21 Palaeoenvironment 21.3.4). During this period the woodland structure may have had no exact modern equivalent (Tipping 2004, 46-48)

24.2.4 Early peoples in the Western Isles

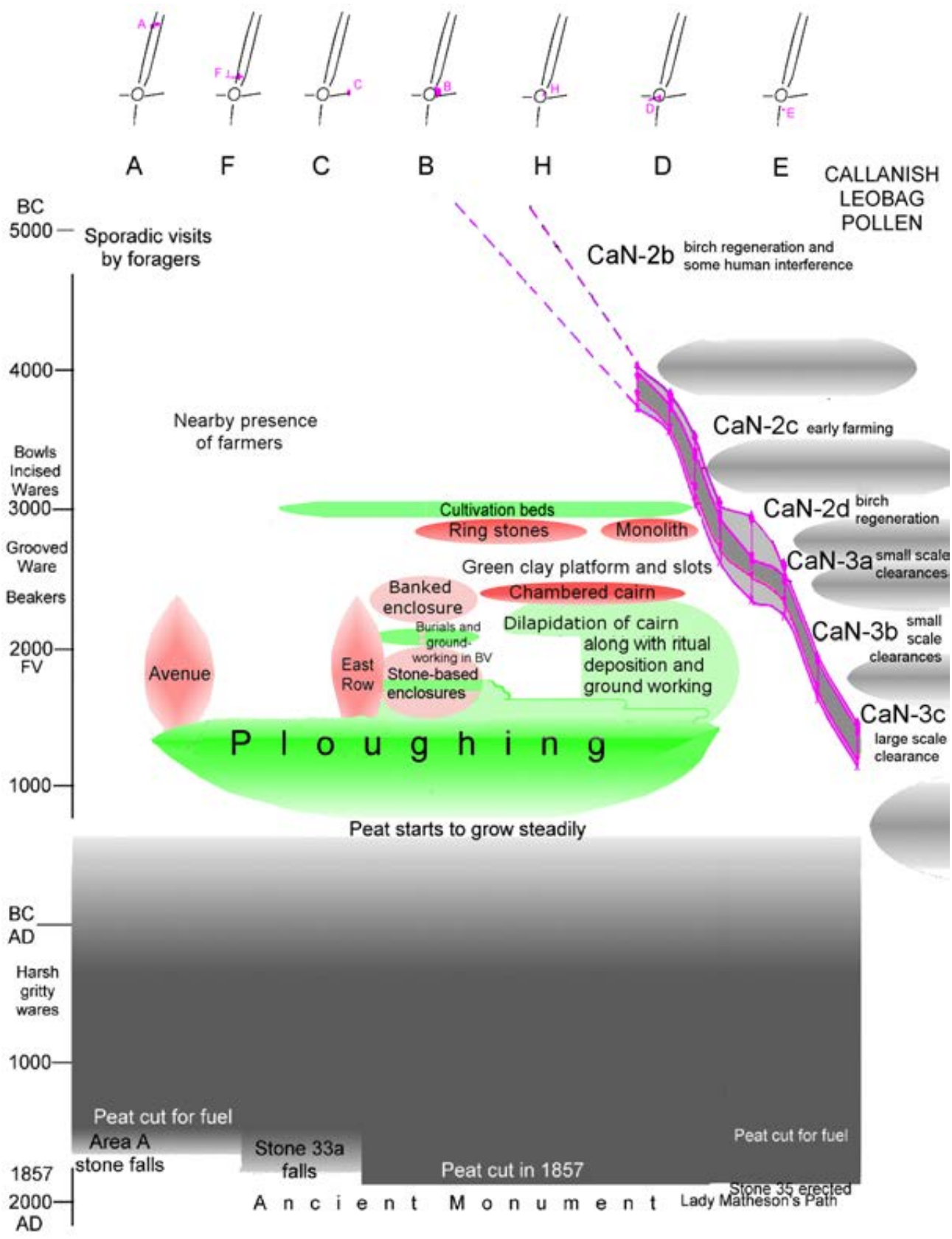
The nearest place with evidence for human activity before the cold millennium and a half of the Younger Dryas, the very cold period between about 11,000 and 9600 cal BC, is at Kilmelfort, Argyll (Saville & Ballin 2009, 37). From a slightly earlier period, stone tools found at Howburn Farm, Elsrick near Biggar in southern Scotland have Later Hamburgian affinities probably dating to around 12,000 cal BC (c. 12,000 BP) (Ballin et al 2010, 344, 357). The initial extremely cold period of the Younger Dryas may have driven even the hardiest prey animals and descendants of the Later Hamburgian hunters from Scotland. But the occasional discovery of flints of Ahrensburgian style, such as the small tanged point from Shieldaig in Wester Ross, suggests a human presence not far from the Great Western Island during the main part of the Younger Dryas. Perhaps they hunted reindeer, like those using similar tanged points on the continent (Ballin & Saville 2003; Edwards and Mithen 1995). It is not beyond credence that their successors maintained a breeding population in N Britain (Technical Note 24.2.4) although Woodman (2012, 6) has recently emphasised how brutally cold the Younger Dryas period was, expressing doubt about the survival of large mammals in Ireland, and has cast doubt on claims for Ahrensburgian points in Scotland.

But marine resources such as seals would still have been available and, conceivably, some of the ancestors of some of those who built Calanais could have been moving around the area at least 7000 years before the Ring was built.

There is not enough archaeological information to allow discrimination between the cultures of forager communities within Scotland, although differences can be seen between it, Ireland, and England (Saville 2003). Current evidence for settlement in Eastern Scotland is considerably richer and up to a millennium earlier than evidence for settlement in Western Scotland (Saville et al 2012, 81). That difference may however reflect only the small number of sites excavated. Settlement of hunter-gatherers at Kinloch on Rum, which is only a short sea voyage away, began at latest about 7500 cal BC (Wickham-Jones 1990). A bevelled tool from Druimvargie rockshelter, Oban, is dated to c 7580–7180 cal BC (7890 ± 80 bp; Bonsall et al 1995). Pollen studies by Edwards (1990), Bennett et al (1990) and others document evidence for what seems to be human activity in the long island at dates before 7000 cal BC. Bohncke (1988, 450) suggested human activity around that time at Calanais Leobag but as discussed below reconsideration of the radiocarbon dates available to him suggests a slightly later date for substantial evidence of woodland clearance and charcoal creation (see also Chapter 21: Palaeoenvironment 21.2.1). At Northton, Harris, two individual hazel nut shells in a midden have been dated to between 7060 and 6690 and between 7040 and 6650 cal BC (AA-50336; AA-50335; Gregory et al 2005, 945; Simpson et al 2006, 23). It could be argued that the charred nut shells were the result of a natural fire incorporated in a later midden almost by chance. They were not however surrounded by an abundance of charred hazel wood. That reduces the likelihood of their originating in a natural fire and favours the explanation that they were a result of nearby human activities related to hazel-nut processing, an activity well attested elsewhere in Scotland on sites of much the same period (e.g. Mithen 2000, 435-6). A recent report of an eroding early land surface at Northton with hearth deposits and food waste (Bishop et al 2010, 178) broadly fits the interpretation of food-related charring.

Three bevel-ended tools from a midden at Sand, Lochalsh have been dated to between 7050 and 6500 and between 7050 and 6450 cal BC (OxA-10384 7855+/-60; OxA-10175 7825+-55 BP) while several other tools and pieces of charcoal dated from then until some date between 5540 and 5320 cal BC (Ashmore and Wickham-Jones 2010 Table 173). A bevel-ended tool from a midden at Loch A Sguirr, Raasay has been dated to between 6220 and 6000 cal BC (OxA-9255 7245+/-55) and a single piece of birch charcoal from the midden to between 6640 and 6250 cal

24.3 The sequence of activities at and near Calanais from c. 5000 BC



Illus 24.4 Activities at Calanais and zoning of pollen column CN3 at Calanais Leobag

BC (OxA-9305 7620+/-75) (Ashmore and Wickham-Jones 2010 Table 174). A bevelled tool from the rock shelter at An Corran, Skye has been dated to between 6610 and 6245 cal BC (OxA-4994) along with a cluster of three similar dates around 6500 to 6300 cal BC from aurochs bones (Saville et al 2012, 73-6).

It is clear that foragers had long settled the shores of western Scotland and its islands by the time, between 6600 and 6200 cal BC, when woodland clearance first took place near Calanais. There is no reason to suppose that the people who burnt the woods there were permanent residents. They will have ranged widely over the seasons. On present evidence they were probably part of a set of communities exploiting the coastal resources further to the south and east.

24.3.1 The overall sequence

Illus 24.4 has been constructed using radiocarbon dates from Calanais and Calanais Leobag (see Chapter 23 Radiocarbon and Chapter 21 Palaeoenvironment). The grey boundaries between the pollen zones named to the right are meant to convey how imprecise the pollen zone dating was. The headings and diagrams at the top show on which of the areas A to H the phenomena in the diagram below occurred. Area S has been omitted.

The excavation did not reveal conclusive evidence for human activities at the stone setting itself before about 3000 BC, although soils possibly indicating earlier cultivation were found in Area F (in the Avenue, Illus 24.4 top). Earlier activity in the general area was inferred from charcoal and pottery imported to Calanais and from pollen evidence at Calanais Leobag.

In the 3rd and early 2nd millennia BC various structures were built; human remains were deposited, soil was imported and ground-working, including ploughing, took place several times (Illus 24.4).

The area where the structures had been built was largely abandoned except for outfield grazing by the middle of the first millennium BC; mosses and other peat-land plants had started to cover the ground at some time between 920 and 400 cal BC. But there may have been some activity at the pre-peat ground level in the Ring around the middle of the 1st millennium BC.

24.3.2 Calanais Phasing

Table 24.1 Phasing of early features north of the Ring from about 6500 to about 3000 BC

Phase	Date BC	Date source	Events	Dating and comments
	6500			
0		Pollen	Woodland clearance	Started at some date between c. 6600 and c. 6200 cal BC. in CaN-2a and 2b at Calanais Leobag.
	6000			
	5500			
1		C14	Foragers in Avenue area?	Date between 5305 and 5215 cal BC
	5000			
	4500			
	4000			

Phase	Date BC	Date source	Events	Dating and comments
2a		C14	Foragers or farmers in Avenue area?	Date between 3720 and 3530 cal BC
2b		C14 and pollen	Farmers in Avenue area and near Calanais Leobag.?	Date between 3640 and 3380 cal BC. Soil disturbances. Early cereal cultivation started near Calanais Leobag at some date between 3875 and 3605 cal BC
	3500			
		Pollen	Cultivation finished	Date between 3490 and 3020 cal BC.
3a		C14	Early farming in Avenue area?	Charcoal date between 3300 and 2890 cal BC. Soil disturbances.
3b		C14	Original deposition of charcoal and early to middle Neolithic pottery in settlements nearby.	Charcoal dated to between 3330 and 2890 cal BC, in round terms between c. 3300 and 3000 BC. Imported with soil to Calanais many generations later in Phase 7.

Table 24.2a Phasing of features in and near the Ring between about 3000 and about 2250 BC

Phase	Date BC	Date source	Events/processes	Comments
4		Pollen	Early ditch	Before cultivation beds.
	3000			
5a		Pollen	Cultivation beds and subsequent flatter cultivation	At beginning of CaN-3a, start between 2983 and 2510 cal BC.
5b		Pollen	Turf formation	Formed over partly flattened cultivation beds (including, judging by pollen samples, formation at various subsequent dates over silts in cultivation troughs). Continues after Monolith erection until Ring erection
	2950			
6a?		Stratigraphy	Monolith erection?	Near beginning of CaN-3a. 3000/2850 BC After 5b turf growth, and interpreted (but not demonstrated) as before Ring.

Phase	Date BC	Date source	Events/processes	Comments
	2900			
6a, 6b?		Stratigraphy	Monolith erection? Ring erection?	
	2850			
6b?		Stratigraphy, analogies	Ring erection? Turf formation? Use of Ring area? Interrupted slot?	A piece of birch charcoal from a charcoal spread in pre-Ring soil 871 produced a radiocarbon age (AA-24959 4140+/-45 BP) corresponding to a date between 2880 and 2580 cal BC. That suggests that the Ring was set up after 2880 cal BC.
	2800			
6b?		Stratigraphy, pollen	Ring erection? Continued turf formation? Use of Ring area? Interrupted slot?	The new turf is that above green clay spoil from Ring pits but where not covered by clay the old turf continued to grow
	2750			
6c?		C14	Interrupted slot? Other use of Ring?	TPQ some date between 2890 and 2620 cal BC from charcoal.
	2700			
	2650			
6c?		C14	Interrupted slot? Other use of Ring? Continued turf formation?	
6d		Artefact	Some deposition outside the Ring?	The Grooved Ware pot may have been made considerably earlier
	2600			
7a?		Stratigraphy	Clay platform and light timber structures built.	Possibly 2450/2350 BC?
7b?		Speculation	Clay and soil imported with Phase 3 artefacts and charcoal.	Possibly as early as this, or even part of a long term process starting earlier.
	2550			

Phase	Date BC	Date source	Events/processes	Comments
	2500			
7b?		Interpretation	Clay and soil imported with Phase 3 artefacts and charcoal.	Layers on Areas D and H, with Phase 3 charcoal and also potsherds. Preferred date shortly before clay platform built.
	2450			
	2400			
7c		Indirect C14 and interpretation	Rows start now?	In general undated but East Row Stone 30 probably erected at some date between 2560 and 1690 cal BC; earlier than green clays with very early Beakers.
7d		Artefacts	Closure of green clay platform structure? Dumping of clays 810 and 812 in BV?	Slot fills include probable fine and 'domestic' Beaker sherds. Green clays 810 and 812 with very early Beakers and no obvious later ones.
	2350			
8		Artefacts	Chambered cairn building	After 2500 cal BC because the primary cairn and immediately pre-cairn contexts included an International Beaker sherd and at least one fine Beaker sherd.
9a		Interpretation / stratigraphy	Enclosure Stage 1, stake-hole defined after disuse of timber structure and after cairn construction	Starts around 2400/ 2300 BC?
9b		Interpretation / stratigraphy	Embanked enclosure Stage 2 earthen bank building,?	Starts around 2400/ 2300 BC? Barbed and tanged arrowheads in entrance silts may reflect use or post-date end of formal use.
	2300			
10a		C14	Ground working and burials	Pine charcoal dated between 2490 and 2290 cal BC could belong here, or Pomoideae charcoal dated between 2120 and 1770 cal BC

Table 24.2b Phasing of features at Calanais from about 2250 BC

Phase	Date	Date source	Events/processes	Comments
	2250 BC			
10c		Starts around 2400/2300 BC?	Ground working and burials	See 10a
10d			Avenue starts now?	No specific dating evidence. Perhaps building on from a North Row? Stones set up over several generations?
	2000 BC			
10e		C14	Ground working including ploughing	Birch charcoal dated to between 2030 and 1750 cal BC and Pomoideae charcoal dated between 2120 and 1770 cal BC, from an ard mark north of the enclosure, could belong here.
11a		Artefacts; Indirect C14 and interpretation.	Wall-based enclosure Stage 3 building	Between 2100 and 1750 BC? After deposition of barbed and tanged arrowheads; also a possible terminus post quem between 2040 and 1770 cal BC.
11b		Interpretation	Ground working including ploughing	Later period of plough soil 141 belongs in pollen zone CaN-3c which started between 1880 and 1520; and was earlier than 139, so dates to between 1880 and 1690 cal BC.
12a		Analogy	Wall-based enclosure Stage 4 building	Undated; possibly in use at some date between 2150 and 1750 BC, judging by an analogy with Ardnave, Islay.
12b		Interpretation	Ground working including cultivation	Includes layer 139, by hypothesis, dated to between 1940 and 1690 cal BC by a piece of heather charcoal.
13		Interpretation	Kerb erection and secondary cairn	After 2040 and perhaps after 1525 cal BC; may post-date ruin of fourth stage enclosure?
	1500 BC			
14		Stratigraphy	Cultivation	Undated except near Area C it cannot be later than steady local peat growth.
	1000 BC			

Phase	Date	Date source	Events/processes	Comments
15		C14 and pollen	Cultivation and encroachment of peat	Peat starts to grow steadily near the east end of the East Row between 920 and 400 cal BC.
	500 BC			
15		Depends on Phase 16 being real.	Growth of peat except by Ring?	Continued use of area of the stone setting, dissuading local peat growth?
	BC/AD			
15		Depends on Phase 16 being real.	Growth of peat except by Ring?	Continued use of area of the stone setting, dissuading local peat growth?
	AD 500			
16		See comments	Disturbance and erection of slab in passage? Growth of peat	Possibly in the second half of the 1st millennium AD judging by occurrence of late Iron Age pottery. But the activity itself may be post-1857.
	AD 1000			
17a			Peat growth	
	AD 1500			
17b		Documentary	Cutting and post-medieval peat clearance	North end of setting cleared before mid 19th century. MacCulloch surves before 1819. Worsaae visits 1846.
	AD 1850			
18a		Documentary	1857 clearance; 19th excavations and disturbances	Pit digging at earliest in AD 1846 but probably after 1857
	AD 1880			
18b		Documentary	Modern conservation	From 1882 to 1980
	AD 1980			
18c		Documentary	Archaeological excavation	Resisitivity survey 1979, excavation 1980 and 1981; intrusive sampling etc 1982; excavation 1986.
18d		Documentary	Post-excavation conservation	Improvement of drainage and returfing and path-building.

24.4 Phases 0 to 3: Early activities at and near Calanais

24.4.1 Phase 0: Burning and clearing of woodland near Calanais

There are no signs in the pollen record from Calanais Leobag of a human presence before some date between about 6675 and 6045 cal BC (the end of Pollen Zone CaN-1). Before that birch trees seem to have been abundant along with some willow and limited areas of grassy heather-rich moorland. The environment was probably fairly harsh given the overall lack of diversity in plant species. Sphagnum spores were abundant at Leobag, reflecting the damp conditions which led to formation of the peat (Chapter 21: Palaeoenvironment 21.3.1). The abundance of trees does not preclude the presence of coastal foragers, for the shore was further from Calanais Leobag than it is today, but it does not indicate any human impact on coastal woodlands.

There was an increase in charcoal in peat column CN3, at the 55 to 54 cm level, in Bohncke's Pollen Zone CaN-2a, so foragers may have been burning woodland near Leobag, about 600 metres SE of Calanais, at some date in the second half of the 7th millennium BC Microscopic charcoal continued to appear in the peat column thereafter.

At 52 cm (dating between 6160 and 5770 cal BC) in pollen zone CaN-2a the percentages of birch pollen dropped suddenly; willow flourished. That may reflect use by foragers or a change in local conditions. Towards the end of this pollen subzone (between 6015 and 5635 cal BC) the grass, heather, herb, dwarf shrub and fern pollen percentages increased firmly although that may have been due more to decreased density of the canopy cover than to a true increase in open ground. That said an increase in potentilla, if really tormentil, suggests the establishing of grassland.

Sub-zone CaN-2b lasted from some date between 6075 and 5525 to some date between 4120 and 3830 cal BC. Birch and willow pollen fluctuated inversely to one another. There was little increase in open ground. But at a date between 5375 and 4825 cal BC, birch was adversely affected and willow almost disappeared. Towards the end of the sub-zone at some time between 4120 and 3830 cal BC heather increased markedly, suggesting dry heath. Birch recovered while remaining subject to fluctuations. Alder began to form a continuous curve in the pollen record.

24.4.2 Phase 1: Sporadic visitors to Calanais

The pollen evidence from sub-zone 2b provides a general background for a piece of birch charcoal found on Area A at Calanais, dated to between 5350 and 5210 cal BC (SUERC-11588) and check-dated to between 5310 and 5070 cal BC (SUERC-11989). The date came from a piece of charcoal in a possible post-hole cutting a patch of angular stones and underlying an area of beach pebbles, presumably introduced at a later date during manuring with sea weed. It lay immediately east of a glacial erratic which probably broke the ground surface of the time.

The mere presence of charcoal does not demonstrate the presence of people. However in western Lewis, with its generally damp climate, wild fires seem a less likely explanation for charred wood than human activities. The survival of pieces of charcoal in these postholes does not date the postholes themselves, except for providing somewhat unhelpful termini post-quem. They seem to have been chance inclusions and suggest no more than fairly local fires long before the postholes were dug.

Perhaps some hunter-gatherers stopped beside the glacial erratic, warming themselves at a fire built in the windbreak provided by the stone. It is as good an explanation as any.

24.4.3 Phase 2a: Later foragers or farmers at Calanais

Another piece of birch charcoal from Area A from another possible posthole also suggests a human presence, at some date between about 3760 and 3530 BC (SUERC-11589 4880+/-35 BP), though whether this should be ascribed to foragers or to farmers, or the common descendants of both, is a moot point because there were probably farmers nearby; the first cereal pollen in column CN-3 at Calanais Leobag is dated to some period between

3875 and 3605 cal BC (see Chapter 21: Palaeoenvironment 21.3.5). Apart from that, the earliest radiocarbon dates from the Western Isles which can be associated with the activities of people who farmed cereals come from Eilean Domhnuill, N Uist. They were measured on charred barley found in a hearth. One date lies somewhere between 3640 and 3350 cal BC (OxA-9157) and the other between 3710 and 3520 cal BC (OxA-9079). They almost certainly demonstrate local farming from about 3600 BC (Armit 2003, 93) though it is in the abstract conceivable that the grain was brought in from elsewhere.

The question whether Calanais was built by indigenous foragers who had adopted farming or by incoming farmers seems to me of considerable interest, so I shall explore it in some depth. Those impatient to find out what happened at Calanais should skip to 24.4.4.

Many models have been developed for the interaction between farmers and foragers (Zvelebil 1998). At one extreme lies demic expansion (population spread of farmers) and at another adoption-diffusion (ideas spread from farming communities to hunter-gatherers) (Gkiasta et al 2003, 45-7; Bentley et al 2003, 63, 65). These broad models probably over-simplify a complex reality, changing in time (Zvelebil 1998, 7-8).

Sheridan has put forward a case for the model of multiple movements of farmers from various points of origin on the Continent with subsequent complex interactions with foragers in which 'indigenous acculturation is regarded as a subsequent development from, rather than a prime mover of, the introduction of novel traditions and practises' (Sheridan 2009, 1). I have to admit to an a instinctive liking for these ideas, despite the demonstration by Whittle et al (2011), described below, that the current radiocarbon date-set suggests only one important point of entry to Britain, in SE England. Of possible relevance to Calanais Sheridan has discussed an early 'diaspora-like spread' of farmers from Brittany up the Atlantic coasts (Sheridan 2003, 5; 2009).

In a 2005 paper Thomas appeared to believe that he had falsified the model within which Sheridan presented her evidence, though he freely acknowledged that narratives other than his own were possible. His has for some years been one of the more coherent voices arguing against diaspora-like spreads of farmers and similar ideas to explain the arrival of farming in Britain (Thomas 2003, 2005, 125-6). Chapter 25: Technical Note 24.4.3 contains a review of his arguments; here a summary is presented.

The background was his belief that although in the southern and eastern parts of Europe farming was introduced by incomers, further north and west the process involved both incomers and adoption of farming by local foragers; and in the lands facing Britain and Ireland farming was largely adopted by indigenous peoples from other such groups.

He argued that the presence of domesticated cattle in at least one late Mesolithic community at Ferriter's Cove in Ireland demonstrates contacts between indigenes and farmers long before farming became prevalent in Britain and Ireland. Woodman and McCarthy have pointed to a lack of lithic evidence for contact between the continent and Ireland in this period (2003, 36) but as Thomas (amongst many others) has pointed out elsewhere people can adopt single traits of a culture while ignoring the rest.

He asserted that the evidence for rapid changes in British and Irish material culture around 4000 BC cannot be explained by the arrival of a few boat loads of farmers. Instead it required either a massive influx or the sudden and widespread adoption of new practises by indigenous groups. This claim is difficult to understand; why should contacts with distant farmers have an effect not allowed with local ones? Even more difficult to understand is his argument that, given the homogeneity of indigenous forager groups before about 4000 BC and the regionalised nature of the first farming groups in Britain, the lack of a single donor population on the continent means that indigenous people must have adopted farming. But if indigenous cultures were homogenous around 4000 BC, the subsequent regionalisation of Britain can best be explained by differences between incoming farmers from different parts of the continent, as argued by Pailler and Sheridan (2009, 47-8).

Others have suggested that indigenous groups may have adopted aspects of farming practices.

Bishop and her colleagues perceived continuity in subsistence practises between forager and farming communities in some parts of Scotland (Bishop et al 2009, 84). However it is difficult to have much confidence in assigning domestic sites to the descendants of indigenes purely on the basis that they made considerable use of wild resources. That evidence could equally well be used to support the idea that cereal farming was introduced by farmers and failed (Stevens & Fuller (2012).

Farming is labour-intensive, and Ester Boserup in her 'The conditions of agricultural growth' showed that the introduction of farming and its intensification are normally dependent on increasing population densities (1995, 11-14). Some experts have perceived an 'unusually high density of [Mesolithic] human populations' on the western coasts of Scotland (Mellars 2004, 172). But there is no evidence from radiocarbon-dated Scottish sites for a major population increase in the centuries leading up to 4000 BC. Instead the number of dated sites is reasonably constant through the 5th millennium and continues at much the same level until about 3800 BC; after a short period fall-off it continues until about 3500 BC (Ashmore 2004, 88). Admittedly mine was a minimal interpretation of a small amount of radiocarbon-dated evidence, much blurred by variations in the amount of C14 in the then atmosphere. Although use of the OxCal Sum Function to produce a diagram of dates spread over millennia has been criticised (Bayliss et al 2007, 10-11, that criticism seems very odd (provided that OxCal's horizontal bars showing estimates of standard deviations are deleted). The technique is merely a way of plotting probability distributions of dates and continues to be used as such (see Stevens & Fuller 2012, 711 for a list of recent uses of this technique). The radiocarbon dates certainly do not demonstrate a rise in population in the centuries preceding the introduction of farming. Thus indigenous adoption of farming in Scotland purely through long-distance contacts without immigration currently seems unlikely.

In the foregoing my argument has not been that all insular foragers failed to or decided not to adopt farming. It is very likely that some of them did, given the existence of long-lasting and evolving relationships between historically recorded foragers and farmers (Zvelebil 1998, 9-10). Instead the proposition that farming was introduced to Britain largely by incoming groups of continental farmers (themselves perhaps as Thomas argued predominantly the descendants of foragers) has not been falsified. That proposition satisfies current evidence better than the idea that farming was adopted amongst insular foragers only by a desire to bolster group identities.

Indeed, as has long been suggested, farming was probably introduced to Britain mostly by small incoming groups of farmers and the main interaction between farmers and foragers happened thereafter (Piggott 1954; Sheridan 2009; Pailler and Sheridan 2009). That interpretation has been given more detail by the results of an extensive radiocarbon-dating programme focussing on the introduction of innovations to Britain and Ireland (Whittle et al 2011). Its conclusion is simpler than that put forward by Pailler and Sheridan (2009). The authors interpret the results to suggest small-scale colonisation of SE England starting slightly before 4000 cal BC. There is the usual problem of distinguishing between adoptions of continental practises by insular foragers, and immigration, so the latter has not been proven. Only isotopic or DNA analyses of much prior and subsequent skeletal material can settle that. The study shows that around 3800 cal BC there was a surge in building activities (Whittle et al 2011, 19-20); By then activities of types usually associated with farmers were abundant enough for their results to feature strongly in the archaeological record in Scotland and Ireland, although their manifestations were different from those in south-east England and there is as yet no clear case for suggesting that the earliest known structures in the north and west were built by the very earliest farming groups there (Ashmore 2004a, 134).

However, as Stevens & Fuller (2012) have argued cereal growing may have been introduced early in the 4th millennium BC but that does not mean that it remained a continuous success story throughout that and the next millennium, a point I shall take up again in discussing Phases 2b and 3 at Calanais.

24.4.4 Phases 2b and 3: First farmers near Calanais

The currently available evidence is scanty but it seems that by the second quarter of the 4th millennium the main source of plant food in Shetland, Orkney and the Western Isles was barley. In most of mainland Scotland cereals, hazelnuts and wild fruit were all used. In Atlantic Scotland domestic species dominated plant assemblages of c.4000 [perhaps better c 3800 cal BC] to 3300 BC (Bishop et al 2009, 56, 72). On the west coast of mainland Scotland and on the Inner Hebrides, however, people predominantly used wild resources (Bishop et al 2009, 90). The latter conclusion is however based on assemblages of plant remains from a very small number of sites (Bishop et al 2009, 50-57, 73). Even so, farming in Scotland probably had different histories in different areas (ibid 84).

Bishop and her colleague's review could be taken to suggest a sharp distinction between local foragers and farmers in the Western Isles; but the evidence is limited: only 3 sites in N Uist and one in Barra were available for their appraisal (Bishop et al 2009, 57). Also the remains of farming communities so far identified in the Western Isles need not represent pioneer settlement of farmers or adoption of farming; the typologically earliest pottery so far discovered (carinated bowls) was used for several centuries.

A less regionally precise study by Stevens and Fuller (2012) of dated cereal remains in Britain has led to the suggestion that cereal farming diminished greatly in importance around 3350 cal BC and remained unimportant, compared to keeping of domestic animals and harvesting of wild resources, until around 1500 cal BC. The authors suggest that the main cause was a climatic deterioration around 3350 cal BC (Stevens & Fuller 2012, 718-9). Although the authors suggest that islanders may have continued to plant cereals because of a scarcity of wild foods their conclusion for mainland populations of the late 4th millennium fit the pollen evidence from Calanais Leobag better; for it suggests that cereal cultivation ceased locally at some date between 3490 and 3020 cal BC, with the reservation that the evidence may instead have reflected changes in pollen capture rather than changes in pollen rain (see Chapter 21 Palaeoenvironment 21.3.6). But their accompanying suggestion that populations may have crashed at the same time does not match the (very limited) evidence from Calanais itself. There, as described below, there was fairly abundant evidence from dated charcoal accompanied by artefacts that there was at very least one settlement in the neighbourhood during at least a part of the last third of the third millennium (Phase 3).

At Calanais a piece of hazel charcoal found on Area F produced a date between 3640 and 3380 BC (SUERC-11601 4760+/-35 BP). It came from a dark greyish-brown slightly gritty clay soil overlying a depression; an underlying layer produced a piece of charcoal of significantly later date (SUERC-11612; 4475+/-35 BP, calibrated to between 3350 and 3020 cal BC) and the soil is interpreted as the result of a combination of levelling, shallow prehistoric cultivation and natural processes.

The earlier date falls within the latter part of Pollen Zone CaN-2c, which started between 4120 and 3830 cal BC and ended between 3490 and 3020 cal BC. Evidence for grazing of the local grassland appeared. At some date between 3875 and 3605 cal BC, ribwort appeared for the first time, along with cereal-type pollen. Cereal was grown near Calanais Leobag until the end of CaN-2c when its pollen disappeared temporarily from the record. The earlier charcoal date thus overlaps with a period when farming was being practised in the area. The later date approximates to the transition between CaN2c and 2d, so the charcoal could belong to either. Farming in the vicinity of Calanais Leobag ceased during zone 2d and it is tempting to suppose that the charcoal preceded abandonment of farming at Calanais itself.

No samples from Area F were analysed for pollen. It is frustrating that the evidence provided by the earlier date in its (secondary) context is so ambiguous. It merely provides a hint that further excavation in this part of the site may produce significant information about early farming activities at Calanais.

Thirteen radiocarbon dates from charcoal found inside the Ring belonged somewhere in a period between about 3350 and 3000 BC (Chapter 23:

Radiocarbon Illus 23.1). That corresponds roughly to the transition between CaN-2c and 2d when farming may have failed locally at some date between 3490 and 3020 cal BC and may not have been reintroduced until some date between 2980 and 2500 cal BC. But it must be stressed that the charcoal could be a few centuries older or younger than the transition and that the apparent similarity of the charcoal dates to one another may be illusory because of the plateau in the calibration curve at this period. Also the apparent cessation of cereal farming near Leobag, based on a lack of cereal pollen in the peat at Leobag may instead reflect only a thickening of the birch woodland canopy there.

The Phase 3 dates came from 9 contexts inside the Ring. Several of those contexts produced pottery (see Technical Note 24.4.4 for descriptions, catalogue numbers and other details). Areas S and H in the northern half of the Ring produced pottery from two contexts with Phase 3 dates. Nearly all were from E/MN Corky pots although there was also a piece of a Hebridean Incised pot and two sherds probably from Beakers. The other three contexts (352, 360 and 369) all came from Area D in the southern part of the Ring, and were probably imported soils and clays. Again most of the sherds came from E/MN Corky pots. But there was a definite fine Beaker sherd from basal cairn layer 360 while layer 369 in addition to many E/MN sherds produced a few E/MN Non-corky sherds, an E/MN Hebridean Incised sherd and a probable fine Beaker sherd.

Most of the pottery could belong to the same period as the Phase 3 charcoal. It seems likely that these contexts included both artefacts from the source of the soils and clays and artefacts contemporary with their movement into the Ring. Indeed in addition to Phase 3 dates layer 369 included charcoal of the first half of the 3rd millennium BC.

However three of the possible Beaker sherds from Context 369 (Cat 759_761) may have been from a much later type of pot. Those sherds, if they were indeed much later in date, may have been intrusive, for there were many ard marks at the same level and Victorian and possibly earlier disturbances nearby.

24.4.5 Further thoughts about Phases 2b and 3

The indigenous groups in the Calanais area before farming started were small and mobile, moving from resource to resource throughout the year; there is no particular reason to see them as having very complex societies (Zvelebil 1998, 12; Hardy & Wickham-Jones 2010). The best prospect for finding relevant evidence locally, given the general peat cover and changes in sea level, is exploration of the shallow waters of inner East Loch Roag.

The simplest interpretation of the pollen evidence from Calanais Leobag is that groups of farmers settled near Calanais from neighbouring areas at some date between 3875 and 3605 (the interpolated date for appearance of cereal pollen in pollen column CN3 at Calanais Leobag). If farming had thriven in mainland Scotland from 3800 cal BC it is credible that resource pressures had grown and that people sought new land rather than improving the productivity of their areas of origin (Boserup 1995). The evidence from Calanais Leobag would fit well with the idea that small groups of farmers moved from time to time to previously unexploited areas. Of course it cannot exclude the possibility that local foragers started farming.

Even though the calculation of the durations of the farming period and the subsequent period without evidence for farming is beset with uncertainties both seem to have lasted for many generations (Chapter 25 Technical Note 24.4.5a). The early local farming period lasted for between 285 and 585 years (say between 12 and 30 generations), and part of the area now occupied by the Avenue may have been used for cultivation (see Chapter 11: Area F). The subsequent gap in the record of cereal pollen at Calanais Leobag corresponded to some 330 to 520 years (between 14 and 25 generations). It is interpreted here as a period without local farming. However the possibility that cereal pollen ceased to be deposited at Calanais Leobag in pollen zone 2d because and only because of a local increase in tree canopy cover cannot be ignored (see Chapter 21.3.6).

The pollen evidence from Calanais Leobag suggests that whether or not after a period of non-cultivation cereal was grown locally from a

date between c. 3000 and 2500 cal BC and the evidence from Calanais itself suggests that it was grown from around 3000 BC.

Despite the gap in the record of cereal pollen at Calanais Leobag there were almost certainly settlements in the general area of Calanais at some times between about 3300 and 3000 BC. The preferred interpretation of the presence of late 4th millennium charcoal and pottery inside and near the Ring is that the vast majority of it was brought there during Phase 7 (at some time between 2600 and 2350 cal BC) in clay and soil from by then old settlements or activity areas. That 'ancestral material' may have been intended to be the soils and clays themselves rather than the potsherds included in them. One can speculate that it in some way reflected claims to the monument from more than one local community.

A settlement from somewhere in the early to mid Neolithic may lie near the pre-modern grain-drying kiln just to the west of the stone setting where stonework and (mainly E/MN non-corky) potsherds were found in a test pit (Chapter 13: Test Pits G and J; Chapter 18: The Pottery Assemblage).

In favouring the idea that farming was introduced by incomers, I have to follow Thomas (2005, 113) in stressing that this is only 'one attempt to reconcile recent discoveries'. A range of other possibilities is discussed in Chapter 25 Technical Note 24.4.5b. More cogently there is a clear interpretative problem in, on the one hand, the presence of charcoal probably derived from settlements of the period 3300 to 3000 cal BC, and on the other hand the gap in the cereal record in the pollen at Calanais Leobag in the later 4th millennium cal BC (if that gap was not caused by closing of the birch woodland canopy over the sampling spots). More fieldwork including a search for settlements and a better-dated pollen record is required.

24.5 Phase 4: The early ditch

24.5.1 Description of the ditch

In Illus 24.5 shows Area D south of the chambered cairn. The early ditch is outlined by very pale green streaks where primary silts have been truncated by later ploughing. They are most readily seen to the right in the bottom third of the picture. The nearer green streak runs in a curve as far as the stones near the central monolith at top left. The ditch is partially obscured by the remains of cultivation bed soils and it was clear that the stratigraphic sequence was first the ditch, then the cultivation beds and then the central monolith. The fills of the ditch in the foreground of Parts of the ditch had been excavated to the right of the mini-baulk.

There was no evidence for the ditch having been cut through a soil or a turf line. Although a fragment of a turf line survived on Section DC (Illus 24.6 that seems to have been associated with a pit. Probably the uppermost fills of the ditch and the surrounding contemporaneous ground surface had been destroyed during creation of the cultivation beds.

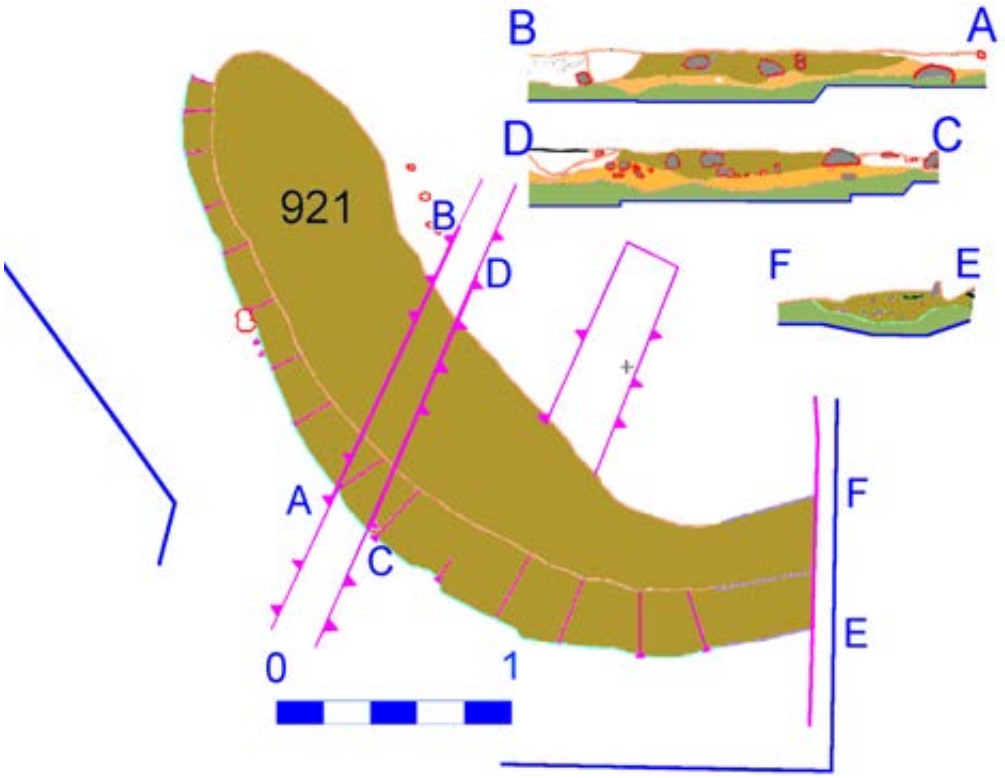
In some places the top several centimetres of the natural green clay by the ditch had been modified into dirty orange clay. Near the east baulk of Area DI a small dump of dirty orange clay overlapped both the fills of the ditch and the clay through which it had been cut. Another orange clay dump was recorded near Ring stone 47. They were reminiscent of a basal orange clay hump at the east end of Area DII which also lay on natural clay without an intervening soil or turf line. It seems that there too any pre-existing turf line had been removed during the succeeding cultivation phase. It was not clear what the humps were because we did had too little time to excavate the lowest levels of Area D, but because one of them overlay truncated fills of the ditch and natural clay they may have been related to cultivation bed building.

The surviving top level of the ditch was about 0.6m wide and 0.2 deep. There were two bands of greasy clay in it which may represent short duration stabilisations. Where best preserved its main lower fills consisted of gritty green clay probably derived directly from the natural clays. No artefacts were found in it.

In the northwest it may have stopped about 2m from the position of the subsequent central monolith (Illus 24.5-24.6), but at this point excavation did not reach below cultivation soils.

Near where it met the east baulk of Area D its

Illus 24.5 The early ditch c. 5 June 1981 (Film 1981.20.11]



Illus 24.6 The early ditch 921 and extracts from Sections 95a and 95b [NMRS DC38194, (part) DC38226 and DC38227-8]

north side was cut by a cultivation trough and the plan made of it therefore has a kink northward which probably does not reflect its original line (Illus 24.6).

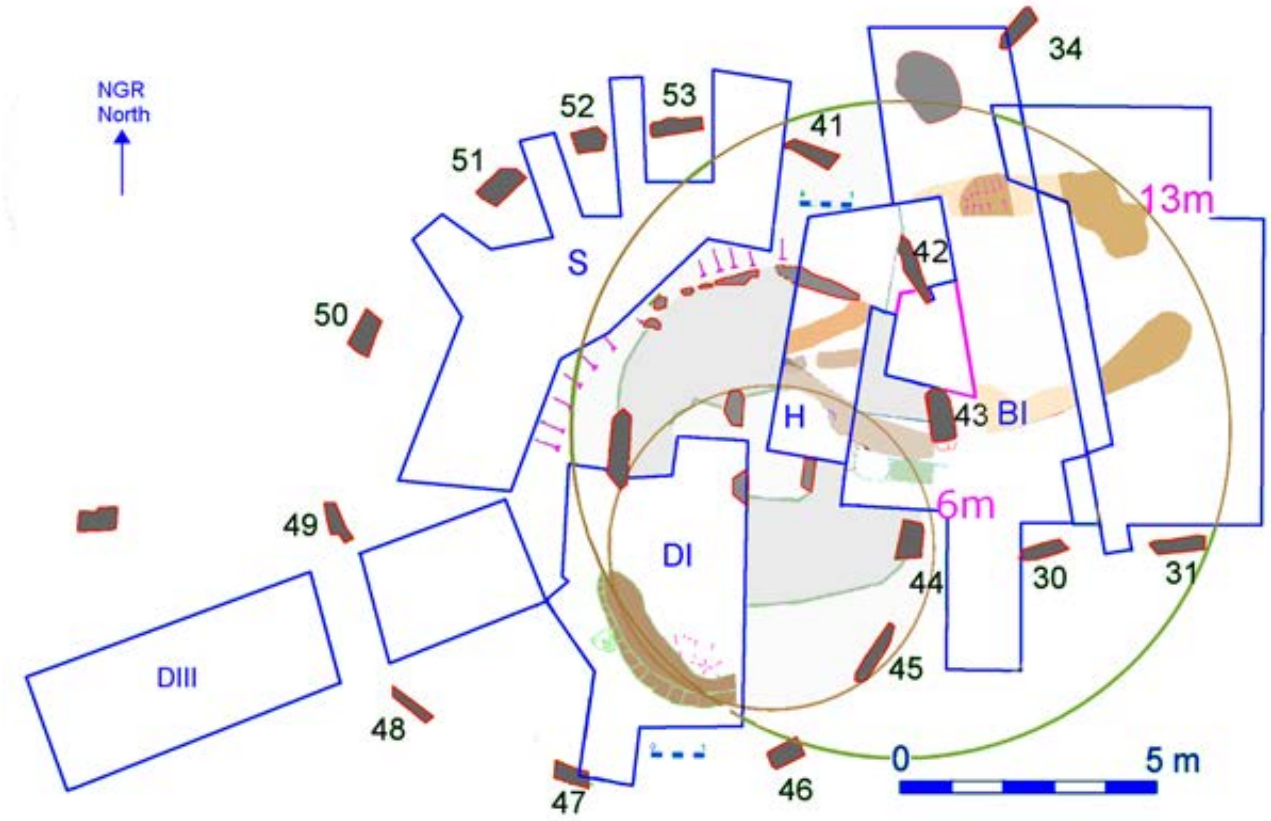
With one possible exception no traces of any related features were identified within its circuit, but that may have been partly because the overlying cultivation beds were not fully excavated and partly because of destruction by cultivation. The possible exception relates to a non-preferred hypothesis that slots formed an egg-shaped enclosure inside it (see Phase 8, Chapter 24.7).

24.5.2 Interpretation as a linear scoop

Given that its uppermost levels had been destroyed, it is faintly possible that the ditch was part of a structure like that at Low Clone on the Solway Firth, where a long scooped hollow 20m in length and c. 0.5m deep with a flat bottom was associated with stake holes and linear stone settings (Wickham-Jones 2004, 231, 234 Figure 12.2). But the surviving ditch at Calanais was too narrow and shallow to form a useful windbreak and no potentially contemporaneous hearths, stake holes or linear stone settings were found in or by it.

24.5.3 Interpretation as a circular enclosure

On Illus 24.7 the features shown on Areas H and B were later and they are included because they may have destroyed earlier evidence.
Two circles defining possible continuations of the ditch if it were circular are depicted, one 6m in diameter and the other 13m in diameter. In Area H a 6m diameter enclosure ditch would have been partly removed by the slot and other complex features. The ditch would have run across the entrance of the passage where there was a change in the green clay possibly caused by the presence of a man-made feature. However on Area DIII where a large expanse of the natural green clay was



Illus 24.7 The early ditch and the likely range of its diameter if it were circular

revealed it included at least two distinct varieties of clay; a similar variation on Area B provides a preferred explanation. If the enclosure diameter was about 13m - as if it might be a functional predecessor to the Ring in a more easterly position - it is conceivable that its traces on Area B were confused by the later earthen bank just inside the line of the 13m circle. There was a shallow broad depression outside the bank there. But to the north it would have hit a large prone slab (Illus 24.7). There was no trace of a ditch in the south-eastern part of Area B. It is unlikely that it would have been missed even though the earliest strata here were not excavated. In Area S there was a slight depression just inside the 13m diameter circle but that was at a very superficial level (Level 2) and levels below 0.15m (the depth of the turf which was to be replaced here) were not excavated.

Other hypothetical circuits with diameters between 6m and 13m run up against similar problems. Altogether there was no convincing continuation of the ditch in the excavated areas if it had indeed been circular; and only the c. 6m diameter one cannot be dismissed entirely.

I am not aware of any well-dated analogies for a roughly circular enclosure of about 6m diameter as early as the first appearance of cereal pollen at Calanais Leobag (in Pollen zone CaN-2c at some date between 3875 and 3605 cal BC). The nearest parallel of perhaps that period in Scotland is Structure H at Chapelfield, Cowie, Stirling (Atkinson 2002, 145-7). There a 'pressure trench' about a metre wide, its edges demarcated in places by stake holes, enclosed an oval area 6.6 by 5.7m (measured from Atkinson 2002 Illus 6 on page 147) or 6m across (according to the text). There was a ragged pit near its centre. Its longer axis pointed NNW-SSE and its entrance was near the south end of the east side and about a metre wide. At the north side of the entrance was an L-shaped slot. A radiocarbon date (AA-26225; 6840+/-85) was obtained for charcoal in a posthole in this slot, but it was from multiple fragments of pine charcoal which were probably residual, for the related Pit II produced a similar date (GU-7201 6710+/-70 BP) from pine charcoal but a hazel nut shell from the same layer 694d in the pit produced a date calibrating to 3980 to 3780 cal BC (OxA-9234; 5085+/-45). The lumps of pine charcoal may have come from fossil trees in the surrounding bogs as Aldritt suggested in her study of the plant remains (ibid 178).

So Chapelfield Structure H probably dated to the first quarter of the 4th millennium and that corresponds roughly to the likely dates for the earlier part of Pollen zone CaN-2c at Calanais, overlapping with the first appearance of cereal pollen. The analogy does raise the possibility that the structure at Calanais was a domestic structure of some kind, the interpretation preferred at Chapelfield (ibid 188). But the comparison is a very loose one based on suppositions about the date, shape and size of the Calanais ditch. Also, given the regional variations in Scotland's archaeology (as discussed in Chapter 24.1.2 - 21.1.5) there is no reason to suppose that people were doing the same things at Calanais and near Stirling. So the Chapelfield evidence is not a good guide to the nature and date of the Calanais ditch.

If the ditch had instead been dug at some date around 3000 cal BC it might have had a similar function to small hengiform enclosures. But only two radiocarbon-dated Scottish examples of small hengiform enclosures, Pullyhour in Caithness and the henge at Broomend of Crichie, have been published in modern times and both date much later. Pullyhour had a terminus post quem of the middle of the 2nd millennium BC (Bradley and Lamdin-Whymark 2009, 3). Broomend dated to after 2000 BC (Sheridan 2007, 221). Neither can usefully be compared to the Calanais enclosure except at a very abstract level.

The ditch need not have outlines a (roughly) circular area. An extremely loose analogy might be drawn with the very much larger enclosure ditch of Structure 2 of the ceremonial complex at Balfarg Riding School in Fife. Only partly preserved, the enclosure was of the order of 50m in diameter. The ditch itself was between 0.5 and 1.1m deep and its width varied between 2.2 and 4.5m (Barclay and Russell-White 1993, 90). It was dated to around 3000 BC (ibid, 47).

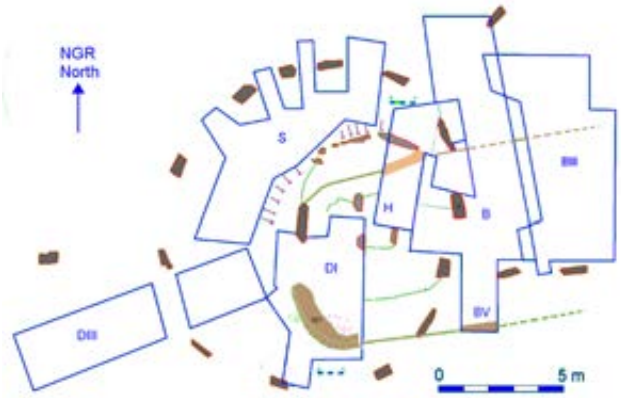
At a similarly very broad conceptual level the Calanais ditch could be seen as a miniature version of the early enclosure at Stonehenge, which probably dates not much earlier than 2910-2670

cal BC, the date for piglet bones in the lowest secondary fills (Parker-Pearson et 2009, 29). But that too was very much larger.

Both of these enclosures were very different in scale from that implied by the ditch at Calanais. All came from different regions with possibly quite different traditions. They should not be used to suggest its function.

24.5.4 Interpretation as a sub-rectangular enclosure

Perhaps the ditch was not part of a round enclosure. Could it have been straight-sided with rounded ends (Illus 24.8)? Two linear features, one in Area H and the other in Area BV, might be called into aid to reconstruct such an enclosure despite the southern one being interpreted as a cultivation trough and the northern one (as excavated) being at a slightly 'wrong' angle.



Illus 24.8 Reconstructed long enclosure based on the early ditch and two supposed cultivation troughs

Could these have originally been other parts of a sub-rectangular enclosure ditch? If so, and if the ditch dated to around 3000 BC, it is conceivable that the enclosure was a structure similar in shape to Balfarg Riding School Structures 1 and 2 (Barclay and Russell-White 1993 173 Illus 71). The latter were post-built not ditched, but their walls were intended to define an open area. They were between 9 and 9.5m wide, with gently rounded ends. Structure 1 was slightly under 19m long - almost exactly twice as long as it was wide. The possible enclosure at Calanais would have been slightly less than 7.5m wide with gently rounded ends (Illus 24.8). If similar in proportions to the Balfarg Riding School structures it would have been around 15m long. Its purpose would have been to define an area in which human bodies were exposed after death (Barclay and Russell-White 1993 182). The broad similarity of Grooved Ware pot 61 from Calanais and some of the grooved ware from Balfarg Riding School could be called in aid of the suggestion that similar things might have been happening at both places, albeit with the usual proviso about using distant comparanda and the perhaps more decisive criticism that the grooved ware pot at Calanais was found in a stratigraphically much later context than the ditch.

For this hypothetical reconstruction to succeed we would have to have missed remains of a ditch up to 0.6m wide and 0.2 deep forming the north side of the structure on Area B. Such a feature might well have been destroyed within the later oval enclosure immediately east of the Ring but even if partially ploughed out it should have been visible in the eastern part of the trench. Near the position of the projected northern ditch of the hypothetical Balfarg-style enclosure there were indeed enigmatic linear features (Illus 24.8). They were interpreted as possibly the remains of part of a cultivation bed system. But their fills had no characteristics in common with those of the ditch. The fact that we did not find any postholes similar to those inside the enclosures at Balfarg Riding School is also a deterrent to embracing the idea. Overall, the idea that the ditch was part of a similar enclosure for exposing bodies on raised timber platforms is almost certainly wrong.

24.5.5 Discussion

It is far from clear what shape and size of area the ditch enclosed. It is even less obvious why it was dug. Although it could have been part of a domestic structure or a funerary enclosure, it could have been created for a more sophisticated reason, for instance to delineate an area in which the moon appeared to set at the lunar maximum

when viewed from some position near the north end of the ridge on which Calanais sits. It is just east of the lunar major standstill moon-set position viewed from the north-east stone of the later Avenue (Curtis and Curtis 1998, 23).

Given these uncertainties the preferred interpretation is simply that it enclosed an area of unknown shape and dimensions, dated to c. 3000 cal BC or earlier and was subsequently obscured by cultivation beds.

24.6 Phase 5a: Cultivation beds

24.6.1 Description and reconstruction

On Illus 24.9 and 24.10 the troughs and possible troughs between cultivation beds are shown in brown. In the southern part of the Ring on Area D the beds were labelled 1 to 4. The beds averaged about 1.5m between the centres of flanking troughs (note the subsidiary scale set at right-angles to the beds). They seem to have been created by spade or hoe cultivation. No definite ard marks were associated with them, and in places, notably on Area DII, turfs appear to have been cut and turned upside down to help form them. The optimum breadth for 'no-tread' cultivation beds worked by modern hoes is about 1.3m. With a trough about 0.3m wide most of the beds at Calanais fitted that prescription fairly well.
Silting and turf lines formed in some of the troughs. The whole system seems to have been affected by subsequent level tilling and in some parts of Areas DI, BV and H by manual levelling.

Only the troughs in the southern parts of Areas DII and BV and the middle trough in Area H were well formed; and only Area D Bed 4 and Bed 2 were clear. All the rest were to varying degrees represented by fairly minor changes in the composition of the soil or by slight changes in height. Gulley 100 in Area BI was the base of a much later drainage ditch running from the mouth of the chambered cairn passage but it is conceivable that the drain followed an earlier depression. Gulley 121 in BIII (not part of the system but on roughly the same orientation) was a textural change in the lower part of the later plough soil rather than a neatly defined feature. The rubbly ridges and very vaguely defined troughs in Area BIII may instead have been related to the entranceway of a subsequent enclosure (Phase 9b). The beds in Area C, to the east, were not excavated and at the level where the troughs between them appeared there were traces of other features (see Chapter 8 Area C Illus 8.26). One may have been the base of a circular mound; but it may instead have been the west end of the upper middle cultivation bed on Illus 21.10.

So the reconstruction depicted on Illus 24.9 and 24.10 is tentative. Most elements of the system, considered individually, can be interpreted in different ways. Nevertheless, the consistency of the orientation of the putative beds and troughs and of later features which might have followed their line suggests that even if the detail is sometimes wrong there was an early cultivation system similar to that shown.

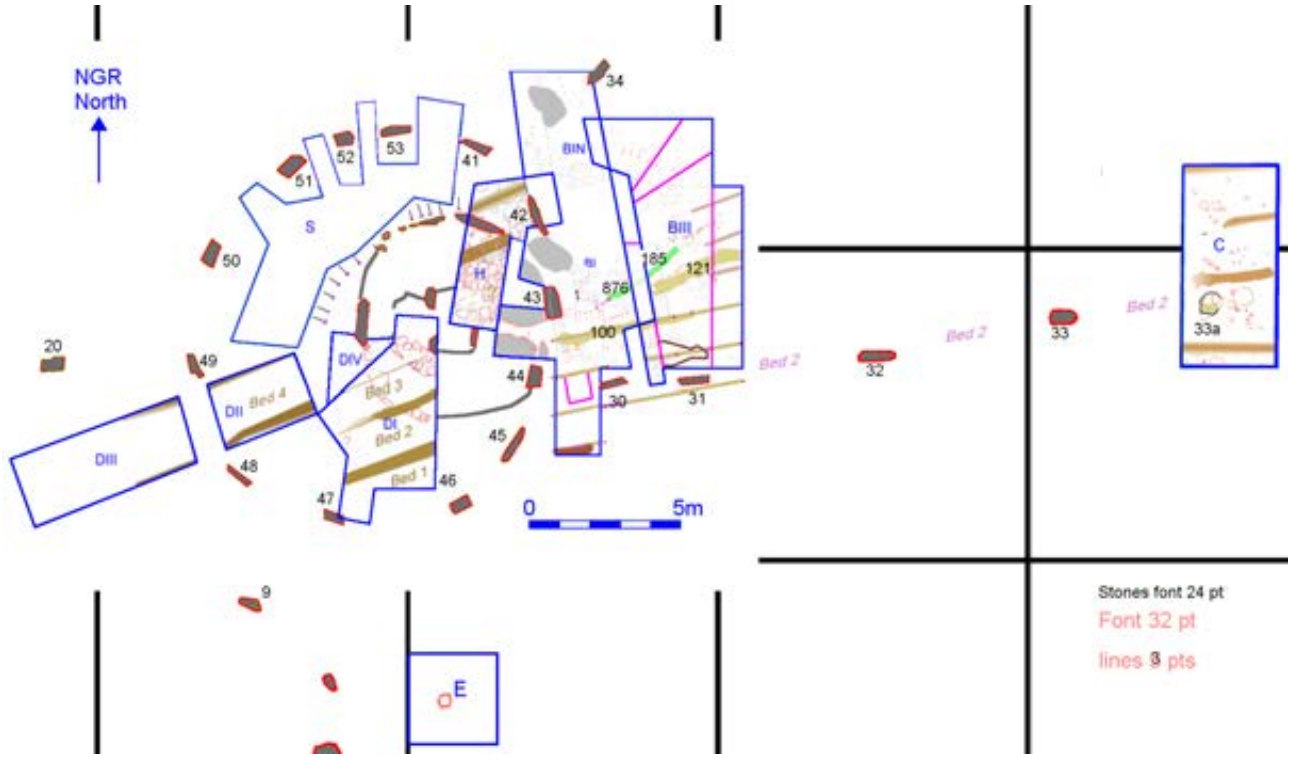
The system on Areas B-D-H and that on Area C need not have been in the same 'field' as each other. The best-defined cultivation bed on Area C was significantly broader than those in B-D-H, although the other two were about the same breadth as on Area D (Illus 24.9). Their general orientation was closer to east-west. They remained largely unexcavated after their surfaces were revealed. No pottery was retrieved from their soils.

24.6.2 Dating the cultivation beds

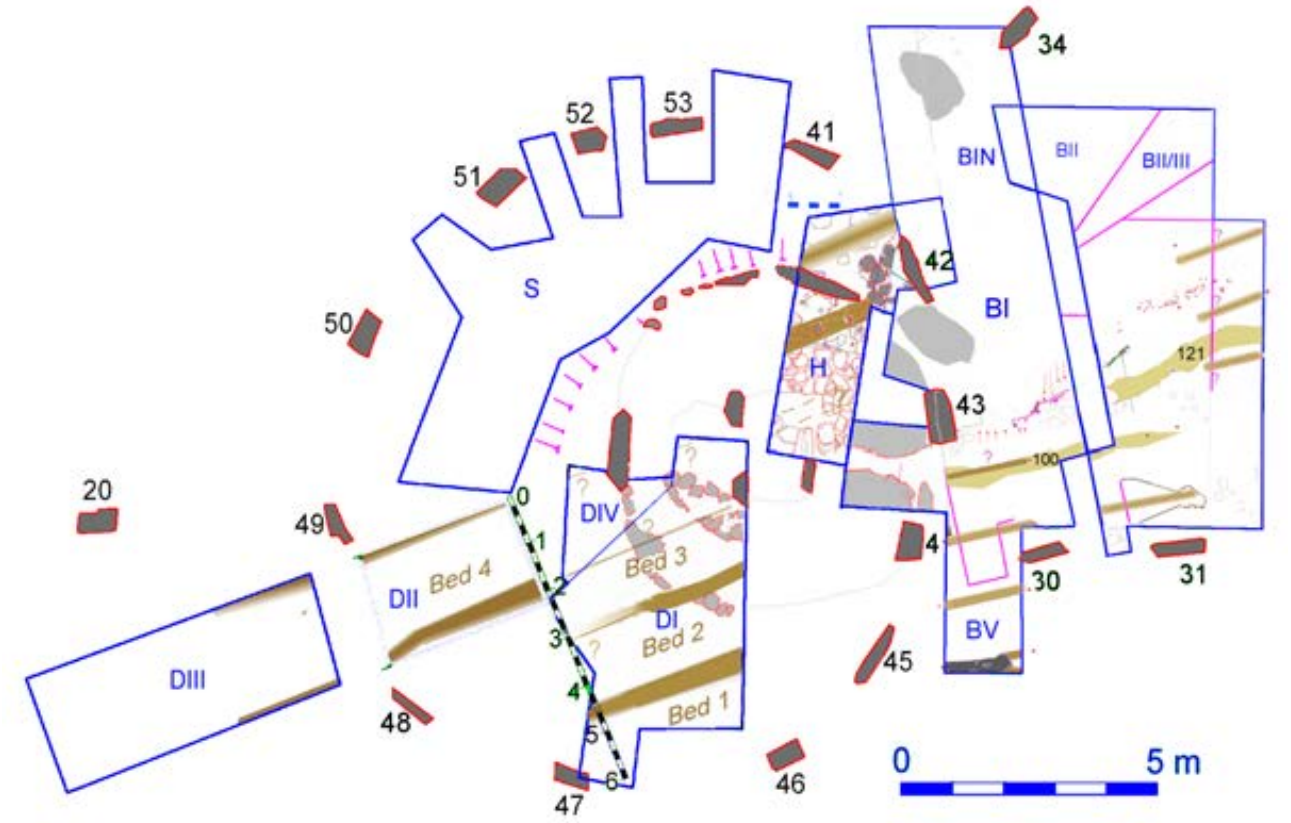
Cereals reappeared in the pollen record at Calanais Leobag at the transition from Pollen zone 2d to 3a (Chapter 21: Palaeoenvironment). The turf lines immediately overlying the beds were also zoned to that transition. The cultivation beds were probably used and abandoned somewhere between 2980 and 2510 cal BC. Other dating evidence from Calanais suggests that they belonged around the earliest part of that range, in round terms dating to c. 3000 BC.

24.6.3 Discussion and Comparanda

Cultivation beds thicken the soil, improve drainage, and allow the sun to warm the soil better, adding a few days to each growing season. In the centuries around 3000 BC average temperatures



Illus 24.9 The cultivation beds and troughs in the central area (note supplementary scale shown in Area D)



Illus 24.10 The cultivation beds and troughs (with 10m grid squares)

around Calanais were possibly much like those of present day Argyll, and those extra days would have been precious. There was no evidence from the Calanais excavation for the precise crop (the only cereal grains discovered date to the mid 2nd millennium BC); it was presumably either a variant of barley closely related to the bere still grown today, or emmer wheat or both (Bishop et al 2010).

Cultivation beds have long been known from a variety of contexts under 4th to 2nd millennium mounds in England and Wales (Barclay 1993, 232). However, the discussion here will be restricted to Scotland and Ireland.

Nearby sub-peat cultivation beds at Calanais Fields have not been dated directly. Peat started growing over them at different times in the 1st millennium BC (Chapter 23: Radiocarbon; Flitcroft et al 2000; Johnson et al in prep). But given the likely interval between abandonment of beds and peat growth initiation on Area C at Calanais it is conceivable that those at Calanais Fields were also significantly earlier than the basal peat there.

At Machrie North on Arran several areas of cultivation beds were found under peat (Barber (ed) 1997, fig 59). The beds in Trench 24/50a had a wavelength of 0.8 to 1m. They were interpreted as having been shifted each year, the furrow of one year being overlain by the bed of the next (ibid, 108). Beds in other areas were not excavated after they had been identified. On Area 24/50 beds set at much the same angle as each other were identified by sample-trenching in an area at least 60m by 55m. Beds at a different angle were found at the NW edge of the area investigated, the change in angle reflecting a change in topography (Barber (ed.) 1997, 106 Figure 59). Pollen analysis of a nearby column produced cereal pollen at an estimated date of 5375 BP (Robinson and Dickson 1993, 117). A large error of +/-217 years should be assigned to this estimate (Technical Note 24.6.2). The date then calibrates to between c. 4700 and 3700 cal BC. But the earliest basal peat date from typical parts of the Machrie North area varied between the 1st millennia BC and AD. In effect the cultivation beds may have been of almost any date between about 4000 BC and 1000 AD.

Beds found under the barrow at North Mains, Strathallan, were spade or hoe dug, up to 0.15m high and had a wavelength of 1.8-2m (Barclay 1983, 191, 231-2). They were thus 12% to 25% wider than most of those at Calanais. They overlay pits, one of which contained a sherd of a 'Neolithic' bowl (ibid, 191, 215). A charcoal deposit at the interface between the fossil soil and the overlying mound produced a radiocarbon age (GU-1134; 3805+/-100 BP) (ibid, 192) which (after its quoted error has been adjusted to 140 to compensate for weaknesses in dating technology at the time it was measured) calibrates to some date between 2900 and 1700 cal BC. The charcoal appears to have been mixed and the precise relationship of the context to the cultivation activity was uncertain (ibid 192).

Field systems of roughly the same epoch but without cultivation beds survive in peat-covered areas elsewhere. At Scourd of Brouster, Shetland, Whittle excavated a complex of field systems and domestic structures (Whittle at al 1986). The first phases of two of the houses were dated to between about 3350 and 2900 cal BC. The fields formed an irregular patchwork covering a huge area (Whittle et al 1986). Charcoal from cultivation levels in a bog was dated to between 3050 and 2450 cal BC. The latest dates from the area (from charred barley in House 3 Phase 1) fell in the first half of the 3rd millennium BC.

At Machrie North on Arran another early field system (24/03) was dated to the 'Neolithic period' by the occurrence of grooved ware in a small pit cut into hill-wash deposits overlying them (Barber (ed) 144). Their absolute date is not clear but they should belong before about 2300 cal BC, despite the fact that technically the sherds provide only a terminus post quem for the pit; the sherds may have been collected during later activities nearby, as were the Food Vessel sherds on Calanais Area C and the Hebridean incised ware sherds on Calanais Area E. The system appeared to consist of field enclosures measuring up to 200 by 50m (Barber 1997, 144-5) and may have been very different from that at Calanais.

Early field systems have been found at several places in County Mayo, Ireland; others survive below peat there and in County Donegal. They varied from large regular fields to small irregular ones. Cooney, in reviewing the evidence, cites a

suggestion by Woodman and colleagues that some of them may have been related to control of animal movements (Cooney 2003, 50).

At Céide Fields, near the north coast of County Mayo, there was a 12 km2 system of large regular enclosures. Pollen analysis suggested a pasture phase starting about 4000 BC that ceased by 3200 cal BC (5200 to 4500 BP; Caulfield et al 1998, 635). They thus seem to have been used somewhat earlier than the cultivation beds at Calanais. However Caulfield did not record the presence of cereal pollen or cultivation beds so the comparison is very loose, particularly because farming in 4th millennium Ireland and Britain had very different emphases (Thomas 2005).

At Belderg Beg in County Mayo a large area of shallow cultivation ridges broadly comparable in size to the cultivation beds at Calanais has been studied using micro-morphological and palynological analysis (Verrill & Tipping 2010, 1214-1225). A phase of ard cultivation immediately preceded the ridges. Midden material was added to the soil of the ridges. A radiocarbon date for basal peat suggested a Mid to Late Bronze Age date for the cultivation.

Barber thought that the survival of the field systems at Machrie North may have been aided by a lack of 'late Bronze Age' (late 2nd to early 1st millennium BC) activity (Barber 1997, 145). This is a cogent point. Remains like those at Calanais are even more fragile than the dilapidated field walls on Machrie North. It seems all too likely that most remains of many 4th and 3rd millennium field systems disappeared well before the start of history. Nevertheless, the brief survey of early cultivation bed systems in Scotland presented here makes it clear that abundant evidence probably still survives in Scotland under peat and 4th to 2nd millennium earthen structures, and possibly under colluvium.

Direct evidence from Scotland for early cereal growing exists in the form of radiocarbon dated grain from around 3800 cal BC and from later in the 4th and 3rd millennia (Ashmore 2004, 127, Fig 11.3). A review of plant remains from Scottish excavations (Bishop et al 2009) suggests that cereal cultivation was widespread in Atlantic Scotland during the period from 4000 to 2500 BC, although there were considerable regional variations in subsistence practices. Stevens and Fuller have argued from a study of radiocarbon dated grain that in many areas of Britain cereal farming failed around 3350 BC when there was a deterioration in climate, although perhaps not in offshore islands (2012, 715-6, 718).

The study by Bishop et al (2009) suggests much local variation in subsistence in Scotland but its main impression on me is how patchy and poorly dated much of the evidence for cereal cultivation in Scotland is. Perhaps Barber was too pessimistic (1997, 146-7) in supposing that lowland and highland agricultural systems would have been very different from each other during every past period, rather than being variations on an overall theme.

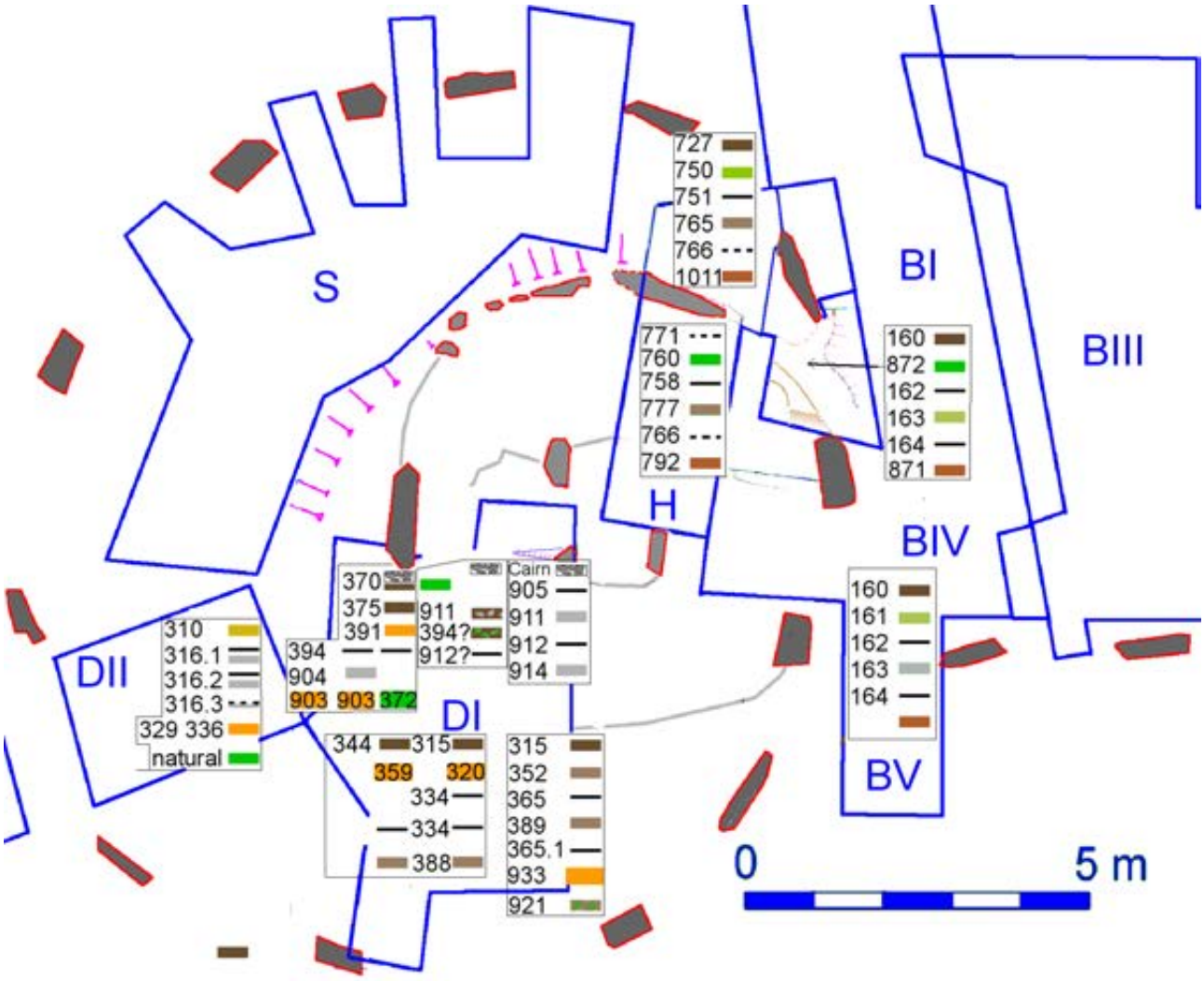
The examples from Calanais, Machrie North and North Mains allow a prediction that 3rd millennium cultivation systems discovered in future in Scotland, and possibly also 4th millennium systems, will consist of beds or ridges up to 0.2m tall separated by shallow troughs or fairly abrupt gullies, with a wave-length between 0.8 and 2m. Ard marks may delineate beds as at Machrie (Barber 1997, 106) but judging by the evidence at all three sites most cultivation earlier than 2500 BC will prove to have been by hoe or spade. The evidence from Machrie North suggests that (some) systems will be extensive and will lack formal boundaries (Barber 1997, 145). That seems to have been the case at Calanais.

This is a bold prediction, given the small size of the present sample and the ambiguity of the chronological evidence. Also, a drastic reduction in cereal farming on the mainland between 3350 and about 1500 BC remains a possibility, as Stevens and Fuller suggested. So surviving remains of early cereal cultivation systems may be restricted on mainland Scotland to the half a millennium between 3800 and 3350 cal BC.

24.7 Phase 5b: Turf line formation

24.7.1 Formation processes and distribution

Before turning to the detail of the earliest surviving turf lines it seems useful to provide a general description of the occurrence and nature of turf lines at Calanais.



Illus 24.11 Some of the sequences including turf lines, which are shown as black lines, in dashes where weak

Apparently coherent and widespread turf lines survived on Area D, Area H and the western part of Area B (Illus 24.11).

Most of them had been preserved by overlying clays, the latter often altered by soil processes to light grey or grey-brown. Weaker ones also left traces on those areas. Fragments of turf lines survived elsewhere, particularly in the fills of depressed areas like the early ditch on DI or the troughs between cultivation beds, foe example on BV. On Area DII three turf lines in a cultivation bed may include stacked layers of turf rather than consisting solely of in situ turf growth. Turf lines at the south end of BIII, BV and on Area S are not shown on Illus 24.11.

The colour and texture of their litter layers varied. Some turf lines were black and very smooth textured. They may originally have had a mossy element. Others were grey or brown with an almost greasy texture. The soil horizons below the litter layers were also diverse. Some were a thin near-white band of stone-free clay. Others were blotchy grey and brown. In some cases the litter layer itself was not distinct from its underlying horizon. Distinguishing between such pairs of layers and a worked soil with no litter layer was sometimes possible only during post-excavation analysis of box-samples.

The most extensive strong turf lines survived on Area D (contexts 334 and 365) and on Area H (contexts 751 and 758). On D the context numbers were applied to two patches of old ground surface in each of which was a stack of two turf lines with a thin grey layer between them. But their apparent

coherence was probably partly an illusion. It seems highly likely that some pits had been cut from the top surface and turf had re-grown over them, for the pollen in the pits suggested a date later than that of the main turf line. Also, in places, the two turf lines merged; elsewhere they were well separated (for instance by clay 389 near the east section on DI on Illus 24.11). In its final form the upper turf line included pollen characteristic of the transition from CaN-3a to CaN-3b which dated to between 2560 and 2200 cal BC at Calanais Leobag.

More generally on Areas B, D, H and S a variety of circumstances and successions was recorded and determining the significance of all of the variations and interactions of the turf lines proved impossible using the traditional excavation technique of trowelling and attempting to remove later strata first.

The process of turf formation in Area H may have been as complex but less clay and soil seems to have been dumped there before the cairn was partially demolished and its stones taken away for construction elsewhere. The sequence on Area H was therefore somewhat simpler to record.

In the western part of Area BI the sequence was similar to that on Area D, with mostly two turf lines a few centimetres from each other, or one turf line. There were traces of a third higher turf line between Ring stones 42 and 43, but the surviving sequence had been considerably complicated by subsequent activities related to the Ring, chambered cairn and enclosures.

The crucial question is whether the turf lines in various parts of the Ring and immediately to its east ever formed a single old ground surface, and if so, how often. One widespread pair of turf lines does appear to have consisted of the pre-Ring old ground surface and a turf line which grew over spread spoil from the digging of the Ring stone pits. It is represented by 164 and 162 in Area B and the two layers of 334/365 on Area D (Illus 24.11).But the sequences further west in Area D may well include earlier turf lines and also, possibly, sets of cut and stacked turfs. A superficially similar sequence of turf lines in the top of ditch 921 is not included in Illus 24.11.

We found no evidence (apart from the very imprecise hints offered by stratigraphy) to show how long individual turf lines had grown. In Areas B, D and H where an area of turf had been partially covered by clay it stopped developing while continuing to form elsewhere. Their colour (and thus distinctness) of their litter layers could have had more to do with the amount of moss in them than their longevity. Clearly turf lines would be treacherous chronological indicators.

Overall, the answer has to be that from time to time turf seems to have been growing on an old ground surface common to more than one of the excavated areas, but different parts of the ground surface were covered up at different times, the turf lines were cut by intrusions which healed over, and other turf lines and layers of cut turfs grew or were laid at different times. In practise, then they could not be assumed to be of the same date as each other. Each comparison had to be argued separately

24.7.2 The earliest turf lines

In outline the way in which the earliest turf lines formed was fairly clear. It is illustrated in Illus 24.12.

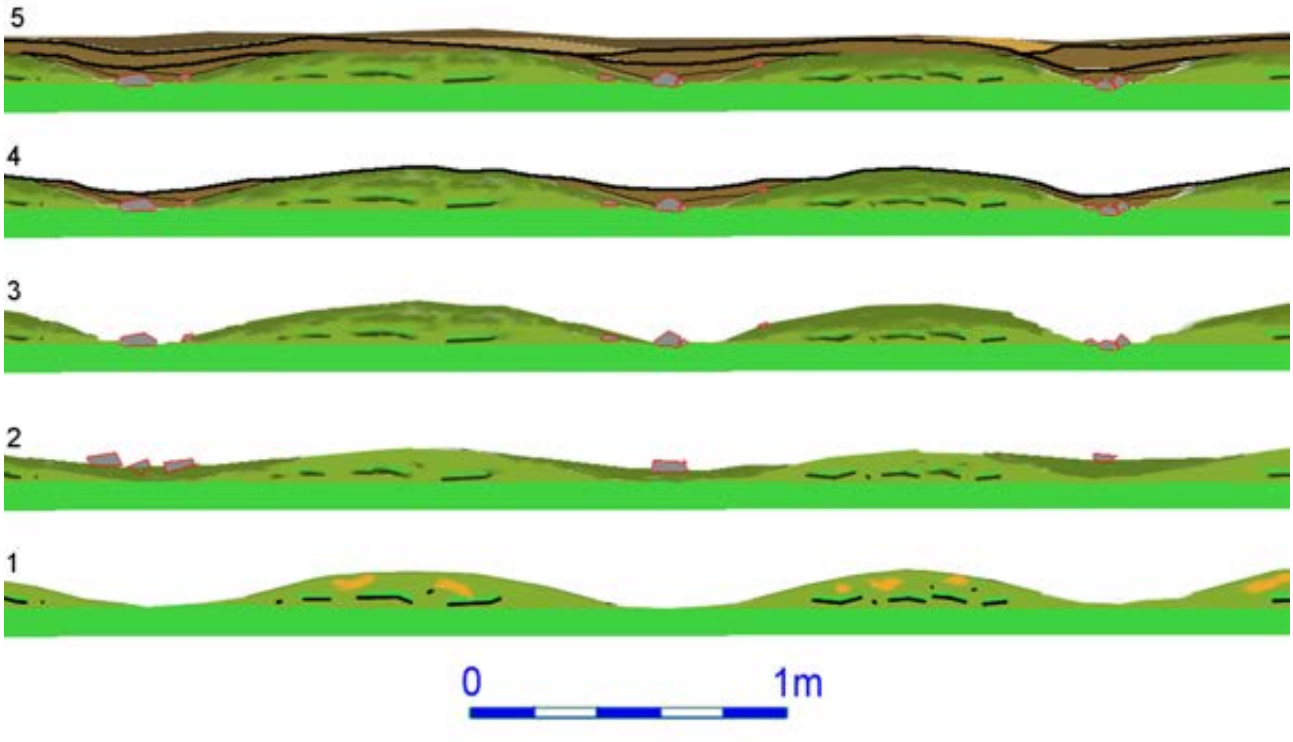
1. Thin turf and soil was removed and piled up with some of the turfs left upside down; this created a set of beds and troughs with a wavelength of around 1.6m;

2. hoe cultivation led to accumulation of soil, mud, silts, clay, weeds and a few cleared stones in the troughs;

3. at least some of the troughs were cleared out at least once leaving stones but removing silts and decayed organic material;

4. the troughs again silted up with short lived turf lines (or layers of organic material from decayed weeds) forming and being covered in turn by silts and debris;

5. clay and soil was dumped on the old beds in some areas; some of the cultivation beds were truncated along with the turf lines which had formed on them; this process was probably repeated at least once in some areas.

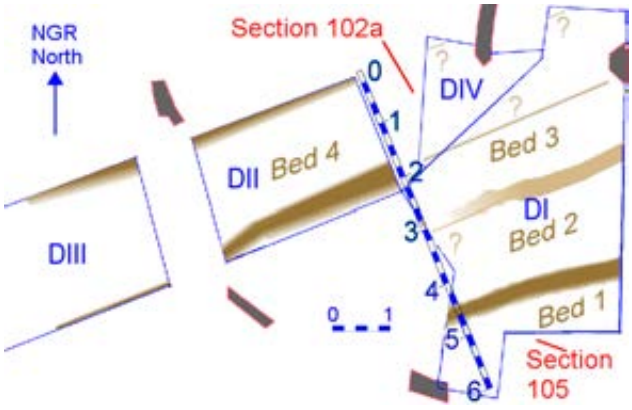


Illus 24.12 Formation and deterioration of turf in the cultivation bed system

Barber (1977, 108) may well have been right to suggest that when early cultivation beds were renewed their position was shifted by half a wavelength. If so, further complications would be expected. For instance the trough between beds 1 and 2 in Area D contained a succession of turf lines (or thin layers of decayed organic material). There and elsewhere new turf lines formed, merging with earlier ones. In several places there were two successive thin turf lines but in some of the troughs there were remains of three or more and elsewhere sometimes only one. Sometimes that was because of truncation and sometimes because a turf line had continued to grow while other parts of it had been covered by soil or clay.

24.7.3 Chronology of the earliest turf lines on Area D

Two sections were sampled using Kubiena boxes and analysed for their pollen contents (Illus 24.13). On Area DI the earliest surviving turf line on Section 105 belonged in pollen zone CaN-2d. A second one belonged at the transition from CaN-2d to CaN-3ai. Subsequent turf lines, probably post-dating the cairn, belonged to CaN-3aii and to the start of CaN-3b. The earliest surviving turf line on Section 105 may have been a patch on the pre-cultivation surface normally removed elsewhere (or evidence for the shifting of beds sideways between one period of cultivation and the next; more excavation is needed to resolve this). The second turf line probably corresponded to abandonment of the cultivation beds.



Illus 24.13 Location of Sections 105 and 102a

The earliest surviving turf line on Section 102a, a metre or so from the central monolith, was as-

cribed to 3aii and the underlying silty layer 904, interpreted as its soil, was ascribed to CaN-2d and CaN-3ai. The sequence to the north of the sampling point was difficult to interpret but included at least one higher turf line and a fragment of turf. A patch of black greasy clay 379 in the fill of the southern trough of Bed 4 on Area DII was assigned to the beginning of pollen zone 3ai. It may have been a turf line or the decayed organic-rich remains of weeds pulled from the adjacent cultivation beds and dumped in the trough.

The transition from CaN-2d to CaN-3a took place between 2983 and 2510 cal BC at Calanais Leobag but the interpretation of the dates of later features at Calanais itself suggests the true date of the first turf line covering part of a cultivation bed was at the beginning of that range. Thus the cultivation beds probably ceased to be used around 3000 BC. Those interested in detail should refer to Chapter 21: Palaeoenvironment.

24.8 Phase 6a: The central monolith

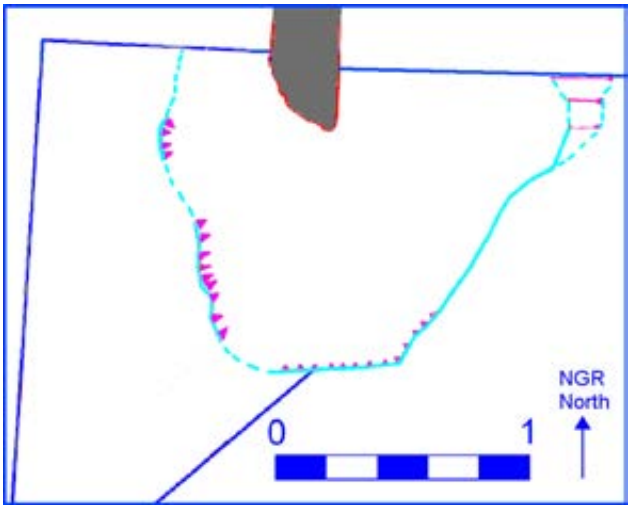
24.8.1 Excavation

The height of the monolith before excavation was 4.8 m (Ponting and Ponting 1984, 28) or 4.75 m (15 feet 7 inches) according to the original RCAHMS survey (NMRS RCD/13/12).

The pit dug for the monolith was about 1.7 m across from east to west with the eastern part more than twice as wide as the western. Its east side sloped at between 20 and 30 degrees. Its west side was more nearly vertical (Chapter 9: Area D). The shallow angles of the eastern side of the pit imply either that the side of the pit was slanted for erection of the monolith or that its edge was compressed as the monolith was levered up. The asymmetrical pit solution is proffered in Illus 24.15.

If it be assumed that about one fifth of it was buried in the ground then the pit in which it was set would be 1.2 m deep and the stone would have been about 6 m long. At about 6 m long by about 0.3 sq. m in cross section, and a density of 2.52g/cm3 (measured from a large Calanais gneiss pounder in my temporary possession), the monolith would have weighed about 4.5 metric tonnes.

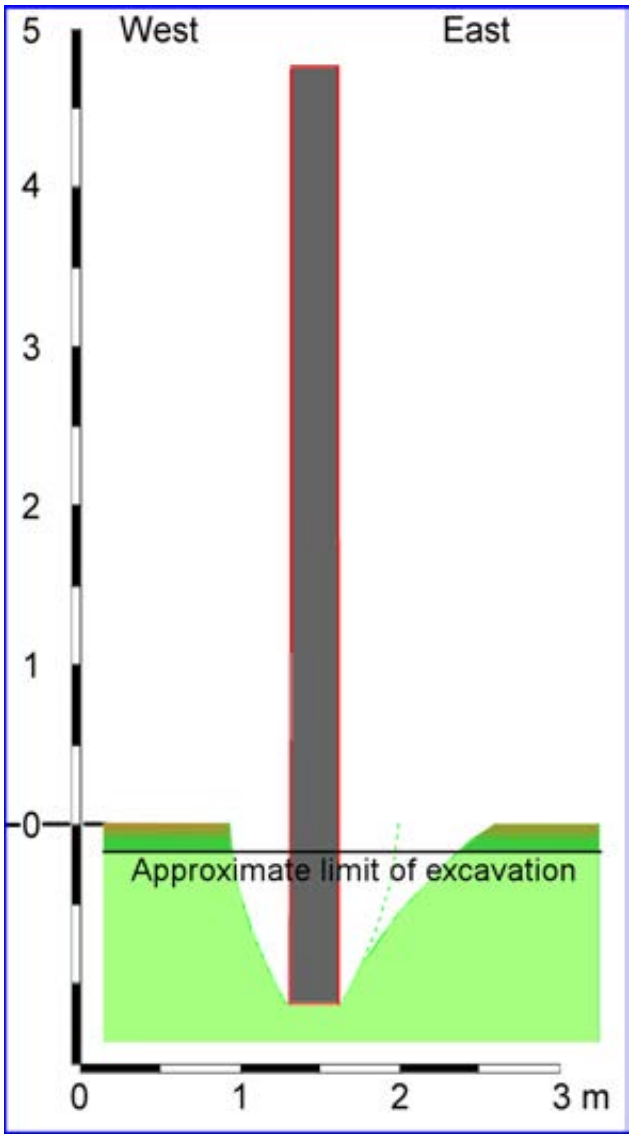
Illus 24.14 The Central Monolith from the west [David Henry, Historic Scotland 1984]



Illus 24.15 The pit for the monolith

24.8.2 Raising the monolith

Pine could have provided substantial timbers which could have been used for erecting stones. Substantial fossil pine stumps survive under the



Illus 24.16 The monolith and pit

peat in several parts of Lewis. The main cause of an early loss of pine woodland cover about 6800 BC appears to have been one or more short periods of violent weather. Radiocarbon dating places many other pine deaths between 3700 and 2700 cal BC (Dickson and Dickson 2000, 37-39, 67). That covers the period when the monolith was erected. Pine pollen appears (admittedly in small quantities) in the earliest levels of the CaN-3 part of pollen diagrams at Calanais and is present in all subsequent levels. Pine charcoal at Calanais was radiocarbon-dated both to between about 3400 and 3000 BC (SUERC-11597; SUERC-11592) and to between about 2500 and 2300 BC (SUERC-11590; SUERC-11591). Given that only four pieces of pine charcoal were dated that is not very significant, but the earlier charcoal might have come from trees available about 3000 BC.

Margaret and Ron Curtis have conducted experiments in moving and erecting stones of about 1.5 tonnes in the Calanais area. They tried both rollers and a wooden frame consisting of a horizontal bar held up between two tripods. In the latter experiment the stone was joined to the bar by two pairs of ropes, and poles were twisted between each of the sets of paired ropes to provide lift. This arrangement allowed a few people to move the stone slowly across the landscape (Curtis and Curtis 2008, 49).

Other possible techniques for moving stones with a small number of people have been described. It has, for instance, been suggested that stone or wooden ball-bearings could have been used on wooden rails. The existence of carved stone balls of consistent diameter, with decorative affinities to Grooved Ware, has been called in aid of this theory. The technique allowed 8 people to move stones of 3.3 to 6 tonnes at a rate of a few miles an hour (Young 2011, 44-5).

Curtis and Curtis found that levering a stone to raise it required a large amount of timber. Beyond an angle of about 60° the stone became difficult to manage. The easiest way to proceed was to raise the stone before the pit was dug, using a bar and two tripods as above, with four rope-pairs used two by two to raise the stone to the vertical (Curtis and Curtis 2008, 49). Their method required only the two of them to erect a 1.5 tonne stone.

In discussing the erection of stones at Stonehenge, R J C Atkinson (1960, 129-134, particularly 133) suggested that the foremost of a set of rollers could have been used to pivot the stone through an initial angle, reducing the effort required to raise it. Given the observed dimensions of the pit at Calanais, once the leading roller reached the edge of the ramp the front 1.7 m of the monolith could have been hanging over the pit (Illus 24.17). It could then be raised until it came to rest on the ramp.

Atkinson quotes E H Stones (1924) to suggest that shear-legs would greatly diminish the effort required to pull a monolith towards the upright. Thereafter the monolith would tend to jam against the far side of the pit and timbers may have been

used to prevent this. Burl cites an experiment at Bougon near Niort in central France where greasy stakes were used to lubricate the heel of the monolith, and clay in the pit served to help hold the monolith in place (Burl 1993, 70). Once the toe of the monolith reached the bottom of the pit the monolith could be pivoted on its end.

In Illus 24.17 the shear-legs method is depicted. In the reconstruction I have chosen to place the shear-legs on the east side of the pit because I think that that might allow better lift overall; and the closer the top of the shear-legs was to the top of the stone the better lateral control it would provide. The timber supports are not supposed to be the only timbers in use. The figures, in modern dress, are intended to provide an intuitive scale: the taller ones stand to about 1.8m (a bit under 6ft).

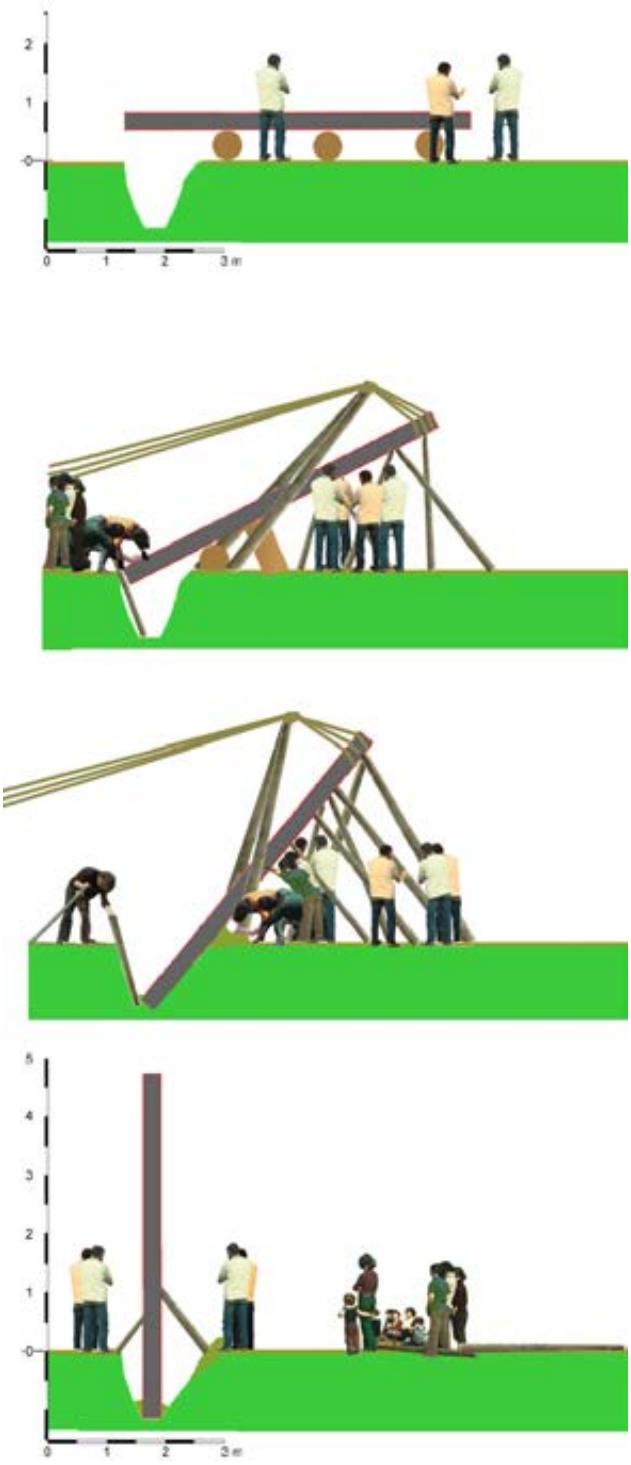
Once the stone was upright the socket and the ramp were filled with stiff green clay and stones. A flat-topped mound of large stones and green clay was built round the base, wider on the east side where the pit was wider, presumably to provide additional support for the monolith.

Ponting and Ponting (1984, 23) illustrate a variant of this method in which the top of the stone is raised on a latticework of logs (the 'leverage platform') to an angle of about 40 degrees to the horizontal before being pulled up the rest of the way. Many other methods have been suggested, including earthen ramps

24.8.3 The workforce required

One problem with wooden shear-legs is that they would be weighty. The stone may have been erected without one. Leaving that thought on one side, Atkinson reported that erection of a stone weighing 26 tons would require a pull of 4.5 tons which could be produced by 180 men each exerting a pull of 56 lb. (c. 25 kg.).

The monolith at Calanais weighed about 4.5 metric tonnes. Converting Atkinson's figures accordingly, the monolith would have required a pull of around 800 kg. Ignoring the slight difference between a metric tonne and an imperial ton, Atkinson's figures imply that the central monolith at Calanais may have required 32 people to pull it



Illus 24.17 Monolith erection

upright. But it probably required far fewer. Farmers would be used to hard labour and could probably pull with considerably greater force for considerably longer than Atkinson's figure suggests. They could probably have exerted a short term pull of about 50 kg (110 lbs) each. Burl suggests a comparable figure of 100 lb (c. 45 kilos) per man

(1993, 70). Thus 16 strong people might have been enough, particularly if the stone was propped up between surges of effort. A few more people might have been needed to ensure that the stone did not topple sideways. This estimate is similar to that of 18 men for a 4 ton stone which Burl based on the erection of a stone at Down Tor on Dartmoor (Burl 1993, 70, 83).

Thus around 20 workers along with their dependents could easily have erected Monolith 29. But social factors probably determined how many people actually did the work. Perhaps local beliefs required the efforts of as few people as possible. Perhaps they demanded the opposite and a whole community swarmed round the stone at an event designed to display the social prestige of some powerful or wishful person.

24.8.4 The area supplying the workforce

Given the variety of social models which could be hypothesised it is not possible to translate this into a good estimate of the minimum size of the area from which people came to set up the stone. There is no direct evidence for population concentrations near Calanais like those discovered on Orkney at Barnhouse and Ness of Brodgar. Nevertheless, it seems quite likely that communities with 25 strong fit people between them could be found between say Garynahine in the south and Breasclete in the north, particularly if more farmland (including grazing) was available then for exploitation because of the lack of peat on higher ground and the somewhat lower sea levels of the time.

Of course, in principle, the labour force could have come from a wider area on the west coast of Lewis, from all of the Western Isles or from a larger part of Scotland. Looked at another way, it might have taken only a few boatloads of people from somewhere else, perhaps people travelling along the western seaways.

24.8.5 The place of the monolith in the Calanais sequence

The 1980 and 1981 excavations did not prove that the monolith was earlier than the Ring but the stratigraphy allowed that interpretation and it is the preferred one because it would have been easier to erect the stone before the Ring had been built.

The monolith post-dated the cultivation beds (covered by turf at some date between c. 3000 and 2500 cal BC but probably in the earliest part of that range) and probably pre-dated the Ring, which while not absolutely dated is interpreted as having been erected between about 2900 and 2750 BC.

No pottery was found in layers associated with its erection and none was found in underlying layers. No charcoal samples were available for dating.

Aubrey Burl thought that the monolith would have been the earliest stone at Calanais: "The orientation of the Callanish stone does not respect the long axis of the ring … its broader face looking out to sea as a landmark" (Burl 2000, 203). In this statement he seems to be treating the Ring as elliptical (see Illus 24.31 below). In fact some other reconstructions of the geometry of the Ring suggest that differences between the ring axis and the central monolith are trivial (Illus 24.28, 24.29). Burl compared the monolith to the apparently unaccompanied tall seaside stones of Clach Mhic Leoid and Borvemore in Harris and the 5.8 m tall Clack an Trustal (Clach an Trushal) stone 16 miles up the coast to the north-east (Burl 2000, 203). This argument, if it was that tall isolated monoliths are found not far from Calanais, has recently been weakened by the briefly reported discovery of remains of stone settings, including a stone ring and possibly an avenue or another ring on a flat platform next to Clach an Trushal (Richards and Wright 2006, 171). Nevertheless, that monolith may be earlier than the adjacent stone settings, and given the difficulty of raising the monolith at Calanais once the Ring was in place Burl was probably right that the monolith was the earliest orthostat (with the proviso that there is no direct evidence for the date of the orthostats composing the south row and the southern part of the Avenue).

