Excavations at Caird's Cave, Rosemarkie, 2010: Data Structure Report

Prepared for the Rosemarkie Caves Project by

Dr Hugo Anderson-Whymark

With contributions by

Ruby Ceron-Carrasco, Rhiannon Mayon-White and Catherine Smith

October 2011

Cover: The excavation team outside Caird's Cave, June 2010.

CONTENTS

LIST OF FIGURES

LIST OF PLATES

LIST OF TABLES

SUMMARY

Between 21st June and 3rd July 2010 the Rosemarkie Caves Project undertook an excavation at Caird's Cave, near Rosemarkie, on the Black Isle. It has long been suspected that this cave was the cave excavated by Dr William Maclean (1867-1930) and Colonel William Hall (1839-1912) between 1907 and 1912, but their excavation was not published and no primary records survive that directly relate their excavations to Caird's Cave. Maclean and Hall's excavations yielded an important assemblage of bone working debris and bone tools, including an exceptionally fine amber inlaid pin, that were donated to the National Museum of Scotland (NMS), Edinburgh, after Maclean's death by his widow, Louisa (Anon. 1931). Maclean initially believed his discoveries to date from the Palaeolithic (Anon. 1913, 42), but an obituary published in the Ross-Shire Journal on the December 12th 1930 suggests the finds were Mesolithic (Rendell and Rendell 2010). These dates are conjecture and the amber inlaid pin is currently considered to date from the 8th or early 9th centuries AD (Foster 1990). It is, however, unclear how the amber inlaid pin related to the other archaeological remains that were identified. More recently in 1992, the construction of a footpath disturbed the remains of a 'stone age midden' in front of the cave, indicating that some archaeological remains were present at the cave.

The current excavation programme was designed to clarify three key issues: 1) if Caird's Cave was excavated by Maclean and Hall; 2) the extent of any previous excavations; and, 3) the date, character and state of preservation of any surviving archaeological deposits. To these ends, five excavation trenches were opened within and around Caird's Cave.

These excavations revealed that the Caird's Cave had previously been extensively excavated, and artefacts recovered indicate this occurred in the early 20th century. These excavations removed c. 70 m³ of deposits from the cave's interior and created a large spoil-heap in front of the cave; the latter is likely to be the 'midden' disturbed in the 1990s. The spoil-heap was composed of re-deposited talus and occupation deposits rich in charcoal and marine shell. A plain bone pin and bone working debris comparable to material held in the Maclean Collection was also recovered. The current excavators are therefore confident that they have located the site of Maclean and Hall's excavation.

The excavations also revealed the presence of in situ stratified deposits within the north eastern half of the cave. These deposits were comparable to the material in the spoil-heap and yielded a further bone pin and bone working debris. Three radiocarbon dates were obtained bone and charcoal present within this sequence. These dates indicate the base of the stratigraphic sequence dates from the 4th or 3rd century BC, while the top of the sequence dates from the 2nd or 3rd century AD. This indicates higher deposits, of early historic and later date, were entirely removed by Maclean and

Hall's excavation. Additional dating on worked bone and antler artefacts from Maclean's excavation provided evidence of activity in the 2nd or 3rd century AD, 7th or 8th century AD and the post medieval/modern periods.

Beyond the spoil-heap a small stone structure was investigated in Trench 4. This structure exhibited several construction phases, but no clear ground-plan could be discerned. The use of lime mortar in the first phase indicates the structure probably dates from the 19th or early 20th century.

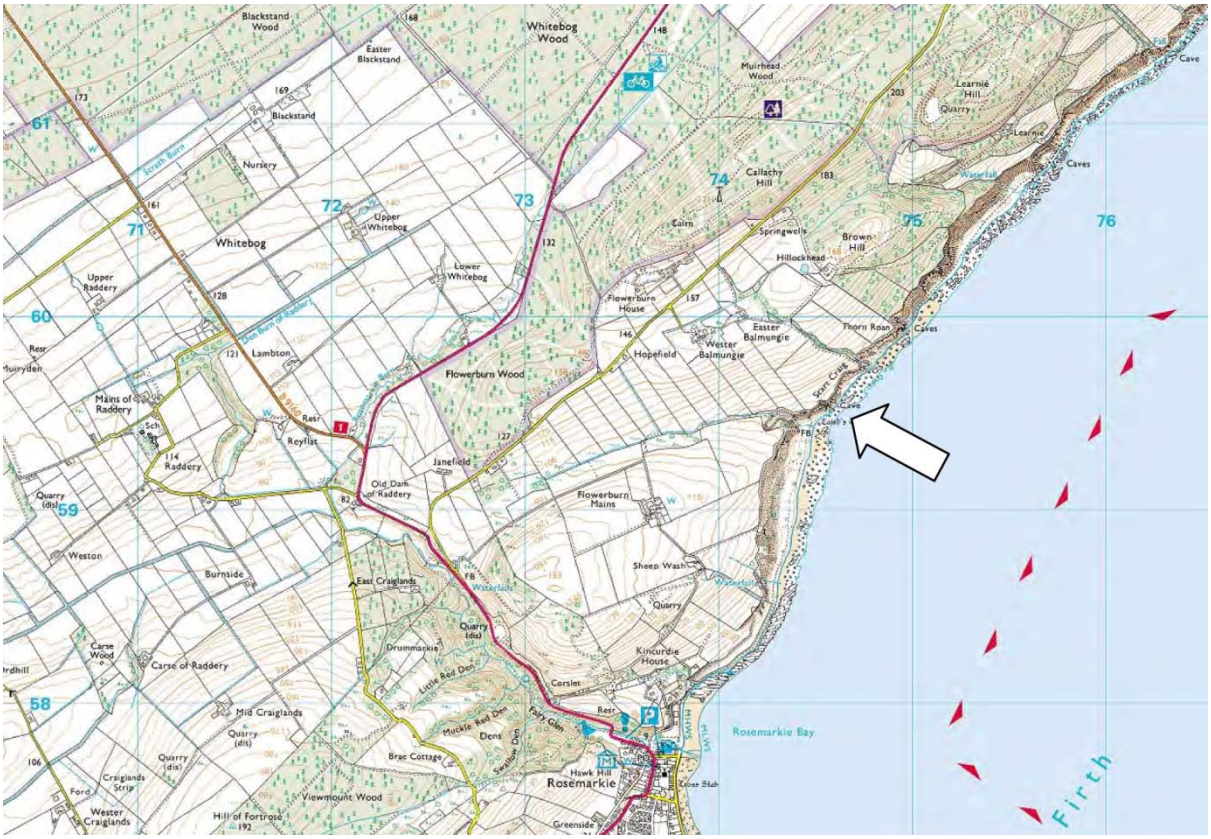
1. INTRODUCTION

This document forms and assessment and an updated project design for the site archive generated by fieldwork undertaken by the Rosemarkie Caves Project at Caird's Cave, near Rosemarkie, between the 21st June and 3rd July 2010. This document sets out a research framework and a proposal for publication.

2. CAIRD'S CAVE: LOCATION AND TOPOGRAPHY

Caird's Cave is located on the northern shore of the inner Moray Firth at NGR NH745 595, approximately 2 km north east of Rosemarkie (Figure 1). The cave was cut by sea into a cliff of psammite, a hard but fragile metamorphic rock, at a point where a localised fault has weakened the rock structure. The floor of the cave is situated at *c.* 8 m above O.D. placing it on the 25 ft (7.6 m) raised beach and well above the current sea level. The cave has a roughly triangular ground plan and is *c.* 9 m wide at the mouth and *c.* 9 m deep with a roof that is 5.5 m high in the entrance and only *c.* 2 m high at the rear of the cave (Figure 2).

Figure 1: The location of Caird's Cave. Map reproduced from the Ordnance Survey 1:25000 mapping courtesy of Highland Archaeology Services under Licence No. 100043217



Directly in front of the cave, the lowest raised beach forms an extensive level terrace. To the west of the cave this terrace has been buried beneath sand dunes and to the east scree from the cliff falls steeply towards the coastline. To the west of the cave a small burn runs from the higher ground above the cliffs to the sea.

3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1. Maclean and Hall's excavations of 'the cave at Rosemarkie', 1907-1912

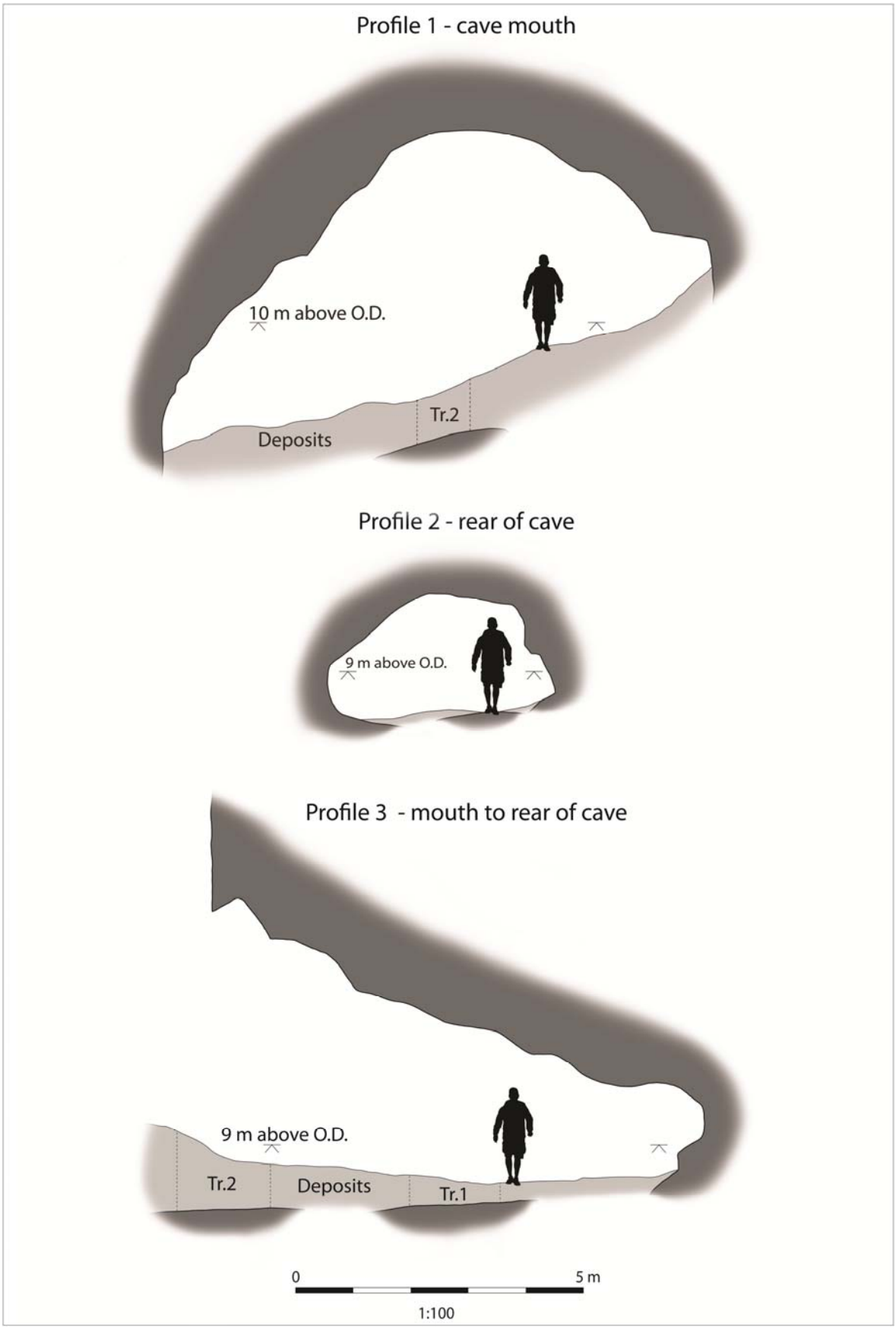
It has long been assumed that Caird's Cave was the cave excavated William Maclean, the GP for Fortrose and Rosemarkie, and William Hall, a retired Colonel of the British Army, but the first direct attribution dates to 1931 when a brief note was published on the artefacts after they were donated to the National Museums of Scotland (NMS), Edinburgh (Anon. 1931). No primary excavation records survive to confirm this attribution: Maclean only referred to the cave he excavated as 'the cave at Rosemarkie' and many of his artefacts are simply marked in ink with the word 'cave'. Caird's Cave is closest cave to Rosemarkie and one of the most prominent in the landscape, but numerous caves are present along the stretch of coastline between Rosemarkie and Eithie. The attribution of these discoveries to Caird's Cave was, therefore, treated with caution.

The only published account of Maclean and Hall's excavation results from a lecture Maclean gave to the Inverness Field Club on 11th February 1913 that was accompanied by a display of numerous bone implements from the site. A brief synopsis of this lecture was published in the Club's Transactions (Anon 1913, 42), revealing that Maclean thought he had found a prehistoric, probably Palaeolithic, dwelling:

'*Dr Maclean was of the opinion that the people who inhabited this cave must have been very primitive and cannibalistic. Associated with human remains in the cave were bones of red deer, elk, and other animals. There were very few fish bones or bones of smaller animals. Evidently the inhabitants of the cave lived chiefly on shell-fish, found on the rock on the immediate shore.*' (Anon 1913, 42)

Putting aside Maclean's dating and interpretation, the latter which reflects bias common in early 20th century accounts of the prehistoric period, this short note provides some valuable information on the character of the deposits that were excavated and the range of species that were present, although it is unclear how the worked bone that was displayed related to the deposits.

Figure 2: Profiles of Caird's Cave. 1) The cave mouth. 2) The rear of the cave. 3) Profile from the cave mouth to the rear of the cave



Shortly after Maclean's death, his widow Louisa donated his archaeological collection, including 58 bone artefacts from the cave excavation, to the NMS (Anon. 1931). These artefacts from the cave excavation comprise four bone pins, four bone needles, four bone spatulae, five antler handles (including one with a sawn lozenge decorations), twenty-one pieces of cut or worked antler, two cut horn-cores and eighteen pieces of splintered bone including many that appear to have been worked or utilised. The finest artefact is a small pin, 38 mm in length, that has a globular head inset with amber. Far from being prehistoric as Maclean suspected, this artefact probably dates from the 8th or early 9th century AD (Foster 1990). Moreover, many of the worked bone fragments exhibit saw and cut marks that have been made by metal tools, indicating that they are not of early prehistoric date.

3.2. Archaeological remains recorded at Caird's Cave

In 1966 following a visit to Caird's Cave it was recorded that 'large midden deposits containing shells and some animal bones lie in front of the cave, and close to these are the remains of an irregularly-shaped building 4.0 m x 3.0 m and 1.0 m high' (RCHAMS Canmore ID: 14369, Site No. NH75NW5; Historic Environment Record No. MHG8855). In 1992, it was noted that a shell midden was disturbed while constructing a footpath to the cave, but no further detail is recorded. The 1998 CFA/MORA Coastal Assessment Survey similarly notes the presence of an 'excavated rock shelter' and a 'stone structure' that are under no threat.

Prior to the excavation, a large area in front of the cave was cleared of bracken revealing a series of earthworks and a stone structure that correlate with the archaeological remains that were previously observed (Plate 1). The most prominent of the earthworks is a sub-rectangular, flat-topped, heap of stone and soil measuring 9.5 m by 12 m by *c*. 1.3 m high, located to the east cave entrance. Erosion has revealed this mound is composed of dark shell-rich soils. A smaller, irregular mound, measuring *c.* 8 m long by 4 m wide and 1 m high is located to the west of the footpath. The origin of this material is not known, but the talus at the entrance of the cave appears to have been superficially and irregularly quarried for stone, possibly for construction of the stone building, and it may be that the small mound results from this activity. The large spoil-heap overlies the episode of quarrying and is therefore more recent. This indicates that the large mound is not an *in situ* prehistoric midden and allows it to be interpreted as the spoil-heap from an archaeological excavation. The stone structure is located to the south east of the large spoil-heap.

Within the cave, a talus deposit covers the floor, although this layer is comparatively thin at the rear of the cave and small areas of the floor are visible. The surface of this deposit is comparatively level at the rear of the cave, lying at *c.* 8.5 m above O.D. However, a large spill of talus has entered the cave from the east, filling the eastern side of the entrance to *c.* 10.5 m above O.D. (Plate 2). Notably,

the talus drops steeply by *c.* 1 m as it enters the cave, before more gently spilling down the slope. This sharp change in angle may represent the edge of a previous excavation, but it may also result from the erosion of deposits under the drip line of the cave. Within the cave there was no clear evidence of previous excavation trenches, but the presence of shells encrusted to the cave wall through the deposition of calcium carbonate between 8.70 m above O.D. and 9.46 m above O.D. indicate that deposits upwards of 1 m deep have been removed from some areas of the cave.

Plate 1: Caird's Cave following the clearance of undergrowth, facing north. The small mound is located to the left of the cave entrance and the large spoil-heap is located to the right. The structure is just visible to the right of the large spoil-heap

Plate 2: The interior of Caird's Cave, facing south east. Note the spill of talus entering the cave from the east and the sharp break of slope as the talus enters the cave

3.3. Travellers at Caird's Cave

The name of the Caird's Cave derives from *ceard*, the Gaelic word for travelling craft workers and gypsies. It is not known when the cave obtained this name and no written references pre-dating the 20th century have been located (Rendell and Rendell 2010). The inhabitation of Caird's Cave by travellers in the early 20th century is, however, well documented (Woodham 1956). The last inhabitants were Mr and Mrs William 'Captain' Devine who seasonally occupied the cave in the opening years of the 20th century and were photographed alongside their makeshift shelters.

4. RESEARCH OBJECTIVES

The excavations at Caird's Cave had six research objectives:

1. To establish the nature and extent of surviving archaeology in the cave.

2. To locate and re-excavate the trenches opened by Dr Maclean, and reinterpret the very limited published results of that work, putting finds into period context and understanding better the methods and limitations of the antiquarian work of the early 20th century.

3. To establish, as far as possible in the time available, the chronology of occupation and use of the cave, in particular to try to establish whether there was human activity in the cave during the Mesolithic and Neolithic periods. While evidence has been found from similar locations on the west coast and on the south side of the Moray Firth, little research has been carried out into the likelihood of similar activity on the northern shores of the inner Moray Firth.

4. To investigate the use of the cave by travelling people – a community as yet very underrepresented in archaeological research and under-acknowledged in the archaeological record.

5. To clarify the current condition and conservation status of the cave, which appears from some records to have deteriorated seriously since the excavations of 1912, and determine whether the cave itself and any archaeological evidence present are stable or deteriorating.

6. To consider whether the results of the investigations at Caird's Cave might inform future understanding and conservation of other caves along this coast.

5. RESULTS

5.1. Extent of the archaeological investigation

Five archaeological trenches were opened to investigate the archaeological features and deposits at Caird's Cave. Three trenches (1, 2 and 5) were excavated within the cave to investigate the location of Maclean and Hall's sondages and to examine if any deposits remained *in situ*. Trench 2 (1 m by 1.7 m) was excavated at the front of the cave to investigate the possible trench edge observed in the talus deposit. Trench 1 (1.5 m by 3.4 m) was located on the western side towards the back of the cave and Trench 5 (1 m by 1.5 m) was positioned to the eastern side of the cave to investigate if any archaeological deposits were sealed beneath the deep layer of talus. Outside the cave, Trench 3 (5.5 m by 1 m) was positioned to section the small mound and the large spoil-heap, in order to characterise the deposits in these earthworks, and Trench 4 (5 m by 4 m) was opened over the stone structure with the aim of establishing a ground plan and recovering dating evidence.

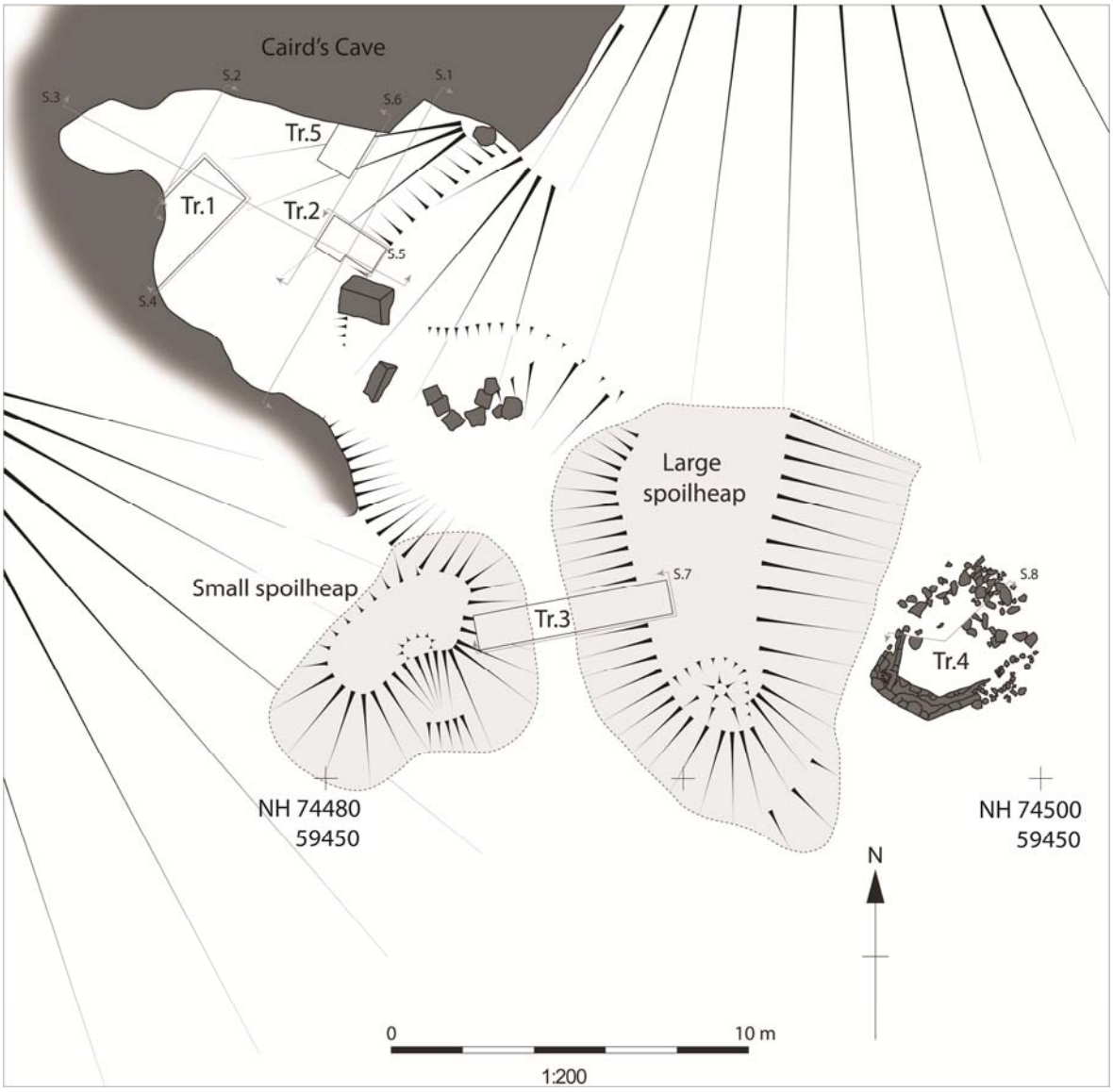
5.2. Excavations within Caird's Cave

5.2.1. Trench 1

Trench 1 encountered the floor of the cave at 7.86 m above O.D. and occasional remnants of an *in situ* Holocene raised beach deposit, measuring up to 0.08 m thick, were noted on this surface (Plate 2). The raised beach deposit was overlain by a 0.20 m thick dark charcoal rich shell layer (103) from which a complete saddle quern rubber (SF3; Plate 11) was recovered along with a small quantity of animal bone and a number of 20th century metal, glass and ceramic artefacts. The latter artefacts indicate this deposit has been disturbed by a previous excavation. Two overlying talus layers (100 and 102), measuring 0.30 m thick, and a placed line of stones (101) were associated with late 20th century and modern artefacts.