His idea that it was a marker for seamen is attractive, although it is worth bearing in mind that it is tucked well into the deep inlet of East Loch Roag. It may also have been further from the sea than today; a better understanding of the shape

of the contemporaneous coastline would help assessment of this notion. In a letter to Margaret Ponting in 1982, Alexander Thom described how in 1933, seeking a quite anchorage, he navigated his yacht with care between rocky islets and promontories, going as far up the loch as his chart allowed him to go in safety. As he stowed sail he looked up, and there was Calanais … he had not realised how close he was (Ponting 1988, 423). Perhaps rather than aiding navigation from afar it marked journey's end for one stage of a voyage. Contrariwise the monolith may have presented a warning rather than a welcome.

The preferred interpretation here is that it was primarily intended to mark the place of a planned greater structure including at least the monolith and Ring combined; and what led to its erection in this precise location was a formalisation of the place's prior significance within the landscape.

24.8.6 Comparanda

The central stone in the nearby ring at Garynahine is tiny, only 0.6m tall, and thus comparable only at a broad conceptual level. Nevertheless some have seen it as analogous (Burl, 1976, 153), which leaves open the question whether the Garynahine example was a pale imitation of the Calanais monolith or a feature which was of greater symbolic importance than implied by its diminutive stature.

Surviving central monoliths are fairly rare. There is one ring with a central monolith on the mainland of Scotland almost due east of Calanais, a group of four in SW Scotland, one in Berwickshire, two in inland N Ireland, at least twelve in SW Ireland, one in Anglesey, at least two in the middle Marches of Wales, four to six in Cornwall and three to five in Wessex (Burl 2000, 253 fig 30). Burl considered the stone settings in southwest Scotland as the nearest secure comparanda for the Calanais ring and central monolith (Burl, 1976, 205-8).

Central monoliths may have been raised for a wide variety of reasons, and there need not have been any direct connection between the people who set up the monolith at Calanais and those who set up central monoliths in other parts of Britain and Ireland. Some surviving monoliths may be the remains of compound structures. Avebury includes one of the most impressive British central monoliths in its south-south-east ring but it may be a relic of a more complex setting; three even larger central stones remain in the adjacent north-north-west ring (Smith, 1965, 223). Indeed the distribution of rings with central monoliths displays all the interpretational problems posed by the existence of regionality, as discussed in Chapter 24.1.

24.9 Phase 6b: The Ring

24.9.1 The archaeology of the stones

The mound and pit at the base of Ring stone 42 were partially excavated in Areas B and H. The layers round the base of Ring stone 43 were examined in Area B. Some of those around Ring stone 47 on Area DV were uncovered and its pit was partially emptied.

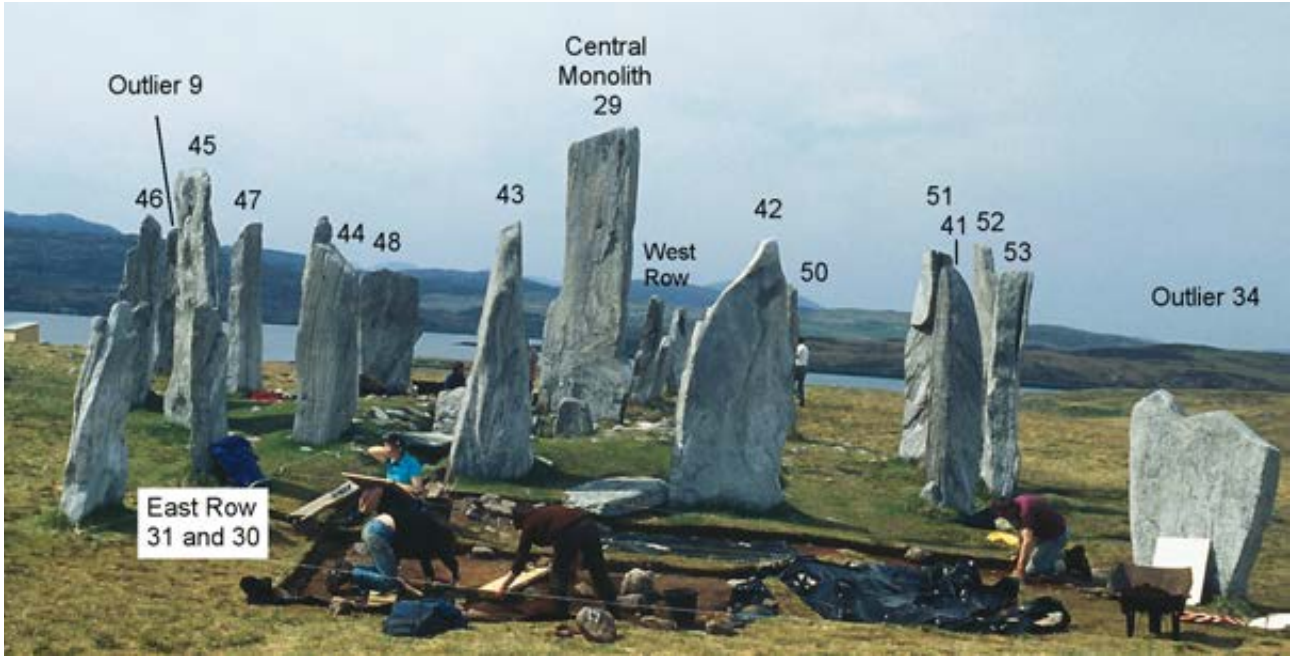
Because of an error in labelling when a find of pottery and charcoal was split up a piece of willow charcoal was long supposed to have come from fill 767 of the primary pit of Ring stone 42 (Ashmore 1999b; 230/81 AA-24969 4095+/-45); it was understood to provide a terminus post quem for erection of Stone 42. However recent re-examination of primary records shows that the charcoal came from upper fills of the chamber wall (Technical Note 12.8.5). The preferred date for erection of the Ring is now 2950 to 2850 BC because associated strata belong in pollen zone CaN-3ai (starting just after 3000 BC) and because it is similar to Stones of Stenness, where a Grooved Ware pot like the one from Calanais (ASH 61) was found.

The strata round Ring stone 42 revealed far more information than those round the others. Illus 24.20 to 24.22 show the preferred interpretation of the sequence.

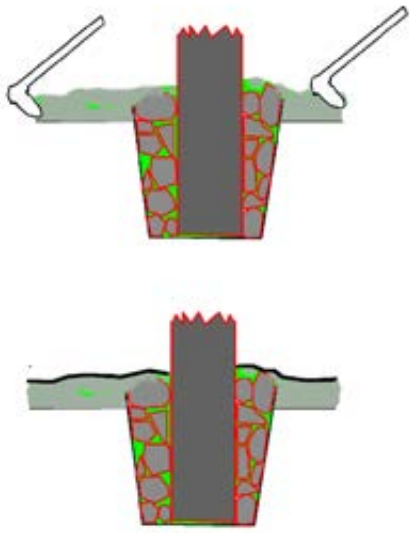
The pit was cut into a cultivated soil on which turf line 766 had formed (Illus 24.20). The orthostat was erected and stones and green clay were used to fill the pit, perhaps with a higher ratio of clay to stone than in the illustrations.

There may have been another episode of levelling of soil before the leftover clay spoil was spread out (Illus 24.21). A turf line 751 /758 formed. At

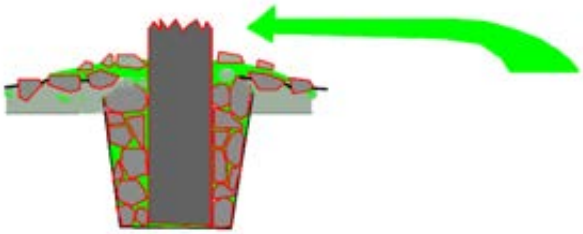
Illus 24.18 The Ring from the southwest photographed by D Henry of Historic Scotland in 1984, with stones numbered after Somerville



Illus 24.19 The Ring from the east-north-east, photographed by M Brooks of Historic Scotland in 1980, with stones numbered after Somerville



Illus 24.20 Erection of Stone 42 and emplacement of stones round it

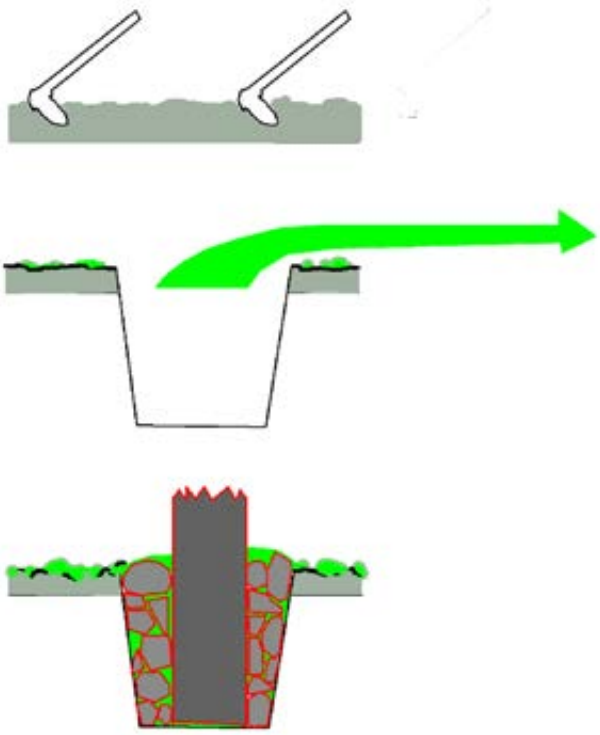


Illus 24.22 Latest phase of emplacement of stones round Stone 42

some later date boulders were placed around the Ring stone. They sank into the soft soil. The turf line continued to grow elsewhere (Illus 24.11).

It looked as if some green clay had been brought in from elsewhere because clay and more stones were dumped on top of the basal stones (Illus 24.22).

During our excavations the pit for Ring Stone 43 (on the north side of the entrance to the chambered cairn) was not excavated below the point where it cut the lowest turf line. Because of later disturbance any mound round its base did not survive. The original presence of a mound and subsequent disturbances when the chambered cairn was built, when it was robbed and when the secondary cairn was built may explain why the precise relationship of the pit to the turf line was slightly ambiguous - sufficiently so that it cannot



Illus 24.21 Turf growth

be regarded as providing independent information about the relationship of the second turf line to erection of the stone.

The top of the pit dug for Ring stone 47 in DV at the south end of Area DI had been at around the level of the composite turf line 365 / 334, the lower part of which was elsewhere interpreted as pre-dating the central monolith and the Ring. Because of the truncation near Ring stone 47 it is impossible to say anything more precise. A pit edge was recorded close to Ring stone 47 but the layers immediately to its north appeared to lie in a depression and may have been the fills of a ramp dug for erection of the stone (see Chapter 9.6). If that is right, then the recorded pit edge nearer Ring stone 47 was actually the edge between ramp fill and pit fill. Alternatively, given that the edges of the pit for Ring Stone 42 were 0.5m from the stone and the edge of the depression was c. 0.5m from the edge of Stone 47 we may simply have misinterpreted the fills because we did not explore them sufficiently. Further excavation is required to see which interpretation, if any, is correct.

In Area S (Chapter 14) trenches were excavated to a depth of c. 0.15m between Ring stones 50 to 53 and 41 to allow turf replacement. The archae-

ology was similar to that in Area H and in essence produced no significant evidence about the relative erection dates of the five Ring stones. That however is a neutral result given how restricted excavation was.

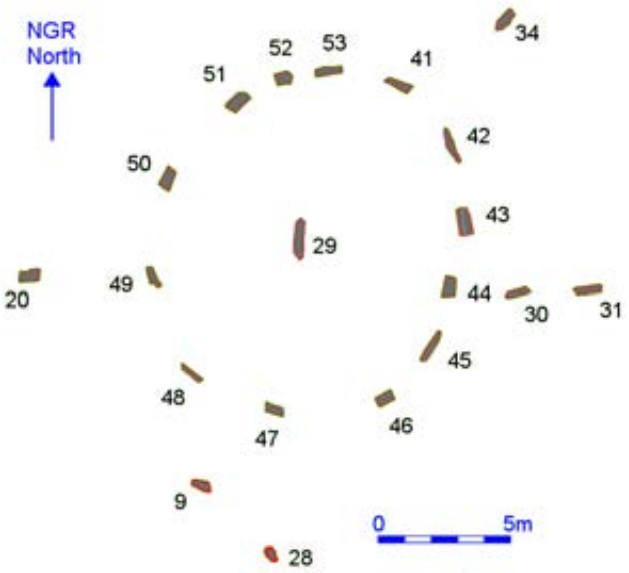
Despite the complications described above, where clear evidence survived the stone ring was set up through a turf line (Illus 24.11; 164 on Area B, 766 on Area H) into which the central monolith was also set. The chambered cairn was subsequently built inside the Ring with its back rising up over the mound at the base of the monolith.

On Area B turf line 164 (the lowest turf line on Area B) formed the old ground surface when the pit for Ring stone 42 was dug. A plain corky Neolithic sherd (Cat 176) was found in soil 871 below 164. The turf line itself contained an abraded non-corky Neolithic sherd (Cat 243), and three abraded sherds from two Hebridean Incised pots (Cat 313-4 and 317). Near Ring stone 42 green clay 872 which overlay a later turf line 162 was overlain by a thicker block of mottled green yellow lumpy clay (870) which formed a low mound southwest of the Ring stone. The same label was used for clay in this area at a lower level of the mound. One of these clays produced 2 conjoining Hebridean Incised sherds (Cat 315).

Sheridan sees all the corky, non-corky and Hebridean Incised sherds found at Calanais as parts of a single pottery assemblage (Chapter 18 The Pottery Assemblage 18.5.5). Most reached Calanais in artefact-rich Phase 3 soils and clays imported during Phase 7. But the sherds described above were in earlier contexts than Phase 7 and probably got into the ground during pre-Ring agricultural activities. There is no evidence that the sherds were fresh by the time they reached the positions in which they were found so they are not much help in dating erection of the Ring or defining the material culture of those who did so.

24. 9.2 The Ring and its stones

The plan of the Ring is not a true circle. Its east side is flattened slightly. It measures about 12.6m north-south from the centre of Ring stone 53 to that of Stone 47 and, less precisely, 11.6m east-west from half way between Stones 49 and 50 to half way between Stones 43 and 44 at the mouth of the cairn passage (measurements from plan, Tait 1978).



Illus 24.23 The Ring and nearby stones after Tait 1978

The stones vary so much in shape that it is impossible to define a typical one. Stone 43 flanking the north side of the later chambered cairn passage is tall and tapers to a point (Illus 24.19, 24.24).

Stone 51 has an almost phallic appearance with a blocky top; along with Stones 44 and 48 it has a top larger than its base (Illus 24.19, 24.25).

Stone 44 also has a distinctive shape from some angles; its top slopes up to a protuberance (Illus 24.19, 24.26).

Stone 48 in the southwest of the Ring stands out as unusually short; and its upper part is notably broader than its bottom (Illus 24.19).

Many of the stones have strong surface textures (Illus 24.19, 24.24-26). We did not record any evidence relating to preferential use of weathered or quarried sides for the interior faces of the stones.

The stones are not regularly spaced, particularly Stone 52 which looks as if it was intercalated between its neighbours (Illus 24.23). If Stone 52 is regarded as secondary the original stone spacing, centre to centre in straight lines, would have been as follows.

Illus 24.24 Stone 43 from the west, photographed by D Henry in 1984

Illus 24.25 Stone 51 from the south, photographed by D Henry in 1984

Table 24.3 Distances between centres of Ring stones excluding Stone 52

Western circuit	metres
Stone 42-41	3.0
Stone 41-53	2.6
Stone 53-51	3.6
Stone 51-50	3.9
Stone 50-49	3.7
Stone 49-48	3.8
Stone 48-47	3.5
Stone 47-46	4.2
Stone 46-45	2.6
Stone 45-44	2.4
Stone 44-43	2.4
Stone 43-42	2.9
Average	3.2

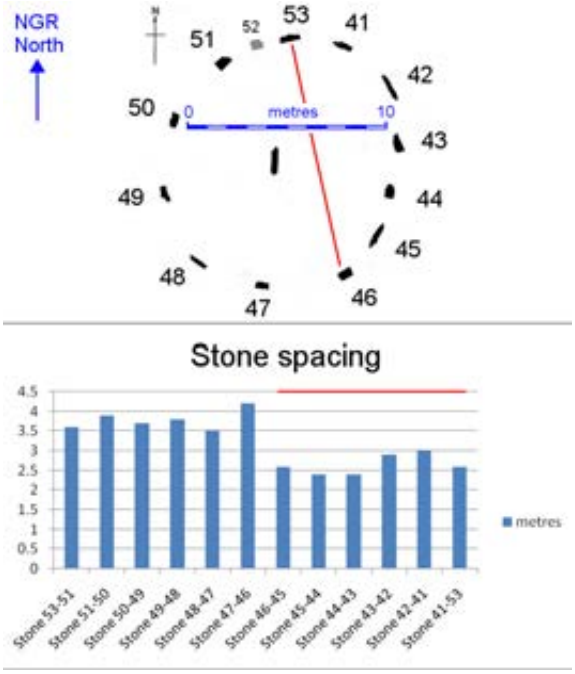
The average distance centre to centre is 3.2m. The number of measurements is so small that formal statistical tests cannot sensibly be applied to the idea that all of the average distances between centres were intended to be 3.2m and the observed differences were due to errors; but Table 24.4 suggests that this idea is wrong because a much higher proportion of small errors would be expected.

Illus 24.26 Stone 44 from the west, photographed by D Henry in 1984

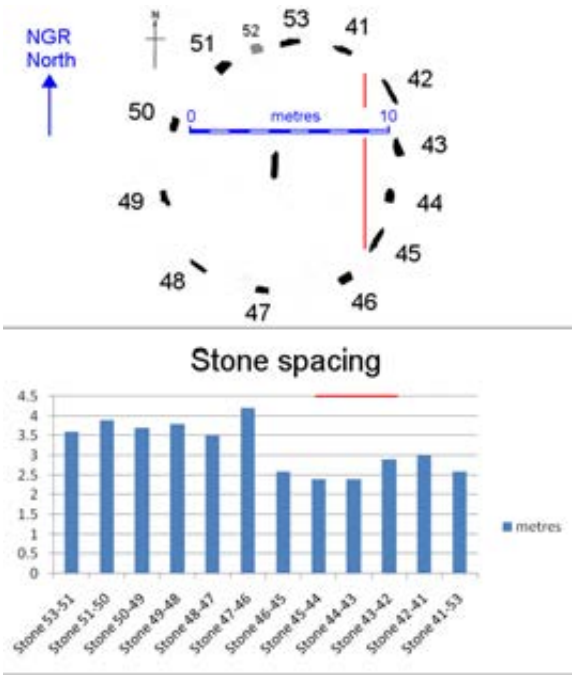
Table 24.4 Error sizes and numbers of such errors if a regular centre to centre distance of 3.2m was intended

Error size (m)	Number of such errors
0-0.09	0
1-1.9	0
0.2-0.29	2
0.3-0.39	2
0.4-0.49	1
0.5-0.59	1
0.6-0.69	3
0.7-0.79	0
0.8-0.89	2
0.9-0.99	1

If gaps between stones are measured the average is 2.3m.



Illus 24.27 Stone spacing



Illus 24.28 Stone spacing on the hypothesis that there was an eastern face

In Illus 24.27 the red lines demarcate a difference between stone spacing to east and west based solely on their values. The widest separation in the eastern group is shorter than the shortest separation in the western group.

Visually, within the eastern group the four stones 42 to 45 are on a flatter curve and are more closely spaced than the others and the Ring might better be divided into a western circuit and a flattened 'east 'face'. Stones 42 and 45 are much longer and thinner in plan than the others, which supports this concept.

Table 24.5 Distances between centres of Ring stones excluding Stone 52 and with a short 4-stone east face

Western circuit (Stones 42-41 and 53-45	metres	Eastern 'face' (Stones 42 to 45)	metres
Stone 42-41	3	Stone 45-44	2.4
Stone 41-53	2.6	Stone 44-43	2.4
Stone 53-51	3.6	Stone 43-42	2.9
Stone 51-50	3.9	Average	2.6
Stone 50-49	3.7		
Stone 49-48	3.8		
Stone 48-47	3.5		
Stone 47-46	4.2		
Stone 46-45	2.6		
Average	3.4		

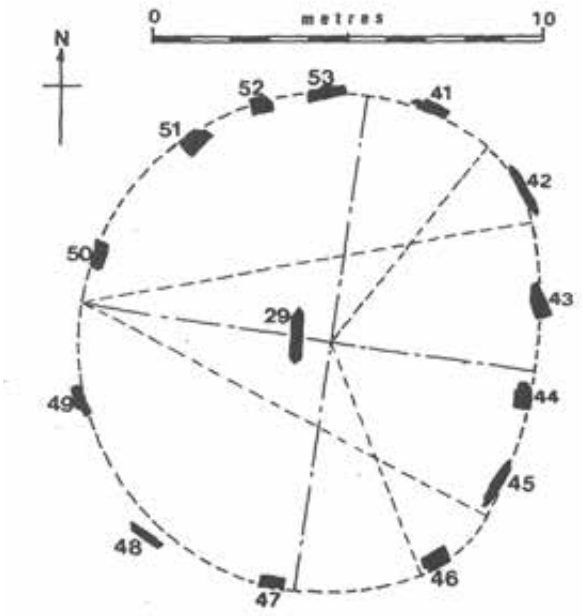
The average centre to centre distance between the 'face stones' is three-quarters (0.76) that of the western circuit stones.

24.9.3 Geometry or a practised eye

There are three main ideas about how that plan was conceived. One is that the stones were erected ad hoc over a fairly long period. Another is that the shape was laid out geometrically and the third is that it was laid out almost entirely in a single operation by eye and pacing-out.

Richards has suggested on the basis of ethnographic evidence that stones could have been added to a stone setting over many years as local magnates demonstrated their social standing by organising erection ceremonies (Richards 2005, 217, 224).

Although nearly all of the Ring stones appear to form a coherent plan Stone 52 in its northern part looks as if it was added as an afterthought in the gap between Stones 51 and 53 (Illus 24.23). This and the existence of Stone 9 to the south-west and Stone 34 to the north-east of the Ring provide support for the idea of ad hoc erection of some stones.



Illus 24.29 Construction of a flattened circle of Type A fitted to the Glasgow plan (Curtis 1980, Fig. 2)

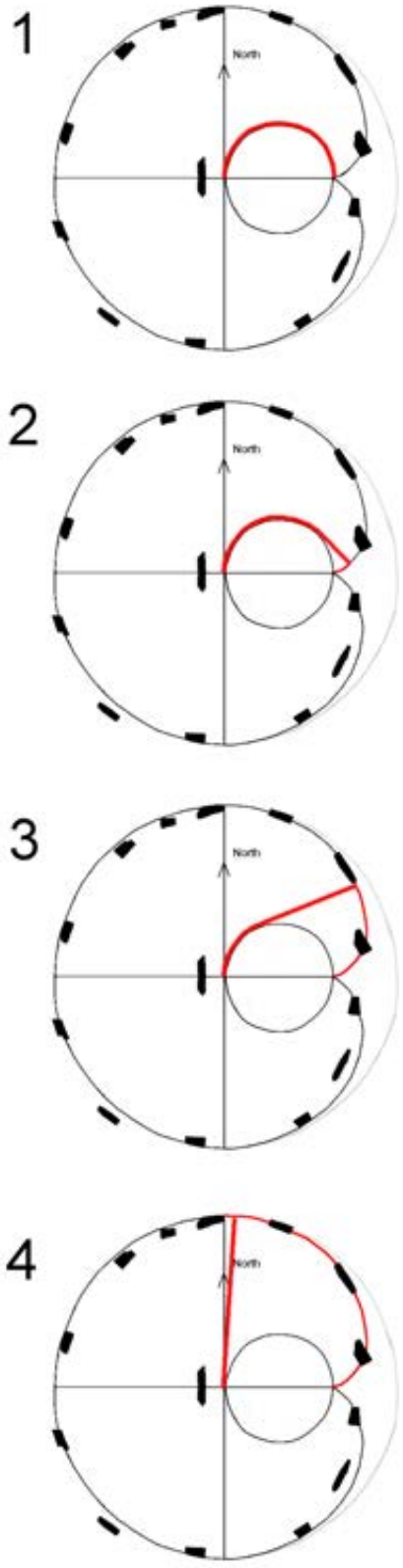
The excavation did not entirely settle whether Ring-stones 42 and 43 were erected over a short or a long period. The similarity of their stratigraphy in relationship to the green clay and turf lines running between them suggests that they were probably built at much the same time as each other, but in testing such arguments the devil is in the detail, and that was certainly ambiguous enough to allow the possibility that several years elapsed between the times that Stone 42 and Stone 43 were set up. Nevertheless the preferred interpretation is that

they (and by extension all of the Ring stones apart from Stone 52) were set up over a short period.

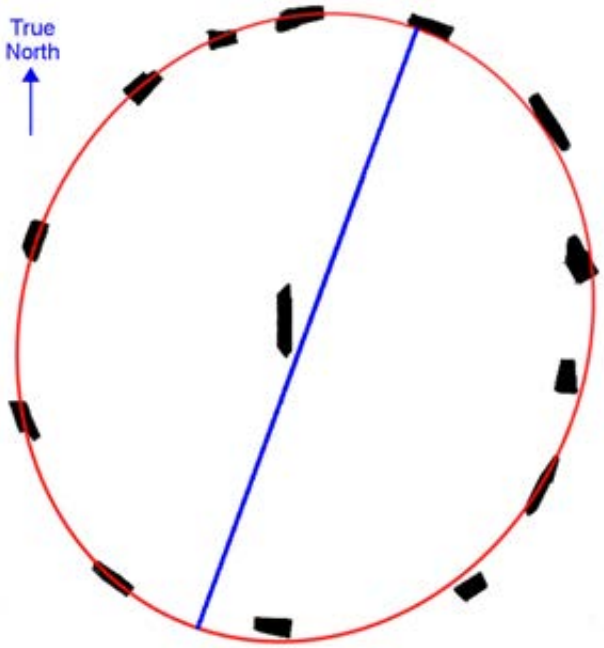
The doyen of ideas about the geometry of stone rings, the late Professor Alexander Thom, thought that the Ring was set on a flattened circle of his Type A, based on a complex geometric method (Thom 1967, 122). Ron Curtis has confirmed that Thom's suggested geometry works quite well, although the orientation of the axes in Curtis' reconstruction is slightly different from that suggested by Thom (Illus 24.29; Curtis 1980, 31; Ponting & Ponting 1984, 49). Apart from the fact that the intentions and intellectual frameworks of the builders of Calanais and other rings are obscure, the main problem with accepting the Thom method is that there are severe doubts whether a megalithic unit of measurement was ever used (Ruggles 1999, 82-3). It is impossible to exclude the possibility that local measurement units were used at a few individual sites and it is impossible to exclude the possibility that individual sites were intended to have a precise shape (particularly given that the execution of most projects fails to match their designer's aspirations). But studies of groups of various types of settings in various parts of Scotland designed to check Thom's ideas do not demonstrate consistent use of any unit of measurement or of consistent precise geometrical figures. The subject is covered in great detail by Ruggles in his magisterial 'Astronomy in Prehistoric Britain and Ireland' (Ruggles 1999).

I devised a simpler method in 1978-9. It involved creating a small preliminary circle of close-set stakes and then stretching a rope round its half diameter before drawing the rope out. That procedure produced a flattened circle with a cusp at the 'entrance' (Illus 24.30).

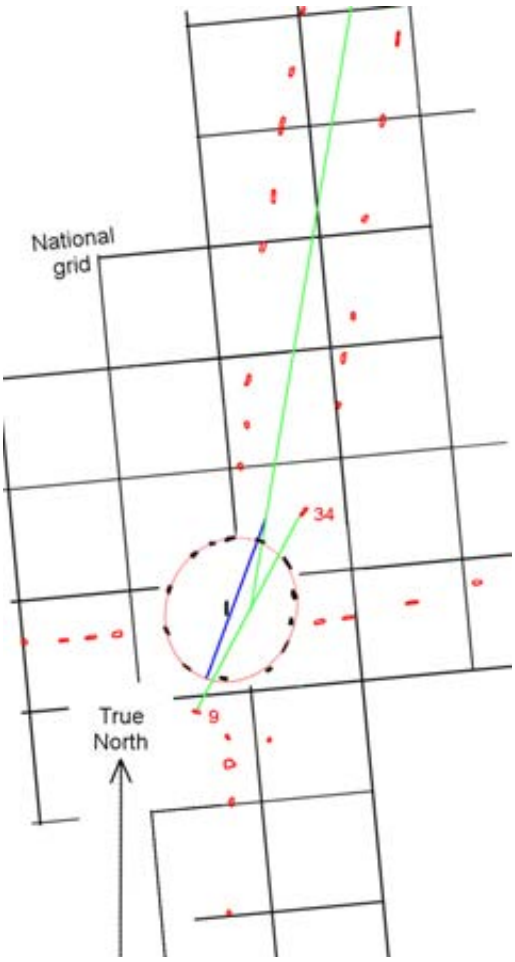
As a matter of record, the radius of the small preliminary circle, at very nearly 2m, would have been almost exactly one of Professor Thom's proposed units of measurement, the 'megalithic rod' (2.07m). However, none of the other Type A flattened circles on which I tested this construction produced a similar match between the radius of a preliminary circle and any of Thom's suggested units of measurement. So it is very likely that the similarity at Calanais was a coincidence in megalithic rods as much as it demonstrably is in metres, no more significant than the alignment of the West Row on modern National Grid east-west.



Illus 24.30 Another possible laying out process



Illus 24.31 The Ring as an ellipse



Illus 24.32 Lack of correspondence between alignments of ellipse, avenue and line between stones 9 and 34

The prior existence of the central monolith would have been a problem in the positioning of Stones 49 and 50, both of which are fairly accurately on the laid out shape; that is an argument against use of my method. Another, shared with the Thom method, is that there are severe doubts whether precisely shaped ground-plans were intended by those who erected stone settings (Ruggles 1999, 82-3). Also, neither of the attempts to derive the Ring's shape from geometry explains why the Central Monolith was not at the centre of the circle describing the western half of the Ring.

Burl (2000, 204) regarded the Ring as a poorly laid out ellipse. The one depicted on Illus 24.31 has its major axis (in blue) at 20 degrees east of north and an eccentricity of 0.88. Visually it matches the stones quite well, indeed quite as well as the flattened circle produced by the Thom or Ashmore methods. Minor elliptical variants would also fit quite well. This solution also suffers from the problems outlined above, and Illus 24.31 shows that an elliptical fitting does not bring out any symmetry in the plan of the Ring, and is therefore a less attractive solution to those people believing in the use of sophisticated geometry for Ring construction; that of course has no demonstrable bearing on what its builders intended.

In passing it should be noted that the avenue sides and centre line (main green line on Illus 12.32) were not aligned with the major axis of the ellipse. Nor was the latter parallel to the line between stones 9 and 34, also in green on Illus 24.32, which Somerville believed indicated a lunar alignment (Illus 24.32; Somerville 1912; see Chapter 3.13).

During the excavations of 1980 and 1981 we looked without success for evidence which might support or conflict with my method or Professor Thom's method. The preliminary circle used in my method does not correspond with any of the curving slots found under the cairn. The centre of the circle lay in the southern part of the subsequent chamber of the chambered cairn. I believe that this method was not used and suspect that the same is true of the Thom method.

The exercises in Illus 24.27 to 24.32 highlight the perils of trying to deduce the intentions of the builders by imposing geometrically derived plans

on stone settings. Structures like Calanais could easily be modified circles (and ellipses in general could easily be laid out by tying the ends of a rope to two stakes on the main axis. Large true circles like the Ring of Brodgar in Orkney, must have been laid out using a rope.

Once it is accepted that the stones themselves are irregular, and laying-out errors must have occurred, any one of several geometrically based reconstructions is usually possible and the fact that some are slightly better than others is not very meaningful (see Ruggles 1999, 82 note 3 quoting Angell 1977 and 1978 for formally argued views on small variations from true circularity).

Despite this the systematic variations in stone spacing make it credible that the flattening of the east side was intended rather than a result of errors. The outer edges of the stones of the western part of the Ring define a nearly true circle 13.0m in diameter, which could easily laid out with a rope despite the presence of the central monolith. That would not require sophisticated geometry. Stone 48 fits it least well and Stone 49 does not fit it perfectly (Illus 24.30) but in the preferred interpretation these divergences are errors rather than having any cryptic meaning. That said, the divergence of the east side from that circle is quite large (Illus 24.30). The preferred interpretation, which is neither strongly confirmed nor refuted by the measurements, is that the builders emphasised the eastern side of the Ring, using two unusually long stones to define the ends of an eastern 'face'; those long stones and the stones forming an 'entrance' were purposefully set back from the position they would be if they lay on a true circle. Put another way, the east side was laid out by eye to create a façade, perhaps to define an entrance or exit facing sunrise on the days around the equinoxes.

24.9.4 Sourcing and erection of the stones

The Ring stones were all smaller than the central monolith and would have been even easier to erect by the methods described for the latter (Chapter 24.8.2). Nor need they have come from far away. Traditionally local people thought they might have come from Na Dromannan, less than 2km away to the east-north-east ((Ponting and Ponting 1984, 22). More recently Colin Richards suggested that the presence of hornblende 'eyes' in the gneiss used for the ring stones showed that they were quarried from a single source, and he reported that gneiss with similar characteristics forms the outcrop to the west of the stone setting at Calanais. Although no specific signs of quarrying were found he had little doubt that the orthostats were quarried very locally (Richards 2006, 182). Assessment of this claim requires formal comparative studies between the Ring stones, the Calanais outcrop and other outcrops.

Ron and Margaret Curtis report significant clumps of dark green hornblende crystals in the central monolith and four of the Ring stones, on one stone on the west side of the avenue and on the three southernmost stones of the east side of the avenue, while hollows on the central monolith and a few of the avenue stones may indicate where similar clumps had fallen out (Curtis and Curtis 2009, 30-31).

24.9.5 Orientation

If the Ring was planned to face approximately east its orientation might reflect sunrise at the days round the equinoxes. Ruggles has cast doubt on the idea that the equinox was important to prehistoric people, going so far as to suggest that the word 'equinox' should be eliminated from the archaeoastronomer's vocabulary (Ruggles 1999, 148-9). His main reason was that sunrise continues to vary along the horizon in the same direction as before; unlike at the summer and winter solstices there is no obvious 'event' to be observed.

The 'façade' effect at Calanais is not visually strong enough to proclaim an orientation of the Ring on sunrise on the days around the equinoxes but there is some empirical data to support suggestions that sunrise viewed at one or both the equinoxes was important to the builders of Calanais. About 1.5 km to its east at Cnoc Sgeir na h-Uidhe there is a small erect stone (Illus 24.33). It is now under 0.5m high. Packing stones are visible around it. Photography undertaken by Ponting and Ponting from within the Ring at Calanais in 1977 demonstrated that the autumn equinoctial sunrise takes place over the stone and that the following

day its northern edge was more than its own width away. Equinoctial sunrise and sunset always take place in the same positions so the sun would have risen there when the Ring was built (Curtis and Curtis 2000, 37). The stone does not show any signs of having once been taller, so it would have been visible only to those with keen eyesight. Of course it could have been supplemented by a more obvious temporary marker but without excavation there is no way to assess that idea. It seems that if the small stone at Cnoc Sgeir na h-Uidhe was intended as a foresight it would have been easy to use by those who already understood the reason for its positioning but far from obvious to anyone without foreknowledge. Similarly if an indication of the days around the equinoxes was intended by building an eastern façade that may have been understood by everyone knowing the purposes of the monument; but it may also have been designed to be difficult to perceive without prior knowledge. But the difficulties in retrieving the intentions of the builders (even if they were simple, which is a different question) seem insurmountable with present evidence.

The preferred interpretation is mainly that the lay-out cannot be shown to involve any sophisticated geometry, but it does suggest an intention to include an eastward 'facade'. Reasons for its eastward orientation may have included the use of the area east of the setting for rituals and ceremonies, or a preferred direction for approaching or leaving the Ring, or a mixture of those. On top of that the evidence adduced by Ponting and Ponting suggests that observation of the equinoctial sunrise was a matter of interest to at least some of its users.

24.9.6 Rings near Calanais and further afield

There are remains of at least 5 stone rings near the main setting at Calanais.

1. Cnoc Ceann a Gharraidh (Calanais 2), about a kilometre to the ESE of Calanais on low lying land is a ring of 5 standing stones, perhaps originally c. 13 stones. Its long axis measures slightly less than 20m and its short axis c. 17m. The tallest stone is c. 3.25m in height and its shortest 1.75m (Ponting and Ponting 2000, 12.

2. Nearby to the north-east is Cnoc Fillibhir Beag (Calanais 3), a ring of 9 surviving standing stones, perhaps originally c. 17 stones, surrounding a setting of which 4 stones survive. It is a flattened circle slightly over 16m by 14m in plan (Ponting and Ponting 2000, 12-18).

3. Ceann Thulabhaig (Calanais 4; Ponting and Ponting 1981), or Ceann Hulavig (Ponting & Ponting 2000, 19) stands 3 km to the SSE of Calanais on a gently sloping hillside. It is an elliptical ring of 5 surviving tall stones (perhaps originally 6). Its long axis measures about 12.6m and its short one about 9.5m. The tallest stone is slightly less than 3m high. The ring surrounds a tiny central monolith which stands in a pile of stones, possibly a small central cairn.

4. About 2 km to the ENE of Calanais on the high ground at Na Dromannan is a ring originally of c. 17 ring-stones and 5 internal monoliths, along with a possible diminutive approach avenue. The western side was flattened with closely spaced stones, while stones were much more widely spaced in the other parts. None of the stones remains erect (RCAHMS 1928; Ponting and Ponting 1981; Richards 2006, 184).

5. Another ring, Cnoc Gearraidh Nighean Choinnich, buried in peat near Breasclete some 2.5 km from Calanais 1, has been reported by Curtis and Curtis (2003, 138; 2005, 149). It was elliptical measuring c. 48 by 41m. 5 fallen stones survive close by their estimated original positions.

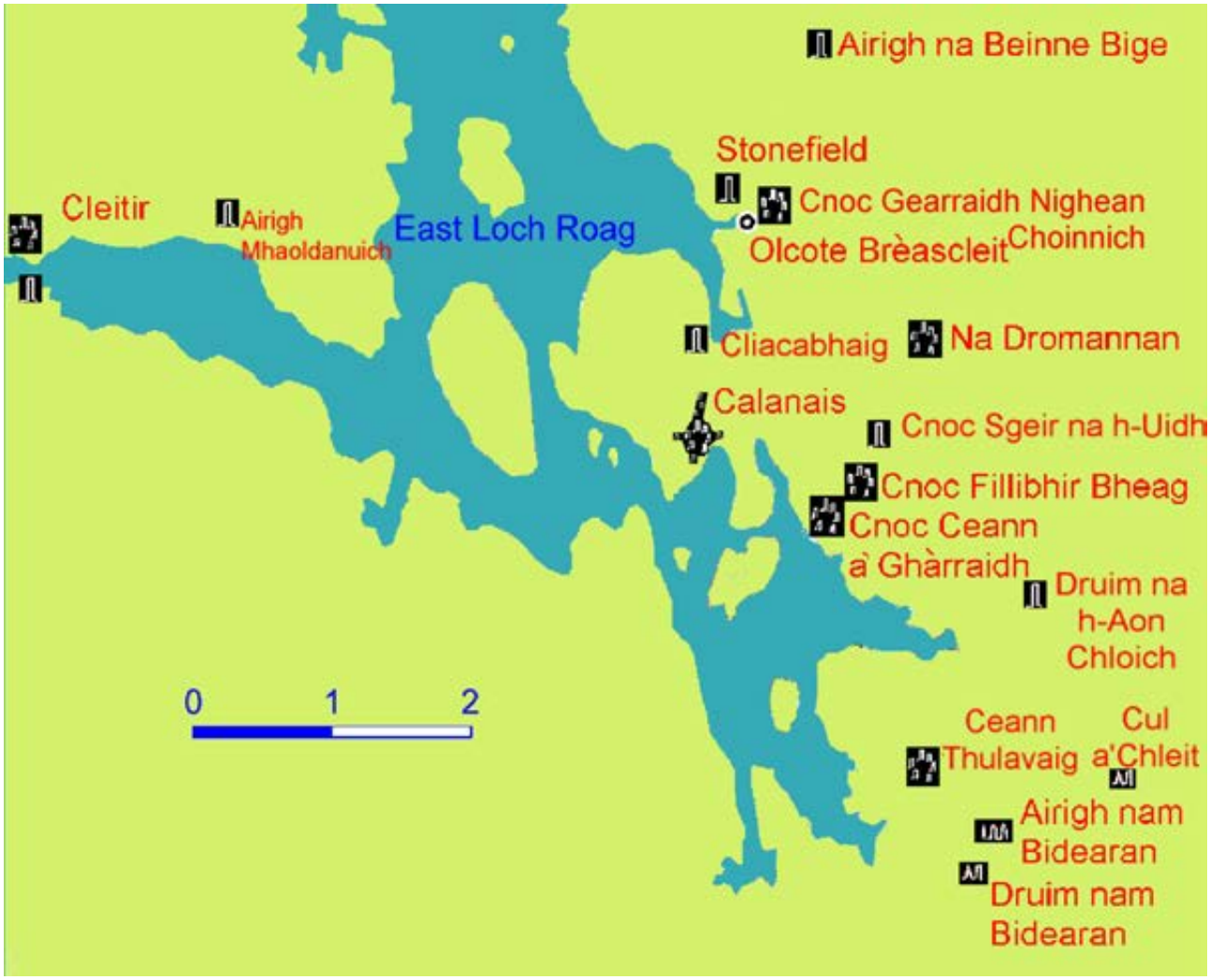
All of these sites lie less than 0.5 km from the present shoreline of East Loch Roag. Some pairs and triplets of stones in the surrounding area appear through the peat and may be parts of more rings or rows, although others may be part of field systems. Several apparently single monoliths survive, including those shown on Illus 24.33 (Ponting and Ponting 2000, 6).

Curtis has shown that Thom's methods of laying out stone settings work well to fairly well for Cnoc Ceann a Gharaidh (Calanais 2) if it was meant to be elliptical, for the outer ring of stones at Cnoc Fillibhir Beag (Calanais 3) if it was meant to be

a flattened circle of Type A, for Ceann Hulavig (Calanais 4) if it was meant to be an ellipse and possibly for the fallen or unerected stones at Na Drommanan (Druim nam Eun; Calanais 10) if was meant to be a flattened circle of Type A. He has also shown, using the accurate Glasgow map of the area (Tait 1978), supplemented by his own surveys, that the axes of some settings point to others and that some lines between sites point fairly accurately north or east (Curtis 1980). So far as I am aware no statistical study to the standards advocated by Ruggles has been carried out to assess the significance of these results.

It is not clear whether the local geographical clustering reflects mainly the original distribution of rings, or mainly survival. There are apparently unfinished or demolished rings like that at Na Drommanan in peat-covered areas elsewhere on Lewis, including Achmore, and Druim Dubh (Ponting and Ponting 1981; Burl 2000, 427). Still others may await discovery as recent discoveries at Clach an Trushal demonstrates (Richards and Wright 2006, 171). Nor is it known whether there were also timber Rings on Lewis. Substantial pine tree stumps up to 0.5 m in diameter have been radiocarbon-dated to the 4th and early 3rd millennia cal BC (Dickson and Dickson 2000, 37-39, 67) so the possibility cannot be ignored.

More broadly, Burl's impressive synthesis of the stone circles of Britain, Ireland and Brittany demonstrates that there are several large areas with abundant stone rings: in Caithness, round Inverness, in Aberdeenshire, Perthshire, Arran, and Wigtownshire, in Fermanagh, Londonderry and Tyrone in N Ireland and Cork in Southern Ireland, and in Cumbria, the Peak District and



Illus 24.33 Some of the rings, standing stones and cairns near Calanais, based largely on Curtis and Curtis 2000, 6

on Dartmoor in England (Burl 2000, 2). Timber rings currently have a generally lowland distribution and some of them will be discussed below in the section on ritualised landscapes (Chapter 24.15)

Here discussion will be restricted to comparanda for the dominant visual characteristic of the Calanais Ring, the ratio of the maximum height of its stones (4.4m) to its plan dimensions (c 13 by 11.8m). The ratio of height to diameter for Calanais is 0.34 to 0.37 giving a strong subjective impression of 'tallness'. It shares this feature with several other rings. The nearby Ceann Thulabhaig partially shares it; the highest stone is 2.75m tall and the ratio of height to diameter is between 0.3 and 0.2.

The two main comparanda are at Stones of Stenness in Orkney and on Machrie Moor on Arran. These comparisons are likely to be legitimate despite the sites being in regions with generally different material cultures because of the distinctive characteristics of the structures, the occurrence of very similar grooved ware pots at Stenness in Orkney and at Calanais, and generally similar grooved ware pots at Machrie, and the ease of travel by sea between Calanais and Machrie.

Two of at least seven stone circles at the large ritual centre on Arran were built of very tall stones (Burl 1976a Machrie Moor 2 and 3, Barnatt 1989 4:17 and 4:18). One of these, Machrie Moor 2, originally had 7 or 8 tall sandstone orthostats. The largest surviving one is 5.3m tall. That ring was about 12.8m across, giving a ratio of height to diameter of c. 0.4. Only one stone of the other ring (Machrie Moor 3) still stands. This ring was probably not circular and it measured about 16.3 by 15.4m in plan (Burl 2000, 90-1); it too would have had an unusually high ratio of height to diameter. The Machrie Moor tall-stone rings are not scientifically dated.

The Orkney complex in the heart of Neolithic Orkney included at least two stone rings, both larger in diameter than that at Calanais. Like Calanais they stand close to water. To their east is the freshwater Loch of Harray and to their west the now brackish Loch of Stenness.

The stone ring at Stones of Stenness was near-circular. The surviving 6 of its original up to 12 stones with reliably original positions imply that a slightly elliptical shape may have been intended (Curtis in Ritchie 1976, 49). Its diameter is c. 30m, more than twice that of the greatest dimension of the Calanais ring. The tallest surviving stone is 5.7m high (Ritchie 1976, 9). The ratio of height to width is 0.19, considerably less than that of Machrie and Calanais. Correspondingly it is a less crowded site, but it produces a generally similar subjective impression. There may have been a third ring of tall stones with a very high height to diameter ratio where Maes Howe now stands (Richards 2005, 243-5). The Ring of Brodgar at 104m in diameter is not comparable in this way because its large area diminishes the dominance of the stones used for its construction.

There are no scientific dates relating directly to the ring at Stones of Stenness. The oldest radiocarbon age OxA-16484 (4346+/-39 BP) is from bones in fills of the ditch, calibrating to between 3090 and 2890 cal BC (Sheridan 2000). OxA-16484 does not form a satisfactory group with the ages OxA-16482, OxA-16483 and OxA-16485 for other pieces of bone from the basal fills (Chi-squared = 9.62 against a rejection figure of anything greater than 7.8). It is marginally compatible with the next oldest age OxA-16485, but perhaps the sample should be regarded as having a different taphonomy from the other ditch samples. It is similar to an age for a burnt sheep long bone from the central hearth-shaped feature (OxA-18037 4305+/-35), calibrating to between 3020 and 2880 cal BC, (Sheridan & Higham 2007, 225).

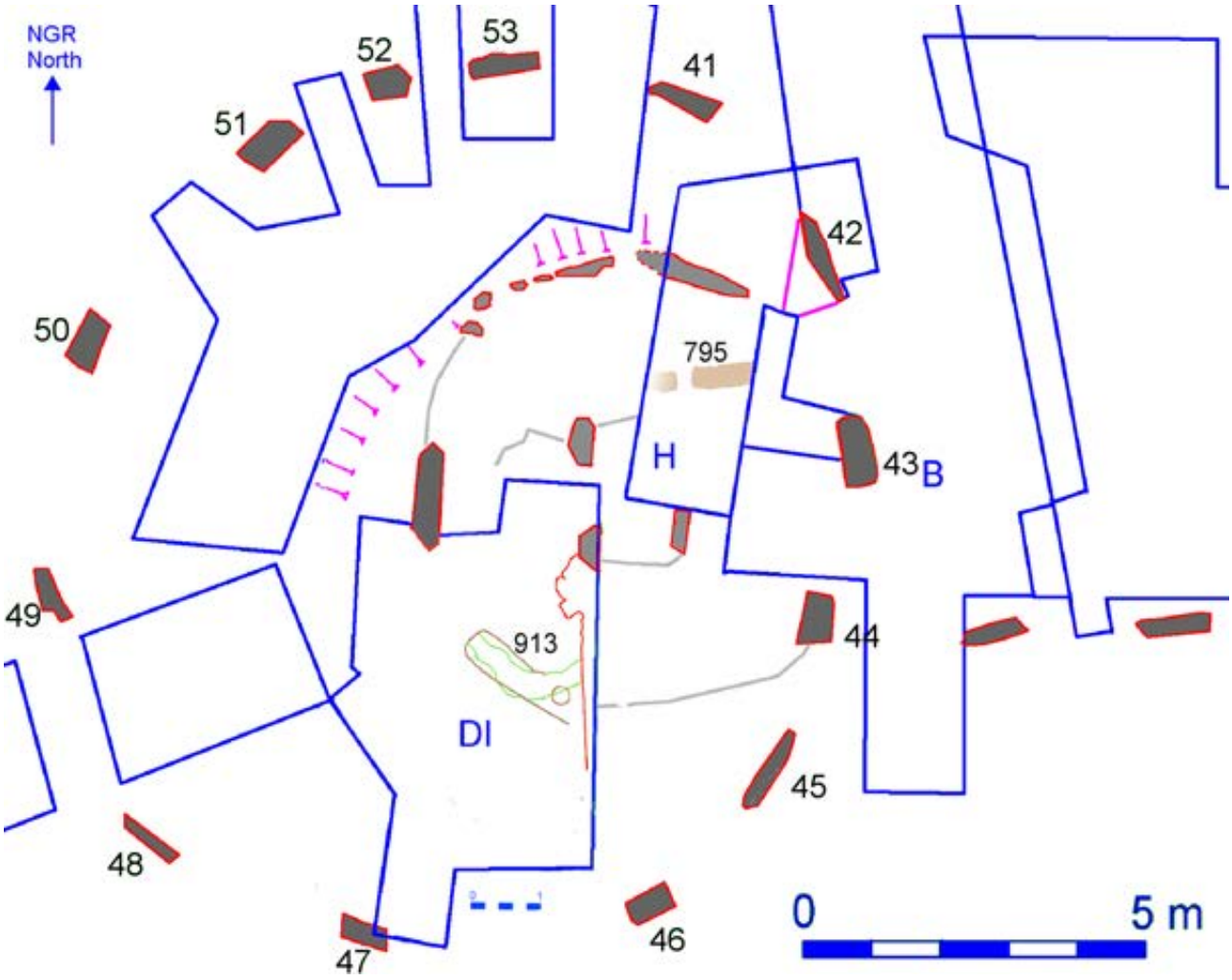
However, a cattle bone from the organic basal ditch fill 3 B 25, the stratigraphically earliest deposit producing a radiocarbon date, had an age (OxA-17783 4111+/-32) between 2870 and 2570 cal BC. That is significantly different from the dates from the hearth and from OxA-16484.

Strictly speaking the hearth may have gone with a clay feature earlier than the Stenness Ring. But one credible interpretation of these results is that the central hearth and the Ring were, as Ritchie suggested, earlier than the henge. The hearth and by implication use of the Ring dated to between 3020 and 2880 while the basal organic fill of the ditch and by implication the ditch itself dated to between 2870 and 2570 cal BC. The earlier animal

bone dates from the ditch, from stratigraphically higher fills in the original west terminal close to the extension which narrowed the entrance to the henge, will thus represent residual bones from the period of use of the Ring prior to digging of the ditch (Ritchie 1976 Fig 3). So the Ring was probably in use sometime between 3020 and 2880 BC.

Grooved ware was found at Calanais, Machrie Moor and Stones of Stenness but not in direct association with Ring stones. Pot 16 from the west ditch terminal at Stenness (Ritchie 1976, 23-4 Fig 6) and Pot 17a from Machrie Moor, one of a group associated with the timber circles (Haggarty 1991, 65-6 Illus 6) are similar to Pot 61 at Calanais. The Stenness pot might have been older than the ditch fills in which it was found, like some of the animal bones, but if the dating arguments above are accepted it was probably deposited at some time between 2870 and 2570 cal BC. That would be a credible date ranger for deposition of the grooved ware pot at Calanais. The latter came from shallow pit or scrape 877 and an adjacent patch of clay 866 in BV which are ascribed to a period after the Ring was set up but before the chambered cairn was built. As so often at Calanais, however, the problems associated with using turf lines and layers of green clay as stratigraphic markers leave open the (non-preferred) possibility that the pit was stratigraphically somewhat earlier or later.

The similarity of the three Grooved Ware pots at the three sites strongly suggests some connection between the places at some time; but the absence of direct association of the cited pottery with the standing stones of the rings means that the



Illus 24.34 Early slot 795 under the cairn on Area H (and the probably unrelated 913 on Area D)

similarity of the three pots should not be used to bolster arguments that the building of the rings was strictly contemporaneous, particularly since the pot found at Calanais may have been left by visitors. However, the use at all three places of rings with very tall stones surrounding fairly small area does suggest that Calanais and Machrie, and probably Stenness, were built within at most a few generations of each other.

Leaving to one side the specific pots cited above, Stones of Stenness was in use at some time between 3020 and 2880 cal BC and was probably set up within a century or so of 3000 BC by people who used Grooved Ware. The ramifications of this interpretation will be discussed after consideration of other structures at Calanais.

24.10 Phase 6c: Early slot 795 under the cairn

24.10.1 Description

Slot 795 on Area H was later than the locally oldest turf line, 766, into which the stone-holes for the Ring were cut, and was covered by a thin soil below turf line 758 underlying the green clay platform. Although the slot was very shallow the gap between its two parts was real, not simply an artefact of later ground-working or of our excavation (Illus 24.34).

Examination of its western part was hampered by cairn stones in the trench section which prevented its being cleaned back to the edge of the area. It seemed to run fairly straight but might have swung north or south.

Excavations in Area S to the northwest were confined to superficial levels (to allow laying of 15cm thick new turf) so the lack of a slot there does not prevent the possibility that slot 795 swung north and formed part of a structure to the north of the later chambered cairn. The absence of a continuation of the slot in Area BIWX is less easy to explain. It is perhaps attributable to the well-developed plough or spade-worked soil at a basal level there, but excavation did not reach clean subsoil and it may be simply that it remains unexcavated at a lower level than the worked soil.

The slot may have been of much the same date as the Ring, because it cut the turf line 766 into which Ring stone 42 was set and was sealed by turf line 751/758 which formed above upcast from the Ring-stone pit. However the slot may have been later than the preferred date for the Ring. It contained a piece of hazel charcoal which was dated to between 2910 and 2630 cal BC (AA-24970; 4205+/-45). However, the date provides only a terminus post quem of 2910 cal BC for the slot.

24.10.2 A feasible but unlikely interpretation

Area DI slot 913 was covered by a turf line which may have been equivalent to turf line 758 which covered slot Area H 795 on Area H. It is possible to draw an egg-shaped enclosure including slot 795 on Area H and the lower remains of slot 913 on Area D (Illus 24.35).t

The problem with this speculation is that the slots were cut through material interpreted as spread from the Ring stone pits but such a structure would not have fitted inside the Ring unless it had a flat east face. On current evidence it is very unlikely to reflect reality and the idea is included here only because it can be tested during any future excavations.

24.10.3 The preferred interpretation

The preferred interpretation is that the two slots were different in date from each other. The turf line covering the slot on DI is interpreted as later in date than that covering the slot on Area H. It is only the fact that the turf lines important to interpretation were treacherous stratigraphic indicators that allows floating of the speculation shown on Illus 24.35. The preferred interpretation therefore is merely that slot 795 was a fragment of a structure not otherwise recorded during excavation, and not far different in date from the central monolith and Ring.

24.10.4 Deposition outside the Ring

Along the south side of the ditch running from the passage entrance to the north of East Row Stone 30 were several patches of dark soil, ashy soil and burning. One of the earliest shallow pits or

scrapes (877) in this area contained several sherds of a fine Grooved Ware pot (ASH 61 Illus 24.63).

Its stratigraphy suggests that the sherds were deposited in a period after the Ring had been set up but before the cairn was built. Other sherds of this pot were found in a nearby shallow scrape 866, as if the pit had been disturbed by later activities. Altogether about 15% of the pot was found.

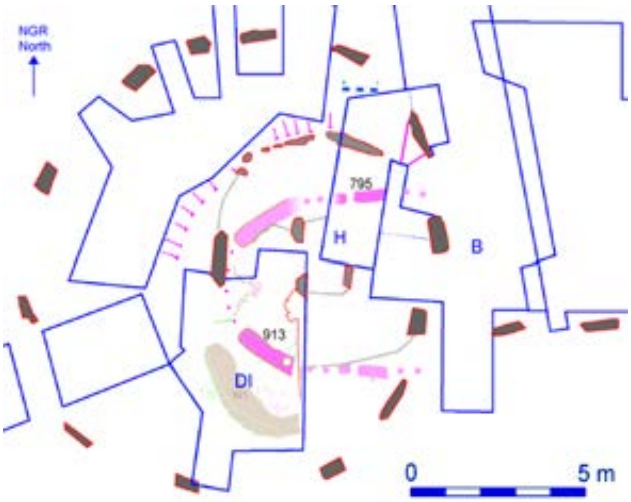
Sheridan (Chapter 18 The pottery Assemblage 18.6.3) suggests that the pot was made locally because it has the same corky fabric as seen in some of the Neolithic pottery from Calanais. She dates it through comparisons with radiocarbon-dated pots to the first centuries of the 3rd millennium BC so its creation may have been contemporaneous with the erection of the Ring at Calanais. She sees the presence of Grooved Ware at Calanais as of considerable significance, as this type of pottery is absent from the north-west mainland of Scotland the only other Grooved Ware find in the Western Isles is a small, thin-walled fine bowl from the passage tomb of Unival, North Uist. This specific type of Grooved Ware is widely distributed, having been found from Orkney to Fife, in Co. Meath in Ireland and at various sites in southern England, including Woodlands, Wiltshire (see Chapter 18.6.3).

24.11 Phase 7: The green clay platform, imported clay soils and the start of ritual epositiont

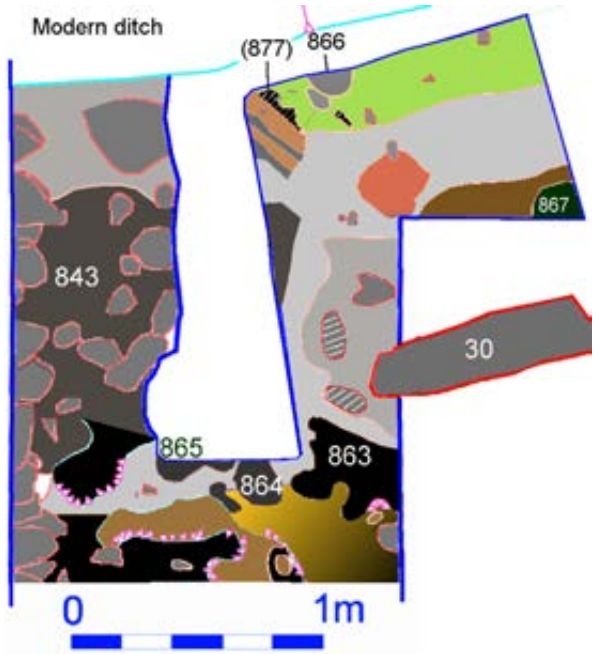
24.11.1 The green clay platform

A light structure was built in the area subsequently occupied by the chambered cairn. It was set through the clays under the cairn, which on Areas H and B, and to a much lesser extent on Area D, had the appearance of a green clay platform.

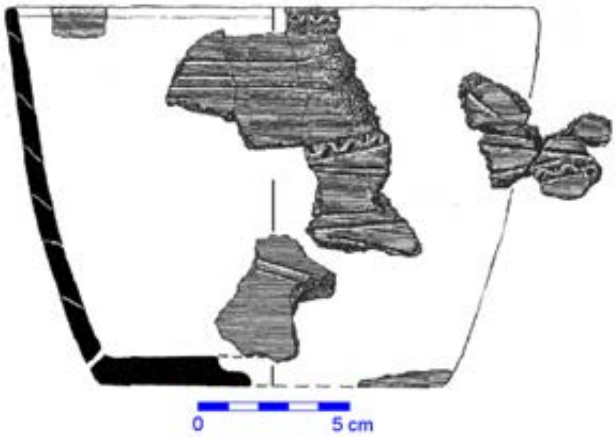
On Area H a layer of green clay 760 forming the platform was of irregular thickness. Similar but more weathered green clay 750 lay to the north of the cairn at the same or a very similar level. On Areas BIWX and BIVWX green clay was found in an identical stratigraphic relationship to the cairn; green clay was also found outside the cairn in a stratigraphically later position than Ring stones 42 and 43 on Area BIWX. Green



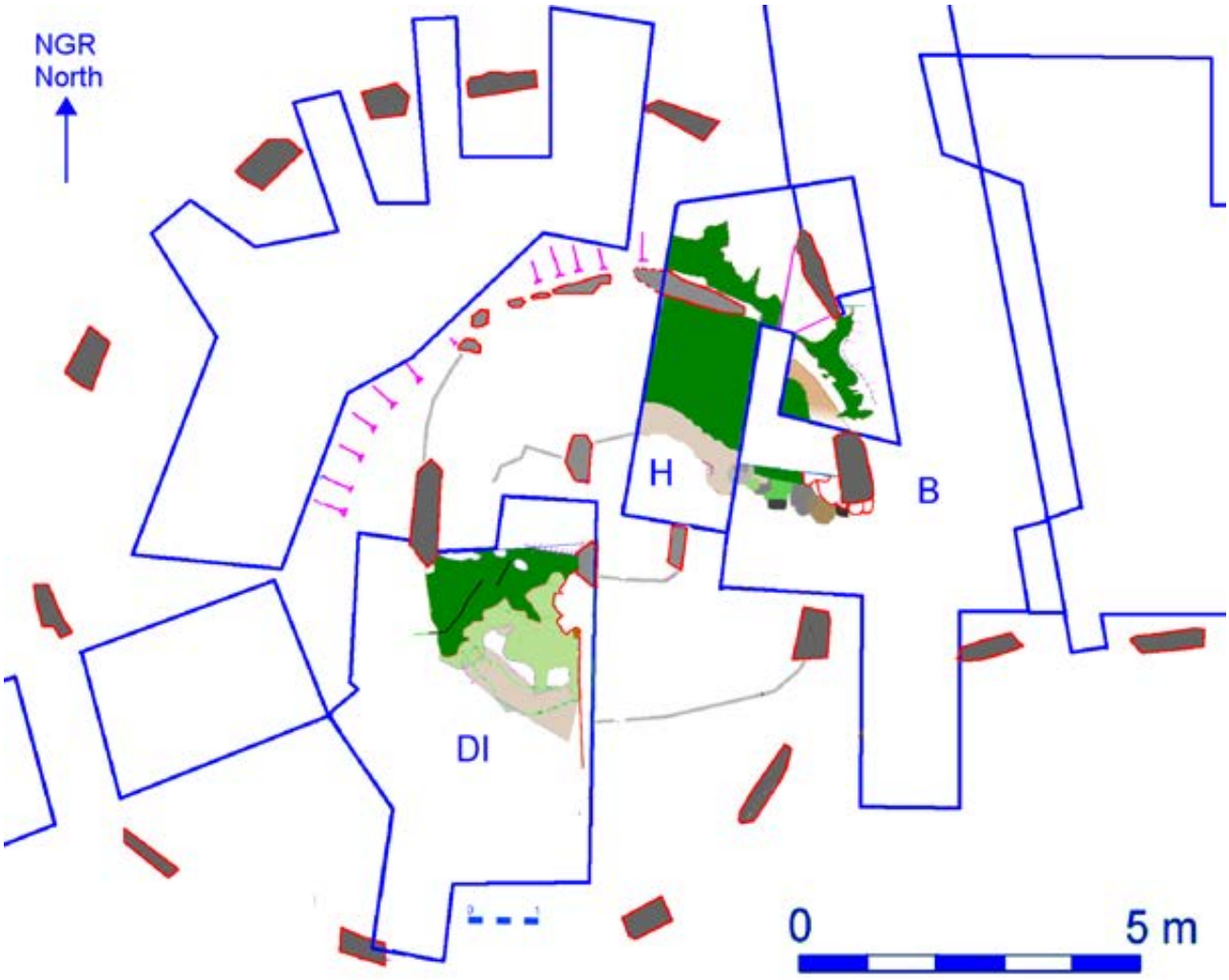
Illus 24.35 Speculative (non-preferred) reconstruction linking slots 795 and 713



Illus 24.36 The features 866 and 867 in which Grooved Ware was found



Illus 24.37 Grooved Ware pot ASH 61



Illus 24.38 The green clay platform (for detail of related slots see Illus 24.39)

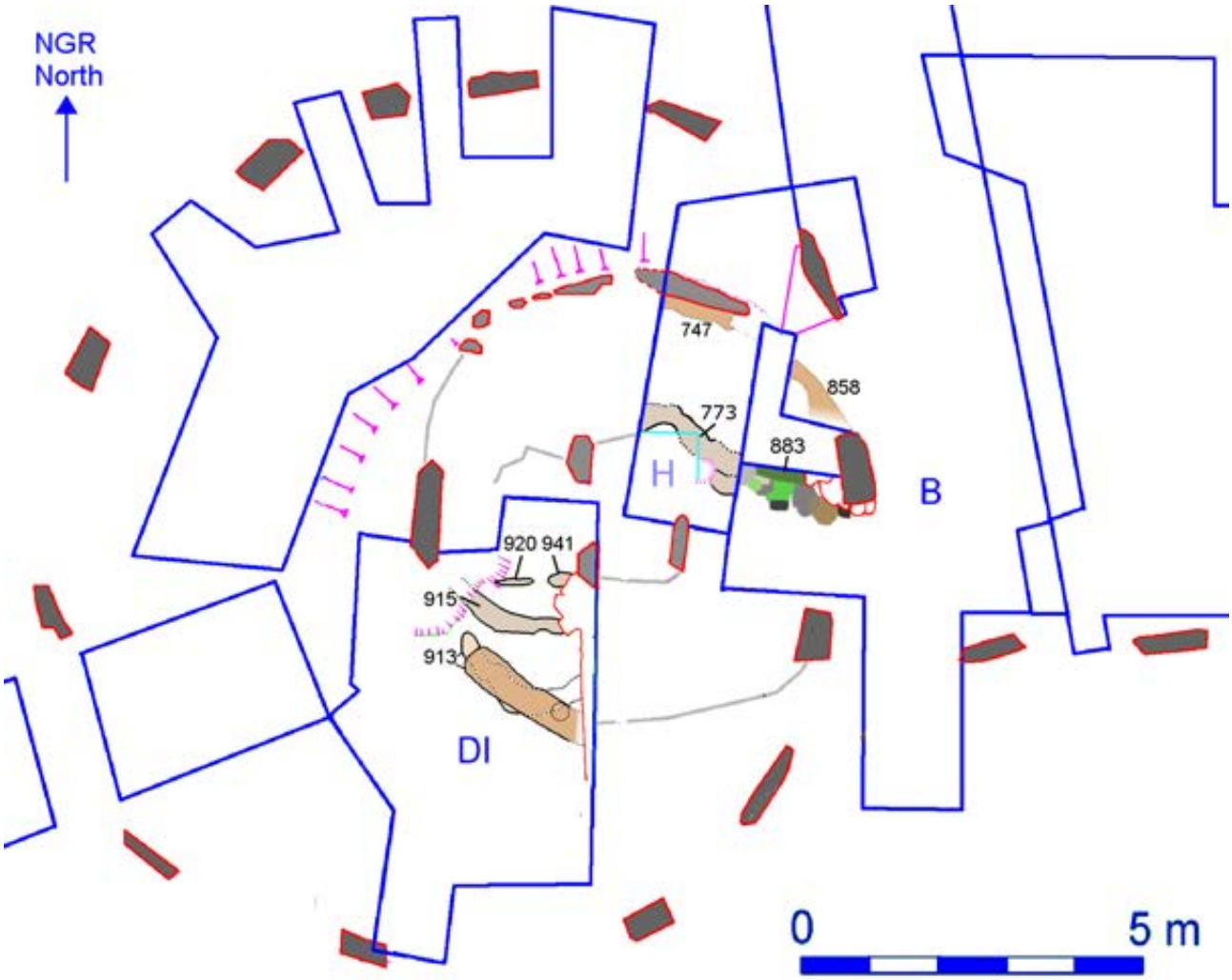
clay was found at the same or very similar stratigraphic position under the south-western part of the cairn, on Area D. Some of it (in dark green on Illus 24.38) may have been clay spread from the mound round the base of the central monolith rather than clay from the pits dug for the Ring stones. Silty green clay 906 underlying the locally uppermost turf line 905 on Area D is shown in pale grey green on Illus 24.38; it is interpreted as having been greatly disturbed by trampling but it may have been remnants of the platform.

The differences between the pre-cairn layers on H and those on D were very marked. In particular, the polygonal drying cracks in the basal-stone-impressed green clay on Area H suggested very little trampling between the time the clay was laid down and the start of cairn-building, but the mixed layers on Area D suggested considerable spreading of green, light green and grey clays and other poorly understood activities. It is hard to attribute these differences entirely to different destruction histories.

24.11.2 The origin of the green clay used for the platform under the cairn

When the Ring stones were erected a surplus of clay would have been produced because of the volume of the buried parts of the stones and that of the packing boulders in the pits. Calculations are presented in Chapter 25: Technical note 24.11.2.

The preferred interpretation is that this surplus turf, soil and clay from the stone pits provided the c 50mm depth of weathered clay between the lowest turf line and the middle turf line on Area H and, less clearly, similar turf lines on Areas B



Illus 24.39 Later slots and clay spread 747 under the cairn

and D. That fits the stratigraphy adequately, and otherwise there is no immediate explanation for the presence of clay separating the two turf lines.

In this preferred interpretation the subsequent green clay 760 of the platform was imported, presumably from nearby. The immediate impetus may have come from the water-logging suggested by sphagnum spores in the underlying soil 758 on Area H. But, given the importation of other soils and clay containing charcoal and potsherds during Phase 7, non-functional reasons may have been more significant to those who made the platform. Perhaps deposition of the clean green clay had some symbolic meaning to them, related to but different from that of the culturally-enriched imported material.

As described in detail in 24.11.1 the ground in and at the east side of the Ring at the same stratigraphic level appears to have been built up with a layer of clay H750, B872 and B161 shown on the stratigraphic diagram of turf and clay layers in Illus 24.11.

24.11.3 The later slots under the cairn

On Area BIWX the green clay under the cairn was delimited by slot 858 with a dark charcoal-rich fill (Illus 24.39). On Area D slot 913 may have had the same function, although the stratigraphy was less clear. We may have conflated the plan of its lower part with the remains of an earlier cultivation trough, as discussed below; because of this ambiguity the upper part, although more amorphous and probably too straight, has been emphasised in illustrations 24.31 to 24.39.

On Area H a spread of dark clay 738 lay under and outside the later kerb slab and brown loam

747 inside the kerb was in the same stratigraphic position. A radiocarbon-dated piece of willow charcoal from clay 848 suggesting disturbance between 2040 and 1770 cal BC ((sample 203/81; AA-24968 3575±45 BP). Clay 747 may have been composed of somewhat less disturbed fills of a bounding slot. Both contained E/MN potsherds. It is admittedly equally possible that they were the disturbed remains of a spread of Phase 7b imported clay like those found on Area D, particularly 738 which spread for 0.2m to the north of the kerb slab. Whatever their origin they may have been disturbed more than once, during cairn construction and during cairn robbing including removal of the early kerb. They need not have been disturbed when the later massive kerb slab was erected.

Another set of slots may have defined an inner structure. On Area DI inner slot 915 probably originally ran up the side of the clay mound round the central monolith although the evidence was difficult to interpret. Between it and the area removed by erosion in the chamber were the last remains of an even slighter slot 920/941.

Slot 883 in BIVWX immediately underlay the north passage wall (Illus 24.39). This slot was not fully excavated; its southern edge was obscured by numerous small clay patches or shallow pits.

Table 24.6 Burnt bone from features in green clay platform in the passage

Ctxt	Descr.	Smpl	Descr.
878	Clay patch abutting wall	699	Burnt Bone
881	Pit or scrape	694	Bone including minute fragments
882	Loam in 881	2022	0.11g
883	Dark grey-green slot fill	2011, 497, 623, 697, 698	0.44g; 1/6/81 and 6/6/81: cremated Bone including one 1 cc in volume

Cremated bone was found in four contexts in the passage; most came from dark grey/green gritty charcoal-rich slot fill 883 under the bottom course of stones of the north passage wall (Table 24.6). There were seven sherds in these features, Cat. nos. 245-7 (all E/MN corky), Cat. 283 (E/MN Hebridean Incised), Cat. 735–736 (one either E/MN Non-corky or Beaker and the other probably fine Beaker) and Cat 841 (either E/MN Non-corky or Beaker).

A piece of fuel ash slag 81.677 found in BIVWX 891 may have been from a hearth in a settlement somewhere near Calanais, and brought in along with soil containing sherds. Conceivably however it may have come from a cremation pyre.

On Area H a more fully explored slot 773 with a structured fill had been partly cut away by the chamber (Illus 24.39). Its layered fills suggest careful back-filling. Its top fill to the east was dark grey peat-like material 772 spilling onto the green clay 760 under the body of the cairn. By the east baulk it was a brown loose fibrous clay loam. It was mostly absent in the west although it survived in the west baulk. It did not contain any artefacts. A charred hazel nut shell from it (sample 2038) produced a radiocarbon date (SUERC-11616 4430+/-35 BP) of 3330 to 2920 cal BC.

The middle layer 778 was mainly humic rich clay containing charred hazel nut shells. A charred hazel nut shell from sample 2051 produced a radiocarbon date (SUERC-11617 4425+/-35) of 3330 to 2920 cal BC. A pollen sample (2051) was zoned to the middle of sub-zone 3a, the transition between CaN-3ai and CaN-3aii, dated at Leobag to a time between 2770 and 2360 cal BC.

The lowest fill (730) was grey-brown with a slight green tinge, charcoal-rich sandy clay with a component of small sub-angular stones It contained 3 E/MN potsherds (Cat 162-5) and two possibly heavily burnt sherds probably from a fairly fine domestic Beaker (Cat 671, Cat 672).

t also contained burnt bone (Table 24.7) and at least one quartz flake (CAT 146). A pollen sample (2048) was zoned to CaN-3ai, starting between 2980 and 2510 cal BC and ending between 2770 and 2360 cal BC).

Table 24.7 Burnt bone from fill 730 of slot 773 in the green clay platform in Area H

Ctxt	Descr.	Smpl	Descr.
730	Slot fill	332, 352/81, 350, 2048; 32	22/5/81 Fragment Bone, Bone (burnt), 26/5/81 Cremated Bone, 0.02g

Table 24.8 Neolithic pottery from the slots and related features

HII	H730	Fill of slot 773	162_165	E/MN corky
BIVWX	B878	Feature below passage north wall	67	E/MN Corky
BIVWX	B881	Dark green fill clay in feature below passage north wall	245, 246 & 247	E/MN Non-corky
BIVWX	B885	Dark green fill below passage north wall, like fill of slot 883, the continuation of the slot on Area H	735	?E/MN Non-corky or dom Beaker

Table 24.9 Probable Beaker pottery from the filling of the slots and related features

Area	Ctxt	Description and interpretation	Cat No	Details
BIVWX	885	Dark green fill below passage north wall, like fill of slot 883, the continuation of the slot on Area H	736	Prob fine Beaker
HII	730	Grey-brown with slight green tinge, gritty sandy clay with small sub-angular stones; charcoal-rich, uncemented and non-greasy. The bottom fill of slot 773	671	Prob dom Beaker
HII	730	Fill of slot 773	672	Prob fine Beaker

The bone, hazelnuts and sherds relate to closure rather than creation of the platform structures. Apart perhaps from the probable fine domestic Beaker sherds they probably reflected Phase 3 ancestral material imported from other sites. It is not clear, however, whether the soil and clay containing them were imported specifically to fill the features or came from imported clays and soils containing material of much the same early date spread out in Area D.

None of the possible and probable Beaker sherds from slots 773 on Area H and 883 on BIVWX and contemporaneous features was unambiguously from a Beaker. However there was also a small fine but worn conjoining pair of Beaker sherd in primary level 736 of the cairn overlying the green clay platform and the presence of Beaker sherds in the slots and related features is contextually credible.

Slot 915 on Area D (Illus 24.39) included what seemed to be stone packing for the bases of postholes. It was not on the same line as the face of the chamber wall, nor was slot 913 on the line of the cairn kerb. Therefore the slots were not dug simply to mark out the subsequent cairn structure but represent an earlier, presumably light timber structure or structures.

24.11.4 Discussion of the later slots

Slot 773 on Area H and slot 883 on Area BIVWX were parts of the same slot. Slot 915 on Area D is interpreted as helping them to form a bag-shaped timber structure (Illus 24.39 -24.41). Slot 915 on Area D, slot 858 on Area BIWX and the spread clay 747 on Area H are interpreted as forming another structural element (Illus 24.39-24.41).

Illus 24.40 was produced by flipping a copy of slots in Area D, H and B around a horizontal (east-west) axis. The slots were then joined up in lighter colours and the interior of the hypothetical enclosure was coloured green. Slot 773 on H and slot 883 on Area B were in identical stratigraphic positions to one another and of the same date. The inner slot 915 on Area D was at the same stratigraphic level.

The problem with it, as mentioned above, is that the southernmost slot on Area D was covered by an old turf line which was cut by the slot to its north. But turf lines are dynamic, not static and the sealing of the slot can be explained by re-growth of turf after the outer part of the light structure decayed or was removed.

An alternative interpretation is that the slots defined successive rather than contemporaneous enclosures (Illus 24.41 1 and 2). It depends on believing the most undemanding interpretation of the stratigraphy, which is that the outer slot was abandoned and had been covered by turf by the time the inner enclosure was built.

In either interpretation the traces of the slight slot 920/941 inside the bag-shaped enclosure may represent a contemporaneous feature or another phase of activity.

There is a problem with both interpretations in that the fill of the deep slot 773 on Area H was very different from that of shallow slot 915 on Area D. Also clay 747 on Area H, interpreted as possibly a spread out fill of the equivalent of slot 913, contained several potsherds but slot 913 had none. However, the layers on Area D were much more disturbed, with only traces of the slots remaining, and the surviving fills are interpreted as corresponding only to the base of the bottom fills of the Area H slot and the slot presumed to be the source of clay 747.

There are no compelling reasons to prefer one interpretation over the other. Whichever of them is more correct the detailed histories of Areas D and H must have been very different once the timber structure or structures went out of use. Area D had very mixed deposits. In sharp contrast, the surface of the green clay platform in Area H was almost pristine, retaining polygonal drying cracks directly beneath the overlying basal cairn boulders. Because of this the filling of the northern slot of the bag-shaped structure must immediately predate the cairn, but the same cannot be shown to be true on Area D. Perhaps certain activities were restricted to the southern part of the green clay platform. Possibly the eastern the deposits beneath the cairn on Area D were heavily disturbed and partly removed during Phase 10, when the cairn was robbed while ritual deposits were made in the area south of it. During that period only the outermost part of the cairn on Area H was removed. This asymmetry may reflect beliefs in a quartering of the cosmos, discussed in 24.13 and 24.14.

I strongly suspect that use of the area was considerably more long lasting and complicated than our (incomplete) excavations suggested. The inner bag-shaped structure may have been preceded by several earlier structures. Slot 913 is Area D, interpreted above as bounding the green clay platform, may have two phases and features 920 and 941 may belong to yet another (Illus 24.39). The interrupted slot 795 on Area H discussed in Chapter 24.10 represents yet another.

Dating of this possible sequence is difficult. Several centuries passed between setting up of the Ring stones and building of the cairn. If a structure was built soon after the Ring was completed, presumably the typical local pottery would have been Hebridean Incised ware, although I do not wish to suggest that it was those people who conceived the idea of building the Ring without stimulus from others. It is possible that Grooved Ware had already been introduced to the area.

In an earlier discussion (Ashmore 1996, 73) I said that the latest structure or structures were associated with Grooved Ware, a point picked up by Bradley (1998, 2). But all of the definite Grooved Ware (ASH 61) at Calanais had been re-deposited in a shallow pit or scrape outside the entrance to

the structure and the association was not direct. At the other end of the sequence, it seems quite likely that Beakers were already being made (elsewhere along the western seaways, perhaps) when use of latest structure was formally ended by filling in the slots with clays and soils containing ancestral and more current potsherds.

If the latest structure was an immediate predecessor to the chambered cairn it may have served for deposition of funerary remains in the inner enclosure or perhaps as a cult house, or both. The fragments of cremated bone in the slot on Areas H and B may turn out to support one of these interpretations if they can be dated and if it can be determined whether they came from animals or humans.

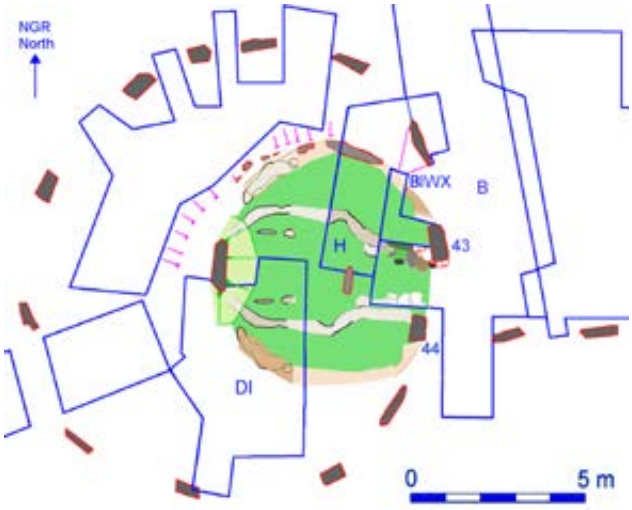
I do not know of any precise parallels for the suggested light structure or structures under chambered cairns, nor in early stone circles. The central hearth at Stones of Stenness in Orkney may have been part of something similar, but the small size of the area excavated inhibits further discussion. The possibilities will be discussed below in the wider interpretative context of the chambered cairn itself.

24.11.5 Imported clay soils

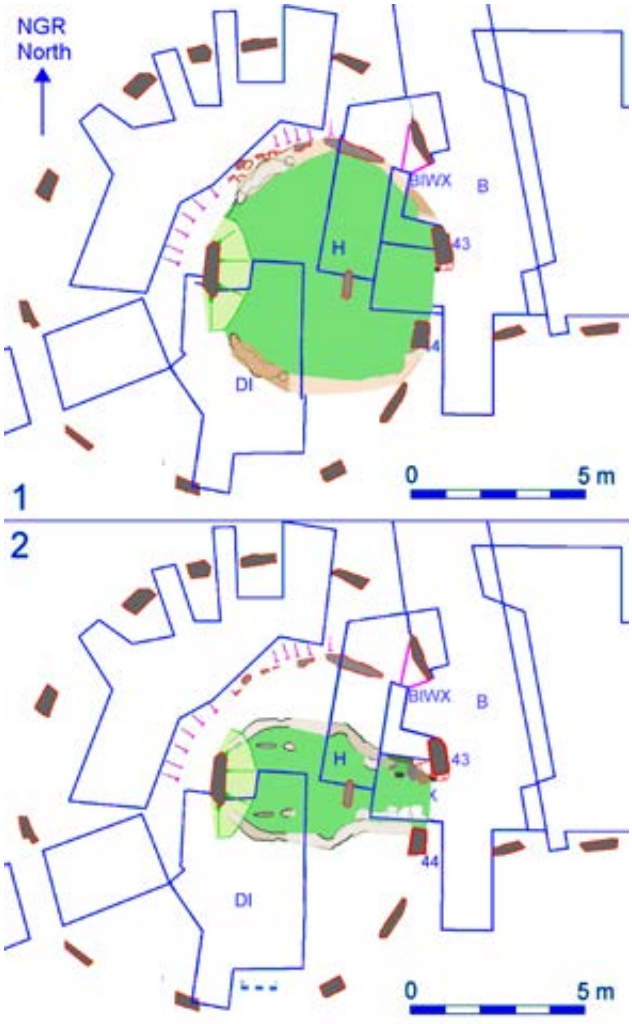
In Area D some clay soil layers below the main plough soil and above well-defined turf lines 344 and 365 seem to have been brought from elsewhere. The most artefact-rich was clay soil 369 found near the edge of the cairn in the eastern part of DI. Other clay soil layers probably formed from dumps of exotic material during this phase include DI 352, 360 and 374 and the fills of a depression 746 in the northwest part of Area H. Area H 738, described and discussed above, may be another example.

Soil 369 produced many potsherds and lithic pieces (Chapter 9 Area D 9.3.16). Four radiocarbon dates were obtained from single pieces of charcoal.
These dates suggest inclusion of material of various ages in the centuries around 3000 BC.

Loose black sandy clay 352 underlying 369 in the south-east corner of Area DI produced a similarly early radiocarbon age from a piece of hazel



Illus 24.40 An interpretation of structure represented by late slots under the cairn



Illus 24.41 An alternative interpretation of the late slots as forming successive structures

(SUERC-11611, 4450+/-35) suggesting a date between 3340 and 2930 cal BC, along with 8 potsherds exclusively of Neolithic type (Technical Note 24.4.4).

Table 24. The radiocarbon dates from context 369

Code	Sample	2 sigma date
SUERC-11597	pine	3360 to 3030 cal BC
SUERC-11599	alder	3350 to 3020 cal BC
SUERC-11598	hazel	3100 to 2910 cal BC
AA-24963	birch	2880 to 2570 cal BC

Chocolate brown clay 377 may also have been imported. It contained one small thin abraded sherd probably from a fine Beaker. Potsherds from clay soil 374 were mostly from E/MN corky pots but included one from a fine Hebridean or non-corky pot and another most likely to be from a domestic Beaker (Technical Note 24.4.4).

A plough soil 1213 on Area S produced numerous small sherds from a corky Neolithic pot and a radiocarbon age from a piece of hazel charcoal (SUERC-11618, 4450+/-35) suggesting a date between 3340 and 2930 cal BC.

These clay soils included Neolithic material. But a few fine Beaker sherds were found in clays 369, 374, 377 and 385 (Chapter 18.7.6 and Technical Note 18.7.6). Along with the radiocarbon and stratigraphic data they suggest importation of clay soils from one or more ancestral settlement sites during the period between construction of the Ring and construction of the chambered cairn. Small loads of soil were presumably brought in in baskets or bags. They need not have been hugely different from the deposits of soil with fragmented domestic artefacts which, along with clay soil from destruction of the cairn, formed much of the plough soil in this area.

24.12 Phase 8: The chambered cairn

Elements of the chamber wall or core cairn were found in Areas BIVWX, DI and H. Parts of the outer cairn were found in Areas BIWX, BIVWX, DI and H but substantial parts of the original outer kerb survived only in Area DI, with stone impressions and a single surviving stone on Area H.

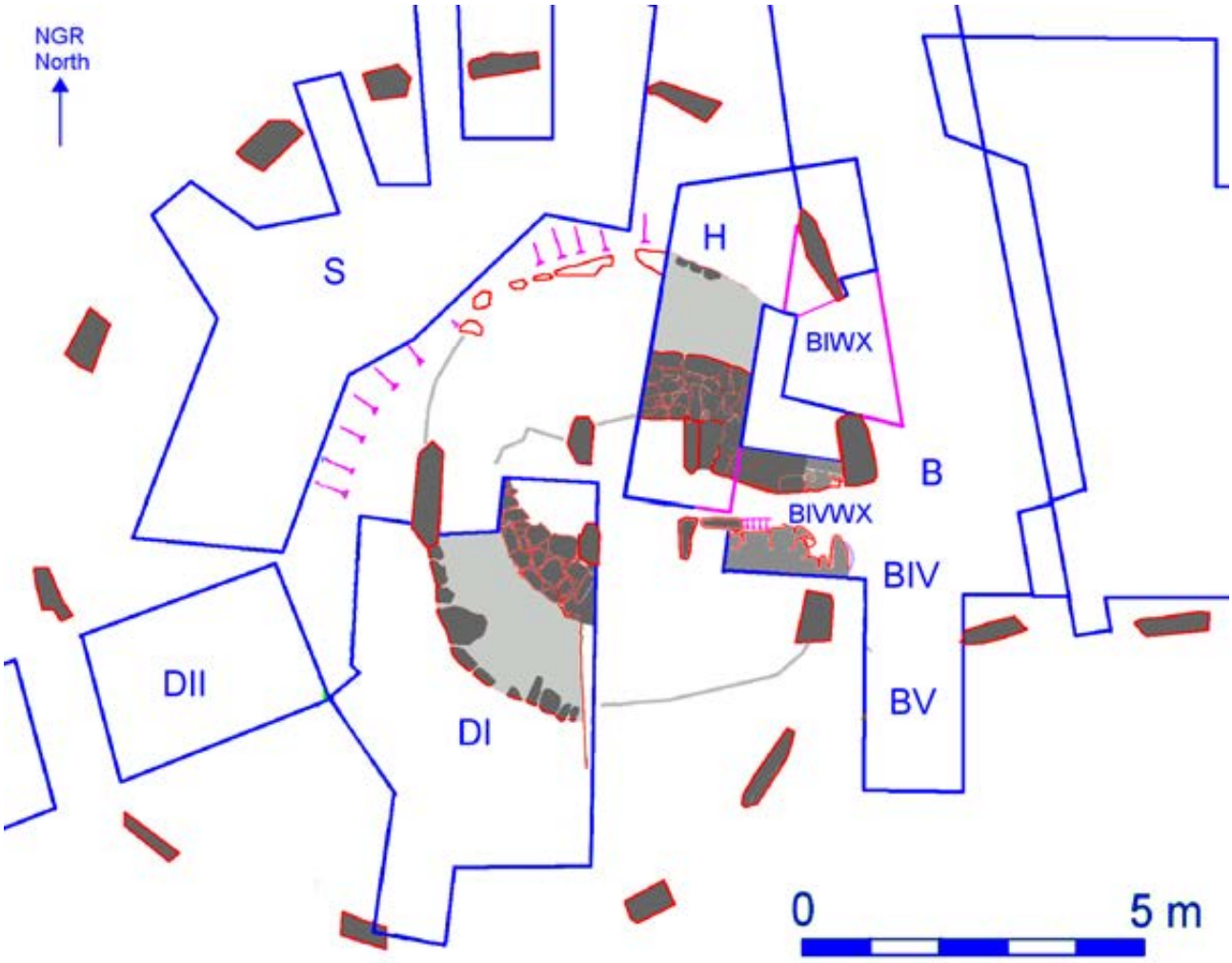
A superseded radiocarbon dating model described in Chapter 23: Radiocarbon and detailed in Chapter 25: Technical Note 23.2.3 suggested that the cairn was built between c. 2900 and 2600 cal BC, and previous publications have included that date range. But as described above there were three probable Beaker sherds in contexts sealed by the cairn and, as described below, a Beaker sherd was incorporated in the original build of the cairn. It very probably dates to after 2500 BC.

24.12.1 The original shape of the cairn

The lower part of the chamber wall and the outer kerb on Area D were built of laid slabs. Where the original parts survived they were well built (Illus 24.43). Impressions of similar kerb stones were found on Area H below the later massive kerbstone. The chamber wall was very well built on Area H (24.42). The south side of the passage had been destroyed and rebuilt in the Victorian period.

In a previous publication (Ashmore 1995) I suggested that the chambered cairn might have been built in two stages, first the chamber wall and then the outer cairn. While that remains a possibility further study of the excavation records suggests that it is slight. Really the only evidence for it was a small pile of gritty material lying against the outer face of the chamber wall on Area H. But the green clay platform on Area H was the same under the chamber wall and the cairn. So was the trampling and other disturbance on Area D. Where it survived the outer kerb in Area D was built in a very similar fashion to the basal face of the chamber wall there. All in all, the chamber wall and outer cairn were almost certainly built as one operation.

The simplified reconstruction shown in Illus 24.45 was produced by flipping the elements on Illus 24.42 about an east-west axis and filling in the gaps. The fallen north-east orthostat has been 'reinstated' somewhat north of the position of the false orthostat recorded by RCAHMS, making the chamber fairly symmetrical (Illus 24.45).



Illus 24.42 The plan of the chambered cairn

The earliest version of the chamber had a round back end which rose over the mound at the base of the central monolith. Its wall was well built of large stones. The cairn material between the kerb and the chamber wall was much less carefully laid, but on Area H the surviving primary cairn was nearly as neat as the chamber wall.

24.12.2 The orthostats

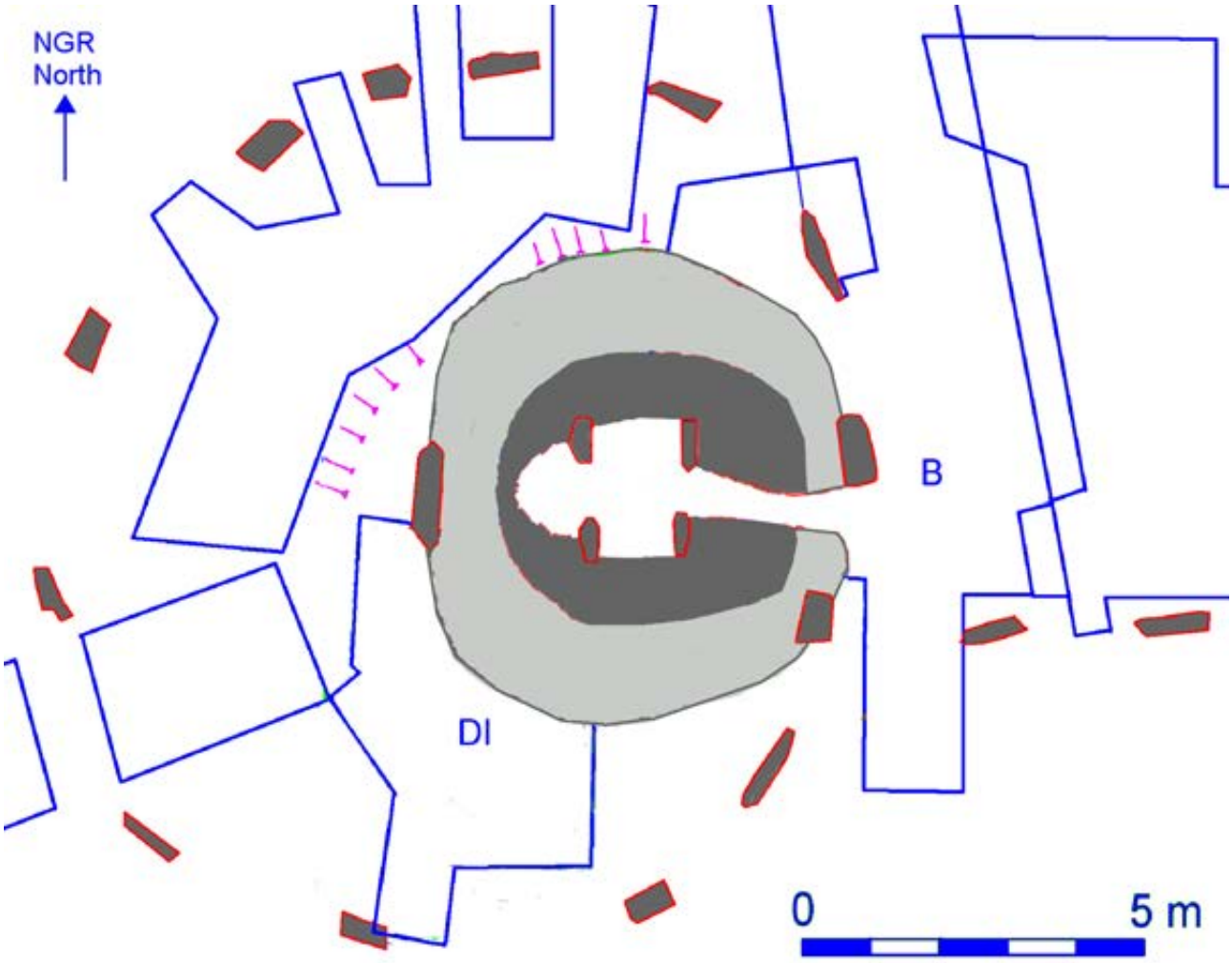
The orthostats need not have been part of the first build of the chamber.

The southwest upright on Area D had glass fragments amongst the small stones at its base and more generally post-peat damage and repairs to the wall left the question moot. Sharbeau's sketch (Chapter 3 Illus 3.35 and Chapter 4 Illus 4.7) does seem to show it was embedded slightly in the wall but less so than in the RCAHMS field drawing of 1923 (Illus 24.46); the RCAHMS record may have reflected clumsy repairs. The other early records cited above are all very schematic but appear to show the east face of the stone completely free of the wall. All early sources show the east face of the north-west orthostat completely free of the wall.

The recumbent stone in the chamber on Area H was the original north-east orthostat, not the one upright in 1980 (see Chapter 12.2.3; Illus 12.12). It was slimmer than the false orthostat, giving more of the appearance of a facing stone. If we were correct in interpreting a slight feature in the clay under the AD1857 and later chamber fills as a cast of the toe of the orthostat then the recumbent stone must at some stage have been in the angle of the chamber wall, not in the AD 1923 position recorded by RCAHMS. The south-east orthostat was also free of the wall.

Illus 24.43 The kerb and chamber from the south with the outer cairn in Area D largely removed [Film 1981.12.22]

Illus 24.44 The later kerb slab, chamber wall and partially removed cairn in Area H with the chamber in the background, seen from the north [Film 1981.5.11]



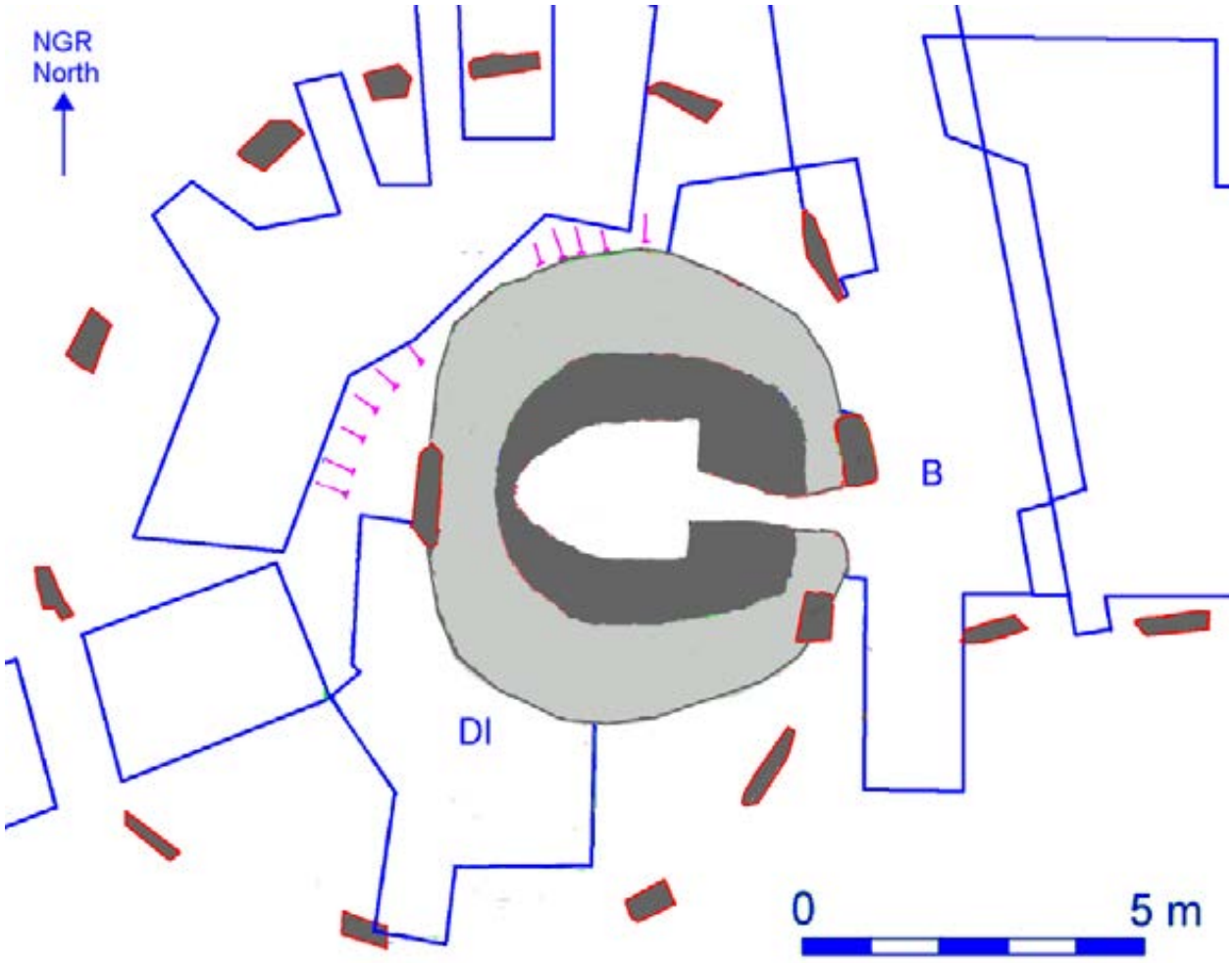
Illus 24.45 Reconstruction of the plan of the original chambered cairn

Although there is no compelling reason to suppose that the original chamber lacked orthostats the possibility thus remains open, as depicted on Illus 24.46. Some implications of this are discussed below.

24.12.3 Dating and finds from the primary cairn

A radiocarbon date was obtained from a single piece of hazel charcoal from a reddened area 736 in the primary outer cairn body (sample 2243/81, AA-24967 4050+/-45). It calibrated to between 2860 and 2470 cal BC. An age from a piece of birch charcoal (sample 116/81; AA-24966; 4210+/-50) from the infill 732 of the cairn at a stratigraphically slightly lower level provided a significantly earlier date of between 2910 and 2630 cal BC. It should not have been deposited earlier than the charcoal in context 736, so must have been residual.

Details of the finds from the cairn and related contexts are tabulated in Appendix 12. They are summarised here. All of the pottery from general pre-cairn contexts (10 catalogue entries) was E/MN corky or probably E/MN corky apart from Cat 48_53 which included a Heb Inc sherd and Cat 1032_1033 which might instead have been corky fine Beaker. The bottom fill of slot 730 cut into the green clay platform immediately under the cairn included alongside neolithic sherds two possibly thoroughly burnt sherds probably from a fine Beaker and one from a domestic Beaker (Cat 671, Cat 672; see Table 12.9). Clay patch 885 by the slot where it lay under the passage wall included a sherd probably from a domestic Beaker (Cat 736). Basal cairn layers included an E/MN Heb Inc (Cat 281) and an indeterminate one.



Illus 24.46 Reconstruction of the plan without orthostats

The primary chamber wall contexts had 8 E/MN corky catalogue entries and one for an E/MN Heb Incised sherd.

Primary cairn layers included mostly E/MN sherds (10 catalogue entries), but they also included an E/MN Heb Inc sherd (Cat 174_175), E/MN or Beaker sherds (Cat 168_171 and 1036–1038), probable Beaker sherds (Cat 541_542), and a much worn International AOC Beaker sherd or sherds (Cat 351_352).

The later dilapidation of the cairn did not reach this level. Analysis of the plans of the layers of the cairn showed that the International AOC Beaker sherd pair probably did not make its way down into context 736 long after the cairn was built. Admittedly the sherd pair might have reached the position in which it was found after the cairn had been partially robbed if someone lifted two layers of large stones, lit a fire, placed the sherd where we found it (it showed no obvious signs of burning) and then carefully replaced the stones. But if that happened, one would expect a large amount of debris to have fallen into the hole when it was created. That no such debris was found is a fairly strong argument against the possibility.

The Beaker sherd pair was in a similar abraded condition to many of the E/MN sherds found in context 736 and other parts of the primary cairn.

The possibly and probably Beaker sherds from immediately pre-cairn and primary cairn contexts provide support for that idea. The maths is simple enough; all of the propositions described above have to be wrong if the cairn dated before Beakers arrived in the area So if the three main 'probably Beaker' identifications are each given a 1 out of 3 chance of being wrong and if each of those probabilities is independent of the others then they together define a 1 in 27 chance that the cairn was pre-Beaker. If on top of that the likelihood

that the definite Beaker sherd was not deposited when the primary cairn was built is also taken to be 1 out of 3 (although my own less conservative assessment is more like 1 out of 5), then the total probability that the cairn pre-dates introduction of Beakers to the Calanais area is 1 in 81. Despite the risks in using subjective estimates of probabilities, and despite the difficulties in defining what is meant by independent assessments of pottery types, those odds are good enough to affirm that the cairn was built after 2500 BC.

The secondary cairn is described and discussed along with erection of the Phase 13 massive kerb slabs in Areas B and H.

24.12.4 Chambered cairn studies, grand narratives and grave doubts

In the second half of the 20th century Henshall demonstrated that whatever the origin of the practice of burying people in stone chambers most Scottish chambered cairns belong to broad regional types (Henshall 1963; Henshall 1972; Davidson & Henshall 1989; Davidson & Henshall1991; Henshall and Ritchie 1995; Henshall & Ritchie 2001). Although very few of them are adequately excavated or dated these broad groupings retain validity for some purposes; but on the one hand there is a lot of local variation and on the other hand some studies have long suggested small-scale social differentiation only broadly linked to distance, for instance Müller's study described below (Müller 1988, 1).

I do not wish to return in any detail to the mid-20th century controversies about the origins and significance of the various types of chambered cairn, controversies cogently described by Stuart Piggott (1954, 124-129). They took place in the context of a belief that farmers first settled in Britain about 2000 BC and that the spread of chambered cairns and their use was over by about 1500 BC. In that mistaken time-scale the belief in an over-arching commonality in culture was entirely credible.

The difficulty remains as it was over 50 years ago that in the areas of Scotland where chambered cairns survive there is (except in central Orkney) little good data about all those other aspects of material culture which would allow us to test and challenge the significances attached to typologies (Piggott 1954, 126).

Indeed it is conceivable that the chambered cairn at Calanais was built for reasons quite different from those which underlay earlier cairn building. Tilley (1998, 155) was right to complain that using identical terms for disparate things creates false links and that our terminologies constrain our thinking. I wholly agree with his comments about abuse of such labels (Ashmore 2003), but paradoxically the same thing can happen when ideas like Tilley's are misapplied as when labels are misused.

That said, and returning to Calanais, even if the chamber was used for burials, it could have been conceived primarily as a space for rituals associated with ancestors; or with initiation; for curating totems; for maintaining mystiques associated with power-games and social elites; for bonding; or for some of these and other purposes. Or it could have been a trophy house for the bones of enemies; that might give a different significance to the inclusion of 'ancestral' material in the pre-chamber slot. If the Ring was conceived as separating a spiritual place from the outside world the slot and the chamber might have been seen as providing a secondary defence against the spirits of old enemies whose bones had been put in the chamber rather than protection against restless ancestral spirits.

24.12.5 Comparanda

In 1954 Piggott compared the Calanais chamber's orthostats with those in the Camster type of chambered cairn (Piggott 1954, 225). Audrey Henshall's contributions in her magisterial survey of the Scottish cairns and material related to them were described in Chapter 3: Previous Studies (see also Technical Note 24.12.8). Here it is worth recalling her comment that in a Hebridean context it was odd that the whole of the interior of the Ring was not used for the cairn, for if it had been the Ring would have served as a peristalith like those round Hebridean style cairns (Henshall 1972, 138).

She saw the little chambered cairn as unique within the Western Isles, reminiscent of the cairns of Caithness and Orkney (Henshall 1972, 125,

138-9, 206). Also the eastward orientation of the Calanais chambered cairn is characteristic of Camster cairns (Davidson and Henshall 1991, 79-80) but of few other sets of large monuments of the 4th or 3rd millennia (Ruggles 1999, 130). it is indeed interesting, even possibly significant, that the Camster cairns in general tend to line up around due east (Davidson and Henshall 1991, 79-80; Ruggles 1999, 130, 148-9). The chambered cairn at Calanais is far younger than all but one of the few scientifically dated Camster-style cairns. The exception is the second phase of Embo in Sutherland, discussed below.

Megaw and Simpson, in their survey of British Prehistory, simply assigned Calanais to a broad group of passage graves of the period 3000 to 2000 cal BC within a model of regional development of styles (1979, 78,135).

In his Magister thesis for the University of Freiburg, published in 1988, Johannes Müller used the information provided by Henshall to analyse the chambered cairns of Shetland, Orkney and the Western Isles (Műller 1988). He applied cluster analysis to try to understand the similarities and differences between the cairns. He considered how information might have been passed between the people who built them, and the reasons why they were built in their particular places.

He showed that in at least one way the Calanais cairn is typical of much of the Western Isles. All of the chambered cairns in the long island are dispersed, with each large cairn or pair of cairns in an area defined by natural boundaries (Műller 1988, 26). Calanais too is isolated from other chambered cairns with the exception of the possible cairn at Breasclete (Henshall 1972, 460).

One of Müller's cluster analysis techniques suggested that in the Western Isles the Calanais chambered cairn is most like those at Loch Glen na Feannag (his Ust 23) and Craonaval (Ust 13) (Müller 1988, 20). Another analytical technique, combining evidence from three different clustering methods, showed it as an outlier closest to Unival (Ust 34), Garrabost on Lewis (L 6) and Sig More (Ust 27) (ibid 19, Fig. 10). But despite these local comparisons he saw the cairn at Calanais as exceptional in the context of other cairns of the Western Isles (Muller 1988, 26). More broadly he saw a similarity between Calanais and Pettigarth's Field (Zet 32) in Shetland, Cubbie Roo's Burden (O 11) on Rousay and, in my view inexplicably, with the cairn (O 15) at Eday Church in Orkney (ibid, 30 Fig 17).

He suggested that cruciform chambers like that at Calanais provided evidence for a direct connection between the Western Isles, Orkney and the Boyne. He argued that such chambers were to be found in the main ritual focal areas at the Boyne, Calanais, Brodgar (Maes Howe) in Orkney and Gruting Voe in Shetland (Műller 1988, 34-6). Had he broadened his analysis he might have seen some of the chambers at Camster in Caithness as cruciform (Henshall 1963, 96, 103); they are no less so than the cairn at Calanais. Many of them (and I would argue also those in the Gruting Voe area in Shetland) are not in obvious ritual foci.

But the comparisons cited by Piggott, Henshall and Műller may not be valid for the original chamber. It had a round back end and the possibility that the orthostats were added in a subsequent phase cannot be excluded. Without the orthostats and square back end the similarity of the chamber to those of Barpa Langass and Marrog in the Uists increases, and that to the chambers in the cairns of Orkney and Caithness decreases. It may have been as similar to other small simple passage cairns in the Western Isles as to any regionally specific type of chambered cairn elsewhere. It could be compared to Achaidh near the Dornoch Firth which contained both inhumations and cremations (Henshall & Ritchie1995, 101-2). But in truth the chambered cairn at Calanais is far from identical to any these comparanda.

Undoubtedly some small chambered cairns remain to be discovered in the Western Isles. For instance, one may be the 7m by 8m cairn at Stacaiscal, Barvas with small northern and western chambers compared by its recorder to cairns 'such as' Calanais (Campbell 2010, 11). So the Calanais cairn may not be as unusual in the Western Isles as it currently seems. That said, for the moment its final form appears to be exotic.

Burl has suggested that it was added to the Ring as a physical retaliation against alien ideas (Burl 2000, 40). He detected a fairly common phenomenon of inserting 'native burial places'

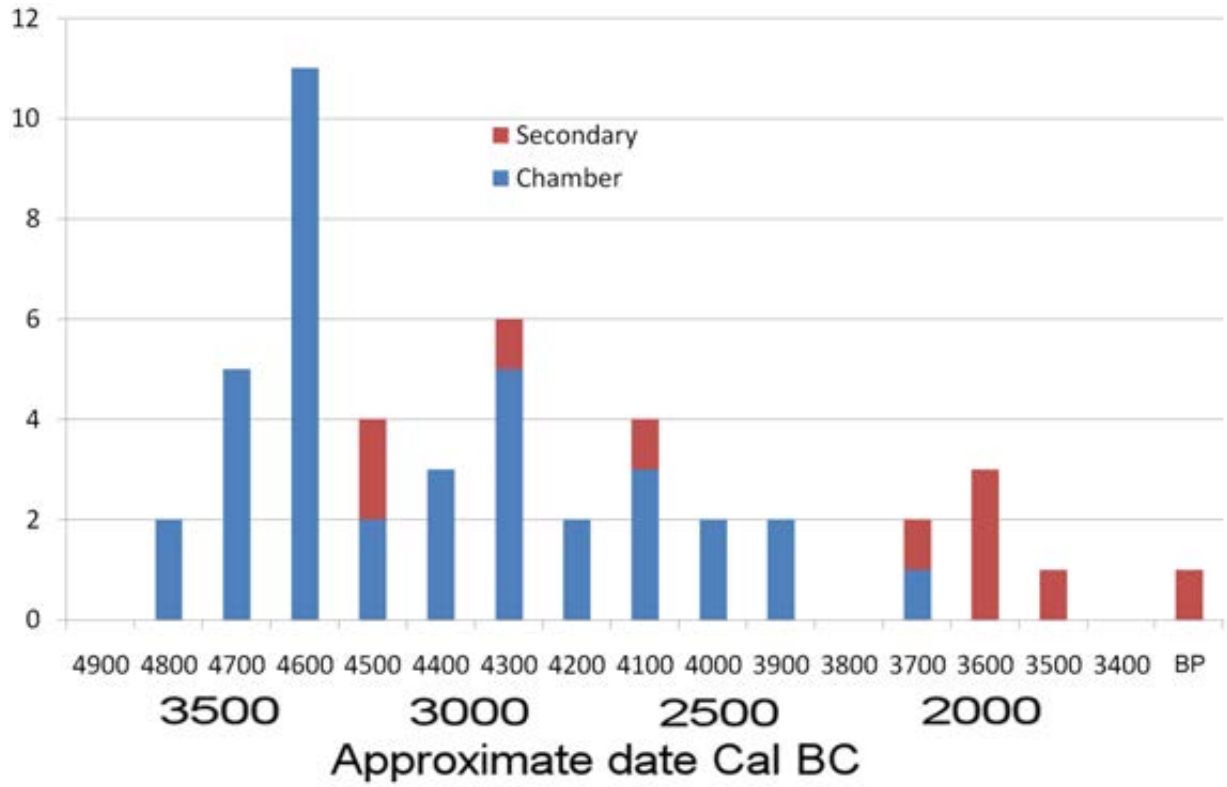
into 'outlandish shrines' (ibid, 132). Although the cairn as it was understood before excavation was of a form alien to the Hebrides, if it was originally bag-shaped and lacked orthostats it conforms better to his idea.

But other interpretations may be preferred. The inclusion of cairns or cists within stone circles, or the erection of stones round cairns, is a common feature in Britain and Ireland. At one extreme is New Grange (O'Kelly, 1971), at another the Clava cairns (Henshall, 1963, 21-7; 1972, 271; Bradley 2000; Bradley 2010), at another the small encircled cairns of Ireland and western Britain. Conversely the huge peristaliths surrounding some of the round-cairned chambered cairns of the southern Hebrides (Henshall, 1972, 127-8), particularly those where the peristalith encloses more than the cairn (ibid), may bear some relationship to stone circles. It has been suggested, somewhat speculatively, that the practices which resulted in the combination of burial monuments and rings of large stones may have been the result of an extremely long-lasting belief that large upright stones were good symbols for people (Bradley 2010). If so it may be very rash to assume that the conjunction of stone rings and burial places was specific to any particular local belief-set or had a narrow chronological significance. In the next section this idea is taken forward.

24.12.6 Dating small chambered cairns

The radiocarbon dates available in 2006 for burials in chambered cairns in Scotland are listed in Technical Note 24.12.9 and summarised in Illus 24.47. The immediate stimuli for building the chambered cairns came from different sources judging by the various styles of chambered cairn in different parts of Scotland.

Burials in a similar manner to that used for primary burials continued in some areas until the middle of the 3rd millennium, and secondary burials in different styles were subsequently added. But it is instructive to consider the sequence of styles of burial in other parts of European similarly distant from the areas where chambered tombs were first built. For instance in Western Switzerland the first (4800 to 4300 BC) funerary ritual involved cemeteries containing mainly individual graves. A second phase (4300 to 3300 BC) was marked



Illus 24.47 Radiocarbon dates for burials in chambered cairns in Scotland

by the appearance of double or multiple, simultaneous or successive collective burials in cists. Megalithic tombs came into use only afterwards; subsequently Beakers were deposited in them with burials (Desideri & Besse 2010, 158-9). I do not for a moment wish to suggest that the Scottish sequence followed an identical path; my point is solely that it may have been equally complicated.

There are indeed suggestions that the sequence in Scotland was complex. Probably some small chambered cairns in Atlantic Scotland did not belong to the main floruit. As part of their analysis of the introduction of farming, pottery making and other practices to Britain and Ireland, Sheridan (2009) and Pailler and Sheridan (2009, 34-7) have shown that simple passage tombs and small closed megalithic burial chambers like that in the cairn at Achnachreebeag may have been constructed in the west of Scotland (and in Ireland) before 4000 BC (Pailler and Sheridan 2009).

There was a period of chambered cairn building in the area round Inverness significantly after the construction of main floruit chambered cairns ceased. Jones and Thomas (2010, 293) have speculated that it may have been much more widespread than previously supposed. They have suggested that the entrance graves of the western tip of Cornwall, a few of the miscellaneous small graves in the Isles of Scilly, those forming the group of wedge tombs near Waterford in Ireland and possibly some of the Bargrennan-style tombs of southwest Scotland may reflect the activities of travellers at a time when exotica such as gold lunulae, Beakers and copper alloy objects were also appearing. They suggested that the idea of building small chambered cairns was taken up afresh amongst diverse communities who responded in local idioms. The surviving evidence suggests that the burial ritual involved cremation although most of the cairns they discussed were built in areas of acid soils (which break down raw bone somewhat faster than well-cremated bone) and they considered that the lack of inhumed remains might be due merely to unsuitable preservation conditions. Jones and Thomas also emphasised that all of the scientific and artefactual evidence for use of these cairns could have arisen from secondary activities. But their preferred interpretation was that some small tombs were established in coastal areas in the late 3rd and the 2nd millennium BC (Jones & Thomas 2010, 292). Their model has more of the status of a speculation than a theory, because of the acknowledged lack of dating evidence for the primary construction and use of the cairns, but Calanais would sit fairly well within the framework of a resurgent interest amongst those familiar with the use of Beakers in building small chambered cairns and depositing cremated human bone in them.

They also pointed to the late dates for some Clava cairns and viewed them as part of the same phenomenon (Jones and Thomas 2010 292). Radiocarbon dates from hazel charcoal on the old land surface under the cairn at Balnuaran of Clava, in a valley debouching on the inner part of the Moray Firth, imply a date for construction after 1900 cal BC (Technical Note 24.12.9b; Bradley 2000, 115-6; AA-24234, AA-25433). As described in Chapter 21.1.1 above, Bradley had already hypothesised that they may have been built because of a perceived lack of 'ancestral' monuments. If Jones and Thomas are right there may have been more to it than that, and the evidence from Culbin Sands cited by Bradley fits as well with their hypothesis as it does with Bradley's. But it is necessary to emphasise that, as freely admitted by Jones and Thomas, their model was based largely on inference, that dangerously attractive methodology, and requires the test of more excavation and more scientific dating.

Even if the ideas of Jones and Thomas are not correct, interesting comparisons and contrasts can be made with the south chamber and passage in a small oval chambered cairn at Embo near the east coast of Sutherland.

The cairn itself was built and used for burials much earlier, as described below. But the south chamber (at least) appears to have been built or greatly modified at some date after 2320 cal BC, probably by Beaker-users. Neither of the chambers was close in form to the one at Calanais (Illus 24.48). Even if the Embo antechamber be taken as equivalent to that part of the Calanais passage within the chamber wall the main differences between the two tombs were substantial: the Calanais chamber was faced by a wall and the chambers at Embo by orthostats up to 1.2m tall, although

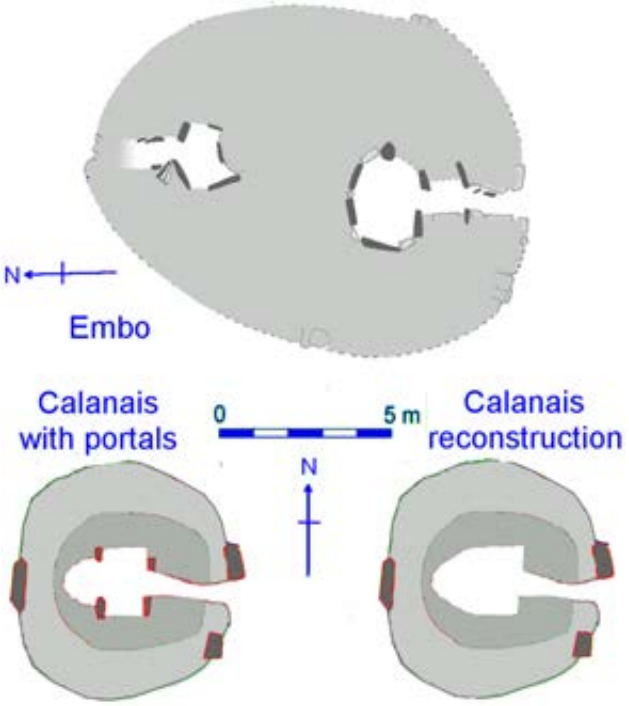
the passage was wall-built (ibid 12, Fig 4). The longer dimensions of the chambers at Embo were at right-angles to the passages. But there were some similarities. The south chamber at Embo was about the same size as the reconstructed original chamber at Calanais; its 'antechamber' was about 1m long and its passage was 1.6m long (Henshall and Ritchie 1995, 136), dimensions not far different from those at Calanais.

Four radiocarbon dates came from contexts supposed to be contemporary with its construction. An age from two adult vertebrae found behind a stone under a corbel stone (GrA-772; 3720+/-70 BP) calibrated to between 2320 and 1900 cal BC. Small animal bones from a deposit contemporary with construction of the chamber provided an age (BM-442 3870+-100) calibrating to between 2580 and 1990 cal BC.

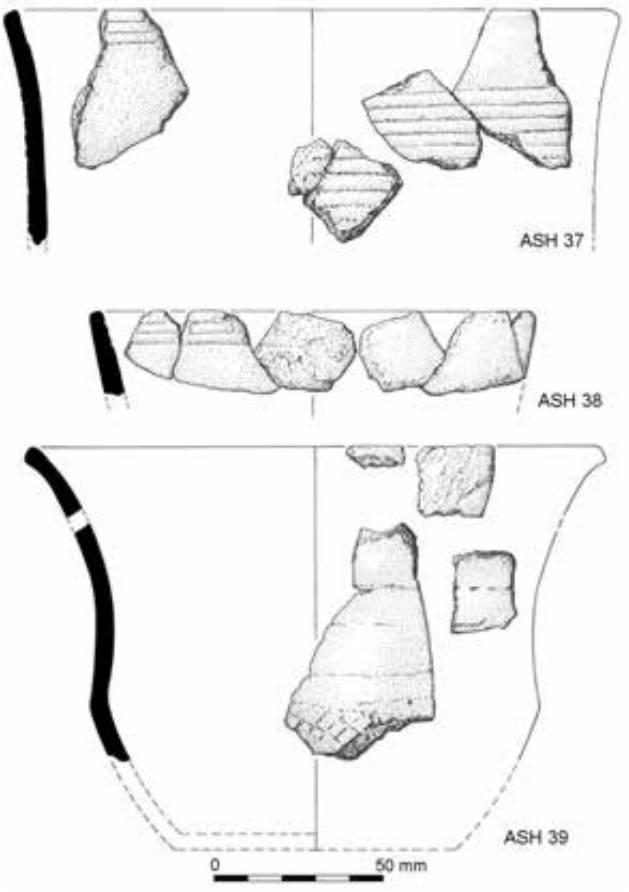
On the other hand, infant bones from under corbel stones produced two ages (GrA-770 and 771, 4010+/-70 and 4340+/-70) calibrating to 2865 to 2310 and 3305 to 2700 cal BC (Henshall and Ritchie 1995, 75). Four more technically reliable dates were recently obtained from single human bones in the north and south chambers (UB-6876 to 6879). Two from fills of the south chamber calibrated to between 3520 and 3350 cal BC; and an age from another bone from fills of the south chamber calibrated to between 3330 and 2920 cal BC. But one from the floor of the much damaged north chamber calibrated to between 2620 and 2470 cal BC. (Sheridan 2006, 205).

Parts of an International Beaker were found redeposited in a secondary cist at Embo and an insular Beaker came from the south chamber. The question must be whether the latter was built in the 4th millennium or in the second half of the 3rd millennium when skeletal material and Beaker pottery were deposited. The most straightforward interpretation of the reported stratigraphy is that the chamber should be dated to between 2320 and 1900 cal BC by the latest radiocarbon-dated bones in constructional contexts. In that interpretation the 4th millennium bones will have been ancestral material from the original cairn.

Opposition to this interpretation can be based on the propositions that the late 3rd millennium bones were simply tucked behind stones in an al-



Illus 24.48 Calanais and Embo, the latter simplified from Henshall and Wallace 1963, 10, Fig 2



Illus 24.49 Early Beakers found at Calanais

ready ruinous construction and that all but the four dates obtained recently are unreliable. Such reservations cannot be dismissed. But if the reported excavation results are accepted, the least complicated explanation is that re-use of a pre-existing chambered cairn involved construction or major reconstruction of a chamber and passage very broadly similar to those at Calanais. Thus the south chamber and passage at Embo bore a similar symbolic relationship to the cairn to that between the chamber and passage at Calanais and the Ring.

In this interpretation Bradley's suggestion that the Clava cairns remedied a perceived lack in ancestral sites can be extended in other areas to include the appropriation of ancient tombs either by people influenced by incomers or by incomers seeking to demonstrate a spiritual relationship to the ancestors of local people. More generally the speculation set out by Jones and Thomas (2010) provides a broad context for construction of new small chambered cairns.

24.12.7 Early Beakers and the cairn at Calanais

Refining the possible date range for building of the chambered cairn at Calanais requires an examination of the likely earliest date for Beakers. Sheridan (Chapter 18 and as described below) has set out the solid evidence from direct dating of human bones found with British Beakers that burials started in the third quarter of the third millennium BC. But if the western sea ways continued to serve as a conduit for new ideas there may have been even earlier Beakers in domestic and funerary contexts on the shores of the Long Island.

The matter has even more direct relevance given the presence of three very early Beakers at Calanais.

Most of the sherds from these Beakers came from the area to the southeast of the entrance to the Ring, pre-cairn enclosures and chambered cairn (Chapter 18 Illus 18.16). One sherd of ASH 38 came from a primary layer (736) of the chambered cairn on Area H. There was a scatter of sherds in Area B to the east of the Ring. A sherd of a fourth early Beaker (ASH 40) was found to the west in a thin soil outside the Ring, far from the other early sherds.

It seems on balance most likely that ASH 37 and ASH 38 at least came from burials (which remain undiscovered) at Calanais. Those burials may have been in a single grave or graves, or even in the chamber of the cairn. ASH 38, however, cannot have been deposited in the chamber of the cairn; it may have been brought to Calanais in soil and clay used to bed the stones of the chambered cairn or accompanied a burial in a grave contemporaneous with one of the pre-cairn enclosures.

Sherds of similar Beakers have been found in many funerary and domestic contexts in the west of Scotland. Sheridan (Chapter 18 The Pottery Assemblage 18.7.4) finds it likely that the Calanais international-style Beakers date to the third quarter of the third millennium as early as the 25th century BC. Her scholarly exposition is an important complement - possibly even a salutary correction - to the somewhat more speculative discussion here.

There are various models for the dating, origins and spreads of Beakers in Europe. They may have first been made in northern Iberia during the first half of the 3rd millennium BC (Desideri and Besse 2010 quoting Giulaine 1998). But Needham (2005, 176) preferred a more cautious assignation to Iberia or south-western France and a more specific origin for Maritime Beakers (a category to which the Calanais Beaker ASH 39 belongs) in the Tagus estuary in Portugal. In discussing the Beakers of southern France Lemercier (2012, 133, 138, 140) suggested that their likeliest origin was in Spain and Portugal. Lemercier dated the appearance of Beakers in his study area to between 2500 and 2400 BC.

One long favoured idea is that early western Beakers were disseminated to northern Europe where Beaker-making potters were influenced by other contemporary styles of vessel, notably Corded Wares (Needham 2005, 176-182). Beakers in new styles were then carried back westward, influencing local artisans. But probably things were far more complex in the centuries after metal tools and ornaments reached Atlantic Europe, allied as the spread of Beakers seems to have been initially with flint trading routes (Needham 2005, 177) and subsequently with metalworking skills (Needham 2005, 177).

In some areas of Europe Beaker-users settled amongst local indigenous communities and were involved changes in both population and ideas (Desideri & Besse 2010, 158, 171). That seems to be a generally accepted model for what happened around the middle of the 3rd millennium in parts of southern Europe; the first Beaker-users were members of a sprinkling of incomers bringing intriguing novelties into local cultures and the consequence was a fusion of the practices of indigenes and settlers (in some cases perhaps involving resuscitation of earlier indigenous ideas).

That model may also apply in Britain, where it is probably wrong to regard burials of Continental incomers as exceptional; Sheridan (Chapter 18: The Pottery Assemblage) points out that Beakers of AOC and E type are particularly widely distributed over Britain, and most of the earliest dated examples are from graves of non-local individuals, as revealed either by strontium isotope analysis of their tooth enamel or by the Continental style of their graves. She speculates that the users of the early Beakers at Calanais might have been Continental immigrants, or were first or second generation descendants of incomers.

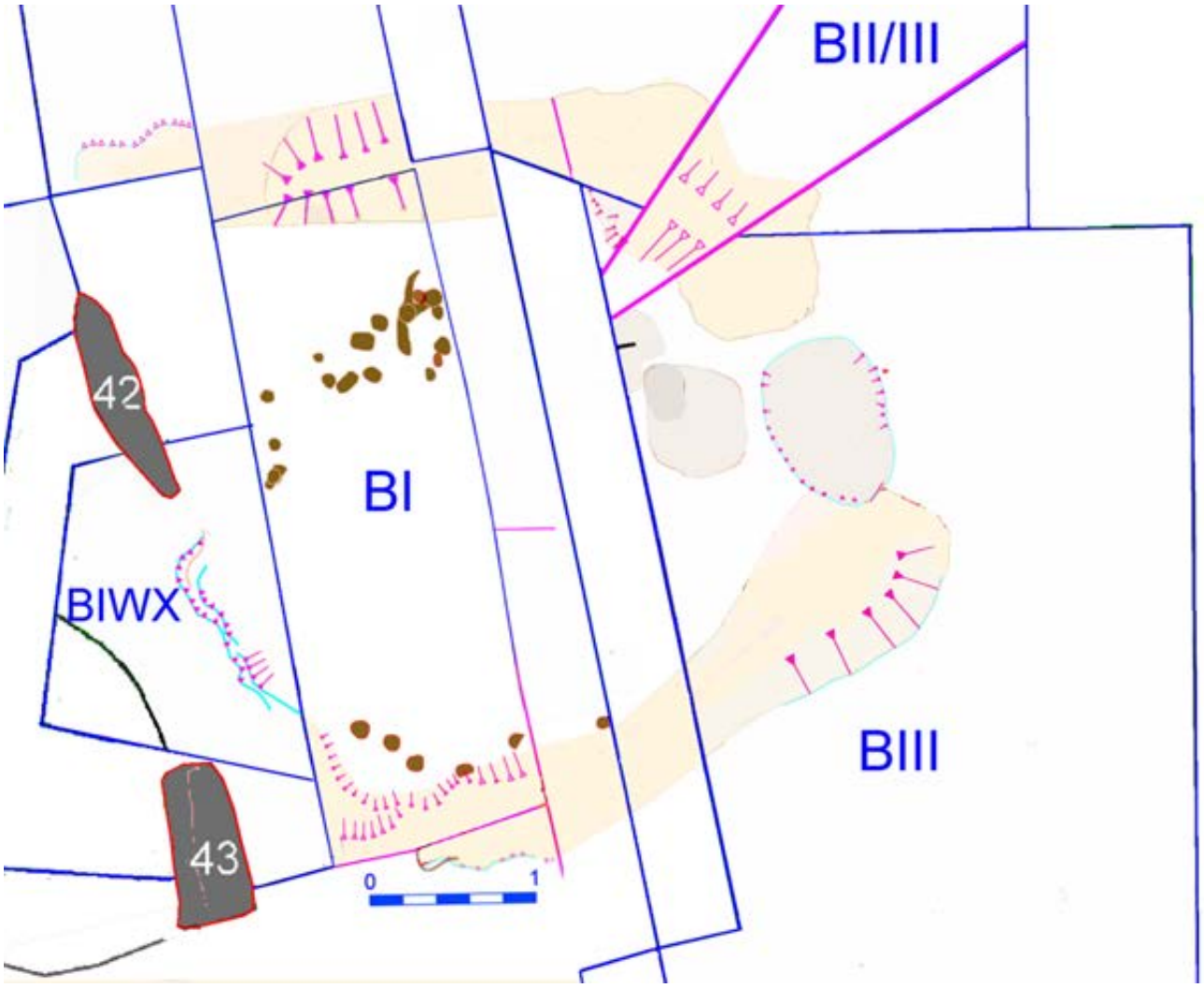
It seems quite likely, taking into account both Sheridan's points and the hypothesis proposed by Jones and Thomas, that the first phase of contact between Beaker users and the mid 3rd millennium inhabitants of the Western Isles resulted from the activities of an early trickle of Beaker-using people, possibly traders or prospectors, perhaps fascinated by whatever the great monuments of the Boyne valley and Orkney (and by extension Calanais) represented. It is even possible that the first landfall of Beaker users in the northern parts of the Western Isles took place before 2500 BC; for given the evidence for the diverse ways in which Beaker users interacted with the people of various parts of Europe, I see no reason why Beakers should not have been put to domestic or ritual use before single burial with Beakers became common enough to show in the British archaeological record. Indeed one of the earliest British burials, on the island of Coll, was cut through layers containing domestic Beakers (Ritchie & Crawford 1978).

But it must be emphasised that the reliable radiocarbon dates currently available for burials associated with Beakers in Scotland all fall significantly after 2500 cal BC and that is currently the most reasonable absolute early limit on the date range of Beakers in northern Britain (Sheridan Chapter 18 The Pottery Assemblage 18.7.4). It thus currently provides the best absolute terminus post quem for the chambered cairn at Calanais; a date half a century later provides a more likely limit.

Because of the considerable similarity of early Beakers along the coasts of Europe it is not ridiculous to draw broad comparisons between their appearance in NW Scotland and southern France, where all the earliest Beakers were fine and in Maritime or International style. Settlements were small, including 1 to 4 oval houses. The burial tradition was generally collective burial in megalithic structures or local caves or cavities (Lemercier 2012, 133-135). But it is clear that the other artefacts associated with Beaker users reflected local and regional indigenous traditions, varying from west to east. It is possibly no coincidence that the description given above fits the (scanty) evidence from Lewis and Harris.

But what specifically stimulated the building of the chambered cairn (and, indeed the earlier timber structure)? Could it have been a period of extreme hardship induced by some drastic change in the environment? Looking at a very different source of evidence, tree ring studies suggest a period of widespread stress on trees starting in 2354 BC and culminating in 2345 BC (Baillie 1999, 146). It is conceivable that this coincided with either the transition from Pollen Zone CaN-3ai to 3aii or to that from CaN-3a to 3b. After each transition there was increasing reliance on pastoralism, perhaps reflecting crop failures during 9 years of devastating weather. If the coincidence was with the earlier transition, it may be that the latest timber structure or the cairn was built in response.

However, for the moment, any relationship must remain highly speculative. Baillie related this environmental event to an eruption of Hekla in Iceland (ibid 146, 205) and if further excavation takes place at Calanais it would be interesting to study clay and soil samples for particles of volcanic glass.



Illus 24.50 The Stage 1 enclosure stake-holes with the area of the spread Stage 2 bank and entrance silts in light colours

Summing up, the chambered cairn at Calanais very probably dated to after 2500 cal BC, its architecture was similar to that of some other Scottish chambered cairns used for burials, and fragments of cremated human bone were found in its chamber in AD 1857. Although a possibility remains that it was built with very different aims it was most probably primarily intended for curating the remains of dead people. More speculatively it can be proposed that it was one realisation of a more general phenomenon: new building of burial chambers and passages stimulated by an infusion of Beaker-using people from south west Europe who in an initial phase of settlement either took up local traditions, causing a new vitality to their expression, or used them to affirm their own ancestors' relationship to the ancestors of local people.

24.13 Phase 9a and 9b: The Stage 1 and Stage 2 enclosures

24.13.1 The Stage 1 enclosure

There were four main stages of enclosure. The earliest was defined by stakes (Phase 9a), the second by an earthen bank with an entrance to the east (Phase 9b). It may have had more than one substage. It was succeeded by two successive wall-based enclosures (Phase 11a and 12a).

At a low level in the north of the Stage 2 enclosure was a greenish-brown layer, 836 lower. In it were numerous small round features (Illus 24.50). They were interpreted as stake holes. Five similar stake holes were found in the south of the enclosure under patches of clay forming later floor levels.

The stake-holes provide evidence for a separate enclosure stage, Stage 1. They were all shallow. They were invisible in layers at only a small absolute height above them. In Illus 24.50 iron-panned stake-holes have been omitted. They are included on Illus 24.52 Some may have gone with the Stage 1 enclosure.

Illus 24.51 The scooped western part of the enclosure [Film 1981.15.5].

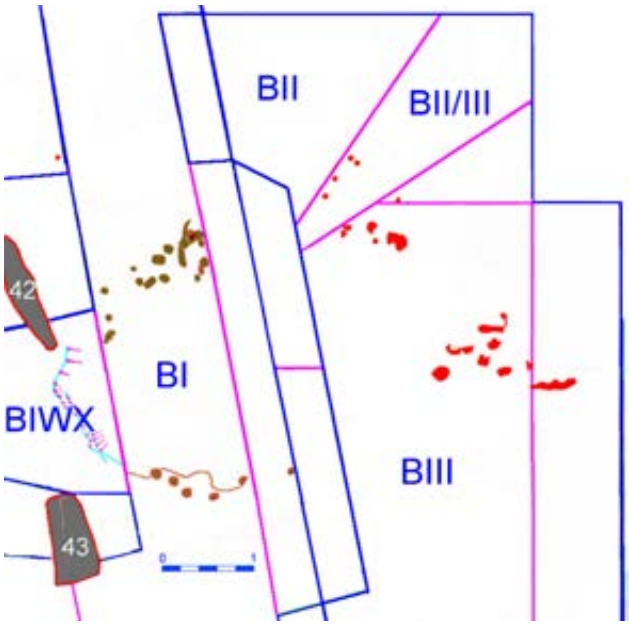
They lay inside a scooped cut through layers of greenish clay and turf lines east of the Ring area (Illus 24.51).

A Food Vessel sherd (Cat 567) may have been in upper soil 836 (see Technical Note 7.6.8 for problems with context assignation of this sherd). If so it must have been introduced by ground-working.

24.13.2 Discussion of the Stage 1 enclosures

The stake holes formed a pattern asymmetrical to the Stage 2 enclosure (Illus 24.50) and highly asymmetrical to the Stage 3 enclosure. The southern Stage 1 stake holes were covered by the stub wall of the Stage 4 enclosure by Ring stone 43. The stake-holes cannot have been internal fittings of any of the later enclosures. So taken in conjunction with the scalloped edge of the enclosure to the west, they define a Stage 1 enclosure.

The stake holes may have been truncated if the ground inside the enclosure was lowered during building of the later Stage 2 enclosure. But the preferred interpretation is that the ground was levelled down outside the Ring (the eastern part of which, it will be recalled, had earlier been built up with green clay) as part of making the Stage 1 enclosure. Just possibly the stakes left very shallow impressions because they were merely set on the levelled down surface as part of a frame for a turf wall, rather than being hammered deep into the ground.

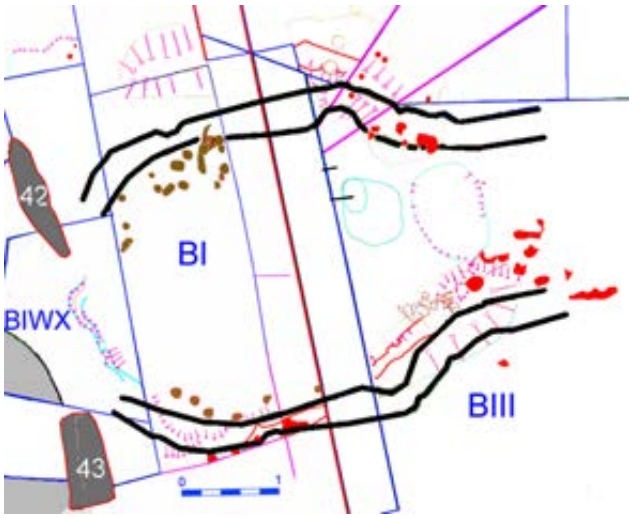


Illus 24.52 The Stage 1 enclosure and iron-panned features of ambiguous date on Plans 46/81 to 48/81 [NMRS DC38080 to 38082].

There was too little evidence to reconstruct the overall shape of the Stage 1 enclosure. It may have been circular, or bag-shaped like one of the enclosures on the green clay platform under the cairn. If it was not circular and some of the iron-rich stake-holes and features around the entrance to the Stage 2 enclosure in fact went with the Stage 1 enclosure the latter might have had a main axis running slightly north of east and just under 4m long (Illus 24.53).

If so it could have been very similar in size and shape to the smaller and probably later of the timber-built enclosures on the green clay platform under the cairn (Illus 24.39 upper).

The match is far from perfect and it is not suggested that the Stage 1 enclosure necessarily had the exact shape of the pre-cairn one. But their broad resemblance gives credibility to the idea that the Stage 1 enclosure was built at the same time as the chambered cairn and its function was to allow the practices followed in the pre-cairn enclosure to continue, albeit outside the Ring.



Illus 24.53 Overlay of reconstructed outline of the small sub-cairn enclosure on Illus 24.50 and the Stage 2 enclosure

24.13.3 Phase 9b: The Stage 2 embanked enclosure

A small sub-oval enclosure was built in much the same area as the Stage 1 enclosure, immediately to the east-north-east of the Ring (Illus 24.54, 24.55).

It was slightly less than 4m across internally. It had a broad eastern entrance, in which were broad shallow depressions containing thin silty deposits. .Illus 24.54 shows the area of the Stage 2 enclosure.

The bank defining it suggests a more substantial structure than the Stage 1 enclosure. It may have been the slumped and ploughed relics of a relatively narrow turf and timber wall. There was no evidence to suggest roofing.

In the west, near Ring stone 43, there was no surviving bank, but the area included several iron-encrusted stake holes which appear to have lined the higher ground to the south into which Ring stone 43 had been set.

Their line bifurcated near Ring stone 43 suggesting that the enclosure was modified at some time. More posts in the palisade slot, which is shown in magenta on Illus 24.55, helped to define a turf wall. There is a possibility that the more southerly line of the palisade continued under turf lines 164 and 162 (see 24.7.1 and 24.9.1) but that is not the preferred interpretation of the field evidence

The middle fills of the enclosure in the area shown on Illus 24.57 were amongst the most heavily iron-encrusted at Calanais. The possible significance of this will be discussed along with the fourth stage enclosure.

A large black patch of turf line on part of the outer edge of the bank in BII may suggest a phase of stability. It was cut by an ard, which had left marks to the west of the surviving patch of ground surface. This reflected at least one period of ploughing at a date before the latest wall-base 103 was added.

Ambiguous linear features (not shown on Illus 24.55) to the east of the enclosure were interpreted as the much-ploughed remains of cultivation beds, but it is conceivable that they had also lined an entranceway to the enclosure.

Bank makeup at Calanais included only Early/Middle Neolithic sherds, one a possible Hebridean incised sherd. They had presumably been in soil and turf used to build the bank. The lack of later pottery allows a (non-preferred) interpretation that the first enclosure was built soon after the Ring and dated to between 2850 and 2750 BC.

Two barbed and tanged arrowheads (Illus 24.58; CAT 209, 210), a sherd of a fine Beaker (Cat 771) and three other Early/Middle Neolithic or domestic Beaker sherds (Cat 829-831) in the silts of the entrance-way independently suggest a date for its active use after the introduction of Beaker pottery to the area after 2500 BC. Many different explanations could be given for their presence but one possibility is that they were purposeful deposits of complete arrows. Given that bone did not survive well at Calanais, another possibility is that they were part of funerary deposits in the entrance. Yet another is that they reflect a conflict.

Central pit 149, about 0.55m across, which might be of this stage, contained a possible fine Beaker sherd (Cat 677); the sherd showed signs of marked abrasion (wear category 3) so was probably residual. But it must be emphasised that the pit and a round -bottomed pit 180 in an ambiguous relationship to it (boteh pits were much damaged by the Victorian pit 129) could have gone with any stage of enclosure except perhaps the first.

Illus 24.54 The second stage of enclosure in 1980 with remains of the fourth stage wall-base outside it [Film 1980.11.23]

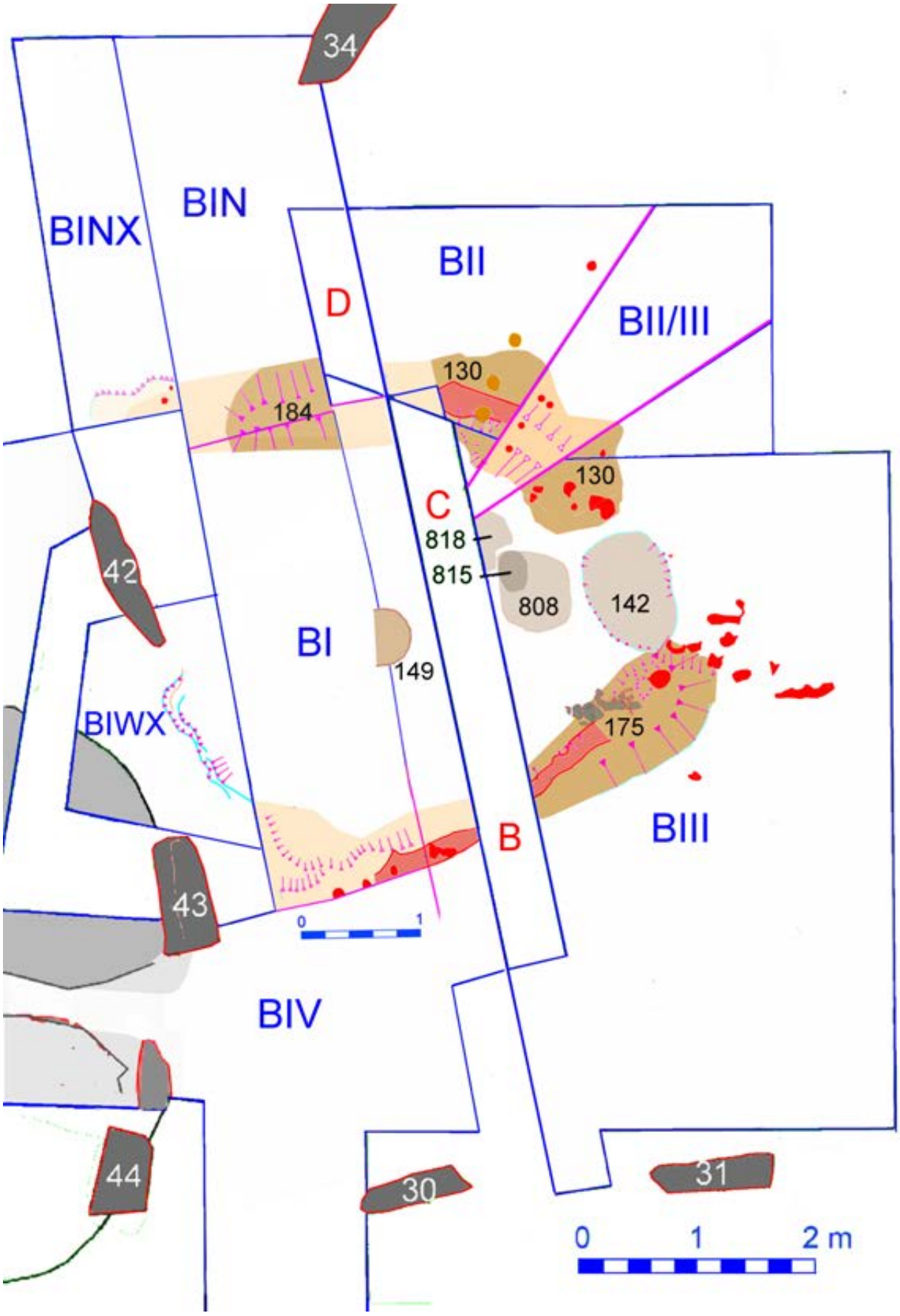
24.13.4 Analogies

If this early embanked enclosure was rectilinear and dated to around 2500 BC it can be compared to some of the houses associated with grooved ware pottery in various parts of Scotland. For instance House 10 at Skara Brae (thought to have been late in the sequence there and to have had a special function within the settlement) and House 1 at Barnhouse in Orkney are of roughly the same size. the latter however probably dated to around 3000 BC.

In some ways a more interesting comparison is with house-like structures at Beckton Farm (Pollard 1997). Beckton Farm is near Lockerbie, in the valley of Dryfe Water which runs north from near the head of the Solway Firth. It is not really beside the main western seaways, but it lay only two weeks leisurely travel away from Calanais by sea and river. The complex included at least two buildings (Illus 24.59), pits with cremated bone, two of which contained several Grooved Ware sherds, and four-post structures measuring c. 3m by 3m.

It was interpreted as a transient settlement, possibly occupied several times, at which four post structures might have been used for excarnation or as raised granaries. Some of the pits may have been used as receptacles for cremation pyre debris. Structure 136 was interpreted as bounded by stake holes and possibly a daub wall enclosing an area about 4m across (Pollard 1997, 75-6, Illus 3). Structure 111 was defined by a shallow ditch lined with stake holes defining four sides of a rounded pentagon and enclosed an area about 4m across. The entrance, formed by the fifth side of the pentagon, faced a little south of east (ibid 77-8, Illus 5). Clearly these structures differed in detail from the Stage 2 enclosure at Calanais, but they were of similar size and shared the general idea of building with clay or turf and stakes.

The house-like structures were not directly radiocarbon-dated but dates (from mixed charcoal which may have included pieces old at the time) from features with Grooved Ware nearby provided a range of date, 3298-2980 cal BC, 2923 to 2617



Illus 24.55 The Stage 2 enclosure

cal BC and 2910-2500 cal BC (ibid, 89). Perhaps in part because of oak and residual charcoal, they suggest an earlier date than that preferred for the Stage 2 enclosure at Calanais. Despite the presence of older charcoal, the main period or periods of use at Beckton Farm probably dated within the span 2900 to 2300 (Pollard 1997 Table 1) and the excavator thought that Structure 136 might have been one of its later features (Illus 24.57).

If the Stage 2 enclosure was originally meant to be oval a loose analogy can be made with a house-like structure found at Tormore, Arran (Barber (ed) 1997, 7-21). The first phase of the structure had Beaker pottery and barbed and tanged arrowhead associated with it. But the area enclosed by the bank of the Tormore was considerably greater at about 9m by 12m so the analogy is not close (Technical Note 24.13.4).

The Beckton Farm structures could be characterised as 'special purpose domestic' like the best analogy for the Calanais Stage 4 enclosure, a building at Dalmore, Lewis, interpreted in that way by Edwards & Ralston (1997).

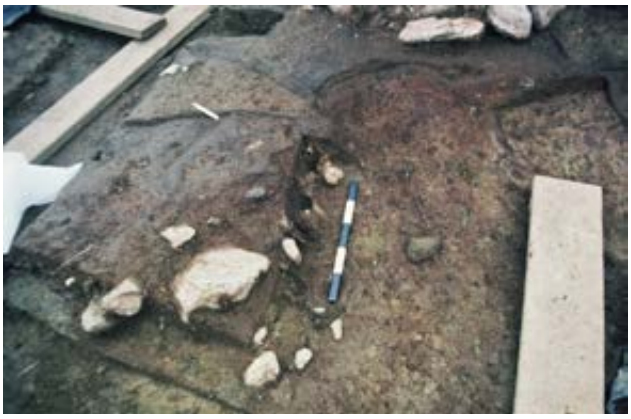
24.13.5 Ploughing of the enclosure

The Stage 2 enclosure bank was ploughed down before the Stage 3 enclosure was built. None of the ard marks in Areas BIV and BV south of the enclosure was datable to before the ritual deposition and ground-working of Phase 10a. So it seems most likely that ploughing of the enclosure succeeded the earliest part of Phase 10a. A piece of Pomoideae charcoal found in an ard mark in clay 123 to the north of the enclosure dated to between 2120 and 1770 cal BC and may reflect the date of some, but necessarily the earliest, of the ploughing of the bank. A pair of Food Vessel sherds (Cat 580_581) in bank-like soil filling a linear depression north of the enclosure may suggest a similar date, although it was possibly intrusive.

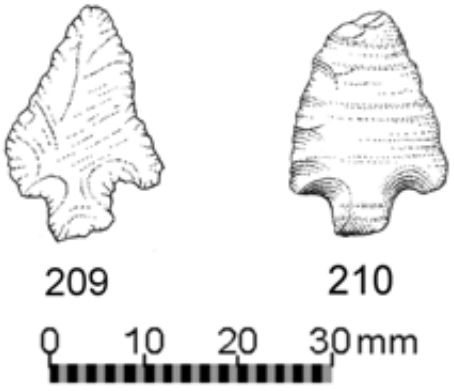
24.13.6 Summary

The preferred interpretation of the Calanais enclosure is that it was 'special purpose domestic'; by that term I mean (as I suspect that Edwards and Ralston also meant) a building used from time to

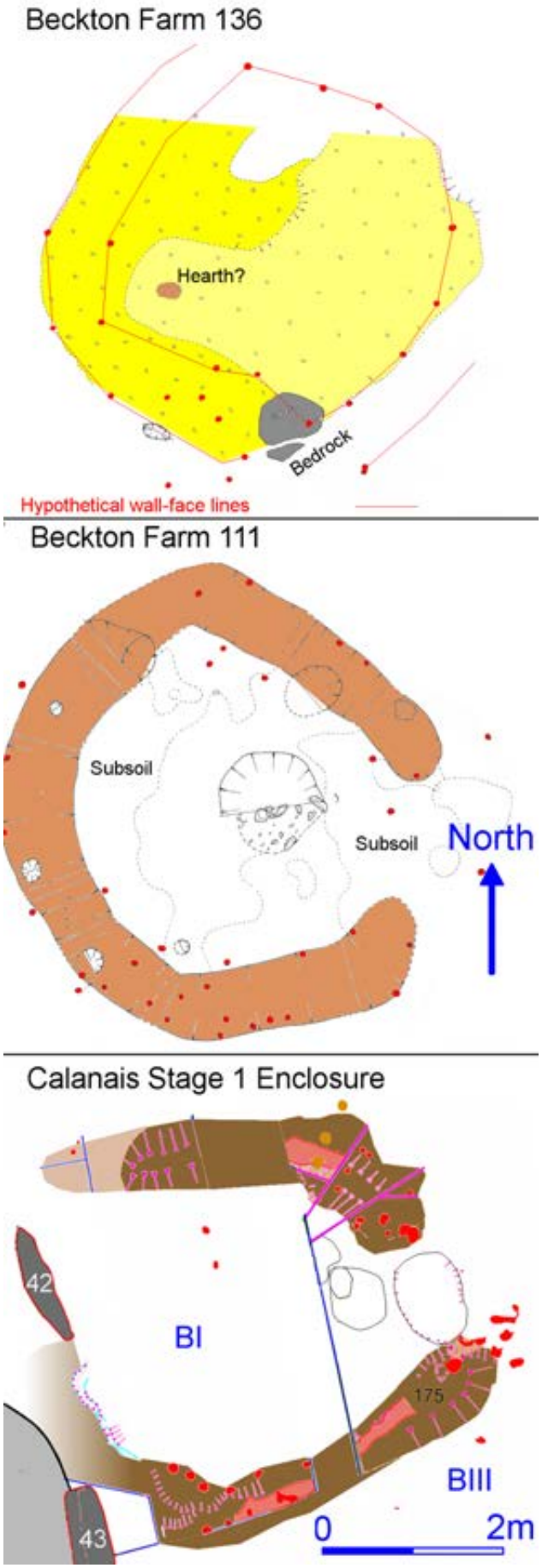
Illus 24.56 Part of the bank sectioned in Area BII [Film 1980-10-4]



Illus 24.57 The southwest corner of the Stage 2 enclosure from the east, with scarped edge and iron-encrusted palisade stake holes



Illus 24.58 Arrowheads in the entrance silts, 209 quartz and 210 mylonite



time while short term seasonal activities or periodic non-domestic activities took place nearby.

It was stratigraphically later than the Ring but there was no direct evidence for its relationship to the timber structures under the chambered cairn, nor to the cairn itself. The preferred interpretation of its construction date is thus based on somewhat speculative ideas about the succession. Thus the preferred construction date, based on interpretation rather than hard evidence, is somewhere in the last half of the 3rd millennium BC. Its closure date is slightly better defined to the last few centuries of the 3rd millennium BC or the first few of the 2nd by finds in its entrance silts, which were probably contemporaneous with its active use.

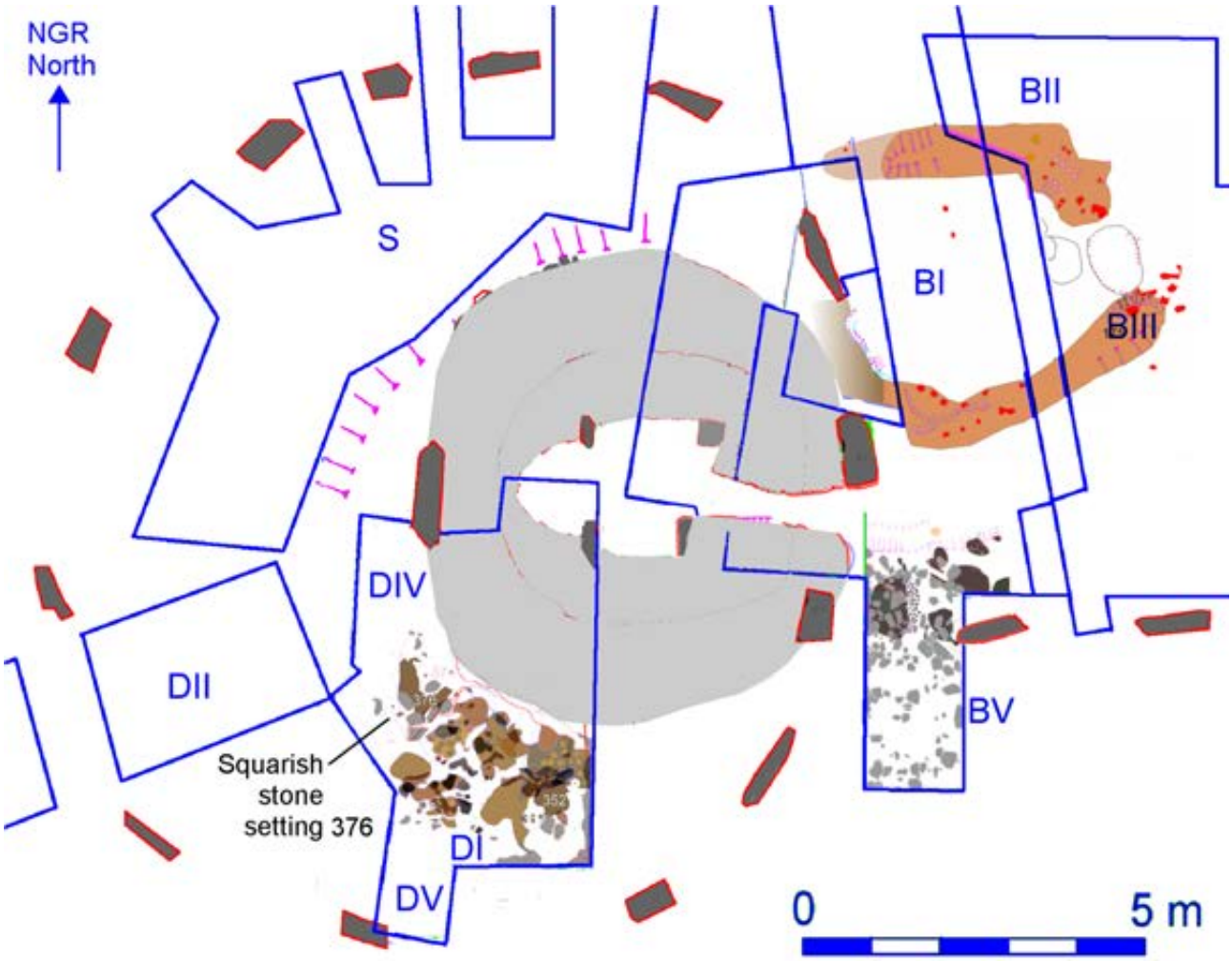
24.14 Phase 10a: Ritual deposition and ground-working

24.14.1 Introduction

As described in more detail below, the preferred interpretation of the evidence in post-cairn construction levels on Areas D and B is that ritual deposition took place over a long period, including that of soil and burial-related materials. Because of ground-working including ploughing, both during the period of deposition and subsequently, it is difficult to separate different periods of disturbance and Illus 24.60 is diachronic. Stones are shown in light grey and clay patches in various shades of brown. There were small patches of clay and soil deposition on top of the main turf lines 365 and 334 in Area D. They lay below ginger-coloured clay 320 which may have had a (generally poorly preserved) turf line separating it from subsequent plough soils 315 and 344. On Area B the (probably much later) patterns of stones found in and above old plough soil 141 may imply the existence of small rough enclosures prior to the latest ground-working.

Much of the deposition may have been of domestic remains in soil. Much of it may have originated in Phase 3 material imported is soils during Phase 7.

◂ **Illus 24.59** Calanais Stage 2 enclosure and Beckton Structures 136 and 111 adapted from Pollard 1997 Illus 3 and Illus 5



Illus 24.60 Possible ritual deposition of material in Areas B and D

Sheridan has identified a wide range of Neolithic sherds in corky and non-corky fabrics, and of both plain and Hebridean Incised types. She interprets them all as from Neolithic domestic assemblages of much the same character as each other. They were distributed widely across many stratigraphic layers.

The single Grooved Ware pot ASH 61 (Illus 24.36) from scrapes outside the entrance to the Ring and to the pre-cairn enclosures in the Ring undoubtedly had a different origin, and was brought to the site as a complete pot, possibly in Phase 6 rather than Phase 7.

Beaker sherds were abundant. Some, notably ASH 42 (Illus 24.62) entered the site as accompaniments to burials

Ballin has noted that burnt quartz was also distributed widely across many stratigraphic layers. It included burnt flakes, cores and tools. The flakes were hard percussion by-products. He reported that burnt quartz occurs on some domestic sites in the Western Isles but flakes scattered across ritual and burial monuments are usually simple bipolar flakes, produced by bashing up nodules on an anvil. Judging by these comparanda the burnt and unburnt flakes at Calanais, and other debitage from quartz working, are likely to have originated in domestic or domestic/craft contexts. Although it is in principle possible that ritual or ceremonial practises demanded tool production in the Ring there is no evidence for this at Calanais (Ballin Chapter 17 Lithics and Ballin pers. comm. May 2009).

This suggests quite strongly that much of the quartz was not associated with remains imported from cremations conducted elsewhere, as might be suggested to explain other aspects of the evidence.

However, the lithic assemblage undoubtedly contains elements with various origins. If the distinctive artefacts were mostly associated with

burial-related activities, as seems very likely for the two arrowheads loosely associated with a probable burial in Area BV (Illus 24.63), or one-off events as seems possible for the arrowheads in the silting at the entrance in Area BIII to the second-stage enclosure, then their date need have little bearing on that of other elements of the assemblage.

Overall, when combined with Sheridan's and Ballin's analyses, the stratigraphic evidence implies that much of the artefact assemblage originated in domestic activities elsewhere in the 4th or early 3rd millennium BC, and was imported during Phase 7 (clay and soil spreading at some date after Ring erection and before chambered cairn building); but others were brought in with ritual deposits of soil and clay during Phase 10, and a subset including the datable artefacts originated in burial-related and other activities in the late 3rd and early 2nd millennia BC.

24.14.2 Deposition, burials and ground-working on Area D

On Area D shallow pits and low spreads of clay were detected at the base of the main plough soil. Numerous Beaker and other decorated sherds were found in the plough soil itself. The first deposits appear to be earlier than insular Beakers. One of the deposits in a pit may have been marked by a post.

The pollen in some of the seemingly lowest pits on Area DI was comparable to that of Phase CaN-3c at Calanais Leobag, which should date after 1900 BC. It suggests that some of them had been dug from higher up than their surviving tops, their upper part having been disguised by soil processes which helped to produce ginger clay 320. That clay overlay many of the small spreads of brownish clay which are interpreted in part as the spoil from shallow pits or scrapes and partly small dumps of clay soil.

The most intriguing feature in the area south of the cairn at this level was a squarish stone setting about a metre across in a dip in the old turf line under the plough soil (Illus 24.61). It may have been a small burial enclosure or a repository for ritual deposits.

Illus 24.61 Squarish stone setting 376 south of the cairn (see Illus 24.60) [Film 1981-8-1]

Several potsherds were found in its immediate vicinity. One was E/MN Corky (Cat 122). All of the others may have come from domestic Beakers, although two they might instead have been E/MN Corky (Cat 595, 714, 765-766). Three quartz flakes and a miscellaneous piece of quartz were also found. However although they were ascribed to this context they might have been residual.

A sherd from a fine Beaker (Cat 954) and a piece of cremated bone were found in a chocolate brown, fine silty clay 377 below the plough soil south of the cairn, cut by a possibly post-cairn pit and spread nearby at a higher level. There is no evidence for cremation taking place at Calanais, so either burnt animal bone occurred in some of the basketfuls of soil deposited in the area or some of the deposits came from cremations conducted elsewhere. As explained in Chapter 15, the few fragments of cremated bone from Calanais are so poorly preserved that they have been reserved from analysis until sample preparation techniques become more advanced.

The interpretation preferred in Chapter 9.3 (Area D) was that the area was used for digging of small pits and deposition of charcoal, potsherds and other material from elsewhere. Then, after some more deposition, soil processes caused oxidisation before use of the area for more deposition recommenced. The closest part of the cairn became more and more dilapidated as time went on, perhaps as stones were removed to mark deposits. The area was ploughed, possibly ritually, or worked

over by hand, perhaps to merge dumped material into the plough soil. This continued, perhaps for generations. Probably some stones were removed from the plough soil to make ploughing easier (or possibly to destroy their function as markers).

24.14.3 Deposition, burials and ground-working on Area BIV/BV

It does not seem very likely that the charcoal-rich deposits in BV and the southern part of sub-area BIV were dumped in 1857. If they had been it is unlikely that the placements of the stones above them would have possessed even the hints of structure that did remain. It is also unlikely that the charred heather twig found in a deposit 139 on top of the plough soil would have survived unbroken.

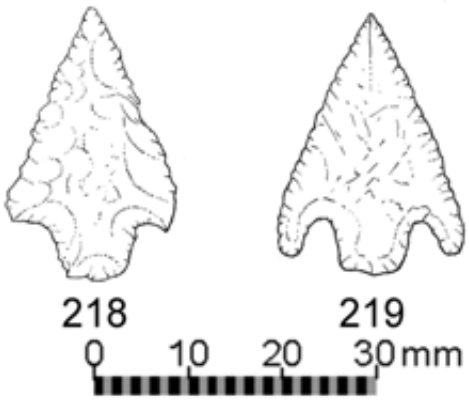
There was a succession of layers to the south-east of the entrance to the chambered cairn passage which reflect a build up of dumped or spread soils and clays and the digging of shallow pits. This seems to have started during a period when Grooved Ware was in use for a pot was deposited probably in Phase 7b.

Other pits or scrapes were later than the erection of Stone 30 but clearly earlier than some of the black deposits and plough soils with charcoal and pottery. They may be evidence for the lighting of fires outside the cairn and east of the Ring, but seem more likely to have been individual deposits of soil with charcoal and in some cases potsherds.

If the early black deposits in and just above dark iron-panned layer 160 (below plough soil 141) originated in the chamber then the grey-green pottery-rich but charcoal-free clay 812 overlying them in Sub-area BV may have come from the chamber floor. But that is not a preferred interpretation; instead the origin of the green clay 812 is admitted to be obscure. Whatever its immediate origin it is conceivable that the greenish sandy clay 812 was used to seal over the spread dumps of charcoal-rich material.

Above the greenish sandy clay a succession of black layers containing charcoal and potsherds included a plough soil 141. Some of the artefacts probably reflect disturbed burial deposits. As on Area D the ground was worked over with a spade or ard or both several times during this period. The material in the main plough soil was similar to that found in Area D, in that it contained abundant charcoal and potsherds. Similar soils were mostly absent elsewhere on Area B.

Illus 24.62 Beaker ASH 42



Illus 24.63 Arrowheads near burial remains

The exception to the general pattern of deposition of mixed potsherds and charcoal is a group of Beaker potsherds (ASH 42; Illus 24.62) and two barbed and tanged arrowheads (Illus 24.63) adjacent to (not strictly associated with) the last vestiges of decayed human bones in a darker patch interleaved in but mostly below the plough soil 141 and at a higher stratigraphic level than the green clays. It is a reasonable candidate for a largely complete interment.

Sherds from ASH 42 were found in 8 different contexts nearby, including the plough soil. The preferred interpretation is that it was a disturbed in-situ burial. But it must be admitted this pattern leaves open the possibility that the burial deposit was in a secondary position and had been removed from the chamber while the skeleton was complete or near complete.

Sheridan (Chapter 18 The pottery Assemblage 18.7.12) compares it to pottery found elsewhere in the Hebrides, and suggests a date between the 22nd century BC and c 1750 BC.

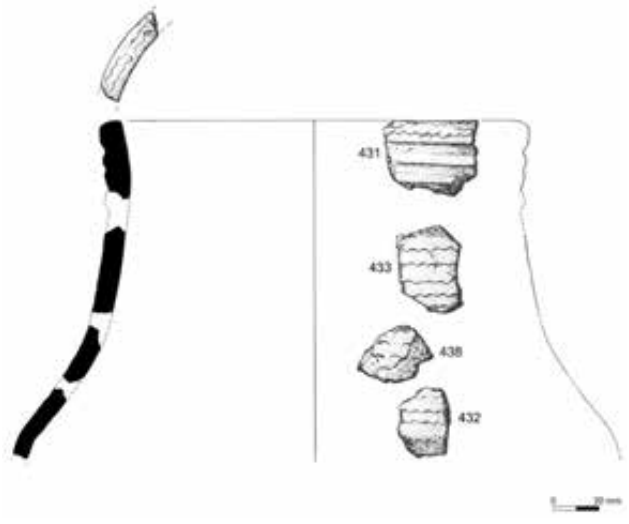
The hints of structure in the stones in the higher parts of the plough soil may reflect creation of and subsequent damage to slight enclosures built to contain burial-related materials (Illus 24.60).

A piece of cremated bone was found in a line of stones running from Ring stone 44 in front of East Row stones 30 and 31 beneath modern turf and soil. The fragment may have been in secondary or tertiary positions, perhaps a relic of prehistoric clearing of the chamber deposits, or possibly a part of deposits cleared from the chamber by Sir James Matheson's men.

One other pot, a domestic Beaker (ASH 48 Illus 24.64) was relatively unabraded and well represented (slightly less than 10% of the pot). It had a distinctive funnel-like neck (Sheridan Chapter 18 The Pottery Assemblage 18.7.7) and was decorated with lines impressed by a marine shell, probably not a cockle. Unlike many of the other domestic Beakers, the sherds of which were small and heavily worn, and which may have been brought to Calanais along with baskets of soil, ASH 48 possibly arrived as a complete pot. Its sherds had a very distinctive distribution, concentrated in plough soil 315 and disturbed Victorian context 326 on the cairn in Area DI. That area was otherwise dominated by finds of fine Beaker,

ASH 48 may not be the only large pot at Calanais with a funnel-like neck although none of the other possible examples survive well enough for secure identification.

Sheridan (Chapter 18 The Pottery Assemblage 18.7.7-8) notes that this form of funnel-necked domestic Beaker is known from elsewhere, citing as an example that from Cluntyganny, Co. Tyrone, Ireland: Given the distinctiveness of the form that raises the possibility of a connection with northern Ireland.



Illus 24.64 Domestic Beaker ASH 48

24.14.3 Deposition and cosmology

The soils in Area H to the north of the cairn and in Area S to its northwest contained far fewer pieces of decorated pottery than those south and southeast of the cairn. The difference in distribution of pottery between the north-eastern and south-eastern parts of the Ring, and to a lesser extent (because less of it was excavated) south-western part of the Ring can be interpreted as evidence for a cosmological scheme. That pattern is supported by the distribution of possible ritual deposits (Illus 24.60).

Pollard and Ruggles (2001, 81-2) listed 3 cosmological schemes involving radial divisions of the world.

— Divisions of the world into two halves (not well attested in the ethnographic record).

— Divisions of the world into four quarters or more strictly parts. Their examples included hearth orientations in Orcadian houses, clustered round the four intercardinal directions (Richards 1990), and the use of different types of stone preferentially used in different quarters of the (solstitially oriented) passage cairns at Balnuaran of Clava (Bradley 1998c).
— Divisions into more complex sets of radial sectors (the example quoted is from the Inca Cuzco).

They identified four quartering schemes; a cardinal scheme, and 3 schemes with divisions at 45 degrees to the cardinal directions, of which two are solar and lunar schemes (Pollard and Ruggles 2001, 82-4 Fig 4a).

Superficially the deposits in the northern half of Area BV and those in Area D seem to have originated in much the same way as each other. Because BV was outside the Ring that would suggest that the Ring was not seen as a microcosm of the world. Instead it sat in a world divided into quarters from its centre. But fundamental to this interpretation is the question whether one should emphasise the similarities or the differences between the deposits in the two areas. Some of the lighter coloured patches on BV below the worked soils and those on D below the main plough soil were at least generically similar to one another. On the other hand, very few pots left sherds on both Areas D and B. Nevertheless the preferred overall interpretation is that similar processes did operate in the south-east quadrant of D and in BV during the earlier periods of deposition. Subsequently there was another depositional phase on the northern part of Area BV leaving abundant very dark soils, amongst which were skeletal material and many sherds of fine Beaker ASH 42 representing about 15% of the vessel. There were no identifiably similar discrete burial deposits on Area D, apart from, just possibly, the squarish stone setting referred to above (Illus 24.60) although it seems quite likely that if similar ones had been there they would have been broken up by ground working. If that analysis is right the events reflected by the archaeology of Areas BV and D followed similar trajectories over a long period; but the later history of the two areas was different.

The stone rows at Calanais (including the hypothetical north row consisting of the southernmost three stones of the west side of the avenue) suggest an approximately cardinal scheme of division of the world into quarters. But the burial-related deposits on Area BV extended further north than the line of the East Row (Illus 24.60), suggesting that the two schemes were not identical. Therefore the preferred working theory is that the deposits on Areas D and BV reflect a cardinal quartering of the cosmos which was subsequently superseded by the less precise quartering suggested by the stone rows.

The relationship of the first deposits of pottery and charcoal to the Ring and chambered cairn are obscure. Some of the small pits on Area D were first noted after the prevalent complex turf lines had been completely removed. At face value this implies that they preceded the Ring and central monolith. However it is possible that all of them had been cut through the ground surface which formed after the chambered cairn was built and subsequent turf formation modified their upper fills. Others were first noticed above the turf lines but below ginger clay 320; the pollen in them and in clay 320 suggests that some of them were cut from a higher level and that soil processes had disguised the fact that they were originally cut through the ginger clay.

The preferred overall interpretation is that many of the early deposits were not related to cremations or inhumations but to dumping of basketfuls of soil from domestic contexts. On the other hand the acidic soils at Calanais are likely to have dissolved most cremated bone, and some of the other deposits may have been charcoal-bearing soils which had been associated with cremations elsewhere. In Scotland overall, cremated human remains have been radiocarbon-dated to around 3700/3600 cal BC, as early as inhumation apart from earlier stray human bones in middens and caves slightly after 4500 cal BC (Technical Note 24.14.5). Known examples from the first half of the 4th millennium come from a pyre under a ring mound at Midtown of Pitglassie in Aberdeenshire, from a mortuary enclosure at Pencraig Hill, East Lothian and from a large cist at Moleigh (also known as Cleigh) in Argyll. These geographically widespread burials suggest that the rite was

practised by different groups of people from the earliest centuries of farming in Scotland, and the very various contexts may reflect equally different local beliefs; but the data set is tiny and the few dated examples may instead reflect different aspects of a widespread tradition (Technical Note 24.14.5).

Only three cremations have been dated to the following thousand or so years, at the long barrow at Fordhouse in Angus, in the hole of a standing stone at Orwell in Perth and Kinross, and in a Beaker cist at Dornoch Nursery, Highland (Technical Note 24.13.5). Deposition of cremations and cremation-related material only became common in Scotland from around 2100 to about 1500 cal BC, peaking roughly from about 1800 cal BC (Technical Note 24.14.5). In the 2nd millennium BC cremations were put in a wide variety of new and old structures; but the dated examples were mostly found associated with urns in flat cremation cemeteries.

The evidence from Calanais contrasts with that from Stonehenge where cremations are judged to have ranged in date from the 30th century cal BC to the 24th century BC (Parker-Pearson et al 2009, 36). Nearly two thirds of them belonged, according to their model, to between the 26th and 24th centuries BC.

Some cremated bone at Calanais was found in contexts underlying the chambered cairn. Charcoal from the same contexts was dated to the last quarter of the 4th millennium. Pottery included possible and probable Beaker sherds. So the cremated bone could be from animals or humans and could belong either to the late 4th or the late 3rd millennium BC. The survival of a few other pieces of poorly preserved cremated bone at Calanais, and the 19th century record of cremated bone in chamber deposits could represent the phenomenon seen at Stonehenge, but the current rarity of dated cremations of the 26th to 24th centuries BC in Scotland could be taken to suggest that the cremated bone at Calanais is more likely to date after 2500 cal BC. Resolving this, should, as detailed in Chapter 15: Introduction to the Specialist Reports await improvements in dating techniques because the surviving pieces of cremated bone are small and poorly preserved.

24.15 Phases 10b and 10d: The Rows and Avenue

Strictly speaking too little dating information was obtained to put the Avenue and South and West Rows in the phasing scheme. That difficulty is accentuated by the possibility, discussed below, that they may have been built sporadically over a fairly long period. Their phasing should therefore not be trusted overmuch.

Illus 24.65 The Avenue and Rows in 1980 during excavations

24.15.1 The Rows

The Rows have no obvious overall symmetry (Illus 24.69). The South Row points almost due north-south but the East and West Rows do not line up with each other. As noted above, the three southernmost stones of the west side of the Avenue could conceivably have originally formed a North Row.

24.15.2 The East Row

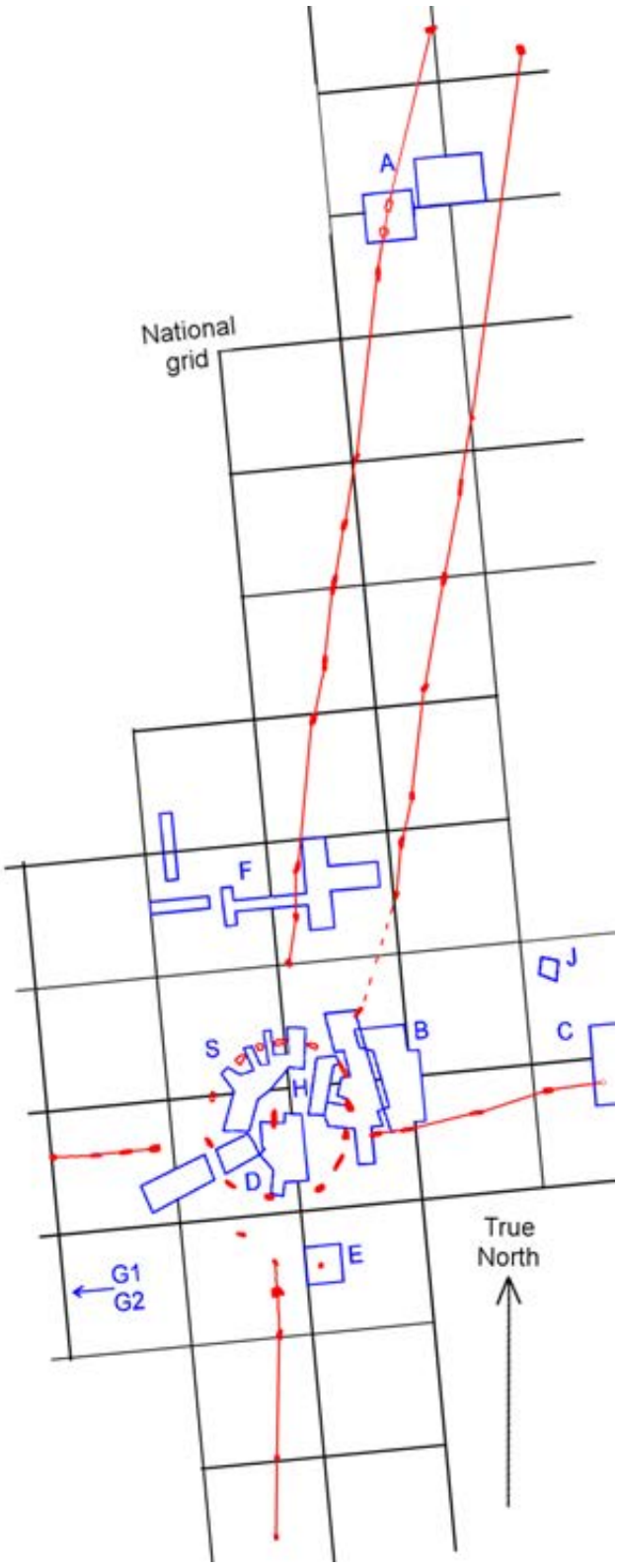
The east row is not straight and it is orientated a little north of east. It consists of five stones, including that found on Area C where Palmer showed a stone in 1857 (Illus 24.66-24.68; see Chapter 3 Previous Studies). The fallen stone was found there (initially through documentary research and probing by Gerald and Margaret Ponting) along with a stone-hole with surviving packers, into which the foot of the stone fitted exactly (Chapter 8 Area C). It was set into a much earlier cultivation bed. It could not be related directly to a small deposit of potsherds with decoration reminiscent of that on Food Vessel 75 (Cat 558_562) under a peaty mound nearby; in any event, the sherds were abraded and may have been collected much later during nearby cultivation and deposited in a mound of weeds and stones. Something like that seems to have happened on Area E at the edge of a cultivation soil, albeit involving Hebridean incised wares.

At the opposite end of the row, near the Ring, part of the pit for Stone 30 was exposed in Area B. Although the stratigraphy in this area was highly complex the pit cut an area of black soils and deposits of material related to burials. It was overlain by a dark soil 141 interpreted as a plough soil. It cut an earlier shallow dark soil 160.4. The stone was erected at some date between 2560 and 1690 cal BC, stratigraphically significantly later than the Ring (see Chapter 7.6 Area B).

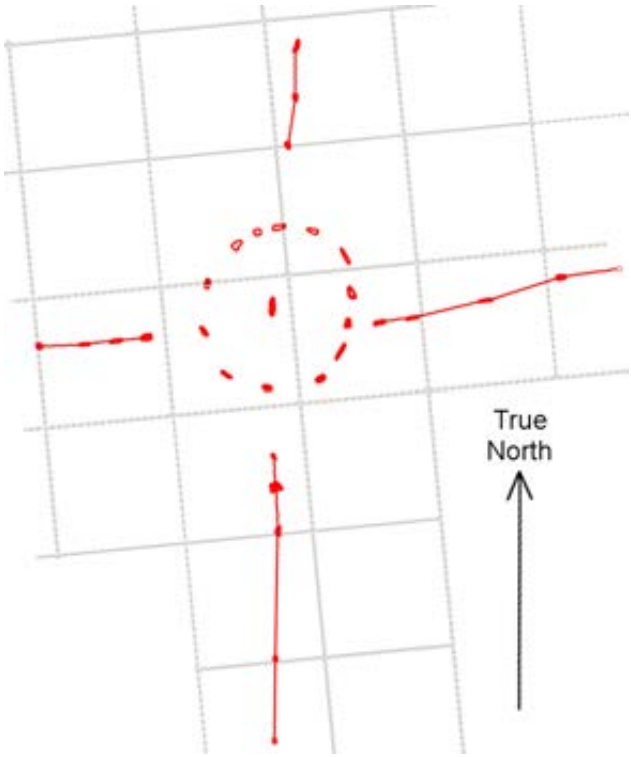
The stratigraphy of Stone 31 was complicated, probably by an earlier pit. This hinted at a prospect of tighter dating than we achieved if further excavation is undertaken. But its immediate consequence was that there was no independent dating evidence for erection of Stone 31; and although their stratigraphy was broadly similar there was no evidence to show whether Stones 30 and 31 of the East Row were set up as the same time as each other or decades apart.

24.15.3 The hypothetical North Row

The hypothetical North Row consists of the three southernmost stones in west side of the Avenue. The resistivity survey did not reveal any anomalies



Illus 24.66 The Glasgow 1975 plan with lines drawn between adjacent stones of the avenue and rows



Illus 24.67 The Rows including a hypothetical North Row

between the 3rd and 4th stones (Chapter 5 Illus 5.1, 5.10). It thus provided no support for any idea of a North Row extending beyond the three stones. The hypothetical row formed by the three stones was on almost the same line as the South Row (see Chapter 24.14.10 for discussion).

24.15.4 The West Row

The west row is nearly straight and consists of 4 stones (Illus 24.67, 24.69). It is much shorter than the East Row. There is a rock outcrop to the west not far beyond it but there would have been room for at least one more stone at a distance similar to the average distance between the other stones. As noted by RCAHMS (1928, 26), however, the westernmost stone is blocky where the others are slabs aligned with the row, and it looks as if it was intended to define its end.

By chance the West Row is aligned almost precisely on national Grid East-West (Illus 24.67). That provides a salutary counterbalance to some theories of the reasons why stone rows were aligned as they were. That said, its orientation is unusual for Scotland; it is discussed in the context of the East Row below.

24.15.5 The South Row

The south row today consists of 5 irregularly spaced stones. It is nearly but not completely straight. It runs on average almost geographical north-south and points fairly accurately at the central monolith (Illus 24.66, 24.70). Bedrock outcrops in the middle of the row and an area of high resistivity readings suggests that rock is near the surface elsewhere, although the soft overburden deepens again between the southernmost surviving stones (See Chapter 5 Resistivity, in particular Illus 5.1 and 5.13).

Excavation by Edinburgh University on the other side of the wall at the south end of the area in State Guardianship revealed complex remains between it and the natural rock outcrop Cnoc an Tursa It has been suggested that it was a kerb cairn (Neighbour 2005, 4, referring to an unpublished report of 1999 by Campbell and Coles, held in the Department of Archaeology at Edinburgh). The other published accounts of the excavations do not

Illus 24.68 The East Row from the North after re-erection of Stone 33A [Film CAL Gen8]

mention a kerb cairn (Coles 1993, 110-11; Coles and Rees 1994, 96). Instead the 1993 account refers to a platform below 5 large boulders. Investigation of the platform revealed large pits, four shallow post-sockets and a shallow ditch running north-south cut by post holes along with other post holes. The 1994 account described a focus of prehistoric activity around a fissure in the c. 2m high natural rock face below Cnoc an Tursa. The lower layers in the fissure consisted of black charcoal-rich deposits including hearth-like settings of flat stones. They partly covered a large pit which was cut by some of the pits discovered the year before. It might be best to interpret most of the stonework as a flat cairn or platform bounded by a long arc of larger stones (Campbell pers. comm. 2009).

Another large pit, also partly excavated the year before, appeared to contain packing stones. It lay directly on the line of the South Row about 10m north of the fissure and was interpreted as a removed standing stone. Thus the South Row may once have been longer than it is today.

24.15.6 Interpreting the rows

In a sample of 300 Western Scottish stone settings studied by Clive Ruggles only two sites have broadly east-west indications, Calanais and Blashaval in North Uist where three stones are placed in a 50 m long line, far longer than the other short rows included in the sample (Ruggles 1999, 75). The façade of the Ring was designed to face very nearly due east and the East Row was set at a significantly different angle so it was probably created for a different purpose from those underlying creation of the Ring. This reinforces the evidence from archaeology that the East Row was significantly later than the Ring.

However the East Row was set on the slight ridge formed by Cultivation bed 2 (Illus 24.10). That may not have been an accident and although it does not provide an explanation for why the row was set up in an eastward direction it does explain why, when the decision to put up a row of stones in that general direction was made, they were set in that particular direction.

As described below (24.15.11) in the context of the Avenue, Curtis and Curtis (2009) have shown

Illus 24.69 The West Row from the Ring photographed by Richard Strachan of Historic Scotland [Film DSCN 0981]

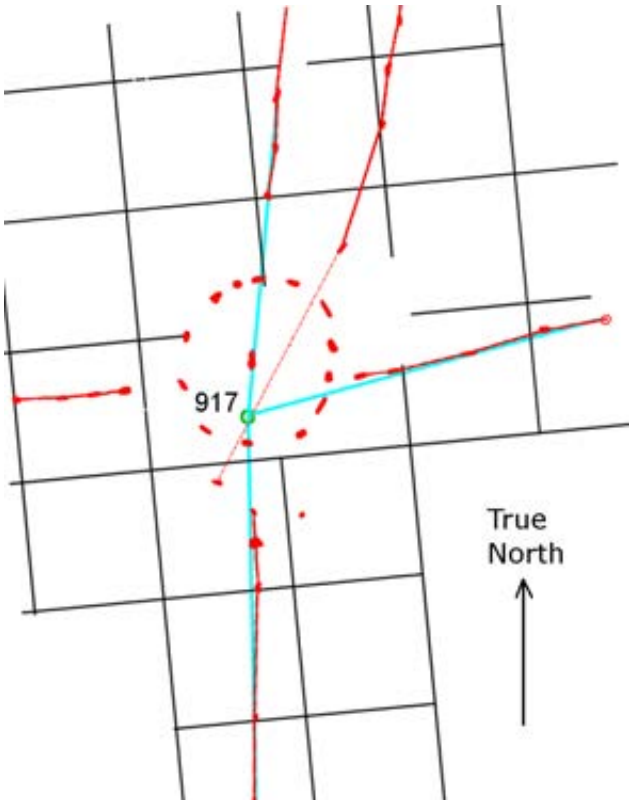
Illus 24.70 The south Row from the South photographed by M Brooks of Historic Scotland (Film BR.3.6)

that the stones of the East Row could have been used to mark out significant moon rising points as viewed from near stones on the east side of the Avenue. Whether that was actually done is one matter; whether it was ever done by more than a few individuals finding a new use for an old monument is another; and whether it was a material consideration when the stones were set up is yet another. Lacking any independent knowledge of what people in the 2nd millennia and late 3rd millennia regarded as significant we cannot prove the matters one way or another.

The orientation of the West Row is of course as unusual amongst prehistoric rows as that of the East Row. Despite there being room for another

stone between it and the sharp drop to the west the blocky plan of its westernmost stone suggests that it was intended to end where it does today. The same blockiness can be seen in the re-erected end stone (Stone 33a) of the East Row (Ponting and Ponting 1984, 12).

On the ground the South Row more obviously points to the central monolith than plans convey, for at ground level the row is slightly ragged (Illus 24.71). It is conceivable that it was intended to link the Ring and Cnoc an Tursa, the prominent outcrop to its south, particularly given the evidence described above for activities at the base of the outcrop. That would fit with ideas about its being one side of an avenue (RCAHMS 1928, 24). But excavation in Area E along the supposed east side of such an avenue produced no evidence to support the idea.



Illus 24.71 Pattern-making and Pit 917 in Area D

The excavation evidence from the East Row suggested strongly that at least the west end of the East Row was later than the Ring. There was no evidence that parts of rows were removed from the area of the Ring when the latter was built.

Only one pit (Pit 917, coloured green on Illus 24.71) could possibly bear this interpretation. But as described in Chapter 9 (Area B) it was probably neither a posthole nor a stone-hole. Nevertheless, Pit 917 could be said to lie on an extension of the east end of the East Row, if one allowed oneself license in drawing an alignment, ignoring the westernmost stone.

If the central monolith is included with the hypothetical North Row they and Pit 917 line up fairly well. Thus Pit 917 was nearly at a point where the extended alignments of two existing Rows and the hypothetical North Row (nearly) met each other. It could even be argued that the South Row and the hypothetical North Row once formed a single somewhat ragged chain, hardly more irregular than the existing East Row or the sides of the Avenue. However, in Area S to the north of the central monolith excavation of the top 0.15m of strata did not reveal any sign of a similar pit near the line of the hypothetical North Row, although a pit was discovered well to its west.

Pit 917 also lies almost on a line drawn between Stones 9 (outside the SW quadrant of the Ring) and 34 (outside the NE quadrant of the Ring). It is shown as a fainter red line on Illus 24.71. It is conceivable that stones 9 and 34 were set up before the Ring, although equally possible that they were later; indeed the evidence from excavation by stone 34 suggested (but did not prove) that it was later.

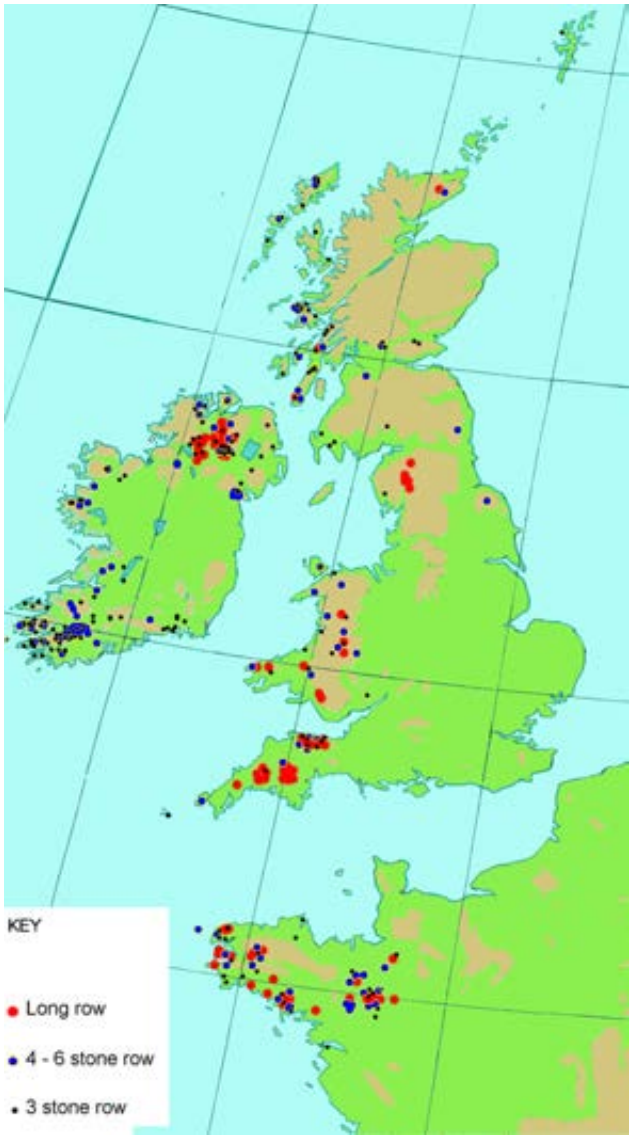
Pit 917 is the best candidate amongst the several pits recorded in Area DI for a post- or stone-hole potentially recording a pre-Ring alignment of the kind suggested by some authors, but given the lack of evidence that it was dug to support a post or a standing stone, and given its similarity to the post-Ring pit under the passage in Area BIWX which almost certainly was never intended to support a standing stone or timber, it should instead be compared to the pits found on several ceremonial sites including Machrie Moor, Arran and Balfarg Riding School, Fife.

In sum, I must admit to regarding the exercise illustrated by Illus 24.71 as purely modern pattern-making. I suspect that those who like such things will admire the (near) coincidences described above and make something of them,

while others, with whom I side, will argue that coincidence is precisely the right word to use.

Overall the preferred interpretation is that, as has long been suggested, all the rows at Calanais were later than the Ring.

24.15.7 The distribution and dating of stone rows



Illus 24.72 Stone rows after Burl 1993, 92, 148, 149

Although the Rows at Calanais may be, perhaps should be, regarded as different from free-standing stone rows, the latter may have influenced the creators of the former. On Illus 24.72 long single rows are in red, 4- to 6-stone rows are in blue and 3-stone rows in black at a smaller dot size. Where there are strong local concentrations numbers are under-represented because of the scale of the map. For detail see Burl 1993.

The East, South and West Rows at Calanais fall into the 4 to 6 row category. The mainly western distribution of Scottish 4 to 6-stone rows is from Calanais to Kintyre although the example in Caithness is given added interest by the style of the Calanais cairn. The distribution of 3-stone rows is similar; they are more abundant, are found further south and they spread further east in the Midland valley. There is a notable lack of surviving single rows of any length in north-east Scotland and the Orkneys (Illus 24.72; Burl 1993, 147-9 Fig 37-38). But it cannot be demonstrated that the intensity of land clearance in those areas is not a factor in that.

Burl contrasted the overall distribution of short and long rows and suggested that their difference means that the short rows developed from the long as 'economical versions of the longer rows that existed in adjacent areas' (Burl 1993, 151). He suggested that unlike the longer rows, short rows fairly commonly formed alignments on astronomical phenomena. That is discussed below when considering the various claims for astronomical alignments at Calanais.

The date range proposed by Burl for long stone rows was 2100-1600 BC and that for short rows was 1800-1000 BC (Burl 1993, 91, 147). Since Burl reviewed the evidence more has been uncovered. The earliest dated stone row in Britain is on Cut Hill, Dartmoor. It was longer and sparser than the rows forming the Avenue. Dating of peat above and below fallen stones suggested that two of them fell or were laid flat in the 4th millennium BC (Technical Note 24.14.2; Fyfe and Greaves 2010, 55, 59, 62-67).

Fyfe and Greaves were careful to point out that the stones of the row might never have stood upright, and of course none of the rows at or around Calanais count as a long row, apart from the sides of the Avenue if they are considered in isolation from one another. But Cut Hill provides an admittedly very general precedent for the existence of stone rows in the 4th millennium, only a few weeks travel away along the western seaways, re-

ducing the most obvious obstacle to free speculation about the relative dates of the main linear and central elements of the stone setting at Calanais.

The distribution of short rows suggests that at the time the rows at Calanais were built the main contacts of the people there were along the western seaways to the south. There is no suggestion of the Aberdeenshire connection hinted at by the avenue at Broomend of Crichie.