Plate 3: Trench 1, post-excavation, facing north west towards the rear of the cave

Figure 3: The archaeology and 2010 excavation trenches at Caird's Cave, nr Rosemarkie



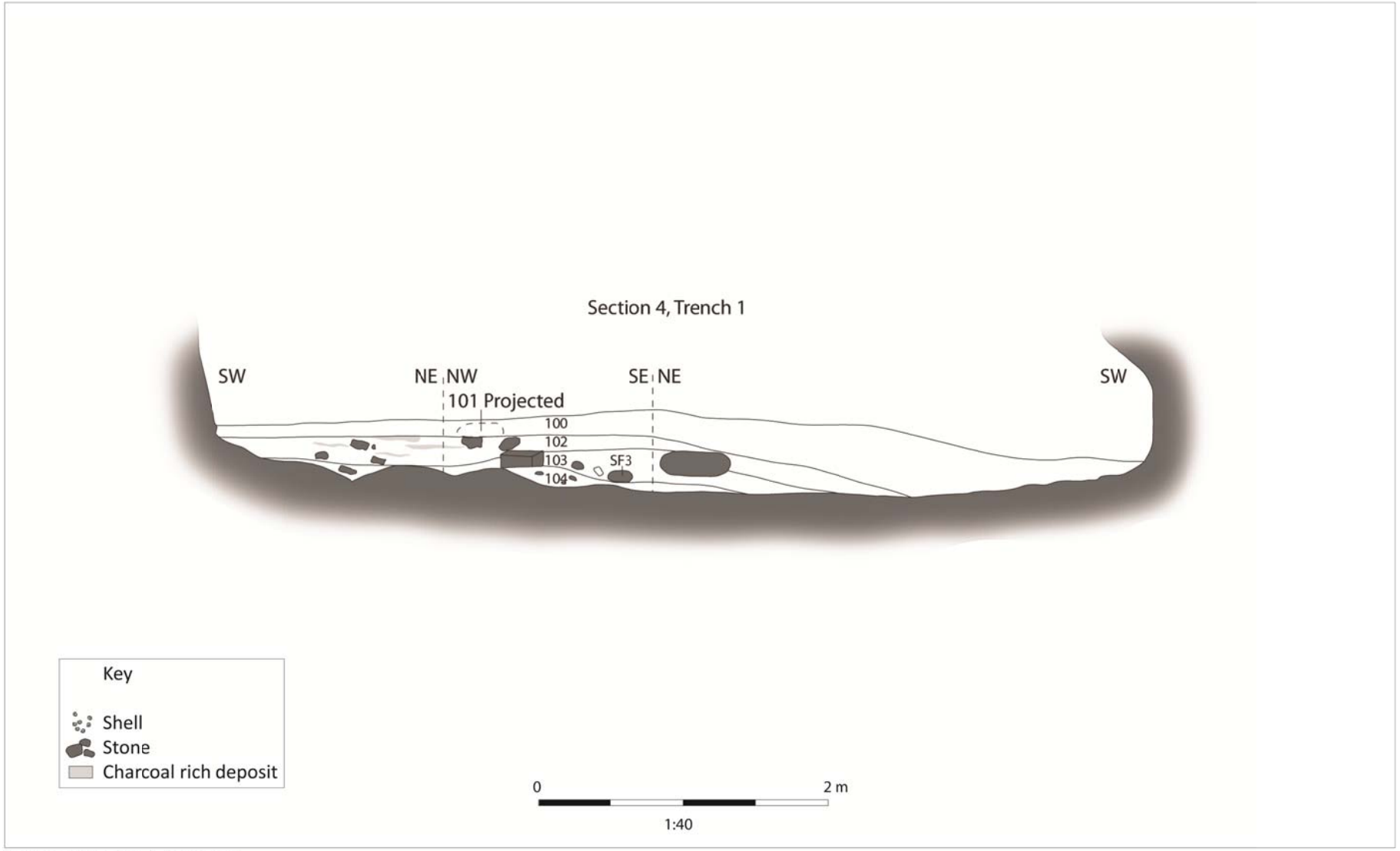


Figure 4: Section 4, Trench 1

5.2.2. Trench 2

The floor of the cave was encountered at 7.49 m above O.D. on the western side of the trench and at 7.99 m above O.D. to the east (Plate 4). The cave floor was directly overlain by seven *in situ* charcoal and shell rich occupation layers measuring 0.60 m thick (202, 203, 204, 207, 208, 209 and 210). The lowest layers (207, 208, 209, 210 and 204) were partially sealed by a roof fall (211). Layer 203 abutted this roof fall and the subsequent layer (202) overlay the collapse. These deposits were then partially sealed by another roof fall (212). Roof fall 212 was removed from the interior of the cave, presumably by Maclean and Hall's excavations, exposing the surface of occupation layer 202. Deposits of talus containing 20th century artefacts subsequently accumulated (201, 200 and 213).

The earliest occupation layers are 210, a homogenous 0.30 m thick friable mid blackish brown, charcoal rich, sandy silt containing small angular pieces of pssamite and occasional rounded beach pebbles, and 207, a 0.08 m thick deposit of comparable composition but containing a higher proportion of charcoal. Layer 207 was overlain by 208, a 0.04 m thick layer of friable mid orange clay sand that was comparatively sterile, being free of charcoal and yielding only a small number of marine shells. Layer 208 was overlain by 209, a 0.06 m thick layer that was similar in composition to layer 207. Layer 209 merges into layer 204 and the latter overlies layer 210. Layer 204 is of a similar composition to 209, but the layer is thicker at 0.14 m and has a slightly lower proportion of charcoal, although occasional charcoal-rich lenses were noted. The surfaces of layers 204 and 210 are almost horizontal, indicating that the cave floor would have been flatter than today and potentially extended at the same level beyond the cave mouth.

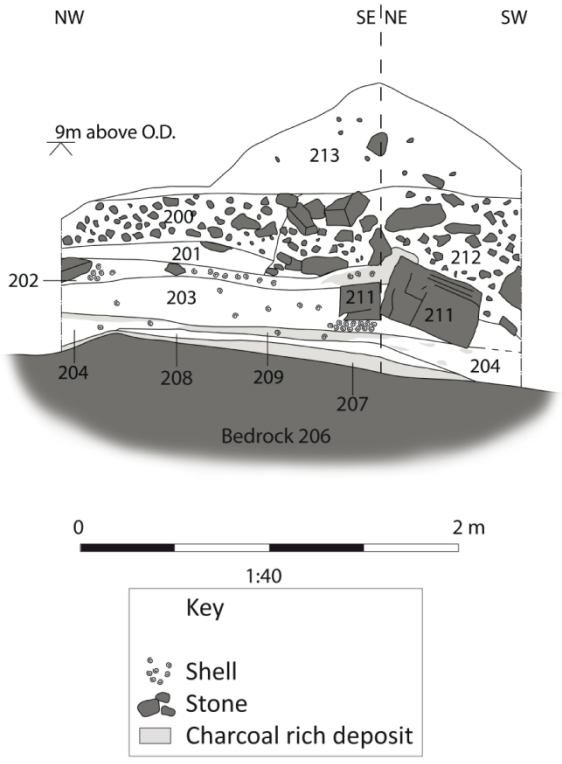
Layer 204 was partially covered by large angular blocks (211) resulting from a roof collapse at the entrance of the cave. This roof collapse was abutted by layer 203 and overlain by 202. Layers 203 and 202 are both homogenous deposits of loose, dark brownish black, sandy silt with small angular fragments of pssamite. These layers are broadly comparable with the lower occupation deposits and there is no evidence for a hiatus in activity at the time of the roof collapse.

The occupation layers all yielded a large quantity of shell-fish and on average these account for approximately 10% of the deposit by volume. The shell-fish were overwhelmingly dominated periwinkles and limpets that are available from immediate foreshore. Crab shell was also relatively common and many pieces exhibited signs of burning, but the shells of species that required more effort to collect, such as oyster, mussel and scallop were uncommon. The deposits also yielded a small quantity of animal bone, including sheep/goat and cattle. Several pieces of the bone had been split, possibly indicating bone working or marrow extraction, but the presence of gnawing and acid erosion indicate that bone in the deposit was also scavenged. Fish bone was very uncommon in

this trench with only small unidentifiable fragments recovered from layers 202, 205 and 210; the only identifiable fragment was a vertebra of a juvenile *gadidae*.

Plate 4: Trench 2, post excavation, facing north east. The lower dark deposits are occupation layers (202-209) which are overlain by roof fall and talus (212, 201 and 200)

Figure 5: Trench 2, section 5



5.2.3. Trench 5

The cave floor was located at 8.50 m above O.D. on the western side of the trench, but the floor falls to the east and the surface of a Holocene raised beach deposit (506) was recorded at 8.01 m above O.D.; excavation ceased at this level and the cave floor was not reached (Plate 5). The raised beach deposit was overlain by 0.25 m of roof collapse (504) which contained a number of animal bones, predominately of sheep/goat, that had became incorporated into the deposits by falling into a void created by the overhanging cave side. This layer was overlain by a homogenous 0.5 m thick occupation deposit (503) containing angular pieces of roof collapse and some large beach cobbles; the latter were imported to the cave. This layer was abutted by a 0.08 m thick charcoal and shell-rich occupation layer (502) that extends towards Trench 2. A thin sandy lens (505) overlies 502 and in turn this layer is overlain by a 0.25 m thick homogenous shell midden (501). Deposit 501 appeared to be undisturbed, but during excavation a small number of 20th century artefacts were recovered potentially indicating some modern disturbance. A 0.4 m to 0.6 m thick layer of talus (500) overlies layer 501; this layer contained numerous 20th century artefacts.

The occupation deposits in this trench were comparable to those in Trench 2 and layers 501 and 502 equate to layers 203 and 204 in Trench 2, respectively. A pin manufactured from a splinter of animal bone, which exhibits a well-used and slightly broken tip, was recovered from the surface of layer 501. In addition, animal bone including several cut, chopped and sawn pieces was recovered from layers 501, 503 and 504. A small quantity of fish bone was recovered from layers 501 and 503.

Plate 5: Trench 5, post excavation, facing south east. The lower dark deposits are occupation layers and shell midden (501 – 505), which are overlain by talus (500)

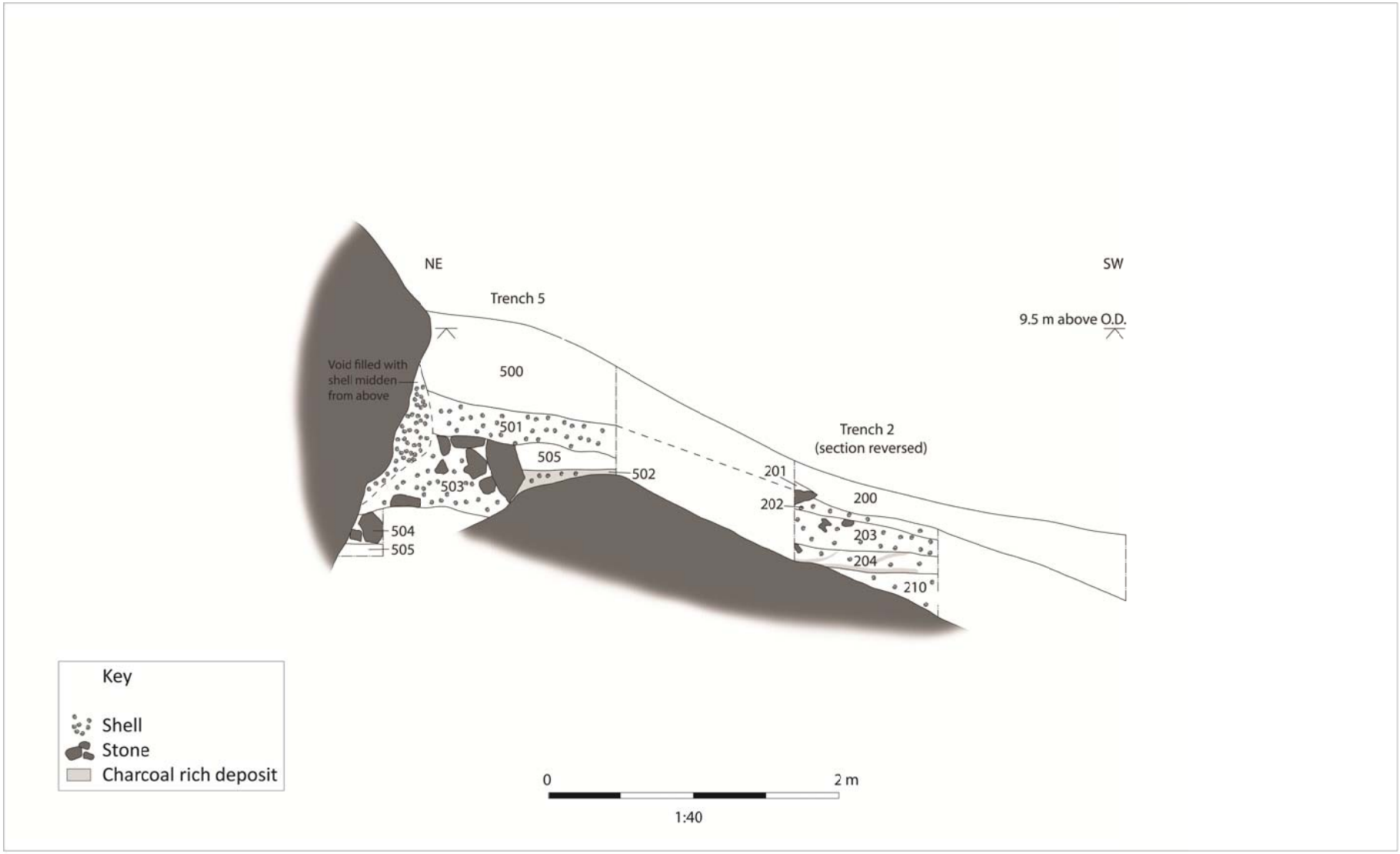


Figure 6: Section 6, Trenches 2 and 5

5.3. Excavations outside the cave

5.3.1. Trench 3

Trench 3 investigated a large spoil-heap and a small mound located in front of the cave. The large spoil-heap was 1.3 m thick and composed of numerous layers that have been tipped from the top of the mound, probably as individual barrow loads of spoil were removed from the cave. It is estimated that *c*. 70 m³ of deposits are present in this spoil-heap. The lowest part of the sequence was composed of loose angular stone (305), reflecting the removal of talus and roof collapse which sealed the occupation deposits within the cave. In contrast, the upper part of the spoil-heap was composed of tips of shell-rich occupation layers (304). The top 0.30 m of the spoil-heap (layer 302) is comparable to layer 304, but it has been reworked and homogenised by modern roots (Plate 6). The cave stratigraphy has, therefore, been inverted in the spoil-heap with the first deposits removed situated at the base of the spoil-heap and the lower cave deposits overlying these and extending down slope.

The deposits in the spoil-heap were sieved through a 10 mm mesh to ensure that small artefacts were recovered. Layers 302 and 304 yielded numerous artefacts including four sherds of medieval pottery, a hammerstone, a burnishing stone, a saddle quern/whetstone (Plate 10), a fragmentary bone pin (Plate 9) and various 20th century artefacts. The bone pin was finely worked and compares well to examples Maclean recovered from his excavations (Plate 9). Faunal remains were relatively numerous and include cattle, pig, sheep/goat, possible deer, sea-bird and fish. Many of these bones exhibited cut marks from butchery and several had been chopped or sawn (the latter were exclusively cattle bones). Two splinters of bone from context 304 may have been split into blanks for pins, although other post-depositional processes may have created these fragments.

The small mound was composed of a 0.2 m layer of silty sand (301) overlain by a 0.3 m thick deposit of stone and sandy soil (300). These deposits overlay a former soil horizon (303). These layers yielded only late 19th and early 20th century artefacts. In between the two mounds a deep linear cut (307) following the line of the modern footpath was observed. This cut was filled with mixed occupation material from the large spoil-heap (306) indicating that the feature dates from the 20th century. It is possible that this cut represents an incised footpath that has been filled with soil eroding from the spoil-heap, but equally the cut may result from footpath maintenance in the 1990s.

Plate 6: Layers in the large spoil-heap in Trench 3, facing east. Note the stone at the base of the sequence (305), overlain by numerous tips of occupation deposits (304) and a root disturbed layer close to the surface (302)

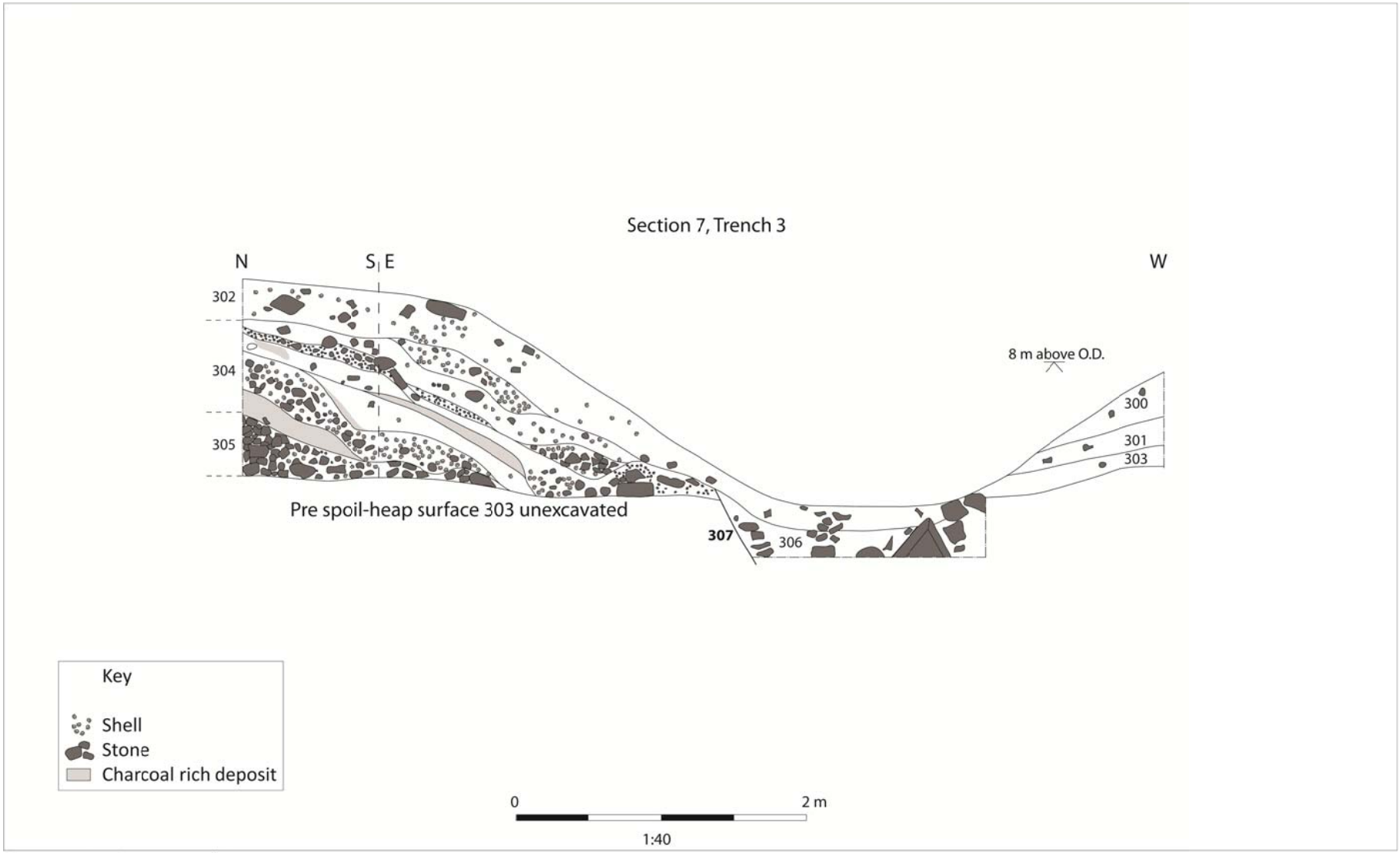


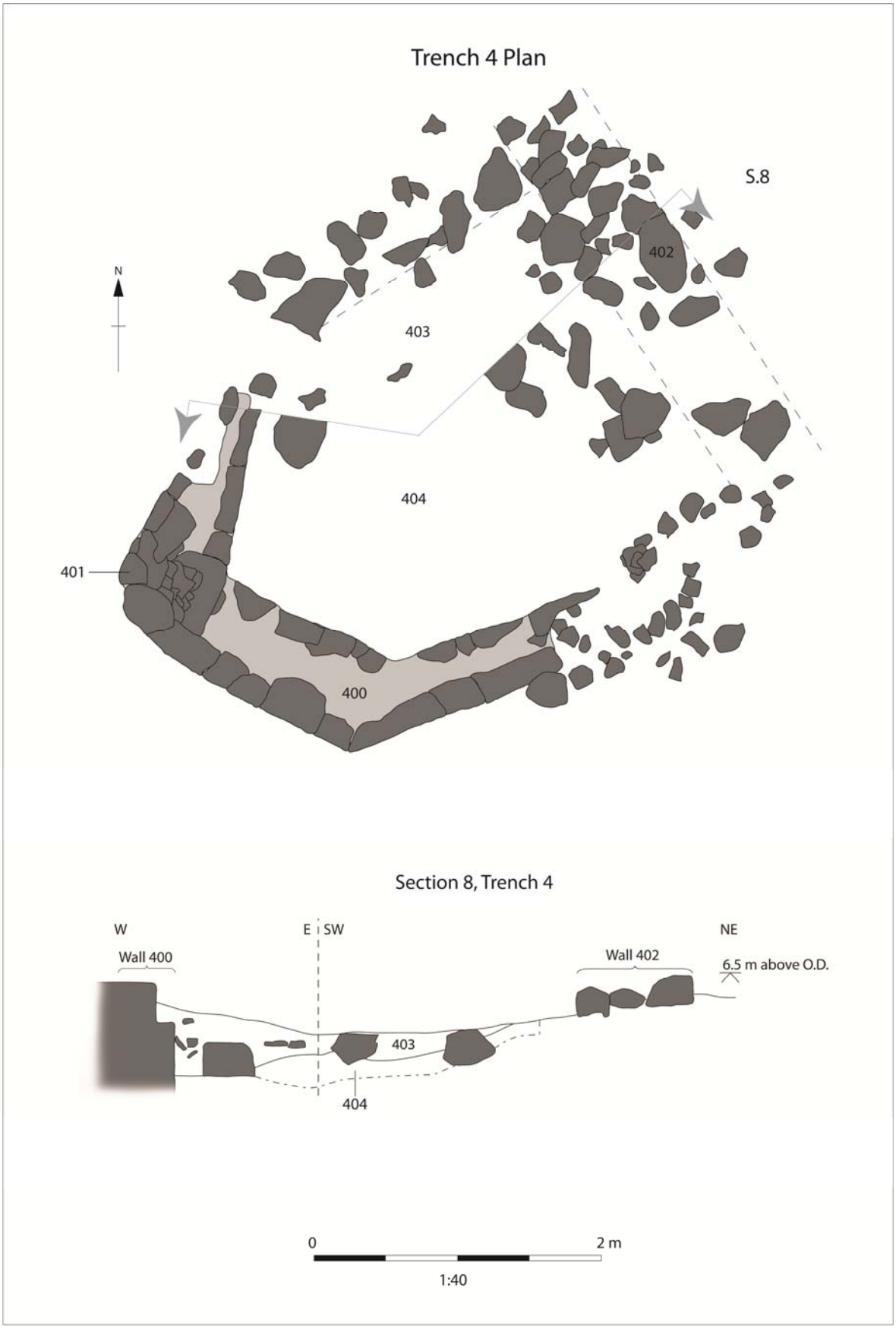
Figure 7: Section 7, Trench 3

5.3.2. Trench 4

Excavation revealed part of a well built, but irregularly shaped, structure (400) constructed from stone and lime mortar that exhibits two insubstantial episodes of rebuilding (401 and 402). The date of the original structure is not known, but the method of construction indicates a late 19th or early 20th century date. The structure was buried by a windblown sand (404) over which a soil had formed (403); the latter yielded modern artefacts and an Old Red Sandstone thatch or fishing net weight. Considering the coastal location and the absence of domestic artefacts, it seems likely that this structure is related to the fishing industry; although no known salmon fishing stations are located in the area.

Plate 7: The structure in Trench 4, facing south west

Figure 8: Plan and section of the structure in Trench 4



6. ARTEFACTUAL EVIDENCE

6.1. Bone pins

By Hugo Anderson-Whymark

A complete bone pin was recovered from the surface of occupation layer 501 in Trench 5 (SF1) and a second fragmentary pin was recovered the spoil of the previous excavation in Trench 3, layer 304 (SF 5). Pin SF1 (Trench 5, layer 501; Plate 8) was manufactured from a splinter of animal bone that exhibits no further modification, but the tip exhibits use polish revealing that this artefact functioned as a pin or an awl. Pin SF5 (Trench 3, layer 304; Plate 9) was broken in antiquity and the tip is missing, but the artefact survives to a length of 78 mm and it has a round cross-section 6 mm in diameter at the flat, plain, terminal end which gently tapers towards the tip. The pin is manufactured from animal bone and has been finely-shaped and polished. Neither of these pins is intrinsically datable.

Plate 8: Bone pin SF1 from the surface of occupation layer 501

Plate 9: Bone pin from Trench 3, layer 304 (SF5)

6.2. Worked stone

By Hugo Anderson-Whymark

6.2.1. Introduction

The stone assemblage comprises a broad range of artefacts, utilised pebbles/cobbles and pieces of burnt and fractured stone (Table 1 and Table 2). The raw materials are locally available and all were collected from beach deposits, with the possible exception of one piece of Old Red Sandstone that was used to manufacture a saddle quern which may have been quarried or obtained from a cliff to the north around Eathie.