Perhaps the distribution mapped by Burl is only part of a wider story. Timber single rows may once have been common in Scotland. The best dated examples I know of are two long rows found at Eweford East, East Lothian (Lelong and MacGregor 2007, 53-68). Both ran roughly east-west. Judging by several radiocarbon dates obtained from single pieces of charcoal both rows were probably built (at least in part) between about 2500 and 2250 cal BC. Grooved Ware was found in some of the pits. Of course, technically, the radiocarbon dates and pottery provided only termini post quem but the lack of later charcoal or pottery suggests that the dating is probably at least roughly right. One pit produced a much earlier date which the excavators thought might reflect use of the structure for 600 years but in my view probably reflects the presence on site of charcoal which was old at the time the pit was dug. Charcoal from hazel and willow, and in the southern alignment also Rosaceae, suggest that the rows may have been panelled. The southern row consisted of up to eight straight segments, between most of which were gaps, which strongly suggests several episodes of construction. These rows were interpreted as complex creations with the digging of each pit perhaps an individual episode in a long process of creation.

24.15.8 The Avenue

On Illus 24.73 the stone pits on Areas A have been included. The avenue runs roughly 9 degrees east of true north from the circle. Its sides have been described as splaying out slightly but the main contribution to that effect comes from the three southernmost stones of the west side of the avenue. They do not themselves form a straight line but are, on average, along a different line to the stones further north. The rest of the west side seems to be simply slightly irregular, with the northernmost stone to the east of the approximate line of the rest. The east side was probably no straighter; in general it pointed at the side of the Ring, and roughly at Cnoc an Tursa, the knob of rock beyond the south end of the setting.

Stone 34 (connected to the rest of the east side by a dotted line on Illus 24.73) was offset from the general line of the east side and oriented at a markedly different angle to the Avenue stones, so it was probably set up for different reasons Excavation of part of its pit (in Area BIN) produced no satisfactory relative or absolute dating evidence. Modern sub-soil weathering had obliterated relationship between the top of the pit and the surrounding mineral soils.

To erect the stone superficial soils and stones were cleared over a larger area than required for the deepest part of the stone-pit. Then the latter was dug. The stone was placed in the pit. Finally head-sized stones were placed round the base of the stone. What appeared to be packing stones stuck up into the weathered soils above and in Chapter 9.5 the subjective impression of a relatively late phasing (perhaps somewhere between Phases 10 and 12) is recorded. But there was no objective evidence.

The gaps between surviving stones are very irregular. It has been suggested that the gaps may have been original; but discovery of at least one stone pit (003) in Area A where a stone was planned in the early 19th century AD (MacCulloch 1819) confirms that some gaps were the result of removal of stones in modern times (See Chapter 3: Previous Studies and Chapter 6: Area A).

Pit 003, the northernmost of the two pits on Area A shown on Illus 24.73 and 24.76 was close to the line between the two northernmost existing stones; twice as long as it was broad it was oriented along the line. If the stone in Pit 003 had the same proportions as the pit it would have been a slab twice as long as it was thick. The other pit marked in Area A, Pit 004, may also be the remains of a stone-hole although it had two phases of fill. A stone matching the whole pit would have been about the same width as it was long. The occurrence of two pits so close to each other suggests that some stones were erected and then disman-

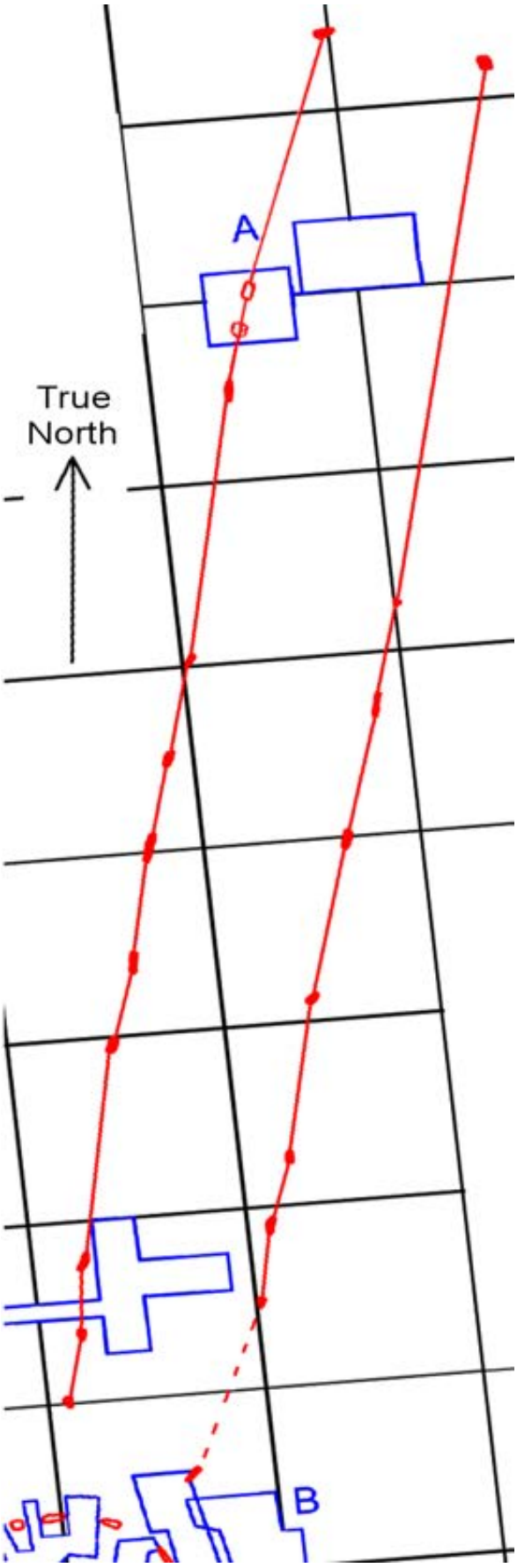
tled in prehistory. Alternatively it is conceivable that the west side of the avenue was marked out only by pits at one stage.

24.15.9 Timber avenues and similar structures in Scotland

It is conceivable that the stone rows forming the avenue at Calanais were preceded by a row of pits (Chapter 6: Area A). If it can be proved that the charcoal dating a pit alignment at Crathes Warrenfield in Aberdeenshire to well before the inception of farming in the area was not residual (Technical Note 24.14.3; Murray et al 2009, 16-17), by analogy the hypothetical pit alignment at Calanais could even be the earliest feature there. However the nearest excavated double pit alignment to Calanais was probably much later. It lay at Upper Largie in the Kilmartin Glen amongst a palimpsest of timber structures including a cursus, a pit/post ring complex, a large timber ellipse and many burials. It had been partially destroyed by quarrying and it is unclear whether it was an avenue as defined by Burl (1993, 4). It dated to after c. 1600/1400 cal BC (Technical Note 12.14.3; Cooke et al 2010, 174-175, 193, 195, 202).

Timber avenues forming approaches to large enclosures have been excavated at Forteviot and studied from air photographs in conjunction with the excavations at Meldon Bridge in Scotland. The avenue at Forteviot was orientated almost exactly north-south. It was 4m wide and some 30 m long; it was built of up to 19 massive timbers which would have stood 3 to 4 m tall. It has been provisionally dated to the 27th or 26th century BC (Noble 2009, 231. No distinctive pottery was associated with it. The Meldon Bridge avenue was oriented roughly NW/SE; it was 4m wide and about 27m long. Judging by the air photographs the 16 posts were massive (Speak & Burgess 1999, 24-5). The enclosure itself dated to after 2600 cal BC and could have been as late as 1900 cal BC (ibid, 110). Similar enclosures with avenues are known from elsewhere in Scotland and from England and Wales (Barclay 2001, 149-151).

These timber avenues were clearly intended to provide monumental entrance-ways to the enclosures. The enclosures towards which they lead



Illus 24.73 The Avenue

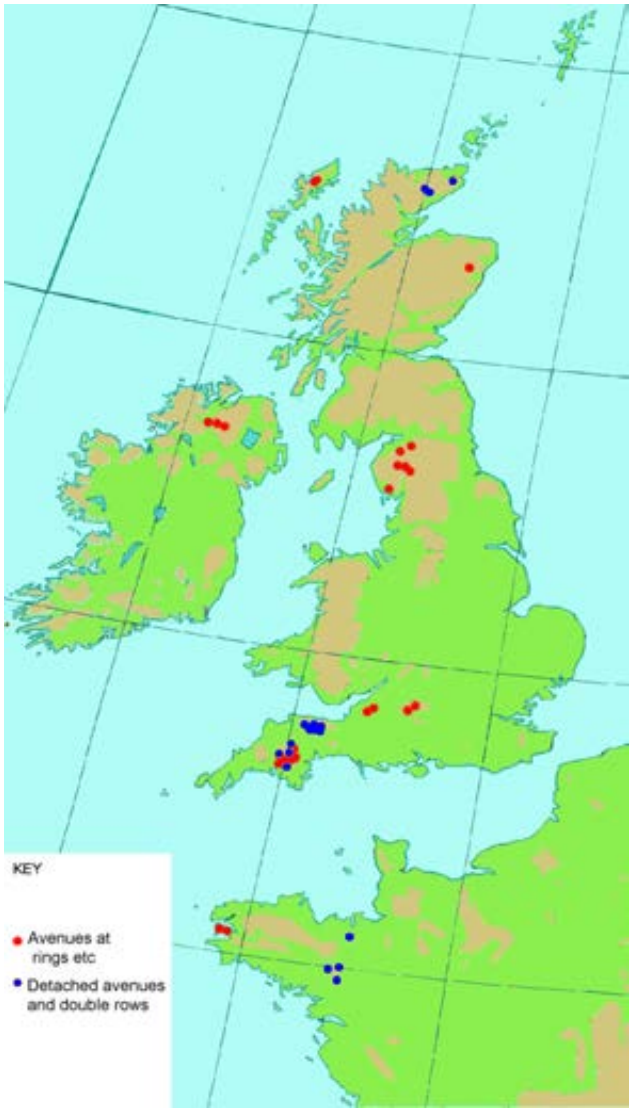
Illus 24.74 Pits 003 and 004 in Area A looking southward [Film 1980.10.16]

were very different from the Ring at Calanais and there is no reason why there should be any direct connection between them. The only similarity, I would argue, is that they lined approach routes.

The double rows at Holm Farm in SW Scotland formed a complex pattern (Thomas (ed) 2007, 201 Fig 22.1). Their elements date from the first quarter of the 4th millennium BC. Sporadic later activities at Holm include what seems to have been creation of a pit-defined enclosure or avenue at the end of the 3rd millennium, and the digging of ring-ditches at substantially later date. The long timber enclosure at Holywood North lined the inner side of a ditch defining the cursus there, and seems to have been set up in the mid 4th millennium. It saw some activity, the cutting of a small ditch and the re-cutting of part of the cursus ditch, in the second half of the 3rd millennium BC, dates not far from those proposed for the avenue at Calanais. Similar timber double-alignments at Cowie Road near Stirling belong in the first half of the 4th millennium (Ashmore in Thomas (ed) 2007, 248-254).

The main formal difference between the early long timber enclosures and avenues is that the former were closed at each end. But if the late 3rd millennium activities at Holm and Holywood reflect a continuing or renewed interest in the enclosures there may have been some connection between the two phenomena.

24.15.10 The distribution and dating of stone avenues



Illus 24.75 Stone avenues and double rows after Burl 1993, 42, 79

"Classical avenues are double rows that are unequivocally attached to a henge such as Stonehenge or a stone circle like that at Callanish. They were popular in north-west and southern England. It is the conjunction of the row with a ritual enclosure that determines its status as an avenue." (Burl 1993, 4).

On Illus 24.75 definite examples of avenues attached to rings and other settings are shown in red. Definite double rows are shown in blue. The concentrations on Exmoor and Dartmoor contained many more examples than can be shown at the scale of this map. For detail and for other possible sites see Burl (1993).

The nearest certain stone avenue to Calanais as the crow flies is at Broomend of Crichie, Aberdeenshire. It was about 10 days away by sea (see Chapter 24.1.6) with a day or so of subsequent overland travel. Broomend shares another feature with Calanais: at one stage it included a central monolith (Bradley 2011, 88). It had been inserted into the top of a refilled shaft grave and the grave or the monolith may have been the focus of the two parts of the avenue. The smaller northern part of the avenue lay between the monolith/shaft grave and a recumbent stone circle (Burl 1993, 59), or probably so (Bradley 2011, 84). The southern part of the avenue ended near but to one side of a Beaker cist cemetery (Ibid, 85). The henge also surrounded a shaft grave, a stone setting and cremation burials in Collared and Vase urns; a later timber circle lay outside the henge and athwart the line of the west side of the southern part of the avenue (Bradley 2006, 19-20; Bradley 2011, 85).

The central shaft grave and the cemetery at the south end of the avenue probably belong somewhere in a period between 2450 and 2150 BC. The shaft grave may well have been dug to take a Beaker burial (Bradley 2011, 73-74). The terminus post quem for building of the henge lies somewhere between 2150 and 1900 BC (Ibid, 74). The timber circle may date somewhere between 1850 and 1500 BC (Ibid, 74).

The relationship of the avenue to the other parts of the complex is somewhat ambiguous (Ibid 75-78) although the henge can be seen as a late structure post-dating the northern avenue (Bradley 2007, 26; Sheridan 2007, 221).

Bradley thought that building of the avenue could date to any time between 2450 and 2150 BC. Given that the timber circle dates after 1850 to 1650 BC and before 1650 to 1500 BC (Bradley 2011, 74) and intrudes into the avenue (Ibid, 85) the latter had probably fallen out of use by then Ibid, 80).

Bradley's data did not allow him to say whether the two parts of the avenue were built at the same time as one another or at different times. He thought, however, that the avenue parts each and together showed signs of a unitary design with alternating massive stones and slender orthostats spaced between 18.5 and 20m apart (Ibid, 78). The available evidence was skimpy and although there is no positive reason to reject his interpretation, in my view further excavation of the avenue is required to test it.

Inland from Broomend there may have been five avenues attached to recumbent stone circles (Burl 1993, 59).

The stone avenues shortest away in time from Calanais (about 8 days by boat and then a day or so overland) are in England and Ireland. Six were attached to rings in Cumberland including that at Shap where large boulders once defined an avenue about 3 km long (Burl 1993, 47). It is comparable to the avenue at Calanais only in the sense that both can be interpreted as consisting of stones erected to either side of a route way. Three examples near Broughderg in N Ireland consist of relatively small stones (all below 0.9m tall) and the stones on the western side of the avenue are markedly lower than those on the other (Burl 1993, 57).

In southern England there is a concentration of 8 certain avenues on Dartmoor. They are very narrow with an average breadth of 1.5m and most of the stone used were small; the few much larger stones seem to have formed portals (Burl 1993, 50-54). They do not provide a close analogy with the avenue at Calanais. Three possible examples occur on the south coast; one may have had an avenue comparable to the Avebury avenues (Burl 1993, 50). The other avenues in southern England are associated with unusually large and complex ceremonial sites. At Stanton Drew the two surviving avenues point to stone circles; one at least of comparable dimensions to the Calanais Avenue

(Burl 1993, 41-5). At Avebury the Kennet Avenue was at a much more massive scale than Calanais and seems to have been built in segments. It points to the massive henge rather than to a stone circle (Burl 1993, 45-7) At Stonehenge the earthen avenue (not included on Illus 24.75) may have pointed to the sarsen ring of stones in Stage 3 of the scheme proposed in 2009 by Parker-Pearson and colleagues, which they date to between 2580 and 2470 cal BC (Parker-Pearson et al 2009, 26). It may be slightly later, between 2580 and 2280 cal BC, if the date provided by an antler pick from the bottom of the ditch near Stonehenge is preferred to that implied by the 2009 phasing (Parker-Pearson et al 2007, 628). It is important to emphasise that the purpose and date of the ditch-defined avenue at Stonehenge cannot be related unquestioningly to those of the orthostat-defined avenue at Calanais. However both run from a stone ring towards water, albeit in the case of Calanais seemingly only for a small part of the distance to Tob na Faodhall, the Bay of the Ford near the standing stone at Cliacabhaig (Illus 24.33), and the date range independently proposed for the Calanais Avenue overlaps with that suggested by the radiocarbon date from the Stonehenge Avenue.

Between the Cumbrian and Wessex concentrations, Arbor Low in Derbyshire may have included an earthen avenue (not shown on Illus 24.75). The only other avenues attached to rings are those in Brittany near Landouec and Kergonan (Burl 1993, 42, Fig 7).

In addition to these, Richards has recently recorded a very short avenue at the complex setting at Na Dromannan (Calanais 10) formalising 'a preferred direction of approach from the S' (Richards 2006c, 184). It hardly seems comparable to that at the main setting, at Calanais even if the avenue started off as a 'short' one.

Burl has also documented detached double stone rows in Caithness, Cumbria and Wales and tangential avenues in the northern part of Ireland. There are many examples on Exmoor and on Dartmoor of double stone rows, much narrower than avenues with an average breadth of 1.3m. The three known double rows in Caithness were built of low stones and are fairly short (Burl 1993, 90). There is no reason to connect them with Calanais.

Burl suggested in 1993, on basis of the Beaker associations, that avenues attached to ritual enclosures date to between 2600 and 2000 BC; he noted for instance the N2 Beaker burial in Avebury's Kennet avenue stone 25a pit contemporary with erection of the stone, quoting I F Smith (1965, 210) (Burl 1993, 67-8). The earliest Beakers are currently held to date at earliest to around 2500 cal BC and the insular Beakers associated with avenues are probably significantly later, but that detracts little from his general argument. It fits adequately with the chronology suggested for Calanais although it is worth stressing that there none of the Beaker sherds there were directly associated with the avenue.

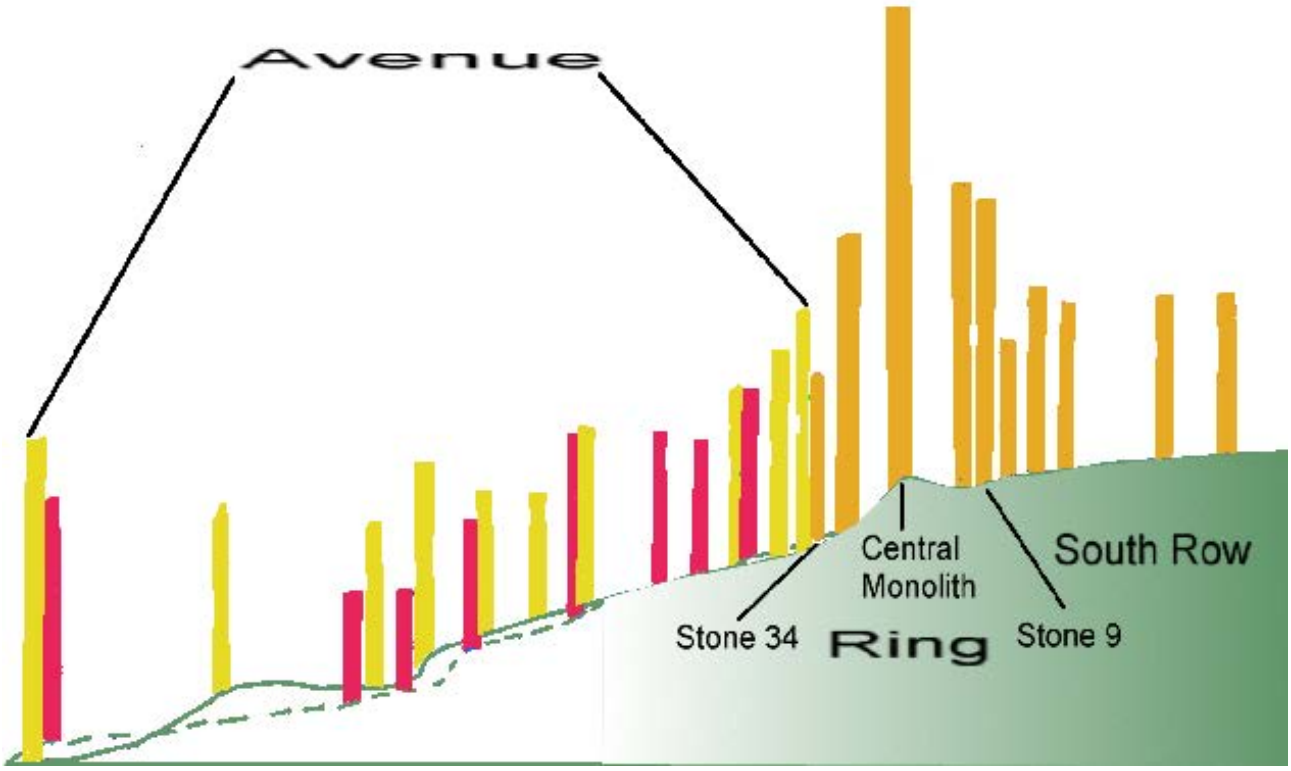
24.15.11 Interpreting the Avenue

Aubrey Burl's has suggested that the Avenue was originally short and later extended. He cited the increasing height of the stones nearest the circle and the increasing height northward of the rest of the avenue stones "causing the avenue to sag like a hammock at its middle" (Burl 1993, 61). Indeed it does (Illus 24.76), although the hammock would have been uncomfortably lumpy.

The prominence of hornblende 'eyes' on the southernmost three stones of the east side of the Avenue (Curtis and Curtis 2009, 30-31) provides more support for the idea that the avenue was originally short. Other Rings seem to have had portal stones framing an approach to them (Burl 1993, 35-9).

A variant on Burl's idea that the Avenue was originally short is the possibility that the three southernmost stones of the west side of the avenue originally formed a north row. That proposition, discussed in more detail in Chapter 24.15.3, might mean that the setting originally had four rows pointing roughly in the cardinal directions before the rest of the avenue was constructed.

A superficially appealing alternative to the idea that the avenue started off short is that some of the northernmost stones were put in place first. Then shorter stones might have been inserted between them and the Ring. That notion is built on the concept promulgated by Curtis and Curtis that the northern end of the avenue was used to observe



Illus 24.76 The heights of the stones (data based on Pitt-Rivers 1882; east side of avenue red, west yellow)

the moon setting into the Ring at the southernmost lunar standstill.

Burl also compared the avenue to Breton examples, saying that the stones on the eastern side were consistently only three quarters as tall as their western counterparts. Illus 24.76 shows indeed that when considered as pairs of stones none of the eastern stones is taller than its (approximate) counterpart on the western side, but it does not support the idea of a consistent 3:4 ratio. In a similar vein he thought that the layout of Calanais may have been influenced by 'high and low' rows of stones on the hillsides in N Ireland (Burl 2000, 145). The possibility that the Avenue was built over a long period of time does mean that different ideas could have predominated when different stones were erected, and as Burl suggested Irish influences may have played a part during some periods of stone erection. The funnel-neck Beaker ASH 48 found inside the Ring does suggest links with Ireland in the centuries around 2000 BC (Chapter 18 The Pottery Assemblage 18.7.7)

Most avenues seem to have lined routes to large monuments. At Calanais the modern township lies alongside one of the likeliest northward routes. Stones possibly emplaced in prehistoric times have been recorded in the modern settlement (Margaret Curtis pers. comm. 2009) but no firm candidate stones for a continuation of the Avenue have been published. The surviving Avenue points downhill towards Tob na Faodhall, the Bay of the Ford, as noted by Burl (2000, 207). Given the changes in sea level since the avenue was built that ford may have been above high water mark around 4500 years ago (Illus 24.3) but there is no reason why a route continuing north from the Avenue need have been straight, and it may have led to a narrow neck of land between salty and fresh water. In that respect it may have been similar to the hypothetical ancient route between the Stones of Stenness and the Ring of Brodgar in Orkney and to the avenues leading from Stonehenge and Durrington to the River Avon (Catling 2009, 23-4).

Colin Richards has proposed that standing stones in some complex settings were erected from time to time by locally important people mobilising the community in celebration (Richards 2005, 217, 224). That seems particularly applicable to

avenues. If the Calanais Avenue lined (part of) an ancient route to the Ring it may have been built over a long period and one need not suppose that its stones were ever particularly regularly spaced. The exact positioning of individual stones might have been determined by reason like those put forward by Curtis and Curtis. However, as so often when dealing with stone settings the evidence allows this interpretation without proving that it is correct.

Another possibility is that the Avenue was continued northward in a different style from the surviving part. The Kennett Avenue at Avebury, for instance, was built in segments probably over a long period (Burl 1993, 67-8). Perhaps at Calanais smaller stones were used in periodic extensions.

The Avenue at Calanais may have served more than one purpose, and they need not have been mutually exclusive. In addition to lining a route it may have been related to celebrations of moonset into the circle at the lunar maximum, which occurs every 18.6 years. As Curtis and Curtis have documented, this phenomenon is easy to observe from the north end of the avenue. Curtis and Curtis (2009, 28) have also suggested that no stones are missing from the east side of the avenue and the stones were used along with a horizon marker for observing extreme settings of the moon. This idea is discussed below in the section on astronomy.

But the preferred interpretation is simply that the Avenue lined a route from the north to the Ring to the northernmost visible stones, and that individual stones were erected ad hoc. The local orientation of the route may have reflected some astronomically related beliefs, as may the placement of some individual stones; but testing that idea scientifically will be difficult if not impossible. The sizes of the later stones may have been chosen with those of the already erected stones in mind; but my suspicion is that for the most part size reflected the wealth or status of individual or group organising erection.

24.15.12 Interpreting the Avenue and Rows

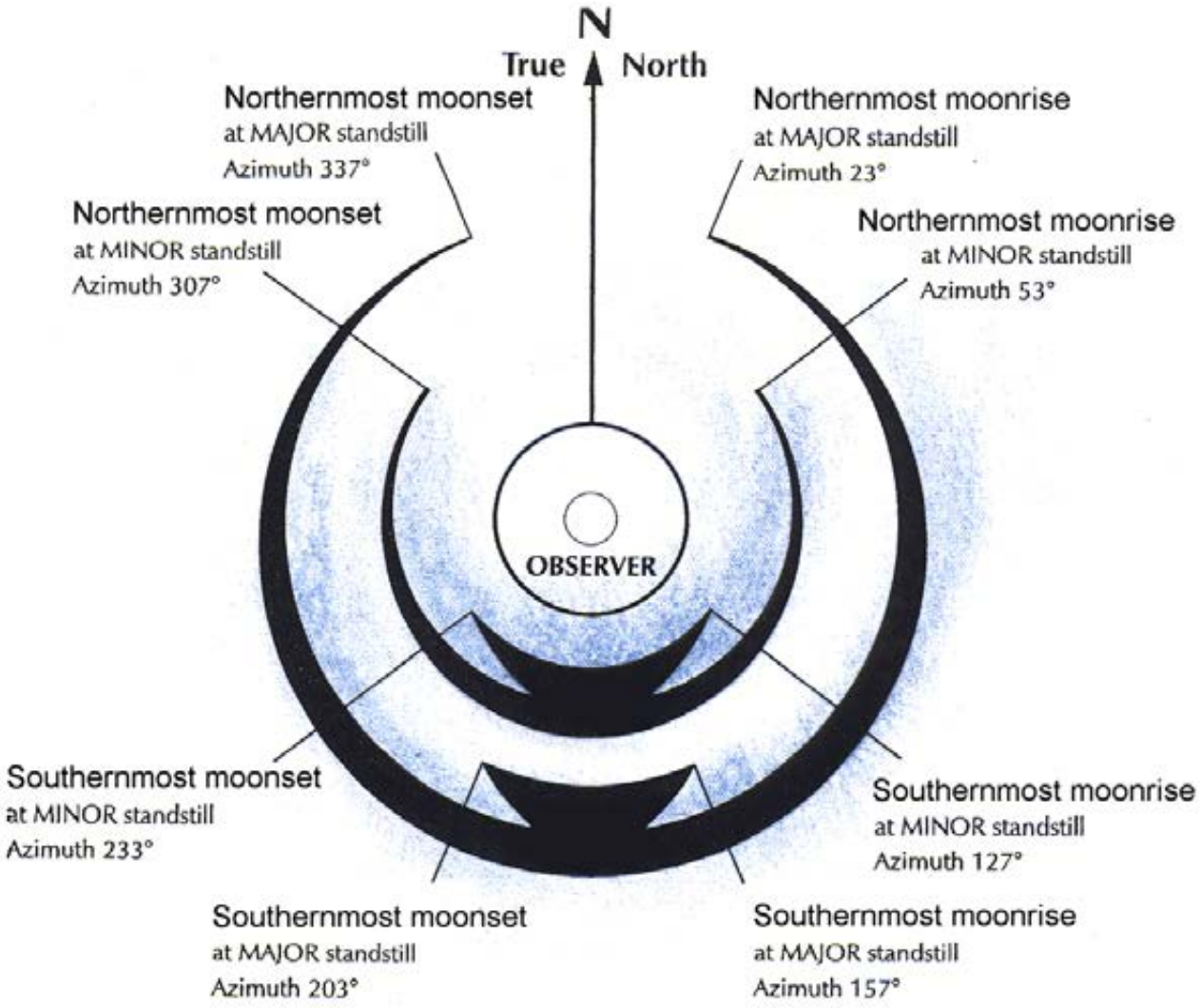
Those who seek to understand why the stone setting at Calanais was built must contend with the reductionist view that Calanais is '… only the familiar forms of avenue and circle, but combined in a unique design' with no more - or less - mystery in the stone setting than in other sites' (Henshall, 1972, 138). Although the motives of the builders of prehistoric structures are opaque, some different possibilities can be suggested.

Műller linked the cruciform stone setting at Calanais (as well as what he claimed to be the cruciform shape of the chamber), to the cruciform chambers of the Boyne Valley monuments (Muller 1988, 24). Henley (2005) also thought that the avenue may have corresponded symbolically to a chambered cairn passage, and the south, east and west alignments to end and side chambers. This idea has a long history to it. John Stuart put it forward in 1866, comparing Calanais to New Grange (Ponting & Ponting 1984, 36). Downes and Richards, in a different context, have suggested that the furniture in houses in Orkney built by those who used Grooved Ware was laid out in a cruciform pattern (Downes and Richards 2005, 57-59, 126). They suggested that the house interiors were designed according to cosmological principles with each element in the cruciform providing a reference to 'the key points in the annual cycles, which govern both agricultural and social practices' (Downes and Richards 2005, 58-9). Given the occurrence of a grooved ware vessel at Calanais similar to that from the Stones of Stenness and some of those from Barnhouse, perhaps similar ideas underlay the layout of Calanais; or the avenue and rows may even have been created to turn it into a symbolic 'house'.

These insights are difficult to assess; the East Row at least was much later than the Ring so while such ideas may have played a part in the final form of Calanais they probably did not determine its initial shape. The same applies to another possibility, discussed above in the context of ritual deposition and below in the context of the Avenue and Rows, that Calanais was a material expression of a cosmological quartering of the area centred on the Ring.

24.15.13 Astronomy and Cosmology at Calanais

Theories that astronomical knowledge was incorporated in the stone setting run through 17th to 19th century discussions of Calanais. Many



Illus 24.77 The movements of the moon (after Ashmore 1995, 39; developed from a diagram published by G and M Ponting 1984, 45)

of them including Somerville (1912), Hawkins (1965), Thom (1967, 1971 and 1978) and Thom, Thom and Burl (1980) were summarised in Chapter 3 (Previous Studies), and they and others have been ably presented by Burl (for instance Burl 1993, 13, 14, 64, 65; 2000, 202-6). I shall review only a few of them here. It hardly needs to be said that Burl's two major books on stone settings (1993, 2000) are indispensable treasuries, and he is responsible for important pioneering work on systematic studies of orientation amongst regional groups (Ruggles 1999, 130). But in what follows I shall rely most heavily on Clive Ruggles' 'Astronomy in Prehistoric Britain and Ireland' in discussing matters of fact and in making value judgement (Ruggles 1999). I shall also depend on the wide-ranging surveys and investigations of the landscape around Calanais undertaken by R and M Curtis (e.g. Curtis and Curtis 2008). Their labours have been conducted very much in the spirit of the 'the pressing need to examine further evidence on the location and design of monuments in relation to the contemporary landscape … in a systematic way' (Ruggles 1999, 156).

Over the years there have been many claims that the avenue indicated the rising of particular stars, and similar claims have been made for the rows; but not one of these explanations for the avenue's orientation or those of the rows stands up to scrutiny (Ruggles 1999, 136). That said, he did emphasise that 'We can never know: all we can ever have is a degree of belief in a certain idea

according to the evidence available' (Ruggles 1999, 76). On the southward orientation of the avenue, he noted that claims of very precise alignments fail because Cnoc an Tursa hides Clisham. His work casts a shadow on claims of precise astronomical or calendrical significance in the lining up of stones at Calanais; but his dismissal of claims that the stones provided scientifically robust evidence for precise alignments was not intended to exclude more general ideas, such as that of the importance of southernmost moon-set to those who lived in the area in the years when Calanais was in use.

Although the precise astronomical claims contain errors, in 1999 Ruggles wrote 'Remarkably, perhaps, we seem to have come full circle, from criticising the inherent biases in the work of Thom and others, through seeking rigour and objectivity, to recognising the shortfalls of that approach and discovering the need to readmit subjectivity as part of a controlled approach which involves 'continuous dialectic between ideas and empirical data" (Ruggles 1999, 162).

I continue to distrust subjectivism in any study that purports to be scientific (Popper 1976, 195-6), except in dreaming up new ideas to test; and if subjectivism does not allow rejection of non-trivial ideas through as objective tests as are possible I am genuinely unsure what a "dialectic between ideas and empirical data" means. I suppose it just means checking your ideas against the data and making sure that the data informs your ideas; but if the criteria for rejection of ideas are purely subjective the approach is as dangerous as it always was. Nevertheless, I have here taken just one of Ruggles' points in isolation and must stress that I agree with Ruggles' points far more than I disagree.

During much of the 3rd and 2nd millennia BC in Scotland there may have been an interest in the southernmost limits of the moon's motion. The evidence for such an interest in movements of the moon or the sun is particularly strong amongst the recumbent stone circles of the north-east and the stone rows of the north-west (Ruggles 1999, 109; Welfare 2011). From many of these sites the moon at its major standstill limit in the lunar node cycle moves just above the southern horizon (Illus 24.77; Ruggles 1999, 159). This is a phenomenon which last occurred at Calanais in 2006 and will occur again in 2024-5 when the moon will glide just above the southern horizon once a month for a few months around the precise lunar extreme.

Ruggles did not quarrel with the data established by Gerald and Margaret Ponting and documented more fully by Margaret and Ron Curtis (see below), and speculated that the intention behind the stone setting may have been to create a dramatic relationship between the monument, the landscape and the heavens, reserved for rare and auspicious occasions, a generalisation of an idea put forward by Margaret Ponting (1988) and described below. Neither did he reject the possibility, raised by the Pontings (Ponting & Ponting 1981; Ponting 1988, 426-7) that the various monuments around the main setting formed a complex in which ranges of sacred hills were framed in relation to lunar rising and setting on the horizon. But he did point out that current rigorous methodologies do not test such possibilities, which means in essence that he could not fully accept them (Ruggles 1999, 136).

As described in Chapter 3 Previous studies 3.1.2 Toland in his History of the Druids produced the first surviving published claim that the tale told by Diodorus Siculus, quoting Hecateus of Abdera (c 330 BC), of the moon dancing along the horizon in a northern island referred to Calanais (Toland 1726, 188-91). Others have suggested that that reference is to the lunar node cycle of 18.61 years, the gap between reoccurrences of the lunar major standstill. Ruggles however has pointed out that the Diodorus anecdote referred to 'the period in which the return of the stars to the same place in the heavens is accomplished' which is the 19.0 year Metonic cycle, not the 18.6 year lunar node cycle (Ruggles 1999, 88-9).

Ruggles referred also to the more rarely quoted Strabo, who wrote that the Celtiberians of NE Spain and their neighbours in the north 'offer sacrifice to a nameless god at the seasons of the full moon, by night, in front of the doors of their houses, and whole households dance in chorus and keep it up all night'. Ruggles thought that if interpreted with caution the writings of Diodorus and Strabo might tell us something about practices in Atlantic Europe in the pre-Roman Iron Age, but 'it is quite another question as to whether

there is any evidence for a continuity of tradition extending back into the Bronze Age and before' (Ruggles 1999, 88-9).

There need be little doubt that the horizon-skimming phenomenon was known to those who built the stone setting at Calanais, even though there is no evidence for how it fitted with their other world-beliefs. It is well seen from near the north-easternmost stone (Stone 8) of the avenue (Curtis and Curtis 1994, 23). From there the moon at its major standstill sets behind the outcrop Cnoc an Tursa to the south of the stone setting and then reappears momentarily close to the central monolith.

M Ponting has suggested that Calanais was specially positioned in the landscape 'to take maximum dramatic advantage' of lunar phenomena (Ponting 1988, 424, 427, 431). She observed that if the north end of the avenue had been intended to allow observation of moon-set on the distant horizon, there would have been no physical impediment to building the avenue a few metres further west (Ponting 1988, 429). She also showed that there were other parts of the setting from which lunar events could be seen. She thus suggested a positive intention on the part of the builders to include both the disappearance and the reappearance.

Ponting and Ponting's work has also confirmed that Somerville was right in supposing that a line between the two stone outlying the circle, stone 9 and stone 34, indicates the northernmost full moonrise at its extreme position in the 19.81 year lunar cycle (Ponting 1988, 430) although that the alignment should be regarded as approximate because of the large size and irregularity of the stones (Ponting 1988 fig 19.5).

Their work has also shown that the avenue can be used to indicate the midwinter setting of the sun behind a mountain and its subsequent gleam through a notch in the horizon (Ponting & Ponting 1984a, 52). If this phenomenon is due to more than chance it demonstrates an interest in sunset at midwinter which can be paralleled at, for instance, Maes Howe in Orkney around 3000 BC and the cairns at Balnuaran of Clava after 2000 BC (Bradley 2000, 122-5). And as described above (Chapter 24.9.5) the layout of the the ring at Calanais suggests an early interest in the equinox (rare in Scotland, reflecting the visual anonymity of the event) which may have lasted for several centuries.

More recent work by Curtis and Curtis has shown that the stones on the east side of the Avenue can be used in conjunction with a foresight marker for assessments of how close moon-set was to its extreme. They have suggested that this explains the positions of all of the stones in the east side of the avenue except Stone 5, and possibly stone 6 (Curtis and Curtis 2009, 28). That concept is of the sort acceptable to those who believe that sophisticated astronomical observations played a large part in the lives of an elite group, but without demonstration of the existence of a contemporaneous foresight most others will suspend judgement; for accepting that it could have been done does not entail accepting that it was done.

As described above (Chapter 24. 14.3), deposition patterns within and just outside the Ring suggest a cardinal quartering of the cosmos. The lines along which the rows were set up may also have reflected cosmological ideas although the direction of the East Row seems more likely to have been determined by the orientation of earlier cultivation beds (Illus 24.10). In this interpretation initially abstract lines divided the whole of the area inside and outside the Ring into quarters. The rows, perhaps initiated generations after deposition started, suggest a somewhat less precise cardinal quartering of the cosmos. These changes seem to fit reasonably well with Pollard and Ruggles conclusions on cosmological ordering in Britain during the third and early second millennia.

'… solar and lunar-derived cosmological schemes were not mutually exclusive, and … it was through long-term ritual practices that the motions of the moon came to be increasingly referenced through deposition. It is perhaps of significance that those deposits most closely allied to the motions of the moon are of human bone (principally cremations) (Pollard and Ruggles 2001 87).

What happened at Calanais will not have been identical to what happened at other stone settings in Britain. But the evidence does corroborate the existence of a belief in cosmological principles similar to those deduced at other sites.

24.16 Sacred and ritualised landscapes

The integration of geography with beliefs about the cosmos is widespread amongst historically recorded and modern non-western societies. It is in principle possible that all landscapes in Britain and Ireland were regarded as sacred in that sense in the fourth to second millennia. And as many authors have suggested (Ruggles 1999) it seems likely that past peoples did not see a clear separation between sacred and domestic landscapes but a continuum.

24.16.1 Some ideas about sacred landscapes

A sacred landscape is 'a numinous landscape with an importance that might extend beyond the immediate locality' (Ritchie 1997, 79). Although Ritchie's phrase sums up the two most important characteristics of sacred landscapes, I shall rely in what follows largely on Ruggles summary of ideas about them. He declares that they are culturally charged; people experience them against a background of memory and associations; they embody ideas and symbolic meanings; and they help to harmonise people's activities with the cosmos (Ruggles 1999, 120).

Although many historical and modern indigenous groups draw no distinction between ritual and mundane activities (Ruggles 1999, 262 Archaeology Box Notes 1) some places were regarded by most people most of the time as more suited to ritual or ceremony, or demanding more observance, than others. There is a considerable literature in which words like 'secular', 'ritual' and 'ceremony' carry specialised meanings. But such words do have useful ordinary (and thus not very precisely defined) senses. By a ceremonial place, in what follows, I mean somewhere designed for ceremonies, celebrations or festivities involving expressions of belief and carried out by groups of people. In this commonplace usage ceremony and ritual can overlap. What I mean by a ritual centre is a place customarily used mainly for carrying out rituals, or formally interacting with the sacred aspects of life, whether actively or passively, privately or publicly. In contrast to that is a place, for instance a dwelling or a field, where rituals may well have been embedded in daily activities but the primary goings-on were domestic or agricultural. The place of faith and beliefs in such activities is brilliantly evoked in an episode attributed to AD 1932 in Claude Michelet's family saga, set in the Correze, France: 'When all the crops were sown Pierre-Edouarde, following an old custom, fixed a small cross, shaped roughly out of straw, in the middle of each field. Mathilde [his wife] attached importance to this practice. She saw it firstly as a sort of tribute to the land and to the work, and also as a discreet appeal to Heaven, a little wink at the Lord, as if to say to him: 'Look, we've done all we should do, as well as we could; now its up to You to do the rest.' (Michelet 1994, 79). .

A distinction has been proposed between two modes of religious practise: infrequent intense events (imagistic) and frequent low-level ones (doctrinal) (Whitehouse 2000). It is very tempting to suppose that large central sites such as Calanais 1 were used mostly for 'imagistic' events and the small rings around it for 'doctrinal' ones But I do not in general intend a precise equation of 'ceremonial' and 'ritual' with 'imagistic' and 'doctrinal' a formal distinction would not be very useful because the current evidence from most Scottish stone settings is inadequate for exclusion of either mode. The same may not be true of timber settings if Thomas is right in supposing some were purposefully built for destruction by fire, suggesting predominantly 'imagistic' events (Thomas 2007).

Darvill has argued that a site-oriented approach (in landscape studies in general) has its dangers; the implication is that one should concentrate neither on 'imagistic' nor on 'doctrinal' sites. Landscape studies should be considered in social terms at larger spatial scales. Subtle landscape features and apparently empty spaces could sometimes have been socially significant. Archaeological surveys do not usually record all the sensory information available. He advocated more attention to assessing what the basis was for actions which did leave traces. He also pointed out that all landscapes may have been in a constant flux but that social constructs may have survived physical change, perpetuated by myths, legends and placenames (Darvill 1997).

Illus 24.78 The landscape to the southwest of Calanais (Mike Brooks, Historic Scotland)

These strictures are well justified. However, I am firmly of the opinion that interpretations of the human dimension of past landscapes must be evidence-based if they are to improve understanding of the past. Proposed social dimensions must often remain speculative because there is often no one-to-one correspondence between traces of activities (let alone absence of traces) and the reasons why the activities were undertaken. For field archaeology the most important point is that while built foci may be recognisable the same may rarely be true of the natural, let alone the transitory. In what follows, while bearing Darvill's points in mind, I shall concentrate on landscapes where there seems to be enough material evidence to suggest that the area was regarded as special.

Stone settings represent a concrete expression of some ideas about the spiritual aspects of landscapes and the natural objects in them. Their creation may usually have formalised and normalised pre-existing practises. The buildings did not make the terrain any more or less spiritual. Instead they facilitated, or for some people imposed, preferred ways of interacting with it. But that will not have happened in isolation from other changes. Ritualisation of the landscape may have reflected increased social group sizes and possibly also contacts with powerful external groups of people. The monuments probably reflected attempts to transmit and reinforce doctrines, strengthening social solidarity. Perhaps frequent visitors tried to strengthen commonalities with local groups by introducing religious beliefs; or local groups may have tried to strengthen religious bonds between each other in the face of disturbing contacts with external groups.

In what follows I shall use the term 'ritualised landscapes' for areas where it can be shown that cosmological symbolism was important in the design or placement of non-domestic structures. But it is important to remember that such ideas were in a sense tools to a different end; whatever the detail behind them, they probably reflected the use of religion to increase (and perhaps to impose) social coherence (Norenzayan 2012, 43).

24.16.2 A ritualised landscape round Calanais

Observations of the moon dancing over the horizon and of moon-set at major standstill can be made from several stone settings near Calanais; and although the southern horizon has attracted most attention other views have great natural beauty, at least by modern standards (Illus 24.78). The area can be regarded a ritualised sacred landscape. Indeed, using a largely superseded terminology Henshall suggested some four decades ago that the east shore of the inner reaches of Loch Roag had some special sanctity in the same way as had Crinan (the southern extension of the Kilmartin Valley) and the area around Stenness in the middle of Orkney 'with their concentration of temple sites' (Henshall 1972, 150).

The evidence from the main stone setting at Calanais appears to show that the people there were, at least in parts of the third and the second millennia BC, interested in coincidence of the southern limits of movements of the moon at major standstill with landscape features and the stone setting. Ponting and Ponting (1981, 1984) and subsequently Curtis and Curtis (1993, 2008, 2009) have photographed and surveyed horizon profiles seen from there and many other stone settings in the neighbourhood and shown that at least some of them could be used in the same way. That suggests, in Whitehouse's terminology, that the setting were built for 'imagistic' events; but the current evidence cannot exclude their use for 'doctrinal' ones.

One aspect of that landscape is that the profile of the distant hills south of Calanais looks to some observers like a woman lying on her back. Further to the west the Clisham Hills profile includes the deep valley of Glen Langdale (partly obscured by a foreground hill in Illus 24.78, but lying directly above the islet in the middle body of water). As viewed from several parts of the area around Calanais at the south lunar extreme the moon rises from the former and sets (after temporarily disappearing behind the hills) in the latter (Ponting 1988; Curtis and Curtis 2008, 4-5). Curtis and Curtis record at least one indication of major standstill southern extreme moonset provided by lines between stone settings; when viewed from the fallen stone at Druim na h-Aon Chloich the stone ring at Ceann Hulavig is in line with the Glen Langdale valley and thus with final moonset at its southern extreme. They have demonstrated that others of the six rings in the area could have been used for observation of the same phenomenon although paradoxically it is not visible from the main stone setting itself (Ponting 1988). Single stones inserted into the landscape may have marked places important within a melding of beliefs with perceptions of the physical geography.

The work of Curtis and Curtis, building on that of Ponting and Ponting, has made a substantial case for there having been a ritualised landscape round Inner Loch Roag, natural but with its symbolic nature accentuated by artificial structures. But how can the specifics of their interpretations be tested? The usual way to investigate such ideas is to form a null hypothesis, that there was nothing special about the placing of the sites, and test it against data. Such approaches have been explored, for instance by Bradley and his colleagues in their examination of the rock art of Galloway (Bradley et al 1993) and of an area around the Clava cairns (Bradley 2000). If the data does not allow acceptance of the null hypothesis then there was something special about the placing of structures. That does not necessarily mean that the reasons for the siting were the same as those supposed when formulating the null hypothesis. There may have been undreamt-of reasons. But testing the null hypothesis is an important first step in assessing whether landscape patterns were significant.

In practice, that means comparing the areas around ritualising constructions with a random set of apparently empty areas. If after that there are no better explanations why the settings were where they are in Calanais landscape, then Curtis and Curtis' thesis will gain more weight. If the areas immediately round stone settings turn out to have few characteristics different from those of other randomly chosen parts of the landscape, interpretation of the placing of the stone settings will be open to many other ideas.

Particularly if their precise locations were not strongly defined by the visibility of astronomical phenomena, the positions of the stone settings were presumably linked to other uses of the land.

One model might be that the single standing stones from which striking moonsets could be seen were close to small settlements while rings and other more complex settings from which the same events could be observed were close to larger settlements. Alternatively, if people moved regularly through the landscape smaller stone settings might reflect less used routes and larger ones those used most frequently. Or it might turn out that archaeologically minor sites were stations on twisting landscape-determined routes between more substantial ones. Terrain modelling might allow predictions about where settlements lay, or how people travelled about the area.

All that said, Curtis and Curtis have made a very good case that the landscape around Calanais was sacred in the sense defined by Ruggles (1999) and ritualised in the sense used here. It is the preferred working hypothesis.

24.16.3 A variety of ritualised landscapes elsewhere in Scotland

What follows is a short version of Appendix 10 Scottish Ritualised landscapes.

There may have been ritualised landscapes in Scotland several centuries before Calanais was built. For instance the large chambered cairn clusters of Caithness, at Loch Calder, Loch of Yarrows, Sordale Hill and Dunbeath (Davidson & Henshall 1991, Fig 5) may prove to be more than members of a set of paired cairn and settlement. In Rousay in Orkney too each cairn may represent a territory belonging to a single household or small community. But the first obvious evidence for more complex ritualised landscapes appears in the centuries around 3000 BC. The most prominent ones with dominant stone structures of much the same period as Calanais are at Machrie Moor on Arran, and in the middle of Orkney The monuments around Balnuaran of Clava and the several clusters of recumbent stone circles in NE Scotland, up to a millennium later than Calanais, may be an expression of integration of landscape and cosmos more like that of the early chambered cairns of Caithness.

The Crinan/Kilmartin Valley, complex includes both stone and timber monuments and thus provides a bridge between the stone-based ritual landscapes and the timber and earth ones of the plough-lands of Scotland Examples are found at Forteviot (Noble 2009, 14-17; 2010; Brophy, K & Noble, G 2011), Meldon Bridge in the Borders (Speak & Burgess 1999), Dunragit in Wigtownshire (Thomas forthcoming). and Balfarg/Balbirnie in Fife (Barclay & Russell-White 1993; Barclay 2005; Gibson 2010). Some of these were probably far more impressive in their time than Calanais.

The ceremonial centre at Machrie Moor on Arran may have lain in a landscape of extensive field systems with far more abundant neolithic settlement than has previously been suggested (Barber 1997, 144-145, 149).

If the rings of tall stones at Machrie Moor are of much the same date as Calanais they should also be of a broadly similar date to the timber circles on Machrie Moor 1 and 11. This conjunction does not match well with the idea proposed by Pearson and Ramilisonina (1998) that (in southern England) timber structures were built in one area for the living and stone ones were built for the dead in a non-overlapping nearby idea

There may have been considerable continuity in the ides expressed at Machrie Moor. The low stone circle on Machrie Site 11 is very probably 250 to 900 years later than its timber predecessor in exactly the same place. It is quite extraordinary; given that ploughing intervened, that the precise site of the timber circle was remembered for at least ten generations, or that precise rules for the placement of structures relative to other features survived that long.

Barnatt and Pierpoint concluded that there was no evidence in the siting of the ceremonial complex for an interest in precise alignments on the main solar or lunar events, but that the rings may have been placed to exploit a horizon notch indi-

cating midsummer sunrise (Barnatt and Pierpoint 1983, 112). But there are problems with the methodology of their study (Ruggles 1983, 116; 1999, 133) and their conclusions have to be treated with caution (Ashmore 1999c).

As things stand the concept of a widespread ritualised landscape has to be employed to an even greater extent at Machrie than at Calanais. From currently available evidence it seems that people looked towards a single ritual focus rather than imbuing several related locations with connections to a wider cosmos.

Around and after 3000 BC a rich society expressed itself in settlements and monuments around and between the southern part of the Loch of Harray and the Loch of Stenness in Orkney. For ease of reference I shall refer to this area as the Heart of Neolithic Orkney (Historic Scotland 1998, 39). It is sufficiently well known and publicised that I shall keep my account very brief; indeed the sometimes indiscriminate use of the archaeology of Orkney in discussions of the prehistory of other Scottish and indeed also English regions has raised protests which merit some sympathy (see for instance Barclay 2000).

From an Orcadian perspective also the singling out of this area has been seen as invidious. Much of Orkney contains exceptionally well endowed 4th to late 3rd millennium landscapes and the Heart of Neolithic Orkney may be only part of an archipelago-wide ritualised sacred geography. But the Stones of Stenness, the hall at Barnhouse, Structure 10 at Ness of Brodgar and the chambered cairn at Maes Howe are currently exceptional in illustrating different but related aspects of the beliefs of a coherent social group. The extraordinary buildings at Ness of Brodgar, some seemingly non-domestic, add depth and complexity to this assemblage of ritual and ceremonial sites. And the multitude of large and largely unexplored monuments, and the division of the landscape by substantial built boundary walls contributes to the case for this area's being special part of a ritualised landscape.

My present impression is that monuments for the living and the dead were set close to each other, rather than set in large and distinctive areas as has been suggested for the Stonehenge Durrington landscape in southern England (Parker-Pearson and Ramilisonina 1998, Figure 7).

The ritualised landscapes at Calanais and the Heart of Neolithic Orkney differed considerably from each other despite the existence of tall-stone rings in both areas. Central Orkney contained two large settlements, and several large funerary mounds; and despite the amazing archaeological landscape it did not have (or more strictly speaking, it does not now have) the small rings and stone settings found round Calanais. Nor does it seem to have links with the Beaker-using people who introduced change to many parts of Europe. But it seems to have been very much richer.

That the Kilmartin Valley supported what I have here called a ritualised landscape has long been recognised. Not only was it '… certainly a centre for ceremony and burial for an extended period …' (Ritchie 1997, 83) but 'The concentration of sites and the intervisibility of many within the confined valley floor allow us to conjure notions of a numinous landscape with an importance that might extend beyond the immediate locality' (Ritchie 1997, 79).

The valley contained both timber and stone structures. The latter have been long known, with a linear cemetery of massive cairns, some chambered, along with a henge, standing stones including the decorated stones at Nether Largie and Ballymeanoch, and the stone rings at Temple Wood. It also contains numerous decorated rock outcrops (Ritchie 1997, 77- 84) and has produced fine artefacts, including highly decorated pottery of many periods and jet jewellery (Ritchie 1997,

80-84). Major timber monuments were discovered near Upper Largie in the late 1990's. They included a long rectangular timber structure; a pit-defined avenue; an elliptical timber ring; a ring complex; Beaker and other graves (Terry 1997, 19-21 fig 8; Ellis C 2000, 16; 2002, 145; Ellis and Crone pers. comm.; Cook et al 2010).

The long rectangular enclosure probably dated to the second quarter of the 4th millennium BC. Building of the stone ring at Temple Wood is not radiocarbon-dated but its plan is similar in size and shape to that of the Ring at Calanais so it may be of approximately the same date. It was subsequently embanked and its interior was filled with boulders under and among which were small kerb cairns and burial cairns. Recent radiocarbon dating of cremated human bone suggests burial between about 1420 and 1270 cal BC (Sheridan 2008, 202).

The Beakers from Kilmartin show many similarities to Dutch ones. Presumably that reflects contacts with the eastern areas of Britain. Irish Bowl Food Vessels from three cairns suggest long-distance western connections and Whitby jet suggests contacts with NE England in the last few centuries of the 3rd millennium BC; (Sheridan 2008; Sheridan pers.comm).

Possibly during the early period of structure-building, and certainly in the later 2nd millennium BC, there is evidence for cosmological interests. Many of the isolated short stone rows and stone pairs of the Kilmartin Valley are, at minus 30°, closely aligned on moonrise or set at the major standstill limit. A smaller number of alignments lie between minus 21° and minus 26°. Each of these is close to a row or pair with an alignment of minus 30°. Ruggles has suggested several explanations for this pattern including the possibility that rows and pairs of the latter group were aligned on midsummer full moon at a random point in the 18.61 year lunar node cycle but when the moon was seen to set further and further south another 'more correct' alignment was built (Ruggles 1999, 109). That said, claims of alignments relating to the earlier stone settings at Temple Wood and Nether Largie need reassessment in the field (Ruggles 1999, 59, 231 note 79).

The apparent contrast between the location of the timber monuments in the upper part of the valley and those of the cairns and stone settings downstream raises the question whether the concept of zones for the living and zones for the dead can be applied to the Kilmartin Valley.

The sacred landscape was on present evidence created and perpetuated by societies which were materially much richer and more widely connected than those around Calanais.

Clava cairns lie mostly along the coast of the inner Moray Firth and the rivers running south with a concentration in Strathnairn (Bradley 2000, 2, 184).

The monuments at Balnuaran of Clava include two passage cairns, a ring cairn and a small rough kerb cairn, while in an area of about a square kilometre around them there are at least six other monuments (Bradley 2000, 5, 175-8). The cairn at Balnuaran of Clava was probably built between 1920 and 1740BC (Bradley 2000, 115-6; AA-24234, AA-25433), or in round terms about 900 to 600 years later than Calanais.

The two passage cairns are orientated towards the point where the midwinter sun sank below a nearby hill (Thom 1966, 18; Bradley 1998, 136, 142; 2000, 122-5). The passages of the two cairns still point at midwinter sunset, although the alignment of the northern one would have been better 4000 years ago, midwinter sunset from southern cairn is currently blocked by trees (Bradley 2000, 122). The more southerly cairn lies on the line indicated by the passage in the north cairn (Bradley 1998, 142). There may also have been orientations on midsummer sunrise but lunar horizon phenomena were not positively indicated. Bradley perceived Balnuaran of Clava as unusual in Scotland, because he thought that indications of interest in solar movements were uncommon (Bradley 2000, 126).

By and large Clava cairns each had a local significance; they dominated their immediate localities but were neither placed to be visible from afar nor to have unusually good views outward

(Bradley 2000, 178-80,182). A sample of 25 cairns suggested that their orientations clustered round midwinter sunset and the major and minor lunar standstills (Bradley 2000, 181-2). Thus in the lands south of the Moray Firth (with outliers on the Black Isle to the North) there seem to have been many small ritualised landscapes. In places they were so close to one another that they probably formed a single large one. The pattern is far richer and more extensive than that visible around Calanais.

The recumbent stone circles of North-east Scotland have a distribution largely confined to Aberdeenshire. On the limited reliable evidence currently available, at least some of them were built over half a millennium earlier than the radiocarbon-dated cairn at Balnuaran of Clava. Beaker sherds have been found in some abundance at them- and they were used as cremation cemeteries around 1000 BC (Welfare 2011, 162-167).

Welfare has contrasted their distribution with that of large burial cairns, some 'found deep in the glens that penetrate the mountain hinterlands' (Welfare 2011, 64-67).

They share many traits with other Scottish 'Bronze Age' monuments and Welfare, noting how many sites had wrongly been called recumbent stone circles, deprecated the tendency to lump sites together, obscuring the true variety of cairns and megaliths in the area (Welfare 2011, 252, 258).

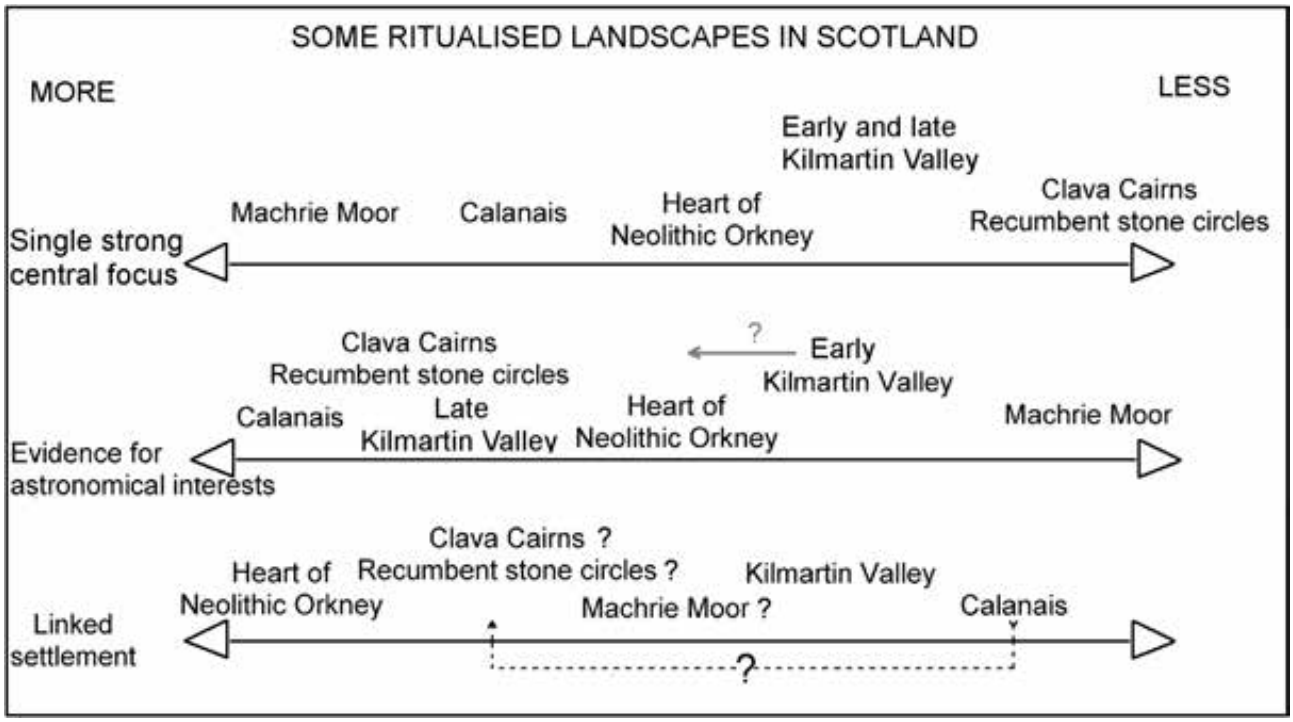
In 1984 Ruggles concluded that there was a highly significant general orientation from the interior of the circles outward over the recumbent stone towards horizon points centred on the SSW, generally avoiding local horizons (Ruggles 1984, S77). He and Burl showed that overall there was no conclusive evidence for precise observations of the sun or the moon (Ruggles and Burl 1985, 57-8). Welfare (2011, 213) has argued that it is more likely that the general orientations of recumbent stone circles and Clava Cairns reflect an interest in the setting sun.

No strictly contemporaneous settlements have been demonstrated although Welfare has suggested that they had settlements close to them. In that respect they are like the Clava Cairns.

The existence of the circles with the interest they demonstrate in the general direction of lunar and solar setting does imply that observance of some contemporary rituals was focussed in particular places and to that extent the landscape was partially ritualised. But despite that there were large areas round them where, whether or not the landscape was thought of as sacred, there is little evidence for its ritualisation.

It must be stressed that Illus 24.79 is based on very incomplete information because of the small number of excavated sites and the limited amount of archaeoastronomical survey. I suspect that the differences which it encapsulates will diminish with future archaeological discoveries. For example the position of 'Early Kilmartin valley' on the 'astronomical' line may be over-cautious. It is based on reservations expressed by Ruggles (1999) about claimed early astronomical alignments. Certainly the orientations of some of the stone rows there suggest that by the second half of the 2nd millennium BC local people had a well developed interest in astronomical events. Also, I have not included the evidence from Lowland Scotland, although the monuments so far excavated, for instance at the Balfarg complex in Fife, at Forteviot in Perthshire, Broomend of Crichie in Aberdeenshire, Dunragit, Holywood and Holm in the south-west represent different patterns again. Nevertheless, even the few examples of ritualised landscapes discussed above suggest that there was no overarching template to their creation.

Barnatt (1989, 5) has suggested that stone circles and related monument forms may 'to some extent form parts of a continuum', particularly the smaller ones. He thought that small stone circles, ring cairns, kerb cairns and other round structures may, functionally, have expressed very similar ideas in different ways in different places and times (Barnett 1989, 9-13). Welfare expressed a similar idea after his exhaustive study of recum-



Illus 24.79 A variety of ritualised sacred landscapes

bent stone circles in northeast Scotland, going so far as to write ' ... similarities as might appear to exist are better seen as shared traits in contemporary manifestations of country-wide beliefs' (Welfare 2011, 259). There is indeed some indication that there were broadly favoured belief systems in Scotland even if local expressions varied. The examples discussed above suggest that there was a stronger interest in building structures referencing the movement of the moon than to the sun, with Maes Howe and Balnuaran of Clava the most obvious exceptions. (although as noted above Welfare (2011, 226-8), preferred to explain their orientation as referencing the sun). Midwinter orientations seem to have predominated over midsummer ones, although how far that is due the relative lack of investigation of timber monuments is an intriguing question given the idea that stone monuments were for the dead and timber ones for the living (Parker-Pearson & Ramilisonina 1998).

24.17 Phase 11a: The Stage 3 enclosure

After the Phase 9b Stage 2 earthen enclosure had decayed, and following a phase of ground-working a wall-base (102/804) was constructed outside the bank. It followed a slightly different line from both the earlier bank and the later wall-base 103. It was not identified close to the Ring.

It survived best in the slightly lower areas outside the better preserved parts of the upper wall-base. Illus 24.80 shows the stones left after digital removal of those definitely part of the upper wall-base and those in the modern ditch. Ignoring (for the moment) a possible fragment of a wall-base near the East Row the remaining stones include disturbed stones of the upper wall-base, stones of the lower wall-base, and a few stray stones.

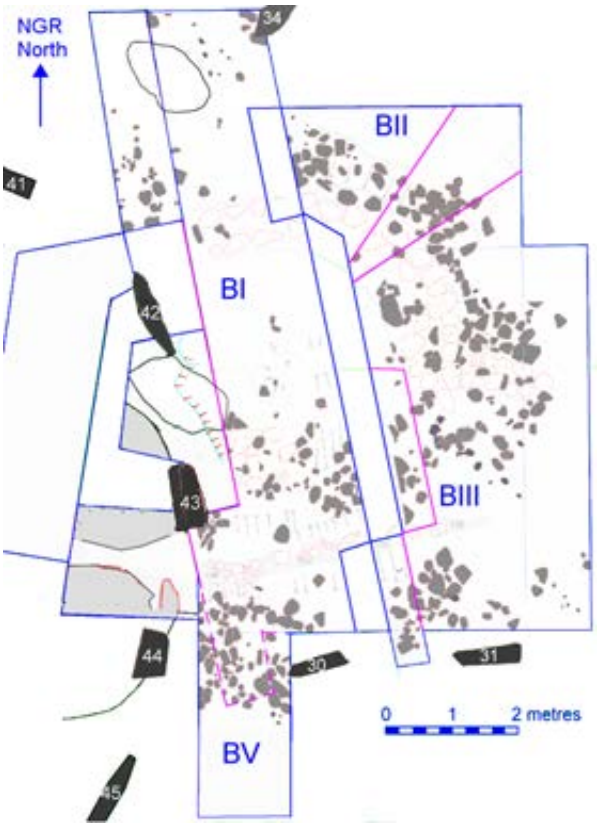
Where it survived best the wall-base consisted of two lines of slabs with gritty grey material between them (113 on Illus 24.81). This enclosure appears to have been roughly oval. Its entrance was in the same position as that of the Stage 2 enclosure. A single line of stones crossed it on the line of the interior face of the wall-base.

No finds could be assigned specifically to the Stage 3 wall-based enclosure.

Interpretation of a radiocarbon age (AA-24968 3575± 45) from a piece of willow charcoal in greasy clay 738 outside the cairn on Area H, together with the inverted pollen zonation of an old turf line 751 and overlying soils, led to a hypothesis that the material forming the northern part of the cairn body was pulled down onto the area

to the north and the stones removed for building elsewhere. Perhaps the stones were taken for the wall-base of the Stage 3 enclosure. It does not seem quite as likely that the robbing was for the Stage 4 enclosure because by hypothesis the cairn was backfilled with material from the third stage one when the massive kerb slab was set up on Area H. That would allow the age, which calibrated to between 2040 and 1770 cal BC, to provide a terminus post quem for the third stage enclosure.

But the preferred interpretation is that the Calanais enclosure had the same function as the Stage 4 enclosure. That function is not clear but may have been a partially 'domestic' one, albeit with a specialised purpose.



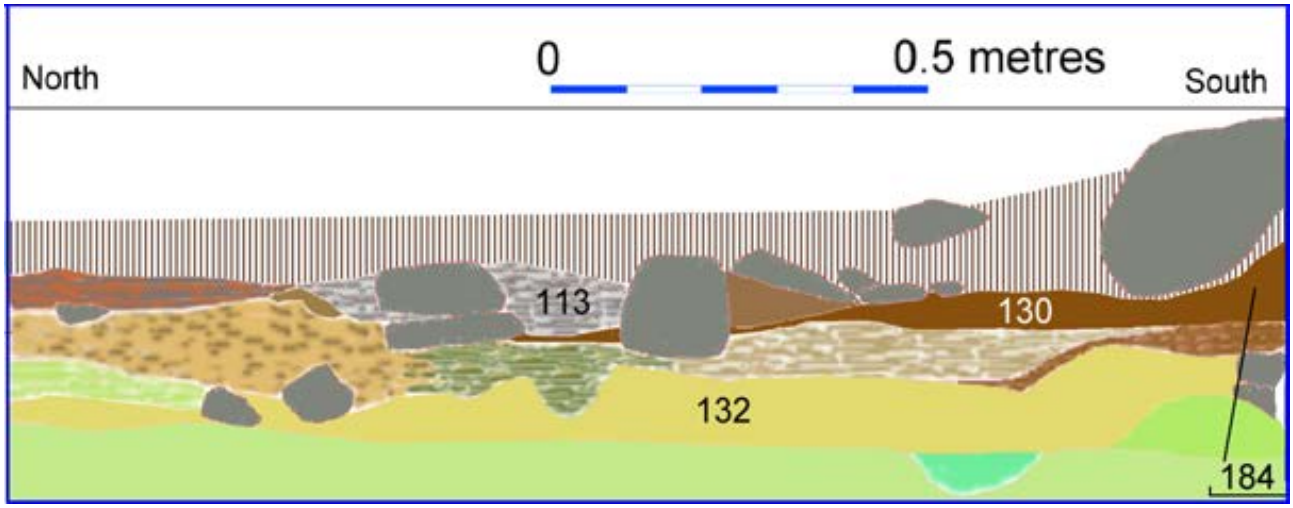
Illus 24.80 The Stage 3 enclosure and stones near the east alignment

24.18 Phase 12a to b: The Stage 4 enclosure and subsequent cultivation

A new wall base (103) was subsequently built, mostly on the worn down crest of the old bank (Illus 24.82). Some of the stones from this were displaced to form the tumble fraction of stone spread 102 (the rest of which formed part of the second phase enclosure).

The latest of the possible floor levels (167) included a sherd of Food vessel ASH 75 (along with three Early/Middle Neolithic Hebridean incised sherds and two possible Beaker sherds), so the Stage 4 enclosure was probably still in use after Food Vessel ASH 75 had reached Calanais, perhaps a few centuries after building of the Stage 1 enclosure.

If, as suggested in Chapter 7: Area B, the area east of the Ring was cultivated after clearance of vegetation between 1940 and 1690 cal BC, and the ploughing turned up stones 134 which were then dumped near the east row, that may explain the incompleteness of the excavated enclosure.



Illus 24.81 The best preserved part of the Stage 3 enclosure wall-base

Another possibility is that stones were robbed to build up the cairn when the massive kerb slab in Area BIWX was erected, although the preferred interpretation is that the Stage 3 enclosure wall-base was robbed for this purpose.

A non-preferred explanation is that we were misled by the stub wall near the Ring. It is just about conceivable that the Stage 4 enclosure circuit continued much further south to join the stones in the southwest corner of BIII (Illus 23.83). If so access to the chambered cairn would have been through the latest enclosure. However this interpretation is not favoured because of the orientation of the hypothetical wall-base between East Row stones 30 and 31(Illus 24.85).

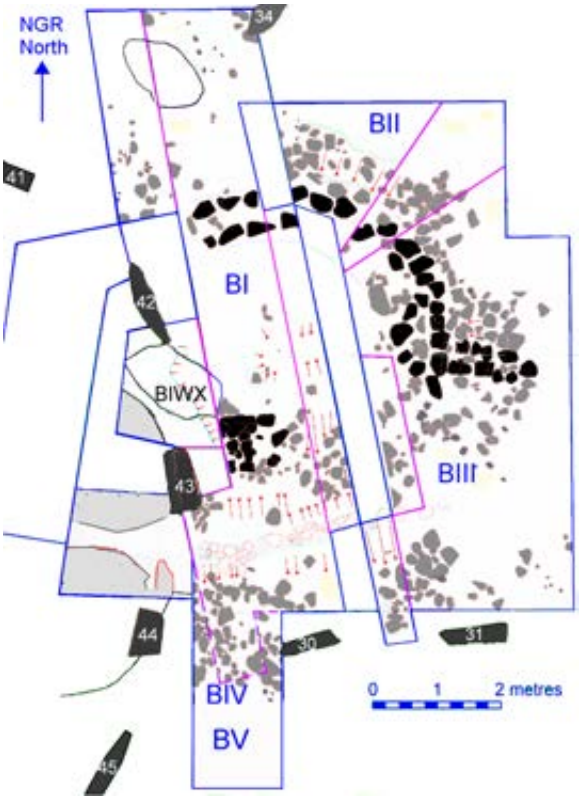
Illus 24.84 combines Somerville's plan, published in 1912, and a plan of the stones found during excavation in 1980. The overlay of the main stones is slightly imperfect. His plan suggests a southern enclosure and if so its line might once have passed between East Row stones 30 and 31, which in this hypothesis would be later, and returned to the Ring stone south of the passage entrance. But there is really nothing in the resistivity survey or excavation plans to support this suggestion and in particular there was no trace of the south-western part of Somerville's suggested wall-base or bank at the south end of the south extension.

Even so, creation of the East Row might have involved the destruction of earlier features; and if there was a southern enclosure it need not have been the same shape as the northern one.

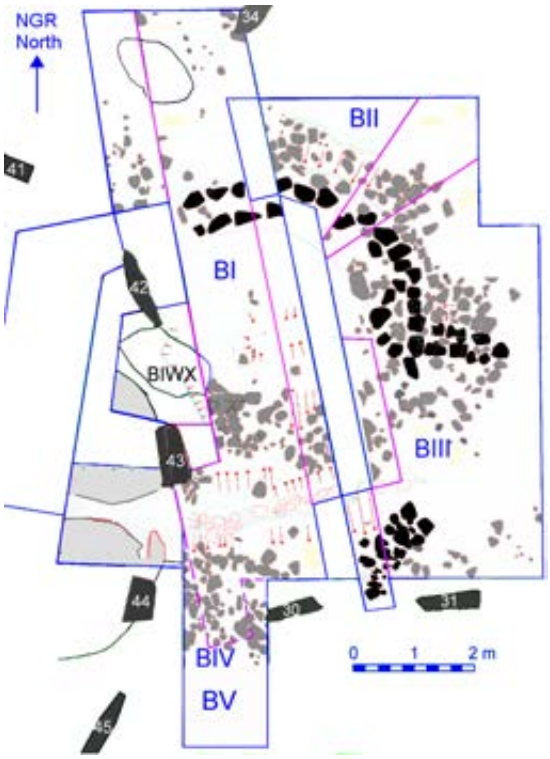
24.18.2 The purpose of the enclosure

Perhaps the enclosure served some part in burial rituals prior to deposition of bones in the chambered cairn, or after the chambered cairn went out of use. Or perhaps it was not used directly in funerary rituals and had a semi-domestic function.

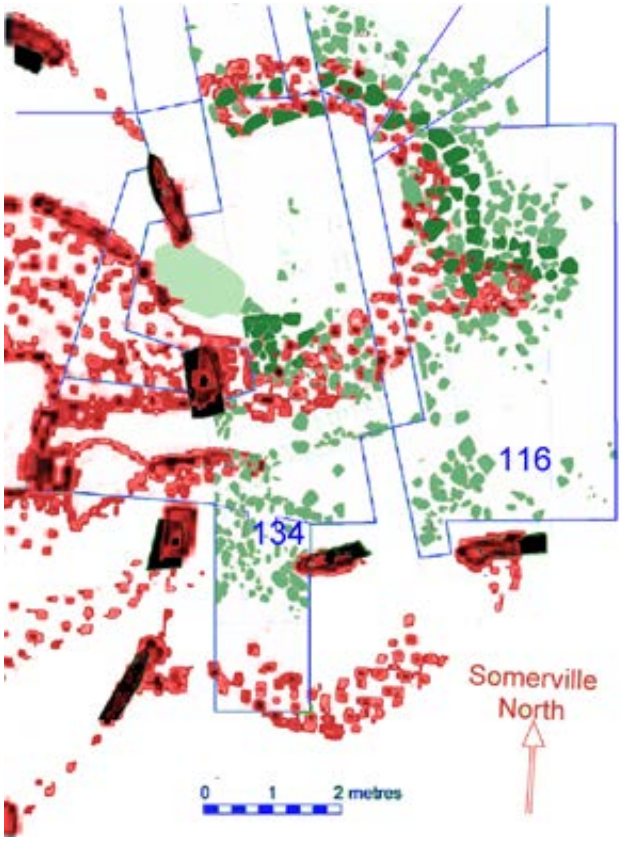
By far the closest morphological parallel for the fourth stage enclosure at Calanais is nearby on the coast at Dalmore, Lewis. It was almost identical in size and had a lined entranceway (Illus 24.85). Like the Calanais enclosure its back was formed by a pre-existing feature. The excavations there produced many Food Vessel sherds (Sheridan pers.



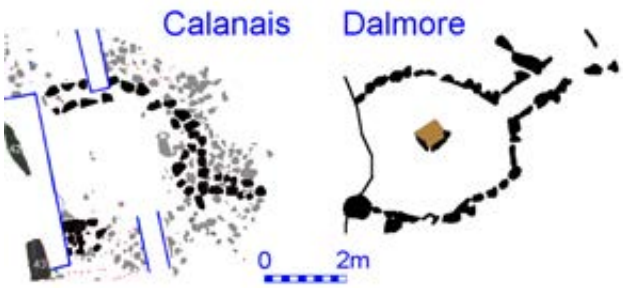
Illus 24.82 The Stage 4 wall-base and stones near the east alignment



Illus 24.83 A non-preferred alternative interpretation



Illus 24.84 Part of Somerville's plan in red superimposed on a plan in green of the upper stones.



Illus 24.85 Calanais Stage 4 and Dalmore the latter after Hunter & Ralston 1999 Fig 5.7

comm.). Loosely ascribed to the Early Bronze Age, its purpose, pending publication of the excavations, is unclear; a specialised and perhaps seasonal use has been suggested because of the paucity of the faunal assemblage and its shaded position (Hunter & Ralston 1999, 85).

A loose analogy can be drawn between the Calanais enclosure and a house at Ardnave, Islay (Ritchie & Welfare 1983 Fig 4). The structure at Ardnave was at least partly subterranean with its wall holding back sand. Part of the early phase was squarish with rounded corners and measured about 6m across, half as big again as the enclosure at Calanais; but in Period 2 the inner area was reduced to a more closely comparable size of 4m by 3.3m. The approximately contemporary structures at Kilellan (near Ardnave) had been so damaged by erosion that their nature is obscure. The closest parallels for the Calanais Food Vessel come from Kilellan and Ardnave where they appear to date to between 2150 and 1750 BC (Chapter 18 The Pottery Assemblage 18.7.11; Ritchie & Welfare 1983 Fig 8; Ritchie 2005, Illus 60-61)).

These analogies suggest that the fourth stage enclosure may date to sometime between c. 2150 and 1750 cal BC, and may have had a 'special domestic' function.

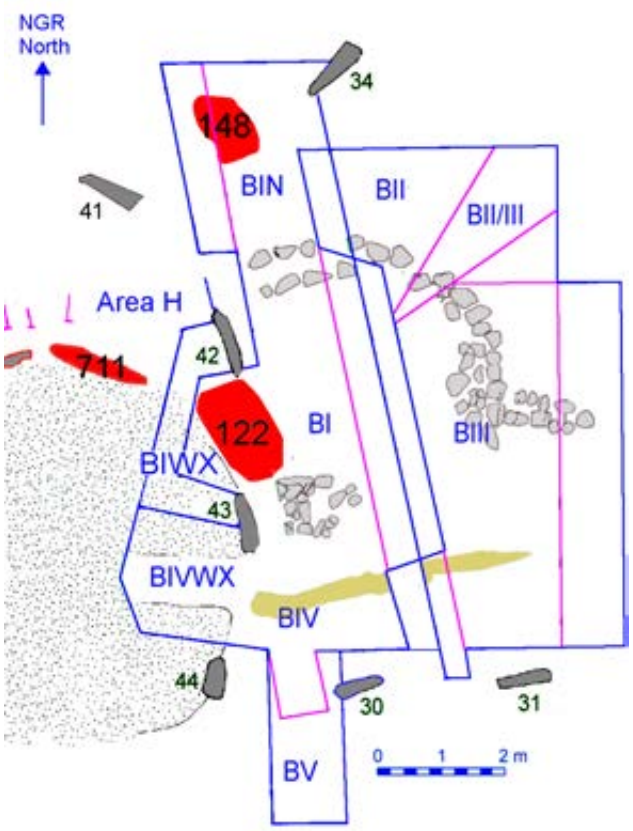
Analysis of other 2nd millennium radiocarbon-dated round and oval domestic and funerary structures in Scotland has not produced any convincing parallels for the Calanais enclosure (Technical note 24.18.2).

It is technically possible that the latest stage enclosure, was much later, perhaps belonging in the very late second or early to mid first millennium BC. Hingley has suggested that the placement of a roundhouse in front of the Quanterness chambered cairn, and in front of that at Howe, both in Orkney (Renfrew 1979; Ballin Smith 1994) was intended to control access to the entrance to the chambered cairn at each of those sites. However if the shape of the enclosure at Calanais has been interpreted correctly all stages of the enclosure lay entirely north of the approach to the passage.

Or it may have been used for excarnation and 'use of bones in significant activities related to the identification of the community' (Hingley 1999, 238-9) or for non-funerary practices because of the potential of human bone for 'symbolising a variety of concerns central to Late Bronze Age communities (Bruck 1995, 250). The paucity of bone fragments could be explained by the acidity of the soil; but it has to be said that there was no evidence to support either suggestion.

24.19 Phase 13: Kerb slab erection and secondary cairn

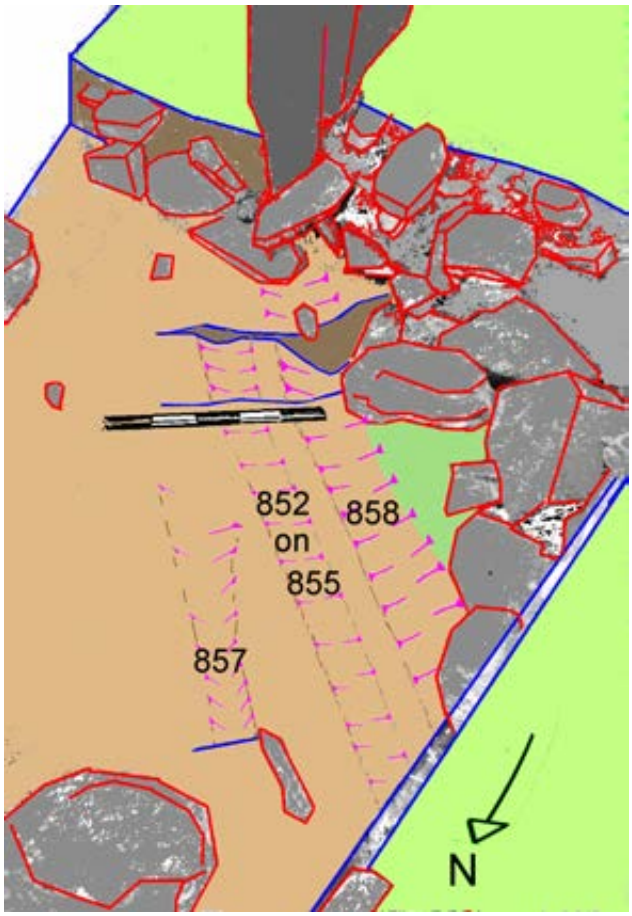
Two massive kerb slabs were erected after a long period of robbing and collapse of the cairn. Stones and soil were then dumped behind them. The kerbstone 122 in Area BIWX was found prone. That in Area H (711) was found leaning slightly outwards.



Illus 24.86 Positions of fallen kerb stone 122, prone stone 148 and kerb stone 711

24.19.1 The kerb slab on Area B

In Sub-area BIWX there was a massive prone slab 122 (Illus 24.86). Once it had been removed excavation beneath it and slumped cairn material revealed several shallow slots (Illus 24.89). The highest, 856, overlay the bounding slot 858 of the green clay platform. Two other well formed slots, 852 and 855, lay some 0.25m east of 856 and traces of another (857) were found still further out. Slot 855 was covered by cairn collapse and the others cut it. Slot 855 was interpreted as having held the base of stone 122 when it served as a massive vertical kerb slab. The other slots probably reflect its re-erection so it seems to have fallen and been set up again at least twice.



Illus 24.87 Sketch view of the slots for the kerb stone and the bounding slot of the green clay platform

There was no dating evidence for the first erection of the kerb stone, except that it was later than the green clay platform under the cairn and underlay what was interpreted as cairn collapse.

24.19.2 A massive prone slab 148 on Area BIN

Prone stone 148 in Area BIN was similar in plan dimensions to the two kerb stones (Illus 24.86). A pit around its south end suggests that an at-

tempt was made to investigate it at some date well before peat covered Calanais. The attempt was abandoned.

24.19.3 The kerb slab 711 on Area H

The massive kerb stone on Area H had been set up in a shallow slot cut into plough soils. It was not vertical; it leant to the north (Chapter 12 Area H Illus 12.28). Deep pockets of ministry grit (706) lay amongst the uppermost secondary cairn stones behind it. It seemed that pressure from the cairn had levered the kerb stone out.

The setting-up of the kerb slab must post-date layer 738, which lay below the uppermost plough soil and above green clay. Layer 738 produced a radiocarbon date between 2040 and 1770 cal BC.

Illus 24.88 The kerb stone on Area H from the north [Film 1981.5.30]

It is tempting to associate erection of the slab with grain found in the topmost layer of the reconstructed cairn immediately behind it and dated to c. 1525 to 1420 cal BC; but that layer was not securely stratified below any prehistoric layers and could have been added at any of several periods before the 20th century. It is also tempting to associate re-building with the sherds of a Food Vessel (ASH 75) found in an upper secondary layer of the cairn; but that layer is interpreted as made of material gathered up from nearby areas so the pot may well have been residual.

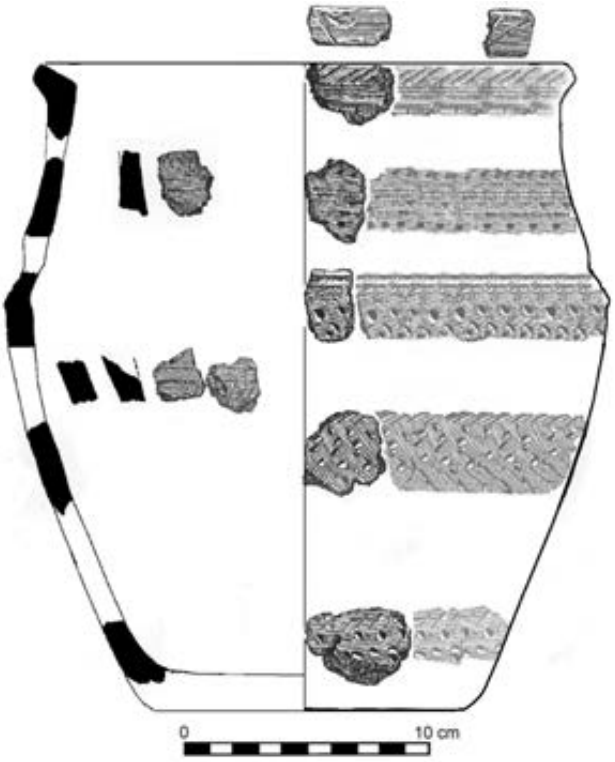
24.19.4 Interpretation and speculation

The most conservative interpretation is simply that the kerb slabs on Areas B and H were part of remodelling of the cairn, probably in the 2nd millennium BC. More speculatively, it may be that the robbing of the cairn in this area was undertaken partly to build the third stage enclosure wall-base. The stones of that enclosure were in turn robbed and provided the fill of the secondary cairn behind the massive kerb slabs.

Manoeuvring the slabs will have required a non-trivial effort. But if the intention was to emulate a kerb cairn the work was very incomplete. Perhaps instead the work was done in conjunction with building of the fourth stage enclosure. The slab on Area BIWX could be seen as forming a back wall. But that does not explain the slab on Area H.

24.19.5 Dating and finds from the secondary cairn

The secondary cairn dates to the 2nd millennium BC and iits discussion here is thus somewhat out of chronological sequence. Details of the finds from the secondary cairn and chamber wall are tabulated in Appendix 12. They are summarised here. Secondary cairn fills had 10 catalogue entries for certain, probable or possible E/MN corky sherds, one catalogue entry for a corky E/MN or Beaker sherd and another for a non-corky one, one for a fine Beaker and 11 for the Food Vessel ASH 75 (Illus 24.89). There were also several pieces of quartz and one piece of flint. No glass or modern ceramics were found, in this way contrasting quite sharply with chamber contexts.



Illus 24.89 Food Vessel ASH 75

Secondary chamber wall contexts had 35 catalogue entries for certain or probable E/MN corky sherds and 2 for probably E/MN non-corky sherds. There were 2 entries for E/MN non-corky or domestic Beaker sherds. Other finds were quartz and glass. The two glass finds came from under the inner face wall stones of layer C of context 769 and suggest that the upper wall face had been re-set or rebuilt after peat was cleared from the area.

It is not possible to assess what proportion of the secondary fills of the cairn and chamber wall came from fill left on the cairn after stone-robbing and what proportion was thrown back onto the cairn when the massive kerb slab was emplaced or after peat was removed from the top of the structure. Certainly some soils and clays were added when or later then when the kerb slab was set up, as were the Food Vessel sherds and charred cereal grains.

24.19.6 The deposits in the chamber

Prehistoric pottery was almost completely absent from chamber fills (the only possible fragment, 81.244, was not seen during pottery cataloguing) and there were abundant Victorian to modern finds (Appendix 12).

All of the original deposits inside the chamber were removed in 1857; or at least they had completely gone by the time of our excavation. As detailed in Chapter 4 (Introduction to the Fieldwork) Sir James Matheson enclosed with his letter about excavation some minute fragments of bones found in the chamber, and a specimen of a black unctuous substance in which these fragments had been contained (Innes 1860, 110-12). They were identified by Professor Anderson of Glasgow as human and probably subjected to the action of fire (Innes 1860, 112). There was no mention of any pottery.

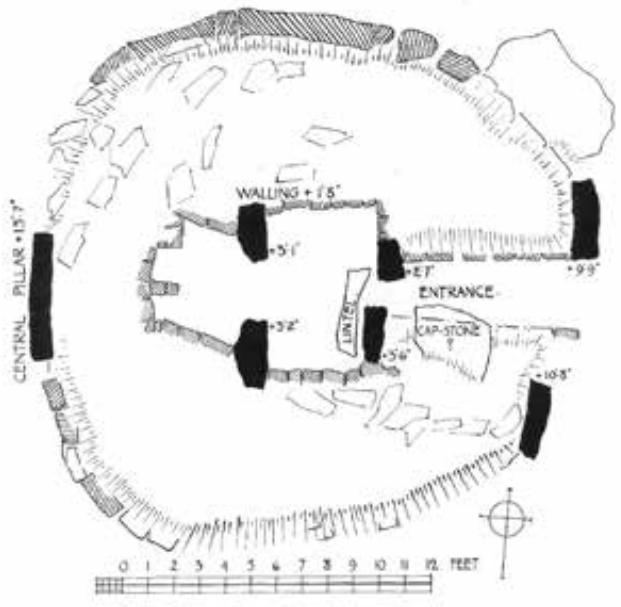
It is conceivable that some of the deposits found outside the passage in Area BV were dumped there by Sir James' workmen, although the stratigraphy disfavoured this possibility. Hingley (1999, 238-9) has suggested that the contents of the chamber may have been cleared out in the 'late Bronze Age' (the late 2nd and early 1st millennia BC), on the basis that there seems to have been a renewed interest in the chambers of chambered cairns during that period. The stratigraphy at Calanais does not preclude that possibility but because Matheson's workmen found some cremated bone in the chamber any earlier clearance cannot have been complete. A charred heather twig from deposit 139 overlying the remains of burials outside the cairn produced a radiocarbon date (AA-24957) between 1940 and 1690 cal BC. Because the charred twig was very fragile it seems likely to have been contemporaneous with its context, so both a 'late Bronze Age' clearance of burial deposits and dumping by Matheson's workmen seem unlikely.

Very small crumbly pieces of cremated bone (human or animal) were found in a variety of contexts at Calanais, most in the slots and related features cutting the green clay platform under the cairn and a few in later contexts including plough soils (Chapter 15 Cremated bone). One or two were in late contexts and might relate to clearance of the chamber deposits in 1857. The pieces were so small and eroded, and the assemblage overall so small, that the significance of the bone fragments even if identifiable as animal or

human seems likely to be deeply ambiguous; the fragments appear to be degraded, and I believe their examination should await advances in sample preparation techniques.

24.19.7 Late modifications to the chamber

Both the drawing prepared by Captain Thomas in 1857 or slightly later updating Palmer's plan (Chapter 3 Illus 3.28) and the sketch included with Innes' 1960 account of the peat-clearance (Chapter 4 Illus 4.8) are stylised but both show a neat square back-end. Sharbeau's sketch (Chapter 3 Illus 3.35 and Chapter 4 Illus 4.7) does seem to suggest a flat back but it is largely obscured by the western orthostats. As discussed in the Introduction to the fieldwork (Chapter 4) Sharbeau's sketch may have been later than some (unrecorded) 'tidying up' of the cairn although Sir James Matheson the proprietor averred that the chambered building was quite undisturbed with even the uppermost tier in its place and that the superincumbent material was ordinary peat (Innes 1860, 110-12).



Illus 24.90 RCAHMS Field drawing of 1923 NMRS RCD/13/12

The RCAHMS field plan of 1923 (Illus 24.90) is the first which can be trusted in its detail. It shows an irregular back end (certainly not rounded). The north wall of the end chamber is at a completely different angle to that implied by Sharbeau's sketch and the drawing prepared by Captain Thomas. They look like the consequence of a casual repair job.

We found no evidence showing that there had been a square back end before peat grew over the site. The small amount of stonework above the original basal courses looked like that planned by RCAHMS and was of very poor quality. Nevertheless some credence has to be given to the early accounts and it must be supposed that the back end of the cairn was rebuilt either in prehistory or immediately after peat was removed from the cairn.

24.20 Phase 14 to 15: Late ploughing and abandonment

Ground working including ploughing with an ard was a frequent activity at Calanais. The setting may have been used for agriculture several times, although some phases of ground working seem rather to have been part of a long-term strategy for dealing with ritual deposits. If the preferred dating for the end of the last phase of use of the enclosure, some date in the period 2000 to 1800 BC, is accepted then subsequent ploughing and use of the ground for pasture may have been the main activities for about a thousand years.

24.20.1 Phase 14: Late farming

The barley and wheat grains found in the topmost secondary layers of the cairn on Area H were dated to between 1525 and 1420 cal BC (See Chapter 23, Radiocarbon). Given the widespread evidence for ploughing in various areas at Calanais 1 it seems likely that this cereal-growing and charring was local. The dates from the grains loosely match that of a peak in cereal pollen in the pollen columns at Calanais Leobag (see Chapter 21, Palaeoenvironment). They also hint at the date of some of the destructive ploughing in and around the Ring after the cairn had become dilapidated – although, of course, this must remain a hypothesis given their context. That date however would not be unreasonable, falling in the period after use of the latest enclosure had ceased.

24.20.2 Phase 15: The growth of peat

Combining a date for basal peat in Area C and an estimate from the pollen there, the true date for the start of peat growth at Calanais probably lay between 920 and 400 cal BC, the earlier limit from the pollen zone 3d to 3e transition date and the later from the direct radiocarbon date GU-1403 (see Chapter 23 Radiocarbon 23.14.2).

24.21 Phase 16: Possible disturbance of the cairn in the first half of the 1st millennium BC

The peat around the chambered cairn may have been about 0.5 to 0.75 cm deep at the time or times between c. 100 and 500 AD when possibly late Iron Age pottery found its way into some apparently pre-peat contexts

This 'Plain Style' pottery came into use around the middle of the 6th century AD and continued in use after Viking pottery appeared in the Hebrides during the 10th century (Chapter 18 The Pottery Assemblage 18.8). But if the cairn itself was better drained than the surrounding ground, peat would have been slower to start accumulating on it. It seems probable that it was still visible then. If building stone was in demand in a mainly peat-covered environment it would have been simple to dig away peat and rob the cairn. That may, for instance, explain the damage to the facade stone on the south side of the passage and the absence of a complementary facade stone on the north side. If there was robbing for building stone in the second half of the 1st millennium BC that may also help to explain why Sir James Matheson's workmen had to trench the south side of the cairn in AD 1857 to find the kerb, although the main robbing of the cairn had probably taken place in the early 2nd millennium BC.

But this explanation is not very satisfactory because the pottery, along with a hodgepodge of distinctive earlier sherds, was found in the fill of the pit 859 for the facade stone. The sherds must have been put in it when the facade stone was erected (or, conceivably, re-erected). If the date for the Plain Style pottery is correct I have no sensible explanation for how it got there.

24.22 Phase 17: Continued Peat growth and post-medieval peat clearance

Judging by the peat-etching on the standing stones at Calanais (Pitt-Rivers 1885) there had

Illus 24.91 Kerr's Excellent Sketch, the engraving which accompanied Callender's 1857 article

been a fairly long period during which the surface of peat stood at about 1.5m above present ground level.

If it had grown at an even rate from say 750 BC to 1850 AD, reaching a depth of 1.5m it will have accumulated at about 5.8 cm a century. But there is no reason to suppose that growth was even. At Calanais Fields the lower 45cm of the 84cm deep peat sampled in Trench 5 (Johnson et al in prep) grew between 390 to 180 cal BC and cal AD 340 to 540, a period of 500 to 900 years; the upper 39 cm grew between cal AD 340 to 540 and cal AD 1640 to 1950, a period of 1090 to 1610 years. So the lower peat there probably grew up to twice as fast as the upper peat.

In round terms the Calanais Fields peat grew 74 cm between 390 to 180 cal BC and 1640 to cal AD 1950. That suggests a somewhat slower rate of growth than at the main Calanais stone setting. The difference in topography may have been responsible.

The CN3 column at Calanais Leobag covered a period ending between 1410 and 1110 cal BC so no useful comparisons can be drawn, except perhaps that the lower 13.5 cm of peat there seems to have grown more slowly than the upper part. The CN1 column at Calanais Leobag grew 30 cm between 1800 to 1200 cal BC and 850 to 200 cal BC. The vagueness of the dates makes peat growth rate estimates very imprecise, so no useful comparison can be drawn (Chapter 21 Palaeoenvironment).

24.23 Phase 18a: 19th century excavations and presentation

The interior of the enclosure was damaged by post-peat pits. It is possible that some of them were caused by the activities of the Danish archaeologist Worsaae in 1846 (see Chapter 3.3 Previous Studies). He dug test pits and noted the presence of iron panning. When we excavated iron panning was common in Area B but not obvious elsewhere at Calanais during our excavations. Worsaae's account suggests that the holes were dug by the bases of standing stones (Chapter 3: Previous Studies Illus 3.19).

Kerr's 'excellent sketch' of the period immediately preceding clearance of the peat in 1857 (Illus 24.91) does not show peat disturbance in this area but if Worsaae had thrown peat back into his sondage it may have healed over during the intervening decade. However it seems most likely that the pits were dug in or after AD 1857 when Sir James Matheson, the proprietor of Calanais (indeed, since AD 1844 of the whole of Lewis), encouraged by the Society of Antiquaries of Scotland, had the last of the peat cleared away (Callender 1857, 383; Innes 1860, 110).

But it is not clear exactly what the workmen, directed by Sir James Matheson's chamberlain Mr. Donald Munro found when they removed the last of the peat from the Ring. The main record comes from a letter which Sir James wrote to the Society of Antiquaries of Scotland (Innes 1860, 110-112). In it he described the chamber "... an erection which proved, as the work proceeded, to be the walls of a chambered building, consisting of three compartments. …" saying that "It is remarkable that the sides of the small chamber are quite undisturbed - not a stone even of the uppermost tier removed from its place …". It sounds, with hindsight, that he was describing the chamber wall in isolation from the cairn and from the passage. It would otherwise be hard to reconcile his claim that it was undisturbed with what we found during excavation. Our excavation showed that the northern side of the cairn was subsequently capped with turf, that the south side of the cairn was subjected to trial trenching before being rebuilt, and that repairs were made to the chamber wall-faces more than once.