6.2.2. Methodology

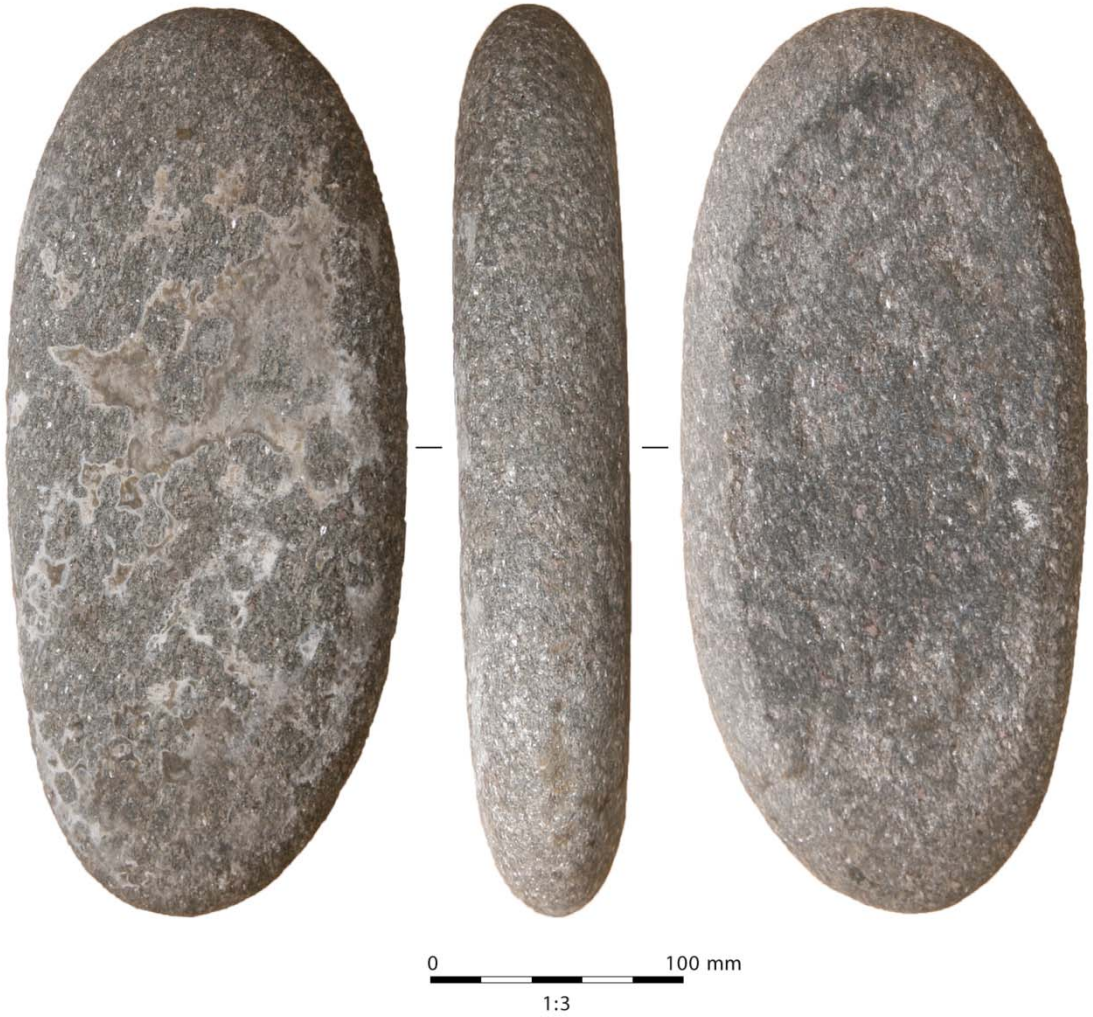
The worked stone was catalogued and quantified according to broad typological forms and dating was attempted, where possible. The burnt and fractured stone was recorded and discarded during the assessment. Detailed descriptions of the artefacts are available in Table 1 and Table 2.

6.2.3. The assemblage

The formal artefacts comprise a saddle quern rubber (Trench 1, layer 103, SF3; Plate 11), a saddle quern reused as a whetstone (Trench 3, U/S; Plate 10) and a fishing or thatch weight (Trench 4, layer 403). The saddle quern and saddle quern rubber may relate to early historic or Medieval activity in Caird's Cave, although neither was recovered from a secure archaeological context. The fishing or thatch weight was recovered from within the structure in Trench 4 and therefore relates either to the structure or activities associated with the structure.

Plate 10: An Old Red Sandstone saddle quern re-used as a whetstone, Trench 3, U/S

Plate 11: Saddle quern rubber, Trench 1, layer 103, SF3



The utilised pebbles/cobbles include a broad range of simple tools, including a hammerstone (Trench 3, layer 304) two small burnishing stones and a further possible example (Trench 3, layer 304; Trench 5, layers 500 and 501, respectively) and a possible whetstone (Trench 5, layer 501). Several ephemeral artefacts were also recovered, such as utilised flat slabs (Trench 1, U/S; Trench 5, layer 503), two split pebbles, a flake from a pebble and 15 pebbles that each exhibit one small chip or flake removal on one edge that may result from use as a percussor. These artefacts were recovered from Trenches 1, 2, 3 and 5 and may relate to later prehistoric, early historic or post medieval activities in Caird's Cave. It is not possible to attribute these tools to specific activities, but the presence of two burnishing stones and one possible example is notable as these may indicate that activities, such as leather or vellum working, were undertaken at this location. None of these artefacts are intrinsically datable.

The burnt and fractured stone comprises 2 burnt pebbles (977 g), 18 burnt and fractured pebbles (3594 g) and 168 fractured pebbles (14,787 g). These pebbles and cobbles have been collected from the beach and used as either hearth stones or pot boilers.

Table 1: Catalogue of worked and utilised stone from Caird's Cave

Site/ Trench	Context No.	SF No.	Object	Description	Raw material
CC10, Trench 1	U/S spoil-heap	-	Utilised slab	Natural slab unmodified rounded slab with one flat surface. The flat surface is smoother than the rest of the stone and appears to have become worn from use. One large flake removed from the end of the stone. 330 mm long by 203 mm wide and 47 mm thick. 4574 g.	Flat cobble of Old Red Sandstone
CC10, Trench 1	103	3	Saddle quern rubber	An appropriately shaped cobble that required minimal modification was selected for this artefact. One surface has been pecked flat across an area measuring 280 mm by 114 mm and slight traces of fine parallel lines run across the short axis. The artefact has been well used and high points have gained a use polish. 347 mm long by 155 mm wide and 59 mm thick. 5475 g.	Garnet schist cobble
CC10, Trench 2	202		Utilised pebble	Two pebbles that each exhibit a chip from one end that may result from use. 48 g and 131 g respectively	Unknown pebbles
CC10, Trench 2	210		Utilised pebble	Chip from one end that may result from use. 77 g	Lias Pebble
CC10, Trench 2	210		Utilised pebble	Chip from one end that may result from use. 63 g	Schist pebble
CC10, Trench 2	210		Utilised pebble	Chip from one end that may result from use. 178 g	Quartzite pebble
CC10, Trench 2	210		Utilised pebble	Four pebbles, typically flat discs, with one chip from one end that may result from use. 33 g, 60 g, 58 g (broken) and 102 g respectively	Various pebbles
CC10, Trench 3	U/S	-	Saddle quern/ whetstone	Irregular block with several old flake removals. The upper and lower surfaces are concave to differing degrees and exhibit worn surfaces. The block has subsequently been used as a whetstone and exhibits 12 straight u- and v- shaped grooves up to 76 mm long by 3 mm wide and 3 mm deep. 233 mm long by 159 mm wide and 79 mm thick. 4008 g.	Old Red Sandstone
CC10, Trench 3	301		Split quartz pebble	Clearly split. 59 g	Milky quartz pebble
CC10, Trench 3	304	-	Hammerstone	Ovid pebble with slight battering an bevel at one end from use as a hammerstone. 341 g. 109 mm long by 64 mm wide and 43 mm thick.	Old Red Sandstone pebble
CC10, Trench 3	304	-	Burnishing stone	Circular pebble, 80 mm in diameter by 25 mm thick, with one flat surface and a convex back. The flat surface is smooth, almost polished from use. Two flakes have been struck from the edge of the artefact. 224 g.	Micacious Sandstone pebble
CC10, Trench 4	403		Fishing/thatch weight	Large ovoid boulder measuring 390 mm long by 200 mm wide and 153 mm thick, weighing 19.8 kg. Mid way along the sides of this cobble two 25 mm wide by 6 mm deep channels have been pecked to secure a rope.	Old Red Sandstone
CC10, Trench 5	500	-	Burnishing stone	Ovoid pebble with one flat surface. The flat surface exhibits a burnish from use. 70 mm long by 69 mm wide by 26 mm thick. Modern break. 207 g.	Limestone? pebble
CC10, Trench 5	501		Split Pebble	Clearly split by blow. 53 g	Micacious sandstone
CC10, Trench 5	501		Burnishing stone?	Circular flat pebble, 71 mm in diameter by 23 mm thick, with slight polish on flat surface and a rusty iron residue. 191 g.	Metamorphic sandstone pebble
CC10, Trench 5	501		Whetstone ?	Sub-triangular elongated pebble with rounded edges, measuring 99 mm long by 33 mm wide and 31 mm thick. One side is smooth, the two other sides and the ends exhibit numerous fine striations running along the long axis of the pebble. 163 g.	Unknown fine grained pebble.
CC10, Trench 5	503		Utilised pebbles	Six pebbles with a fake from one edge that may result from use. 39 g 54 g,64 g, 69 g, 189 g and 283 g respectively	Various pebbles
CC10, Trench 5	503		Utilised slab	Natural slab unmodified rounded slab with one flat surface. The flat surface is smooth and appears to have become worn from use. Dimensions: 420 mm by 305 mm by 50 mm thick. Weight 13.95 kg	Flat cobble of Old Red Sandstone
CC10, TR.5	503		Flake	Struck from pebble, 21 g	Unid. pebble

Table 2: Fractured and/or burnt pebbles (discarded)

Site/Trench	Context No.	Object	Description	Raw material
CC10 Trench 1	103	Fractured stone	9 pieces, 328 g	Sandstone pebbles and two quartz pebbles
CC10 Trench 2	202	Fractured stone	11 pieces, 566 g	Sandstone pebbles
CC10 Trench 2	202	**B**urnt stone	1 piece, 193 g	Sandstone pebble
CC10 Trench 2	204	Fractured stone	2 pieces, 191g	Various sandstones
CC10 Trench 2	205	Fractured stone	One fragment of quartz 4 g.	Quartz
CC10, Trench 2	210	Fractured stone	17 pieces, 1103 g	Various pebbles one quartz
CC10, Trench 3	302	Fractured stone	Not clearly worked. 2 g.	Quartz
CC10, Trench 3	302	Fractured stone	4 pieces, 506 g	Various pebbles
CC10, Trench 3	304	Fractured Stone	32 pieces, 4096 g	Various pebbles
CC10, Trench 3	304	Burnt, fractured Stone	4 pieces, 1466 g	Various pebbles
CC10, Trench 3	306	Fractured stone	Mostly angular, two flat pieces, but not comparable to scale knives. 16 pieces, 2624 g	Various pebbles
CC10, Trench 3	306	Burnt, fractured Stone	3 pieces, 731 g	Various sandstone pebbles
CC10, Trench 5	501	Burnt, fractured Stone	10 pieces, 1371 g	Various pebbles
CC10, Trench 5	501	Fractured stone	24 pieces, 1597 g	Various pebbles, including 4 of milky quartz.
CC10, Trench 5	501	Fractured stone	2 pieces, 196 g. Vague resemblances to scaill knives, but the resemblance is purely superficial.	Various pebbles
CC10, Trench 5	502	Fractured stone	1 piece, 159 g	Micacious sandstone
CC10, Trench 5	502	Burnt, Fractured Stone	1 piece, 26 g	Unknown pebble
CC10, Trench 5	503	Burnt stone	1 piece, 784 g	Sandstone cobble
CC10, Trench 5	503	Fractured stone	43 pieces, 2357 g	Various pebbles
CC10, Trench 5	505	Fractured stone	1 piece, 97 g	Sandstone pebble
CC10, Trench 5	507	Fractured stone	4 pieces, 151 g	Various pebbles

6.3. Ceramics

By Hugo Anderson-Whymark

One-hundred and three sherds of pottery and china was recovered from the excavations. The ceramics were all recovered from recent deposits, with the exception of three sherds of china from layer 501 that are intrusive. The vast majority of the assemblage is composed of late 19th century and early 20th century domestic china and glazed earthenware and stoneware jars.

Four sherds of medieval pottery were recovered from layer 304 in the spoil-heap of the previous excavations. These comprise three body sherds Scottish Redware that are liable to date from the 13th-15th centuries AD (Hall 1996) and one body sherd of Organic Tempered Ware that can only be broadly dated to *c.* 400-1400 AD (Derek Hall pers. comm.).

Table 3: Catalogue of pottery and china from the excavations

Context No	No. of objects	Material	Description
100	2	Glazed stoneware	
200	2	China	Wetley China cup and a sherd of glazed stoneware jar
300	19	China/glazed earthenware	Jars
301	10	China	One piece blue transfer print on side has wording 'the american lark'
301	1	China	transfer print cup
302	3	China	
303	3	China	Includes fragments of a plate
304	6	China and stoneware	
304	1	China	banded decoration
304	2	China	
304	4	China and stoneware	
304	1	Stoneware ball	
304	1	Pottery	Body sherd, Organic Tempered Ware c.400-1400 AD
304	3	Pottery	Body sherds, Scottish Redware c.1300-1500 AD
304	1	Glazed stoneware	Traces of glaze
304	3	China	banded colour decoration
305	5	Glazed stoneware/china	One sherd of blue and white transfer
305	1	Glazed stoneware	Jar
305	2	China	Includes blue and white transfer
306	17	Glazed earthenware/china	One Jar
403	2	China	decorated with brown glaze
404	6	Glazed earthenware/china	
500	1	Earthenware	brown glazed
500	1	Glazed stoneware	Storage jar
500	2	China	blue and brown glazed china
501	1	Earthenware	brown glazed, found on surface of 501
501	1	China	
501	2	China	Cup fragments

6.4. Other materials

By Hugo Anderson-Whymark

The excavation recovered a small number of pieces of clay pipe, glass, slag, copper alloy, iron and leather (Table 4). These artefacts were all recovered from recent deposits, including the spoil from the previous excavation, with the exception of a small number of glass and copper fragments from occupation layer 501. The presence of these artefacts in layer 501 may be explained as the surface of this deposit was exposed by the previous excavation and subsequent trampling may have introduced artefacts into the surface of this deposit.

The presence of several clay pipe fragments in the spoil-heap from the previous excavation in Trench 3 is notable as these are likely to have been used by the labourers who excavated the cave. The use of clay pipes indicates that the previous excavation was probably prior to WW1 as the introduction of cigarettes around this time sent the clay pipe industry into terminal decline.

It is also possible that some of these artefacts result from the inhabitation of this cave by travellers in the 19th and early 20th centuries, for example the furniture fittings. The assemblage, however, provides little insight into the lifestyle and occupation of these people.

Table 4: Catalogue of clay pipe, copper alloy, glass, iron, leather and slag

Material	Context No.	No. of objects	Description
Clay pipe	300	1	Stem fragment
Clay pipe	301	1	Bowl fragment
Clay pipe	303	3	Stem fragments
Clay pipe	304	3	Stem fragments and a bowl fragment
Clay pipe	306	2	Stem fragment
Clay pipe	500	1	Bowl Fragment. Rear of bowl marked with PW in an oval
Copper alloy	102	1	Furniture fitting
Copper alloy	304	1	20th century copper chain
Copper alloy	403	1	20th century button
Copper alloy	501	2	One triangular offcut and one small piece of plate
Glass	205	1	
Glass	300	5	Fragments of bottle glass
Glass	301	3	Fragments of bottle glass
Glass	302	3	Fragments of bottle glass
Glass	303	6	Fragments of bottle glass
Glass	304	45	Fragments of bottle glass
Glass	304	2	Soil Sample 6. Fragments of window glass
Glass	305	4	Fragments of bottle glass
Glass	306	11	Fragments of bottle glass
Glass	403	8	Deep punt, thick green glass
Glass	404	3	Bottle with ceramic stopper labelled 'St. Abbans'
Glass	500	1	Small Find 2. Bead, handmade. Unknown date.
Glass	500	20	Includes a fragmentary brown bottle labelled 'Newcastle on Tyne'
Glass	500	1	Wine glass base with snapped pontil mark. Victorian
Glass	501	5	Fragments of bottle glass
Glass	501	1	Soil Sample 9. Fragments of window glass
Iron	102	1	
Iron	302	1	
Iron	304	1	Caster (discarded)
Iron	304	1	
Iron	304	3	Wire 20th century
Iron	304	10	Wire etc. Modern
Iron	304	7	Wire 20th century
Iron	305	8	Wire. Modern
Iron	305	4	Nails. Modern
Iron	306	11	Boot shoe. Early 20th century
Iron	501	4	Wire and nails
Iron	501	1	Wire
Leather	303	1	Leather boot.
Slag	304	11	Soil Sample 6. Slag and two coal fragments

7. FAUNAL AND ENVIRONMENTAL EVIDENCE

7.1. Animal bone (excluding fish, bird and micro-fauna)

By Rhiannon Mayon-White

7.1.1. Introduction and overview

In total, 326 bone fragments were recovered from the 2010 Caird's Cave excavations, excluding bird, fish and micro-faunal material. The assemblage exhibited very little weathering, with 81.3% of the bones coming under 'slight' or 'very slight' weathering categories (Figure 9 and Table 6). Despite this, the assemblage was highly fragmented. The average bone fragment was only 43 mm long and represented less than 15% of the original element. Most of this fragmentation appears to have occurred before burial (84%), suggesting that bone was fragmented to a high degree before discard, although undoubtedly trampling of material while on the surface would have continued the breakage within this enclosed space. The actions of scavengers must also be considered, especially as 58 fragments indicate gnawing or digestion. Other forms of modification including burning (10%), cut marks, sawing and possible chopping (10%).

Figure 9: Bar chart showing weathering of the animal remains by Trench

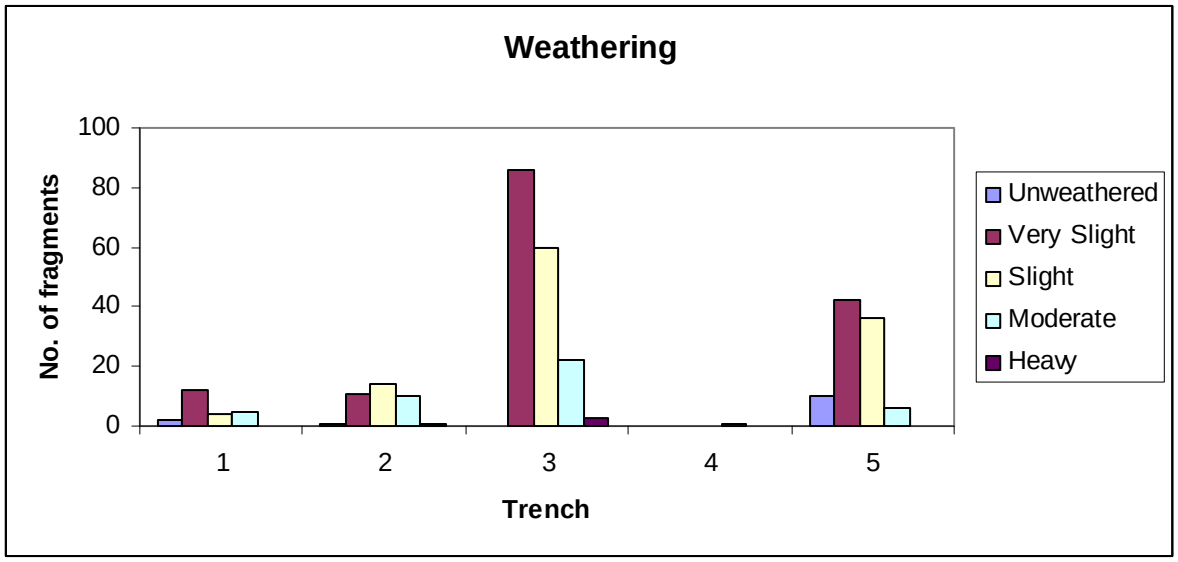


Table 5: The animal remains by number of species (NISP), minimum number of elements (MNE) and minimum number of individuals (MNI)

Animal Size	Taxonomic Group	NISP	% NISP	MNE	% MNE	MNI	% MNI
Small-Medium	cf. *Leporidae* (Rabbit/ Hare)	10	5	8	8	6	13
Medium	Sheep-Sized (Small Artiodactyl)	87	41	22	23	7	15
	Ovis/ Capra / Capreolus	8	4	8	8	1	2
	Ovis/ Capra	32	15	27	28	8	17
	Ovis	1	0	1	1	1	2
Medium-Large	Large sheep/ Deer/ Small cow-sized (Medium Artiodactyl)	23	11	10	10	9	19
	cf. *Sus*	1	0	1	1	1	2
Large	Cow-sized	43	20	14	15	9	19
	Bos	7	3	5	5	5	11
Total		212	100	96	100	47	100

Table 6: Table showing the weathering of animal bones throughout the contexts

Context	No. elements	Weathering									
		Unweathered	%	Very Slight	%	Slight	%	Moderate	%	Heavy	%
100	2			2	100						
102	19	2	11	9	47	3	16	5	26		
103	2			1	50	1	50				
200	1	1	100								
202	10			2	20	3	30	5	50		
203	3					3	100				
205	7			2	29	4	57	1	14		
210	16			7	44	4	25	4	25	1	6
300	1							1	100		
301	2							2	100		
302	11			5	45	6	55				
303	4			2	50	2	50				
304	132			72	55	39	30	18	14	3	2
305	10			3	30	7	70				
306	11			4	36	6	55	1	9		
403	1							1	100		
500	21	1	5	9	43	10	48	1	5		
501	31	7	23	12	39	8	26	4	13		
503	25	2	8	15	60	7	28	1	4		
504	17			6	35	11	65				
Total	326	13	4	151	46	114	35	44	13	4	1

The fragmentation made identification extremely difficult. Only 212 fragments could be identified to an element and placed within a taxonomic group, giving an overall percentage of bones identified species (NISP) of 65% and representing a minimum of 95 elements (MNE) (Table 5 to Table 8). This fragmentation appears heaviest within the sheep-sized animal category, where there is a distinct drop between the number of identified species (NISP) and minimum number of elements (MNE) (Table 5). This is in sharp contrast to the larger animals, which rise in prominence when the minimum number of elements (MNE) or minimum number of individuals (MNI) are considered. Clearly, fragmentation can only explain part of this pattern.

The small-medium animal size group is most likely represented solely by rabbit, a suspicion supported by a mandible recovered from context 501. The elements of this group tend to be more lightly weathered and more complete than the larger animal groups. Smaller animal bones do tend to preserve better, but there is the possibility that these are either intrusive or part of a predator

assemblage which may have made use of the cave in the absence of humans. Their presence would therefore indicate periods of abandonment. No gnaw marks were observed on these bones, so the predator would most likely be avian.

Table 7: Table showing the represent the distribution of elements using NISP over taxonomic groups

	No. of Elements (NISP)									
Element	Small (cf. Leporidae)	Medium (Sheep-sized)	*Ovis/ Capra/ Capreolus*	*Ovis/ Capra*	*Ovis*	Medium-Large (Artiodactyls)	Large (Cow-sized)	*Bos*	*Cf. Sus*	**Total**
Cranium		6		4		7	13	1	1	32
Mandible	1	3		2		1	1			8
Teeth	3	4	3	8		5	1	1		25
Atlas				1						1
Thoracic Vertebrae		3				1	2			6
Other Vertebrae		12				2	4			18
Sacrum					1					1
Ribs	3	43				4	15			65
Scapula		5	1	2		1	3			12
Proximal Humerus	1			1						2
Distal Humerus										0
Proximal Radius/Ulna				3						3
Distal Radius/Ulna		2		1				1		4
Carpals			1					2		3
Pelvis		1		1						2
Proximal Femur										0
Distal Femur	1	2	1	1						5
Proximal Tibia	1	2		1			2			6
Distal Tibia				1						1
Astragalus				1						1
Calcaneum				2						2
Other Tarsals		1								1
Proximal Metapodial		1				1	1			3
Distal Metapodial		1		3						4
Phalanx I			2					1		3
Phalanx II								1		1
Indet. Phalanx		1				1	1			3
Total	10	87	8	32	1	23	43	7	1	212
% NISP	5	41	4	15	0	11	20	3	0	100

The medium-sized animal group probably represents only sheep, although this is difficult to prove with so much fragmentation and the absence of many diagnostic elements. Even when such elements are present there seems to be an overlap in characteristics, suggesting that the goats are either more gracile, or the breed of sheep hardier and more adapted to rough terrain. Given the location of the site, the latter seems more likely and an analysis of likely breeds may be required to aid in their identification.

The medium-large group are the most curious. While it is possible they represent large sheep or small cattle, it seems far more likely that they indicate the presence of deer, possibly red deer (*Cervus elaphus)*. Unfortunately, there is nothing clearly identifiable, although a possible pig (*Sus*) maxilla without teeth was recovered from context 303. An unusual canine recovered from context

304 that could not be safely identified also fits into the pig size category, but the elements described beyond the maxilla seemed too gracile and unlike pig; the excavator (HAW) has suggested that this canine may be from a seal.