Late 19th century photographs of the Ring such as those taken by Valentine's in the St Andrews University Special collection show many loose stones lying around. Our excavations suggest that many of these were collected up into a rough platform which formed part of the base for Lady Matheson's Path. It also seems likely that much of the area was returfed - or maybe covered with a layer of soil and seeded. There may also have been attempts to stabilise the surface stones of the fourth stage enclosure using turfs dug from an area with a high grit component indistinguishable from earlier grit from decomposed stones. Many of these repairs may well have been carried out for Sir James before 1882, but records do not seem to survive.

24.24 Phase 18b: modern conservation and excavation

Less vigorously intrusive conservation measures continued after 1882, when Lady Matheson passed Calanais into State Guardianship, selling it to the State for a nominal sum. Low key conservation, now under the aegis of Historic Scotland, continues to the present day. Over the last century and many routine records of what has been done have disappeared in conscientious attempts to weed out unnecessary paper. The excavations described here are undoubtedly the most destructive activities undertaken at Calanais in the last century and I trust that this record will survive better.

24.25 Conclusions

I am left with the frustrating knowledge that we recorded only a small fraction of what happened at Calanais during past millennia. The patterns we did observe were often ambiguous. One obvious example is provided by the slots and the ground into which they were set under the cairn; why, as they survived, were the features to the north so different from those to the south? The clays were interpreted as part of a platform and the slots as part of light timber structures. How long did they last and how often were their components replaced? The limits are provided only by construction of the Ring and construction of the chambered cairn. If the structures were used for a substantial proportion of that period they would have had to be refurbished many times. But the duration of the enclosure stages and the possibility that each stage represented several minor modifications is equally problematical. And even if we did distinguish all the major revisions to the observed structures, we undoubtedly did not capture the activities of individuals.

On a slightly different tack, we did not use some sampling and analytical techniques which are now commonplace. For instance, reverting to Baillie's (1999) ideas of environmental catastrophes leading to changed ways of life, we could have asked someone to check samples for occurrence of particles of volcanic glass. It is a dry compensation that our excavations left much evidence untouched for the future.

Some 18th and early 19th century writers used the monument to bolster ideas about religion and race. Religious, ceremonial and astronomical themes predominated in the later 19th and 20th century literature, with variations echoing the preconceptions of the periods in which they were expressed. The current fashion seems to be that major monuments encapsulated beliefs woven around the local environment. As with interpretations offered in previous centuries, that probably says as much about prevailing worries than about prehistoric Calanais.

It is tempting to interpret Calanais using ideas about shifts in social structure, to talk about collective works and communal actions, segmentary societies, chiefdoms and states, administration, social ranking and other facets of how people organised themselves (Renfrew and Bahn 2008,200-215). But there is currently too little relevant evidence from the Calanais area for that to be worthwhile. Speculation would be ill-bounded.

Current attempts within British archaeology to refocus attention on regional and local interpretational frameworks have many merits (albeit reflecting curiously similar current political ideas). Nevertheless the building episodes at Calanais did not arise as isolated phenomena but, as with similar centres elsewhere in Scotland, within the context of contemporaneous developments elsewhere (for the general argument see for instances Kinnes 2004, 139, Brophy 2006, 39 and Beek 2011, 25, 43-45). Judging by the structures and artefacts found at Calanais, local communities were well-connected to those in some other parts of Scotland (and possibly to parts of Ireland and England) from some date between 2950 and 2850 BC to perhaps some date between 2000 and 1800 BC. The excavations described here allow the suggestion that the Ring was the focus of one of the several regionally important ceremonial complexes built in Scotland between 3100 and 2600 BC, including Kilmartin Glen, Machrie Moor, Stenness/Brodgar, Broomend of Crichie, Forteviot and Balfarg.

There is at least one alternative interpretation. The Calanais complex as presently understood seems to have been much poorer than other complexes such as Kilmartin, and they are dwarfed by some of the earthworks and timber settings

of lowland Scotland. One could envisage Calanais as merely a staging post for people travelling along the western seaways, a place where religious and other practices could be expressed by a transient population. The presence of a locally made Grooved Ware pot and the complete lack of other Grooved Ware sherds would fit this idea quite as well as other notions.

But the interpretation preferred here is that the Ring and cruciform setting at Calanais was built and used by local people under the influence or direction of travellers along the western seaways, for the only potsherds in levels roughly coeval with the Ring were from Hebridean incised wares. It is worth remembering that the latter were part of an assemblage of Neolithic pottery including types found in Orkney. The fact that they subsequently deposited soil and clay from ancestral settlements inside the Ring is more ambiguous; it implies a sense of local ownership but that might have reflected a wish to take possession of a structure created by others.

The evidence for a belief in a cosmos which could be divided into quarters is fairly strong. The vast preponderance of ritual deposits was in the southeast part of the Ring and to the southeast of its entrance. And although it is possible that the East, South and West Rows were built piecemeal, the preferred idea is that (apart perhaps from the easternmost stone of the East Row) they were built at a single time to make material an ideological quartering of the universe.

The preferred interpretation of the Avenue is that standing stones lined the sides of a pre-existing approach to the central complex. Perhaps the stones were set up by affluent individuals to help announce or cement their status. Thus the 'permanent' feature may well have been the route, while the stones each reflect ephemeral events.

A good case has been made by Ponting and Ponting and Curtis and Curtis that the Calanais complex was (in the terminology used here) part of a ritualised sacred landscape. Ideas about the sacred seem to have led to the placing of many stone settings, influenced by observations of the rising and setting points of the moon. Those beliefs probably did not involve precise astronomical observations in the sense that we use those words in current Western societies, nor perhaps did people rely on them for precise calendars. But it seems certain that they took a more than passing interest in the movements of the moon, that they were aware of the cardinal points as special parts of the sky and, at a more subtle level, they may have discerned the equinoxes as special times of the year.

It looks as if the main setting was not much used after about 1800 BC. It may have served as a familiar landmark but there is no evidence from the place itself for undeniably ritual or ceremonial activities after that time. Perhaps however the focus of activities leaving material traces shifted only slightly; our investigations omitted many parts of the site; excavations by others have shown that there may have been a small artificial platform or burial cairn at the south end of the South Row. Or the foci for activity may have become more widely disseminated while still being influenced by earlier monuments. Excavations at Breasclete, about 1.5km away, have demonstrated the presence of a burial cairn roughly on the extended axis of the main Calanais stone setting.

The current lack of data need not persist long if recent fieldwork takes less time to publish than the excavations reported here. Excavations nearby by Coles, Cowie, Curtis and Curtis, Johnson and Flitcroft, Neighbour, and Ponting and Ponting, have demonstrated that the area round the main setting contained agricultural systems and cairns as well as the long-known stone settings, although no domestic sites demonstrably contemporary with building of the main setting have been discovered. Further, the area, including the sea floor in East Loch Roag, clearly has good archaeological and palaeoenvironmental potential. It has probably not suffered the same amount of marine erosion as the machair plains of the western seaboard and there is an excellent likelihood that sites of all periods survive under the peat and below the sea. Some ways forward are discussed in Appendix 13: Looking to the Future.

25. Notes

In these notes the convention used for labelling sections is different from that of the rest of the report. The headings like '25.1' each cover a chapter in the rest of the report. But the subordinate headings have the same numbers as the section of the main narrative in which their subject is most important. That number is used for all references to the note in earlier and later sections.

25.1 Notes for Chapter 1: Abstract

There are no Notes for Chapter 1

25.2 Notes for Chapter 2: Introduction

There are no Notes for Chapter 2

25.3 Notes for Chapter 3; Previous Studies

There are no Notes for Chapter 3

25.4 Notes for Chapter 4: Introduction to the Fieldwork

Note 4.4: Excavation technique for widespread soils

Where we did attempt to investigate soils 112 and 117 by box sectioning the consequences were often negative. Often the box sections did not resolve relationships unambiguously. In addition, they cut through lower levels making it more difficult to understand the latter once their remains were more fully exposed. With hindsight it might have been better to have resisted the temptation to use box sections. They were particularly unhelpful where 'later' levels of these pervasive soils were the results of diachronic soil processes rather than anthropogenic features.

25.5 Notes for Chapter 5: Resistivity Survey

There are no Notes for Chapter 5

25.6 Notes for Chapter 6: Area A

There are no Notes for Chapter 6

25.7 Notes for Chapter 7: Area B

Note 7.4.8 Labelling of Section F

The labelling of Section F (Section 81/7) may have been misleading. The soils above and below black layer 802 should not both have been labelled 117 even if they were superficially similar. The description of 117 written on the section was 'pinkish, clayey, some roots'. That is quite different from the general description of 117 as ' Red-brown fibrous peaty/rooty layer covering the whole site except the enclosure 120 and ditch fill 138'. That said, when moisture content varied the colours and textures varied too, so the difference in descriptions does not on its own prove a real original difference.

The layer labelled 132 on Section 81/7 'rich brown, clayey, less grits, less roots [than 117]' had a completely different colour and texture from that labelled 132 on Section 11 Part D 'green sandy yellow clay'. The Context Sheet has 132 as 'yellow clay/sand with small grits in which grey ard marks area cut' which is not incompatible with the labelling of Section 11 Part D but is incompatible with that on Section 81/7.

The soil labelled 132 on Section 81/7 might better have been compared to 112 which was 'a red-brown clay firm soil' (Context Sheet 112). Indeed, that would fit the hypothesis that parts of 112 were material ploughed down from the second stage enclosure bank.

Be that as it may, layers 132 on sections 81/7 (brown clay) and 81/11 Part D (green sandy) are sufficiently different to demand separate context labels.

Note 7.6.6 the stone spread 102 in BIN

Although analysis of the medial baulk sections suggests that the absence of Stones 102 in this area was real I have a distinct memory that the

topsoil in this area was removed very fast by an energetic person with a pick and shovel. At the time stones 102 were thought of as tumble. It is therefore possible that some stones were removed with topsoil.

Note 7.6.8 Conflict in context labelling of Finds 164-166

Cat	Find		Ctxt	Description	
784	81.164	BI	810.1	E/MN or Chalco/ EBA	Non-corky or dom Beaker
294	81.165	BI	810.1	E/MN	Heb Inc
567	81.166	BI	810.1	EBA	Food Vessel

Finds numbers 164-6 are marked on plan 46/81 of the interior of the enclosure, dated 12/5/81 (the day before the date of 13/5/81 on the bags for small finds 164 and 165). The context is 836, a khaki strip near the N bank of the enclosure. One sherd is Heb Inc, one is FV and one is E/MN non-corky or Beaker.

The Finds List and (I believe) the bags have BI 810, and independent of other problems either BI or 810 must be wrong. I had 'solved' this problem by renaming the context 810.1 and interpreting it as a variant of 812, just south of the ditch which ran from the mouth of the chambered cairn. But in truth it is impossible to know which of the records was correct.

Note 7.9.2 Layer 132

A layer on Section 81/07 was labelled 132 and described as a rich brown clay. It was stratigraphically similar to 112/130 .

It must not be confused with a different layer, labelled 132 on Section 11/80 Part D during excavation, but relabelled 132.1 during post excavation, which was ard marked green sandy yellow clay merging with a mottled green-brown sand in 1980 - it seems highly likely that the numbering of 132 on Section 11/80 Part D was an error for 123.

Note 7.13.3 Packers at the base of Stone 30

Plan 21 (DC38055) had an annotation that Stone 30 was shown inaccurately, and the packers will have been recorded relative to it. The plan appears to show the southernmost socket lay just west of other packing stones corresponding to the southernmost packer on Plan 19, but the depiction was ambiguous.

Note 7.13.6 Interpretations of the stratigraphy round East Row stone 31

Interpretation 1

The marginally preferred interpretation of the record is that a pit and ramp were dug for erection of the orthostat through soils derived from ploughing down of the earliest enclosure and the turf line 157 formed over their fills.

1. cultivation beds;

2. level ground-working;

3. ploughing down of the early earthen-banked enclosure and soil spreading, forming soil 112;

4. digging of a pit and ramp;

5. erection of Stone 31 and backfilling (leaving packing stones proud?);

6. formation of a turf line 157 running up to the packing stones;

7. collapse and spreading of the turf element of the third stage enclosure;

8. ground-working forming 141 and perhaps the lower part of 117;

9. placing of a local wall base (stones 116) possibly with a turf superstructure;

10. collapse of the turf element of the wall 116; the turf subsequently formed part of soil 117 and modern topsoil.

Interpretation 2
The levelness of turf line 157 could suggest that it had been cut through by the pit for Stone 31. Had it formed after the pit was dug one might have expected it to lap up over clay around the packing stones. Thus a possible sequence in this area is as follows.

1. cultivation beds;

2. level ploughing;

3. digging of a pit unrelated to Stone 31;

4. ploughing down of the early earthen-banked enclosure;

5. formation of a turf line 157;

6. erection of the stone with packers;

(Then as 7 to 10 above.)

In this interpretation erection of East Row stone 31 took place after a turf line had developed over ploughing associated with flattening of the early enclosure. Elsewhere putatively contemporaneous turf lines seem to have survived only in depressions where they had been covered by material from collapsed turf walls or another plough soil. In the case of turf line 157 which was directly overlain by soils 117 and 160 it may be supposed that it was covered by soil-like material spread from collapse of a turf structure before any further ground-working took place.

Interpretation 3
However, it is impossible to rule out a variant sequence, with digging of the stone-pit and erection of the stone after formation of layer 160.1, with packers pressed tightly into the side of the stone-pit.

1. cultivation beds;

2. level ploughing;

3. digging of a pit unrelated to Stone 31;

4. ploughing down of the early earthen-banked enclosure;

5. formation of a turf line;

6. dumping of weeds and clearance debris forming layer 160.1 (possibly actually the lower part of soil 141);

7. spreading of plough soil from further north to cover 160.1;

8. erection of the stone with packers;

(Then as 9-10 above.)

If this interpretation is preferred, and it is supposed that the pit was originally dug through soil covering the turf line, it provides no closing date for erection of the stone, for the only direct evidence for its history is that the area was subsequently ploughed and organic material, stones and charcoal were laid or dumped on it.

Interpretation 4
There is, alas, yet another possibility. If soils around and above the pit had been completely removed some time after the stone was erected, and the turf line then formed on the surface thus exposed, that would explain the relationship of the turf line to the packers on Section 57-58. One obviously possible reason why a fairly large area of surface layers round the orthostat should have been removed is turf-cutting for building structures. There is still a fair likelihood that the layer marked 112 on Section A was formed from ploughing down of the first enclosure, but if that is rejected as unproven it would allow erection of Stone 31 before the building of the first enclosure.

As a working interpretation requiring testing by future excavation I prefer the first interpretation which sees Stone 31 being erected between building of the first and second enclosures, and my second preference is for the looser interpretation which still sees it being erected some time after ploughing-down of the first enclosure bank. But I have to stress that the other two possibilities are not incredible, and the fourth interpretation allows

one of the enclosures (perhaps the earliest) to be later than erection of the orthostat.

In all of these interpretations the isolated (when excavated) stretch of wall-base 116 could well be of much the same date as the second or third phase of the enclosure although it seems unlikely that it actually formed part of either of them (see Chapter 7.4 and Chapter 24: Discussion).

Note 7.14.1 Layer 160

The basic sequence near the west section of Area BV (incorporating the southern part of BIV) was recorded in the Day Book as in the illustration above. But the context number 160 had been used in 1980 to refer to dark layers in BIII (renumbered 160.1 in the final form of the context list), and in BIV in 1980 it was used for a dark layer intercalated with 139 (renumbered 160.2 in the final form of the context list).

Table 25.1 Subdivisions of label 160

Label	Subarea	Description
160	BIV, BV	Retained for 1981 layer 160 in the stratigraphic position depicted in Illus 25.1
160.1	BIII	Dark layer dug in 1980 notably near East Row Stone 31
160.2	BIV	A dark layer dug in 1980 intercalated with 139 (in its original sense of a group of layers) near the top of the sequence in the west baulk.
160.3	BVWX	The layer immediately outside the passage south of the ditch and in the passage, at the same level as 160 and sometimes still called 160
160.4	BVSX	A dark layer in the southern part of trench BV

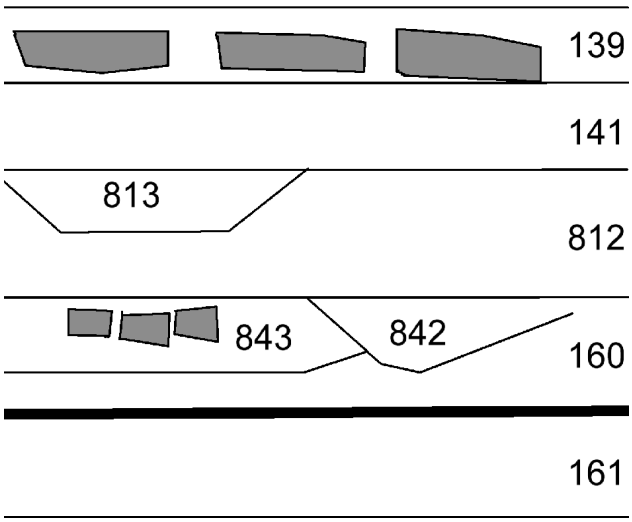
Note 7.15.4 Excavation of the passage features

The excavation of the features under the north wall of the passage took place mainly in extremely rainy weather; at any one time most of the passage was covered by polythene sheeting. Most plans were therefore overlays covering only parts of the passage. Later plans were orientated at 7 degrees to earlier ones. In this report the plans have been overlain on a base plan of the passage wall facing stones to make for easier understanding. There were in some cases errors in relative placement of up to 0.15 m between features from different plans.

Slot 883 does not seem to have been formally planned as a single slot but a sketch plan was made on Context Sheet 884 and in the Day Book (page 77). The clearest overall depictions are provided by Film 1981.18.18 and Film 1981.19.11.

Note 7.15.6 West sections of BIWX

Working from digital files it was not feasible to combine the overlays completely accurately with the main section, and in any event the digital overlays were restricted enough in their detail that some license has had to be taken. However I am confident that the results are not positively misleading.



Illus 25.1 Interpretative section of Area BV [Day Book 31]

Note 7.15.7: Pollen in slot 883

Three pollen samples were taken from the slot (2009, 2011 and 2020). The samples reflect vegetation near Calanais Leobag straight after the clearance of birch wood in the middle of CaN-3a (see Chapter 21: Palaeoenvironment). Pinus pollen was absent or barely present. Non-tree pollen values were dominated by grasses. Heather pollen varied between 7% and 15%. Sample 2020 should possibly be placed somewhat later in time than the others, during zone CaN-3aii which started sometime between 2770 and 2360 cal BC and ended sometime between 2560 and 2200 cal BC.

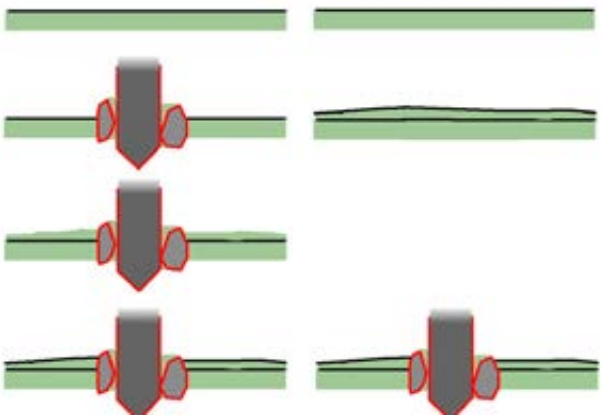
Variations between the pollen samples could suggest a heterogeneous origin, which fits in well with the interpretation that the slot contained much old material. The samples may have contained pollen of the period when the slot was filled (after the Ring stones were erected but before the cairn was built) and also remnants of pollen from a pre-Ring period of activity in the late 4th millennium cal BC suggested by the radiocarbon dates.

However, the preferred interpretation is that pollen grains contemporary with the movement of the clay greatly outnumbered residual pollen grains from the period indicated by the radiocarbon-dated charcoal, and fairly reflects the period of slot-filling.

Note 7.17.3

Much of the description of the Ring in Area B is about turf lines near to it. Turf lines have distinctly different characteristics from most anthropogenic layers because they form over a period of time and disturbances to them can heal over. If a pit is dug through a turf line and backfilled new turf will grow over the fill. It may soon become visually and tactilely indistinguishable from the older turf around it. Then the pit may seem to be completely earlier than the turf line, where in fact it dated to some date within the overall period during which turf grew. This can be particularly confusing if for some reason turf does re-form over one pit before it is covered by a subsequent layer, whereas it does not form over an earlier pit because it was covered by for instance clay earlier and the turf line on the resulting rise in ground level is subsequently truncated by ground-working.

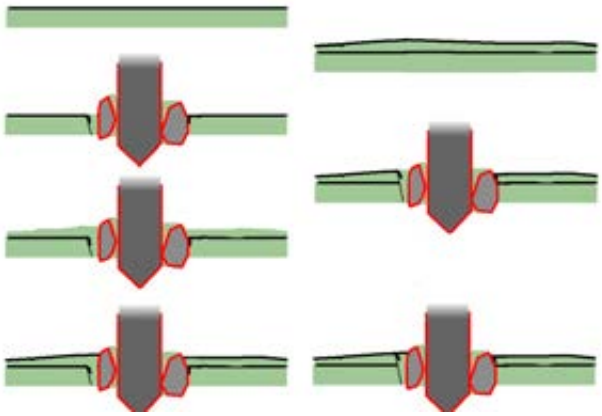
The stone-pits at Calanais presented their own versions of the problems associated with interpreting turf lines. I have built several wooden structures (without using concrete) over the last few years. When erecting posts, I seek to jam stones tightly between the pit edge and the post. Then I fill the gaps with whatever I had dug up to create the pit and stamp it well down. The stones often peek above the final surface. The larger the packers the more tendency there is for the topmost ones to stick up. Patchy turf then forms round and over the packers. From this direct experience, and to a lesser extent from other observations, I believe that if a pit is dug through a thin clay turf, and the pit is over-filled with stones tightly packed against the turf, and then clay is put round the packers and a new turf line grows right up to them, one could not tell through normal archaeological techniques whether the pit had been cut through the lower or the upper surface (Illus 25.2).



Illus 25.2 Interpreting turf lines: two possibilities

In Illus 25.2 I have not added the effects of subsequent building operations, iron panning and other soil developments; but they were present at Calanais and made discrimination even more difficult.

On the other hand (ignoring the many other ways in which the top of a cut can be very obvious), it can be easy to see the cut if the pit-digging leads to bits of ragged turfs flopping over the pit edge (Illus 25.3, 25.4). Turf curled over the



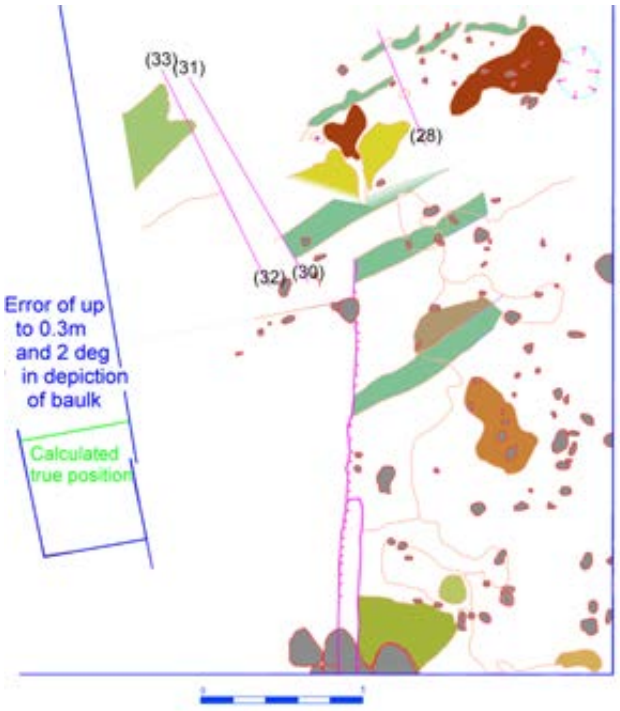
Illus 25.3 nterpreting turf lines: two possibilities

edge of the Stone 42 pit and defined the turf line through which it had been dug; but alas, in this area, the two turf lines which existed near Stone 43 had merged by the time they reached Stone 42. The only useful thing the curled-over turf line edge showed us was that the pit had not been cut through the clay covering the turf line.

Note 7.18.7 Variations between plans of BIII and the southern part of BI

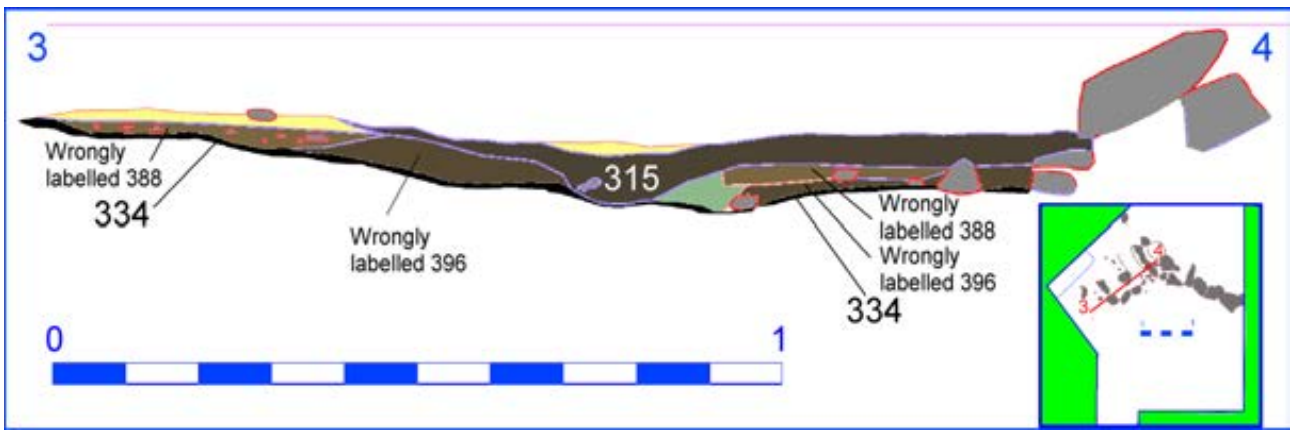
Minor variations in the orientation of depictions of baulks and temporary section lines made interpretation of some features difficult. In particular the depiction of small vertical stones 118 in slot 185 on Plan 12/80 did not line up neatly with the depiction of the palisade slot 876 further west on Plan 43/81. The relevant plans are:

— Plan 08/80[DC38027] used as a base plan; the undated last main plan of 1980
— Plan 12B/80 [DC 38032] undated May 1980
— Plan 32/81 [DC38066] of 01/06/81
— Plan 43/81 [DC38077] of 26/5/81



Illus 25.5 Plan 32, the southern part of the last full 1981 plan [DC38066 part]

The absolute position of the plan 32/81 is inadequately recorded and its match with the other plans may be wrong by up to 20 cm. Also Plan 48/81 of 16 May 1981, showing the edges of cut-away turf lines as first discovered (in brown near Ring stone 43), was probably not in perfect register with the plan extract 31 of 28 May 1981, showing palisade elements.



Illus 25.4 Turf lipping over the side of Area H

There are errors in DC38066, the last full plan of Area BIII, because it does not match DC38027, the last full plan of B in 1980, or DC38065 or DC38077 which match DC38027 quite well.

The error in the central baulk south end position on DC38066 is of the order of 0.75 m (Illus 25.5); the error in the meeting point between the central baulk and the boundary with BII/III (south) is 0.2m, and when the east edge of the plans are lined up the central baulk orientation differs by 2 degrees. Also, the north end of the east extension of BIII is probably drawn 0.7 m too far north.

It is not clear whether the error is in the original plan (which in many ways is of a higher quality than many others, in that it describes fills of features in a confidence-inspiring way) or in digitising, but the former, alas, seems more likely.

However, once corrections to the south end of the medial baulk have been made, and ignoring the other two errors, the match between 38066 and other plans is not unusually poor.

25.8 Notes for Chapter 8: Area C

There are no Notes for Chapter 8

25.9 Notes for Chapter 9: Area D

Note 9.2.17 Layer 356

The layer under the chamber wall was wrongly labelled 360 on the digitised (and perhaps also the original?) versions of plans 44A and 44B, although correctly labelled on Section 43.

Note 9.3.4 Plan 9a of 1980 and Plan 31 of 1981

Plan 31 is the first 1981 plan of DII. Because it bears the annotation 'overlay of Plan 9 with additions' it must be a revised version of the Plan 9a referred to in the 1980 Day Book, the last plan of DII that year. 'Plan 9a' does not seem to exist independently

Note 9.3.12a Layer 320

Layer 320 appeared on several plans. It was found below plough soil 315 and above a black greasy layer identified over most of the western part of area DI as the uppermost prevalent turf line 334. Over most of the southern half of DI it overlay the equivalent of turf line 334, turf line 365. More generally clay 320 was separated from the underlying turf line by patches of brown and black material. On Plan 34 of 9 May 1981 it was shown reaching as far as the south baulk section. Its stratigraphic equivalent was depicted but left unlabelled on the southern baulk section. It was labelled 950 on the section during post-excavation.

In the easternmost part of the trench it was not present at all, judging by the main baulk section 62 where its stratigraphic position was occupied by reddish brown gritty charcoal-smeared 369 or the underlying 377 to the north and black-brown humic clay 389 to the south. The turf line shown under 369 in the north may therefore be stratigraphically equivalent to the turf line above 950 described below.

A layer labelled 377 was at the same absolute level on the eastern part of the southern baulk near corner of the trench.

During pollen analysis 950 was described as a humus-rich grit. It was about 5cm thick. It was at the same stratigraphic level as ginger-brown clay 320 on the area south of the cairn.

A turf line (or at least a humus-rich band of material) lay between the plough soil and the underlying layer 950, although it was not noticed during excavation.

Clay 320 was visible at the level of the surviving top of the original kerb and underlay the Victorian kerb line. For an understanding of its stratigraphic relationship to the prehistoric kerb, a useful comparison is between Photograph 1981.5.5 of 9 May, in which the Victorian kerb had been largely removed and the top of the prehistoric kerb was just starting to appear, and Photograph 1981.1.18 of 14 May in which the prehistoric kerb was better revealed. Despite interference from Victorian activities to find the line of the prehistoric kerb, represented on the photographs by darker material just outside the kerb line, and despite the complication of the remains of the lower part of the erosion hollow 376 described below, it looked as if clay 320 tailed off towards the prehistoric kerb.

Note 9.3.12b layer 332

The label "332" was added to the plan during post-excavation. On the original plan it was not numbered separately, nor was its extent precisely defined, but it was described as reddish brown and gritty, in contrast both to plough soil 315 and the more ginger brown clay 320. In the Day Book it was described as wetter and heavily smeared with charcoal. It coincided with an area subsequently labelled '315 base' on Plan 34 of 9 May 1881. Although further cleaning led to the view that it was the same as the top of 320, and its superficial differences were ascribed to the protection provided by Lady Matheson's Path, its original interpretation as basal 315 seems just as likely to be correct, in the sense that it was the top of 369 impinged upon by the ploughing which modified soil 315. Yet its identification with 320 suggests that the gingery colour of 320 and the reddish brown of 332 reflect soil processes including the washing down of iron oxide.

It is also worth noting that clay 332 was close to the second Victorian intrusion in the cairn described in Part 9-2 and soil 369 just below 332 overlay the surviving remnants of the eastern part of the prehistoric kerb perhaps as a result of Victorian activity. It is possible that the Victorian activities modified clay 320 to form 332 in this area.

Note 9.3.14: Section 50 recording problems

There are problems with the original labelling of Section 50 (Illus 25.4). Elsewhere on Area DI soil 396 was described as a composite layer consisting of black greasy clay above brown greasy clay with silt. But 396 on Section 50 did not include black greasy clay. Worse, whereas the main layer of 396 lay under turf line 365, which is the exact equivalent of 334, the layer labelled 396 overlay turf line 334 on Section 50.

The section also shows two lenses of brown clay wrongly labelled 388, immediately above the turf line and 396. The label '388' was mainly used for a similar looking clay forming a bank below the turf lines 334 and 365 (Plan 60).

For these reasons, the original labelling of layers 396 and 388 on Section 50 cannot be treated as following the context-labelling system normally used at Calanais. However, if it is accepted that it provides a shorthand description of the layers complementing that written on the section, it implies that the hollow was partly filled with material derived from layers under the turf lines.

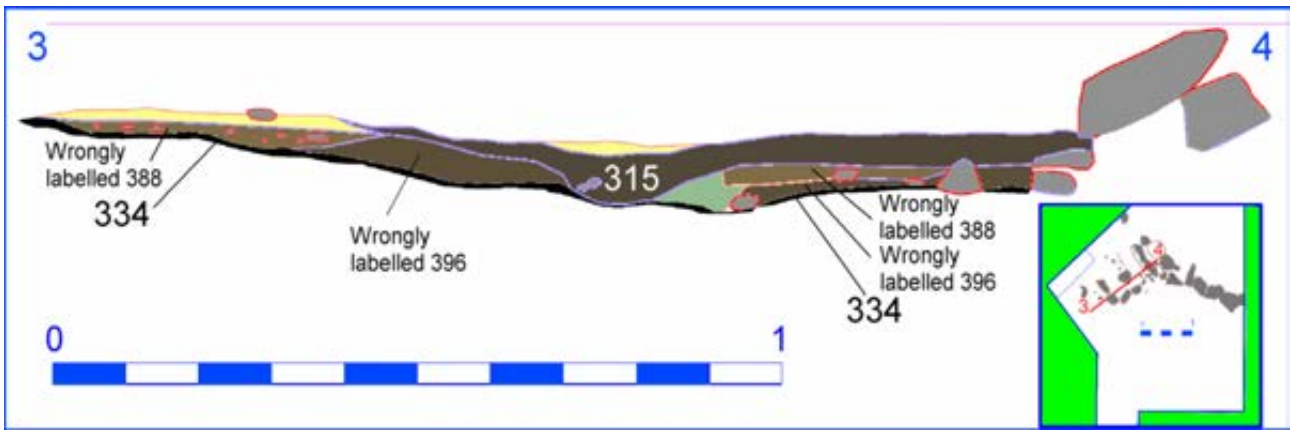
Note 9.4.2 The plan on Illus 9.91

The plan on Illus 9.91 is composite. The south-eastern kerb and cairn was drawn on 19 May and the northern part of the kerb, monolith and chamber wall on 24 May.

Note 9.4.3a: Chamber plans on Illus 9.97

Plan 87 was numbered out of date sequence.

On each plan in Illus 9.97 the SW chamber orthostat shape and position have been copied in red from Plan 64. The central monolith shape has been



Illus 25.6 Section 50 [NMRS DC38182]

copied from Plan 87 and is shown in a graded grey on top of the shape shown on each plan. The grey lines meet at 6m grid north of Reference Point X. Errors were in general up to 50 mm; a few larger differences probably reflect variation in choices of what to draw. In the case of the SW orthostat the height at which it was drawn affected its planned position and cross-section. There were some errors in relative orientation, probably less than 2 degrees.

Earlier plans also had offsets from one another. For instance Plans 58 and 69 fitted together with discrepancies of about 0.1m.

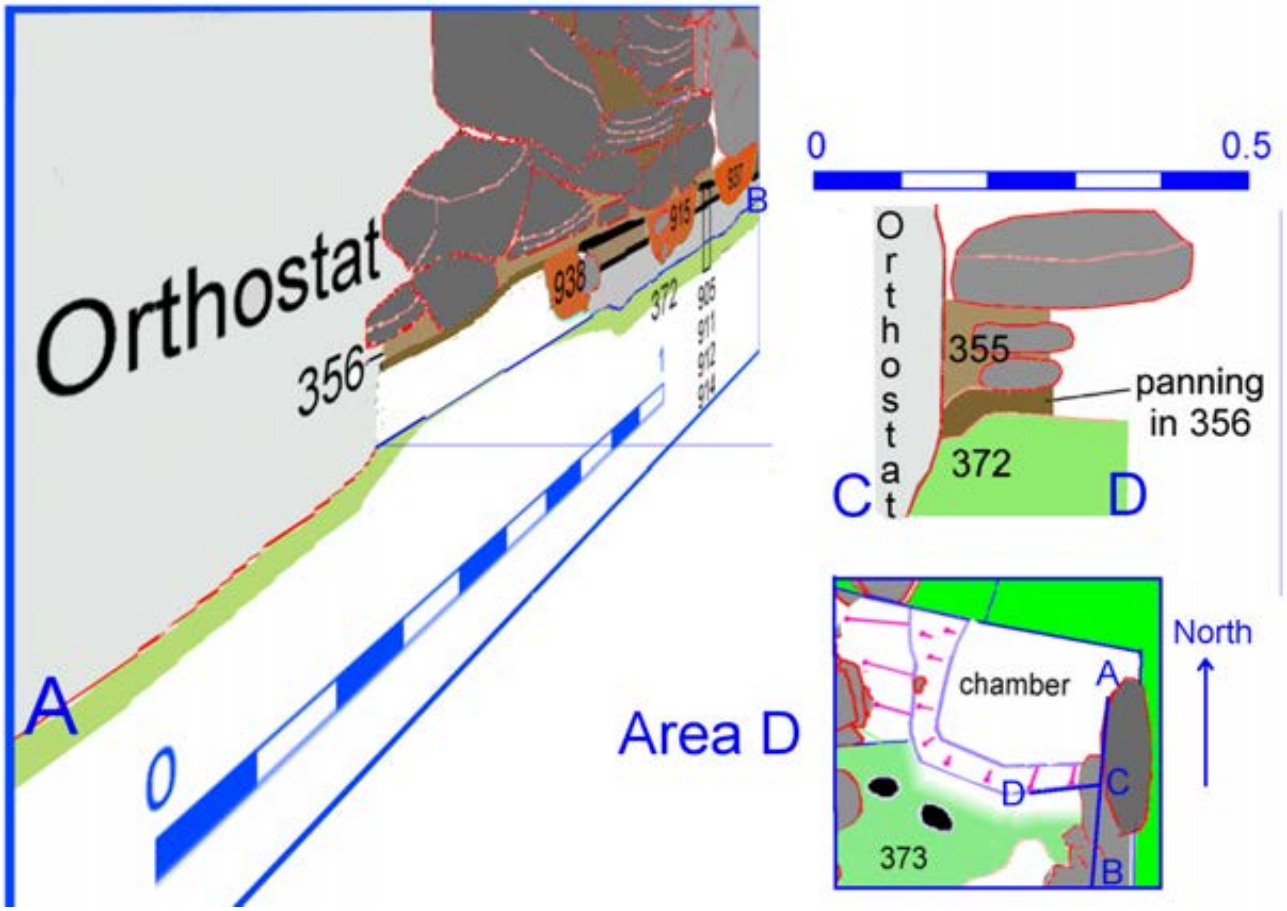
Note 9.4.3b: Relationship of cairn to wall

During excavation we were initially uncertain whether the two stones shown on Plans 71 and 72 of 26 May in black were part of the cairn body or the wall. If they were part of the wall at this level then the fact that they were intercalated with cairn stones would have demonstrated that the wall and cairn were built up at the same time as each other.

Between them and under them was orange-brown greasy clay. It was similar to the clay 356 found under the inner wall-face. The stones were below clay 318-4, which may have been undisturbed when the cairn became dilapidated around or before the ploughing with abundant Beaker sherds (Day Book 169). It seems clear that they were in fact part of the cairn rather than the wall and therefore the chamber wall was probably built to at least this height before the cairn was filled in.

Note 9.4.5: North chamber baulk sections

The north baulk of the DI chamber trench was drawn twice towards the end of the 1981 season of excavation, in Sections 97 and 104. Section 97 is ambiguous in that it does not show the point where the lower turf line (probably equivalent to 912 elsewhere) was cut by the chamber. Section 104 appears to be more a diagram of what appeared at the surface of the sloping back of the



Illus 25.7 Ambiguities in the recording of layers 355 and 356

chamber than a true section. However it confirms that the patchy lower turf line was directly cut by the chamber, a point which Section 97 did not convey. A diagram in the Day Book confirms the existence of two turf lines cut by the chamber.

Section 104 adds that at the back of the chamber the upper turf line was contemporary with the paving which covered the socket, a point which was not however supported by the diagram in the Day Book where another unlabelled layer intervened.

Note 9.4.7: Ambiguities in recording of 355 and 356

The sequence by the chamber orthostat was originally described early in May as a 0.1 m thick layer of dark brown friable clay 356 between the bottom of the chamber wall and grey clay 355 forming a chamber fill.

On Section 62 a layer labelled 356 overlay an unlabelled layer, above green clay labelled 372, a label generally used for undisturbed natural clay (Illus 25.7).

The labelling contrasts with that from the short section running east-west (Illus 25.7) where the highest level was 0.1 m thick brown friable clay labelled 355. Under this on the short section was a 30 mm thick layer labelled 356, dirty green clay with iron panning overlying green clay labelled 372.

The label 355 was originally used early in May for a layer of yellow-green-grey sandy clay with lenses of black and green-brown humic clay and organic material near the central monolith. I suspect that there was no connection between the layers called 355 and 356 at the west end of the chamber and those by the SW orthostat.

It is difficult to escape the impression that the labelling of section A-B on Illus 25.7 contradicts that on section C-D.

Note 9.5.1a Planning ambiguities

It is not possible to say from the plans alone whether features under the cairn lined up neatly with one another vertically or horizontally at different levels. The weather towards the end of excavation was appalling. In those circumstances our surveying method, using Fibron tapes to position planning grids at a considerable depth below our survey grid pegs, did not allow us to produce plans with good long-distance accuracy. Local accuracy remained good but, for instance, there were east-west differences of up to 0.2 m over a two to three metre distance (6 to 10%) between Plans 94 and 101. In the middle of the area there were discrepancies of about 0.1 m (3 to 5%).

The implications of this are not trivial. But I do not want to exaggerate the difficulties. Its main consequence was that one should not work the information from the plans too hard: no stratigraphic significance can be given to what seem from the plans to be minor overlaps.

A more serious problem was that the multiplicity of similar and interleaving patchy layers led to uncertainties about which labels should be attached to which layers on drawings made at different times. In particular I think the main east baulk section was wrong where it assigned the label 912 to a turf line running over the top of slot 913. This turf line would better have been labelled 905 because the preferred interpretation is that the latter had developed in and filled gaps in the earlier turf line 912.

This final account adopts nearly all of the on-site interpretations. This includes the conviction of the site supervisor that slots 913 and 915 were (as excavated in plan) at the same stratigraphic position as each other. My one disagreement is about the relationship of Slot 915 to the pit dug to erect the central monolith; the slot was very shallow and the supervisors view was that it was cut by the Monolith pit but my view was that it had originally risen slightly over clay spread from the mound over the monolith pit and had been truncated. That I discuss in some detail in Chapter 9: Area D and in Technical note 9.5.4 below. Most of the interpretations proffered in the main text can be tested if future excavation includes the area under Lady Matheson's Path between Areas D and B.

Note 9.5.1b: Green clay ambiguities

The green clay of the mound surrounding the monolith was not always distinguishable from

green clay under the cairn. In the main narrative I have not described the many ways in which I have explored alternatives to the preferred interpretation described there.

Illus 9.112 to 9.114 are based on Plan 101 of 30 May 1981 with the addition of some information from Plan 88 of 27 May 1981. Plan 88 showed the extent of grey-green silty clay 906 and turf line 905 in isolation from other features. Clay 905 occupied much the same area as the underlying slot 913. It was described as black greasy clay (a description often applied to a turf line) and 906 was described on plan as dirty greasy clay and in the Day Book (Page 203) as green silty clay. On other plans 906 was described as grey. Clearly it was heterogeneous; the differences cannot be ascribed simply to changes in weather conditions. My interpretation is that it reflects disturbance and weathering of green clay.

Below the brown clays at the base of the cairn on Area D patchy green clay 398 was recorded as overlying turf line 905. It does not seem to have been planned although a 1982 annotation on Plan 88 (Illus 9.112) also records that turf line 905 appeared after 398 was cleared away. The green clay labelled 373 may simply have been spread from the mound round the base of the central monolith (Illus 9.115 Day Book 270 sketch plan). In the west it merged with the clay of the mound and in the northeast it was not recorded as present.

Its eastern part was probably equivalent to the green clays of the platform under the base of the cairn on Areas BIWX, BINX and H. That means that the higher green clay 398 must have been spread above 905 by trampling. Certainly it did not form a coherent widespread layer.

Slot 915 may have been visible in grey-green to dirty clay 906; the label was marked on Plan 101 in roughly the right position (Illus 9.115) but its outline was not drawn. The preferred explanation is that the slot top was obscured by clay trampled into it when people were working in this area at the start of cairn building.

Note 9.5.4: Slot 915

At its western end slot 915 appeared to run up to paving stones associated with the central monolith mound on Plan 94 (Illus 9.117). But the day book and context sheet record an interpretation that slot 915 was cut by the monolith ramp or socket. My observations and discussions on site convinced me that it petered out at this level and appeared to have stopped because it had originally risen over the paving round the base of the monolith, in the same way that the basal layers of the cairn wall rose up over the mound. It was thus actually later than the cut for the monolith socket. The fine brown clay 939 in the mound shown in yellow on Illus 9.117 and 9.118 may reflect its former presence.

Note 9.5.5: Slot 920 and related soils

Sections 95a and b, about 0.2 m apart, had apparently different evidence for the relationship of Slot 920 to earlier layers (Illus 9.111).

On Section 95a near the middle of the slot its flat bottom sloped and its southern side cut through grey mineral soil (presumably 911) and an underlying mineral soil (presumably 914). A bifurcating turf line about 10cm to its south lay approximately at the junction between the mineral soils. The north side of the slot, on Section 95a, cut a patch or layer of clay, then two turf lines (presumably 905 and 912) separated from each other by about 20 mm, and then the underlying clay soil 914.

On Section 95b the south side of the slot was partly overlain by a 0.2 m long patch of what was thought during recording to be turf line 912 and the overlying subsoil 911 of turf line 905 on which the cairn was built. The north side of the slot cut only the lower mineral soil 914, here over 0.1 m deep.

There are three possible explanations for the patch of thin black material partly overlying the south side of the slot in Section 95b. It may have been an upturned turf; or it may possibly have been a remnant of charcoal-rich clay 390 or of a turf line in the cast of a basal cairn stone.

That however leaves the problem of explaining why the northern side of the slot on Section 95a cut a layer of clay above two turf lines and their subsoils with a total thickness of 60 mm while on Section 95b the basal soil 914 survived to a height

of at least 100 mm. The simplest explanation is that the soil 914 covered by the lower turf line rose quite sharply by 80 mm over a distance of 200 mm. Similar abrupt changes in level were recorded on Section 62. Local compression by basal cairn stones may have caused this.

On the other hand soils and turfs of the underlying cultivation beds may have complicated the stratigraphy in this area. The slot was probably on the south edge of Rig 4, or almost in its gully. The turf lines recorded on sections 95a and 95b may have had nothing to do with those recorded on the main east baulk section 62.

Note 9.5.7: Slot 913

The slots 913 and 915 on Area D seemed to be of a different date from one another because on the main east baulk section slot 915 cut a turf line labelled 912 which was shown overlying slot 913. Yet on plan 88 (Illus 9.112) that turf line was shown in the area of Slot 913 and labelled 905. It seems almost certain that turf lines 912 and 905 had merged at this point, the earlier turf line having healed over.

The upper part of the slot, although clear in section, was not well-defined in plan. When first noted it appeared to be fairly straight and of even width. At a slightly lower level, planned four days later, it appeared to be crooked and to kink sharply northward towards its east end. As described in the main text the completely different line of the lower expression of the slot in its eastern half may be due to confusion with a cultivation gully.

At its western end the lower version of the slot extended beyond the upper one. Although there were planning discrepancies at this level they do not seem to have been sufficient to explain the difference, the cause of which remains unresolved although trampling during cairn construction may again have been to blame, spreading out the upper layers of the slot.

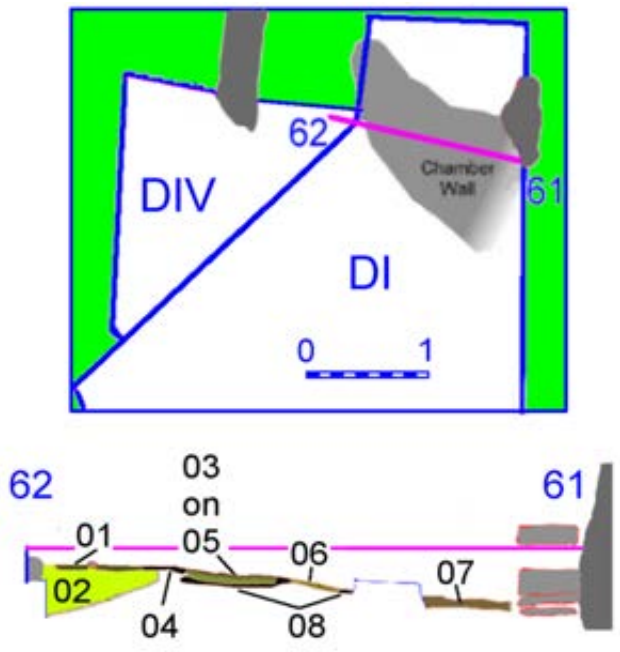
Note 9.7.2: Pit 917

Pit (917) was revealed in the west baulk of DV and DI when it was cleaned back towards the end of the 1981 season. It had not been visible in Section 81 because the section stopped just short of it. In Section 103C (undated) and in other versions of much the same section (Section 100 and 102C of 9:6:81) differences probably reflect cleaning back.

A feature noted on Plan 40 of 9 May 1981 in the extreme NW corner of DV, and interpreted at the time as the edge of a turf line, may have been part of it.

In Section 103B DC38237 of 4.6.81 the lower of two turf lines just overlaps the edge of the pit (Illus 9.126).

Note 9.8.2a: More green clay ambiguities



Illus 25.8 Section 92 of 2 June 1981 [NMRS DC38224]

The original label 373 used for the green clay above and below the paving at the base of the monolith has to be treated more as a description meaning 'green clay close to the monolith' than a context number. The pit fill was numbered 922 but this label does not seem to have been used much. On plans 61 and 65 the green clay round the monolith was labelled 373. It interleaved with clay 391, interpreted as spoil from digging it (Illus 9.137). But the pit fill itself (922) underlay 391, cut from the top or near the top of mottled turf-rich clay 394, and probably the green clay on Plans 65 to 74 should have been labelled 922 (see also Technical Note 9.8.2c).

Note 9.8.2b: Problems with labelling of Section 92

Section 92 of 2 June 1981 was labelled with temporary numbers 01 to 08.

Table 25.2 The concordance list on Section 92

01	dark greasy clay	373
02	green clay Mon 29 socket	373
03	Mottled brown clay	911
04	Dense black clay Old Ground Surface	918
05	Brown/green gritty clay	905
06	Green/black dirty clay	906
07	Brown/black mottled humic clay	390
08	Old ground surface	912

A concordance with context numbers was written on the section drawing (Table 25.2). These appear to be unjustified.

Table 25.3 Descriptions belonging with the contexts listed on Section 92 when found elsewhere

373	Green to green-yellow clay
390	Charcoal impregnated clay, onto which the second layer of cairn stones was laid
905	Dense greasy black turf line
912	Dense black greasy turf line
906	Green/grey silty clay.
911	Mottled grey/brown gritty clay
918	Upper layer of turf line

The lack of correspondence between the descriptions written on Section 92 and the descriptions given to contexts elsewhere (Table 25.3) strongly suggests that the context numbering in the list on Section 92 was wrong.

Plan 87, drawn on 1 June 1981, the day before the section was drawn, shows at the west end of Section 92 a layer 394 described as 'a dense black greasy clay old ground surface with a grey-black gritty clay base' where it occurred in DIV (Context Sheet 394).

Context number 918 seems to have been used here only on Section 92 and 97 and must be the same as 394. The layer under mottled soil 394 in DIV rested on a patchy turf line which overlay a patchy grey mottled soil (904). Under the patchy soil 904 was mottled orange clay (903) which may have been equivalent to the low pile of orange clay stained soil 339c in DII around a metre away to the west, which underlay cultivation bed 4 (Table 25.4).

Table 25.4 A modified version of the concordance list on Section 92

01	dark greasy clay	Maybe related to 391, an orange yellow speckled clay in DIV?
04	Dense black clay turf line	394 (=918)
06	Green/black dirty clay	Lower part of 394?
07	Brown/black mottled humic clay	356 or 911
03	Mottled brown clay	911
02	green clay Mon 29 socket	922
05	Brown/green gritty clay	Lower part of 394?
08	Turf line	Patchy turf line under 394?

This tentative reinterpretation brings Section 92 into fair accord with the sequence in DIV.

Note 9.8.2c: layer 391

When 391 was discovered on 20 May 1981 it was described as spreading under the paving round the base of the monolith (Day Book 245). Plan 56 of 16 May 1981 (Illus 9.138) shows a paving stone

overlay 391 and 373 where they met. Judging by Section 102b of 9th June clay 391 was interleaved with green clays called 373. But at least the bottom part of the lower of these should probably have been labelled 922 (green clay in monolith socket.

Note 9.8.6 layer 394

Plan 98 (Illus 9.138) was numbered out of sequence. It preceded Plan 74. Layer 394 rested on a patchy grey mottled soil (904) which was probably the soil of a patchy turf line recorded at the base of 394. These were cut by the monolith pit. Its edge became unambiguous at the level of 904. Under the patchy soil was mottled orange clay (903). 394 may in part have been composed of turfs thrown on one side when the monolith pit was dug.

The orange clay patch 903 may have been equivalent to the low pile of orange clay stained soil 339c in DII around a metre away to the west, which also lay directly on the natural and was partly covered by a turf line (316c). In DII the turf line 316c was interpreted as underlying a cultivation bed and surviving in its furrows. Extrapolating the rig from DII to DIV, it would lie in the eastern part of the area DIV, where clay 394 suggested turfs laid upside down on the turf line. The two explanations are not mutually exclusive: layer 394 may have been hybrid, partly a flattened old rig and partly the first turfs from digging of the monolith pit.

Note 9.9.1

Cultivation beds were clearest on Area C at the east end of the east row of standing stones. There they were orientated roughly east-west, had a wave-length of about 1.4 to 1.6 m and survived to a height of about 0.1 m. Excavation was not taken below their surface except in narrow exploratory slots. Dating was provided by ascription of the material overlying the cultivation beds to early zone CaN-3aii in the CN-3 column at Calanais Leobag sometime between 2750 and 2300 cal BC. That suggested that the underlying soil belonged before then. However despite their similar orientation to the beds on Area D there is no strong reason why they must have been of exactly the same date.

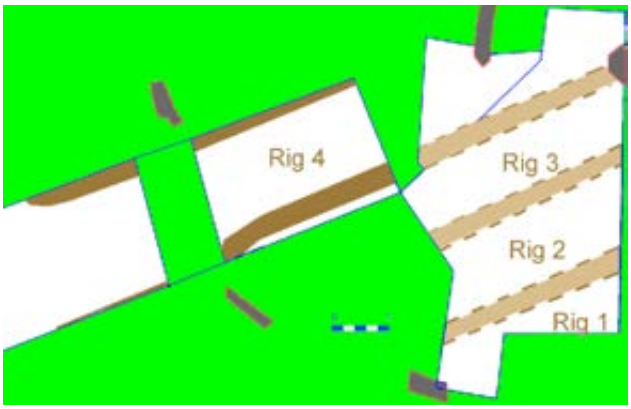
Note 9.9.14 Area DIV lessons for Area DI

If Area DIV had been ploughed to the level of the bottom of Kubiena Box 1 then 904 itself would have been a strip of patchy silty grey clay, the earlier orange clay 903 would have been exposed to its south and the later grey silty soil 394 with halos and turf fragments would have appeared to its north. It is very doubtful that it would have been clear which levels were stratigraphically the latest, so it would not have been clear how to proceed. The complexities and ambiguities revealed by sections 95a and 95b in Area DI on either side of the temporary baulk preserved in the middle of DI (Illus 9.111) reinforce this point

Note 9.9.16

The idea that there were cultivation beds on Area D arose with the excavation of Bed 4 on Area DII to the west of the central monolith. It was made immediate with the discovery of a ridge of grey gritty material 388 lying in plan between turf lines 334 and 365 on DI (Illus 9.164). It was given impetus by the sinuous turf lines outcropping in 334 because we speculated that they might reflect turf lines undulating between two beds.

Illus 25.9 Copy of Illus 9.176, the initial bed hypothesis



This became established as a loose working hypothesis. Illus 9.165 which illustrates this hypothesis is spuriously precise. In fact we were far from confident that beds, if they had ever been present, would be straight, or regularly spaced. The wavelength of about 1.6 to 1.7m, in this initial hy-

pothesis, was determined by the width and centre line of the bed in DII and the centre line of the ridge of grey material 388 (Illus 9.164). The idea was that seed beds about 1.4m across might be separated by gullies about 0.2 to 0.3m wide although as already explained these might be gentle depressions rather than sharp narrow features.
The characteristics of Bed 4, which informed identification of beds elsewhere, were as follows.

— Stray patches of in situ turf lines, and low heaps of dirty orange clay, survived in some places under the bed;
— upside-down turfs, some with the turf line and the underlying green (or sometimes orange) clay subsoil retaining its colour and texture in each turf;
— areas between seed beds could simply be shallow broad declivities, but sometimes narrow gullies occurred, perhaps created through clearing out of soil;
— turf lines survived at one or more levels in the gullies and on the flanks of the bed; stretches of turf line were covered by soil as the gullies filled in;
— when beds were levelled the turf lines on the bed flanks were truncated. Soil filled the gullies; in many places on Site D the mineral soils above and below a truncated turf line were identical;
— although the gritty and quartz-rich components of the beds may have resulted in part from decay of stones (a process seen particularly clearly on the periphery of the later chambered cairn), they may also have reflected importation of sand on seaweed, and turf-rich material from grittier soils.
— detritus perhaps from weeding and removal of small stones from the seedbeds occurred in or at the edges of the gullies.

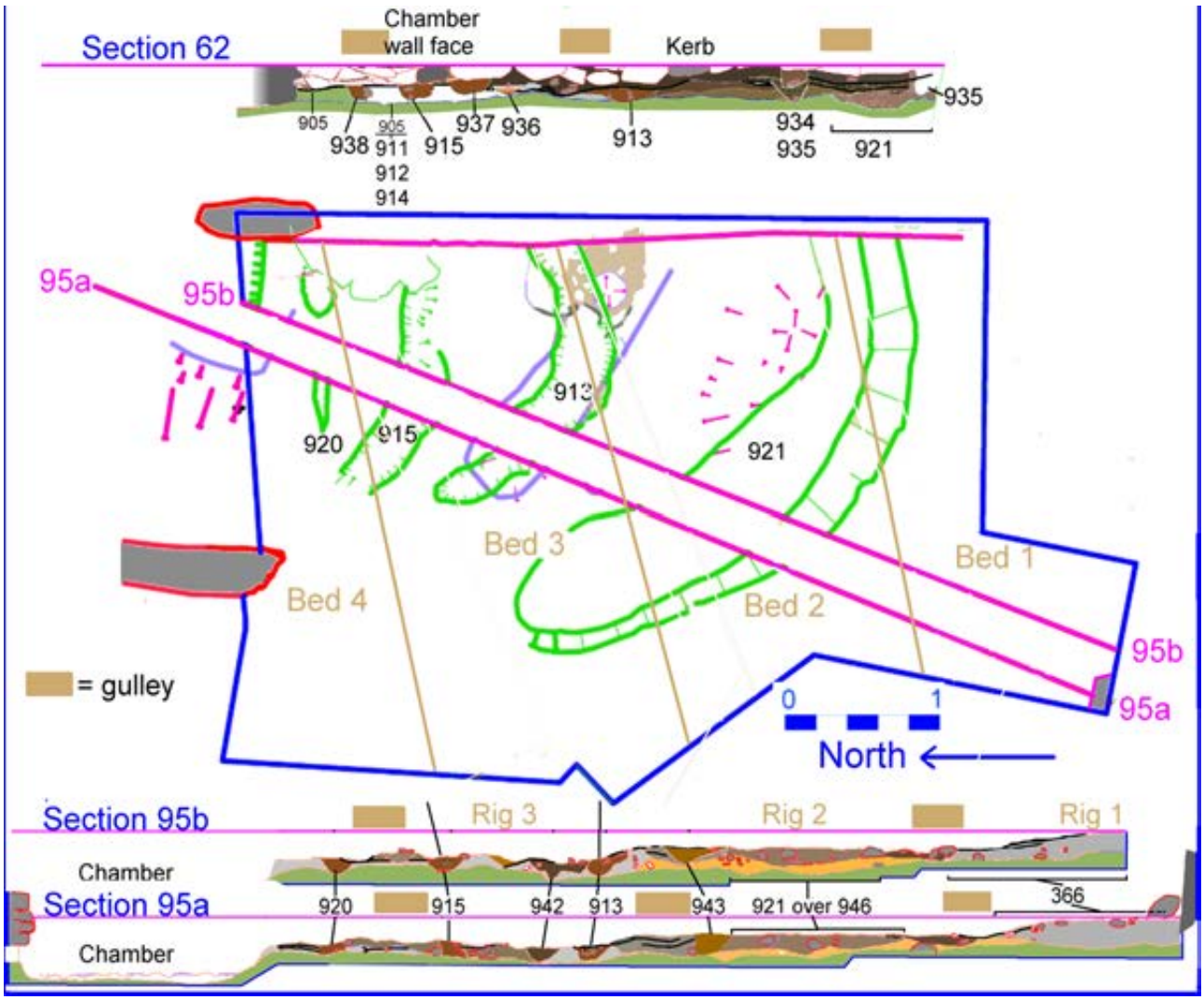
The problem from the point of interpretation was, and remains, that many of these small-scale phenomena could have been caused by activities other than farming. Perhaps because the bottom 0.1m of the soils and clays were left unexcavated on Area DI we did not see beds and gullies in plan except where Bed 2 survived between two complex turf lines.

There were stray examples in Area DI of the formation processes observed in the bed on DII, but it cannot be pretended that every detail of every sequence of turf dumping, litter-layer formation and burial was fully recorded or completely understood. The bottom 0.1 m depth of soils in DI was not excavated except in a few narrow exploratory slots, and most of the evidence related to bed formation would be expected to survive in those soils. Illus 25.4 illustrates the problems; Sections 95a and 95b are almost too rich in variations to be interpretable. The beds, if they had ever been there, would have been damaged by subsequent flat cultivation or levelling, and the erection of standing stones and building of the cairn would have further disturbed them. Nevertheless, the information recorded on plans and slit sections allows interpretation of some of the features on Area DI as the remains of four beds, bed 1 underlying Ring Stone 47, about 1.5 m SSE of bed 2, bed 3 about 1.5 m to the NNW of bed 2 and bed 4 cut by the pit for the central Monolith 29 (Illus 165).

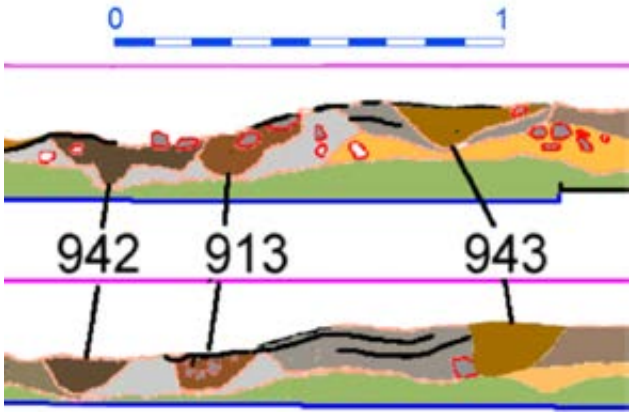
The crook in the line of the lower part of Slot 913 does fit the idea of a gully between Beds 2 and 3. The feature labelled 943 on Sections 95a and 95b might be the westward continuation of the cultivation trough. However I suspect that 943 was in fact a non-circular pit rather than gulley created by cleaning out the trough. Perhaps the grey soils with fragments of turf line, particularly those on Section 95b (the upper section) are the fill of the trough between the two beds. But generally elsewhere such soils with turfs in them were part of the body of cultivation beds. Also I do not entirely trust the depiction of variations in grey soils in section 95a at this point because of the way that the lower turf line is shown as cut at a point well to the south of the end of the upper turf line. The grey soils rising at the south ends of Sections 95a and 95b may be the same.

On Section 105 (Illus 9.161) the lowest soil had been labelled 388. Technically this was wrong because that label had been used for soil in Bed 2 to the north; it has been relabelled 946 in the Context List. But it is still likely that it was the soil of a cultivation bed.

The most definite bed on sub-area DI, bed 2, was on the area least disturbed by later features, in the middle south part of the area. It was seen as a ridge of gritty clay running WSW to ENE



Illus 25.10 Sections 95a and 95b and the main baulk section 62



Illus 25.11 The gully between Beds 2 and 3 on Sections 95a and 95b (extract from Illus 9.177)

after removal of the overlying late ploughing level and patches of clay though to represent funerary deposits. The turf line of one or more turf lines lay to either side of it. It appeared to curve slightly (Illus 9.164).

Note 9.9.23: Dating the cultivation beds

Without the evidence from the pollen samples the cultivation bed might have been attributed to CaN-2c, the cultivation phase at Calanais Leobag preceding CaN-2d and more precisely it might have been supposed that creation of the cultivation beds started at the same date as formation

of the 35cm level in Leobag column CN3, where Cerealia pollen first appeared. This dated approximately to between 3900 and 3600 BC. It might also have been supposed that use of the cultivation bed ended at the CaN-2c to 2d transition at between 3490 and 3020 cal BC.

The pollen records of columns D2-3 in DIV and D4-5 in DI both started off with relatively high birch and hazel percentages after which a clearance phase followed. This marked the end of zone CaN-2d, dated to between 2980 and 2500 cal BC. Although it was assigned overall to zone CaN-2d, both agriculture and cattle breeding were practised during CaN-3ai in column D6-7, coinciding with a thick turf line. This must have formed the pre-cultivation bed ground surface and where it survived it received cereal pollen from neighbouring cultivation.

In columns D2-3 in DIV and D4-5 in DI the first Cereal-type pollen appeared at the beginning of Phase D-2 (zone CaN-3ai) together with Compositae pollen of the Liguliflorae type and Plantago lanceolata. Subsequently grasses increased firmly and pollen of the Trifolium-type and Trifolium repens appeared in the samples, after which the indicators for agriculture declined, marking the end of CaN-3ai at some time between 2750 and 2300 cal BC.

Agriculture was temporarily abundant during phase 2 in column D6-7 while cattle-breeding was still practised.

Heather increased strongly in phase D-3 (CaN-3aii) in columns D2-3 in DIV and D4-5 in DI Possibly cattle breeding was practised because no decline was registered in the Plantago lanceolata, the Ranunculaceae and the Trifolium curves. Grasses showed a temporary decline during this zone.

In column D1 the lowest levels belonged near the start of zone CaN-3aii, a stage during which both agriculture and cattle-breeding were practised. It was followed by a stage during which agricultural activities declined and a heather spread was registered in the samples. These three stages were also clearly registered in the CN-3 column zone CaN-3a. The increase in heather marked the transition to zone CaN-3b.

At the start of phase-3 in column D6-7 there was a sharp decline in the birch values. Cereal-type pollen reappeared in the samples and grasses increased sharply. Heather pollen declined, possibly as a consequence of increased agricultural activity around the site.

Grasses recovered again in Phase D-4 (CaN-3b), in columns D2-3 in DIV and D4-5 in DI, together with cereal. Heather declined, possibly as a consequence of increased agricultural activities.

Together with the birch, hazel, alder and pine declined. Pine fell below the 1% level which coincided with the regional pine decline. This decline in the pine pollen marked the beginning of zone CaN-3c, dated to between 1800 and 1200 cal BC in Leobag column CN-3.

During phase-4 in column D6-7 (in CaN-3b) the cereal curve increased but the Compositae lig did not reach the high values of Phase 1 in column D6-7. Heather values recovered while grasses declined to around the 40% level.

In all of the columns there was a correlation between the occurrence of turf lines and an increase in heather pollen. The fact that the heather curve showed two successive maxima in D4-5 but the curve in column D2-3 had only one peak was probably due to local influences. In Column D6-7 the turf lines seemed to correlate also with temporary declines in the cereal pollen curve (except in the lowest turf line which immediately preceded CaN-3ai and contained the first cereal pollen from Area D. This demonstrated temporary declines in agricultural activity around the site during periods of turf formation.

Note 9.10.3a: Sections 68 and 93 of Ditch 921

On Illus 9.175 the drawings of Sections A-B and C-D have had their horizontal scale adjusted by a factor of 0.85 to bring their width to that of orthogonal cuts across the ditch at the same points.

A health warning has to be sounded on Sections 68 and 93. The primary records relating to them are very confusing. 'North-facing' and 'south-facing' appear to have described the direction the person drawing the sections was facing. Indeed I have a recollection of what I thought was an abstract discussion of what such terms meant when those

sections were recorded. The triangulation co-ordinates for the section points make little sense. Both sections appear to have been 'flipped' east to west. The pit on Section 93 was given a context number, 385 the same as that of a pit some metres away, and not related to Ditch 921. It should have been numbered 395 Nevertheless I am confident that the depictions in Illus 9.175 are correct.

It seems pretty clear that the fills on Section 68 are different from those on Section 93. I think that that may be because Section 68 was in a different feature, although the section documents more than simply the trough hypothesised above.

Note 9.10.3b Pit 385 and 395

On the digitised version of Section 93 the pit was labelled 385. This number however referred to a posthole shown on Plan 55 (DC38187A) near the cairn. Probably the label should have been 395 (see section E-F on Plan 55). The confusion in labelling probably arose because a line of small features between 385 on Plan 55 and 385 on Section 93 was interpreted at one stage as possibly forming a line running NNW-SSE. Subsequently this interpretation was abandoned.

25.10 Notes for Chapter 10: Area E

There are no Notes for Chapter 10

25.11 Notes for Chapter 11: Area F

Note 11.1.3: Contour plan ambiguities

The spot heights on another plan, Plan 10, suggest that the centre of FV, the east-most trench, was 1.79m below datum and the centre of FVIII, the north-western trench, was 2.38m below datum. That is a height difference of about 0.59m between a point in the avenue and a point on the slope. This correlates well with the height difference of about 1.0 to 0.5m suggested by Plan 11. A note on page 6 of the Day Book says the lowest marshy point was 1.73m below site datum and two low wet spots were at 2.43 and 2.53m - height differences of 0.7 and 0.8m. The photograph on Illus 11.1 suggests that the general impression given by Plan 11 is a fairly good qualitative match with reality; but the detail in its western part must be treated with caution.

Note 11.9.7 Stake hole 644

There is a conflict between the recorded position of stake hole 644 on the digitised versions of Plan 10 (Illus 11.17) and Plan 6 (Illus 11.13). A sketch plan of 23 May 1980 (Illus 11.19) resolves the issue; the stake hole was in the position shown on Plan 10.

25.12 Notes for Chapter 12: Area H

Note 12.2.3: Labelling error

On Plan 3 (Illus 12.13) the largest area of chamber fill, marked '720?', was wrongly labelled 721 on the digitised plan. 721 was undisturbed subsoil in the chamber. Section 14 (Illus 12.15) and a sketch plan in the Day Book p.4 (Illus 12.9) suggest that it should have been labelled 720.

Note 12.2.7: Cereal context label error

I distinctly remember that I found grain in the capping 708 of the cairn or the top of dark layer immediately below. That memory was of an event which was exciting at the time and thus registered firmly. Also it has been refreshed fairly frequently over the years during the various attempts to write up Calanais.

The cereal grains, 3 barley and one wheat (Triticum) grain, were recorded in the macroplant report as from samples CSS 752-773) and selected for radiocarbon dating. The context number for the cereal grains in the macroplant report was given as 764, but that must have been misread and must truly have been a carelessly written 704 (general label for the cairn outside the chamber wall) because 764 was a fill of primary Ring stone pit 775.

It was called small find 75/81 in the original Finds book where it was assigned to layer 728 and dated 6 May 1981. But Layer 728 had not been reached at that time. The top layer of the cairn was removed on 5th May (Plan 2) and the second layer on 5th/6th May. The latter plan shows soil layer

712 (immediately under 708) amongst the cairn stones. This proves the point.
In earlier versions of the Radiocarbon date list the context of the grain had not been resolved satisfactorily. That has been remedied in the list of dates in Chapter 23.

Note 12.3.1 Pit 710 and Slot 735

The lower fill of the pit 710 was reinterpreted as the fill of the underlying slot 735 (Day Book Page 3) and Plan 5 has been renumbered accordingly.
Note 12.5.12: Interpreting layer 771

Four possible explanations for the origin of Layer 771 under the chamber wall were considered.

1. It was an incipient litter layer which formed on the green clay under the cairn. This was the preferred interpretation on-site and also during post-excavation analysis, because it was visually similar to some of the weaker old ground surfaces elsewhere on Area H.

2. It consisted of fine humic material which had seeped down from grey clay layer 770, or if the latter was itself the result of down-washing of a fine soil fraction, had seeped down earlier than formation of that layer. Indeed the pollen from 771 was quite like that from clay 770. The main support for this idea is the fact that there was fine silt on some of the basal layer of stones under the chamber.

3. The layer was the remains of vegetation ritually scattered on the green clay. This explanation was conceived during post-excavation many years ago. However, the relatively high proportion of tree pollen in the pollen assemblage does not suggest 'floral offerings', and even though the pollen might represent a mixture of the general pollen in the air at the time plus pollen from offerings that possibility was therefore not preferred to the others (See Chapter 21: Pollen].

4. The layer consisted of airborne dust which had blown over the exposed clay; but if so it must have settled after a few of the chamber wall stones had been lain down. This seems to be slightly special pleading.

Kubiena box samples were taken for pollen analysis. Box 1 incorporated layer 771 under the chamber wall and the green clay of the platform. The descriptions were as follows: 0-2cm green humic gritty clay and 2-6cm green slightly humic clay.

This largely resolves the issue. Layer 771 under the chamber was a humic version of the green clay, about 2cm thick. It was thus almost certainly an incipient litter layer forming on an exposed old ground surface. The grit disseminated in it (not noted in the slightly humic green clay below) does not reflect a component of downwash but activities which took place as the litter layer formed. That is the preferred explanation.

However, layer 771 should survive on both sides of Area H so if there is excavation here again at some time in the future soil micromorphology and other techniques can be used to test the possibilities considered here, alongside other explanations. It would also be interesting to look for drops of tephra (volcanic glass) in this and other layers under the cairn given the possibility that a period of poor tree-growth in Ireland around 2354-2345 BC might have been due to the Hekla 4 volcanic eruption in Iceland Baillie 1999, 205).

Note 12.6.2: Ambiguity in record for relationship between layers 749 and 758

There is some confusion in the records for this area, with what seem to be alternative drawings of the stratigraphy at the east end of the section under the massive kerb slab (Illus 12.89 64-5). Clay 749, clean olive green subsoil is recorded on its context sheet as lying over turf line 758. I can find no evidence for this on plans or sections; on Section 85-6 (Illus 12.80) its relationship to the turf line is ambiguous.

Also on the section under the kerb the layer below the turf line under the platform was labelled 750 (Illus 12.80 64-65). That label there introduces a stratigraphic anomaly. In fact this layer was probably 777, the light grey layer under the turf line on the main sections (Illus 12.34, 12.36).

But green clay 760 was later than some parts of mixed clay 716 and the large stones near the base of Ring Stone 42, which formed a group overlying the standing stone pit fill (Section 85-86).

Note 12.7.3: Depression 746 ambiguities

There is some doubt about the identification of layers in the depression 746. The layers most likely to cause confusions have been renumbered in this final narrative. What was labelled 750 has become 1005 and what was labelled 751 has become 1009.

There were also some discrepancies in the records relating to these layers. The original label 740 for the patch of grey green material in the upper left-hand corner of plan 6 was wrong (according to the context list, the number was for modern upcast in chamber) / olive green clay). A label 745 on Plan 7 was an original or a digitising error for 743 (according to the context list, the number 745 related to an earth clod in modern upcast 740 in chamber).

The identification of the main fill (now labelled 1005) as 750 may have been stratigraphically correct if the identification of the turf line 1009 as 751 was correct. But it is also possible that the turf line was earlier, perhaps equivalent to 776 which formed the lowest turf line on Section 13 (Illus 12.101), and if so the underlying very variable soil 743 may have been the equivalent of 789 and 792, the early plough soil.

Much of the depression should survive immediately north and west of the edge of Area H and it may prove possible in any future excavation to relate it to the strata around Ring stone 41.

Note 12.8.4: correlating H and B plans

Registration between the plans of H and B was poor and numerous slight adjustments had to be made to bring them together. Some details have been added from a photograph (Illus 12.103, 12.104). Errors in the composite plan near Stone 42 are probably of the order of 0.1 to 0.2m.

Note 12.8.5 Wrong assignation of Sample 230 charcoal to green clay 767

Work on the excavation narrative for Area H to incorporate information from the Sheridan pottery catalogue led to the realisation on 21 November 2011 that the radiocarbon-dated charcoal sample ascribed to Context 767 in the McCullagh charcoal report ((AA-24969 4095+/-45) was almost certainly from context 768.

Clay 767 was clean green clay in the pit for Ring stone 42. The radiocarbon-dated charcoal sample ascribed to 767 was therefore taken to provide a terminus post quem for erection of Ring stone 42 (Ashmore 1999a, 2000).

The original 1985 Rod McCullagh charcoal report (like the pottery bag for Find 230 - see below) did not include sub-Area numbers for Sample 230. If it had it might have distinguished between HI (where 767 was) and HII (where 768 was).

The original Finds Book has Find 229 as from 768 and containing pot and carbonised hazelnut, immediately followed by Find 230 (with the contents shown by ditto marks). However, on 20/10/97 Andy Heald annotated the Finds Book entry as follows "wrong context. Should be 767 check on sample bag"

Checking other records I find:

— The 1995 version of the Context list has Sample 230 as from both 767 and 768.
— An early typed version of the Finds list (alas undated) has no pot from 767, and both charcoal samples 229 and 230 from 768.
— Mel Johnson's draft pottery catalogue (the earliest file version is dated 1995) has no pot from 767.

Alison Sheridan has checked (22-23/11/2011) the finds bags and reports that the old bags for find 230 have context 768 on them.

The pot in Find 230 was as follows.

Cat	Comment
1007-1020	7 spalls and 7 fragmentary spalls from a fairly thick-walled probably E/MN corky pot.

Fairly similar pottery was in Find 81.229 from 768, which was a secondary chamber wall capping.

Cat	Comment
18_26	9 sherds from a large fine E/MN corky pot (ASH 8)
27	A featureless from a fine Beaker or less likely a particularly fine E/MN non-corky pot
28	Spall possibly from a very fine Beaker
29	A sherd probably from a fine Beaker.

There is no hint in the context records or the Day Book that clay 767 contained any charcoal or pot, although that is purely negative evidence because finds were often not listed on context sheets even when present.

It is from this evidence extremely probable that when Find 230 was divided up into Pot 230 and charcoal sample 230 the charcoal sample bag was mislabelled. This will have happened before its receipt by Rod McCullagh.

Note 12.9.2: Section 34 ambiguities

There were some apparent discrepancies between Section 34 and the plan on Illus 12.121. The plan is composite. Overlay 18 showing slot 795 / 1001 has been shown on Plan 9, which included the complex slot under the chamber wall and a patch of 752/760 in bright green. Probably the discrepancies are due to the fact that the lower part of Section 34 was not drawn on a vertical plane. However there is a discrepancy between the projected line of the western part 785B under the cairn stones on plan and the record in the section. The composite plan seems to fit well enough with Section 33.

25.13 Notes for Chapter 13: Test Pits G and J

Note 13.2.1 Test Pit G1

Table 25.5 Details of the soils in Test Pit G1

Context	Layer	Depth	Colour	Description
1301		0-2cm		Litter layer with decomposed root mat, turf-like. Rare presence of worms noted
1302	Op[1].	2-21cm (19-24cm)	5 YR 2.5/1 Black	Peat with clay. Rare rounded stones weathered 2cm- 6cm. Approx. 5% unstained quartz grains. Crumbly when dry. Uncompacted, springy. Many roots both fleshy and fibrous. Indistinct, clear (boundary definable to 6cm), irregular lower boundary to:-
1303	Oh	21-38cm	5 YR 3/2	Brown fibrous peat with very little, if any, included mineral matter. The peat is redder at the top, becoming browner downwards. Many fine fibrous roots. Wetter than Op[1], softer but not crumbly. Sharp flat boundary to:-
1304	Omh	38-41cm	5 YR 2.5/1	Black amorphous peat. No stones, sticky, greasy; fine fibrous roots common. Abrupt irregular lower horizon to:-

Context	Layer	Depth	Colour	Description
1305	A1	41cm-?	5 YR 3/2	Brown coarse sandy clay. Many fine and very fine fleshy and fibrous roots. 10% coarse sand grains, unstained. 20% indurated green gneisses 2cm-6cm. Some boulders from the layer below cut the A1, making it discontinuous. Very irregular boundary to:-
1306	A2/ B1	90cm		Bouldery, sandy clay (NB not boulder clay). 90% boulders with clay and sandy clay between. Boulders of gneiss, rounded, angular, blocky - tabular. Root mats on stones, charcoal between stones. Occasionally the matrix material has a slightly red-brown tinge. Layer A2/B1 contained abundant pottery which is described in Chapter 18: Pottery. Abrupt irregular lower boundary to:-
1307	B2C			Light green olive sandy clay (colour not represented on Munsell chart pages available). Soft, very wet, no roots and some stones. Base not seen [pit became waterlogged] but becoming rockier, suggesting this as B2/C with clay forming down into jointing, clay inwards being hydrated.

Note 13.3.1 Test Pit G2

Table 25.5 Details of the soils in Test Pit G2

Context	Layer	Depth	Colour	Description
1321		0 - 0.02m		Litter layer under grass.
1322		0.02 - 0.09m	7.5 YR	Layer 2. Black peat, very rooty stone-free with some quartz grains and charcoal. Springy, very rooty, and fleshy and woody roots to 3 mm. No mottle, no charcoal and no structure. 5cm irregular boundary to:-
1323	Ap	0.09 - 0.28m	10YR 2/1	Layer 3. Black peat with less quartz grains than above; 1-3mm fleshy roots. 5% very disintegrated crumbly stones, 2 - 6 cm, not possible to record angularity. Worms. <1cm flat to irregular boundary to:-
1324	A1	0.28 - 0.39m	10YR 3/2	Very dark greyish brown very humic fine sandy with no mottle and with 30% 2 - 6cm stones and 6 to 20cm sized ones on top surface. Stones are sub-angular, weathered, and rotten when green. Very frequent fissures and root-mats; fine irregular vertical cracks. No structure, no mottle, charcoal in top surface as normal. Many very fine fleshy (woody) roots. Abrupt irregular lower boundary to:-
1325		0.39 - 0.52m	10YR 3/2 to 10YR 4/2	Very dark greyish to greyish brown (lighter than above) slightly sandy clay. Very wet and sticky with some 1-2mm fleshy roots. 20% 2-6cm stones. Sharp irregular boundary to:-

Context	Layer	Depth	Colour	Description
1326		0.52 - 0.55m	10YR 3/3	Rooty mixed sand with a 10% humic clay fraction Mainly uncemented but slight cementing in places. Lenses of green.
1327		0.55 - 0.59m		Discontinuous 0-5mm root mat.
1328		0.59 - 0.69m	Light green	Colour not on Munsell chart. Fine sandy clay with some clay bands and very fine fibrous roots; a slightly platy structure with very variable cementation. Less than 10% stones. Abrupt lower boundary to:-
1329		0.69m down-wards		Green sandy clay with staining. 20% 2-6cm 10YR 5/6 yel-lowish brown rotted stones. No roots. Sticky irregular peds. Base flooded and not seen

Note 13.4.1 Test Pit J

Test Pit J was occasionally referred to as G3. Its NE side measured 2.17m, its SW side 2.07m, its NE side 2.15m and its SE side 2.11m. It was dug to a depth of 0.76m. Only the main profile is reported here; the labels of the other consisted entirely of cross-references to this main profile.

Table 25.6 The main profile in Test Pit J

Context	Layer	Depth	Colour	Description
1331		0 -2 cm		Litter layer; medium brown wet under grass
1332		2 - 8cm		Very wet medium brown peat, fibrous with fleshy roots
1333		8 - 11cm		Slightly dark fibrous peat
1334		11 - 14cm		Dark brown fibrous peat with grits and dried peat lumps. Regeneration layer.
1335		14 - 27cm		Orange brown fibrous peat
1336		27 - 48cm		Medium brown peat becoming orange brown downwards with a 20mm orange band at bottom. Mixed disturbed peat with grits and dried peat lumps.
1337		48 - 49cm		Orange band 0-2cm above it. Dark grey brown amorphous peat. Sharp boundary to:-
1338		49 - 55cm		Layer 1. Dark brown very rich humus rich clay with red brown fine roots; a few fleshy roots and abundant very fine fibrous roots and no mottle. Cemented, imbricated non-greasy, <1 cm rotted stones along with quartz grits and some charcoal. Sharp irregular and occasionally abrupt boundary to:-

Context	Layer	Depth	Colour	Description
1339		55 - 60cm		Layer 2. Medium brown slightly sandy silty clay with a slight yellow green tinge and diffuse indistinct dark brown mottles. Cemented but not as much as above. It contained 20% 2-6cm stones and 10% <1cm green stones all rotted but mineralogy retained. Abrupt lower horizon to:-
1340		60 - 68cm		Layer 3. Uncemented although very compact green brown silty clay with some white rotted stones less than 1cm in diameter at the top. Vertical fine fibrous roots very common
1341		68-70cm		Layer 4. Uncemented green subsoil
		70 cm		2mm root mat.
1342		70 down-wards		Green clay loam; with a much cemented top surface.

Note 13.4.2 Pollen Samples 2036 and 2060

The records for Pollen Sample 2060 conflict (Tables 25.7 to 25.9).

Table 25.7 1981 samples from GII and J = GIII according to the soil sample list

Soil Sample	Test pit	Context	Description of sample and reason for sample
2046	GII	605	For soil and pollen analysis [This is an Area F context number]
2047	GII	662	For soil and pollen analysis [This is an Area F context number]
2055	GII	layer 3	For soil and pollen analysis
2058	GII	layer 4	Charcoal peat and fungus sub sample for soil and pollen analysis
2060	GII	layer 3	NW profile sample
2062	GII	layer 1	SE profile sample
2036	GIII	ly4	Sample for soil and pollen analysis
2037	GIII	ly5	Sample for soil and pollen analysis
2044	GIII	A2	Charcoal peat and fungus sub sample for soil and pollen analysis

Table 25.8 Details according to Bohncke (Chapter 21: Palaeoenvironment)

Site	Sample	Feature	Field interpretation
G	2060	Lay-3	81 horizon NW profile
G	2036	Lay-4	B1g horizon in the pit.

Table 25.9 Details according to AOC (Chapter 22 Macroplant)

Sample	Box	Description
2036	CSS 2023-2048	Pit G3, Layer 4, SE profile
2060	CSS 2049-2068	G3, layer 3, B?, NW profile

If Soil Sample 2060 is from G2 Layer 3 as both Bohncke and the original Soil Sample list have it, and the sample numbering sequence in Table 25.7 suggests (Tables 25.7 and 25.8), the sample is from black peat. The overlying layer was black peat with some quartz grains and charcoal. The assignation to just after the CaN-2d to CaN-3a is slightly surprising given the much later date of the basal peat on the other side of the stone setting and at the Calanais Fields project where peat grew, in round terms, from 500 BC to 800 AD and from 250 BC to after 1700 AD. However, Pit G2 was on what appeared from air photographs CUP RA84 and RA85 of 1955 to have been cut into a squarish pre-modern cultivation area. Peat and other material may have been dug up elsewhere and dumped on this area and modified in the 19th century AD.

If this sample is actually from G3 (=J) as the AOC Macroplant Bag record has it, it was from a very compact green brown silty clay. But that would mean an inversion because the pollen in Sample 2036 from J Layer 4 is assigned to the transition of zone CaN-3a to CaN-3b. That too would be somewhat surprising.

The records for Soil Sample 2036 have a lesser problem. Pollen sample 2036 was taken from G3 (=J) layer 4 according to the bag, but there is no layer 4 named in the J=G3 primary record although a layer 3 is specified. The layer in J under layer 3 was described as uncemented green subsoil and the information provided to Dr Bohncke described the sample as from a B1g horizon (although that label did not appear in the primary soil record). A 'B' horizon is illuviated subsoil in which fine material (in this case clay) has derived from organic-rich higher layers. A B1g layer is the gleyed form. The two descriptions could thus be complementary. If that is right it seems likely that the pollen in sample 2036 washed down from above along with the clay fraction forming this layer.

25.14 to 25.17 Notes for Chapters 14 (Area S) to 17 (The lithic assemblage)

There are no Notes for Chapters 14 to 17

25.18 Notes for Chapter 18: The Pottery Assemblage

Note 18.2.1 Number of sherds

Note that the Catalogue has 1110 entries, of which one (Cat. No. 613) is void. The 'official' overall total of sherds and fragments is, however, taken as 1110 since at least one of the individual catalogue numbers covers more than one piece. The actual total of pieces is not significantly greater than 1110.
Note 18.7.6: List of Beaker sherds identified as 'miscellaneous (as opposed to 'early, international-style') fine Beaker'

Note 18.7.6 List of Beaker sherds identified as miscellaneous (as opposed to 'early', international-style') fine Beaker

The first table lists those sherds counted in the 'conservative' estimate of Minimum. Number of Individual (MNI) vessels – i.e. those where the identification as Beaker is based on diagnostic features such as rims, bases and decoration. The second table lists other sherds that count as 'probable/possibles'. The entries are sorted by Area and, within that, by Cat. No.

Entries grouped together indicate where the

sherds are definitely/ probably/possibly from the same pot. Sherds that had been identified by Audrey Henshall as definite or possible fine Beaker are indicated in bold. An asterisk beside wall thickness indicates that one surface spalled off.

i) Sherds included in the conservative MNI estimate

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
BI	677	80.192	149	1	3	5.0*	76 Unc	Poss rim, gently squared off, upright or minimally everted; top slopes inwards
BIII	488	80.030	121	9	3	10	60	Base-wall junction (base flat); est base diam c 80, so small pot.
BIV	480–483	80.119	134	16	2	7.3	NC	4 sherds (of which 2 are refitted) from lower body of small, thin fine pot – Th mostly c 5.5; diam at this point c 100 mm. One sherd is from immediately above flat base.
BIV	409	81.399	863	7	3	7.2	45a	409 = rim (pointed, rounded on I, minimally everted) from small Beaker; ERD c 100 mm. Deeply-incised horizontal grooves.
BI	410	81.447	100	6	3	7.3	45b	410 = neck sherd; diam at this point also c 100 mm. Deep incised horizontal grooves
DI	413	80.096	315	2	3	6.5	46	413 = small neck sherd, poss from this pot or else same pot as Cat. No. 414 (ASH 46), As Henshall suggested; although grooves are more similar to those on ASH 45ab
BIVWX	450	81.199	859	2	1a	6.6	49a	Rim, gently pointed, with low, rounded sub-rim cordon
BIVSX	451	81.612	141	1	1a	5.7*	49b	Neck sherd with low, gently ridged cordon on E
BVSX	469–470	81.444	141	14	1a	9.2*	56	2 sherds. Flat base with interior omphalos; EBD c80, so small pot

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
BVSX	869	81.137	141	1	2	4.5	76 crb	Markedly curving neck sherd from small, thin, fine Beaker with everted rim; sherd too small to estimate diameter. Not from ASH 39 Internat Beaker even though shares same small find no.
DI	414	80.175	315	1	3	7.1	46	Rounded, slightly everted rim from thin, fine Beaker; too small to estimate diameter. E has fairly shallow horizontal incised lines. See above regarding whether Cat. No. 413 may be from the same pot
DI	415	80.157	315	2	3	6.1	46	Curving neck sherd from thin, fine Beaker with splaying neck, decorated on E with closely-set, shallow, roughly horizontal incised lines (grooves). Probably NOT same pot as Cat. No. 414)
DI	416	80.097	315	2	3	8.5	46	Body sherd from fairly thin, fine pot but not the same pots as the others listed under ASH 46.Deco: shallow incised lines on E, running in 2 directions: horizontal and diagonal, the latter not reaching as far as the horizontal line
DI	457–8	80.159	332	5	3	7.1	50	2 sherds. Rimsherd rounded & everted, with prominent narrow horizontal sub-rim cordon. ERD 140 mm. Body sherd from same pot
DI	459	80.171	318.3	4	3	8.4	51	Prob from neck of med to lg fine Beaker (diam at this point c 200). Low, fairly broad cordon which would have been a sub-rim cordon

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
DI	460	80.087	315	3	1a	5.8	52a	460 = 4 refitted sherds from curving, splaying neck of small, thin, fine Beaker; diam at this point poss 110–130. Friable.
BIVSX	461	81.614	141	2	1a	5.9	52b	461 = curving neck sherd, prob from same pot as ASH 52a
DI	471	80.078	315	8	2	10.5	57	Flat base from fairly fine, fairly small Beaker; EBD c 80; wall splays gently
DI	472	80.180 + 80.038	315 + 315	10	3	10.6	58	2 refitted sherds from base and lower wall of small, fine, thin-walled Beaker; gentle pedestal, above which wall kinks out
DI	536	80.111	321.2A	2	1a	5.6	65	Prob belly sherd from small, thin, fine pot; diam at this point c 150 mm. Decoration: fairly random stab impressions, some roughly circular, some irregularly-shaped. Fabric 1a but with few or no mica flecks
DI	896	80.102	315	1	1a	7.0	76 crb	Small, heavily abraded sherd from small, fine pot. Very gentle low ridge may be a cordon, so sherd will be from neck
DI	918–9	81.047	315	2	1a	6.5	76 crb	2 spalls, prob from neck of one or two fine Beakers. Both may have cordons
DI	932	81.254	360	1	2	7.0	76 crb	Either gentle carination or (less likely) neck and edge of rim, or base. Fabric 2 but soft
HI	543	81.083	735	2	2	8.2	68	Small abraded body sherd with dot-stab impressions. Not identical to ASH 67 but could possibly have come from the same pot. (Treated here as if from a separate pot.)
HI	998	81.121	739	1	1a	5.7*	76 crb	Small abraded spall, either from flat base of small fine Beaker or E/MN rim flange; seems most likely to be Beaker base

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
HI	1004	81.155	748	1	1a	6.6*	76 crb	Small abraded sherd, either from neck and gentle carination or else from flat base and bottom of wall. Virtually inclusion-free but one angular frag of quartz/ite
HII	29	81.229	768	1	2	5.9	NC	Rim, gently squared off, with top sloping very slightly towards I; too small to estimate rim diam

ii) Other sherds likely to be from fine Beakers:

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
BI	361	80.144	120	1	2	6.3	NC	Tiny sherd from thbin fine pot, prob. Beaker
BIII	747	81.676	9999	2	1	5.9	76 Unc, ?fine Bkr	Curving neck sherd from fine Beaker; diam at this point c 150 mm. Very similar to Cat. No. 744. Fabric 1 but minimally corky
BIII	771	80.145	142	1	3	5.6	76 crb	Neck sherd; too small to esti-mate diam.
BIII	814–6	80.165	112	1	3	4.7	76 crb	3 refitted, prob neck sherd
BIII	828	80.055	121	1	3	5*	76 crb	Small, heavily abraded body sherd, possibly from fine Beaker
BIV	383	81.184	814	1	3	5.5	NC	Body sherd, thin, fine pot, prob Beaker
BIVWX	736	81.454	885	1	3	6.9	76 unc ?EN	Small sherd from thin fine pot, most probably Beaker.Paler than most Beaker and E/MN pottery but not necessarily burnt

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
BV	344–5	81.396	813	4	3	5.2*	NC	2 abraded spalls from fine pot, probably Beaker
BV	693	81.524	141	4	3	6.0	76 Unc	Belly sherd from small, fine, thin-walled pot; diameter at this point 110. Fabric 3 but slightly sandy
BV	694	81.413	160	2	4	5.7	76 unc	Body sherd; uncertain whether a surface had spalled off. Rather gritty for a fine Beaker
BV	744	81.162	813	3	3	6.0	76 Unc, ?fine Bkr	Neck sherd from small pot; diam at this point c 160 mm. Very similar to Cat. No. 747. Can't rule out possibility that it's from a very fine E/MN pot
BV	745	81.448	812	2	3	6.1	76 Unc, ?fine Bkr	Small body sherd from thin, fine pot
BV	862	81.430	874	1	2	8.1	76 crb	Small abraded body sherd from fairly thin, fairly fine pot; can't rule out possibility that it's E/MN. Fabric 2 but not abundant mica
BVSX	540	81.191	141	1	2	7.6	NC	Very small, heavily-abraded body sherd from thin, fine pot, prob Beaker. Fabric 2 but very few corky voids
BVSX	870	81.383	141	2	2	6.6	76 crb	Belly sherd from small, thin, fine pot. Diam at this point c 150. Fine but gritty fabric
BVSX	881–3	81.409	812.1	1	3 but fairly soft	7.5*	76 crb	Prob from neck
BVSX	884–94	81.432	812.1	7	3	6.6	76 crb	5 small sherds + 6 frags from thin, fine pot; could be fine or dom Beaker (but can't rule out possibility that it's E/MN)
DI	748	80.121	315	2	3	7.2	76 Unc ?fine Bkr	Small neck sherd from thin fine Beaker

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
DI	897	80.151	315	1	1a	6.7	76 crb	Small body sherd from small thin fine pot; sherd too small to estimate diameter
DI	898	80.173	315	1	1a	6.3	76 crb	Body sherd from small, thin, fine pot; diam at this point c 150 mm
DI	922	81.249	320	1	3	6.7	76 crb	Very small sherd from thin fine pot
DI	939	81.237	369	3	3	5.9	76 crb	Poss from belly of small thin fine pot; diam at this point c 130
DI	953	81.282	374	1	3	7.9	76 crb	Small body sherd from fairly thin, fairly fine pot; could well be Beaker
DI	954	81.276	377	1	3	7.7	76 crb	Small abraded body sherd
DI	955	81.285	385	1	1(?)	6.3	76 crb	Small belly sherd from small thin fine pot, most prob Beaker
DV	975	81.042	340	1	2	3.9*	76 crb	Spall, prob from neck or belly of fine Beaker
E	984	81.033	1108	1	2	6.0	76 crb	Belly sherd from small thin fine pot; est siam at this point c 100 mm. Fabric 2 but mica not abundant
G1	639	80.005	1306	1	3	6.5	79	Body sherd from thin fine pot, most prob Beaker but can't rule out possibility of E/MN date
HI	155	81.154	746	1	1a	4.3	11	Body sherd from thin, fine pot that could be Beaker rather than E/MN
HI	992	81.062	707	1	1	5.5*	76 crb	Small spall, probably from flat base; too small to estimate diameter
HII	27	81.229	768	<1	3	4.1*	NC	Featureless spall from fine, thin-walled pot, poss Beaker
HII	28	81.229	768	<1	3	3.6*	NC	Spall from very fine, prob thin-walled pot

Note 18.7.7: List of Beaker sherds identified as 'domestic Beaker'

The first table lists those sherds counted in the 'conservative' estimate of Minimum Number of Individual (MNI) vessels – i.e. those where the identification as Beaker is based on diagnostic features such as rims, bases and decoration. The second table lists other sherds that count as 'probable/possibles'. The entries are sorted by Area and, within that, by Cat. No.