Table 8: Table showing the represent the distribution of elements using MNE over taxonomic groups

	MNE									
Element	Small (cf. Leporidae)	Medium (Sheep-sized)	*Ovis/ Capra/ Capreolus*	*Ovis/ Capra*	*Ovis*	Medium-Large (Artiodactyls)	Large (Cow-sized)	*Bos*	*Cf. Sus*	**Total**
Cranium		1		2		1	1	1	1	7
Mandible	1	2		1		1	1			6
Teeth	3	2	3	8		2	1	1		20
Atlas				1						1
Thoracic Vertebrae		2				1	1			4
Other Vertebrae		2				1	2			5
Sacrum					1					1
Ribs	1	3				1	2			7
Scapula		1	1	1		1	1			5
Proximal Humerus	1			1						2
Proximal Radius/Ulna				3						3
Distal Radius/Ulna		2		1				1		4
Carpals			1				2			3
Pelvis		1		1						2
Proximal Femur										0
Distal Femur	1	1	1	1						4
Proximal Tibia	1	1		1			1			4
Distal Tibia				1						1
Astragalus				1						1
Calcaneum				2						2
Other Tarsals		1								1
Proximal Metapodial		1				1	1			3
Distal Metapodial		1		2						3
Phalanx I			2					1		3
Phalanx II								1		1
Indet. Phalanx		1				1	1			3
Total	8	22	8	27	1	10	14	5	1	96
% MNE	8	23	8	28	1	10	15	5	1	100

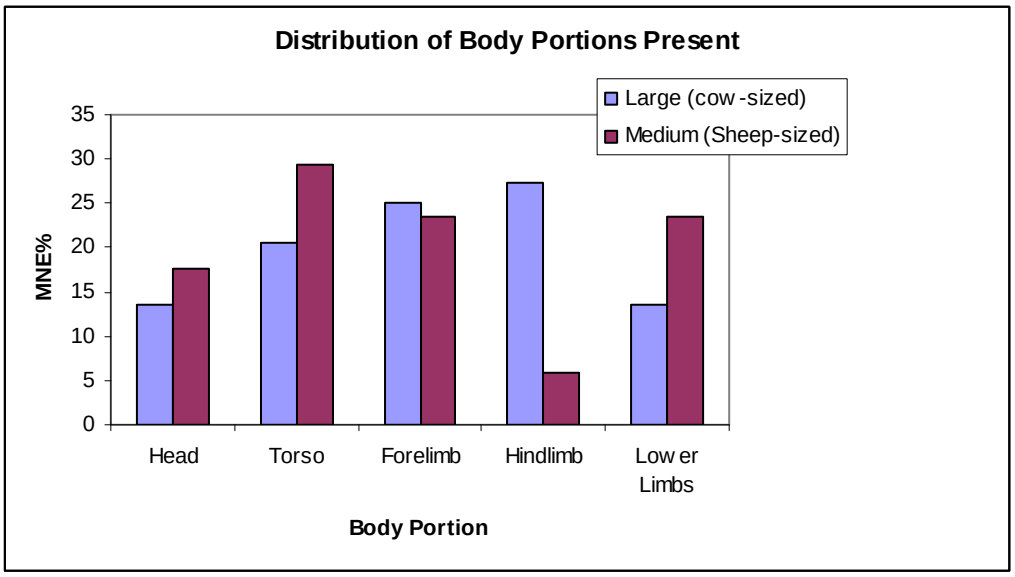
Cattle may not represent the most common element recovered, but become the dominant animal when MNI is considered (Table 5), as mentioned earlier. This pattern is most likely due to a mixture of preferential fragmentation and the removal of specific elements from the site (Figure 10; Table 7 and Table 8). Figure 10 shows the % MNE of the main body portions, excluding teeth. This chart clearly shows that there are fewer hind-limb elements than would normally be expected. This becomes even clearer when all the major limbs are mapped out (see Table 7 and Table 8). Hind-limb elements of cattle are associated with some meaty portions, such as the topside and silverside (Davis 1995). It seems likely these were carried away from the site to be consumed or sold elsewhere. Another possibility is that these limbs were favoured for bone industries and were transported be to be worked on at another location.

Clearly the various species involved different strategies of processing, with the removal from site of hind-limbs of larger animals, while the elements of medium-sized animals, such as sheep, were fragmented mainly on-site.

Table 9: Table showing MNI of the contexts

	MNI									
Context	Small (cf. Leporidae)	Medium (Sheep-sized)	*Ovis/ Capra/ Capreolus*	*Ovis/ Capra*	*Ovis*	Medium-Large (Artiodactyls)	*cf. Sus*	Large (Cow-sized)	*Bos*	**Total**
100	1									1
102	1	1						1		3
103						1				1
200			1							1
202		1				1			1	3
203						1				1
205						1			1	2
210	1	1				1		1		4
300		1								1
301				1						1
302		1				1		1		3
303				1			1	1		3
304	1	1		2		1			1	6
305				1				1		2
306				1				1		2
403									1	1
500	1				1			1		3
501	1	1				1		1		4
503				1				1		2
504				1		1			1	3
Total	6	7	1	8	1	9	1	9	5	47

Figure 10: Chart showing the presence of body portions of medium and large-sized animal groups (excluding teeth)



7.1.2. Summaries of the animal remains by trench and context

Trench 1

Twenty-three bones were recovered from Trench 1, contexts 100, 102 and 103. The majority of these bones showed very slight weathering.

Context 100

A proximal shaft fragment of a rib and a mid-shaft fragment of a long bone were recovered from context 100. Although neither could be identified to taxon, they could both be placed within the small-sized animal category (rabbit to medium dog), giving the MNI of 1. The fragments both showed pre-depositional breakage, but no other forms of modification. They were weathered only very slightly, which suggests they have experienced little exposure to the elements (although the rib fragment appeared slightly discoloured). It seems unlikely that their presence is due to human agency, although this cannot be proven as yet, and may be the result of predatory action in the area.

Context 102

In total, 19 bone fragments were recovered from context 102, and, with the exception of one small burnt shaft fragment, all could be placed within 3 size categories; small-sized (rabbit to medium dog), sheep-sized (small artiodactyls), and cow-sized (large artiodactyls), giving a MNI of 3.

The small-sized category was represented by a proximal end and shaft fragment of a tibia, and the same portion of a humerus. Both had clearly visible epiphyseal lines suggesting they came from a juvenile. They were far less fragmented compared to the rest of the assemblage and their surfaces indicated no weathering, whereas some degree of weathering was in evidence on all other bones collected from this context. This suggests the bones may be intrusive to the layer, and, as in context 100, may be the result of the actions of a predator, most likely avian.

The sheep-sized category consisted of 7 bone fragments, all slightly, or very slightly, weathered and very fragmented (less than 15% completeness). While one shaft fragment of a radius with a clear ulna scar was recovered, identification could not be taken beyond sheep/goat/deer, and other fragments consisted of rib, a vertebra and unidentifiable shafts, so could not be identified to taxon. One rib fragment bore a single light cut mark, possibly related to filleting, but otherwise no modification was visible on any of these elements.

The remaining nine bone fragments were large enough to belong to *Bos* but did not include elements that could be identified to taxon. Many of these bones (102.b.2-4, 6, 9) showed moderate weathering and possible root-etching (102.b.3-4). Furthermore, light carnivore gnawing was in

evidence on five of the fragments (102.b.2-4, 8-9) and digestion on two (102.b2-3), which may explain the higher level of weathering on four of the elements. Butchery marks were also found on two of the fragments; a single light cut mark on an unidentifiable shaft fragment, possibly related to filleting, skinning or disarticulation (102.b.7), and a dorsal portion of a vertebra with heavy cut marks and straight edges indicating it was chopped most likely for dismemberment (102.b.1, Plate 12).

Plate 12: Dorsal portion of a large vertebra (102.b.1) with clear cut marks and chopped edge

Context 103

Only two bones were recovered; a skull fragment of a medium-large sized animal (large sheep/deer/pig/small cow) and a completely calcined dorsal-exterior portion of a scaphoid belonging to a sheep or a goat. No other forms of modification could be seen beyond the slight weathering.

Trench 2

In total, 37 bone fragments were recovered from 5 contexts in Trench 2 (200, 202, 203, 205 and 210), most coming from 202 and 210. In general, weathering was more intense in this area when compared to Trenches 1 or 5 (Figure 9).

Context 200

This context produced a single complete first phalanx of a sheep/goat/deer with very little weathering and no other forms of modification.

Context 202

Ten bone fragments were recovered from this context representing a MNI of 2. Moderate weathering was present on five of these bones, with the remainder showing light to very light weathering. With the exception of 202.b.7, a thoracic vertebral fragment, all bones were estimated

to represent less than 5% of the original elements. No butchery or other cut marks were in evidence but two indeterminate fragments were completely calcined (turned white by high temperature burning).

The presence of sheep/goat/deer was indicated by three bone fragments, including a spinous process of a thoracic vertebra (202.b.7) and the proximal anterior portion of a tibia (202.b.8). One skull fragment of either a large sheep/goat/deer or a small cow, judging by the thickness, was also recovered along with a mid-shaft fragment of a cow-sized tibia (202.b.10). Some light carnivore gnaw was also present on this last element.

Context 203

Three bone fragments from a medium artiodactyl (large sheep/goat/deer/small cow), all with evidence of either light carnivore gnawing or digestion, as well as slight weathering. Light cut marks were present on 203.b.1-2, most likely associated with filleting or the cleaning of the bones (see discussion). The remaining indeterminate bone fragment (203.b.3) had an unfused surface, so, if all these fragments are from a single individual, the individual is young.

Context 205

No gnawing, digestion or cut marks were in evidence on any of the seven bone fragments recovered from context 205. One fragment (205.b.4) did show signs of high temperature burning, i.e. it was completely calcined. A pointed shaft fragment (205.b.1, Plate 13) from a sheep-sized animal may indicate possible tool manufacture on site, but there is no sign of wear or secondary shaping, so remains speculation at present.

Plate 13: A possible unfinished point from Trench 2, context 205 (205.b.1)

The bone fragments could only be roughly classed according to three animal sizes; sheep-sized, cow-sized, and an intermediate size group between the two. In this context, three skull fragments, one calcined, seemed too robust to fit easily within the sheep-sized category and yet not thick enough to be cow-sized. While it is possible that these represent a young cow or a pig, there is also a possibility of a large cervid, such as red deer. Deer would fit with the gracile appearance of many elements placed in the medium artiodactyl category.

Context 210

All 15 bones within this context had undergone pre-depositional fragmentation, and while 7 had been exposed to only very slight weathering conditions, the remainder had undergone more exposure with one fragment even showing signs of heavy weathering. Light carnivore gnawing was noted on one fragment, while another fragment had possibly been digested, indicating the presence and actions of a large scavenger, such as a dog. Burning was also apparent on four bone fragments; one burnt black rib fragment (sheep-size) and the other three unidentifiable fragments burnt white or grey.

Bone fragments could be placed into 4 size categories. One gnawed rib fragment was rabbit/hare-sized, while two fragments were sheep-sized, and another two cow-sized. The most common size was the large sheep/deer or small cow category, but included no clearly identifiable elements.

Trench 3

Context 300

A single unfused proximal fragment of a right humerus from a sheep/goat/deer was recovered from this context. Moderate weathering, but no other forms of modification were visible.

Context 301

Two elements collected; a left distal femoral fragment of a sheep/goat/deer and an unidentifiable fragment. Both were moderately weathered and had signs of light carnivore gnawing, but no cut marks or burning.

Context 302

The 11 fragments from this context were either slightly or very slightly weathered, although 3 showed evidence of light carnivore gnaw. No cut marks were present on any elements collected, but 6 showed signs of burning.

Context 303

There was an absence of digestion, gnawing and burning in this context, and weathering remained between slight and very slight, suggesting rapid burial followed by little disturbance. Only one cow-sized rib fragment (303.b.3) bore cut marks associated with possible filleting. Sheep/goat/deer were also represented by two elements. A possible pig maxilla without teeth was also present.

Context 304

This was by far the richest deposit with 132 bone fragments, and in many ways the most interesting. Heavy butchery, in the form of chop and saw marks, can be seen on three cow-sized elements and one sheep-sized vertebra (304.b.65). Whether this is true butchery should be carefully considered, especially as two possible points were found in the same context (304.b.1, 304.b.8). Furthermore, light cut marks were observed on eight fragments, mainly on the shafts of unidentifiable long bones or ribs. Cut marks on the superior surface of rib shafts can be explained by filleting, that is the removal of meat elements, such as the sirloin or tenderloin (Davis 1995, Binford 1981). The interpretation of the cut marks on long bone shafts, however, usually depends on the element involved; light cut marks on metapodials, for example, often relate to skinning. This is a possibility, but Binford offers the cleaning of bone prior to working as an alternative (Binford 1981). This is supported by the artefacts recovered during the earlier excavations, but neither skinning nor the working of bone need be exclusive and both activities may involve the same bone.

Sheep-sized elements are the most common in this context, especially rib fragments, some of which have been modified by burning (304.b.101), gnawing (304.b.18, 61) or cut marks (304.b.20). Epiphyseal lines are visible on three elements within the sheep/ goat/ deer category, indicating that at least one individual out of the minimum of three for this size-group is young (Figure 10). A single right femur, also with clear fusion lines, represents the smaller-sized category of animal in this context. Ten elements represent the medium artiodactyls group, and, similarly to the sheep-sized group, show signs of gnawing, light cut marks, and possible shaping. It is on the cow-sized elements, however, where clear sawing can be observed (Plate 14). Skull fragments, including horn, along with vertebrae and ribs, a scapula, a radius, a metacarpal and phalanges all represent a MNI of 1 for this larger group that incorporates *Bos.* While this indicates the presence of the majority of the animal, the hind-limb elements are missing, as discussed earlier. The absence of the meat bearing femur may be understood as removal for consumption elsewhere, but other options can also be considered. The scavengers should not be forgotten; preferential removal is not unknown. The hind-limbs may also be the source of the indeterminate long-bone fragments. This latter

explanation would fit with observations made by Emery. He found that hind-limbs, such as the tibia, were the most useful for bone tool manufacture on Mayan sites (Emery 2008). If this is the case, the under-representation of identifiable hind-limb elements is to be expected.