Entries grouped together indicate where the sherds are definitely/ probably/possibly from the same pot. Sherds that had been identified by Audrey Henshall as definite or possible fine Beaker are indicated in bold. An asterisk beside wall thickness indicates that one surface spalled off.

i) Sherds included in the conservative MNI estimate of 'domestic' Beakers

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
HII	541–2	81.147	733	1	3	5.5*	67	2 small, abraded body spalls with same kind of dot-stab impressed decoration seen on ASH 65 and 66, but from a different pot
HII	672	81.351	730	2	3	6.2	79	Gentle carination plus adjacent parts of neck and upper belly of very thin, very fine pot, prob Beaker. Soft; may well be burnt.
HII	1031	81.009	708	1	3	7.6	76 crb	Small sherd from base-wall junction, prob small pot but sherd too small to estimate diameter. Wall splays slightly
BI	405	81.443	100	15	2	10.5	44a	405 = Neck sherd, broken along ring joint to create 'false rim'; diam at this point c 140 mm. Horizontal incised lines on E. 406 = belly sherd, poss as large as c 230 mm diam at this point. Could nevertheless possibly be from same pot as Cat. No. 405 if pot had had a funnel-like neck and globular belly (cf. ASH 48). Not much mica in inclusions
BV	406	81.198	837	13	2	10.1	44b	

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
BIII	554	80.042	117	2	3	9.4*	72	554 + 555 = body sherds; 556 = neck sherd, from large pot with oval jabbed impressions, similar to those on Cat. Nos. 549–53. Could possibly be from same pot as 549–53. Diameter at neck c 200 mm
BV	555	81.396	813	2	3	9.2*	72	
BV	556	81.178	810	2	3	11.5	72	
BIV	437-475	80.119	134	30	4	12.4	59.a	473–5 =Base + 2 body sherds from fairly large, flat-based dom Beaker; too small for EBD. Wall prob. splays widely. Fabric 4 but inclusions not very abundant.
BVSX	484	81.387	141	13	4	11.5	59b	484 = 2 refitted sherds from base, prob of same pot as ASH 59a; EBD c 110
BIV	520	81.449	877	11	2	9.8	NC	Curving, splaying neck, prob from domestic Beaker; diam at this point c 190 mm
BV	407	81.620	814	11	2	10.1	44c	Probable base plate from large 'domestic' Beaker, but not necessarily the same pot as ASH 44a-b. Not much mica in inclusions
BV	537	80.061	117	4	2	9.9	66	537 = belly, near base of small 'domestic' Beaker; diam at this point c 120
BV	538	81.397	810	5	2	9.6	66	538 = sherd from further up belly of same pot
BVSX	539		141	9	2	10.4	66	539 = from further up belly than 537 & 538; diam at this point c 170. Small circular stab impressions, in irregular rows

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
BVWX	422	81.195	859	6	2	11.4	48	Sherds from rim, neck, carination and belly of large jar of unusual shape, with funnel-like neck and globular belly, as described in 18.4.6., Entry 3. ERD 190 mm; diam at carination possibly 260 mm. Decoration: 3+ deep, wide horizontal grooves under rim, plus impressions of marine shell edge, with wavy edge: 2 concentric lines on rim top; 2 lines immediately below rim and above grooves; and as horizontal lines below grooves.
BVWX	423-424	81.379	859	8	2	11.4	48	
DI	425	80.79	859	2	2	10.9	48	
DI	426-427	80.86	315	2	2	8.5	48	
DI	428-429	80.88	315	4	2	8.6	48	
DI	430	80.93	315	6	2	8.2*	48	
DI	431	80.120	315	18	2	9.5	48	
DI	432-437	80.123	326	33	2	11.4	48	
DI	438	80.186	326	5	2	10.2	48	
DI	439-449	80.186	326	19	2	8.8	48	
BV	857-861	81.606	837	1	2	5.8*	48	
BVSX	466	81.194	141	15	1	15.5	53.b	466 =Rim, rounded & everted, from large, thick-walled domestic Beaker; ERD 230–250 mm, with deep horizontal groove below rim on E, creating cordon-like feature. Definitely from same pot as ASH 54 and poss from same pot as ASH 53a, even though sub-rim groove is narrower and I is different colour.
DV	467	81.044	344	11	1	15.4	54	467 = rim from same pot as ASH 53b and possibly same pot as ASH 53a; ERD 230–250 mm
BVSX	485–7	81.387	141	3	3	12.1	NC	Probably a base sherd

ii) Other sherds likely to be from 'domestic' Beakers (but see qualifications in some of the entries below)

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
BNW	365	80.185	9999	2	3	7.4*	NC	Body sherd, poss dom Beaker
BI	359	80.144	120	1	3	8.8	NC	Poss from neck, poss domestic Beaker
BIINE	579	80.029	112	8	3	10.8	NC	Probably lower belly sherd; diam at this point c 180 mm
BIVWX	602	81.380	859	18	3	11.1	79	Sherds possibly from large domestic Beaker, although cannot rule out later date.
BIVWX	603-4	81.386	859	13	3	11.0	79	602 = prob from neck of large pot; diam at this point c 210 mm. Hard, non-gritty, laminar fabric. Harder than other Calanais Beaker pottery, although from stratigraphy and sherd shape, may be dom Beaker.
BVSX	607-609	81.141	141	c15	3	10.4	79	603–604 = neck sherd; from same pot as 602 and probably also same pot as 607–9
BVSX		81.906	141	c6	3	11.2	79	607–9 =3 refitted sherds from gently cuving neck of large pot of hard, non-gritty fabric. Diameter at this point c 220 mm
BVSX		81.384	141	c12	3	9.0	79	
BV	758	81.616	160	6	1a	9.0	76 Unc poss dom Bkr	Body or base sherd, poss Beaker; can't rule out possibility that it's of later date

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
BV	879	81.373	812	3	4	8.1	76 crb	Belly sherd from small, fairly thin-walled pot with fine-gritty fabric; est diam at this point c 160. Most likely to be dom Beaker but can't wholly rule out possibility that it's E/MN
BVSX	610	81.384	141	2	3	10.1*	79	Featureless body sherd
BVSX	895	81.615	812.1	3	3	5.7	76 crb	Spall, prob from a flat base; could be either fine or dom Beaker
BVWX	611	81.416	160.3	4	4	8.2	79	Belly sherd from small, fairly thin-walled fine-gritty pot; diam at this point c 170 mm. Slightly grittier than the grittiest definite domestic Beaker from Calanais, but may still be Beaker
BVWX	612	81.416	160.3	5	4	9.2	79	Featureless sherd from pot with fairly hard, gritty fabric
BVWX	698	81.438	160.3	2	2	8.0	76 Unc	Small abraded belly sherd, poss from thin dom Beaker
DI	595	81.278	376	4	4	8.1	77	Upright, sharply squared-off rimsherd from small, fairly thin-walled pot with hard, gritty fabric; ERD poss c 150 mm. Grittier than Beakers of comparable thickness but stratigraphy suggests that it could be mid-2nd millennium or older – in which case, Beaker is the most likely
DI	706	80.181	315	3	1a	4.1*	76 unc	Spalls from gently-curving neck of fairly large cooking pot

Area	Cat. No.	SF No.	Con-text	Shd Wt. (g)	Fabric	Th	ASH No.	Summary description
DI	765	81.255	376	6	2	10.5	76 Unc (?dom Bkr)	Belly sherd; diam at this point c 200 mm
DI	927	81.242	333	2	3	10.0*	76 crb	Belly sherd, prob from fairly small pot with hard fabric; I spalled off; could possibly be dom Beaker
HII	671	81.351	730	4	3a	9.4*	79	From fairly fine pot, possibly from carination area; possible shallow incised V on exterior. Note: cannot entirely rule out the possibility that this is a post-Early Bronze Age pot

Table of Misc Beakers by context

Area	Ctxt	Dom No	Fine No	Dom wt (g)	Fine wt (g)
BI	100	1	1	15	6
BI	120	1	1	1	1
BI	149	0	1	0	1
BIII	112	0	1	0	1
BIII	117	1	0	2	0
BIII	121	0	2	0	10
BIII	142	0	1	0	1
BIII	9999	0	1	0	2
BIINE	112	1	0	8	0
BIV	134	1	1	30	16
BIV	814	0	1	0	1
BIV	863	0	1	0	7
BIV	877	1	0	11	0
BIVSX	141	0	2	0	3
BIVSX	859	2	1	31	2
BIVSX	885	0	1	0	1
BNW	9999	1	0	2	0
BV	117	1	0	4	0
BV	141	0	1	0	4

Area	Ctxt	Dom No	Fine No	Dom wt (g)	Fine wt (g)
BV	160	1	1	6	2
BV	810	2	0	7	0
BV	812	1	1	3	2
BV	813	1	2	2	7
BV	814	1	0	11	0
BV	837	2	0	14	0
BV	874	0	1	0	1
BVSX	141	9	4	90	18
BVSX	812.1	1	2	3	8
BVWX	160.3	3	0	11	0
BVWX	859	2	0	14	0
DI	315	11	12	47	35
DI	318.3	2	1	65	4
DI	320	0	1	0	1
DI	326	3	0	57	0
DI	332	0	1	0	5
DI	333	1	0	2	0
DI	360	0	1	0	1
DI	369	0	1	0	3
DI	374	0	1	0	1
DI	376	2	0	10	0
DI	377	0	1	0	1
DI	385	0	1	0	1
DI	321.2	1	1	3	2
DII	336	1	0	6	0
DV	340	0	1	0	1
DV	344	2	0	22	0
E	1108	0	1	0	1
E	1108 & 1112	1	0	19	0
GI	1306	0	1	0	1
HI	707	1	1	14	1
HI	735	0	1	0	2
HI	739	1	1	6	1

Area	Ctxt	Dom No	Fine No	Dom wt (g)	Fine wt (g)
HI	746	1	1	1	1
HI	748	0	1	0	1
HII	708	0	1	0	1
HII	730	1	1	4	2
HII	733	0	1	0	1
HII	768	0	3	0	2

25.19 Notes for Chapter 19: Soils

There are no notes for Chapter 19 apart from a reference to Technical Note 13.4.2

25.20 Notes for Chapter 20: The Vegetation Survey

Note 20.1 Authors

The records do not make it clear who produced the report on the vegetation. My memory is not clear on the matter. It is my spotty recall however that Marion Wade-Evans had considerable expertise and that Alan Fairweather helped her. It may have been Alan who produced the final typescript (preserved in the archive and to be found in digital form in Calanais Resources).

A vegetation survey was conducted for HS years later and is presumably available from it.

25.21 Notes for Chapter 21: Palaeoenvironment

Note 21.4.5: Section 105 recording

The details of the section in Illus 21.14 differ from those on the original section drawing. They include information from photographs taken just before sampling (Films PO1 and PO2). The differences reflect cutting-back of the section for sampling.

25.22 Notes for Chapter 22: Macroplant

Note 22.4.1 Errorst

In the original report Sample 391 was numbered 139 which according to the context record is a mistake

Sample 255 may actually have been 2255 as suggested by the context list.

'Contexts' 240 and 241 (marked as 'not found') do not exist. Nor are samples 240 and 241 in the context list. Finds 240 and 241 are pot. I have therefore removed those rows.

Sample 672 does not exist in Context or Sample list.

Small find 672 is listed as quartz.

Sample 3688, said to be from context 369 and from McCullagh's 1983 work, is labelled wrongly. Samples from context 369 listed in the context and sample lists are:
2567;

— 673/81 charcoal sample - seen 23/10/95;
— 678/81 charcoal sample - seen 23/10/95;
— 688/81 charcoal sample - seen 23/10/95;
— 693/81 charcoal sample - seen 23/10/95

I suppose the likeliest answer is that the identification was from sample 688.

Sample 2060 is said to be from GIII but is more likely to be from GII (see Technical Note 13.4.2)

Sample 2243 is from 736 not 733 according to the sample list; note that the McCullagh charcoal list has this right despite it being wrong in the original version of this document (corrected).

Sample 2256 is not from 759 but from 795 according to the sample list (corrected).

2052 is said to be from D812; but 800-series numbers are from Area B. The full context list has sample 2052 from D360 (corrected).

Small find 54 is a carbonised Pomoideae sp.

charcoal twig from Area B 123 not 132 (corrected)

According to the original finds book and the context list a piece of barley (75/81 barley (2.20/1.25)) was found in H728.

According to the original finds book and the context list a piece of carbonised hazelnut 108/81 (1.18, 2.43/1.05) was found in H732.

This report does not seem to include all of the McCullagh table rows (a copy of that table can be found in the digital archive).

Uncontexted samples:

Table 25.11 Uncontexted samples

Sample	Other	Notes	Vol	Sieved	>4mm char
2595 1	Uncontexted ….	Site B, S ext, 141???	3.5	Yes	0.04
2595 2	Uncontexted ….	Site B, S ext, 141???	3.5	Yes	0.08
2595 3	Uncontexted ….	Site B, S ext, 141???	5	Yes	
BH770/ BP2	Callanish Soil Samples	Find?	n/a		
	CAL 80/ BL/001	1 x tin of "peat samples for PA"	n/a		

The full sample list has sample 2595 from context 141. It is credible that 3 sample bags were taken from this charcoal-rich soil [PJA]

25.23 Notes for Chapter 23: Radiocarbon

Note 23.2.3 Bayesian modelling

Several simple Bayesian models were developed. After further stratigraphic analysis they were abandoned.

The first listing is for a model using all of the dates; but it had few stratigraphic controls and was rapidly abandoned. Please note that the Phasing nomenclature here is different from that adopted for final publication.

Listing 1: Script for the 6 Date Group model

```
Sequence "Calanais all dates"
{
 Boundary "Start 1";
 Phase "1"
 {
  R_Date "SUERC-11588" 6295 35;
  R_Date "SUERC-11989" 6245 35;
  Interval "Span 1";
   !calculates interval between
   !Start 1 and End 1
 };
 Boundary "End 1";
 Interval "Interval 1 to 2";
 Boundary "Start 2";
 Phase "2"
 {
  R_Date "SUERC-11589" 4880 35;
  R_Date "SUERC-11601" 4760 35;
  Interval "Span 2";
 };
 Boundary "End 2";
 Interval "Interval 2 to 3";
 Boundary "Start 3";
 Phase "3"
 {
  R_Date "SUERC-11600" 4515 35;
  R_Date "SUERC-11608" 4510 35;
  R_Date "SUERC-11596" 4495 35;
  R_Date "SUERC-11597" 4495 35;
  R_Date "SUERC-11607" 4490 35;
  R_Date "SUERC-11599" 4475 35;
  R_Date "SUERC-11612" 4475 35;
  R_Date "SUERC-11592" 4465 35;
  R_Date "SUERC-11606" 4455 35;
  R_Date "SUERC-11611" 4450 35;
  R_Date "SUERC-11618" 4450 35;
  R_Date "SUERC-11617" 4425 35;
  R_Date "SUERC-11616" 4430 35;
```

```
 R_Date "SUERC-11598" 4390 35;
 R_Date "AA-24965" 4385 50;
 Interval "Span 3";
};
Boundary "End 3";
Interval "Interval 3 to 4";
Boundary "Start 4";
Phase "4"
{
 R_Date "AA-24966" 4210 50;
 R_Date "AA-24960" 4205 50;
 R_Date "AA-24970" 4205 45;
 R_Date "AA-24964" 4185 45;
 R_Date "AA-24959" 4140 45;
 R_Date "AA-24963" 4115 45;
 R_Date "AA-24969" 4095 45;
 R_Date "AA-24958" 4065 45;
 R_Date "AA-24961" 4055 50;
 R_Date "AA-24967" 4050 45;
 R_Date "SUERC-11590" 3965 35;
 R_Date "SUERC-11591" 3915 35;
 Interval "Span 4";
};
Boundary "End 4";
Interval "Interval 4 to 5";
Boundary "Start 5";
Phase "5"
{
 R_Date "AA-24956" 3580 45;
 R_Date "AA-24968" 3575 45;
 R_Date "AA-24962" 3555 50;
 R_Date "AA-24957" 3495 45;
 Interval "Span 5";
};
Boundary "End 5";
Interval "Interval 5 to 6";
Boundary "Start 6";
Phase "6"
{
 R_Date "SUERC-11610" 3220 35;
 R_Date "SUERC-11609" 3215 35;
 R_Date "SUERC-11602" 3195 35;
 Interval "Span 6";
};
 Boundary "End 6";
};
```

Phase Group 4 model (30 Jan 07)

The second listing is for a model based only on contexts in the area of the Ring with stratigraphic controls, excluding material thought to be obviously residual. Again the phasing is different from that finally adopted. In this model AA-24969 was assigned to the pit of Ring stone 42. That was wrong and the sample actually came from secondary layers of the cairn.

Listing 2: Script for Phase Group 4 model

```
Sequence "Group 4"
{
 Boundary "Start Phase 4a";
 Phase "4a"
 {
  R_Date "AA-24970" 4205 45;
  Interval "Span 1";
   !calculates interval between
   !Start 1 and End 1
 };
 Boundary "End 4a";
 Interval "Interval 1 to 2";
 Boundary "Start 4b";
 Phase "4b"
 {
  R_Date "AA-24969" 4095 45;
  Interval "Span 2";
 };
 Boundary "End 4b";
 Interval "Interval 4b to 4c";
 Boundary "Start 4c";
 Phase "4c"
 {
  R_Date "AA-24959" 4140 45;
  Interval "Span 3";
 };
 Boundary "End 4c";
 Interval "Interval 4c to 4d";
 Boundary "Start 4d";
 Phase "4d"
 {
  R_Date "AA-24964" 4185 45;
  Interval "Span 4";
 };
 Boundary "End 4d";
 Interval "Interval 4d to 4e";
 Boundary "Start 4e";
```

```
 Phase "4e"
 {
  R_Date "AA-24963" 4115 45;
  Interval "Span 5";
 };
 Boundary "End 4e";
 Interval "Interval 4e to 4g";
 Boundary "Start 4g";
 Phase "4g"
 {
  R_Date "AA-24967" 4050 55;
  Interval "Span 6";
 };
 Boundary "End 4g";
};
```

This model and other similar models were abandoned in 2009 when further examination of the primary excavation records confirmed that a Beaker sherd was indeed securely stratified in the primary cairn. In 2011 and early 2012 identification of a few probable Beaker sherds in pre-cairn contexts provided more support for dating the cairn to after 2500 BC. That increased the likelihood that all of the dated charcoal, except perhaps a fragile heather twig, was significantly residual to such an extent as to preclude Bayesian modelling based on the proposition that samples could be chronologically ordered by their stratigraphic relationships.

25.24 Notes for Chapter 24: Discussion and conclusions.

The data set used here is derived from the 2005 Historic Scotland database and is called 'C14dates 2005 plus.mdb',. It includes the publically available C14dates 2005.mdb housed in NMRS and the data in the splendid lists published in and for the years between 2005 and 2011 in D&ES by Alison Sheridan and her collaborators. It does not include ages obtained by HS since it ceased publication of its lists in D&ES (Ashmore 2005). The latter are now available through NMRS

Note 24.2.4 Ancient genes

Claims of a human presence in the Western Isles and neighbouring areas from between 13,000 and 11,000 years BC have been made by Oppenheimer (2007, 129-31, Figures 3.3 to 3.5; 134-5, Figures 3.6a to 3.6d). These are based on the modern presence of gene groups which changed around that time, approximately the warm period before the Younger Dryas.

In general the date of arrival of people in areas where a particular gene variation now occurs need not be the same as the date the variation first occurred. The genes might have arrived much later in genetically heterogeneous populations. In other words, a single ancient gene variation in a modern population provides a terminus post quem for the arrival of their ancestors, a marker-date some time, perhaps a long time, before the people immigrated. That is useless afor regional studies. But Oppenheimer's analysis is more convincing (with the strong qualifications described below) when it is based on genetic variations which seem to have arisen locally, and he cites a localised gene variant which he claims arose in the Highlands before the Younger Dryas cold period (Oppenheimer 2007, 173-4 Fig 4.7).

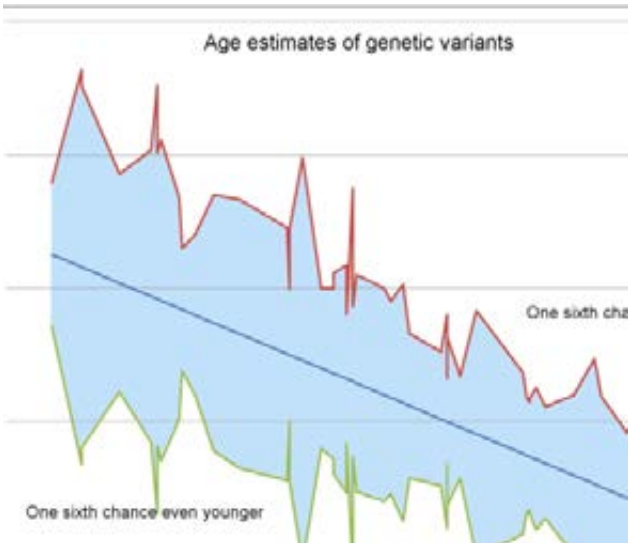
But it is important to remember that if the ranges of prey animals shifted northward with regional warming then dependent human populations may have moved after them en masse, taking a local gene variant with them and precluding it from the subsequent gene pool of the area in which it first occurred. That means that the gene variation may not have originated where it is found today and by extension its dating does not apply except as a terminus post quem in the area of its present distribution.

Nevertheless there is some published archaeological evidence to support Oppenheimer's dating of human activity in Highland Scotland to the period 13,000 to 11,000 BC (Chapter 24 Discussion 24.2.4). Overall it seems sensible to treat Oppenheimer's claim that people who contributed to the modern local gene pool were settled in the Highlands of Scotland before the Younger Dryas as a fair working hypothesis.

However many of Oppenheimer's other conclusions seems to be based on genetic changes which took place elsewhere so it is far from clear when exactly those people arrived. There is another serious problem. Oppenheimer provides age estimates

for c. 65 particular gene changes, giving the size of the standard deviations (or the standard errors) attached to them in various Notes. Generally the errors are around half the associated age estimates.

In Illus 25.# his estimates for ages under c. 12,000 BC have been put in order of age (from left to right). The standard deviation associated with each age is shown by the red and green lines. Statistically, only 2/3 of true ages will actually lie in the blue-coloured area although alas it is uncertain which estimates are seriously wrong. But for instance an age estimate of 4000 BC (an age of c. 6000 before present) has a 1/6 chance of actually lying after 1000 BC. Most of his ages are in fact not significantly different from many of their neighbours, in the sense used by statisticians.



Illus 25. 13 The 1 sigma errors associated with Oppenheimer's age estimates.

In fact data can be ordered for any given lineage by adding information about which gene changes preceded others. So probably the situation created by the size of the errors on individual estimates is not as bad as Illus 24.# suggests. Nevertheless it is far worse than his text implies. Further, and presumably devastatingly for his date estimates, in 2012 it was reported that the best estimate for human mutation rates is half that previously assumed (Brahic 2012, 36). Presumably Oppenheimer's chronological estimates will have to be reviewed and roughly doubled. I have therefore not mentioned his conclusions in the main text.

Note 24.4.3 Forager and Farmer interaction: the arguments offered in Thomas 2005

In what follows the arguments put forward by Thomas (2005, 125-6) are in italics. My comments are in regular type.

1. Britain and Ireland were not isolated in the Late Mesolithic. The presence of domesticated animals in late Mesolithic communities in Ireland undermines any suggestion that they were.

Two dates for pre-farming cattle bones from Ferriter's cave in Ireland have been discussed by Woodman and McCarthy (2003, 32-6). They suggested that cattle might have been prestige gifts or economic supplements to communities which, at least in terms of lithics, were remarkably insular (Woodman and McCarthy 2003, 36). They have since documented problems with the dates (Sheridan 2009) but they suggest those are not bad enough to invalidate all of them.

In abstract terms, the bovines in Ireland in the 5th millennium BC may suggest at any one time either a succession of short distance links or a single long distance link. A large skin boat could undoubtedly carry cattle (Bowen 1972, 36). However, the proposition that cattle imports are evidence for a substantial amount of cross-cultural knowledge is otherwise weak. As Thomas himself pointed out people could adopt single traits of a culture while ignoring the rest.

2. Indigenous people will have been aware of the contents of the Neolithic package long before 4000 BC. The adoption of domesticates and novel forms of material culture cannot be explained by the arrival of boat loads of continental people.

I have no quarrel with the first proposition, although the direct evidence is at present restricted to Ireland. But the latter argument seems to me a non-sequitur; no new evidence is adduced in support and there is little dated evidence for novel forms of material culture amongst basically indigenous cultures. Indeed Woodman and McCarthy have pointed to a lack of lithic evidence for contact between the continent and Ireland in this period (2003, 36).

3. It is unfeasible that the rapid spread of the Neolithic 'package' was triggered only by the arrival of a few boatloads of agriculturalists from NW Europe.

For Thomas' argument to succeed it has to be demonstrated that it was more difficult to borrow from (a few) people close to hand than from more distant people. Had he modified his argument to say merely that the rapid spread of the Neolithic 'package' would have been quicker if indigenous populations adopted farming from close neighbours it would have been much easier to agree with him.

4. There are only two ways to explain the rapidity of the transition: either a massive influx of farmers or its sudden and widespread adoption by indigenous groups.

Any assertion that all but extreme explanations should be excluded is intellectually unacceptable. Sheridan has documented the proposition that the introduction of farming need not have been a unitary phenomenon, nor need it have happened abruptly around 4000 BC (Sheridan 2009, 1). That said, even the strongest proponents of the idea that farming was introduced to Britain by small groups of colonists accept that indigenous people may have picked up the idea of farming from their new neighbours (Sheridan 2009; Pailler and Sheridan 2009).

5. In the absence of any single donor population on the continent the only realistic possibility is that indigenous people in Britain, Ireland and Scandinavia adopted farming over a period of two centuries.

This should be read in the context of Thomas' earlier acceptance that the material cultures of the first farmers in Britain showed similarities to those in neighbouring parts of the continent (Thomas 2005, 118; Whittle 1977).

The material culture of the indigenous people seems to have been fairly uniform even though some variations in the use of lithic resources may reflect differences (Wickham-Jones 1994, 97) and it is envisaged that they maintained widespread social networks, although that is very largely a presumption based on ethnographic analogies and the lack of variation in lithic assemblages.

Turning Thomas' argument on its head, if indigenous cultures were homogenous around 4000 BC, the subsequent regionalisation of Britain can most easily be explained by (local) contacts with groups of incoming farmers from different parts of the continent (Pailler and Sheridan 2009, 47-8).

6. Given a long period of interaction between insular foragers and continental farmers, the likeliest explanation for insular change is that the practises of the farmers were good tools for creating and maintaining group identities [and thus highly attractive to insular foragers].

This is a sophisticated argument best seen against a background of an apparent general uniformity in insular forager material cultures. But that evidence is based on not much more than lithics. The claim that foragers could not maintain group identities in ways as attractive as those offered by farming is somewhat audacious.

7. The differences between the early farming material cultures of Britain and Ireland reflect different adoption pathways determined by cultural differences in the pre-farming period.

It would be equally easy to argue that the differences between the material cultures of the farmers in Britain and Ireland owed much both to differences in environments and the different origins of farming groups colonising different regions. In other words the differences in both periods may have owed much to environmental and social factors with many inputs, amongst which those of incoming farmers may have played a large part.

7 and 8) The British indigenes adopted pastoral lifestyles because they were used to managing large prey animals. The Irish indigenes, lacking that heritage, adopted more sedentary settlement patterns based on houses. The large British halls were not houses. Thereafter the shift in Britain to sedentary patterns was gradual.

Equally one could argue that incoming farming groups learnt from indigenous cultures. The possible parallel cited by Thomas, quoting Richards (2003, 33), of the Norse settlement of Greenland can be used in the opposite way that Thomas did (2005, 117), to suggest adoption of insular subsistence practices by incomers rather than changes amongst the indigenous people.

Even the strongest proponents of the idea that farming was introduced to Britain by small groups of colonists accept that indigenous people may have picked up the idea of farming from their new neighbours and spread it to other groups (Sheridan 2009; Pailler and Sheridan 2009). But the bar-

riers to adoption of cereal cultivation in Scotland should not be underestimated. Ester Boserup in her 'The conditions of agricultural growth' showed that the introduction of farming and its intensification are normally dependent on population densities rather than the opposite (1995, 11-14). She showed that most forms of farming are much more laborious than foraging. The lowest input systems involve secondary forest in which fire does most of the work. Bush clearance systems are more labour-intensive. In more intensive systems the need for frequent weeding and grass root clearance makes for even harder work (Boserup 1995, 15, 29-31). That makes the adoption of intensive farming techniques by foragers unlikely in the absence of population pressures (the same is not true of non-intensive cereal planting and some modern foragers do not distinguish between gathering and planting of crops (Zvelebil 1998, 6)).

Other important factors may have been in play in the period when farming began in Britain and Ireland. There is a fairly strong possibility that incomers living with domestic animals of Near-Eastern origin brought highly infectious diseases with them, or foragers visiting farmers brought sickness back. Diamond has suggested that the rise of agriculture (and the keeping of domesticated animals in close proximity) in the Near East launched the evolution of crowd-infectious diseases. "Infectious diseases, like smallpox, measles and flu arose as specialized germs of humans, derived by mutations of very similar ancestral germs that had infected animals" (Diamond 2005, 92). He listed the animal pathogens which leapt to humans (ibid, 207). There are many recorded examples of high death rates amongst hunter-gatherer groups through disease after contact with farmers (ibid, 87 Fig 4.1). For example "… in the winter of 1902 a dysentery epidemic brought by a sailor … killed 51 out of the 56 Sadlermiut Eskimos, a very isolated band of people …" (ibid, 204). It is possible that epidemic diseases weakened the ability of indigenous foragers to defend their territories from incoming farmers. It is even possible that some Mesolithic populations were drastically reduced by diseases such as poxes before farmers settled the areas they had inhabited (Holtsby et al. 2012, 207-8). That might allow groups of farmers to expand as fast as or faster than new techniques could be spread by groups of indigenes.

Inter-group violence may have been a counter-acting factor. In modern hunter-gatherer groups about 10% of deaths are from violence, which usually takes the form of raiding. There seems little doubt that small isolated groups of incomers would have been vulnerable, and that might be taken as an argument against the likelihood of a successful proliferation of groups of farmers.

Note 24.4.4 Pottery from contexts inside the Ring with Phase 3 charcoal

This is also referred to from Chapter 23 Radiocarbon 23.5.6.

The 13 Phase 3 dates came from 9 contexts, of which 4 were in Area D, 3 in Area H, one in Area S and one under the passage wall in Area BIVWX. Of these, contexts 369 and 398 also produced later radiocarbon-dated charcoal.

The following contexts produced dates but no pottery: D398 green clay under cairn, B883 grey-green clay under passage wall, H772 dark grey/green fill of slot 773 under cairn and H778 gritty very humic middle fill of slot 773. But the lowest fill of this slot produced two probable Beaker sherds (Cat 671 and 672).

Five contexts produced potsherds, predominantly Early/Middle Neolithic, although indeterminate sherds were fairly common and some Beaker sherds were also found (Table 25.12). Context 352 was black sandy clay south of the cairn. Context 360 was greasy orange/brown clay at the base of the cairn near the outer face of the chamber wall. It included a fine Beaker sherd (Cat 932). Context 369 was a layer of dark greasy clay rich in charcoal fragments which survived just south of the cairn in a shallow hollow beneath plough soil 315. It included a sherd from a small thin fine pot, probably a fine Beaker (Cat 939). Context 746 was a light grey-brown slightly sandy charcoal-rich clay, with a variable texture from friable to greasy. It immediately underlay the locally uppermost turf line, although technically unrelated to more widely spread layers during excavation it was thought to be contemporaneous with turf line 771, possibly

equivalent to a turf line on the green clay platform under the cairn. It included a sherd possibly from a fine Beaker (Cat 155) and a small sherd probably from a domestic Beaker (Cat 523). Plough soil 1213 on Area S produced numerous small sherds (Cat 1049-1103) all from one E/MN corky pot.

The most likely implication of this pattern is that clay containing Phase 3 charcoal and E/MN pottery was dumped in the area before the cairn was built but after Beakers had reached the area. One sherd group (Cat 759-761 could have been from Domestic Beaker or very much later. Stratigraphically the latter is highly unlikely.

Table 25.12 Pottery from contexts inside the Ring with Phase 3 charcoal

Cat	Area	Ctxt	Shd Nos	Date	Pot type	Comments
16	DI	352	1	E/MN	Corky	Rim or rim flange from thin fine pot.
114_115	DI	352	2	E/MN	Corky	From abraded relatively thick pot.
116	DI	352	1	E/MN	Corky	
928_931	DI	352	3 & 1F & crbs	Indet;	Indet	Heavily bunt and abraded spalls from a conceivably E/MN pot.
620	DI	360	1	Prob E/MN	Non-corky	Belly sherd from large pot with virtually all of exterior spalled off.
621	DI	360	1	?E/MN	Non-corky/ Heb Inc	Belly sherd from large pot
932	DI	360	1	Chalco/ EBA	Fine Beaker	From thin fine Beaker; Area given as DV on original finds bag.
30_38	DI	369	7 + 2F + sev crbs	E/MN	Corky	From thin, fine pot.
39_43	DI	369	4 + 1F	E/MN	Corky	From fairly fine pot.
117	DI	369	1	E/MN	Corky	From fairly fine pot; much of interior spalled off
118	DI	369	1	E/MN	Non-corky	Featureless body sherd
119	DI	369	1	E/MN	Corky	Much of interior spalled off.
222	DI	369	1	E/MN	Non-corky	Rim rounded, upright.
339	DI	369	1	E/MN	Heb Inc	Narrow incised herringbone lines on exterior

Cat	Area	Ctxt	Shd Nos	Date	Pot type	Comments
712	DI	369	1	E/ MN or Chalco/ EBA	Non-corky or dom Beaker	Small sherd from cooking pot
713	DI	369	1	Prob E/ MN	Non-corky	Small abraded spall
759_761	DI	369	3	?Chalco/ EBA or post-EBA – poss 1st millen-nium AD?	Dom Beaker or much later pot type	May well be from same pot as Cat. 752–757 form B 141, interpreted as a plough soil. Chalco/EBA Domestic Beaker or much later pot type, poss 1st millennium AD
762_764	DI	369	2 & 1 F & crbs	Indet	Indet	Featureless body sherds, burnt; soft and friable.
935	DI	369	1	Indet;	Indet	Small abraded spall.
936_938	DI	369	3F	Indet	Indet	Three tiny heavily abraded and quite possibly burnt fragments.
939	DI	369	1	Prob Chalco	Prob fine Beaker	From small thin fine pot, probably a fine Beaker.
940_944	DI	369	5	Prob E/ MN	Corky	.
143_154	HI	746	10 + 2F + crbs	E/MN	Corky	Body sherds (including several spalls) from pot with laminar, friable fabric.
155	HI	746	1	? Chalco/ EBA	? fine Beaker	Body sherd from thin, fine pot, possibly fine Beaker.
522	HI	746	1	E/MN	Heb Inc	Rim flange from large, thin, fine Hebridean Incised pot.
523	HI	746	1	Prob Chalco/ EBA	Prob Beaker	Small sherd probably from a domestic Beaker.
1049-1103	S	1213	31+ 24 F plus crbs	E/MN	Corky	All probably from a single medium-sized cook-ing pot of corky fabric; a

Note 24.4.5a The duration of farming in pollen zone 2c and the duration of the subsequent period lacking cereal pollen

The part of pollen zone 2c including cereal pollen was represented by 5 cm of peat, and judging by that and the peat column radiocarbon dates and interpolated dates this period probably lasted between 385 and 585 years before farming stopped locally at some date between 3490 and 3020 cal BC.

Similarly the subsequent Zone 2d during which pollen did not include cereals was represented by 4 cm of peat and the simplest interpretation is that farming ceased locally for between 430 and 520 years.

However, each analysed block of peat represented between 80 and 120 years of growth and it is not certain where within each block the cereal pollen grains were preserved. Therefore the lowest estimates of duration should probably be reduced by about a century; cereals were grown for between 285 and 585 years and the subsequent period without evidence for cereal growing lasted between 330 and 520 years.

But even though the calculation of these durations is beset with uncertainties both the period during which peat was grown and the subsequent cereal-pollen-free period seem to have lasted for many generations.

It is also possible that the lack of cereal pollen in the peat during Sub-zone 2d was caused by a local thickening of the birch woodland canopy (Chapter 21 Palaeoenvironment 21.3.6).

Note 24.4.5b various possibilities relating to the introduction of farming to the Calanais area

Listed below are some possibilities and melanges of the possibilities relating to the introduction of farming in the area around Calanais.

1. Small groups of farmers may have settled around inner Loch Roag from neighbouring communities at some date between 3875 and 3605 BC and stopped cereal cultivation after a few centuries with reintroduction of farming only many generations later

   a. because they came to concentrate on foraging;

   b. because they moved the focus of their farming;

   c. because they died off locally.

2. Farmers may have settled from much further away, leapfrogging intervening communities, with the various sub-possibilities of Possibility 1.

3. Sea-farers may have introduced the idea of growing crops.

   a. Planting and harvesting them to help provide a secure way-point in their travels north and south, with more or less permanent settlement following.

   b. Sea farers may, without themselves settling, have introduced the ideas and seeds which allowed indigenous peoples to broaden their subsistence strategies by including farming.

4. Farming may have been introduced locally by indigenous people.

   a. Indigenous people may have adopted cereal growing and other practises as part of a chain of changes amongst indigenous groups.

   b. Indigenous people may have visited neighbouring farming communities, and brought back agricultural techniques, and domestic animals, and possibly also spouses who supported new practices such as pot-making.

5. Large groups of farmers from Scotland, Ireland or north-west England may have settled.

Possibility 1

The possibility of immigration by farmers is preferred largely because Schulting and Richards have demonstrated a fairly abrupt change of diet in western Scotland around 3800 BC from a reliance on marine sources to a reliance on terrestrial sources of food (Schulting and Richards 2002). That contrasts with what happened in some other

parts of Europe (Lightfoot et al 2011, 73-4, 83). The domination of domestic species in early Neolithic assemblages of plant remains in Atlantic Scotland tends to support the idea that there was a fairly drastic change although in some areas assemblages of plant remains suggest that a reliance on wild food resources continued for many centuries (Bishop et al 2009, 72). Admittedly, for everyone who interprets the evidence as suggesting a change in population there is someone who believes that it demonstrates no more than a change in diet.

If farming had thriven in mainland Scotland from about 3800 cal BC it is credible that resource pressures had grown and that people sought new land rather than improving the productivity of their areas of origin (Boserup 1995). That would fit well with the idea that small groups of farmers moved from time to time to previously unexploited areas.

The likelihood that agricultural technology was lost at least locally after some 10 to 25 generations of farming is based on the evidence from Calanais Leobag described above in Chapter 24.4.4.

Possibility 1a is that the local farmers at some date between 3490 and 3020 BC took up an 'indigenous' life style based largely on hunting and gathering, only for farming to be reintroduced 12 and 20 generations later at a date between 3000 and 2500 cal BC.

Option 1b differs from the first in that it places less weight on the gap in the local cereal record; for cereal pollen does not disperse very widely and it is possible that abandonment of farming close to Leobag was balanced by increased activity not far away.

Option 1c is based on an idea that the local community was successful for many generations but remained small and eventually succumbed to some accident.

Possibility 2

The second possibility is based on the ideas resuscitated by Sheridan (2009). She showed that people from farming communities reached at least as far north as the Irish Channel in the centuries before 4000 BC and it is a formal possibility that their forays, migratory or intermittent, reached even further north. The extension of this idea to fit the evidence from Calanais is that subsequently other groups did something similar.

Possibility 3

The third possibility, that sea-farers initiated farming (either settling people or coming to an arrangement with indigenous groups) to help supply their voyages, rests on a very loose analogy with Greek pioneers in the Black Sea area, and it is included only with hesitation. It is interesting because it allows for the possibility that those responsible for agriculture at Calanais regarded the area mainly as a place to supply voyagers rather than as a new home.

Possibility 4

The fourth possibilities, two versions of adoption of farming by local hunter-gatherers, probably have a lower likelihood because if Boserup's observations (1995), admittedly largely developed in very different environments, are accepted there would have been little in it for them. Factors including the diminishing size of the Great Western Island may have concentrated pre-existing populations and influenced them to take up new lifestyles with effects similar to those in areas near Doggerland (Spinney 2008, 43). However size of landmass alone may have been less important to foragers than length and nature of the coastline and the length and variety of habitats may even have increased as sea level rose if the coast became more indented (Illus 24.3, 24.4).

Possibility 5

The last item in the list, a large influx of farmers over a short period, is meant merely to widen the options. There is little reason for supposing it reflects the reality of the introduction of farming to the Calanais area. Few chambered tombs are known from the area and more might have been expected if there had been a large population of farmers in the middle third of the 4th millennium BC.

Other aspects

Four possibilities can be mixed with the above suggestions. They are not in any particular order of preference.

1. Farmers may rapidly have displaced indigenous foragers through hostile action or disease.

2. Farmers and foragers may have coexisted in largely separate groups.

3. Farmers and foragers may have lived in a social grouping combining aspects of both traditions.

4. Foragers may have displaced farmers through hostile action.

There is no direct archaeological evidence from around Calanais for or against these supplementary options. The best prospect for finding relevant evidence, given the current paucity of plough disturbance in the area, is exploration of the shallow waters of inner East Loch Roag.

Note 24.6.2 Cereals at Machrie North.

At Machrie North pollen analysis of a nearby column produced cereal pollen with an estimated date of 5375 BP (Robinson and Dickson 1993, 117). The uncorrected errors of the adjacent dates were respectively 85 and 130 C14 years and they have to be corrected by multiplying them by 1.4 (Ashmore et al 2000); the error attached to the interpolated estimate is the square root of the sum of the squared (corrected) errors, +/-217. If this is applied the date of the first appearance of cereal pollen calibrates to between c. 4700 and 3700 cal BC.

Note 24.11.2 Soil and clay volumes

The Ring stone pits as a clay source:
1. There were 13 Ring stone pits. The cross-sectional areas of the Ring stones on the Glasgow University plan varied between 0.16 and 0.36 sq m, and their total plan area was about 3.25 sq m.

2. If the Ring stones were set into the ground to a depth of between about 0.5 and about 1m, then the volume of stone in the ground, and thus the volume of clay displaced would have been between approximately 1.5 and 3.25 cubic metres.

3. The volume of packing stones in the pits might have released about the same amount of clay.

4. The total volume of clay displaced might thus have been about 3 to 6.5 cubic metres.

The Monolith pit as a clay source:
1. The stone had a cross-section area of about a third of a square metre

2. If it was buried to (at least) a metre then the volume of stone in the ground, and thus the volume of clay displaced would have been between about 0.3 cubic metres

3. The volume of packing stones in the pits might have released about the same amount of clay.

4. The total volume of clay displaced might thus have been about 0.4 to 0.6 cubic metres

Soils between lowest and middle turf line on Area H (soil 777 in HII above turf line 766 and below turf line 758, soil 756 in HI above turf line 766 and below turf line 751):
1. Soil 777 averages between 0.03 and 0.04m thick on Section 33a and 34a

2. Soil 756 also between 0.03 and 0.04m thick on Section 13

3. Area inside Ring 130 sq m.

4. If this soil spread over the entire Ring its volume would be 130 x 0.03 = 3.9 cubic metres to 130 x 0.04 = 5.2 cubic metres.

The volume of soils 777 and 756 if they did spread over the whole area of the Ring would have been about the same as that released by digging the 13 Ring stone holes, erecting the stones and putting packers and clay back in the pits.

Clay 760 under the cairn on Area H (the chambered cairn had an area of roughly 27 sq m. The underlying green clay platform was only slightly larger):

1. The green clay platform seen on Sections 33A and 34A was on average 0.1 to 0.15m deep.

2. The upper green clay under the kerb slabs on Section 33D was probably green clay 760 rather than 750. It was about 0.1m deep where not truncated by the slot under the largest kerb stone

3. The volume of the green clay platform was 27 x 0.1 = 2.7 cubic metres to 27 x 0.15 = 4 cubic metres.

The volume of the green clay platform would have been less than that released by digging the 13 Ring stone holes, erecting the stones and putting packers and clay back in the pits. But there would not have been enough clay solely from the more local pits.

Clay 750 to its north of the cairn on Area H and clay 320 on Area D
1. Clay 750 was found on less than half of the area of Area H. Its maximum recorded depth (on Section 13) was about 0.06m and on Section 33D (under the kerb slabs) where it underlay clay 760 it was about 0.05m deep. Generally its depth was probably nearer on average to 0.04m over less than half of the area north of the cairn.

2. So say its average over the whole area north of the cairn was 0.01 to 0.03m.

3. Clay 320 on Area D was found on three quarters of the area south of the cairn (and not at all recognisably under the cairn there).It did not appear on any sections unless it was the same as 950 which was 0.05 to 0.01m thick according to the Kubiena box column of Section 105 in the Palaeoenvironment report

4. Area B had various spreads of green clay but there was too much destruction there for an estimate of its original volume.

5. Area S was dug only to a shallow depth and did not reach the relevant stratigraphic levels.

6. Suppose there was a fairly even spread of clay about 0.04m to 0.06m thick in the area excluding the cairn. That area was 130 sq m minus 27 sq m, = 103 sq m.

7. The volume of clay would have been 103 x 0.04 = 4.1 cubic metres to 103 x 0.06 = 6.2 cubic metres. That is at the upper end of the estimate for the volume of clay which might have been released from the pits.

The volume of all clays of 320, 750 and 760 type 1. If clays of 320, 750 and 760 type at this approximate level covered the whole Ring area they would have had a volume between (2.7 to 4 + 4.1 to 6.2 cubic metres) or between 6.8 and 10.2 cubic metres.

2. The Ring pits would not have provided enough green clay for this volume of clay.

24.12.8 Northern and western Scottish chambered cairns.

Various regional groups of chambered cairns have been recognised in Scotland (Henshall 1963; 1972). It is perfectly clear that there are overall differences between different parts of Scotland. Chambered cairns varied considerably in size and architectural form and indeed there were many areas in which chambered cairns were not built at all (Ashmore 1996, 57; Barclay 1997, 137-9). There was also considerable variation amongst chambered cairns within very small geographical areas. For instance the chambered cairn at Midhowe, Rousay, 32.5 m long with a chamber 23.4 m long by 2 to 2.2 m wide may have had a different function from Kierfea Hill, Rousay, 9.5 m across with a chamber less than 4 m long (Davidson and Henshall 1989, 146-7; 130-1).

In most areas at least two popular chamber types occur. For instance, in Orkney there are at (at least) Orkney-Cromarty and Maes Howe style structures, but the former in particular includes many variants (Davidson and Henshall 1989). In Caithness where chambers morphologically similar to the Calanais example are known, three broad types can be identified:

1. single chambers without subdividing slabs,

2. bipartite chambers with a large baggy end compartment

3. long chambers with subdividing slabs, including Henshall's Yarrows, Camster and Assery types (Davidson & Henshall 1991, 21).

In plan, there is a basic subdivision between baggy bipartite chambers and neat rectangular chambers with subdivisions. But hybrids and variants do occur, and in three dimensions the differences between the two main types appear little more significant than variations within the types. The cairns themselves show abundant evidence of extension. They fall into four basic types, round, long, horned and double-horned. There is no correlation between chamber types and cairn types (ibid. 56 Figure 17). Overall the impression is of farmers picking from a bagful of ideas within traditions which did not include some possibilities (such as the horizontal stone sills used to divide up Clyde cairns in western Scotland).

In west Sutherland there are clusters on the limestone areas of the straths around Inchnadamph, but most cairns lie on the east coast and in the straths leading inland from it (Henshall and Ritchie 1995, 15-17). Many of the chambers are of types reminiscent of those in Caithness, including single chambers and bipartite chambers with a large baggy end compartment. The baggy-ended Skelpick type of chamber is also relatively common. In the harsh lands of western Inverness and Wester Ross only one chambered cairn is known on the western mainland (Henshall and Ritchie 2001, 29). Overall, if there were links between Lewis and the mainland north of Skye they seem likely to have been with the extreme northwest.

In Southwest Scotland there is again evidence for two different types of chambered cairn if one ignores long cairns, the Bargrennan type in Dumfries and Galloway and the Clyde type, which has a wider distribution. The Bargrennan type had small chambers and long passages, usually in a small round cairn. The Clyde type had long chambers opening directly through a facade, often in elongated cairns. Many chambered cairns of the Clyde type have several chambers in a single mound; each may originally have been surrounded by a small cairn. As others have noted the classification into Bargrennan and Clyde cairns probably oversimplifies a complex relationship between various styles of chamber and cairn. Two cairns were preceded by wooden mortuary enclosures (Henshall 1972; Cummings 2002, 129-130; 139-142).

The chambered cairns in the Western Isles are even more heterogeneous than those of the northern isles (Müller 1988, 19-21). Most of them are in North Uist, in the middle island of the Long Isle. Only the use of massive peristaliths, paralleled in Ireland, seems to be a local particularity in a Scottish context; otherwise the characteristics of the chambered cairn are shared with those of the mainland from south-west to north-west. Within this variety, the chamber of the cairn at Calanais is very different from the rest, having a plan reminiscent of (but not identical to) those of some chambers in Caithness and Orkney.

There is not enough dating evidence to show whether these differences have any chronological significance. The evidence from most areas could be taken to suggest at least two overlapping traditions or cultural predilections. This suggests a long and complex history, very little of which has been elucidated. On the other hand it has been contended that modifications to monuments took place with an apparent broad continuity of purpose in many parts of Britain and Europe; the funerary traditions at single sites changed significantly but they continued to be used for burials. For instance Bradley argued that Neolithic tumuli at Carnac, Brittany were enlarged and passage graves built in their sides to expand one kind of monument and assimilate another; and that some long barrows on the river terraces of England were converted to round mounds so that 'their basic affinities were altered from a well established local form of mortuary monument to a tradition of round barrows with quite different symbolic and geographical references' (Bradley 1993, 100).

Another example is the chambered cairn at Achnachreebeag in Argyll which started off with an 'exotic' small closed chamber, comparable to some examples in Brittany (Pailler and Sheridan 2009, 35), and was enlarged to support a small

passage grave of a kind found fairly widely in the Hebrides and less frequently in Argyll (Ritchie 1970, 32-37). As Pailler and Sheridan note the Breton-style pottery did not come from the early Breton-style chamber but from the small passage grave, its position perhaps reflecting manipulation of ancestral material as at Calanais.

Manipulation of ancestral material may have taken other forms. Skeletal material could have been stored elsewhere (for instance in a midden, grave or cave) before deposition. Understanding what the chambers in cairns meant to those who built and used them is a problem because the function of chambered cairns may have changed over time, and there is no proof that they were all built primarily to take burial deposits. Instead some of the chambers may have been built for 'hidden' ceremonies and only subordinately or subsequently have been used for storing skeletal material.

Note 24.12.9 Dating Scottish chambered tombs.

The earliest C14 ages for human bone in chambered tombs come from N Ayrshire, Argyll and Bute, Caithness and Orkney. They suggest that burials were being made throughout most of the distribution area of chambered tombs from some date between c. 3600 and c.3350 cal BC. This chronological distribution to some extent reflects patterns of investigation and preservation conditions, and is based on a very small data set. Also, if remains were cleared out from time to time the dated bones may not have been the earliest put into the chambers. But the evidence currently available suggests that the practise of putting skeletal material in massive chambers with an access passage started at much the same time throughout western and northern Scotland, around 3500 BC (Table 25.13, Illus 25.22).

Table 25.13 C14-dates for human bone with weaknesses less than 20 from chambered cairns in Scotland

Site	Council	Reference	Description	Context type	Code	Date cal BC	Age BP	+/-
Clachaig, Arran	North Ayrshire	Schulting, R	A human adult mandible	chamber	GrA-25616	3660 to 3380	4800	40
Tulloch of Assery A	Highland	Sharples 1986	Disarticulated human bone	chamber	GU-1338	3950 to 3300	4800	110
Torlin	North Ayrshire	Schulting, R	Human adult cranium	chamber	GrA-25644	3650 to 3380	4775	40
Torlin	North Ayrshire	Schulting, R	Human adult	chamber	GrA-25646	3650 to 3380	4770	40
Crarae	Argyll & Bute	Scott 1961; Schulting 2002, 160;	Human phalanx	chamber	OxA-7662	3640 to 3370	4735	40
Holm of Papa Westray North	Orkney	Schulting, R	Human sub-adult phalange	chamber	GrA-25636	3640 to 3370	4715	40
Clachaig, Arran	North Ayrshire	Sheridan 2006, 205	Unburnt human cranium	chamber	UB-6898	3640 to 3370	4708	37
Rattar East	Highland	Sheridan 2006, 204	Human mandible	chamber	UB-7010	3630 to 3360	4695	35

Site	Council	Reference	Description	Context type	Code	Date cal BC	Age BP	+/-
Holm of Papa Westray North	Orkney	Schulting, R	Human adult right femur	chamber	GrA-25638	3630 to 3360	4690	40
Tulach an t' Sionnaich	Highland	Sharples 1986	Human bone.	chamber	GU-1334	3700 to 3050	4685	110
Point of Cott, Westray	Orkney	Barber 1997b, 59	Human bone from Skeleton E	chamber	UtC-1660	3630 to 3360	4680	50
Point of Cott, Westray	Orkney	Barber 1997b, 59	Human bone from Skeleton B	chamber	UtC-1658	3630 to 3360	4680	50
Clachaig, Arran	North Ayrshire	Schulting, R	A human adult cranium	chamber	GrA-25617	3630 to 3360	4670	40
Haylie House	North Ayrshire	Schulting, R	Human adult cranium	chamber	GrA-25643	3630 to 3350	4665	50
Embo	Highland	Sheridan 2006, 205	Human adult right talus	chamber	UB-6879	3520 to 3350	4645	35
Holm of Papa Westray North	Orkney	Schulting, R	Human adult right femur	chamber	GrA-25637	3620 to 3340	4640	40
Embo	Highland	Sheridan 2006, 205	Human left femur	chamber	UB-6877	3520 to 3350	4633	35
Point of Cott, Westray	Orkney	Barber 1997b, 59	Human bone from Skeleton D	chamber	UtC-1659	3520 to 3100	4600	50
Quanterness	Orkney	Renfrew et al 1976; 1979	Human bone.	chamber	Q-1363	3650 to 2850	4540	155
Point of Cott, Westray	Orkney	Barber 1997b	Human bone from an infant burial	chamber	AA-11697	3370 to 2930	4505	60
Embo	Highland	Sheridan 2006, 205	Human adult left calcaneum	chamber	UB-6878	3330 to 2920	4433	36
Holm of Papa Westray North	Orkney	Davidson and Henshall 1989, 120-2	Human bone	chamber	GU-2068	3340 to 2910	4430	60
Rattar East	Highland	Sheridan 2006, 204	Human mandible	chamber	UB-7011	3330 to 2920	4427	35
Point of Cott, Westray	Orkney	Barber 1997b, 59	Human bone from Skeleton C.	chamber	GU-2936	3330 to 2880	4390	60
Point of Cott, Westray	Orkney	Barber 1997b, 59	Human bone from Skeleton I.	chamber	GU-2940	3260 to 2880	4360	50

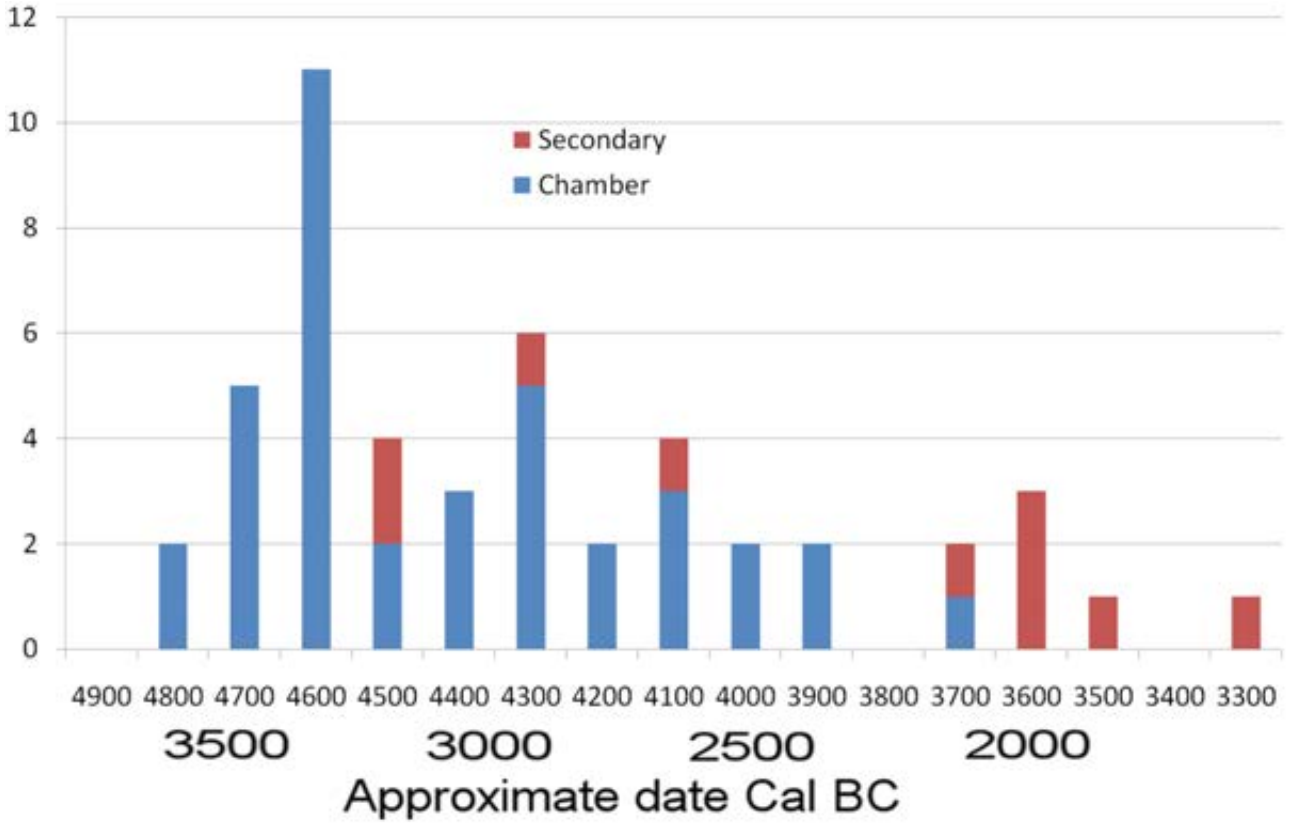
Site	Council	Reference	Description	Context type	Code	Date cal BC	Age BP	+/-
Embo	Highland	Henshall and Ritchie 1995	Mandible of human infant	chamber	GrA-771	3350 to 2700	4340	70
Point of Cott, Westray	Orkney	Barber 1997b, 59	Human bone from Skeleton F,	chamber	UtC-1661	3090 to 2700	4300	50
Quanterness	Orkney	Renfrew et al 1976; 1979	Human leg bones from a single skeleton Pta-1626 4300+/- 110, Q-1479 4170 +/-110, SRR-754 4360+/-110;	chamber	Mean of 3 ages		4300	
Quoyness, Sanday	Orkney	Renfrew et al 1976; 1979	A single human bone	chamber	SRR-753	3350 to 2500	4270	110
Point of Cott, Westray	Orkney	Barber 1997b, 59	Human bone from Skeleton A	chamber	GU-2934	3100 to 2500	4250	90
Quoyness, Sanday	Orkney	Renfrew et al 1976; 1979	Human collagen from a tibia	chamber	SRR-752	3100 to 2450	4190	110
Quanterness	Orkney	Renfrew et al 1976; 1979	Human bone from the chamber of a chambered cairn.	chamber	Q-1451	3050 to 2200	4110	140
Embo	Highland	Sheridan 2006, 204	Human adult? male right femur	chamber	UB-6876	2620 to 2470	4023	32
Embo	Highland	Henshall and Ritchie 1995	Human infant skull	chamber	GrA-770	2900 to 2300	4010	70
Quanterness	Orkney	Renfrew et al 1976; 1979	Human bone from a single skeleton Pta-1606 4130 +/-60, Q1480 (3905+/- 70 BP) and SRR755 (3870+/- 60 BP).	chamber	Mean of 3 ages		3970	
Clachaig, Arran	North Ayrshire	Sheridan 2006, 205	Unburnt human cranium	chamber	UB-6897	2570 to 2300	3949	36

Site	Council	Reference	Description	Context type	Code	Date cal BC	Age BP	+/-
Embo	Highland	Henshall and Ritchie 1995	Two adult human vertebrae	chamber	GrA-772	2340 to 1890	3720	70
Point of Cott, Westray	Orkney	Barber 1997b	Human bone from an infant burial in the cairn.	cairn	AA-11698	3650 to 3000	4585	85
Fordhouse Barrow, House of Dun	Angus	Proudfoot, E	Bone apatite from cremated bone	chamber or fill	SUERC-2723	2140 to 1910	3645	35
Fordhouse Barrow, House of Dun	Angus	Proudfoot, E	Bone apatite from cremated human bone	chamber or fill	SUERC-2722	2030 to 1770	3575	35
Knowe of Rowiegar	Orkney	Sheridan 2005	Human skull	fill	UB-6421		4515	37
Holm of Papa Westray North	Orkney	Davidson and Henshall 1989, 120-1	Human bone.	fill	GU-2067	3340 to 2890	4395	60
Achnacreebeag	Argyll & Bute	Sheridan 2004 CHECK	Human cremated bones	blocking	GrA-26543	2190 to 1920BC	3660	40
Cuween	Orkney	Sheridan 2005, 182	Human left femur	passage	UB-6422		3668	36
Tulach an t'Sionnaich	Highland	Sheridan 2005, 183	Cremated human bone	forecourt	GrA-28611	2140 to 1970	3705	35
The Ord North, Lairg	Highland	Sharples 1981; Sheridan 2005, 183	Cremated human bone	roof collapse	GrA-28614		3360	35

In Table 25.13 all ages with a weakness of 20 or more have been excluded (Ashmore 2004b). Excluded ages include many of those measured during the 'heroic age' of radiocarbon dating, most of those from mixed bones and a few with technical problems. Two sets of multiple dates from single burials at Quanterness are each represented by an average. A new set of dates for Quanterness will soon be published (Sheridan pers. comm.).

Thanks to the recent publications of Schulting and of Sheridan considerably more radiocarbon-dated evidence is available than in 2004 (Ashmore 2004, 130). But the total number of dated burials is still very small compared to the total number of chambered cairns in Scotland. That means that many styles of chambered cairn are not represented at all, or are represented by a single date. Therefore Illus 25.22 is likely to reflect large sampling biases; it bundles together what may have been distinct traditions and provides only a provisional overall picture losing all the nuances of different regional trajectories. Nevertheless, it is a start.

Given the likely date of the chambered cairn at Calanais the later dates for burials are most relevant. There are a few mid to late 3rd millennium dates for what seem to be 'normal' inhumations in chambered tombs. Those later than 4000 BP



Illus 25.14 Human bone ages from chambered cairns (Table 25.13)

(c. 2580 to 2470 cal BC) come from Clachaig in Arran, Quanterness in Orkney and Embo in eastern Highland (Table 25.13). All of these examples came from chambered cairns with much earlier burials. However a chambered cairn at Balnuaran of Clava dated to after 2000 cal BC judging by charcoal on the old ground surface beneath it (see Note 24.12.8) and Jones and Thomas (2010) have made a case for the building of small chambered cairns along the Atlantic and Irish Sea coasts of Britain at some date after 2500 BC. The chambered cairn at Calanais, built after 2500 BC, is thus very late in the Scottish tradition but it was built before Clava cairns and probably before the date when deposition of 'normal' burials in the chambers of chambered cairns ceased elsewhere.

All later radiocarbon ages associated with burials in chambered cairns come from remains found in secondary positions (apart from the earliest, two cremations from Fordhouse in Angus which came from a chamber floor and may not be secondary in the sense used here). Of the rest four were from inhumed bone and three from cremated bone (Table 25.13).

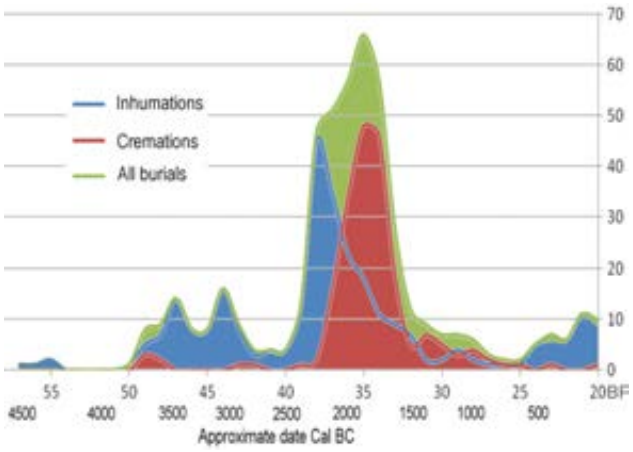
Note 24.12.9b The date of the Balnuaran of Clava cairns

Within the broad tradition of building chambered cairns some areas did continue the practice longer than others. In round terms the NE chambered cairn at Balnuaran of Clava seems to have been built between 1900 and 1600 BC. A piece of hazel charcoal under the core cairn of the NE passage grave at Clava has been dated (AA-25234) to between 1920 and 1680 cal BC and another (AA-25233) to between 2010 and 1740 cal BC, while a piece of charcoal from below the Ring cairn (AA-21256) to between2200 and 1740 cal BC. The dates may, like others from Balnuaran, have been older than their contexts, although the charcoal seems most likely to have come from ground clearance immediately prior to construction. These dates are supported by several others from contexts in the cairns (Bradley 2000, 115). The chambers continued in use for some purposes until 1050 to 810 cal BC, judging by a date (AA-21254) from a piece of charcoal in the chamber of the SW cairn (Bradley 2000, 115)

24.13.4 Tormore, Arran

If the Stage 2 enclosure was originally oval a loose analogy can be made with a house-like structure found at Tormore, Arran (Barber (ed) 1997, 7-21). But the area enclosed by the bank of the Tormore was considerably greater at about 9m by 12m and it was a complete oval, so the analogy is not close. The Tormore structure had two main phases with several episodes of activity in each. Beaker pottery was found in the first phase bank which also produced a radiocarbon age (GU-1176 3485+/- 60 corrected to +/-110) from charcoal, which calibrates to 2150 to 1500 cal BC. That is later than the preferred date for the Stage 2 enclosure at Calanais. A fine barbed and tanged arrowhead was found in the final bank and turf horizon 141 of this phase (Barber (ed) 1997, 24), recalling the arrowheads at Calanais. The second phase produced later pottery of types not found at Calanais and later radiocarbon dates (Barber (ed) 1997, 21). It must be noted, however, that the dating evidence for the first phase structure at Tormore could all have been residual; the pottery and dated charcoal came from the bank and the arrowhead came from soil which could have been in part imported.

Note 24.14.5: Radiocarbon-dated burials in Scotland before 2000 BP



Illus 25.15 Radiocarbon-dated burials in Scotland before 2000 BP

Illustration 25.24 was prepared by counting the number of inhumations and cremations per uncalibrated century BP and plotting that in Excel. The Cal BC scale was added from a plot of the calibration curve because there is no simple one-dimensional correspondence between ages and calibrated dates. This technique was adopted to avoid claimed problems with summing calibrated date distributions using OxCal. It has its own problems, but they are probably insignificant compared to biases in the data set. The main source of bias is a probably disproportionate number of dates from human material associated with artefacts as opposed to burials without them. The other factor which must be born in mind is that radiocarbon-dated burials represent a miniscule proportion of the past populations of Scotland. Nevertheless it probably gives a better idea of at least the relative distribution in time of Scottish cremations and inhumations than guesswork. The graph shows that cremation and inhumation rites had been used in Scotland from at least the mid 4th millennium BC, and although dated inhumations outnumber date cremations for the next two millennia that may reflect sampling bias. Certainly many of the Caithness tombs excavated in the 19th century contained both burnt and unburnt human bone; none of this 19th century material has been scientifically dated (Davidson & Henshall 1991, 60-62).

Inhumations

Most early Scottish radiocarbon-dated inhumations came from chambered tombs. A major change in burial practises started slightly before 2400 BC. More and more burials were put in short cists, sturdily constructed of slabs and long enough for a crouched inhumation. A few burials in timber coffins are also known, as are some multiple burials and some cremations. Often the bodies were accompanied by Beakers.

Beakers were also used for domestic purposes in Britain and ranged in size from fine wares holding a third of a litre to large pots holding 7 litres, suggesting that a wide range of uses is represented. The Beakers accompanying burials were selected from the low to medium end of this range (Gibson 2002, 91).

Early Beakers

As discussed by Sheridan in Chapter 18 The Pot-

tery Assemblage 18.7.4 the first radiocarbon-dated Beaker burials in Britain probably date to the third quarter of the third millennium and may represent incomers. In Chapter 24 Discussion and Conclusions 24.12.6 and 24.12.7 I suggest that that does not preclude the possibility that there were Beakers in use a generation or so before those Beakers were deposited with burials.

Beakers have been found from Portugal to Hungary and from Britain to North Africa (Desideri & Besse 2010, 157). They were probably first made in northern Iberia during the first half of the 3rd millennium BC (ibid quoting Giulaine 1998) although even in Iberia the first Beakers in some areas such as the southern Meseta are dated only to the second half of the millennium (Garrido-Pena 2007, 192). Early types, decorated in an International style, are found widely along the Atlantic coast from Portugal to Brittany from about 2600 cal BC (Cottiaux et al 2007, 154). Beakers reached the Paris Basin, for instance, perhaps c. 2600-2500 BC (Cottiaux et al 2007, 157) or only after c. 2500 BC (ibid 155).

Modern research focuses on regional variation in the interaction of Beaker-users with 3rd millennium communities (Desideri & Besse 2010, 158). For instance, Desideri and Besse have shown through comparison of the non-metric characteristics of teeth from burials in various parts of the Continent that Beaker-using people from the south (the Mediterranean coast) were buried in western Switzerland. Their conclusion is that Beaker-users settled amongst local indigenous communities and made both populational and ideological changes (Desideri & Besse 2010, 171). That seems to be a generally accepted model for what happened around the middle of the 3rd millennium in other parts of southern Europe; Beaker potters were members of a sprinkling of incomers bringing intriguing novelties including metal working into local cultures and the consequence was a fusion of the practices of indigenes and settlers (see also Chapter 24: Discussion and Conclusions; Jones and Thomas 2010).

Despite the increasing evidence Europe-wide for the movement of individuals (see Sheridan, Chapter 18) it is not clear exactly how far the first occurrence of Beakers in north-western Scotland reflects continental incomers or the adoption of continental fashions by those here already. Burials with Beakers occurred in the northwest of Scotland as early as anywhere else in Britain. A Beaker burial at Sorisdale, Coll has been dated to between 2470 and 2230 cal BC (OxA-14722 387932, refining the previously measured BM-1413 3884+/-46; Sheridan 2005, 183). None need imply true dates before c. 2400 cal BC.

There are in fact two earlier radiocarbon dated features with Beaker sherds in them, Pit 50 at Dunragit, Dumfries & Galloway and a midden at Holm of Papa Westray, Orkney. The Dunragit pit had a complex fill and contained Grooved Ware sherds as well as Beaker ones. It produced four dates from individual pieces of charcoal, SUERC-2109 (4175+/-45) from oak and SUERC-2107 (4150+/-35), SUERC-2104 (4085+/-35) and SUERC-2106 (4055+/-35) from hazel (Thomas 2004). These ages calibrate to 2890 to 2600, 2880 to 2600, 2870 to 2490 and 2860 to 2460 Cal BC. A report, with details of the Beaker sherds, is in preparation. A limpet midden (context IV.1) and a pocket of limpet shells at Holm of Papa Westray North produced three sherds from a coarse Beaker with impressed cardial decoration (Henshall in Ritchie 2009, 36). Context IV.1 also produced two dates, each from a red deer astralagus, OxA-17782 (4294+/-37) and OxA-17781 (4075+/-30) (Ashmore in Ritchie 2009, 60-61). These ages calibrate to 2870 to 2570 and 2860 to 2490 cal BC. Nearby structures contained Grooved Ware sherds, providing a probably coincidental analogy with the occurrence of both pottery types in Pit 50 at Dunragit.

The latest date from Pit 50 at Dunragit is significantly different from the others demonstrating residuality. Even if only the latest date is taken into account it would be surprising (given current dating models) if the Beaker sherds from the pit at Dunragit did date to before 2490 cal BC and it is natural to suppose that the bit of charcoal which provided the latest date was also residual. The two dates from Holm of Papa Westray North were also significantly different from one another suggesting that even the later one, also falling before 2490 cal BC, was from bone deposited before the Beaker sherds. Neither site, therefore, provides incontro-

vertible evidence for Beakers in Scotland before c. 2500 cal BC.

Nevertheless, given the Continental evidence for early Beakers on the Atlantic coast it is possible that Beaker-using people reached Scotland several generations before the practise of grave and then cist inhumation became prevalent. That provides a background for the early Beaker sherd in the cairn at Calanais, as well as making it conceivable (although it must again be emphasised inadequately supported by current evidence and highly speculative) that the Holm of Papa Westray North Beaker and possibly, pending its publication, even the Dunragit Beaker, both dated to before 2500 cal BC.

Cremations

Although most dated cremations belong after about 2200 cal BC (Illus 25.23) some were much earlier. A cremation at Midtown of Pitglassie in Aberdeenshire has been dated to between 3940 and 3660 cal BC (GrA-34772 4995+/-35; Sheridan 2007, 220).

Almost as early is another in a mortuary enclosure at Pencraig Hill, East Lothian where a piece of cremated human bone was dated to between 3920 and 3630 cal BC (SUERC-7910 4940+/-50 BP; Lelong & MacGregor 2008, 41). This date was supported by several similar dates from charcoal. The third place with an early cremation is Moleigh (also known as Cleigh) in Argyll where a cremated bone from a large cist has been dated three times (GrA-24858 4945+/-40, GrA-26158 4920+/-40 and GrA-28741 4855+/-45 Sheridan 2004; Sheridan 2005, 182-3 Note 1). These three ages form a satisfactory group (agreement 108%) and if there are no technical reasons for not doing so can be combined to suggest a date range at 2 sigma of 3715 to 3640 cal BC.

Many radiocarbon-dated 2nd millennium BC cremations were from urns, often highly decorated. No such urns have been identified at Calanais which suggests that it had few far-flung connections after about 2000 BC. That said, the small kerb cairn at Olcote, Breasclete, c. 1.5 km away, produced many 2nd millennium BC sherds including a small bucket urn accompanying a cremation burial and discrete deposits of sherds in similar fabrics to the urn. The kerb cairn was broadly dated to the early to mid 2nd millennium BC. Johnson has identified a widespread tradition of plain domestic and funerary urns in the Western Isles in the second millennium BC (Johnson in Neighbour 2005, 31-3) and their absence from the main setting at Calanais is as notable as the absence of collared and other types of urn common on mainland Scotland. It hints at a diminution in its local importance.

24.14.6 Crathes pit alignment and Upper Largie double pit alignments

The pit alignment at Crathes Warrenfield, Aberdeenshire has been interpreted on the basis of radiocarbon dating as originating between the 9th and 7th millennia with further use in the 6th millennium (Murray et al 2009, 16-17). One piece of oak charcoal in a pit of the alignment was dated (SUERC-4031) to the first quarter of the 4th millennium (Murray 2009). It may be that the earlier charcoal was residual; that would bring it more into line with evidence from elsewhere in Scotland.

The double pit alignment at Upper Largie in the Kilmartin Glen was discovered amongst a palimpsest of timber structures including a cursus, a pit/post ring complex, a large timber ellipse and many burials. It had been partially destroyed by quarrying; the surviving part was between 11 and 13.76m wide and up to 40m long. The pits were spaced between 3.2 and 5.3m apart from one another (centre to centre). It seemed to be later than the ellipse, which was dated to between c. 1600 and 1400 cal BC (Cooke et al 2010, 174-175, 193, 195, 202). Because of the destruction prior to excavation it is unclear whether it was an avenue as defined by Burl (1993, 4).

An increasingly intriguing question is how avenues relate, if at all, to the supposedly or definitely much earlier bank barrows, earthwork cursuses, post-defined cursuses and long enclosures which have been discovered over the past few decades in Scotland. Some of these are truly massive, such as the Eskdalemuir bank barrow (Brophy 2007, 165, Fig 20.6). Indeed the variety of sites to which the label 'cursus' has been attached is great enough that the term may have lost some of its usefulness (Brophy 2007, 158-60).

24.14.7 Cut Hill Stone Row

The stone row at Cut Hill, Dartmoor was at least 215m long and included at least 9 large stones; they now lie prone, spaced between 19.5 and 34.5m from their neighbours. Excluding the smallest stone at 1.53m the average height was 2.1m; again omitting the smallest stone at 0.5m wide they were on average 0.9m wide. Dating of peat above and below them suggested that one stone fell during the second quarter of the 4th millennium BC and another one three centuries later. They were probably submerged in peat around the middle of the 3rd millennium BC (Fyfe and Greeves 2010, 55, 59, 62-67). The row was constructed on an open heath in woodland. Its stones were more widely spaced, on average, than those of other long stone rows in Cornwall and Fyfe and Greeves regarded it as a typological outlier (ibid 68).

Note 24.15.3: The earliest radiocarbon-dated farming settlement in Scotland

The case for early impacts by continental farmers in the west of Scotland has been outlined in Chapter 24: Discussion and Conclusions. But the earliest radiocarbon-dated large timber constructions in Scotland assignable to farmers are at Eweford West and Pencraig Hill in East Lothian (Lelong and MacGregor 2008), where the timber structures can be interpreted as free-standing or as lining long mounds. They appear to date to the first quarter of the 4th millennium.

The pots associated with the Eweford structures were mainly carinated bowls (Lelong and MacGregor 2008, 25, 33). More generally these often seem to be a component of early pottery assemblages in northern Britain (Sheridan 2009, 8-11). There is just a possibility that other fine pottery styles may have been used, at least in eastern Scotland where at Dubton near Brechin Impressed Ware sherds formed part of a large assemblage including carinated bowls in pit B233/1 (MacSween in Cameron 2002, 37). Charcoal with the assemblage was radiocarbon-dated to between 3940 and 3659 cal BC (AA-39951; Cameron 2002, 25-7, 37, 68-9). But this date is at least a few hundred years earlier than the start-date for Impressed Wares of a little before 3300 BC suggested by Gibson (2002, 78) and unless the dating is supported by other examples it is likely that the hazel charcoal used for dating was older than the Impressed Ware pottery.

Large timber halls were built in several areas from Aberdeenshire to Stirling from perhaps as early as the second quarter of the 4th millennium BC (Barclay 2003, 73-80). Large timber monuments - enclosure and avenues - appeared at about the same time (Ashmore 2007, 249).

The long structures at Eweford were later than the first long mounds built in north-western Europe. Amongst others creating them, from a date before the middle of the 5th millennium BC, the Funnel-neck Beaker or TRB cultural grouping arose in the lands facing eastern Britain, in northern Germany and Denmark, while the Cerny culture communities of north-west France lived in areas facing southern England (Midgeley 2004, 120-121). The long mounds were set out in fan-shaped arrays forming cemeteries, a phenomenon unparalleled in Britain, and no direct connection can be suggested. It has not been demonstrated that the succeeding cultures of these areas built long mounds around 4000 BC.

Sheridan (2009, 10-11) noted that the dating evidence then available suggested that settlement by farmers occurred at about the same time in the north and the south of Britain, suggesting multiple points of entry. More recent analysis of English and lowland Scottish radiocarbon dates by Whittle and his colleagues suggests settlement in the southeast of England by small groups of colonisers from the continent slightly before 4000 cal BC with subsequent interaction and fusion with indigenous peoples and an extension to southern Scotland, perhaps through maritime leapfrogging of some intervening areas by around 3800 cal BC. They also envisage the possibility of direct settlement of Aberdeenshire from the continent by that date. They suggest more tentatively that occupation of the southern parts of the Highlands and Islands may have occurred around 3700 BC (Whittle et al 2011, 19-20).

It seems probable that interaction between foragers and farmers in northern Britain was highly

variable and took place at various times. It may have taken a few centuries for farming lifestyles to predominate and in some areas of Scotland forager subsistence strategies seem to have remained important even longer (Bishop et al 2009, 84). That said, feedback may have been an important element in the spread of farmers, whether or not descended from foragers in the lands around Britain and Ireland (Thomas 2005). If some groups were successful, and if they maintained links with continental groups, others might follow them fairly swiftly. Estimates of the time span over which the change took place in various parts of Scotland require substantially more radiocarbon-dated evidence if they are to improve.

Note 24.18.2 Rejected parallels for the Calanais enclosure in Scotland

Round domestic and funerary enclosures of around the late 3rd and the 2nd millennium BC are common in Scotland. The database C14dates 2005 plus, archived in NMRS, was scanned for radiocarbon-dated examples. No structures closely similar to the Calanais enclosure were noted. Looser analogies were fairly common but apart from those discussed in 24.16.4 the differences between them and the Calanais enclosure were too great for useful discussion. The embanked round houses at Lairg, Sutherland, for instance, were all much larger (McCullagh & Tipping (eds) 1998). Many other Scottish structures were defined by ditches rather than banks or included substantial post-holes. The Calanais enclosure does thus fit very broadly into a roughly 2nd millennium framework but little more can be said from the current radiocarbon-dated corpus.

26. Archiving and finds disposal

All of the documents from excavation and the main post-excavation documents have been offered for archiving in the National Monuments Record of Scotland. They include the original records and digital documents (including plans and photographs) created during the post-excavation process. Several superseded versions of digital documents have been included even though they contain misinterpretations and can only be of use to those interested in the process of writing-up.

Disposal of the finds to a museum awaits the publication of this report.

27. Acknowledgements

Illus 26.1 Calanais, and in the foreground Calanais III, taken from the east by Mike Brooks of Historic Scotland

I am very conscious of the support of my colleagues: administrators, architects, inspectors, professional and technical staff in what was then the Ancient Monuments Division of the Property Services Agency. In those days the Ancient Monuments Division was small - ridiculously so by today's standards. Inspectors turned their hands to many tasks. General civil service archiving policies mean that many records of the background to our work on the monuments have been destroyed. I apologise to those whose help I have not recognised here.

The men of the works squad, led by Mr MacPhee, not only supplied us with equipment but also moved and re-erected large stones, rebuilt the cairn and undertook many other arduous tasks. I am most grateful to them for their skill and amiability.

Iain MacIvor, the then Chief Inspector, benevolently allowed me to excavate for two seasons. David Breeze, then managing excavation matters, provided much welcomed support. Even their patience had to have limits, however, and a third season was not feasible. The architects, Bill Boal and Ingval Maxwell along with Alan Armstrong managing the works team authorised crucial services and backup. Mr. B. Petersen of the Ancient Monuments Drawing Office kindly translated the note on Worsaae's sketches from Danish.

Without the skilled supervision of individual trenches by Jean Comrie, Anne-Marie Gibson, Lily Linge, Ian Maté and Peter Strong the excavation would have been far less successful than it was. Mike Brooks, with his usual skill and care, took the better photographs included here. He also kindly let me have copies of Captain F W L Thomas' photographs which he had recognised in the National Archives of Scotland.

The civility of the people of Calanais and Breasclete lightens even further my recollection of those sunny days when we dug amongst the stones, and mitigates any memories of the rainy ones. My thanks go in particular to Mr and Mrs MacArthur of Breasclete who were most pleasant hosts during our stay there, to Mrs MacDonald of Calanais who minded our children and to the staff of Breas-

Illus 26.2 The works squad re-erecting Stone 33a watched by school pupils from Breasclete

Illus 26.3 Mr MacPhee setting a fallen chamber orthostat on end [Film 81.21.13]

Illus 26.4 Jean Comrie, Anne-Marie Gibson and Ian Maté photographed by Mike Brooks

Illus 23.6 Some of the volunteers and staff in 1980

clete School. The co-operation of Carloway Estate and of Mr Angus Morrison, adjoining proprietor and crofter, was most welcome. Jim Crawford and friends organised a delicious salmon supper for the whole dig, still remembered with pleasure.

I hope that the many people who worked on

Illus 26.5 John Linge, Fionna Ashmore and Lily Linge photographed by Mike Brooks [Film Brooks 1-34]

the site in 1980 and 1981 both enjoyed themselves and found the experience helpful. We advertised for volunteers in the Stornoway Gazette and the Guardian. Many more applied than we could accept and I once again extend my apologies to those whom we could not fit in. I shall not reveal which of the successful applicants noticed our advert in the Guardian because it was used to wrap a fish supper. They included Mark Angliss, Alexandra Campbell-Stewart, Jane Corrie, Alan Fairweather, Catriona Graham, Dick Grove, Robert Horrocks, Richard Jones, Elaine Lawes, Mary McCann, Brian Matthews, Cathy Payne, Margaret Ponting, David Rowswell, Clive Ruggles, Peter Roberts, Sarah-Jane Sloan, Rhian Sterland, Marion Wade-Evans and Adrienne Walton.

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Tom Borthwick produced the finds illustrations with his customary skill and accuracy.

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The post-excavation process was long drawn out. That was no fault of the specialists, including Rod McCullagh, Sjoerd Bohncke, Audrey Henshall, Melanie Johnson, Alison Sheridan, Ian Maté, Torben Ballin and Caroline Wickham-Jones, to all of whom I am most grateful. Alison Sheridan in particular worked all hours to produce an exhaustive report on the pottery which significantly changed my conclusions. Without the post-excavation labours of the site supervisors, of Ann Clarke, Melissa Seddon and more recently, Emma Carver and Andrew Heald publication would have been more difficult.

The first set of radiocarbon samples was identified by Rod McCullagh, prepared by Philip Naismith of SURRC and sent by Gordon Cook for dating at the Arizona AMS laboratory. The second set of samples was identified by Robin Inglis, Ann Crone and colleagues at AOC Archaeology; these samples too were prepared by Philip, and Gordon arranged their measurement on the SUERC AMS laboratory. I am grateful to all for their skill and care.

The site drawings were turned into vector drawings by Headland Archaeology, with management of the project by Mike Middleton and main editing by Mike Kimber. Some of the photographs were digitised by Historic Scotland photographers David Henry and Chris Hutchison; most were digitised commercially.

In 1997 and 2000 Professor David Breeze, by then the Chief Inspector, kindly allowed me time to complete a draft of the accounts of the excavation areas. Peter Yeoman and Richard Strachan managed completion of the writing up project for Historic Scotland after my retirement from Historic Scotland in April 2006.

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Appendix 1
Approaches and biases

A short version of this can be found in Chapter 2 Introduction 2.8.

It helps readers to understand what authors have written if the latter's prejudices are transparent. This appendix reveals some of mine.

I learnt archaeology in the late 1960s at the University of Wales, Cardiff, largely from Richard Atkinson, Leslie Alcock, Mike Jarrett, Bill Manning, John Evans and some of my contemporaneous students. I was part of an undergraduate and postgraduate group inspired by the prehistoric and early historic archaeology of Britain. At that time culture-historical approaches were being influenced by processual ideas. I studied British archaeology because I was at least as interested in things as in people. Many may find that deplorable, but objects and the connections between them have their own fascinations, and if one is really focussed on people rather than things then history, ethnology, Pleistocene archaeology and a host of social and hard sciences offer a more direct route to their study than the archaeology of the post-glacial period in Britain before the advent of written records.

By the time Calanais was excavated in 1980 and 1981 I had come to think that much archaeological theorising was the result of academic fashions, its fabric woven on second-hand looms with a small range of bobbins. In promulgating ideas many archaeologists tended to quote authorities favouring particular schools of thought rather than use original evidence. I had not read Kuhn's 'The Structure of Scientific Revolutions", published in 1962; had I done so I would have realised that much academic archaeology was conducted within the framework of 'normal science' described by him (Fuller 2003, 18-22, 216). The problems associated with 'normal science' persist. I find no help in most of the forms of interpretive archaeology listed by Renfrew and Bahn (2008, 491); and in particular the extreme forms of relativism seem to me nihilistic and highly unlikely to increase understanding. But I do accept that even archaeological theorising which goes far beyond the primary evidence has the merit of revealing biases and ignorance, my own as well as the authors'. As Terry Pratchett put it: *'I was confused and uncertain about all the little details of life. But now', he brightened up, 'while I am still confused and uncertain it's on a much higher plane …'* (Pratchett 1987, 156). But my approaches in 1980 and 1981, when most of the excavation described here took place, probably fell most closely into the processual category and during the writing of this report into the cognitive-processual one as defined by Renfrew and Bahn (2008, 495-6).

The greatest influence on my thinking has been Karl Popper's theories of science, first published in 1935 and subsequently translated into English (e.g. Popper 2002). Before 1980 I absorbed them indirectly through the approaches of people whose use of evidence I admired. Of the books which have since provided me with inspiration I single out Bryan Magee's accessible 'Popper' published in 1973 in a Fontana edition (Magee 1973), Popper's own 'Unended Quest (Popper 1976) and Steve Fuller's well-balanced 'Kuhn vs. Popper (Fuller 2003). Popper's lesson was that in practise all non-trivial scientific theories are incomplete and that in principle though one can occasionally show that a theory is wrong one can never show that it is right in all circumstances. He accepted that one can say many worthwhile things even if they are not 'science', provided that one does not pretend that they are (Magee 1973, 45-6). I have tried to follow his advice that one should foster a scientific culture providing support to those who challenge currently accepted ideas, although I have found it difficult, despite Popper's advocacy, to welcome written criticism of my own ideas and equally difficult to criticise in writing the ideas of others (Magee 1973, 39).

There is however a profound difficulty in applying Popper's approach: problems must be manageable. One must be able to formulate a theory in such a way that it can in principle be refuted by

data. More broadly, problems tend to be selected for testing because they are parts of systems which can be described using traditional mathematical or logical tools. This applies to many other scientific disciplines: "The systems discussed [in textbooks of science and mathematics] are usually ones that are specifically chosen to be amenable to fairly complete analysis, and whose behaviour is therefore necessarily simple." (Wolfram 2002, 115). That can mean that scientific tests are limited to one or at most a few aspects of complex systems.

Another influence has been Bayes' theorem and the intellectual apparatus which surrounds its use. Some aspects of the Bayesian approach are common sense. It 'emphasises that the interpretation of data is conditional on the information available and on an individual's understanding of it at that time' (Buck et al, 1996, 1). It demands explicit modelling based on clearly stated prior assumptions, which often provides a healthy antidote to fuzzily defined interpretations. I do however have concerns about its application. It is designed to give some rigour to inferential approaches but all too often it seems to apply only a 'scientific' gloss to received ideas. To those who accept Popper's approach to learning more about the world inferential methods are inherently flawed and should not be described as scientific. "To choose a 'likely' hypothesis and then test it back on the data that helped to suggest it is clearly to move dangerously in the direction of circular argument" (Ruggles 1999, 77). But Bayes' theorem can equally well be used in a critical framework, and there I include less rigorous attempts at refutation than those advocated by Popper. In published studies the recognition of competing prior beliefs and assessments of their probability are often highly incomplete. With narrow models the real probability of observing an event within a particular interpretational framework is that estimated multiplied by the probability that the interpretation is correct, plus the probability that the event would have occurred even if the interpretation was wrong multiplied by the probability that it was wrong. More broadly, Bayes' theorem was defined with billiard balls in mind; life is usually more complex than that. Commonly archaeological evidence allows more than one interpretation, and often they are not mutually exclusive. For instance, the skeletal material in a chambered tomb may have been deposited fairly evenly over time, each time involving the remains of one or a few freshly dead people, or it may have been added very clumpily, perhaps including the freshly dead and the long-dead. The state and ordering of the excavated remains may reflect processes including manipulation and removal of bones; they may be stratified in a different order from the times of death of the people. They may include only a few founder burials and those of the last few generations to use the tomb. This latter may have been what happened for instance at Point of Cott and Holm of Papa Westray in Orkney (Barber 1979; Ritchie 2009). But given the fact that only very specifically stated theories are open to refutation in the way that Popper advocated, I accept that Bayesian approaches to archaeological questions offer a substantial improvement over traditional ones provided that they follow the formal methods advocated by Buck et al (1996, 355-62); and provided that their purely inferential nature is recognised. I thoroughly agree with Buck and her colleagues' recommendation that the project team should spend a considerable effort on considering the background to the analysis (Buck et al 358). To their Step 10, Interpretation, I would add one phrase: stand back and think again whether the prior(s) and the new evidence can bear more interpretations than those initially contemplated. Indeed the examples they adduce (e.g. Buck et al 1996, 290) include such considerations, but I think the point is worth re-emphasising because there is a danger that, wooed by the wonders of poorly understood computer programmes which magically take in numbers and output others, critical faculties may be lulled.

In earlier drafts of this report on Calanais I attempted Bayesian analysis as advocated by Buck and her colleagues at junctures where it seemed important to distinguish between various possibilities. But my attempts proved unsuccessful (except in making me look more critically at my interpretations of the evidence) for they were usually based on an incomplete set of non-mutually exclusive prior beliefs leading only to fuzzy posterior beliefs. I have removed them in this final version, to avoid

what would almost certainly have amounted to no more than a spurious sheen, returning to descriptions like 'possibly' and 'probably'.

The unhealthy stepchildren of relativism (Sokal & Bricmont 1998) still rule some areas of modern archaeology. In a non-trivial sense I follow those who believe that there is a reality independent of human (or other conscious) observers. This is perhaps all the more fundamental a declaration given some (in my view carelessly phrased) recent statements by brilliant theoreticians. For instance Hawking and Mlodinow appear to claim in their 'The Grand Design' that that because science offers many incomplete windows on reality there is no theory-independent reality (Callender 2010, 50). That phrasing of their view will be grist to the mill of relativists who confuse human weakness with some imagined unreality in the fabric of the universe. And some statements by brilliant scientists are unambiguous and, in my view, wrong. One eminent scientists has said that 'The universe exists because [and only because] we are aware of it' (Sir Martin Rees quoted by Rosenblum and Kuttner 2006, 192). Of course the fabric of the cosmos can appear to be ambiguous, wavy or particulate at very small scales; the way in which an experiment is set up can produce evidence for one or the other; and it has been argued that that it is not merely a demonstration that the choice of apparatus reveals different aspects of an underlying reality but that a set of potential realities collapses into a single state due to (for an extended and accessible discussion see Rosenblum and Kuttner 2006; see also Ananthaswamy 2013, 39 for the view that, in the light of recent experiments with a control photon determining the way in which a photon is measured, attempting to describe reality at very small scales with concepts like wave and particle is doomed to failure). But I reject the interpretation that a 'collapsed' reality is due to observation by a conscious being, although admittedly with no more hard evidence for so doing than Rees had for saying it (and with full recognition that this belief is held by people with far deeper, fresher and agile brains than mine).

I would rather say that 'We conceptualise aspects of the existence of the universe because we want to understand it', and that we do not yet have the concepts to express the basic building blocks of reality (Ananthaswamy 2013, 39). In archaeology we should focus on the macroscopic. I believe that the universe trundled merrily on its way before observer-style consciousness evolved, and continues to do so now that it contains conscious beings. Consciousness is a mystery only because it is the result of feedback systems involving the interaction of the body (including the mind) with its environment. Understanding of feedback systems, which are characteristically nonlinear, is very imperfect, although new approaches may eventually remedy that (Wolfram 2002). That underlies my belief that the objects and evidence of processes commonly found in archaeological sites should be regarded as the results of past causes and effects (in the simple everyday sense) operating independent of modern observers.

But I do accept that all observations and the frameworks within which they are made are affected by (often unconscious) mental models. '*… there is no such thing as an unprejudiced observation. All observation is an activity with an aim (to find, or to check, some regularity which is at least vaguely conjectured); an activity guided by problems, and by the context of expectations … There is no such thing as passive experience; no passively impressed association of impressed ideas,*' (Popper 1976, 51-2). There is a theory of mind, ascribed in its 2008 form to Karl Friston of University College, London and colleagues, which suggests not only that the brain works in an inductive Bayesian fashion, but that it also works to minimise prediction error. Sensory information is always compared to the brain's internal expectations, which are updated by information. But this mechanism leads not only to our ability to make sense from partial information such as mumbled speech but also to our tendency to distort or discard sensory information when it conflicts with internal predictions (Huang 2008, 31-3).

Put brutally, the relevance of this is that while excavating I and my colleagues ignored information. I do not in this refer only to the forgetting of information which did not fit in the framework which governed how I looked at it. I mean that much sensory information was discarded by pre-conscious parts of the brain because it did not

fit expectations.

I still believe (it was very much part of the approach I learned as an undergraduate) that excavators must try to interpret at all levels in the field, so that interpretations and indeed observations can be challenged while it is still possible to gain new information from the site itself. It is much chancier to try to interpret the site only during the writing-up process because samples, texts, drawings and photographs provide a limited and distorted extract of the original. But interpretation in the field can reinforce a tendency to ignore 'irrelevant' information, and a prescription for the best balance between 'objectivity' and interpretation during excavation eludes me; the most one can do is adapt excavation techniques to the evidence, remain conscious that nothing exists independent of its environment, sample systematically and record abundantly, carefully and consistently, in the hope that biases can be subverted by reality.

Turning to other aspects of interpretation at Calanais, it is vital to understand what a tiny proportion of the activities which took place there left any recognisable trace. Around two and a half millennia passed between the creation of a curving ditch there and the period when peat covered the place. Most deeds will have left no retrievable evidence in the excavation areas; others will have left unrecognisable traces; relatively few will have left evidence which could be retrieved by the techniques we used in 1980 and 1981, within the conceptual frameworks we then employed. Put succinctly, our work captured only a miniscule proportion of what people did.

The same applies to processes. We cannot always have discriminated adequately between one and several episodes of ground-working, nor of natural soil developments. We might have done a little better if we had had an on-site laboratory; our capture of information suffered from the lack. But I doubt whether we could have discriminated between for instance a few and many overlapping processes even with a laboratory to hand.

Those, then, are some of the underlying reasons why complete certainty about anything other than basic observations is rarely claimed in this report. I would like to say that that includes all simple assertions, such as that an object was found in a particular layer, however it got there. But defining layers was in part subjective. Worse, the excavation records include some demonstrable errors.

Although I think it unacceptable to pretend certainty where it cannot exist, and have tried to flag up all significant problems in the relevant parts of the narratives, I know that over-use of qualifiers runs counter to people's general desire for clarity. So detailed descriptions of important ambiguities, and also expressions of vague doubts and uncertainties, have been hosted in the Technical notes in Chapter 25, in appendices, and in the Resources element of the archive hosted by NMRS.

P J Ashmore (January 2013)

Appendix 2
Area B summary of excavation progress, discoveries and remaining archaeology

This appendix is referred to in Chapter 7 Area B 7.20.

Appendix 2.1 Trench layout and excavation progress in 1980

Illus Appendix 2.1 Area B from the south-east during laying out [Film 1980.2.4]

Illus A2.1 shows Area B, the monolith and the northern part of the Ring before excavation, with stones of the East Row to the left and avenue stones to the right.

Area B was initially laid out as three trenches (Illus Appendix 2.2). The north, south and east sides of BI to BIII were parallel to the National Grid and overall they measured 8m north-south. The west side of Area BI and the central baulk ran 10 degrees to the west of national grid north. The width of Area B thus varied from east to west between 5.5m and slightly under 6.5m; but the various extensions discussed below increased those dimensions.

Area BI lay immediately to the east of the Ring of Stones. It was designed to allow investigation of the main part of the interior (120) of an enclosure formed of head-sized stones (103), along with its relationship to Ring stones 42 and 43; its south edge was at the modern drain (100).

Area BI was extended to the north-west to allow examination of a prone stone (148) and of standing stone 34, between the ring of stones and the east side of the avenue. That area was called BIN.

Area BII covered the north-eastern part of the enclosure wall-base and BIII covered its eastern part. A triangular area between Areas BII and

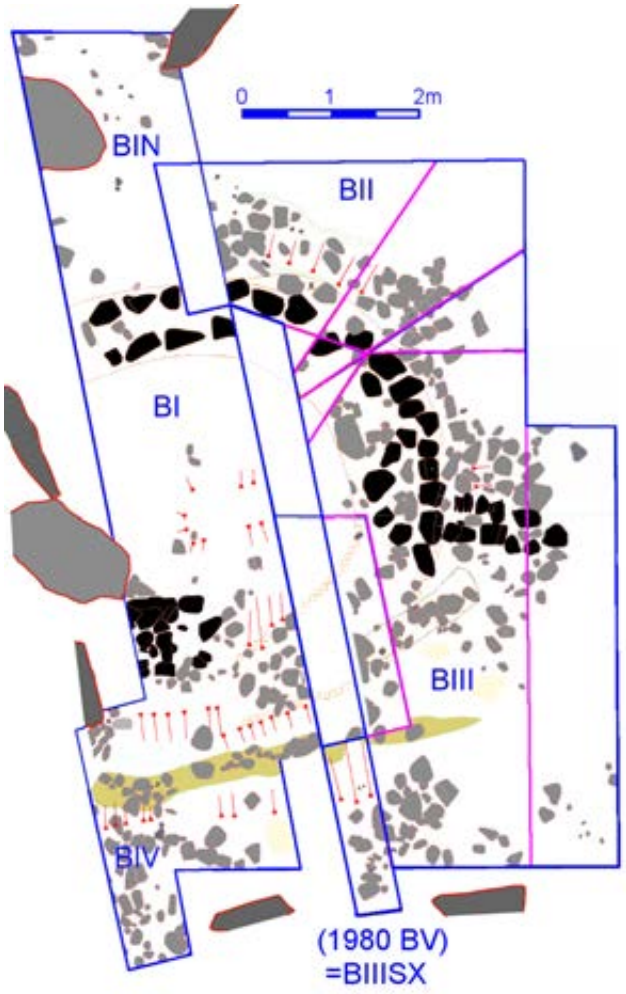
Illus Appendix 2.2 Area B as first opened, from the east [Film 1980.2.27]

Illus Appendix 2.3 The southern part of Area B looking west along the north side of the East Row on 12 May 1980 [Film 1980.5.2]

BIII was called Area BII/III. The trenches were intended to reveal all of the stones related to the enclosure including what seemed to be tumble outside the visible enclosure. The tumble turned out to be more complex than expected and to incorporate an earlier wall-base, while under the wall-bases a bank formed the earliest enclosure.

A further strip of ground between the ditch and the East Row was opened by 12 May 1980 revealing lines and clusters of stones south of the ditch (Illus Appendix 2.3).

A trench across the line of the East Row to the south of Trench BI, and extending westward towards the cairn, was called Area BIV. It was designed to illuminate the relationship between the modern drain (100) and the adjacent ridge (101) running eastward from Ring stone 43. During the excavation of Area BIV in 1980 a deep slot trench was cut to see how deep the layers were. The rapidity with which this was done subsequently led to recording problems, although it did show that deep pottery-rich deposits survived.

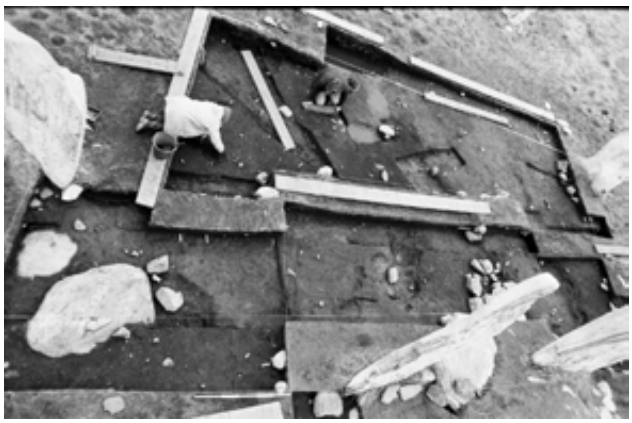


Illus Appendix 2.4 Area B in 1980 [NMRS DC38024]

A small extension to the south of Trench BIII along the line of the central baulk was called BV in 1980 but it is treated as part of BIII and called BIIISX in this text to avoid confusion with the 1981 extension of BIV to form BV.

Illus Appendix 2.4 shows the extent of the trenches at the end of the 1980 season. Stones which were considered to be in-situ parts of the latest enclosure are in black and others in grey; most had been removed by the end of the season. The modern ditch running from BIV to BIII is shown in light ochre.

Appendix 2.2 Excavation progress in 1981



Illus Appendix 2.5 Area B on 6 May 1981 (near the beginning of the 1981 season) from the north-west [Film 1981.3.26]

Excavation in 1980 left many unanswered questions. In 1981 work on the enclosure produced more evidence allowing its interpretation as a four-stage structure. Iron-panned stake holes were discovered in the bank and elsewhere. The extent of a palisade trench in the southern part of the enclosure circuit was defined.

The area BIN (BI north of the enclosure) was extended to the west to form BINX, at the bottom left hand side of Illus Appendix 2.5. BINX is sometimes referred to in the records as BINW.

Area BIN contained the northern half of a bank seemingly continuing the line of the enclosure bank, two large buried stones (148 and 171), and

Illus Appendix 2.6 The south part of Area B from the East on 11 May 1981 [Film 1981.6.7]

Illus Appendix 2.7 A view of Area B from the west showing an excavation drainage ditch on the east side of BIII, not otherwise recorded. Area H is in the foreground [Film 1981.6.21]

Illus Appendix 2.8 Area B on 17 May from the north before removal of the prone slab in Area BIWX [Film 1981.9.31]

part of the pit for Avenue stone 34.

Area BIV was widened and extended southward on 7 May 1981 to form BV, to the left on Illus Appendix 2.6, somewhat hidden by East Row stone 30. The sondage dug in BIV in 1980 is visible on the photograph. The stratigraphy of the area proved to be complicated with evidence for deposition of burial material and ground-working.

The part of BIV north of the modern ditch was excavated only down to a layer corresponding roughly to the period when the Ring was built, revealing remains of a burial and other deposits including much pottery. But because of the differences in stratigraphic depth over the area pre-Ring strata, including a shallow trough running between cultivation beds, were revealed in the southern part of BV.

Area BI was extended westward in 1981 to al-

Illus Appendix 2.9 Moving the prone slab from BIWX [Film 1981-10-18]

Illus Appendix 2.10 Area B on 22 May from the south-east after the prone slab had been moved [Film 1981.12.35]

Illus Appendix 2.11 Area B extension BIWX from the east on 25 May 1981 [Film 1981.14.25]

Illus Appendix 2.12 Area B extension BIVWX from the east c. 20 May [Film 1981.11.22]

Illus Appendix 2.13 Area B extension BIVWX on 27 May 1981 from the south showing the north passage wall [Film 1981.16.35]

low excavation of the area around the prone slab between Ring Stones 42 and 43 (BIWX) and of the passage (BIVWX).

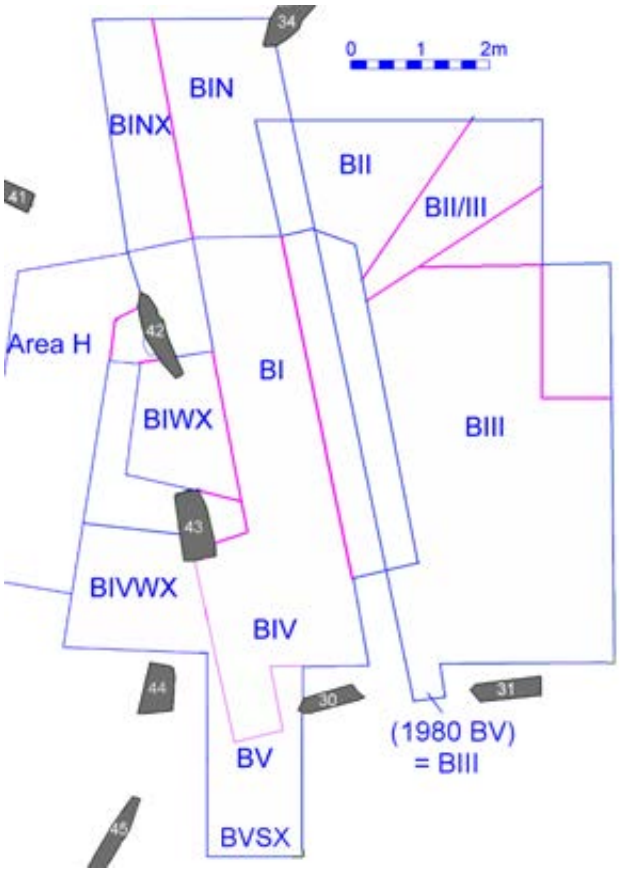
Before excavation much of Area BIWX was covered by the prone slab (122) measuring 1.5 m by 0.8 m and 0.25 m thick.

The prone slab was removed and temporarily stored on the baulk between BI and BIII (Illus Appendix 2.9)

Discovery of slots corresponding to the base of the slab allowed it to be re-erected at the end of the 1981 season.

Extension BIVWX revealed almost none of the original south passage wall, on the left of the drain in Illus Appendix 2.11, survived.

The west part of the north passage wall was well built (Illus Appendix 2.12) and covered a shallow but complex succession of earlier features cut



Illus Appendix 2.14 The final layout of Area B

into the green clay under the cairn. These features linked up with similar ones in Area H allowing correlation of layers below the passage and chamber walls.

During the last few days of excavation Area

B was connected to Area H (north of the chamber) by removing part of the baulk between Area BIWX and Area H. to help confirm the stratigraphic relationship between the chambered cairn and Stone 42 of the Ring (Illus Appendix 2.13).

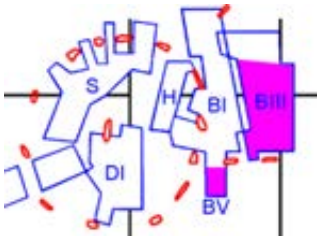
In early 1981 the rest of Area BIII was extended eastward by a metre. A week or so from the end of excavation this extension was itself extended further north.

Appendix 2.3 Summary description of the archaeology of Area B

This summary focuses on low-level interpretation from earliest to most recent. Key maps show the sub-area most relevant to the proximate text. Higher level discussion can be found in Chapter 24: Discussion.

Several sub-areas of Area B were not cleaned down to the natural clay (Appendix 1). Where subsoil was reached, mainly in BII, BII/III and BIII, the colour of its surface varied depending on what iron compounds had formed. It was mostly light green but included yellow and orange variants and its texture varied from somewhat sandy to stiff fine clay. In places it contained rotten stones.

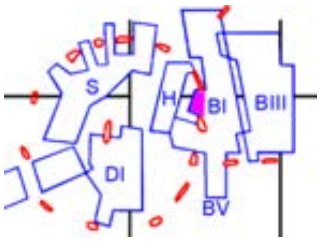
2.3.1 Phase 5 Early cultivation



On Area B the most convincing evidence for cultivation beds at or near the base of the succession came from BV, the southern part of the area near the Ring. There, a fair case could be made for two or three cultivation beds orientated slightly north of east. They would have been about 1.3m apart centre to centre.

In Area BIII, the easternmost part of Area B, there did seem to be ghosts of cultivation beds even in the upper soil developments, again running somewhat north of east at about the same spacing as on BV. It seems probable that their direction had influenced that of later features including the East Row which would have sat along an old cultivation bed.

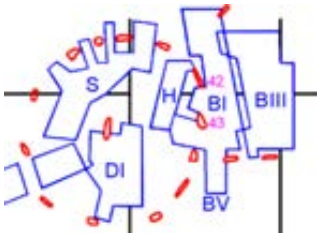
There was probably a subsequent phase of flat



cultivation judging mainly by the evidence from BIWX. Elsewhere later ploughing had helped form a palimpsest of ard marks of various dates.

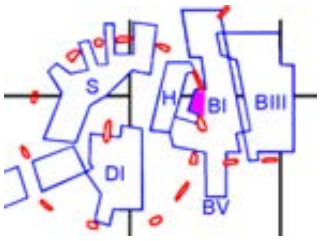
This story of cultivation beds followed by flat ploughing is probably basically right even if some of the detail has been misinterpreted.

2.3.2 Phase 6b Ring stones 42 and 43



Ring stones 42 and 43 were probably put up at much the same time as each other. Their pits cut the same ground surface. The most convincing evidence that their erection took place over a period of less than a few years was the coherence of the green clay layer outside the circuit of the Ring, which seemed to reflect spreading of the spoil from both stone-pits without any intervening layers. No signs of construction ramps were detected.

2.3.3 Phase 7b The green clay platform

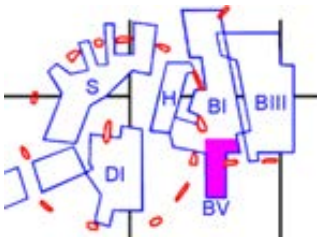


In BIWX the green clay platform had a boundary slot from Stone 43 northward, curving round to the north-west. As on Area H there was polygonal cracking in the clay surface. The cracks suggest that the clay lay open to the sun for a while.

On the north side of the passage the green clay was cut by a slot and several small pits or scrapes. These succeeded a fairly large pit, central to the passage of the overlying chambered cairn. It had been backfilled mainly with green clay and stones, but its upper fills also included stacks of turf. The sequence on the south side of the passage had been damaged by Victorian activities and was not fully explored.

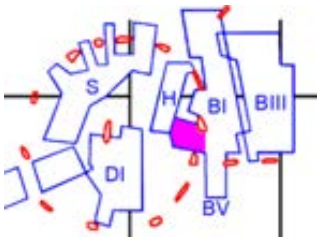
The slot under the passage wall joined up with a slot below the chamber wall in Area H and seemed to form part of a carafe-shaped enclosure. It contained charcoal which was ancient at the time the slot was filled, along with tiny fragments of cremated bone. Its pollen, however, was probably roughly contemporary with its filling which took place after 2500 cal BC judging by probable Beaker sherds in the features under the chambered cairn wall.

2.3.4 Phase 7b The East Row



The favoured interpretation is that Stone 30 of the East Row was inserted into a layer which formed before most of the dumping of burial material to the south of the chambered cairn, entrance. Attempts to date East Row stone 31 were frustrated by truncation of the evidence. However the preferred interpretation was that the East Row was started before the chambered tomb was built.

2.3.5 Phase 8 The chambered cairn



The chambered cairn had a well-built core cairn (or chamber wall) in Area BIVWX and, a sloppily built (or rebuilt) outer cairn. The evidence from Area B supplies no information about the original outer face of the cairn.

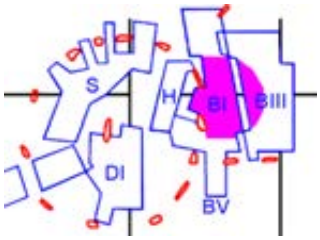
Probably what we saw on Area B reflected back-piling of stones after the massive kerb-slab in Area BIWX was first erected.

The passage width and direction were not easy to establish because all but one of the stones forming the south side of the passage had been disturbed in early modern times. The best estimate is that it was 0.4m to 0.5m wide. It was at least 0.56m tall above the clay forming its floor. There was no proof that the floor had ever been paved.

Its original length is also a matter of interpretation. It could have been as short as 1.8m or as long as 2.5m. Anyway, it was fairly short and narrow. There is no way of telling whether the passage had a low or a high roof, for with the support of the well-built core cairn and the substantial Ring stones it could have been built up to 2m or more.

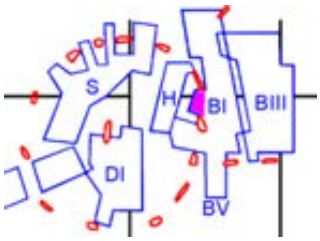
The part of the passage north wall which had shored up the outer cairn was severely damaged. The entire south wall-face also seems to have been destroyed. There is some evidence for disturbance of the passage in latter half of the 1st millennium AD. But possibly more damage to the passage took place fairly soon after 1857.

2.3.6 Phase 9 The Stage 1 and Stage 2 enclosures



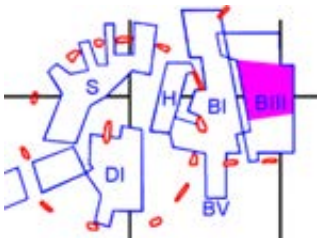
The first enclosure was represented by stake-holes in BI forming a small structure of uncertain shape. The second enclosure was roughly 3.6 m across internally, defined by an earthen bank with an entrance to the northeast. The ground at the entrance looked much worn; there were depressions in it with signs of several episodes of silting-up.

The southern bank (and just possibly the northern bank also) seems to have incorporated a palisade. In places it looked as if the palisade was doubled up but more generally it looked designed to revet the inner face of a turf wall.



The previous ground level survived in the area between Ring stones 42 and 43. There the cut or eroded slope of the west side of the enclosed area was ragged and some of the slabs which originally surrounded the base of Stones 42 and 43 had been removed.

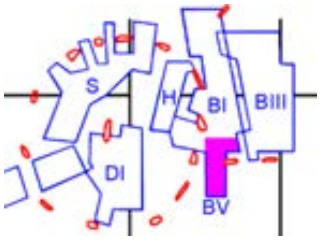
As described above it is possible that there were two ridges lining an external pathway to the en-



trance in Area BIII.

It should be recognised that there is a possibility that the palisade inside the enclosure bank was earlier than the Ring. But there was a mass of circumstantial evidence that it was later than the Ring and that is the interpretation preferred here.

2.3.7 Phases 11 & 12 The third and fourth stage enclosures

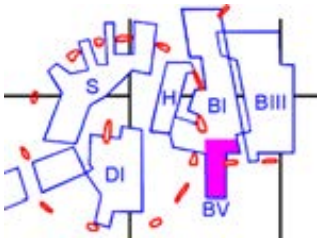


An area including the earthen enclosure was ploughed and a somewhat larger third-stage wall-based enclosure was built. There were enigmatic hints of wall-bases radiating from this second-phase enclosure; and two of them may have formed the sides of an eastern entranceway.

The fourth stage enclosure was also wall-based. Its northern and eastern parts were neatly laid out. It was pretty well at the modern ground surface, and therefore it may have been tidied up at any time after peat was cleared from the area. The preferred interpretation however is that it was not a substantially Victorian invention because if it had been it should have been more complete. In fact its southern part was grossly disturbed and in that area it was impossible to distinguish between stones of the middle enclosure, the latest enclosure and random stones.

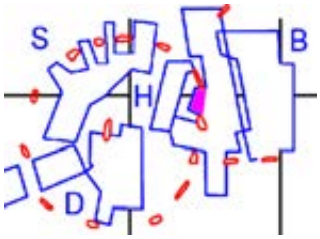
There was just enough order to the near-surface stones in BV and BIV south of the ditch to give a little support to Somerville's depiction of a matching southern enclosure. If there was such an enclosure it had been just as damaged as the south side of the known enclosure and on grounds of economy of hypothesis it is better to suppose that the possible southern enclosure stones were instead stones cleared from the area when it was tilled again at some period in the second millennium BC.

2.3.8 Phases 11 & 12 Burials and ground working

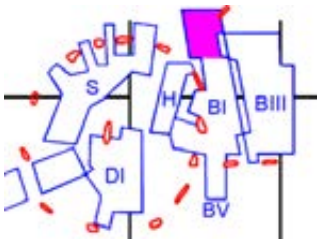


The ploughing and ground-working west of Stone 30 in BIV/BV alternated with deposition of burial material including beaker sherds and pieces of impressed and other wares. There seems also to have been at least one crouched burial with an insular beaker. Some of the surface stones hinted at the existence of rough burial enclosures.

2.3.9 Phase 13 The massive kerb slab



At some stage the outer face of the cairn between Ring stones 42 and 43 was faced with a massive slab like that still in situ in Area H. The slab in BIWX had been set up more than once. Its original slot survived. Only a relative date could be established: it was (hardly surprisingly) set up later than the slot bounding the green clay platform. The two secondary slots were really almost more like casts of its base than dug slots and it seems that after it fell it was twice leant up against the collapsed side of the cairn.



A superficially similar slab was found in Area BIN flat on its face underground between the Ring and the Avenue; it appeared to be in the position that the ice sheet had left it.

2.3.10 Phase 15 to 17 Peat

Although basal peat near Area C beyond the pre-excavation end of the East Row was dated to the 1st millennium BC finds of pottery near the Ring suggest that there was disturbance near the mouth of the passage in the second half of the 1st

millennium AD. So peat growth may have been highly diachronic.

2.3.11 Phase 18 Victorian activities

In 1857 the last of the peat was cleared from an area round the standing stones. In the north-east corner of Area B we found the edge of the cleared area. Beyond it peat had been left to a depth of 0.1 to 0.2 m. That boundary can be seen on air photographs and even, with care, traced on the ground.

After the peat was cleared Sir James' workmen may have tidied up the walls of the cairn and passage. Glass was found under the large innermost basal slab of the south wall of the passage. But if they did repair the chamber and passage, then others undid their work. Indeed, apart from one basal stone of the south side of the passage and the north core wall the surviving passage stones were in disarray.

More surprisingly there were a few modern pits inside the enclosure and at least one in the area south of the entrance to the passage. Most of the modern pits were very small but one, more or less central to the enclosure, was substantial. These were probably not the work of J J Worsaae in 1846, despite his account of test-pitting, because details in his description do not correspond exactly to what was found, and there was no peat in the backfills, which suggests that the work was done after 1857.

Appendix 2.4 Areas remaining unexcavated

At the end of excavation none of the areas shown on Illus Appendix 2.13 had been completely dug to subsoil level. Most had in part. The main surviving areas of archaeology were in BIVWX, BIV/BV and adjacent to the medial baulk. That baulk itself was not excavated and preserves a record of the stratigraphy of the enclosure.

No systematic record was made of what remained unexcavated. The table below thus depends largely on memory and the recent experience of revising the narrative for Area B.

Area	Comments on remaining archaeology
BI	Basal levels of the bank, and levels including and below turf line 162 near the Ring survive.
BII	Small parts of the basal bank survive?
BII/BIII	Small parts of the basal bank survive and possibly basal soils all over the area
BIII	All gone, to subsoil except perhaps near the bank and the East Row.
BIIISX	Quite possibly fairly complex strata remain.
BIV/BV	Levels including and below clay 161 in the north survive; bank 838 in the south and the trough to its north in the middle survive, as do parts of the Pit of East Row stone 30.
BIN	Pretty well everything was removed down to natural subsoil
BINX	May be basal soil remaining.
BIVWX	Much of the green clay platform and features in it on the north side survives, and layers of about the same period on the south side.
BIWX	Some of this area was taken down to subsoil on the last day as clay soil 871 was trowelled away, but some may remain near slot 858 which bounded the cairn, along with the green clay platform. The pit for Ring stone 42 was not emptied and a little of soil 871 may remain between BIWX and Area H.
Baulk	The medial baulk should preserve a complete record of stratigraphy across the enclosure from north to south.

Appendix 3
Area B enclosure contexts with finds

This appendix is referred to in Chapter 7 Area B 7.10.13.

The contexts listed here are not all directly related to the enclosure; topsoil and plough soils are included and some contexts, like 130.1, are only interpreted as related. The Pottery Catalogue provides a reference to the narrative where the pottery is discussed.

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
BINX	130.1	A band of clay/soil well north of the enclosure wall-base and bank	580_581	EBA Food Vessel ASH 75	
BINX	130.1	A band of clay/soil well north of the enclosure wall-base and bank	727_728	E/MN Non-corky	
BI	149	Apparent pit in the central area of enclosure. Cut by 129 = modern hole. Cuts 180 = round-bottomed pit.	677	?Chalco/EBA ?fine Beaker	ASH 76
80.137 quartz					
BI	165	Area of mixed yellow clay in the enclosure. Possible floor fill.	781_783	Prob E/MN corky	
BIII	175	Bank composed of iron impregnated clay.			81.185 rotten sandstone at junction of this and soil 112
BII/III	130	Bank fill.	_		Lost?
BII/III	130	Bank fill.	063	E/MN Corky ?Heb Inc	
B	130	Bank fill.	055	E/MN Heb Inc?	ASH 11
BII/III	130	Bank fill.	768	Indet non-corky	ASH 76
BII	130	Bank fill. Brown fibrous soil with charcoal in its upper part.	809	?E/MN Non-corky	
BINX	803	Black layer, turf lines formed before and after an episode of ground working associated with reduction of the bank of the first enclosure.		other	81.52 not in Pot catalogue.
54 burnt bone					
56 not described, seemingly discarded					
BINX	803	Black layer, turf lines formed before and after an episode of ground working associated with reduction of the bank of the first enclosure.		other	81.53 not in Pot catalogue.

BINX	803	Black layer, turf line. The simplest interpretation is that the two turf lines formed before and after an episode of ground working associated with reduction of the bank of the first enclosure.	810_812	?E/MN non-corky	
BI	167	Greenish/khaki gritty clay at the western edge of the enclosure. Possible floor fill.	297	E/MN Heb Inc	ASH 26 80.215 charcoal
81.702 burnt bone					
BI	167	Greenish/khaki gritty clay at the western edge of the enclosure. Possible floor fill.	318	E/MN Heb Inc	ASH 36
BI	167	Greenish/khaki gritty clay at the western edge of the enclosure. Possible floor fill.	319	E/MN or poss. Beaker non-corky	ASH 75
BI	167	Greenish/khaki gritty clay at the western edge of the enclosure. Possible floor fill.	566	EBA/Food Vessel	ASH 75
BIWX	125	Impressions of slabs around Ring stone 42.		EBA Food Vessel ASH 75	
BIWX	125	Impressions of slabs around Ring stone 42.		EBA Food Vessel ASH 75	
BI	835	Linear feature. - red brown sandy clay - under 836? = khaki strip which was first seen running parallel to 835 and just to its south	295_296	E/MN Heb inc	
BIII	815	One of the shallow features in the entrance way to the first enclosure. Under 183 = soil fill of enclosure and 808 = patch of paving in brown earth		other	81.188 mylonite arrowhead 81.466 mylonite
81.601 quartz x 5					
BIII	142	Silts and possibly make-up in an erosion hollow in the entrance-way of the first enclosure.	771	Chalco/EBA Fine Beaker	80.134 hornfels
80.135 quartz arrow					
BI	183	Superficial soil fill of the central area of the enclosure.		other	81.505 mylonite short end scraper
BIII	142	The largest of the shallow features within the enclosure	829_831	Indet non-corky	
BIII	142	The largest of the shallow features within the enclosure	832	Indet	
BI	107	Topsoil above uppermost dark brown fills in the enclosure	354	Chalco Early International Beaker ASH 39	In 107 but inside 120
BI	120	Uppermost dark brown fills in the central area of enclosure.	563	EBA Food Vessel	80.44 glass, modern; 80.51 chert

BI	107	Uppermost dark brown fills in the enclosure	726	Prob E/MN Corky	In 107 but inside 120.
BI	120	Uppermost dark brown fills in the enclosure	360	?E/MN 'Non-corky'	
BI	120	Uppermost dark brown fills in the enclosure	357	Chalco Early International Beaker ASH 39	
BI	120	Uppermost dark brown fills in the enclosure	358	Chalco/EBA Beaker	
BI	120	Uppermost dark brown fills in the enclosure	361	Chalco/EBA Beaker	
BI	120	Uppermost dark brown fills in the enclosure	359	Prob Chalco/ EBA prob Beaker	
BI	120	Uppermost dark brown fills in the enclosure	239-42	E/MN 'Non-corky'	

Summary

BANK — Four sherds, all from Context 130 in the northern bank sector: E/MN Corky ?Heb Inc, E/MN Heb Inc?, Indet non-corky and ?E/MN Non-corky. These should reflect the contents of the turfs and soil used to build the first bank.
INTERIOR FILLS — These were clays and included three E/MN Hebridean incised sherds, two possible beaker sherds, and, in the locally highest clay patch 167, a sherd of Food vessel ASH 75. A lower patch 165 included a probably E/MN corky sherd. A near-central pit (149) contained a possible fine beaker sherd.

ENTRANCE SILTS — Three sherds, one fine beaker, and Indet and Indet non-corky, from the largest area of silting 142. The silts also contained a mylonite and a quartz arrowhead and stray bits of mylonite and quartz.

MISCELLANEOUS — The slab impressions on the ledge by the Ring were filled with material interpreted as washed down from the cairn. They included two sherds from the Food vessel ASH 75.

REDUCTION — Contexts outside the northern sector of the bank, interpreted as reflecting reduction of the bank by ploughing, included two E/MN sherds (one of somewhat ambiguous affiliations) and a sherd of Food Vessel ASH 75. They also contained find 81.54 burnt bone in a turf line 803.

UPPER FILLS — The upper fills of the enclosure reflect ploughing with the possibility of movement of soil and sherds from elsewhere in the area. They included one probably E?MN corky sherd and two non-corky ones (one of somewhat ambiguous affiliations), two bits of Early International Beaker ASH 39, three Beaker sherds (one of somewhat ambiguous affiliations) and, from an uppermost fill, a piece of Food Vessel ASH 75. They also contained two finds of glass, two pieces of chert and a fragment of a mylonite short end scraper (81.505). The lack of Hebridean Incised sherds is notable. This appendix is referred to in Chapter 7.12.

Appendix 4
Green clays 810 and 812 and East Row Stone 30

The grey-green sandy clays in BIV/BV: layers 810, 810.1, 812 and 812.1 were sandwiched between plough soil 141 and thin black worked soil 160 and its cognates 192 etc.

The crucial interpretational problem is the nature and date of the green clay 812 which was later than the pit for East Row stone 30. The closely related layer 810 should also be taken into account. Until careful reanalysis of the labelling of potsherds in the Finds Book and on the finds bags after the latter had been recorded by Alison Sheridan (Chapter 18), it was not apparent that what is now labelled 810.1 went with 812 in BI, northeast of the northern part of BIV/BV and that 812.1 went with 810 in the southern part of BV. 810 (and now 810.1) are used for seemingly definitely disturbed layers and 812 (and now 812.1). are used for seemingly relatively undisturbed ones, as follows. The finds in them are listed in the main text (Chapter 7.12).

— 810 Disturbed green sandy clay in the southern part of BV: although on the bags the area was identified merely as BV other records make it clear that this was in the southern part of the trench. This sandy green clay 810, in BV towards the south end of BIVS/BV trench, was thin and it was certainly disturbed by later intrusions. For instance a small pit or root hole 834 with glass was found below 810.

— 810.1 Disturbed green sandy clay in BI: this thin green sandy clay lay north of East Row 30 and south of the modern ditch in an area where layers ran together. 810.1 was disturbed, and it was close to the pre-peat topsoil and thus cannot be regarded as well-sealed.

— 812 Green sandy clay in BV: although on the bags the area was identified merely as BV other records make it clear that this was in the northern part of the trench.

— 812.1 Green sandy clay in BVSX: bag labelling and the Finds Book show that despite being given the Area label 821 these finds were in the southern part of the trench.

One idea to explain the existence of 810 and 810 can, I think, be rejected. Given the evidence for dynamic post-depositional soil processes in the northern part of BV, and the strong iron pans in layers 892 'soil like 141' under 812 and 810.1, it might be argued that the light colour of clay 812 reflected leaching-out of organic and iron-rich elements. But the green iron-rich compounds in 810/812 should have been oxidised during such processes. I therefore think it can be excluded as a possible explanation. That said, in any future excavation nearby the layers should be examined carefully for a better understanding of local soil developments.

These green clay layers lacked sherds from ASH 42, the insular Beaker probably associable with a burial redeposited during the formation of plough soil 141; nor did they include any other specifically late types of beaker. The only two Beaker sherds which were not diagnostically early or anonymous (Cat 538 and 556 Illus 18.21) had stab decoration, not very common at Calanais.

Thus, as with the green clay in BVS, the assemblage may have been an early Beaker one apart from the residual Neolithic sherds, the presumably intrusive Food Vessel sherd (Cat 567) in disturbed clay 810.1 in Area BI to the north of East Row stone 30 and a possibly intrusive possibly 6th century AD sherd (Cat 756_757) in the southern part of the trench.

Hypotheses about origins and dating of 810 and 812

The clays can be assigned to any of several phases between construction of the green clay platform under the cairn and digging of the stone-holes for the stones of the East Row.

a. Phase 7b to 7c with subsequent disturbance perhaps as late as Phase 10a or 10b: The clays may have come from disturbance of the fills of graves dug for people using early International and AOC Beakers.

b. Phase 7c: These sandy green clays could be contemporary with the manipulation of green clay

related to closing down of the green clay platform. Closure of the latter probably took place a period when Beakers were still exceedingly rare in the Western Isles. In this hypothesis it could be argued that the southern half of the structures on the green clay platform had been used for deposition of Beakers but the northern half was not used for deposition. When the timber buildings were decommissioned the green clay and potsherds in the southern half of the building were scraped up and dumped outside the Ring.

c. Phase 8 (use of chambered cairn): The layers could have been taken from the chamber of the cairn during 'over-vigorous' cleaning. The chamber floor area was roughly 3.5 to 4 sq m, and the passage floor area was around 2.5 sq m, so if a 0.1 m layer of subsoil were taken from it that could account for the amount of green clay in layers 810 and 812 (plus for that matter 842). The 'contaminating' presence of the potsherds in (disturbed) subsoil of the chamber might explain why it was removed.

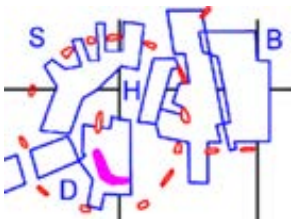
d. Phase 9a: Alternatively the interior of the enclosure a few metres to the north may have supplied green clay when it was dug down through earlier layers, possibly after the first enclosure was built and while its floor was mainly green clay. Given the absence of beaker sherds from 130 where it formed part of the enclosure bank (here I am excluding the similar material in a depression in BIN relabelled 130.1 during post-excavation), the early embanked enclosure would, in this hypothesis, have been in existence for some time when this levelling down was carried out, time during which many disturbances introducing beaker material to green floor layers there could have occurred.

e. Phase 10b: Another source could have been the stone holes of the East Row, but spread at a somewhat later date after activities not represented in the areas we dug had led to incorporation of potsherds in the clay. Yet another possible source is the (admittedly very poorly understood because seen only in section) pit or linear ditch underlying the pit for Stone 30. The problem with these ideas is that it is not clear why Beaker sherds should be incorporated unless digging the stone-holes disturbed earlier graves.

Appendix 5
The sequence in Area D and E

This summary runs from early to late.

Appendix 5.1 The early ditch

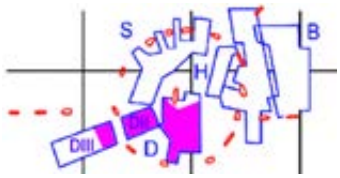


The earliest large feature discovered was the ditch 921 in Area DI which was about 0.8 to 1m wide and no more than 0.15 m deep. It appeared to be part of the shallow encircling ditch of an enclosure. If it was circular it is impossible to estimate its diameter at all closely, particularly because the east end of the ditch was overlain by the trough separating cultivation beds 1 and 2. The end of the enclosure ditch near the central monolith was not investigated fully; it appeared to be much disturbed. It is therefore not clear whether there was a terminal at that point although it did seem to end.

To pre-empt the discussion in Chapter 24 where all of the Areas are considered together, there were no features elsewhere which might have been part of the same ditch.

The ditch must date to before the cultivation beds, and the best estimate for the start of the latter is sometime between 2980 and 2510 cal BC.

Appendix 5.2 Cultivation beds



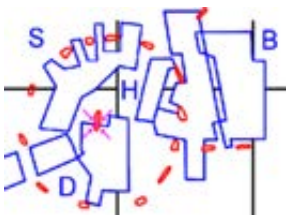
The area contained shallow cultivation beds with a wavelength of on average about 1.5 m. The ambiguity of some of the evidence demands that some detail should be taken with a pinch of salt.

But Bed 4 in Area DII, DIII and DIV, and Beds 1 and 2 in DI did seem to be well-attested and there was a little evidence for Bed 3. Again, I shall discuss cultivation beds in Chapter 24, pulling together the evidence from all of the Areas.

Appendix 5.3 Pre-Ring old ground surfaces and related layers

A persistent turf line, 334-lower to the north with 365-lower to the south, covered much of the area of DI. In places another old turf line (also labelled 334 and 365) formed over it, above spreads of clay or soil. Broadly speaking although the turf lines were in place before the cairn was built, it is impossible to be sure how they related to the erection of the central monolith or that of the Ring. In discussing the evidence I suggested that the earlier old ground surface was that into which the monolith and Ring were set and the younger one had formed on top of clay spreads derived from spoil from Ring pits. But this generalisation must be treated with caution. Turf tended to form on any exposed soil or clay at Calanais. A new turf line could merge with an old one. Breaks in a turf line could heal over and become unrecognisable.

Appendix 5.4 The central monolith

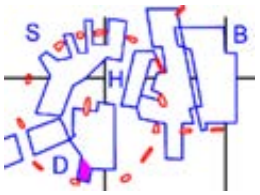


There was no direct evidence from Area D to suggest that the monolith was earlier than the Ring. It was definitely earlier than the chambered cairn and although there was some ambiguity in the evidence the monolith was probably also earlier than a light timber structure built on a platform of green clay to its east. Although the evidence suggests the timber structure was built on an area levelled up using clay from the Ring stone pits it does not strictly speaking prove that the Ring was later than the central monolith.

Appendix 5.5 The Ring

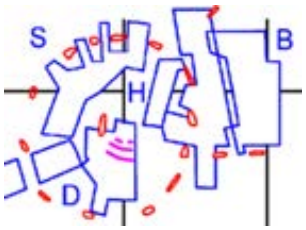
There was no unambiguous evidence for the date of setting-up of the Stone 47 of the Ring on

Area DV, because of later ground-working and soil processes. The evidence from round the base of the stone could be interpreted as suggesting a ramp inside the Ring. It was too tenuous to provide much interpretative weight. Further excavation would resolve the point. It would be fascinating if there proved to be some reason to pull the stone up from the enclosed area, rather than from outside.



Appendix 5.6 The platform and slots under the cairn

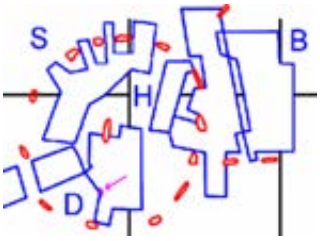
There were remnants of a clay platform under the cairn. The slots on it and immediately under the cairn were slight and if they supported structures they must have been lightly built and short-lived. In the interpretation favoured here the slots were contemporary with one another even though one cut an old ground surface which seemed to have grown over the other. It is very easy for ground surfaces to be diachronic. Maybe the inner part of the structure was more durable than the outer, or it was more significant and was kept in good repair after the timbers in the outer slot had decayed or been removed. In Chapter 24 the slots are considered along with similar ones found on Areas H and B.



From pollen analysis it seems probable that the turf outside the cairn continued to grow long after the cairn was built.

Appendix 5.7 Pit 917

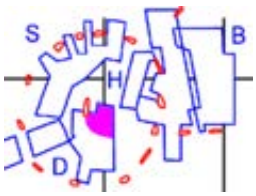
Pit 917 was the best candidate amongst the several pits recorded in Area DI for a stonehole unconnected to known standing stones, but given the lack of direct evidence that it was dug to support a standing stone, and given its similarity to the pit under the passage in Area BIWX which almost certainly did not support a standing stone, it should instead be compared to the pits found on sites discussed in Chapter 24.



Much of Pit 917 remains unexcavated; further excavation would allow testing of the idea that it held a stone or a timber. More cogently, perhaps, its date could be ascertained. The possibility that it was related to the rows and part of the avenue is discussed in Chapter 24.

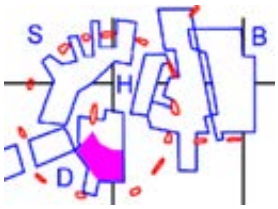
Appendix 5.8 The chambered cairn

The cairn was shown to include an inner core or chamber wall and an outer cladding. The original chamber wall included a deeply curved rear wall rising up the mound round the base of the central monolith, rather than the square end shown by Sharbau shortly after it had been cleared of peat. There was a neat outer kerb, probably of laid slabs, which also rose up over the mound of clay at the base of the monolith. It seems to have been polygonal rather than rounded. All but its basal level was robbed in prehistory.

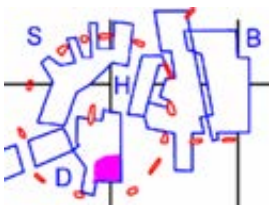


Appendix 5.9 Burials and ploughing

In Area D subsequent activity focused on the area south of the cairn. It was used for deposition of burial-related or domestic material in low piles and small shallow pits. It seems fairly likely that deposition alternated with ground-working over a considerable period, with deposition perhaps ending some time in the first few centuries of the second millennium BC. Ploughing, perhaps for cultivation, continued long after that. Its complex chronology is discussed in Chapter 24.



Appendix 5.10 The rubble platform



The rubble platform in the southeast part of the area remains an enigma. Given the amount of Victorian activity in the area it is conceivable that it started life as a depot for cairn stones during trial trenching prior to cairn-rebuilding. It is also conceivable that it reflects more general stone clearance. But we could not entirely exclude the possibility that it was built before peat covered the place.

Appendix 5.11 The Victorian cairn and Lady Matheson's Path

The amount of disturbance during the post-peat period was a surprise. It is not at all clear whether the square back end of the cairn was a Victorian addition or a change made before peat started to grow continuously in the first millennium BC.

Probably in a second phase of Victorian activity a sondage was cut into the cairn under where Lady Matheson's Path was planned to be and then the cairn was trenched round almost to the central monolith to trace the line of the original kerb. A new kerb was built and earth and stones tossed back behind it. The material thrown back into the initial sondage was revetted by a neat slab-built wall and Lady Matheson's Path was built over it.

Area D was landscaped by addition of earth and turf (perhaps with some stone clearance) after which only minor maintenance took place until our excavations.

Appendix 5.12 Unexcavated archaeology

In Area D only DI Chamber and Area DIII were completely excavated. The cultivation bed levels in DII were very nearly bottomed. They were only partly removed in Area DI and important remains may survive including, perhaps, features related to the early ditch 921.

Area E summary description

Most of Area E contained a plough soil but to the southwest there was a rock outcrop close to the surface. In soil above the bedrock was a small cluster of Hebridean incised wares sherds. Probably later pottery suggests subsequent cultivation and the sherds may have been collected during cultivation and put to one side.

Taken in conjunction with the evidence from antiquarian accounts (Ashmore 1984; Ponting and Ponting 1979 appendix C), the archaeological evidence makes it improbable that Stone 35 was erect in any part of Area E before peat covered the place. There was no convincing evidence for any other standing stones having been present.

The bleaching of Stone 35 was different on the top and bottom halves. That suggests that one half lay below the peat which covered the site from the first millennium BC to the early modern period and the other did not. It is conceivable that this latter piece was one of the 'extra' stones recorded on early plans (Chapter 3: Previous Studies).

The history of use of the stone may be quite complex. It is possible, for instance, that it was originally used as a lintel over the chamber or the passage; perhaps it was broken in antiquity so that its parts could be used as kerb stones. But that is pure speculation.

Appendix 6
Area F Summary description

After the end of the glacial period the ground in which Area F was set out may all have been as undulating as the area west of the Avenue. Human activity was dated by charcoal spreads including fragments of hazel charcoal dating to some time between 3640 and 3380 cal BC and between 3330 and 2890 cal BC. The pottery assemblage consisted of small undiagnostic non-corky fragments, apart from one possibly early neolithic sherd, two rim sherds from Hebridean Incised Ware pots, one in a superficial deposit but the other in clay filling a pre-cultivation depression, and a sherd with harsh very gritty fabric found in the upper mineral soil on FVIII. In contrast to the areas near the Ring, there were no sherds from Grooved Ware, Beakers or Food Vessels.

The area inside the Avenue must have been levelled purposefully, for otherwise turf lines would not have survived in the depressions. This activity led to the digging up of soil containing the earlier piece of 4th millennium BC charcoal. The later piece of charcoal provides a terminus post quem for the cultivation which allows it to be as early as the latter part of CaN-2c at Callanish Leobag, the earliest period of cereal-growing in the area. But it may have started much later and cultivation may have continued even until initiation of peat growth.

Some of this pre-cultivation levelling-up, whatever the date of the rest, appears to have been roughly contemporary with erection of the southernmost stones of the western side of the Avenue, because a thin turf line covered both the fill material (green clay containing a piece of Hebridean incised ware) and the edge of the mound around Avenue stone 12. However that mound was brown clay rather than the green clay forming the mound round Avenue stone 11 and there is a possibility of more complicated stratigraphy near Stone 12 than appeared in Area F.

There was a slight suggestion of a curving linear depression in the area enclosed by the Avenue stones, earlier than the local levelling-up. Too little of it was seen to be sure that it was not in fact part of an amorphous depression.

The other seemingly prehistoric features found in Area F may well relate to agriculture or grazing. Stones were found in piles which presumably reflect clearance either of cultivated plots or pasture. In general they lay on top of a cultivated soil. However, similar piles of stones lay in peat.

When MacCulloch visited before 1819 stones 11 and 12 were not visible. Shortly before 1857 all three stones were shown largely peat-free on Callender's 'birds-eye view'. By the end of 1857 all of it been cleared except for a thin skim of amorphous peat. Fibrous peat subsequently formed over parts of the area.

There seem to have been attempts to fill up waterlogged areas with flat stones (under some of which glass was found).

Area H Summary description

Area H was not cleaned down to natural subsoil and some 0.1m of deposits remain unexcavated in part of the area.

The excavated sequence started with creation of cultivation beds with a wavelength of about 1.4 to 1.6m, although only one trough was well-preserved. Turf-line 766 formed. A thin layer of soil 756 / 777 overlay this, following the contours of the cultivation beds and best preserved trough.

The preferred interpretation is that Ring stone 42 was erected through turf line 766 and that soil 756/777 was spoil from the pit for the Ring stone.

Alternative interpretations are possible. It is conceivable that the Ring stone was erected after turf line 751 / 758 had formed. The stratigraphy suggests that this is less likely that the interpretation offered above. But if it was, then some of the green clay found above turf line 751 / 758 might have come from the nearby stone pits. Pollen evidence suggests that if that was so then the green clay would have had to be stored somewhere else before being spread under the subsequent area of the cairn. That does not seem very likely.

Soil 756 / 777 was ground-worked, which seems to have destroyed the top of slot 795/1001, if it was originally cut from the top of the soil.

Another slot may have existed to its south although the evidence consisted only of a shallow feature in section. If it had been a slot it would have been removed by the chamber of the chambered cairn.

Turf line 751/758 began to grow. After a time long enough for it to have become well-developed imported green clay was spread out over the area. At some time before that stones had been piled in a mound round the base of the standing stone and the green clay lapped onto this mound.

On this green clay platform a light structure or successive light structures were built. If it was a single building it will have consisted of an inner and an outer timber wall or screen. But an alternative interpretation is that a light timber circle about the same diameter as the subsequent cairn was superseded by a smaller structure. The inner gulley defining the latter enclosed a space similar to that subsequently occupied by the chamber of the chambered cairn and passage.

Once the structure had been abandoned the inner slot was filled with clay containing by then ancient charcoal and above that organic material which had a peaty appearance. The fills included two probable domestic Beaker potsherds. Above a patchy turf line covering Area H a sturdy chamber wall and an outer cairn were built. The outer cairn was probably faced with a wall of laid slabs. The two pieces of charcoal from the cairn which were radiocarbon-dated seem likely to have been residual. An early International beaker sherd was incorporated in the cairn; it, supported by the probable domestic Beaker sherds from the underlying slot, shows that the cairn was built after c. 2500 BC.

The details of the find spot of the Beaker sherd in the cairn makeup show that it was far more likely to have been part of the original cairn than to have put there during the later disturbances; and that it is also quite unlikely to have fallen down through layers of stones from a secondary filling level. But the possibility that it was intrusive cannot be absolutely excluded. There are enough demonstrable errors in the record that it is in the abstract conceivable that another one has affected this detail. But I have no reason to think that it did.

A balanced interpretation, while giving primacy to the observed stratification, should acknowledge the currently perceived gap between the latest likely date for building a chambered cairn and the earliest likely date for International Beakers. The scientific evidence for the date at which building of chambered cairns ceased is very unsatisfactory (Ashmore 2004a). But there are no (other) chambered cairns in Britain with beakers in primary building contexts. In current models none are thought to have been built after c. 2600/2500 BC, and many scholars would prefer an earlier date. There are also uncertainties about what dates should be assigned to the earliest International Beakers. Some see Beakers appearing widely on the borders of the Atlantic around 2600 BC (Cottiaux et al 2007, 154) and reaching the Paris Basin, for instance, perhaps c. 2600-2500 BC (Cottiaux et al 2007, 157) or only after c. 2500 BC (ibid 155). Sheridan suggests that the first Beakers probably reached Britain after 2400 cal BC (Chapter 18, this volume). That is soundly based on the many available radiocarbon dates associated with Beakers in Britain; but because all the reliable dates are from burials the possibility that the earliest Beakers in the Western Isles were used in domestic contexts at around the date ascribed to early Beakers in other Atlantic-bordering areas cannot be excluded.

It has been suggested that some small tombs were established in coastal areas in the late 3rd and the 2nd millennium BC (Jones & Thomas 292). Their model has more of the status of a hypothesis than a theory, because of the acknowledged lack of dating evidence for the primary construction and use of the cairns, but it provides a framework for dating the Calanais tomb to the second half of the 3rd millennium BC. Its is discussed in further detail in Chapter 24: Discussion and Conclusions.

My own view is that the difficulties currently perceived in an apparent gap between the last building of chambered cairns and the first appearance of International beakers in Atlantic areas in Britain are quite as likely to be resolved by new data as they are to be confirmed.

The preferred interpretation purely from the

stratification and nature of context 736 at Calanais is that the International Beaker sherd reached the position in which it was found when the cairn was originally built, with the proviso that the stratigraphic evidence is not strong enough to entirely preclude an origin for the sherd in secondary activities.

The original position of the north-east chamber orthostat and its form suggest that the wrong stone was in position in 1980. The recumbent slab in the chamber is a better candidate for the original orthostat.

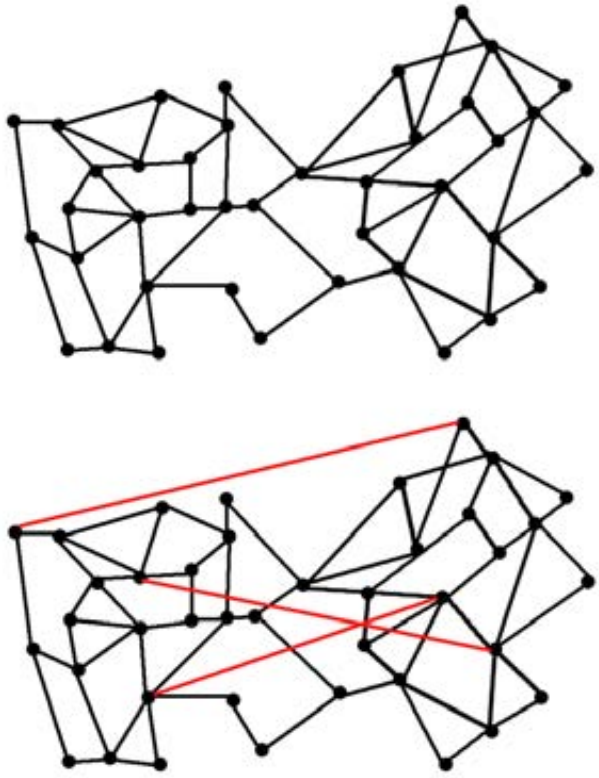
The outer part of the cairn was robbed of its stones, including its entire kerb apart from one stone. All but the lowest few layers of the chamber wall inner face may have been removed at this time along with any remaining chamber roofing. Eventually a slab large enough to have been a roofing slab was erected to form a new outer facing to the cairn; two smaller slab-like boulders continued the line of the kerb to the east. Stones and soil were thrown back behind the slabs building up the cairn to an even height. The material capping the cairn included charred cereal grains dating to between c. 1600 and 1400 cal BC. It also included many sherds of a fine Food Vessel (ASH 75) with ornate impressed decoration. Because this deposit was of material scraped up from somewhere nearby, and because it was unsealed, the act of capping the cairn, the cereal grains and the potsherds need not have been of the same date as each other, and the barley and potsherds do not provide a terminus post quem for the capping.

Some rough repairs to the inner face of the chamber may have taken place at this time, although the evidence suggested that the repairs visible when we excavated the chamber occurred in the Victorian period after peat had been cleared from the area in and around the Ring in AD 1857.

The chamber was emptied in 1857. At the same time a pit may have been dug to investigate the footing of the external kerb slab. The only surviving account of the clearance refers to black deposits containing pieces of cremated human bone.

Alternative interpretations for many other details could be promulgated, and in earlier versions of this narrative the text was overloaded with provisos. In this version those alternatives have been implied or alluded to in passing rather than described in detail because they do not affect interpretation of the recognisable structures built on Area H.

Appendix 7
Modelling connections



Illus Appendix 7.1 Increased connectivity through addition of a few long distance links.

In discussing regionality I said that one good reason for spreading comparisons over long distances is that local changes may sometimes have depended on changes elsewhere. The reason for failure of a previously successful social nexus may be loss of links between other areas rather than any events at the place itself (taking 'success' here in the limited sense of creation and survival of a rich material culture). If social networks are crucial to an understanding of how change took place it is important to grasp their common characteristics. Network behaviour is in some ways independent of the particular entities joined up in it, provided it is possible to establish and to lose both short and long distance two-way connections between them.

Both in a formal sense and in practice the elements of a large, sparsely connected social network can be 'close to each other' (Watts 1998, 5, 40). In the 'egalitarian' networks studied by Watts, a small number of long distance links can create a high degree of overall connectivity (Illus 24.1), which translates for instance into people frequently travelling long distances, meeting the inhabitants of distant areas, influencing them, being influenced by them and returning to influence their own neighbours.

Other studies emphasise 'aristocratic' networks. In these some nodes start to attract more connections than others. Once they have more connections they seem (irrespective again of the particular entities making up the connection-set) to become unusually attractive to yet more (Buchanan 2002, 111-20). This too appears to be a universal behaviour where there are simple low cost two-way links. In some networks, however, over time the less successful nodes catch up with the more successful ones, returning the system to a near-egalitarian state.

Thus the success or failure of the people at one site was inextricably linked to the success or failure of those in other places. In other words, it was probably the existence of low-cost two-way links between productive groups of people at geographically various locations which led to success. I suspect that this model applies to Calanais.

Formal analysis demands identification of criteria for measuring success, the strength and number of links and other features. By way of example, a study of maritime interactions in the Aegean Bronze Age incorporated social as well as geographical factors (Knappett et al 2008). The analysis was based on 34 sites spread around the Aegean, for each of which a fixed intrinsic carrying capacity, reflecting its local resources, was assessed. The relative importance of each site was a variable reported with other output figures of the model. The social size of the site was represented by multiplying these two figures together. The links between sites also had physical and relational values, on the one hand the geographical

distance and on the other the fraction of effort which the people at one site put into maintaining a link with another site.

Knappett and his colleagues calculated a cost-benefit social potential for each possible configuration of site and link variables, based on the costs of supporting a local population, the benefits of exploiting local resources and the costs and benefits of maintaining links. The benefits of one site's maintaining a connection with another were based on the product of their populations and a number which reduced as the distance between sites increased. Thus Knappett and his colleagues encapsulated a proposition that the people living in large sites preferentially chose to interact with one another. The network was approximately optimised for many combinations of the input variables to minimise the overall 'cost-benefit' social potential, and the implications of the output figures were assessed.

One problem identified by the authors with their own approach is that the choices made in setting up the model (which for instance in their case emphasised the role of socially large sites) affected the outcome. But their model was robust, producing similar outputs from many starting points of the input parameters. For the set of 34 Aegean Bronze Age sites it produced both historically plausible results and some less obvious ones which seem to fit the historical record. It showed the importance of some relatively small sites; for instance they suggested that the eruption of Thera, which destroyed an important link, permanently affected sites on Crete. They emphasised that their model was a tool for thinking rather than a mechanistic problem-solver and discussed possible improvements such as using transport times rather than geographical distances as input factors. In a subsequent study of the same region they concluded that the Thera event did not destroy the network; it was sufficiently resilient to sustain overall levels of activity; they attributed the changes following the eruption to an increase in exchange costs (Knappett et al 2011, 1019-1020).

Rather than transformations at Calanais itself it was maybe changes in ideas amongst the other peoples of the lands bordering the Irish Sea that changed perceptions of cost-benefits of connections with Calanais. But it is hard to judge whether the models described by Knappett and his colleagues (along with others like them) could provide a realistic strategic research agenda for the late 4th and 3rd millennia BC in the north and west of the Hiberno-British archipelago. My impression is that their approach would require considerable modification, for instance because there is far too little data to measure the carrying capacity of relevant sites in Britain and Ireland. It might be feasible to develop some measure of their likely social importance and the likely strengths of their links with others; but if modelling is to be worthwhile much preliminary work must be done on examining the date from excavated sites in the context of their local landscapes and interpreting existing material in museum collections, as recommended by Clarke (2004).

Another problem in devising such a research framework will be agreeing what the evidence for connections between places means. For instance, one of the interesting facets of the model proposed by Sheridan (2009) and Pailler and Sheridan (2009) to explain the occurrence of possibly late 5th millennium Breton-style artefacts in Western Scotland is that the contacts between N W France and the countries bordering the Irish Channel have not been shown to have been two-way. The circumstances which they envisaged would thus not include networks with the 'universal' behaviour described above. In other words, there need not have been an enduring high level of social connectivity between people in Brittany and those on the coasts of the Irish channel.

Appendix 8
Phasing Table

Table 24.1 Phasing of early features north of the Ring from about 6500 to about 3000 BC

Phase	Date BC	Date source	Events	Dating and comments
	6500			
0		Pollen	Woodland clearance	Started at some date between c. 6600 and c. 6200 cal BC. in CaN-2a and 2b at Calanais Leobag.
	6000			
	5500			
1		C14	Foragers in Avenue area?	Date between 5305 and 5215 cal BC
	5000			
	4500			
	4000			
2a		C14	Foragers or farmers in Avenue area?	Date between 3720 and 3530 cal BC
2b		C14 and pollen	Farmers in Avenue area and near Calanais Leobag.?	Date between 3640 and 3380 cal BC. Soil disturbances. Early cereal cultivation started near Calanais Leobag at some date between 3875 and 3605 cal BC
	3500			
		Pollen	Cultivation finished	Date between 3490 and 3020 cal BC.
3a		C14	Early farming in Avenue area?	Charcoal date between 3300 and 2890 cal BC. Soil disturbances.
3b		C14	Original deposition of charcoal and early to middle Neolithic pottery in settlements nearby.	Charcoal dated to between 3330 and 2890 cal BC, in round terms between c. 3300 and 3000 BC. Imported with soil to Calanais many generations later in Phase 7.

Table 24.2a Phasing of features in and near the Ring between about 3000 and about 2250 BC

Phase	Date BC	Date source	Events/processes	Comments
4		Pollen	Early ditch	Before cultivation beds.
	3000			

5a		Pollen	Cultivation beds and subsequent flatter cultivation	At beginning of CaN-3a, start between 2983 and 2510 cal BC.
5b		Pollen	Turf formation	Formed over partly flattened cultivation beds (including, judging by pollen samples, formation at various subsequent dates over silts in cultivation troughs). Continues after Monolith erection until Ring erection
	2950			
6a?		Stratigraphy	Monolith erection?	Near beginning of CaN-3a. 3000/2850 BC After 5b turf growth, and interpreted (but not demonstrated) as before Ring.
	2900			
6a, 6b?		Stratigraphy	Monolith erection? Ring erection?	
	2850			
6b?		Stratigraphy, analogies	Ring erection? Turf formation? Use of Ring area? Interrupted slot?	A piece of birch charcoal from a charcoal spread in pre-Ring soil 871 produced a radiocarbon age (AA-24959 4140+/-45 BP) corresponding to a date between 2880 and 2580 cal BC. That suggests that the Ring was set up after 2880 cal BC.
	2800			
6b?		Stratigraphy, pollen	Ring erection? Continued turf formation? Use of Ring area? Interrupted slot?	The new turf is that above green clay spoil from Ring pits but where not covered by clay the old turf continued to grow
	2750			
6c?		C14	Interrupted slot? Other use of Ring?	TPQ some date between 2890 and 2620 cal BC from charcoal.
	2700			
	2650			
6c?		C14	Interrupted slot? Other use of Ring? Continued turf formation?	
	2600			

7a?		Stratigraphy	Clay platform and light timber structures built.	Possibly 2450/2350 BC?
7b?		Speculation	Clay and soil imported with Phase 3 artefacts and charcoal.	Possibly as early as this, or even part of a long term process starting earlier.
	2550			
	2500			
7b?		Interpretation	Clay and soil imported with Phase 3 artefacts and charcoal.	Layers on Areas D and H, with Phase 3 charcoal and also potsherds. Preferred date shortly before clay platform built.
	2450			
	2400			
7c		Indirect C14 and interpretation	Rows start now?	In general undated but East Row Stone 30 probably erected at some date between 2560 and 1690 cal BC; earlier than green clays with very early Beakers.
7d		Artefacts	Closure of green clay platform structure? Dumping of clays 810 and 812 in BV?	Slot fills include probable fine and 'domestic' Beaker sherds. Green clays 810 and 812 with very early Beakers and no obvious later ones.
	2350			
8		Artefacts	Chambered cairn building	After 2500 cal BC because the primary cairn and immediately pre-cairn contexts included an International Beaker sherd and at least one fine Beaker sherd.
9a		Interpretation / stratigraphy	Enclosure Stage 1, stakehole defined after disuse of timber structure and after cairn construction	Starts around 2400/ 2300 BC?
9b		Interpretation / stratigraphy	Embanked enclosure Stage 2 earthen bank building,?	Starts around 2400/ 2300 BC?
	2300			
10a		C14	Ground working and burials	Pine charcoal dated between 2490 and 2290 cal BC could belong here, or Pomoideae charcoal dated between 2120 and 1770 cal BC

Table 24.2b Phasing of features at Calanais from about 2250 BC

Phase	Date	Date source	Events/processes	Comments
	2250 BC			
10c		Starts around 2400/2300 BC?	Ground working and burials	See 10a
10d			Avenue starts now?	No specific dating evidence. Perhaps building on from a North Row? Stones set up over several generations?
	2000 BC			
10e		C14	Ground working including ploughing	Birch charcoal dated to between 2030 and 1750 cal BC and Pomoideae charcoal dated between 2120 and 1770 cal BC, from an ard mark north of the enclosure, could belong here.
11a		Artefacts; Indirect C14 and interpretation.	Wall-based enclosure Stage 3 building	Between 2100 and 1750 BC? After deposition of barbed and tanged arrowheads; also a possible terminus post quem between 2040 and 1770 cal BC.
11b		Interpretation	Ground working including ploughing	Later period of plough soil 141 belongs in pollen zone CaN-3c which started between 1880 and 1520; and was earlier than 139, so dates to between 1880 and 1690 cal BC.
12a		Analogy	Wall-based enclosure Stage 4 building	Undated; possibly in use at some date between 2150 and 1750 BC, judging by an analogy with Ardnave, Islay.
12b		Interpretation	Ground working including cultivation	Includes layer 139, by hypothesis, dated to between 1940 and 1690 cal BC by a piece of heather charcoal.
13		Interpretation	Kerb erection	After 2040 and perhaps after 1525 cal BC; may post-date ruin of fourth stage enclosure?
	1500 BC			
14		Stratigraphy	Cultivation	Undated except cannot be later than steady local peat growth.
15		C14 and pollen	Encroachment of peat	Between 920 and 400 cal BC near the east end of the East Row
	1000 BC			
15			Growth of peat	Continued use of area of the stone setting, dissuading local peat growth?

	500 BC			
15		If Phase 16 real.	Growth of peat	Continued use of area of the stone setting, dissuading local peat growth?
	BC/AD			
15		If Phase 16 real.	Growth of peat	Continued use of area of the stone setting, dissuading local peat growth?
	AD 500			
16		If Phase 16 real.	Disturbance and erection of slab in passage? Growth of peat	Possibly in the second half of the 1st millennium AD judging partly by occurrence of late Iron Age pottery. But this activity may be post-1857.
	AD 1000			
17a			Peat growth	
	AD 1500			
17b		Documentary	Cutting and post-medieval peat clearance	North end of setting cleared before mid 19th century. MacCulloch surves before 1819. Worsaae visits 1846.
	AD 1850			
18a		Documentary	1857 clearance; 19th excavations and disturbances	Pit digging at earliest in AD 1846 but probably after 1857
	AD 1880			
18b		Documentary	Modern conservation	From 1882 to 1980
	AD 1980			
18c		Documentary	Archaeological excavation	Resisitivity survey 1979, excavation 1980 and 1981; intrusive sampling etc 1982; excavation 1986.
18d		Documentary	Post-excavation conservation	Improvement of drainage and returfing and path-building.

Appendix 9
Scottish Ritualised Landscapes

It is a moot point whether the large chambered cairn clusters of Caithness, at Loch Calder, Loch of Yarrows, Sordale Hill and Dunbeath (Davidson & Henshall 1991, Fig 5) should be regarded as ritualised landscapes in the sense defined above. If current ideas about the date of these complex and multi-period monuments are correct they are centuries earlier than less ambiguously ritualised landscapes. The most concentrated cluster is at Loch of Yarrows with an average of slightly more than 1 cairn per square kilometre but the Sordale Hill and Loch Calder clusters are nearly as dense (ibid, 17; Fig 6). Davidson and Henshall suggested that in general the cairns might lie close to settlements. An alternative interpretation is that the clusters were in an area thought to be particularly suitable for funerary monuments by several distant communities. Particularly if this latter speculation is right, the areas will have had some particular meaning for those who buried their dead there. But apart from a favoured chamber orientation between ENE and south and however tempting it is to assume that the massive cairns made particular beliefs material, there is little about them to suggest what part the cosmos played in their belief systems (ibid, 79; Fig 23.

Two of the most prominent ritualised landscapes of much the same period as Calanais are that centred on the stone rings at Machrie Moor and that around the great stone rings in the middle of Orkney, which includes other features both above and below the surrounding modern plough soils. The multi-period complex in Crinan/Kilmartin Valley, overlapping in date with the others, may be another instance even though it has no surviving tall-stone rings. The monuments around Balnuaran of Clava and the several clusters of recumbent stone circles in NE Scotland, up to a millennium later than Calanais, may be a different expression of integration of landscape and cosmos. On the other hand, the favoured interpretation of the distribution of the stalled cairns of Rousay is that they each represent a territory belonging to a household or small community, and the same may be true of the Clava cairns and recumbent stone circles.

There were also timber and earth ritualised landscapes, on the plough-lands, for instance at Forteviot Leadketty with a 265m diameter enclosure and entrance avenue, henges and burials (Noble 2009, 14-17; 2010; Brophy, K & Noble, G 2011). Other examples exist at Meldon Bridge with its large enclosure and entrance avenue (Speak & Burgess 1999) and Dunragit with its multiple concentric timber rings and massive burial mound in Wigtownshire (Thomas forthcoming). The Balfarg/Balbirnie complex in Fife included early neolithic pit scatters in the east and the west, a possible long barrow, a major henge, timber mortuary structures, a smaller henge and a small stone circle (Barclay & Russell-White 1993; Barclay 2005, 88). Thus the visible clusters are the remains of a once more widespread type of landscape containing ritual sites, some far more impressive in their time than Calanais.

The ceremonial centre at Machrie Moor on Arran included at least seven stone circles, two of which were built of exceptionally tall stones. Two of the lower rings were precede by timber ones. To its north-west were extensive strip field systems measuring up to 200m by 50m, and thought to belong to the Neolithic, period. Both to the north-west and south-west open fields of the Late Neolithic to Early Bronze Age were found and Neolithic remains were found also in a third area. Boundary dykes of the late Bronze Age and Iron Age were abundant, perhaps serving to distinguish in-field from out-field (Barber 1997, 144-145). Barber argued that settlement during the Neolithic period was much more abundant than has previously been suggested (ibid, 149).

As at Calanais the visible stones at Machrie

Moor overlay remains of earlier activities. Excavation of two of the rings of low stones (numbers 1 and 11) revealed a complex history (Haggarty 1991). Charcoal from pits dug during the Neolithic and containing Neolithic pottery was dated to between 3710 and 3380 BC (GU-2321, 4820+/-50 BP) while another date, between 4500 and 4140 BC (GU-2320, 5500+/-70 BP) is either anomalous, or reflects a mixture of Neolithic and Mesolithic charcoal, or, conceivably, very early Neolithic settlement (ibid, 57-8). A complex timber ring was set up on Site 1 including two non-concentric circles and a horse-shoe setting of 5 massive timbers, and Grooved Ware was found in post-holes of the inner ring and the horse-shoe setting. Charcoal from the inner ring was dated to between 3350 and 2920 BC and between 2950 and 1950 BC (GU-2316, 4470+/-50 BP; GU-2325, 3980+/-180; ibid. 63). A simple circle of timbers was set up on Site 11 (Haggarty 1991, 61, Illus. 5) and charcoal from it was dated to between 2900BC and 2350 BC (GU-2324, 4080+/-90 BP; ibid, 63), leaving open both the possibility that the two circles were contemporary and that they were successive. After a phase of ploughing and erection of fences, with which sherds of Beaker and Impressed Ware pottery were found, stone circles were erected on both Sites 1 and 11. Circle 1 was almost exactly on the Site 1 timber ring. Circle 11 was exactly on the circuit of the earlier timber ring and most of the stones were set equidistant between the timbers of the earlier setting. The locations of the holes for these stone seem to have been marked out in advance by timber posts. A terminus post quem of between 2210 and 1920 BC was provided for the erection of Circle 11 by oak charcoal (GU-2323, 3690+/-50 BP; ibid, 76). Subsequently burials were inserted into the area.

The low stone circle on Site 11 is significantly later than its timber predecessor and there are 19 chances out of 20 that the interval between them was between 250 and 900 years if the excavator's interpretation of the stratigraphy was correct; there is no reason to suggest that it was not. This is quite extraordinary; given that ploughing will have removed physical traces of the timber rings, either the precise site of the timber circle was remembered for at least ten generations or there existed for many generations precise rules for the placement of structures relative to other features in a sacred landscape, perhaps in this case the tall stone rings.

If the rings of tall stones at Machrie Moor are of much the same date as Calanais they should also be of a broadly similar date to the timber circles on Machrie Moor 1 and 11. This conjunction of stone and timber settings could be explained through the analogies with Madagascan sites propounded by Parker-Pearson and Ramilisonina (1998), who suggested that the timber structures were built for the living and stone ones for the dead. However it does not match well with their idea that these different functions were carried out in separate large areas.

The area round Machrie Moore was the subject of a case study by Barnatt and Pierpoint (1983, 101) to distinguish between two hypotheses: that stone circles may be viewed as scientific instruments and that they were impressive focal points of a society that did not use such structures to support any interest they had in astronomy. Many archaeologists and archaeoastronomers no longer accept that dichotomy (Ruggles 1999). The main value today of their paper lies in its examination of the placement of the rings in what must have been, if Barber's deductions are right, a well populated landscape. Starting from the proposition that the monuments should be in the best possible position for astronomical observation if the latter were important to the circle builders Barnatt and Pierpoint concluded that there was no evidence in their siting for an interest in precise alignments on the main solar or lunar events, but that the rings may have been placed to exploit a horizon notch indicating midsummer sunrise (Barnatt and Pierpoint 1983, 112).

There are problems with their study in the number of prior assumptions made about which lunar and solar events should be selected for the assessment of astronomical potential (Ruggles 1983, 116; 1999, 133). Also, their analysis was based on declinations centred around 2000 BC, and did not take into account the long history of use of the ridge on which the rings sit. Barnatt and Pierpoint's conclusions have to be treated with caution (Ashmore 1999c). That said, the main fac-

tor in the placing of the group of circles may have been their prominence in the local landscape. As things stand the concept of a ritualised landscape has to be employed in a much more limited way at Machrie than at Calanais. From currently available evidence it seems that people looked towards a single ritual focus rather than imbuing many locations with connections to a wider cosmos. However, detailed examination of the moorland along the lines pursued by Curtis and Curtis at Calanais, along with those suggested above for enhancing understanding at Calanais, may one day change that impression.

Around and after 3000 BC a rich society expressed itself in settlements and monuments around and between the southern part of the Loch of Harray and the Loch of Stenness in Orkney. For ease of reference I shall refer to this area as the Heart of Neolithic Orkney although strictly speaking that term refers to the World Heritage site which includes Skara Brae and excludes many monuments near to the World Heritage area (Historic Scotland 1998, 39). It is sufficiently well known and publicised that I shall keep my account very brief; indeed the sometimes indiscriminate use of the archaeology of Orkney in discussions of the prehistory of other Scottish and indeed also English regions has raised protests which merit some sympathy (see for instance Barclay 2000).

From an Orcadian perspective the singling out of this area has been seen as invidious. Other parts of Orkney contain 4th to late 3rd millennium landscapes which are exceptionally well endowed and the Heart of Neolithic Orkney may be only part of an archipelago-wide ritualised sacred geography. But the extraordinary non-domestic buildings in the settlements at Barnhouse and Ness of Brodgar, and the massive ceremonial and funerary structures in this area makes the case for its being part of a ritualised landscape particularly simple.

The Heart of Neolithic Orkney also contains several 4th and 3rd millennium burial monuments including standing stones, massive boundaries and two major settlement foci (Historic Scotland 1998; Richards 2005; Card 2010). Putatively 2nd millennium BC monuments are also fairly abundant, including large and small burial mounds and small stone settings (Historic Scotland 1998).

The settlement at Barnhouse, on the shore of the Loch of Harray close to the Stones of Stenness, included Structure 8, a hall with a central hearth, a dresser against the rear wall and a complex entrance arrangement incorporating another hearth. It sat on a platform constructed of yellow clay and bounded by a substantial wall. The general arrangement of hall and platform is reminiscent of that at the chambered cairn of Maes Howe, just across the Loch of Harray (Richards (ed) 2005, 205 Figures 6.2-6.3). Further, taken in isolation, the archaeological remains of the central hearth and elaborate entrance arrangements of the hall have more than a passing similarity to the central hearth at Stones of Stenness and the features to its north. Richards has noted that their obvious differences concealed similarities in their modes of construction and, possibly, their purposes (Ritchie 1977, Fig 4; Richards 1993, 304-307; 2005, 221-2).

Another settlement of broadly the same date as Barnhouse has been discovered at Brodgar Farm, between Stones of Stenness and the Ring of Brodgar (Ballin-Smith and Petersen 2003, 102-3; Card 2007; 2008; 2009; 2010; see also www.orkneyjar.com/archaeology/nessofbrodgar/). Landscape resistivity and magnetometry survey show that it was both complex and extensive and the excavations by Orkney Archaeological Trust and Orkney College demonstrate considerable stratigraphic complexity. It included four substantial buildings, the latest (Structure 10) more than 16m long by 10m wide, surrounding a central area. The stones composing some of them were painted; many others bore incised geometric designs and areas of pecking, while red and yellow sandstones were incorporated in their builds. They appear to have had slate-like slab roofs. They stood in a massive enclosure measuring c. 125m by 75m, the north wall of which was 4m wide and survives in places to over 1.7m tall. The pottery associated with the complex was Grooved Ware. A massive deposit of cattle bones is interpreted as evidence for feasting

possibly associated with the "decommissioning" of Structure 10. The complex is currently interpreted as "primarily non-domestic and ... an integral part of this rich ritual landscape" (Card 2010, 1-3). No radiocarbon dates have yet (January 2012) been published, but unpublished dates are said to indicate a start-date for the complex before c. 3200/3100 cal BC and the cattle bones, thought to date within a very few centuries of the end of use of the complex, are reported to date around 2300 cal BC.

The pottery from Ness of Brodgar was apparently all Grooved Ware. No sherds of the putatively earlier Orcadian pottery style, Unstan Ware, have been reported nor any of the (mainly later) Beakers styles.

Another massive land division, of unknown date, has long been known slightly further north (Historic Scotland 1998). Large burial mounds formed another feature of the local Orkney landscape before the time Calanais was abandoned to peat growth. Big Howe near the Stones of Stenness and the mound just north of Bridge of Brodgar may include funerary structures under much later putatively secular ones, and there are four large burial mounds round the Ring of Brodgar. Further to the north the Ring of Bookan appears to extend the area regarded as suitable for major ceremonial and burial monuments. Smaller tumuli also survive locally in areas without a long history of ploughing.

There are no relevant absolute dates for the Ring of Brogar. The dates available for silting up of the ditch (SRR-502, 2210+/-60; SRR-503, 2320+/-50; Renfrew 1979, 39-43) belong in the Iron Age. Recent work by Richards et al (2009) has not as yet improved the dating evidence. In my view the likeliest date for construction of the Ring is between 2500 and 2000 BC, since it has two diametrically opposed entrances; that estimate is based on the frequent occurrence of Beakers at two-entrance henges. If that is right the Ring of Brodgar was built 5 centuries later than the likeliest building date for the Stones of Stenness.

The Stones of Stenness, the hall at Barnhouse Structure 10 at Ness of Brodgar and the chambered cairn at Maes Howe illustrate different but related aspects of the beliefs of a coherent social group. Different parts of the landscape may have held different meanings for the people of this area. Modern ideas about the Stonehenge / Durrington complex in England provide food for thought. Parker-Pearson and Ramilisonina used analogies with recent cultures in Madagascar to suggest that the area around Stonehenge and Durrington Walls was divided up between a domain of the living and a domain of the dead (Parker-Pearson and Ramilisonina 1998, Figure 6). It was suggested that the period of building of the sarsen stone settings at Stonehenge (centred around 2400 BC) and that of the timber settings at Woodhenge and at Durrington Walls (2500 to 2000 BC and 2500 to 2100 BC respectively) may have been broadly the same (ibid, 314) although that becomes a moot point with the proposed re-dating of the sarsen structures at Stonehenge to between 2580 and 2470 cal BC (Parker-Pearson et al 2009, 26). In the area of the living the massive earthwork at Durrington Walls with its internal timber settings and the timber setting inside the henge at Woodhenge were places for ceremonies. In the domain of the dead, the stone monument at Stonehenge was a place of the ancestors. In between was an area of a few square kilometres through which people could pass from one domain to the other, perhaps using the Avenue as a ceremonial route for introducing initiates to the ancestors. That area was part of a liminal zone surrounding the domain of the ancestors (Parker-Pearson and Ramilisonina 1998, Figure 7) and was used for early Bronze Age burials.

The Ring of Brodgar may fall into the same broad period as the monuments discussed by Parker-Pearson and Ramilisonina. Leaving to one side the difference between stone and timber, which may have had little relevance to Orkney, maybe there was a change of focus; Stenness and the nearby settlement at Barnhouse were left to the ancestors while Brogar became a centre for the living.

Be that as it may, the ritualised landscapes at Calanais and the Heart of Neolithic Orkney differed considerably from each other despite the existence of tall-stone rings in both areas. Central Orkney contained two large settlements, and several large funerary mounds; it did not have the

profusion of small rings and stone settings found round Calanais.

That the Kilmartin Valley supported what I have here called a ritualised landscape has long been recognised. Not only was it '… certainly a centre for ceremony and burial for an extended period …' (Ritchie 1997, 83) but 'The concentration of sites and the intervisibility of many within the confined valley floor allow us to conjure notions of a numinous landscape with an importance that might extend beyond the immediate locality' (Ritchie 1997, 79).

The Kilmartin valley contained both timber and stone structures. The latter have been long known, with a linear cemetery of massive cairns, along with a henge, standing stones including the decorated stones at Nether Largie and Ballymeanoch, and the stone rings at Temple Wood. It also contains numerous decorated rock outcrops (Ritchie 1997, 77- 84) and has produced fine artefacts, including highly decorated pottery of many periods and jet jewellery (Ritchie 1997, 80-84).

The discovery of major timber monuments followed excavations in advance of gravel quarrying near Upper Largie in the late 1990's. They revealed a long rectangular timber enclosure or pit-defined cursus, a pit-defined avenue, a pit and a pit or post-ring complex, Beaker graves, cists and burials, an elliptical timber ring and a short row of posts (Terry 1997, 19-21 fig 8; Ellis C 2000, 16; 2002, 145; Ellis and Crone pers. comm.; Cook et al 2010).

Kilmartin is one of the few areas in Scotland where there is enough scientific dating evidence to (start to) form a long chronology.

The 25 radiocarbon ages from Upper Largie include three suggesting forager activity in the second half of the 5th millennium BC. These activities at Upper Largie (and doubtless elsewhere) led to the creation of a substantial amount of charcoal.

Nine ages were obtained in all from the postholes of the long rectangular enclosure; the youngest suggesting a date in the second quarter of the 4th millennium BC. It, the Clyde Cairn at Nether Largie South and the massive cairns of the late 3rd and 2nd millennia, at least one overlying what may have been free-standing earlier stone and earth structures, overlapped the creation of timber and stone settings of various kinds including the timber ring at Upper Largie.

A human burial belonged in the centuries around 2000 BC. The timber circle at Upper Largie seems to have belonged around 1500 cal BC judging by the youngest age from it although other ages suggest a somewhat earlier date in the second quarter of the 2nd millennium BC (Ellis 2002, 145; Ellis and Crone pers. comm.; Cook et al 2010).

The stone ring at Temple Wood was preceded by a small oval ring of stones to the north, which itself seems to have been later than a small timber ring. The latter may be as early as 3500 cal BC but strictly speaking the radiocarbon age from it may relate to activities before the ring was set up (Ashmore 1997, 238). The southern ring has been seen as flattened, and at 13.5m by 12.5m it was similar in size and shape to that at Calanais. It was embanked and its interior was filled with boulders under and among which were small kerb cairns and burial cairns. Most of the 11 radiocarbon ages from this part of the site were obtained many years ago from samples of mixed charcoal, and most of them had large standard deviations. Although they give a very broad indication of the chronology of the long use of the site for burials they do not provide many useful dates for the site phasing or the inhumation burials. The most reliable of them suggest activities continued until the last half of the 2nd millennium BC but they were not directly associated with the cremations deposited in the ring (Scott 1989; Ashmore 1997 253, 266-270, 283). However, recent dating of cremated human bone has shown that Burials D, Primary E and Secondary E have indistinguishable dates suggesting burial between about 1420 and 1270 cal BC (Sheridan 2008, 202).

Cist burials reported from other excavations near Upper Largie have been dated to around 2000 BC and to the centuries preceding 1000 BC (Mercer and Rideout 1987; Ashmore 1997, 263, 268; Cook et al 2010).

The Beakers from Kilmartin show many sim-

ilarities to Dutch ones. Presumably that reflects contacts with the eastern areas of Britain. Irish Bowl Food Vessels from three cairns suggest long-distance western connections and Whitby jet suggests contacts with NE England in the last few centuries of the 3rd millennium BC; (Sheridan 2008; Sheridan pers.comm).

Smaller cairns and short rows of standing stones may be mainly of the later 2nd millennium BC. A cremation in the socket of the holed-stone at Ballymeanoch has been dated to between 1370 and 1040 cal BC (GrA-28613 2970+/-40 BP Sheridan 2005, 183). Many of the isolated short stone rows and stone pairs of the Kilmartin Valley are, at minus 30°, closely aligned on moonrise or set at the major standstill limit. A smaller number of alignments lie between minus 21° and minus 26°. Each of these is close to a row or pair with an alignment of minus 30°. Ruggles has suggested several explanations for this pattern including the possibility that rows and pairs of the latter group were aligned on midsummer full moon at a random point in the 18.61 year lunar node cycle but when the moon was seen to set further and further south another 'more correct' alignment was built (Ruggles 1999, 109). That said, claims of alignments relating to the earlier stone settings at Temple Wood and Nether Largie need reassessment in the field (Ruggles 1999, 59, 231 note 79).

The apparent contrast between the location of the timber monuments in the upper part of the valley and those of the cairns and stone settings downstream raises the question whether the concept of zones for the living and zones for the dead can be applied to the Kilmartin Valley. But it is perhaps only the small amount of exploration of timber monuments in the valley which allows distinction to be drawn.

It seems likely that there were strong connections between the people who lived in Kilmartin Valley and those of other areas along the western sea-ways in the 4th millennium BC and later. There were also connections with the Netherlands, Ireland and Yorkshire (Sheridan 2008; Cook et al 2010). The sacred landscape was on present evidence created and perpetuated by societies which were materially much richer and more widely connected than those around Calanais.

Clava cairns lie mostly along the coast of the inner Moray Firth and the rivers running south with a concentration in Strathnairn (Bradley 2000, 2, 184).

The monuments at Balnuaran of Clava include two passage cairns, a ring cairn and a small rough kerb cairn, while in an area of about a square kilometre around them there are at least six other monuments (Bradley 2000, 5, 175-8). Radiocarbon dates from hazel charcoal on the old land surface under the cairn at Balnuaran of Clava imply a date for construction which lies between 1920 to 1680BC and between 2010BC and 1740BC (Bradley 2000, 115-6; AA-24234, AA-25433), or in round terms about 900 to 600 years later than Calanais.

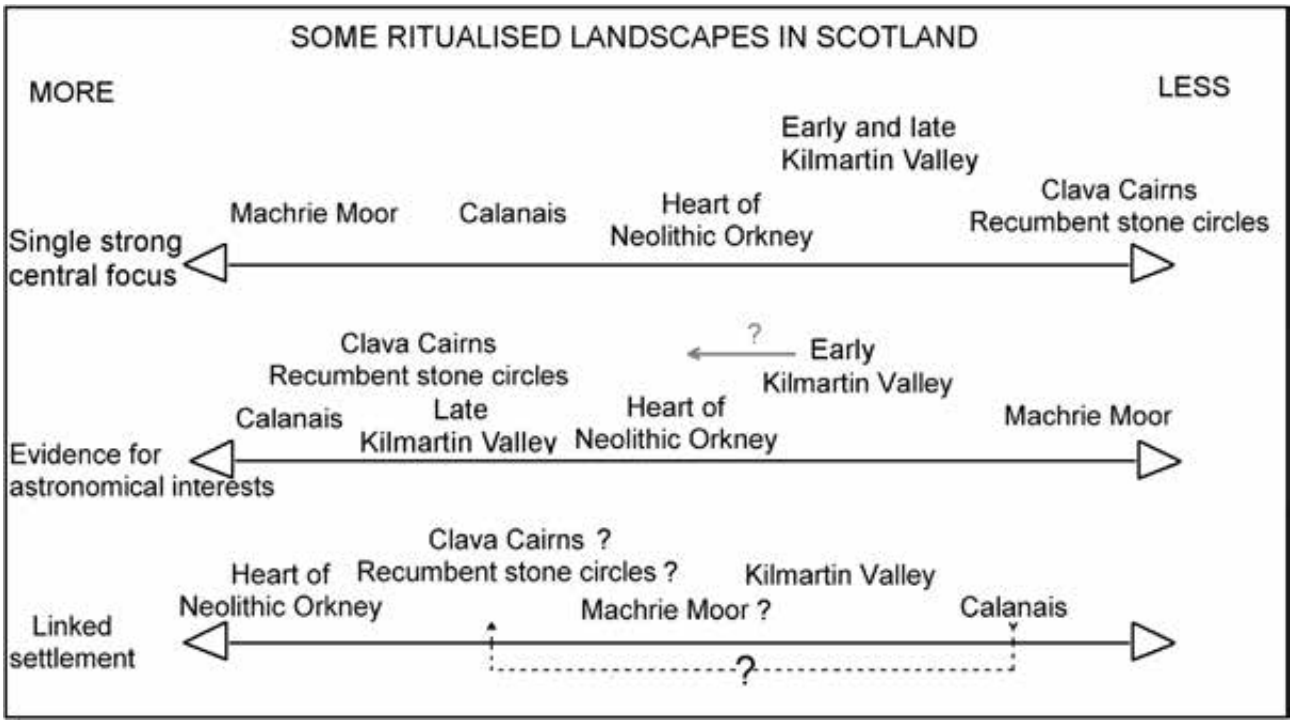
The two passage cairns are orientated towards the point where the midwinter sun sank below a nearby hill (Thom 1966, 18; Bradley 1998, 136, 142; 2000, 122-5). The passage of the more northerly cairn still points at midwinter sunset, although the alignment would have been better 4000 years ago, but while the passage of the more southerly cairn points in the same direction midwinter sunset is blocked by trees (Bradley 2000, 122). The more southerly cairn lies on the line indicated by the passage in the north cairn. In Bradley's words, 'seen from the other monument, the summit of that cairn merges with the horizon. As a result the sun appears to set on top of the cairn itself' (Bradley 1998, 142). There may also have been orientations on midsummer sunrise and while lunar horizon phenomena could have been observed they were not positively indicated. Bradley perceived Balnuaran of Clava as unusual in Scotland, because he thought that indications of interest in solar movements were uncommon (Bradley 2000, 126).

By and large Clava cairns each had a local significance; they dominated their immediate localities but were neither placed to be visible from afar nor to have unusually good views outward. They seem not to have been designed to be intervisible (Bradley 2000, 178-80). The layout of the monuments does not seem to have favoured prominent

horizon features (Bradley 2000, 182). But a sample of 25 cairns suggested that their orientations clustered round midwinter sunset and the major and minor lunar standstills (Bradley 2000, 181-2). Thus in the lands south of the Moray Firth (with outliers on the Black Isle to the North) there seem to have been many small ritualised landscapes. In places they were so close to one another that they probably formed a single large one. The pattern is far richer and more extensive than that visible around Calanais.

The recumbent stone circles of North-east Scotland have a distribution largely confined to Aberdeenshire. On the limited reliable evidence currently available, at least some of them were built over half a millennium earlier than the radiocarbon-dated cairn at Balnuaran of Clava. Beaker sherds have been found in some abundance at them- and they were used as cremation cemeteries around 1000 BC (Welfare 2011, 162-167). There are no convincing prototypes for them outside the area but they share many traits with other Scottish 'Bronze Age' monuments (Welfare 2011, 252). It is important here to take on board Tilley's point about labels (Tilley 1998). Indeed in rejecting 85 out of 156 northeast Scottish structures claimed at one time or another to be recumbent stone circles Welfare deprecated the tendency to lump sites together into self-reinforcing typological schemes obscuring the true variety of cairns and megaliths in the area. Types of monument in the northeast 'that can be tentatively identified and which would repay further study might include: small open circles; closed cairns surrounded by both graded and ungraded circles; cairns surrounded by platforms; other ring cairns with and without circles; and circles which have other types of settings in their circumferences.' (Welfare 2011, 258).

In 1984 Ruggles concluded that a highly significant general orientation was evident. That orientation was from the interior of the circle outward over the recumbent stone towards horizon points centred on the SSW, generally avoiding local horizons (Ruggles 1984, S77). He and Burl showed that overall there was no conclusive evidence for precise observations of the sun or the moon, and although the orientations did suggest an interest in the rising or setting of the major standstill moon this did not explain all the sites (Ruggles



Illus Appendix 9.1 A variety of ritualised landscapes

and Burl 1985, 57-8). Welfare (2011, 213) has argued that it is more likely that the general orientations of recumbent stone circles and Clava Cairns reflect an interest in the setting sun. But I must admit that I do not see why the ideas must be mutually exclusive, nor why they cannot have varied over time and space.

No strictly contemporaneous settlements have been demonstrated. Bradley has shown that the local distribution of lithic scatters around Tomnaverie was not centred on the circle (Bradley 2005, 46-7), which may suggest that it was on the fringes of areas used for domestic and agricultural purposes. But Welfare catalogued a large number of circles with evidence for possibly contemporary nearby landscape elements and suggested that they had settlements close to them. He contrasted their distribution with that of large burial cairns, some 'found deep in the glens that penetrate the mountain hinterlands' (Welfare 2011, 64-67).

In terms of possibly ritualised landscapes the most significant aspect of the Clava and recumbent stone circles distributions is the impression they give of social landscapes mixing ritual, burial and (hypothetical) domestic sites.

But the existence of the circles does imply that observance of some contemporary rituals was focussed in particular places and to that extent the landscape was partially ritualised.

It must be stressed that Illus 24.70 is based on very incomplete information because of the small number of excavated sites and the limited amount of archaeoastronomical survey. I suspect that the differences which it encapsulates will diminish with future archaeological discoveries. For example the position of 'Early Kilmartin valley' on the 'astronomical' line may be over-cautious. It is based on reservations expressed by Ruggles (1999) about claimed early astronomical alignments. Certainly the orientations of some of the stone rows there suggest that by the second half of the 2nd millennium BC local people had a well developed interest in astronomical events. Also, I have not included the evidence from Lowland Scotland, although the monuments so far excavated, for instance at the Balfarg complex in Fife, at Forteviot in Perthshire, Broomend of Crichie in Aberdeenshire, Dunragit, Holywood and Holm in the south-west represent different patterns again. Nevertheless, even the few examples of ritualised landscapes discussed above suggest that there was no overarching template to their creation.

Barnatt (1989, 5) has suggested that stone circles and related monument forms may 'to some extent form parts of a continuum', particularly the smaller ones. He thought that small stone circles, ring cairns, kerb cairns and other round structures may, functionally, have expressed very similar ideas in different ways in different places and times (Barnett 1989, 9-13). Welfare expressed a similar idea after his exhaustive study of recumbent stone circles in northeast Scotland, going so far as to write ' ... similarities as might appear to exist are better seen as shared traits in contemporary manifestations of country-wide beliefs' (Welfare 2011, 259). There is indeed some indication that there were broadly favoured belief systems in Scotland even if local expressions varied. The examples discussed above suggest that there was a stronger interest in building structures referencing the movement of the moon than to the sun, with Maes Howe and Balnuaran of Clava the most obvious exceptions. (although as noted above Welfare (2011, 226-8), perceiving mindsets distracted by the idea of precise alignments on mainly lunar events, and proceeding from the new orthodoxy that the orientations of recumbent stone circles and Clava cairns were not astronomically exact, preferred to explain their orientation as referencing the sun). Midwinter orientations seem to have predominated over midsummer ones, although how far that is due the relative lack of investigation of timber monuments is an intriguing question given the idea that stone monuments were for the dead and timber ones for the living (Parker-Pearson & Ramilisonina 1998). But more generally there seems to have been no over-riding uniformity of practise. At Machrie Moor, there seems to have been a central sacred place where many monuments were built close to one another, but the surrounding landscape was not ritualised. The main setting at Calanais dominates its landscape and it is inter-visible with many of the smaller settings around it. The sacred landscape in and around the Heart of Neolithic Orkney included a variety of substantial monuments well

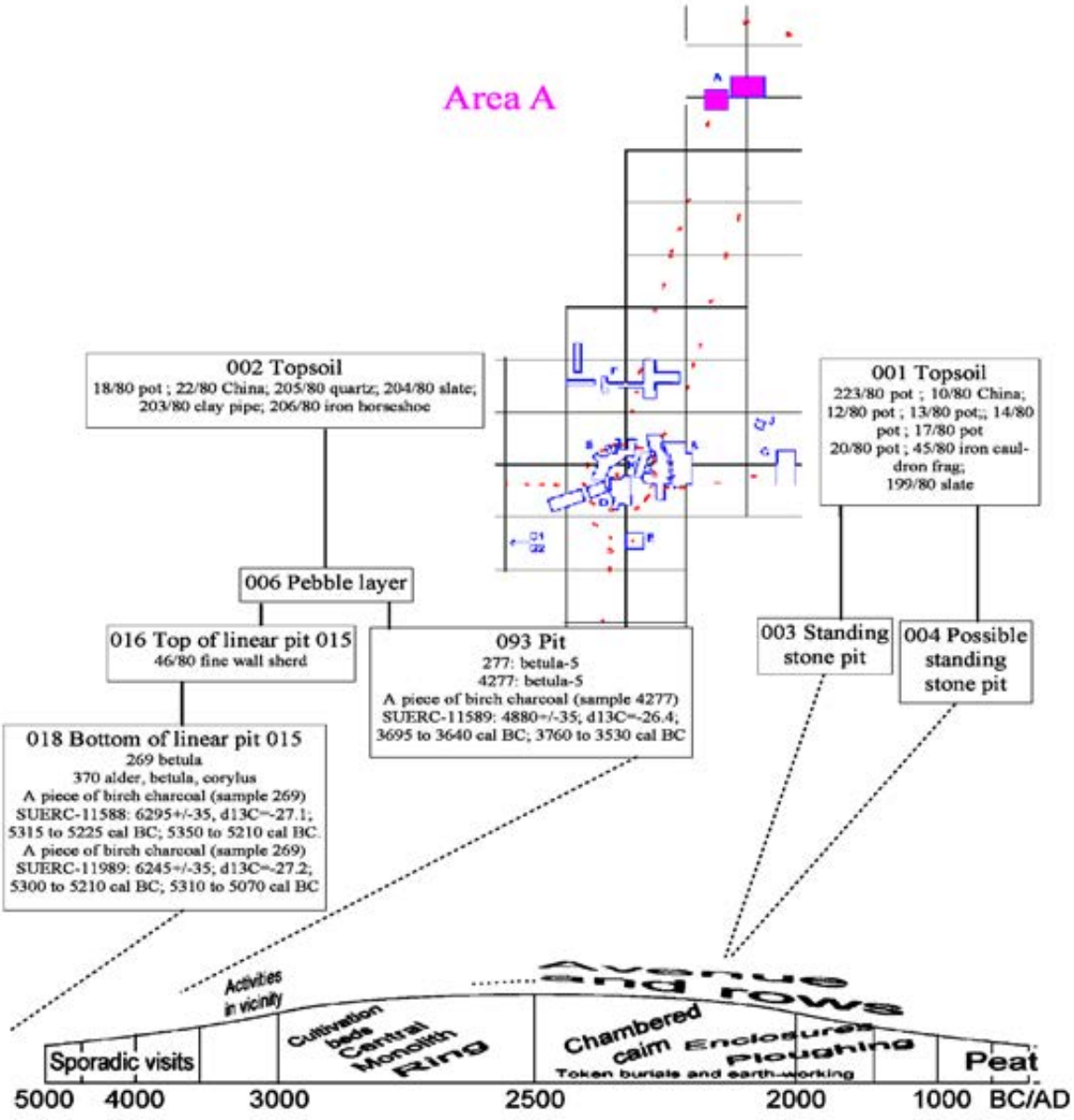
spaced out from each other; a large settlement existed nearby to the east of the Stones of Stenness and a collection of large houses or halls, possibly with a mainly non-domestic function, has been explored to its north. The recumbent stone circles of northeast Scotland seem to be parochial sacred places each similar to the others. Further west, at around the same time, one or two of the sacred places incorporating Clava cairns were larger than others but seemingly did not otherwise differ.

In this discussion I have favoured the ideas put forward by Bradley (2000), Jones and Thomas (2010) and Welfare (2011) that in the changing societies of the late 3rd and early 2nd millennia BC Scotland 'ancestral' monuments were built, either as a reaction by natives to incomers or as an attempt to claim local ancestor kinship by incomers. The creation of new 'ancestral' monuments occurred both in areas where real but ruinous ones were fairly common (Calanais and Embo) and in areas where they were rare (Clava and the lands of the recumbent stone circles). Yet there are hints that the apparent lack of earlier large funerary and ceremonial monuments may be more apparent than real. The Clava style platform cairn and massive graded kerb at Stoneyfield, Raigmore may be some 500 to a thousand years earlier than Clava cairns. But there are severe problems with the radiocarbon dates from the site. A structure like the two timber enclosures at Balfarg Riding School, built of perishable materials (Simpson 1996, 62-3 Illus 10), underlies the cairn. Grooved Ware was associated with it. The 'permanent' stone structure may be considerably later despite Simpson's (not unreasonable) argument that its placement around the timber structure leaving the latter near-central suggests 'near-continuity' (Simpson 1996, 65-6). So I do not find the evidence demonstrates a visible pre-Clava 'ancestral monument' in the sense Bradley appeared to mean.

Yet in some other areas such as the Kilmartin Valley it may be more realistic to see continuity, neatly encapsulated by the linear cemetery there. The chamber of the early cairn at Nether Largie South contained a secondary built cist associable with Beakers; the earliest burials in the massive Kilmartin Glebe cairn further north in the linear cemetery were accompanied by Food Vessels. The one monument was reused while it was in a good state of repair, ancient though it was at the time, and the other was built anew.

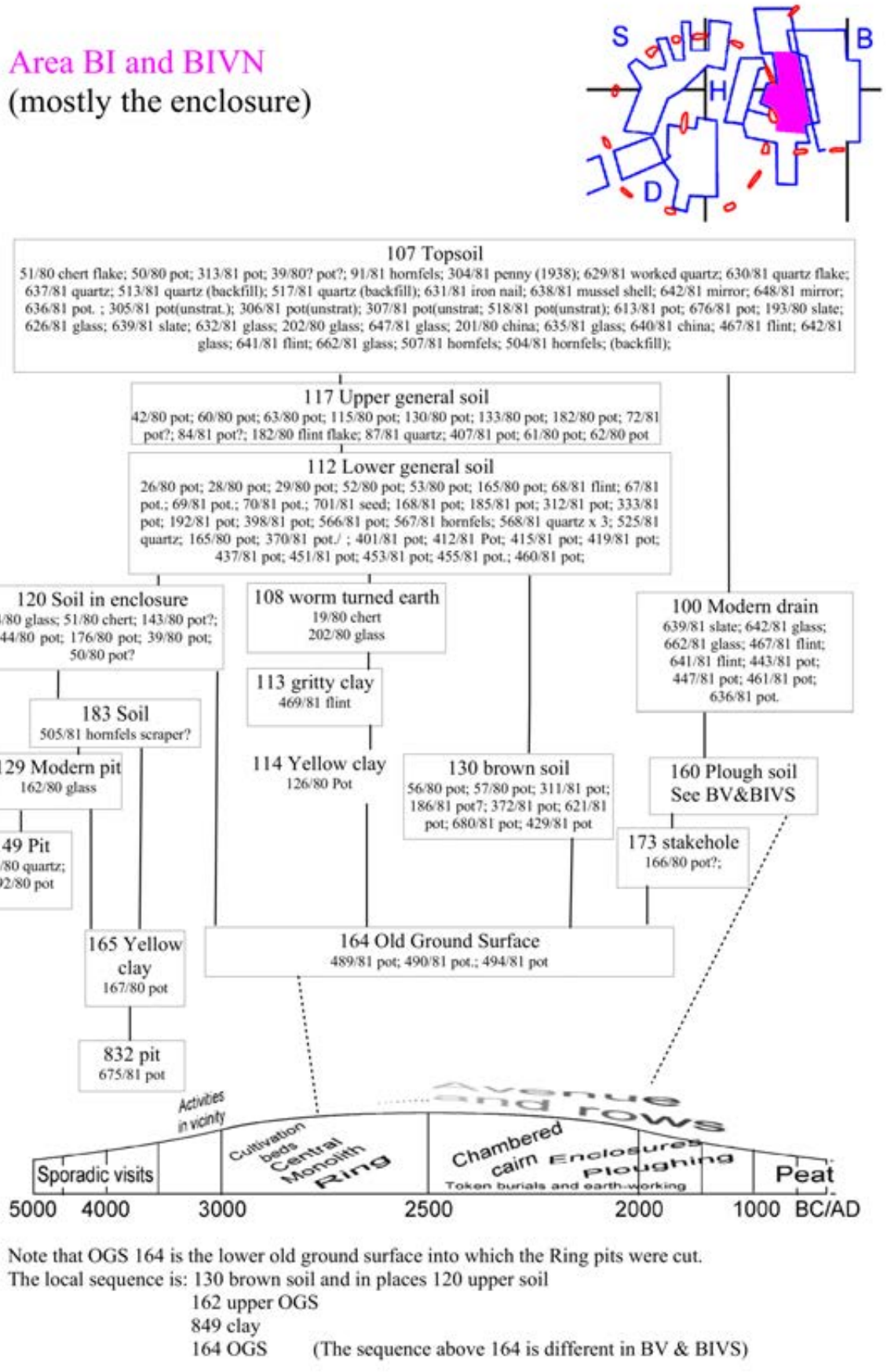
As remarked above (24.1.2) the most fruitful way forward in disentangling these similarities and differences is through local and regional studies of evidence from surveys, excavations and museum collections and subsequent comparisons between the results from other similarly studied areas, with any temptation to restrict interpretation to local comparisons tempered by a recognition that some long-distance links did exist and that occasionally there were wider-scale changes (Beek 2011, 45).

Appendix 10
Stratigraphic diagrams of contexts with finds



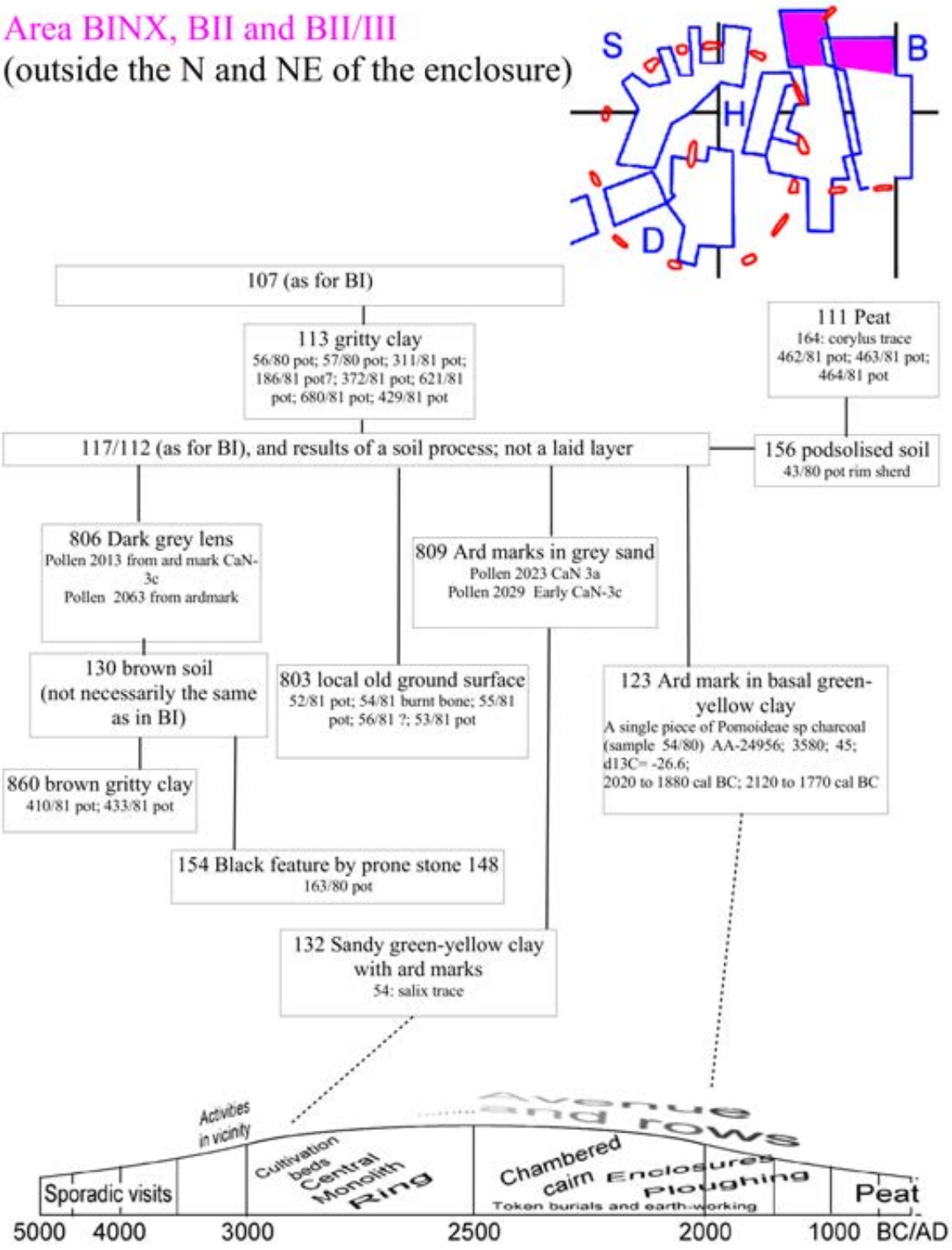
003 and 004 formed part of the avenue.
The other pits were of unknown date and function.

Illus Appendix 10.1 Area A

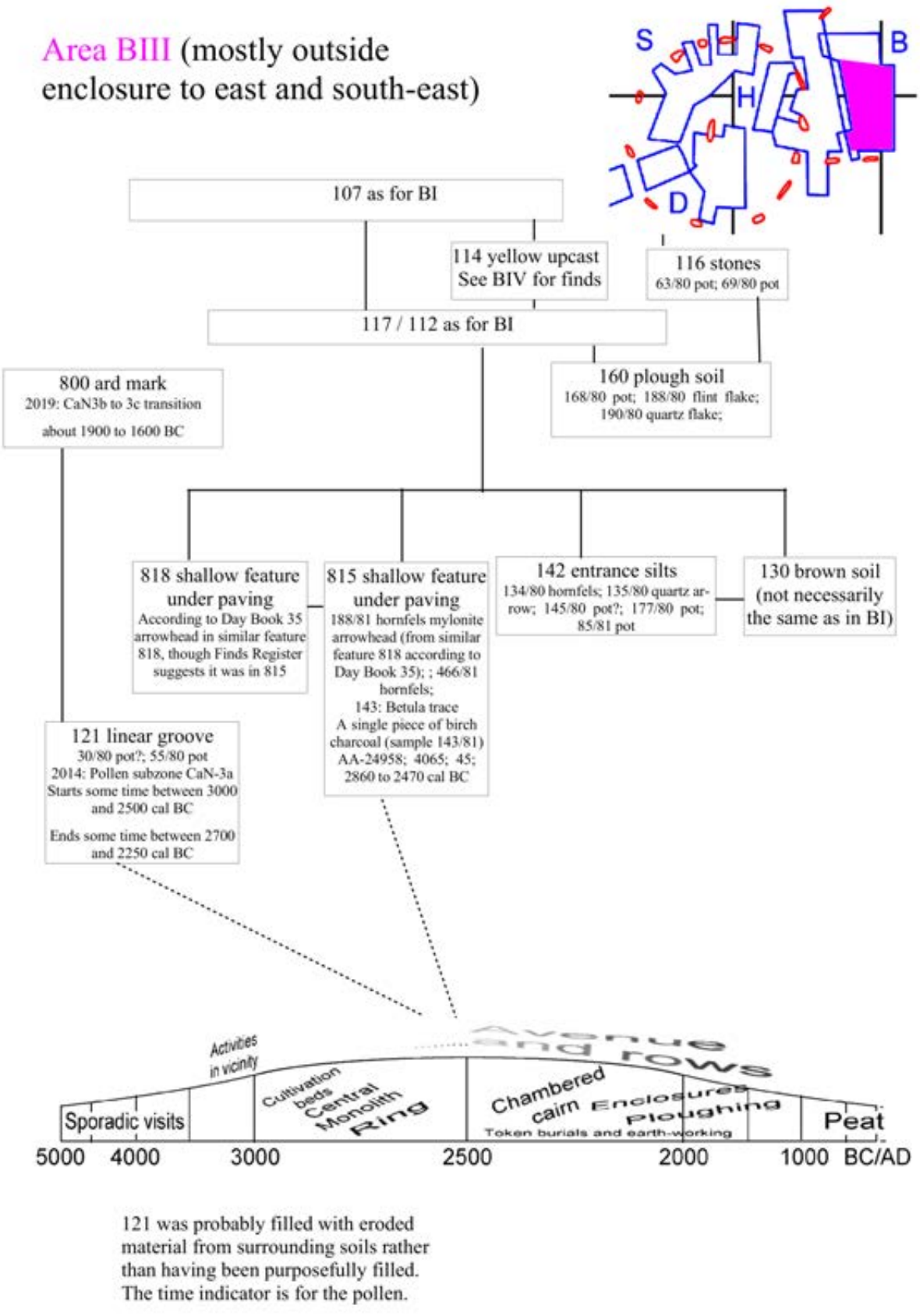


Note that OGS 164 is the lower old ground surface into which the Ring pits were cut.
The local sequence is: 130 brown soil and in places 120 upper soil
162 upper OGS
849 clay
164 OGS (The sequence above 164 is different in BV & BIVS)

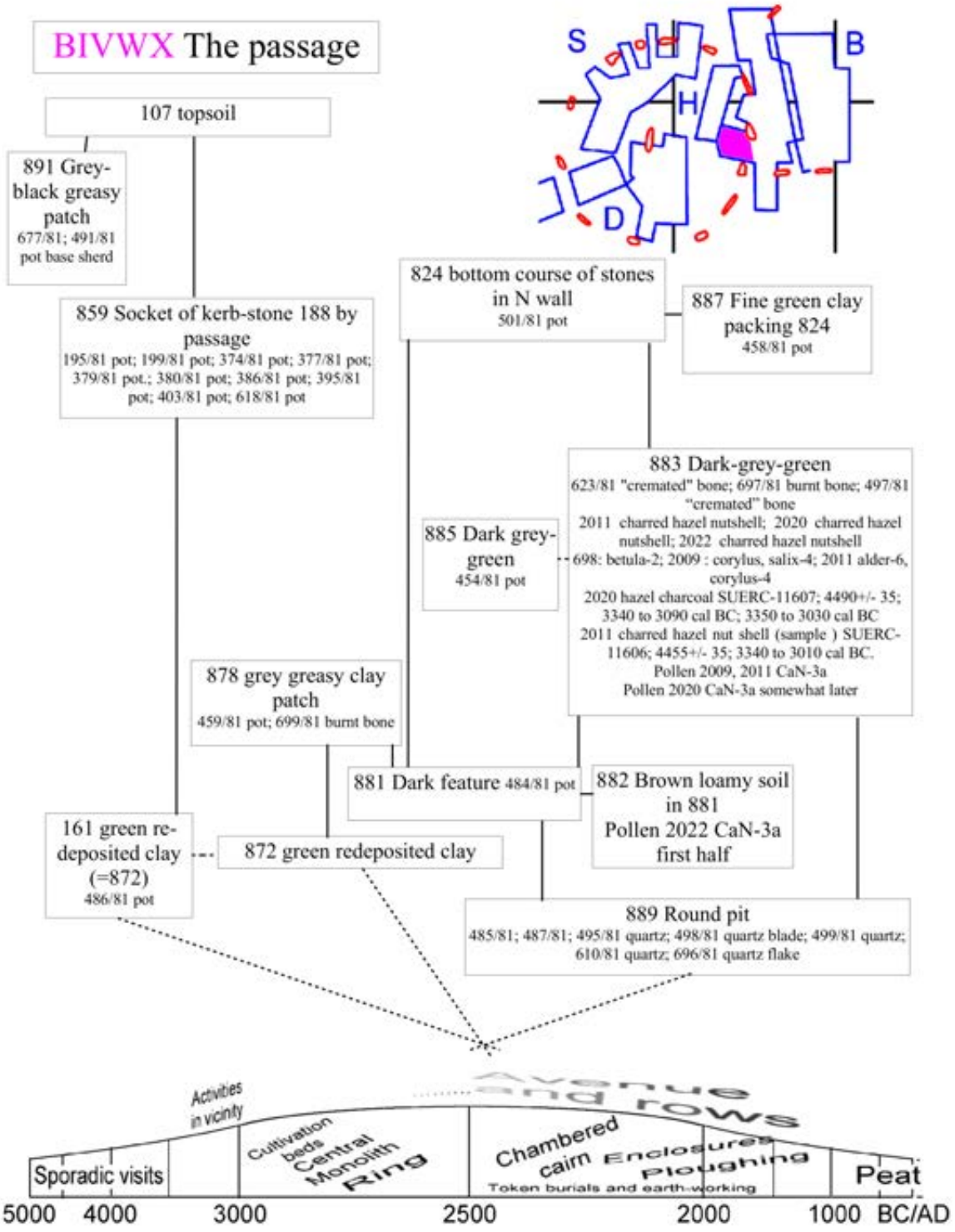
Illus Appendix 10.2 Area BI and BIVN



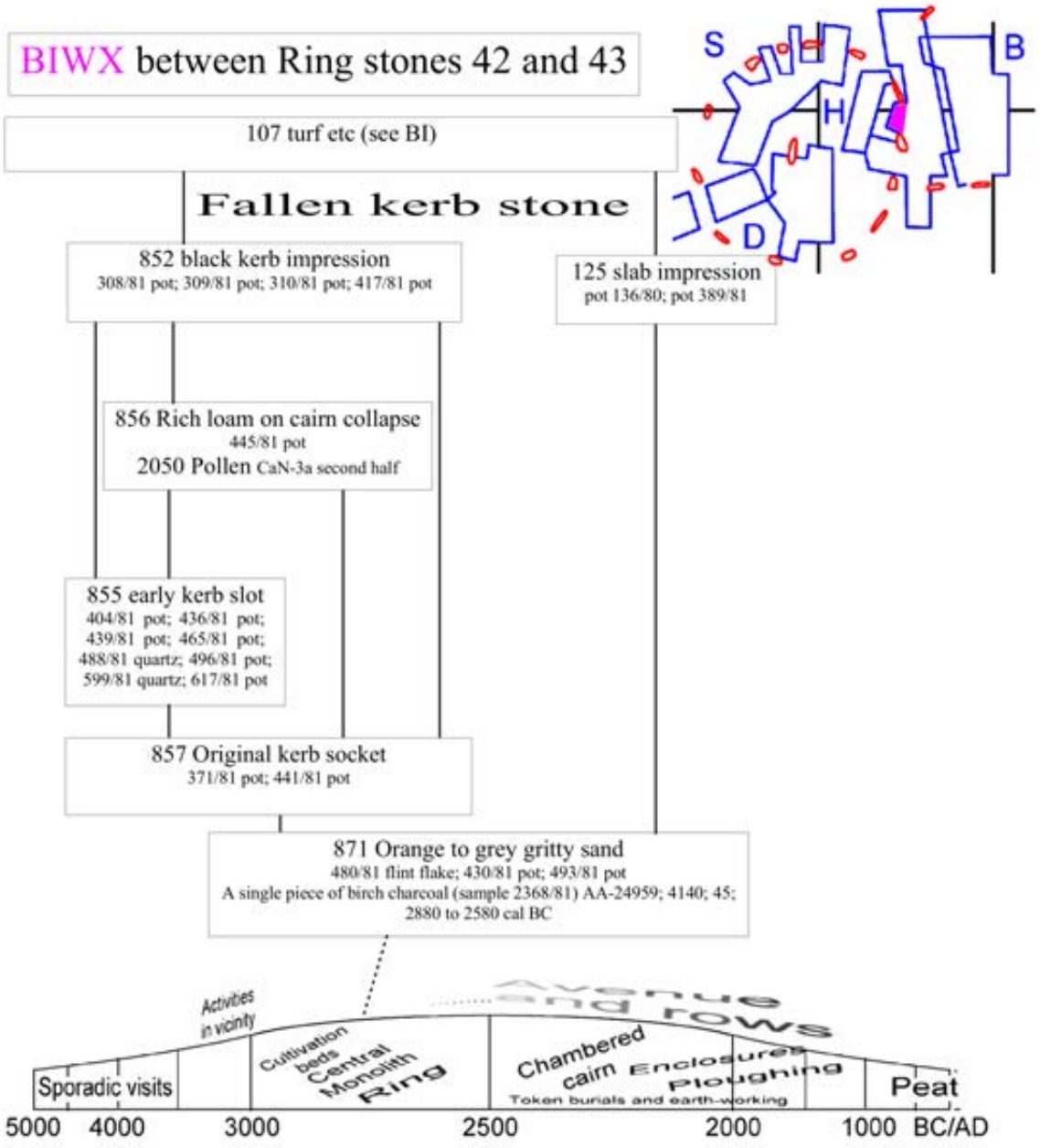
Illus Appendix 10.3 Area BINX, BII and BII/III



Illus Appendix 10.4 Area BIII

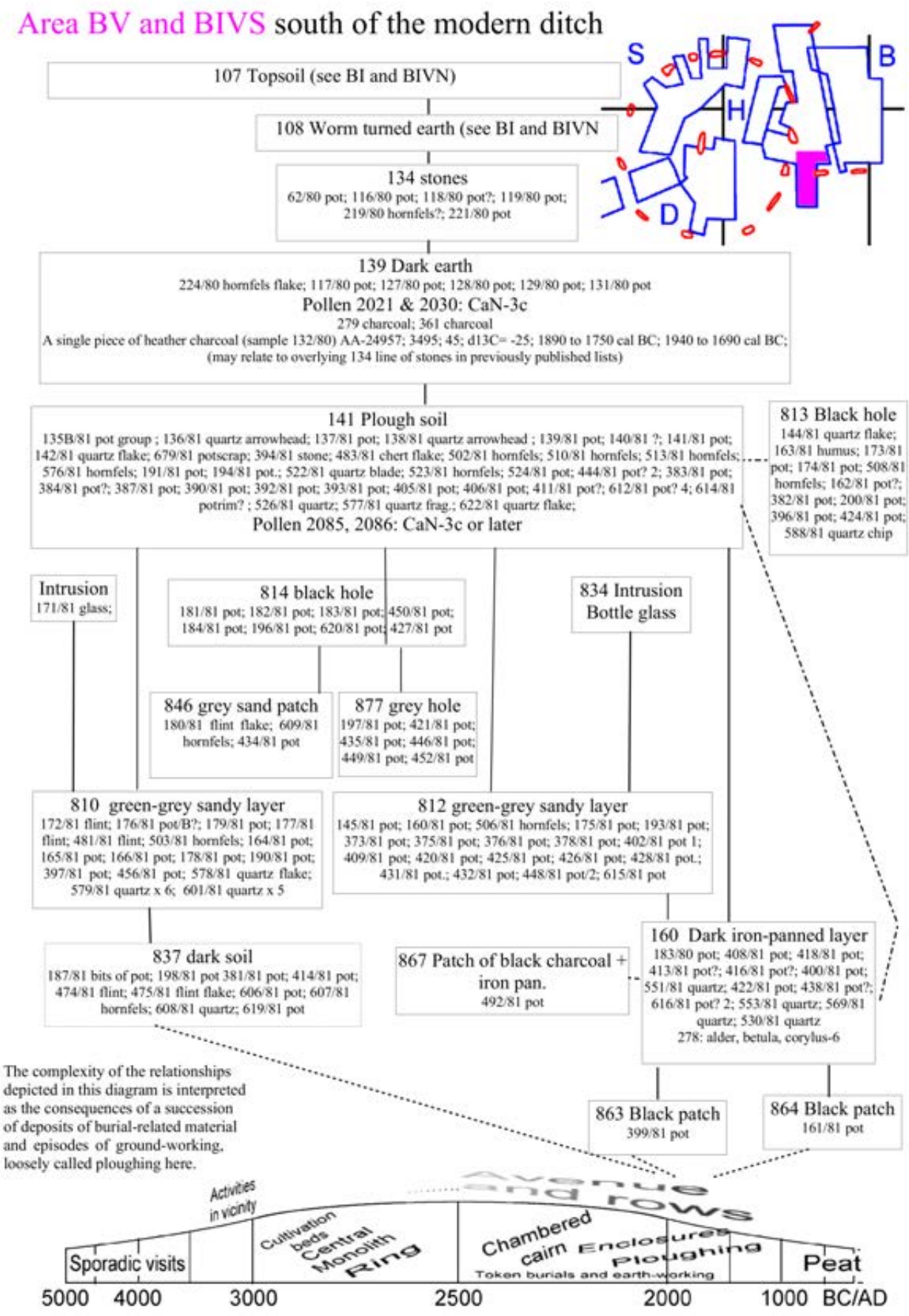


Illus Appendix 10.5 Area BIVWX

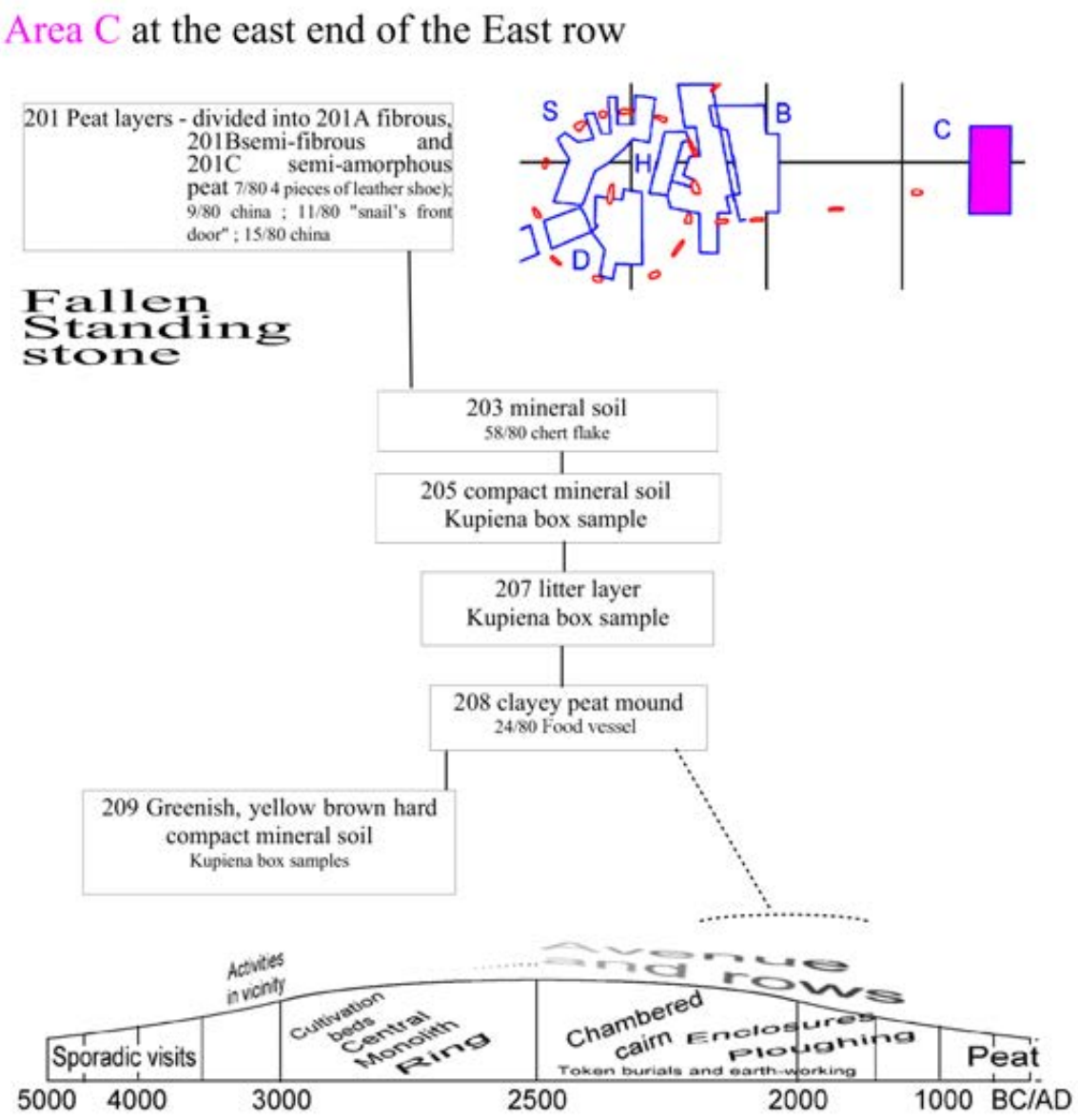


This Area includes a 'ledge' at the west side of the enclosure where pre-enclosure strata are preserved along with features relating to the Ring stones and the cairn.The basal soil 871 lies below two old ground surfaces 162 and 164 which are in places separated by a thin clay layer and above them is the prevalent greenish clay layer 872

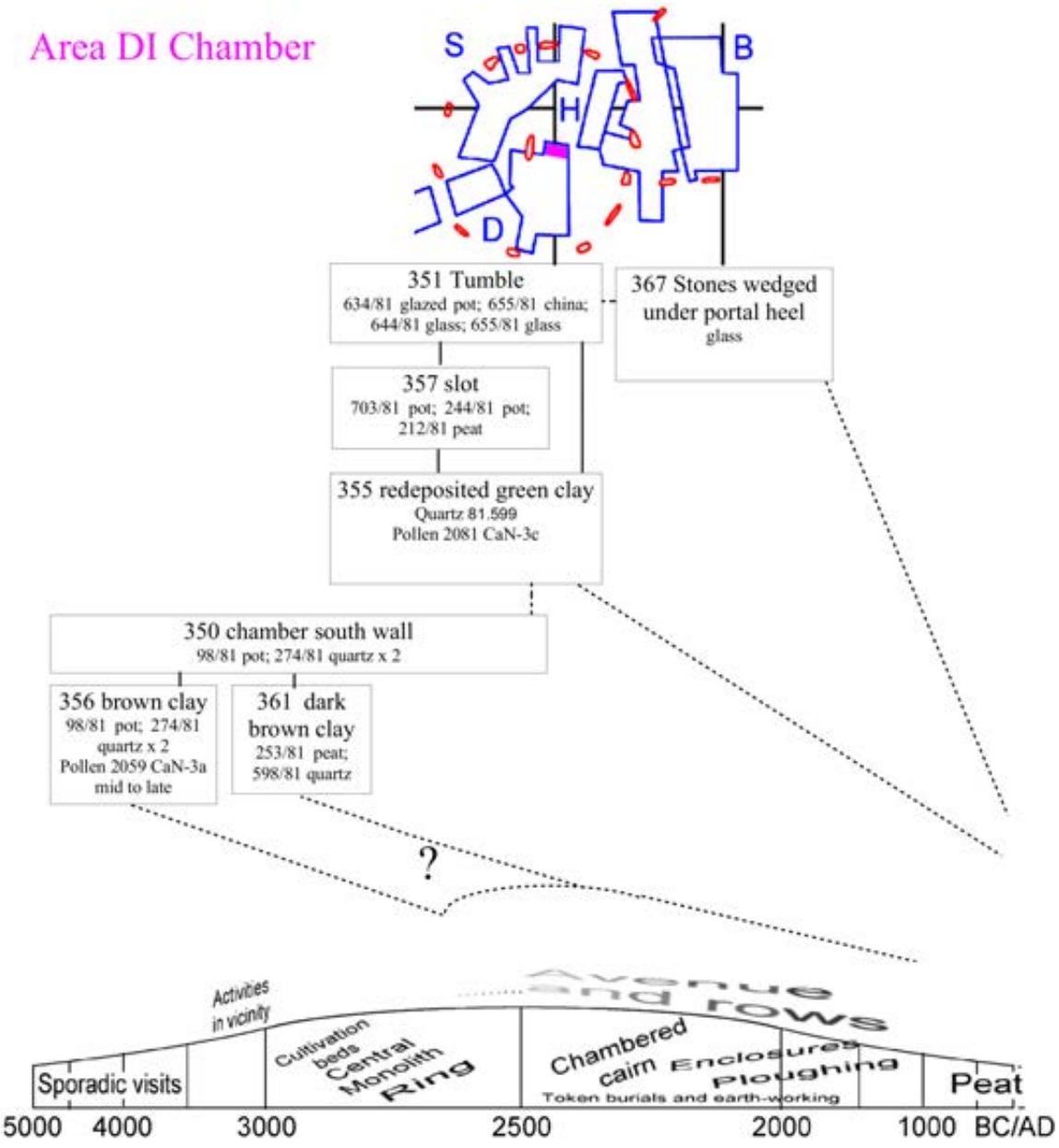
Illus Appendix 10.6 Area BIWX



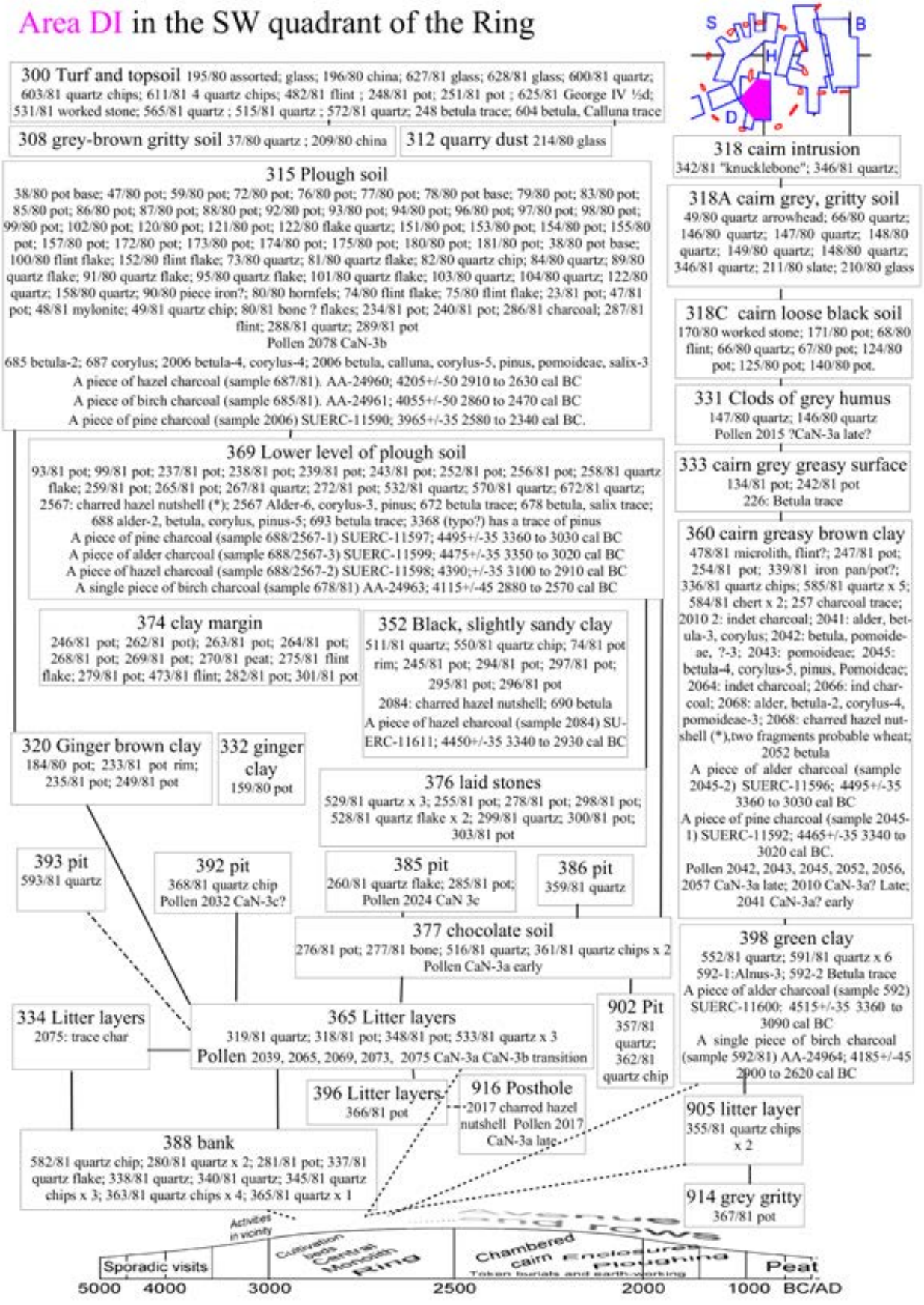
Illus Appendix 10.7 Area BV and BIVS



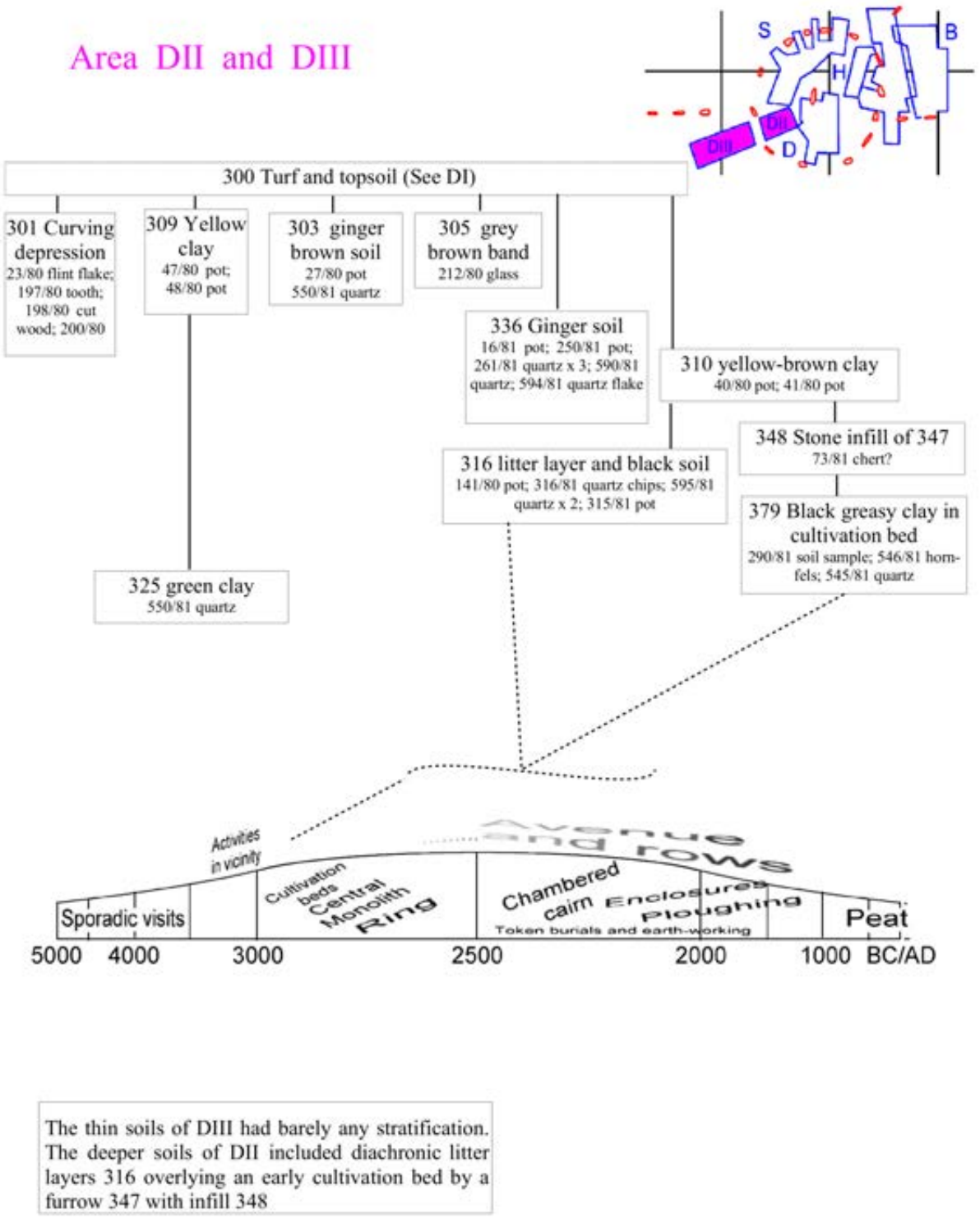
Illus Appendix 10.8 Area C



Illus Appendix 10.9 Area DI Chamber

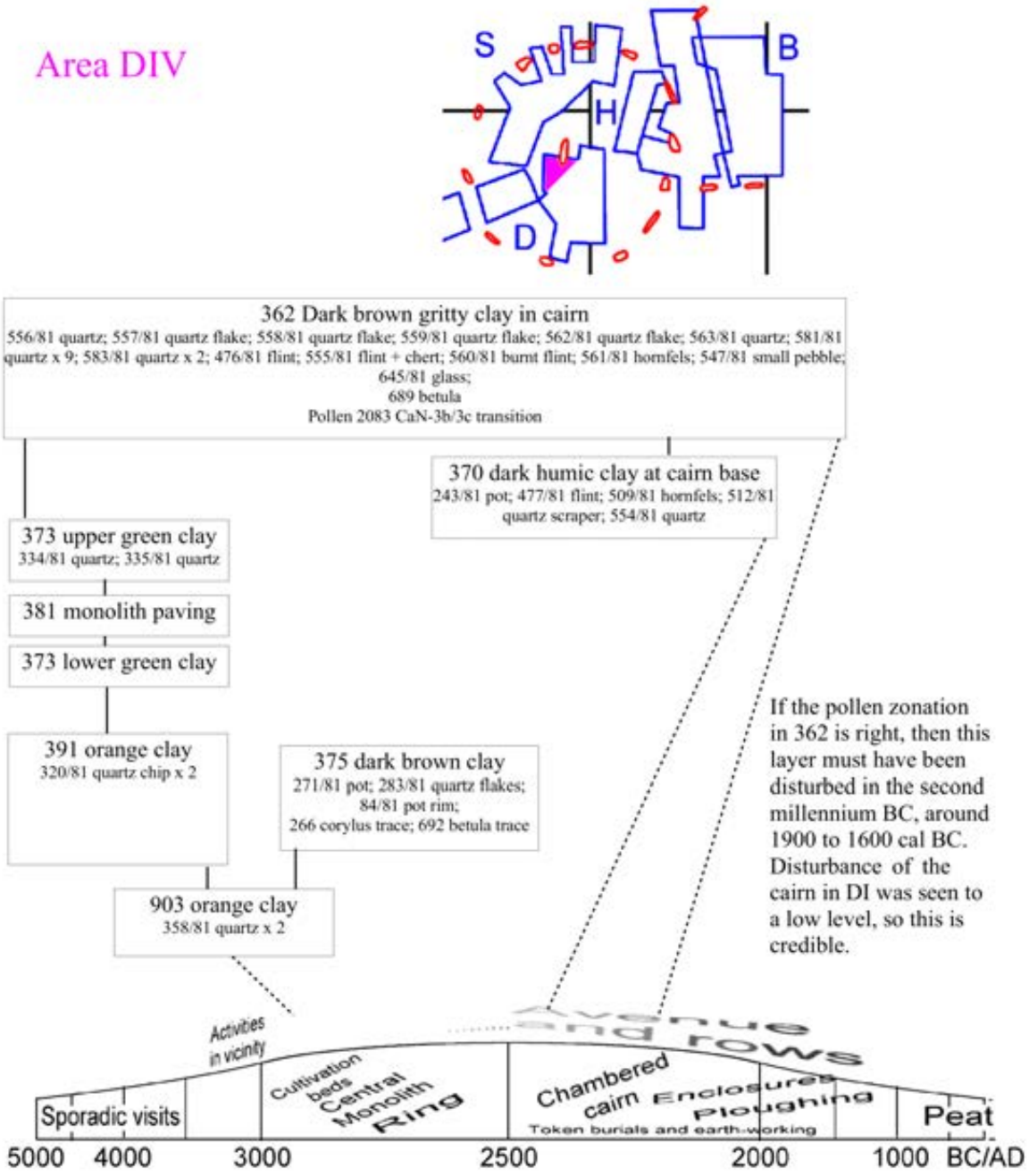


Illus Appendix 10.10 Area DI

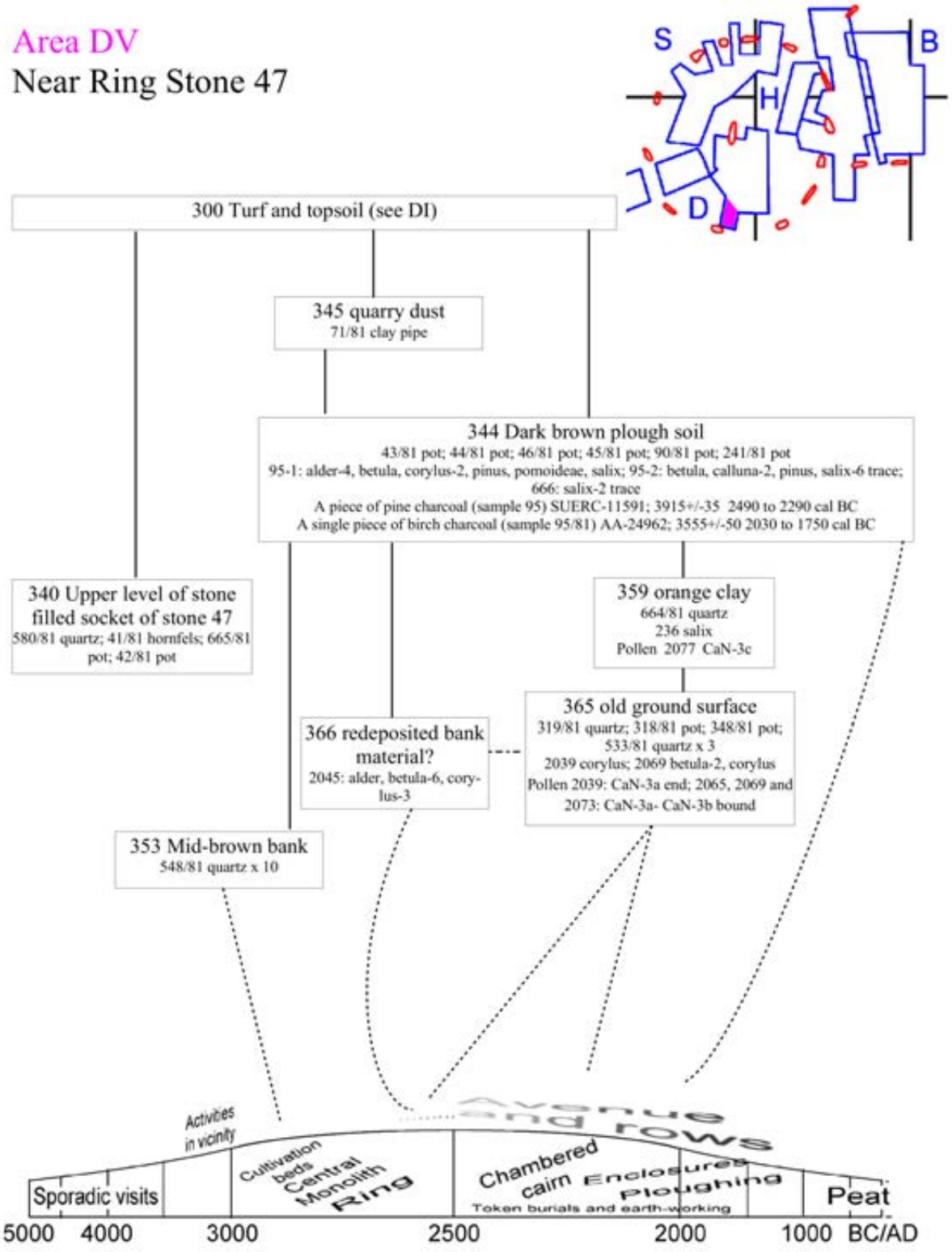


The thin soils of DIII had barely any stratification. The deeper soils of DII included diachronic litter layers 316 overlying an early cultivation bed by a furrow 347 with infill 348

Illus Appendix 10.11 Area DII and DIII

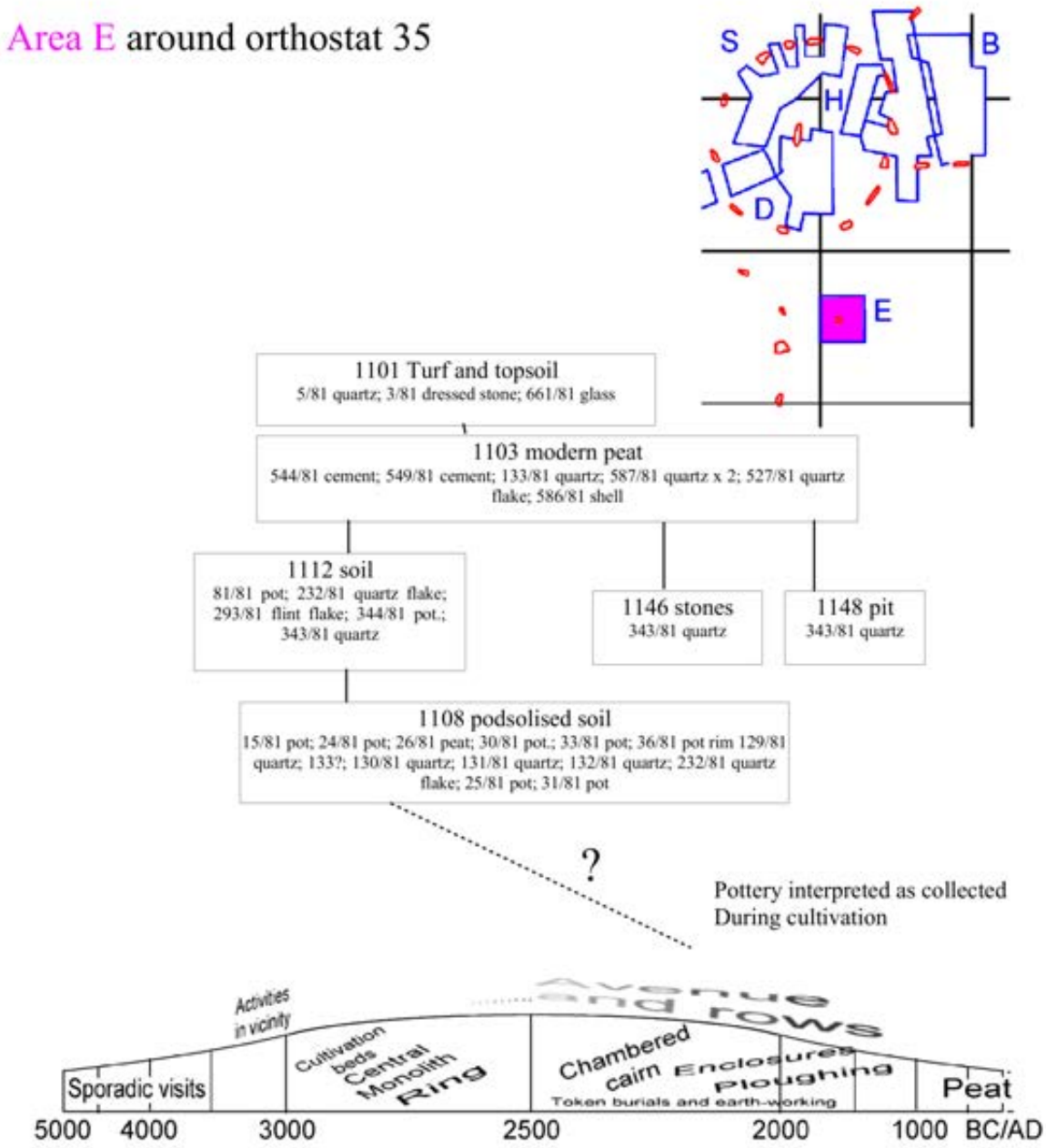


Illus Appendix 10.12 Area DIV



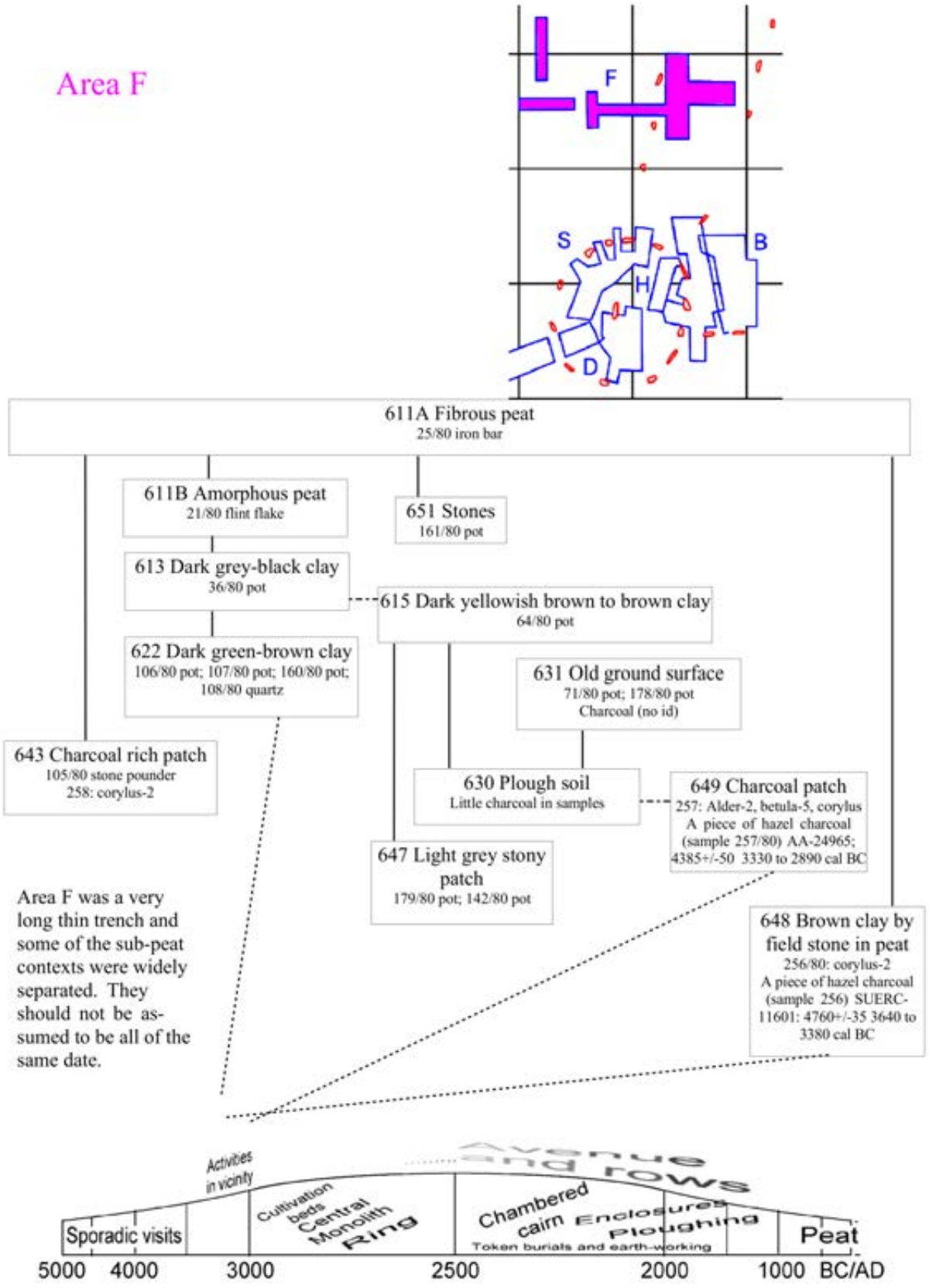
344 is directly equivalent to plough soil 315 on Area DI.
The top of 340 was lost in topsoil and its relationship to the other contexts shown here is unclear
365 is diachronic; 366 appears to be 'bank material' between upper and lower 365

Illus Appendix 10.13 Area DV

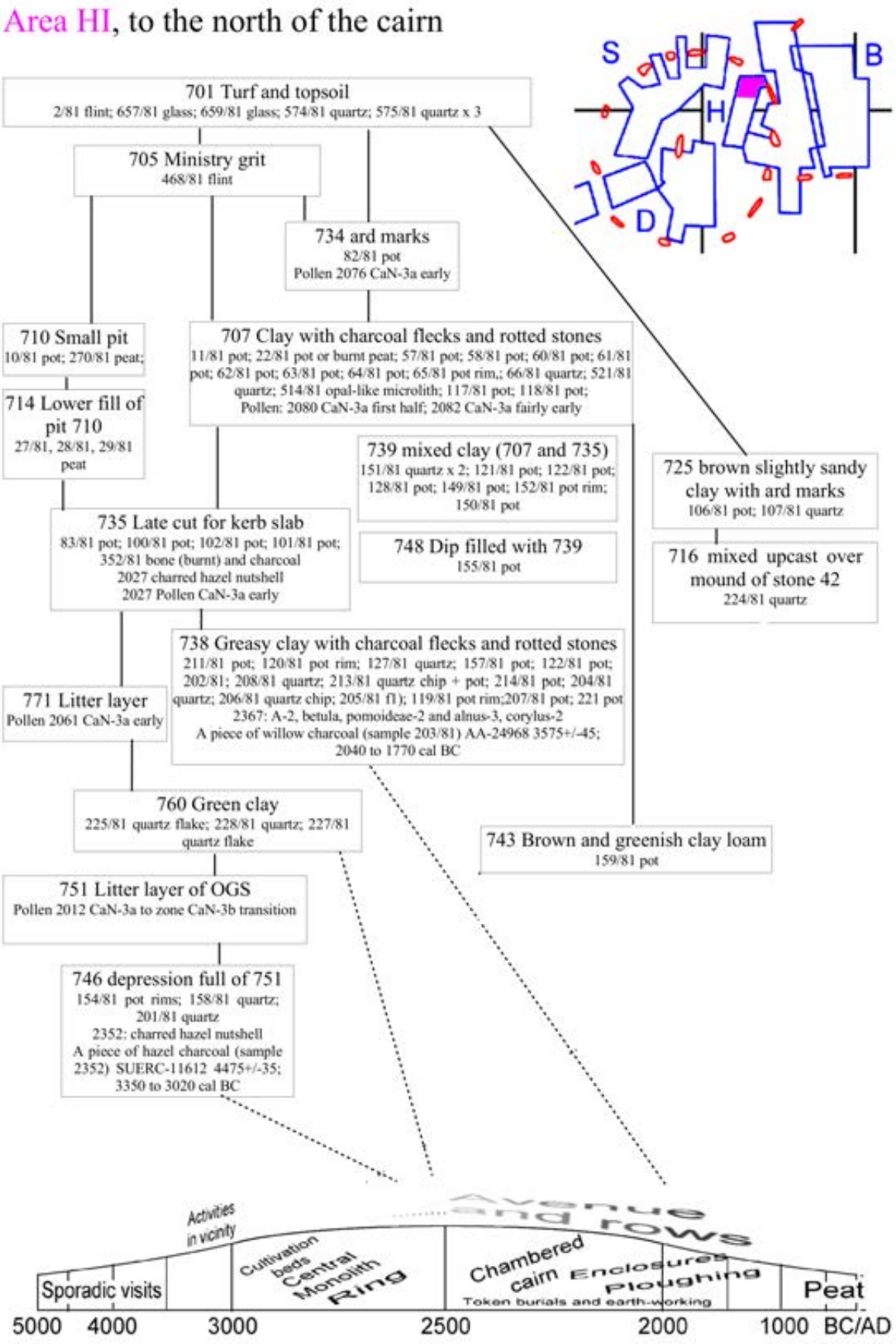


There were many contexts on Area E but few produced any finds or charcoal. There was no relationship between the possible stone-hole represented by 1148 and 1146 and the spotted dick 1108

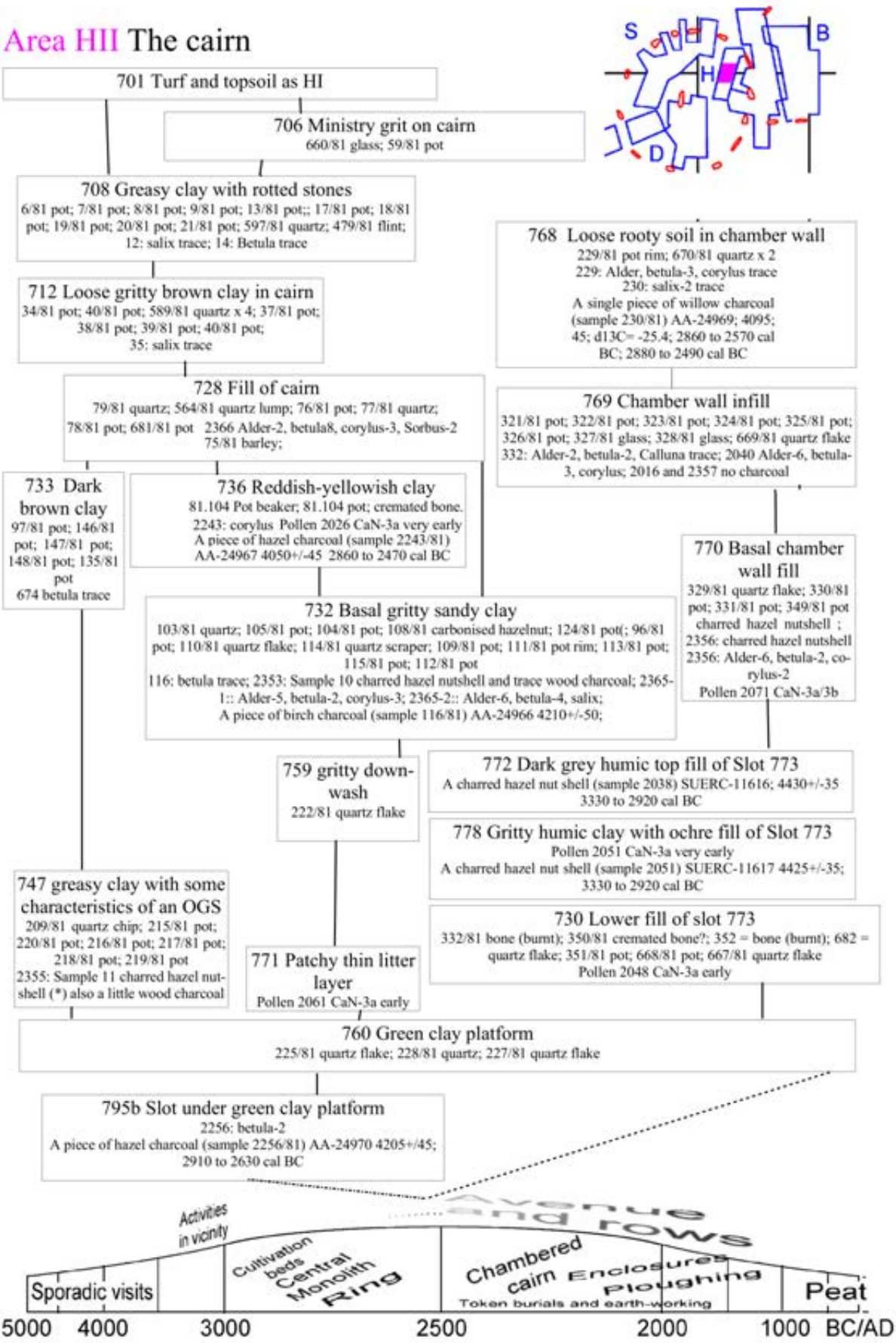
Illus Appendix 10.14 Area E



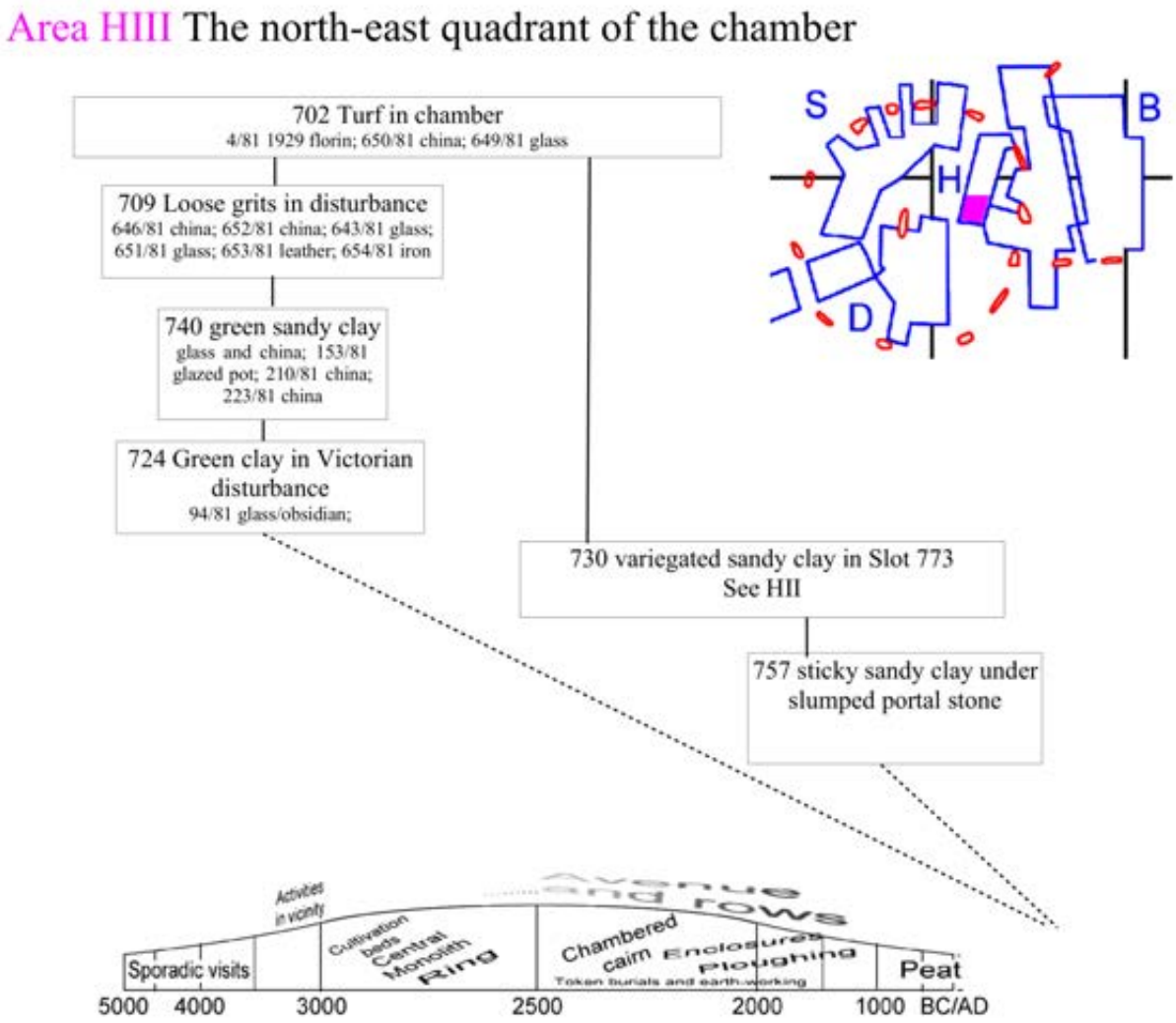
Illus Appendix 10.15 Area F



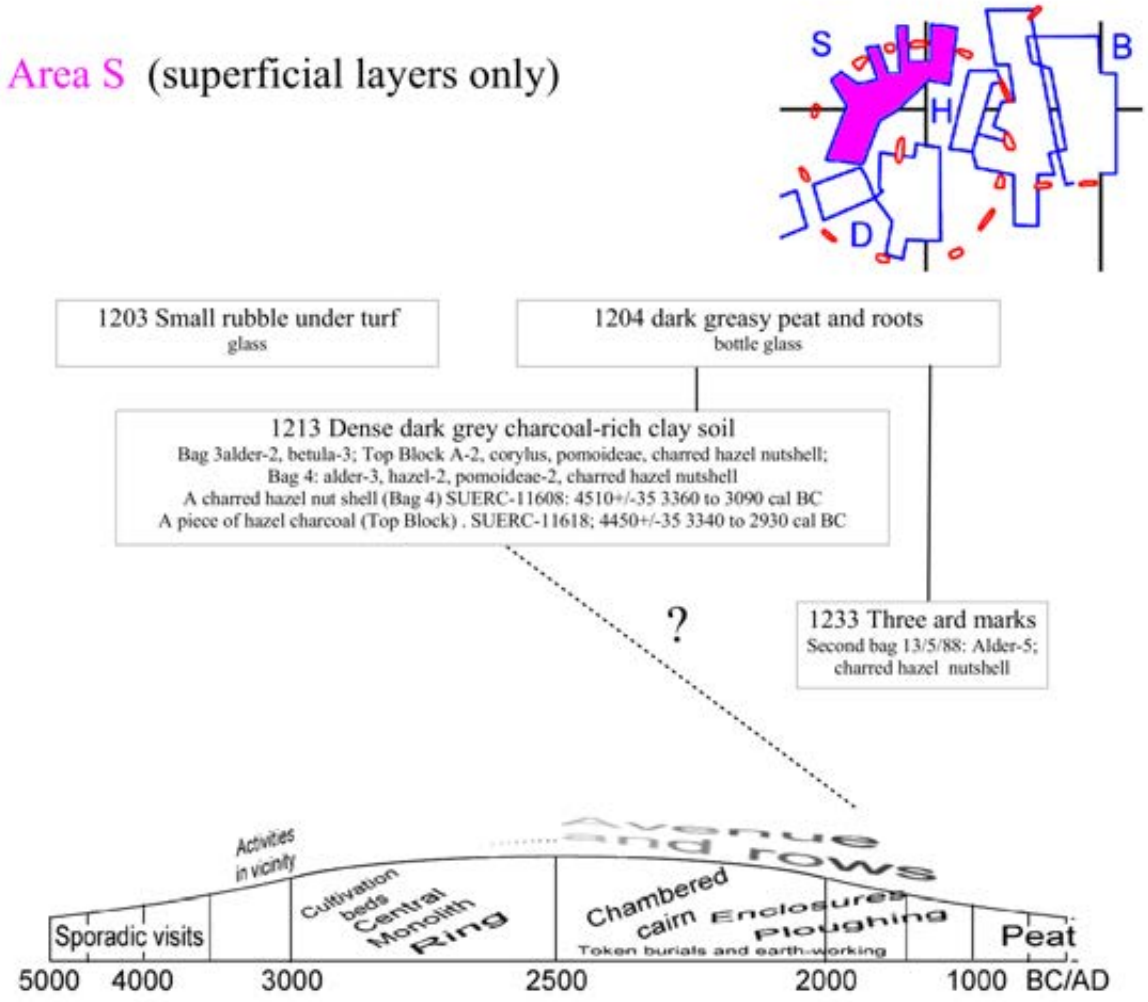
Illus Appendix 10.16 Area HI



Illus Appendix 10.17 Area HII



Illus Appendix 10.18 Area HIII



If 1213 was the equivalent of the plough layers in H and D then the inclusion of residual charcoal would explain the early dates.

Illus Appendix 10.19 Area S

Appendix 11
Analysis of the pottery and other finds from cairn contexts in Areas B, D and H

This is referred to in Chapter 24 Discussion and Conclusions 24.12.3.

PRE-CAIRN

All of the pottery (10 catalogue entries) was E/MN corky or probably E/MN corky apart from 48_53 which included a Heb Inc sherd and 1032_1033 which might instead have been from a corky fine Beaker.

Table Appendix 12.1 Artefacts from immediately pre-cairn contexts

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
HII	760	Compact green clay layer with a very minor sand component and some rotted grits, with a surface pattern of polygonal cracks 752. Cut by linear feature beneath chamber 773. Notes Often referred to in the narrative as a 'green clay platform'.			81.225 quartz flake 81.228 quartz 81.227 quartz flake
DIV	375	Dark brown gritty clay noted in west corner of trench. Under 370 bedding layer for cairn boulders. Over 332 = possible bank material plus 394 = turf line.	1104_1105	E/MN prob corky	81.283 quartz flakes
DIV	375	As above	17	E/MN corky	
HII	747	Medium grey-brown crumbly clay loam with some olive-green flaking, charcoal-rich and greasy when rubbed. Under 733 = lower fill of cairn. Over 760 = green clay platform.	48_53	Heb Inc (5 sherds)	
HII	747	As above	179_180	E/MN corky	81.209 quartz chip
HII	747	As above	1034	E/MN corky	
HII	747	As above	1032_1033	E/MN corky or fine Beaker,	
HII	747	As above	1035	E/MN corky	
DIV	391	Orange/yellow speckled clay under 373 = redeposited green clay and over 394 = turf line. Interpreted as same as 339 in DII.			81.320 quartz chip x 2

PRE-CHAMBER WALL SLOT AND PRE- PASSAGE WALL FEATURES

The bottom fill 730 of a slot under the chamber wall included two probable Chalco/EBA Beaker sherds and an E/MN corky sherd. The features under the passage wall included one E/MN corky sherd, 3 E/MN non-corky sherds , a sherd which was either E/MN non-corky or domestic Beaker and a fine probable Beaker sherd.

Table Appendix 12.2 Artefacts from pre-chamber wall and pre-passage wall contexts

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
HII	730	Grey-brown with slight green tinge, gritty sandy clay with small sub-angular stones; charcoal-rich, un-cemented and non-greasy. The bottom fill of slot 773	671	Prob domestic Beaker	81.332 bone (burnt) 81.350 cremated bone? 81.352 = bone (burnt) 81.682 = quartz flake 81.667 quartz flake 0.02 gm of cremated bone from sieving by AOC in 2005/6
HII	730	The bottom fill of slot 773	672	Prob fine Beaker	
HII	730	The bottom fill of slot 773	162_165	E/MN corky	
BIVWX	878	Clay grey greasy clay in feature below passage north wall	67	E/MN Corky	
BIVWX	881	Dark green fill clay in feature below passage north wall	245	E/MN Non-corky	
BIVWX	881	Dark green fill clay in feature below passage north wall	246	E/MN Non-corky	
BIVWX	881	Dark green fill clay in feature below passage north wall	247	E/MN Non-corky	
BIVWX	885	Dark green fill below passage north wall, like fill of slot 883, the continuation of the slot on Area H	735	?E/MN or Chalco/EBA Non-corky or dom Beaker	
BIVWX	885	Dark green fill below passage north wall, like fill of slot 883, the continuation of the slot on Area H	736	Prob Chalco/ EBA Prob fine Beaker	

ARTEFACTS FROM THE PIT UNDER THE PASSAGE AREA

Table Appendix 11.3 Artefacts from the pit under the passage area

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
BIVWX	889	Clay green pit fill of round pit in the passage	283	E/MN Heb Inc	
BIVWX	889	Clay green pit fill of round pit in the passage	841	?E/MN or ??Chalco/EBA Non-corky or dom Beaker	

ASAL CAIRN LAYERS

These layers included an E/MN Heb Inc catalogue entry (Cat 281) and an Indet one.

Table Appendix 11.4 Artefacts from basal cairn layers

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
DIV	370	Bedding layer of humic clay for cairn boulders - layer of dark brown/black clay with charcoal located among cairn boulders from middle of cairn to perimeter. Similar to 360 = greasy orange/brown clay with quartz chips, but on other side of kerb. Under 362 = soil on DIV and fill of upper chamber wall. Over 375 which may be redeposited natural from nearby monoliths. Note It shows ard marking (Film 1981.7.27) and may be equivalent to basal 315 or 320 on DI	974	Indet	81.477 flint 81.509 hornfels 81.512 quartz scraper 81.554 quartz
DI	398	Patchy layer of green clay onto which rested base layer of cairn. Possibly redeposited 373 = capping over paving 381 around Monolith 29. Under 390 = bedding layer for 2nd layer of cairn boulders, and associated cairn boulders. Cut by 915 = linear feature. Over grey gritty clay layer, 905 = upper layer of several turf line under the cairn and chamber.			81.552 quartz 81.591 quartz x 6

DI	910	Probable the same loose charcoal impregnated clay as found within lower courses of cairn material. Under 368 = upper layer of stones located in vicinity of Monolith 29. Over 381 = "paving" of large slabs around Mono. 29.	281	E/MN Heb Inc	
DIV	373.1	373.1 was yellow-brown at its surface and greener underneath. Contemporary with 355 = redeposited green clay. Under 362 = upper fill of chamber wall, and 380 = kerb of cairn. Over 381 = paving around Monolith 29, and 918 = turf line east of Monolith 29.			81.334 quartz (6.94/8.02, 1.15 BD) 81.335 quartz (7.15/8.12, 1.14 BD)

PRIMARY CAIRN

Primary cairn layers included mostly E/MN sherds (10 catalogue entries), but they also included an E/MN Heb Inc sherd (174_175), E/MN or Chalco/EBA corky or Beaker sherds (168_171 and 1036–1038), Prob Chalco Prob Beaker sherds (541_542), and a Chalco/EBA sherd or sherds (351_352).

Table Appendix 11.5 Artefacts from primary cairn layers

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
HII	733	Dark brown slightly sandy clay with more humus than 732, but more gritty and less greasy. Under 729 = fill of cairn. Over 737 = outer cairn base and 747 = clay loam above 760 green clay platform.	178	E/MN corky	81.674 charcoal sample - seen 23/10/95
HII	733		176	E/MN corky	
HII	733		177	E/MN corky	
HII	733		1036–1038	E/MN or Chalco/EBA corky or Beaker	
HII	733		541_542	Prob Chalco Prob Beaker	
HII	759	Greyish very gritty clay just outside the base of the northern face of the chamber wall. Under 732 = lower fill of cairn interpreted as basal fill of cairn.			81.222 quartz flake

HII	732	Gritty slightly sandy clay basal fill of cairn. Under 728 = fill of cairn. Over 741 = base of inner cairn. Cut by 736 = yellowish-reddish clay by reddened stones. ?Same as 733 = fill of cairn.	166_167	E/MN corky	
HII	732		2	E/MN corky	
HII	732		172	E/MN corky	
HII	732		173	E/MN corky	
HII	732		174_175	E/MN corky one sherd Heb inc	81.103 quartz 81.108 carbonised hazelnut 81.110 quartz flake 81.114 quartz scraper
HII	732		168_171	E/MN or Chalco/EBA corky or Beaker	
HII	736	Slightly reddish gritty clay, much less rooty than the surrounding 732, with a few fragments of burnt bone (Day Book 6) in an area of discoloured stone in the cairn. Under 728 = cairn fill. In 732 = lower chamber fill. Interpreted as modification of 732 by a fire set when the cairn was being built.	351_352	Chalco/EBA International Maritime Beaker	
HII	736		279	E/MN non-corky	81.104.81 piece of cremated bone.

PRIMARY CHAMBER WALL

The primary chamber wall contexts had 11 E/MN corky catalogue entries and one E/MN Heb Inc.

Table 11.6 Artefacts from primary chamber wall layers

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
HII	770	Very dark grey clay, more compact than the overlying 769. Over 771 = top turf line, 773 = linear feature under chamber wall. Layer D of the stonework had 770 between its cracks.	1040_1043	E/MN Heb inc	81.329 quartz flake (2.60/1.80) 81.330

HII	770	6	E/MN corky
HII	770	7_9	E/MN corky
HII	770	218_219	E/MN corky

PRIMARY PASSAGE WALL

The primary passage wall contexts had 3 E/MN corky catalogue entries and one E/MN Heb Inc.

Table 11.7 Artefacts from primary passage wall layers

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
BIVWX	824	Passage North Wall fill	316	E/MN Heb Inc	
BIVWX	887	Passage North wall green clay	842	E/MN corky	
BIVWX	887		843	E/MN corky	
BIVWX	887		844	E/MN corky	

SECONDARY CAIRN

This had 10 catalogue entries for certain, probable or possible E/MN corky sherds, 1 catalogue entry for a corky E/MN or Chalco/EBA Beaker sherds and another for a none-corky one, 1 for a Chalco/EBA fine Beaker and 11 for the Food Vessel ASH 75. There were also several pieces of quartz and one piece of flint. No glass or modern ceramics were found, in this way contrasting quite sharply with chamber contexts.

Table 11.8 Artefacts from secondary cairn layers

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
HII	708	Slightly greasy clay blanketing the cairn under turf and Ministry grit and over 712 = upper fill of cairn.	592	EBA FV	81.597 quartz 81.479 flint
HII	708	ibid	1022	?E/MN corky	
HII	708	ibid	723	Indet ?E/MN corky	
HII	708	ibid	1030	Prob E/MN corky	
HII	708	ibid	1023	E/MN corky or Chalco/EBA Beaker	
HII	708	ibid	1031	Chalco/EBA Fine Beaker	

HII	708	ibid	593	EBA FV	
HII	708	ibid	1024_1029	EBA FV	
HII	708	ibid	560	EBA FV	
HII	708	ibid	591	EBA FV	
HII	712	Loose gritty dark brown clay fill between upper stones of cairn. Under 708 = gritty clay Under Ministry grit. Over 728 = fill of structural stones of cairn plus 729 = more compact version of 728. Interpreted as secondary filling related to erection of kerb slab 711.	594	EBA FV	81.589 quartz x 4
HII	712		156	E/MN corky	
HII	712		157	E/MN corky	
HII	712		158	E/MN corky	
HII	712		724	E/MN or Chalco/ EBA Non corky fine Heb inc or Beaker	
HII	728	Loose unconsolidated gritty clay with many fine fibrous roots amongst the structural stones of cairn. Under 712 = upper fill of cairn. Over 732 = lower fill of cairn.	725	Prob E/NM non-corky	81.77 quartz 81.79 quartz 81.564 quartz lump
HII	728		161	E/MN corky	
HII	728		159_60	E/MN corky	

SECONDARY CHAMBER WALL

Secondary Chamber wall contexts had 35 catalogue entries for certain or probable E/MN corky sherds and 2 for probably E/MN non-corky sherds. There were 2 entries for E/MN non-corky or Chalco/EBA domestic Beaker sherds. Other finds were quartz and glass. The two glass finds came from under the inner wall stones of layer C of context 769 and suggest that the upper wall had been re-set or rebuilt after peat was cleared from the area.

Table 11.9 Artefacts from secondary chamber wall layers

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
HII	768	Very loose light medium brown sandy rooty soil with many fragments of rotten stone between stones of layer A of chamber wall over 769	18_26	E/MN corky	81.670 quartz x 2

HII	768		27_28	Prob E/MN non-corky	
HII	768		29	E/MN non-corky or Chalco/ EBA domestic Beaker	
HII	769	Dark brown very loose clay with a little sand friable rooty fill of chamber wall varying slightly in amount of humus and in colour to brown with a green tinge. In layer C 769 was 'very rooty and loose towards the chamber - more like 768' according to Plan 26	181	E/MN corky	81.327 glass 81.328 glass 81.669 quartz flake
HII	769			Not in catalogue	
HII	769		182_200	E/MN corky	
HII	769		201_206	E/MN corky	
HII	769		1039	E/MN non-corky or Chalco/ EBA domestic Beaker	

PREHISTORIC DILAPIDATION?

Context 352 was a set of small features filled with black sandy clay under the basal levels of the main plough soil outside the cairn kerb. It contained catalogue entries for 4 E/MN corky sherds and 4 indeterminate sherds along with two fragments of quartz. Context 374 was a slightly lower level of black compact clay forming a margin round the cairn. It contained 5 catalogue entries for certain or probable E/MN corky sherds, 1 for an E/MN Heb Inc or non-corky sherd and in addition there was an empty bag labelled 'Hebridean'. There was1 entry for ?Chalco/EBA ?dom Beaker and 3 for Indeterminate sherds. The interpretation of the features is difficult. They may reflect both down wash (374) and removal of stones during ploughing (352) at an early stage of ground-working, before Beakers became abundant at Calanais, along with initial cairn dilapidation.

Table Appendix 11.10 Artefacts associable with dilapidation of the cairn

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
DI	352	Black, slightly sandy clay small features outside the cairn. Under layer 315 plough soil; it directly underlay 369, the basal level of 315. Over turf line 365 which overlay clay 389 (area of mottled black/brown clay. There are complications here which did not appear in plan and it is not clear what 352 represents.	114_116	E/MN corky	81.511 quartz 81.550 quartz chip 81.294 no pot in bag

DI	352		16	E/MN corky	
DI	352		928_931	Indet	
DI	352			Not in catalogue	
DI	352			Not in catalogue	
DI	374	Margin of black compact clay with charcoal around perimeter of cairn - Under 320 and 369, i.e. lower level of 315 producing Hebridean ware. Over Turf line 334 and probable linear bank feature 388. Interpretation Thought to be mineral percolation from cairn.	622	Indet	81.275 flint flake (5.40/6.90, 1.15 BD) 81.473 flint 81.270 peat was entered in finds book but deleted and the finds number reassigned
DI	374		624	?E/MN corky	
DI	374		625	?E/MN corky	
DI	374		120	E/MN corky	
DI	374		121	E/MN Corky	
DI	374		623	Prob E/MN corky	
DI	374		340	E/MN Heb Inc or non-corky	
DI	374			Empty bag saying 'Hebridean'	
DI	374		953	?Chalco/EBA ?dom Beaker	
DI	374		945	Indet	
DI	374		946_952	Indet	

LATE KERB SLAB SLOTS ON AREA BIWX

Table Appendix 11.11 Artefacts in late kerb slab slot fills, probably associable with dilapi-dation of the cairn

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
BIWX	852	Black clay soil in late kerb slab socket at base of cairn	785	E/MN Heb Inc	

BIWX	852	Black clay soil in late kerb slab socket	786	E/MN Corky
BIWX	855	Early kerb slab socket	59	E/MN Corky (but see under fabric)
BIWX	855	Early kerb slab socket	60	E/MN Corky
BIWX	855	Early kerb slab socket	61	E/MN Corky
BIWX	855	Early kerb slab socket	787	E/MN Corky
BIWX	855	Early kerb slab socket	788	E/MN Corky
BIWX	855	Early kerb slab socket	789	E/MN Corky
BIWX	855	Early kerb slab socket	790	E/MN Corky
BIWX	855	Early kerb slab socket	791	E/MN Corky
BIWX	855	Early kerb slab socket	792	E/MN Corky
BIWX	855	Early kerb slab socket	793	E/MN Corky

'FACADE' SLAB PIT AT PASSAGE ENTRANCE

The 'facade slab' pit at the passage entrance included two E/MN Corky sherds, an E/MN Hebridean Incised sherd, 4 Beaker sherds, 3 E/MN Non-corky or Chalco/EBA Beaker sherds, 3 Indet or possibly domestic Beaker sherds, 2 Post-EBA possibly indeterminate IA or IA 'Plain Style' pottery and two completely indeterminate sherds. It is hard to explain the presence of the post-Bronze-Age sherds particularly if they belong in the first millennium AD.

Table Appendix 11.12 Artefacts from the 'facade slab' pit at the mouth of the passage

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
BIVWX	859	Black greasy clay in passage facade socket	4	E/MN Corky	
BIVWX	859		5	E/MN Corky	
BIVWX	859		308	E/MN Heb Inc	
BIVWX	859		422	Chalco/EBA Beaker	
BIVWX	859		423	Chalco/EBA Beaker	
BIVWX	859		424	Chalco/EBA Beaker	
BIVWX	859		450	Chalco/EBA Beaker Early	
BIVWX	859		602	Indet; ??Chalco/EBA?? dom Beaker	
BIVWX	859		603	Indet; ??Chalco/EBA?? dom Beaker	

BIVWX	859	604	Indet; ??Chalco/EBA?? dom Beaker
BIVWX	859	614	Post-EBA: ?IA or later Indet; ??'Plain Style' pottery
BIVWX	859	615	Post-EBA: ?IA or later Indet; ??'Plain Style' pottery
BIVWX	859	863	Indet
BIVWX	859	864	Indet
BIVWX	859	865	E/MN Non-corky or Chalco/EBA Beaker
BIVWX	859	866	E/MN Non-corky or Chalco/EBA Beaker
BIVWX	859	867	E/MN Non-corky or Chalco/EBA Beaker

AMBIGUOUS CONTEXTS, POSSIBLY DISTURBED BY VICTORIAN INTRUSIONS

Table Appendix 11.13 Artefacts from ambiguous contexts possibly disturbed by Victorian intrusions

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
DI	360	A layer of greasy orange/brown clay with quartz chips in the interstices between stones of the cairn near the outer face of the chamber wall, Under 318 layer IV	620	Prob E/MN non-corky	81.478 flint? 81.336 quartz chips 81.585 quartz x 5 81.584 chert x 2 81.339 iron pan/pot?
DI	360		932	Chalco/ EBA Fine Beaker	
DI	360		621	?E/MN non-corky/ Heb Inc	

DIV	362	Dark brown gritty charcoal-rich clay fill of cairn. Under 300 = turf. Over 370 = layer of dark brown/black clay bedding, and 373 = the clay capping over stone paving around stone 29. Interpretation Same as 360? Note DIV did not include much of the cairn fill. 360 was disturbed during the Victorian period. This layer may also have reflected Victorian disturbance.		81.556 quartz 81.557 quartz flake 81.558 quartz flake 81.559 quartz flake 81.562 quartz flake 81.563 quartz 81.581 quartz x 9 81.583 quartz x 2 81.476 flint 81.555 flint plus chert 81.560 burnt flint 81.561 hornfels 81.547 small pebble 81.645 glass

VICTORIAN SOUTHERN CHAMBER WALL FILL

Table Appendix 11.14 Artefacts from Victorian southern chamber wall fill

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
DI	361	Fill of lower chamber wall, dark brown friable clay thought to have been washed in rather than deliberate fill. Same level as 360 = greasy orange/brown clay. Interpretation The peat was probably washed in during the clearance of 1857. If this is correct it implies that the upper part of the southern face of the chamber wall in Area D was very dilapidated, as interpretation of early accounts of the clearance independently suggest; Sharbeau's sketch may have been drawn after repairs had been made.			81.253 peat 81.598 quartz

VICTORIAN CAIRN FILL?

Table Appendix 12.15 Artefacts from Victorian cairn fill

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
DI	318	Cairn and soils in it including layers 318.1 to 318.4. This is a portmanteau label.			81.342 "knuckle-bone" 81.346 quartz

DI	318 1	A loose grey, gritty soil behind false kerbstone interpreted as Victorian reconstitution.			80.49 quartz arrow head 80.66 quartz 80.148 quartz 80.149 quartz 80.211 slate 80.210 glass
DI	326	Grey gritty patches which lay in a drift over the kerb.	425	Chalco/EBA Beaker	80.187 quartz *80.150 quartz
DI	326		432_437	Chalco/EBA Beaker	
DI	326		438	Chalco/EBA Beaker	
DI	326		439_449	Chalco/EBA Beaker	
DI	326		711	Prob E/MN non-corky	
DI	318.3	A loose black soil, filling stones of cairn - animal burrows interpreted as probably disturbed by Victorian activities	619	Prob E/MN	80.66 quartz 80.68 flint 80.170 worked stone
DI	318.3		420	Chalco/EBA Beaker	
DI	318.3		421	Chalco/EBA Beaker	
DI	318.3		334_338	E/MN? Heb inc?	
DI	318.3		709	E/MN non-corky or Chalco/EBA domestic Beaker	
DI	318.3		459	Chalco/EBA Beaker	
DI chamber	356	Layer of friable dark brown clay. Possibly equivalent to 390 = surface on which the second bottom layer of cairn stones was laid. Under 350 = chamber wall. Over 355 = redeposited green clay.		Not in catalogue	81.274 quartz x 2 (1.13 BD)

VICTORIAN CAIRN INTRUSION FILL?

The fills of this intrusion contained an Indet sherd and quartz. **Table**

Appendix 11.16 Artefacts from Victorian cairn intrusion fill

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
DI	333.1	Grey greasy surface within cairn 318 and 331 = clods of grey humus. Over 360 = greasy orange brown clay.	927	Indet	81.226 charcoal 80.147 quartz 80.146 quartz

NOTE 24.12.4: ANALYSIS OF THE CHAMBER FILL AND MODERN CONTEXTS

Prehistoric pottery was almost completely absent from chamber fills (the only possible case 81.244, a pot fragment, is not in the catalogue) and there were abundant Victorian to modern finds.

Table Appendix 11.17 Artefacts from Chamber fills

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
DI	351	Stone tumble within chamber.			81.634 glazed pot 81.655 china 81.644 glass 81.655 glass
DI chamber	357	Rectangular slot cut into green clay 355 with fill of loose organic-rich clay and stones. Under 364 = clay fill of tumble in chamber. Interpretation Fairly modern. Could this be a cast of the 'lintel'?		Not in catalogue	81.703 recent leaf or other organic matter 81.212 peat
DI chamber	364	Remnant layer of friable black humic clay fill of stone tumble in chamber. Same as clay within 351. Under 351 = stone tumble in chamber. Over 355 = redeposited green clay. Within 925 = chamber.			81.700 insect wing
DI chamber	367	Stones wedged under SW chamber portal this century or last. Under SW portal stone. Over 372 = undisturbed green natural. Within 925 = chamber.			glass

HIII	709	Loose with many grits Ministry grit. Under 702 = turf. Over 720 = gritty wash down from cairn. Note Fill very similar to 731. Interpreted as modern disturbance in chamber.	81.646 china 81.652 china 81.643 glass 81.651 glass 81.653 leather 81.654 iron
HIII	724	Redeposited natural in a cut interpreted as Victorian exploratory trenching	81.94 glass/ obsidian
HIII	740	Light olive green sandy clay loam in chamber with black mottling. Under 720 = grit wash down from cairn. Over 742 = recent "turf line". Interpreted as modern redeposited natural from excavation. in chamber	glass and china 81.153 glazed pot (1.27, 2.68/2.20) 81.210 china (1.27, 2.54/2.21) 81.223 china (1.36, 2.88/2.37)
HIII	757	Sticky sandy grey/green clay with yellow brown mottles and iron staining. Under 753 = slumped portal stone, 770 = displaced fill of bottom chamber wall. Interpreted as redeposited natural.	81.221 quartz x 1 (1.40, 2.90/2.24)

MODERN CONTEXTS

Table Appendix 11.18 Artefacts from modern contexts

Area	Ctxt	Description and interpretation	Pot Cat No	Details	Other
HII	706	Ministry grit on cairn, blanketing it [Day Book 5b]. Under 701 = turf. Over 704 = cairn, and 712 = upper fill of cairn, 708 = gritty clay [Day Book 5b]	1021	Indet	81.660 glass
HII	701	Turf over cairn 704.			81.2 flint 81.657 glass 81.659 glass 81.574 quartz 81.575 quartz x 3
HIII	702	Turf in chamber - lusher than turf in Areas I and II.			81.4 1929 florin (2.45/2.18) 81.650 china 81.649 glass

Appendix 12
Looking to the future

One pressing need is publication of the wide range of environmental and archaeological fieldwork carried out in the area in the last few decades. Complementing that, research on sea levels and underwater exploration in Loch Roag has a large potential for revolutionising understanding of the story of foragers and early farmers in the area; and study of the land surface beneath the deep peat covering much of the area will probably reveal well preserved archaeological features.

The slight remains of cultivation beds at Calanais and the discoveries of better preserved but perhaps substantially later cultivation beds at Calanais Fields (Flitcroft et al 2000, Johnson et al in prep) suggest that much evidence for 4th to 1st millennium field systems survives under surrounding peat. Judging by the results from Calanais settlements may be well preserved, apart from loss of bone assemblages. There is also a fairly high likelihood that well preserved evidence for early human activities will survive in the innermost parts of Loch Roag. The seabed between Tob nan Leobag and the southern shore is less that 2m deep and the wide expanse of deeper water to its east should at some date have contained a freshwater loch (Illus 24.4; J Crawford pers. comm.).

More broadly evidence for how the loch-side landscape has changed, and how people exploited it should emerge if the submerged parts of the Great Western Island (Illus 24.3) are examined in a similar way to that in which Doggerland is being explored.

The east-west trending inlets and passages may be particular fruitful areas for detailed underwater studies despite the current erosion of 2nd millennium sites (Shepherd 1976). For example any search for hunter-gatherer burials in the Western Isles should take account of recent ideas about the original placement of such burials. The Møllegabet canoe burial was found in shallow water at what would have been the mouth of a river near a Danish Baltic island (Grøn & Skaarup 1993, 38). Whatever the precise reason for its placement where it was found, it provides a clue to where similar burials might survive – possibly, for instance along the submerged stream channels of inner East Loch Roag (Illus 24.4).

Of the many field systems and fragments of structures revealed by peat cutting on Lewis, perhaps Steinacleit, in the care of Historic Scotland, is the likeliest well-known structure to be a major 3rd millennium domestic building, at least in one phase. It reminds me of some of the pre-peat halls of Shetland and although few of the latter are well-dated a smaller but otherwise similar structure at Ness of Gruting belongs around the last quarter of the 3rd millennium (Barcham 1980, 504). Steinacleit is a possible starting point for investigating late 3rd millennium farming communities in Lewis.

As described in detail above, the discoveries made by Ron and Margaret Curtis encourage a working theory that many of the small structures found near Calanais formed part of a richly symbolic landscape (Illus 24.30). To explore their model studies of the landscape should move into a new phase, comparing the loci reported by Curtis and Curtis with others nearby and developing and testing models of how people used and moved around the land. It hardly needs to be said that the smaller rings around Calanais along with the many sites and potential sites discovered by Ponting and Ponting, and Curtis and Curtis, deserve geophysical survey and some excavation during those broader landscape studies.

Colin Richards' work on the sources of the stones used to create the setting (Richards 2006, 182) could usefully be expanded through detailed petrological studies of the standing stones and the many outcrops of gneiss in the surrounding landscape. It could be extended to the smaller stone settings. The possibility that stones were sourced amongst the communities which had an interest in Calanais suggests that such studies should not be restricted to the area immediately round Calanais and the other stone settings.

Closer to the stone setting at Calanais, excavation in the area of Test Pit G1, near the pre-modern kiln to the west of the southern part of the setting might reveal early settlement. The pottery from the test pit could all be of 4th or 3rd millennium BC date. The possible wall-base in Test Pit G2 could reflect medieval or post-medieval activities but given its proximity to Test Pit G1 it could instead relate to much earlier settlement.

Turning to Calanais itself, the true layout and function of the ditch cannot be resolved without further excavation. That should start with emptying of the backfill in Area DI and investigation of the unexcavated early soils, followed by re-examination and scientific analysis of the soils and turf lines on the Area D east baulk section (Chapter 9). Subsequently excavation between Area D and Area B, and completion of the excavation of Sub-area BV, might trace more of the ditch circuit although that would perforce demand equally careful re-examination of the complex overlying layers, complicated by the presence of Ring stones 44 and 45. Because it would remove any subsequent chance of exploring the strata in the southeast part of the Ring and the area immediately to its east, investigation should involve a systematic comprehensive sampling and on-site scientific support; it should be attempted only if substantial investment becomes available.

The late slots in sub-area DI continued under the east baulk. Reinvestigation might clarify the problems of their relationship to one another and to the local turf lines .

The idea that the Ring was not all built at once did not receive support from excavation. Nevertheless, the devil is in the detail. Subsoil weathering between many of the stones may have removed evidence but some recognisable strata did survive under the low bank of stones between sub-areas DII and DIII. They may survive elsewhere, particularly round the bases of Ring stones 51 to 53 which are close together. Excavation there might show whether Ring stone 52 was, as suspected, secondary.

The possibility that there was a substantial early pit in the area around East Row stone 30 can only be tested by new excavation. That should start with the emptying of BV and might as well be planned with the idea that that area would be excavated to natural - that would allow investigation of the early soils and cultivation beds. If funds allowed excavation around BV could test the idea that there were early Beaker graves nearby and the idea (from Somerville) that there might have been an enclosure in the area.

There is a slight possibility (if pinned down I would guess a 1 in 5 chance) that the Beaker sherd used to provide a terminus post quem for chambered cairn construction was secondary. A substantial proportion of the cairn remains unexcavated. A programme of radiocarbon dating of individual pollen grains from basal cairn levels might provide a conclusive answer. But given the plentiful evidence for importation of soils with by the ancient material in them very many grains would have to be dated and until dating costs are greatly reduced that will not be affordable.

It would also be interesting to look for drops of tephra (volcanic glass) in the layers under the cairn given the possibility that a period of poor tree-growth in Ireland around 2354-2345 BC might have been due to the Hekla 4 volcanic eruption in Iceland Baillie 1999, 205).

Parts of the enclosure bank survive, particularly in the main north-south baulk left between sub-areas BI and BIII (Chapter 7). Again dating of many individual pollen grains might illuminate its chronology. The palisade trench under the southern part of the enclosure bank was interpreted as going with the second stage enclosure. But it remains possible that it was earlier. The surviving strata immediately east of Ring stone 43 will contain evidence allowing complete resolution of this issue.

More data is need from the area of the Avenue. Future fieldworkers should first improve geophysical information (Chapter 5: Resistivity Survey, Illus 5.1, 5.10) using ground penetrating radar, resistivity tomography and other techniques (Chapter 5: Resistivity Survey, Illus 5.9; Part 5.4). The results reported here suggest investigation of the possibility that the Avenue was preceded by a row or rows of pits, and the possibility that some stones were removed in prehistory. They should explore the idea that there was a route-way from the north to the Ring. In response to speculations

about the early form of the Avenue they could look for systematic differences between the archaeology of the southernmost stones and the rest. In all this they should bear in mind the fairly high likelihood that the area occupied by the Avenue was used for agriculture in the 4th millennium BC. During future excavation one productive endeavour would be exposure of a large area round Area F and the use of modern analytical techniques to explore the mounds round the bases of Stones 11 and 12, the mineral soil and the layers underlying it. Judging by the results of our work there is considerable potential for dating of Avenue stones 11 and 12, and for fruitful exploration and dating of the pre-peat cultivation north of the Ring.

The area east of Calanais seems to have an important meaning for the builders of the Ring and of the chambered cairn. The peat on the ridge there might be a productive target for geophysical investigation and test-pitting, if permission can be gained. Also investigation of the small erect stone at Cnoc Sgeir na h-Uidhe, about 1.5 km east of Calanais (Illus 24.30) might reveal whether it could have been used as a marker for equinoctial sunrise.

Lastly, Calanais has provided inspiration for creative work. Some fine examples are provided in the official guidebook 'Calanais: The Standing Stones', thanks to Heather Delday, my then editor (Ashmore 1995; reissued by Historic Scotland with cosmetic changes and minor updates in 2002). Other first-rate examples are contained in Calanais, the book accompanying the 1995 exhibition of the same name (An Lanntair 1995). I hope that this report will help to stimulate further creativity.