Plate 14: Chop and sawing marks on a cow-sized scapula from Trench 3, context 304 (304.b.30)

Context 305

Ten elements were recovered from this context, six of which were either relegated to sheep-sized or sheep/ goat/ deer. These included an atlas, a pointed long bone fragment that may have been discarded during manufacture, one bone burnt brown, and a vertebra with cut marks. A medium to large-sized rib may indicate the presence of a medium-sized artiodactyl, but was considered too unreliable to include for MNI (MNI=2).

Context 306

A sheep-sized individual was represented by a rib fragment and a distal tibia fragment with visible saw marks on its proximal end. A chop mark could also be observed on a skull fragment from medium-sized artiodactyl (large sheep/ deer/ small cow). All three long bone fragment belonging to this group had evidence of gnawing. A cow-sized individual was also indicated by a rib and a scapula fragment.

Trench 4

One Phalanx of *Bos*, moderately weathered, was recovered from context 403. This context relates to a layer of soil burying the structure and is believed to be modern.

Trench 5

Ninety-four fragments were recovered from contexts 500, 501, 503 and 504. Once again, the majority of elements were slightly or very slightly weathered, and a few bore no signs of weathering at all.

Context 500

The 21 fragments collected from this context represent a minimum of three individuals; a small-sized animal (via a long bone fragment), a sheep-sized animal, and a cow-sized animal. Eleven fragments related to a sheep-sized animal, including a left ischium fragment with gnaw, a left femur with cut marks that seem related to disarticulation, and a left tibia with both gnaw and saw marks (500.b.9). Of particular note is the sacrum, 500.b.11, since the wings clearly extend beyond the level of the centrum on the articular surface indicating sheep over goat. It is very likely that all individuals in this size category are robust sheep. Hardy breeds of sheep can be difficult to separate from goats because the sheep often become more robust.

Cow-sized fragments included an unfused vertebra, an ulna, and a rib fragment and an indeterminate fragment both with rodent gnaw (Plate 15).

Plate 15: Rodent gnaw and a possible chopped edge on a bone from Trench 5, context 500 (500.b.4)

Table 10: Table showing the modification of gnawing and digestion throughout the contexts

Context	No. elements	Gnaw	% Gnaw	Digestion	% Digestion
102	19	5	26	2	11
202	10	1	10		0
203	3	2	67	1	33
210	16	1	6	1	6
301	2	2	100		0
302	11	3	27		0
304	132	17	13	2	2
305	10	1	10	1	10
306	11	4	36		0
403	1	1	100		0
500	21	6	29		0
501	31	2	6	1	3
503	25	4	16		0
504	17		0	1	6
Total No. Elements	326	49	15	9	3

Table 11: Table showing the distribution of burnt bone types throughout the contexts

Context	No. elements	Burning Coloration					Total burnt	% Burning
		Brown	Black (carbonised)	Mixed Low	Gray	White (calcined)		
102	19	1					1	5
103	2					1	1	50
202	10					2	2	20
205	7					1	1	14
210	16		1		2	1	4	25
302	11	1	1	2		2	6	55
304	132		3	5		2	10	8
305	10		1				1	10
500	21	1					1	5
501	31	2	4			1	7	23
Total	326	5	10	7	2	10	34	10

Table 12: Table showing distribution of modification and butchery marks

Context	Modification								Total
	Chop	Sawn	Cut	Split Point	Cut + Chop	Cut + Sawn	Cut + Point	Chop/ Sawn	
100				1					1
102			3						3
203			1		1		1		3
205				1					1
303			1						1
304	3	2	7	5		2			19
305			1	1					2
306	1					1			2
500	1	2	1		1			1	6
501					1				1
503			2						2
504			1	1					2
Total	5	4	17	9	3	3	1	1	43

Context 501

This context contained 31 fragments, 7 of which were burnt to various degrees. Only one cut mark on a cow-sized rib was observed and two instances of light carnivore gnaw. Weathering varies from completely unweathered to moderate, suggesting that some mixing of material has occurred possibly before burial. It should be noted, however, that the unweathered condition of the

leporidae mandible may be aided by its small size. This element was the only bone that could be identified beyond simple size categories. The majority belonged to a sheep-sized individual represented by 11 fragments, but the sheep/deer/small-cow-sized category (medium-artiodactyl), the cow-sized category and the rabbit-sized categories were also present.

Context 503

No burning or digestion was observed on any of the 25 fragments recovered from context 503. Weathering varied from unweathered to slight weathering, and there was an absence of the smaller-sized animal elements. Indeed, this context was heavily dominated by a sheep-sized individual, with only two fragments relegated to a cow-sized individual. Nineteen fragments, mostly of long bone or rib were sheep-sized but a further three fragments could be placed in the sheep/goat/deer or the sheep/goat taxonomic group. Only one vertebra and one long bone fragment had signs of cut marks relating to possible filleting and skinning.

Context 504

This context was once again dominated by a sheep-sized individual, which could be identified to sheep/goat with two teeth. These teeth were very worn indicating an older animal, which was supported by the ossification of a rib fragment where a possible break had mended. The sheep/goat/small cow (medium artiodactyl) category were also present as well as a single tooth identified to *cf. Bos.* Cut marks on a vertebra were observed and a metapodial had been fragmented into a possible point, but no wear could be found.

7.1.3. Discussion

Human Modification: Butchery and Tools?

The animal remains of Caird's Cave are of particular interest due to their association with bone artefacts excavated by Maclean and Hall between 1907 and 1912. The assemblage gives no clear indications of bone tool industry, such as wear, but there are hints. The high degree of fragmentation indicates the bones were being processed beyond simple butchery. Indeed, the cut marks may support this, since the majority are light cut marks on shafts. Normally this would be interpreted as skinning or filleting, but the process of cleaning bones before breakage leaves very similar marks (Binford 1981). Such cleaning removes any left over tendons, muscle and even periosteum, to avoid any interference with breakage. Burnt bones may also be an indicator of tool manufacture. Dry bones fracture and break in a more predictable manner, and for this reason they may be warmed near fires or left for weeks to allow them to dry before further processing (Frison 1982).

The absence of obvious tools, wear or secondary shaping would be expected for much of the site, since these would have been preferentially removed by Dr Maclean. Their absence from sealed contexts, such as those from Trenches 2 and 5, however, suggests if tool manufacture is occurring then the useful fragments are being removed for processing at another site, possibly by a craftsman. The possible points recovered may be discarded failures or simply misplaced. Indeed, if any were used as expediency tools, that is made for immediate use and discard, it is likely that no evidence of manufacture or wear would be observed (Plug 1982). Indeed, this pattern of discard often makes the utilisation of such sites difficult to identify and comprehend (MacGregor *et al.* 1999).

7.1.4. Conclusions

Caird's Cave is most likely a multi-functional site; the primary reason for animal slaughter will have been the meat, which is supported by the presence of filleting marks, especially on the ribs, and the absence of meat rich elements, such as the femorae of the larger animals. The presence of the lower limb elements, such as the phalanges, is likely to represent skinning, which again is upheld by light cuts on long bone shafts, although these may be interpreted as bone cleaning as well. If skins were being processed on site, elements, such as cattle ribs, would often be used. If used repeatedly wear would show along the edge, but single-use tools (expediency tools) would not. This is also a problem when considering the possible points recovered. This brings us back into bone tool industry, supported by fragmentation, especially of medium-sized animals, and the possible removal of elements for further work at another site.

7.1.5. Addendum

During analysis of the micro-fauna Catherine Smith identified a small number of additional animal bones (

Table 13). The majority of these bones are of rabbit (layers 102, 304, 306, 403, 501 and 503), but an atlas vertebra and a metatarsal of pig (layer 304) and an ungulate bone (layer 500) were also identified. The pig bones exhibited chop marks.

Table 13: Additional animal remains from Caird's Cave

Trench	Context	Sample/Bag number	Description	Size	Taxonomic group
1	102		fibula, proximal, adult	Small mammal	Rabbit (*Oryctolagus cuniculus*)
1	102		indeterminate mammal fragment	Small mammal?	
2	200		distal tibia, juvenile	Small mammal	Rabbit
2	202		cf mammal fragment		
3	304	Bag A	mammal vertebra	Small mammal	cf Rabbit
3	304	Bag B	pig atlas vertebra; gnawed by carnivore; probably chopped sagittally	large mammal	Pig
3	304	Bag B	mammal innominate; acetabulum and ilium	Small mammal	Rabbit
3	304	Bag B	mammal ossified rib	Small mammal	
3	304	Bag B	mammal vertebral fragment	Small mammal	
3	304	Bag B	mammal skull fragment	Small mammal	
3	304	Bag D	mammal distal humerus, adult (2 conjoining fragments); small depression in shaft may be carnivore tooth mark	Small mammal	Rabbit
3	304	Bag D	mammal vertebra; unfused epiphysis; immature	Small mammal	cf Rabbit
3	304	Bag E	pig metatarsal III; shaft probably chopped across during marrow extraction	large mammal	Pig
3	304	Bag G	rabbit metatarsal; entire, adult	Small mammal	Rabbit
3	304	Bag H	rabbit L mandible; oral, teeth absent	Small mammal	Rabbit
3	304	Sample 6	rabbit metatarsal; entire, adult	Small mammal	Rabbit
3	304		rabbit R mandible with premolar in situ; loose incisor and molar	Small mammal	Rabbit
3	306		rabbit incisor tooth rabbit scapula; adult	Small mammal	Rabbit
4	403		mammal vertebra; unfused epiphysis; immature	Small mammal	cf Rabbit
5	500		mammal rib	large mammal	ungulate
5	501		mammal vertebrae x 2	Small mammal	cf Rabbit
5	503		Rabbit ulna; olecranon; probably juvenile	Small mammal	Rabbit

7.2. Bird bone and micro-fauna

By Catherine Smith

7.2.1. Introduction

This report documents the bird and micro-fauna remains from Caird's Cave. Catalogues of the bird and micro-faunal remains are presented in Tables 14 and 15, respectively.

Table 14: Bird remains from Caird's Cave

Trench	Context	Sample/Bag number	Description	Size	Taxonomic group
1	100		bird scapula shaft	large bird	Goose sp (*Anser* sp)
1	100	Bag 1-2	bird femur shaft; abraded ?knife cuts present; bleached appearance	large bird	cf Fowl (cf *Gallus gallus*)
1	102		bird L and R mandible; ulna; humerus	small-medium bird	cf Starling (cf *Sturnus vulgaris*)
1	102		bird cranium; left side crushed; beak absent	small-medium bird	Medium Passerine sp
1	103	SS 1, 1 mm residue	bird tibiotarsus; distal	small-medium bird	Passerine; Starling
1	103	SS 1, 4 mm residue	bird shaft fragment	small bird	
2	202		2 x bird vertebrae	small-medium bird	
2	202		bird scapula, proximal bird R innominate bird tarsometatarsus bird 3rd phalange	small-medium bird	Passerine cf Starling
2	202		3 small fragments	small-medium bird	
2	202	SS 2	bird synsacrum; poor condition	small-medium bird	
3	302	SS 4, 1 mm residue	bird foot phalange	small-medium bird	
3	304	Bag B	bird L coracoid bird R coracoid	medium bird	Guillemot (*Uria aalge*)
3	304	Bag B	bird coracoid; proximal gnawed by rodent; clean break, probably chopped	large bird	Cormorant (*Phalacrocorax carbo*)
3	304	Bag B	bird femur	medium bird	cf Fowl
3	304	Bag C	bird upper beak	medium bird	Gull sp most likely Kittiwake (*Rissa tridactyla*)
3	304	Bag C	bird ulna shaft	medium bird	cf Fowl
3	304	Bag C	bird tarsometatarsus, juvenile	medium bird	Gull sp, cf Kittiwake
3	304	Bag F	bird ulna	small-medium bird	Passerine cf Starling
5	500		bird ribs x 2	large bird	cf Goose sp
5	500		bird coracoid; adult; knife cuts anterior and posterior	large bird	Goose (*Anser anser*)
5	500		bird ulna; adult	medium bird	Fowl
5	501		bird tibiotarsus shaft; distal; calcined	medium bird	Fowl

7.2.2. Results: birds

One or possibly two domestic species of bird were represented. Domestic fowl (*Gallus gallus*) was definitely present in contexts 500 and 501, and very likely present in contexts 100 and 304. Goose (*Anser anser*) bones could have come from either the wild greylag or its domesticated descendant and were found in context 500, while bones referable to goose were present in contexts 100 and 500.

Wild bird species were represented mainly by bones of a medium-sized Passerine species, in all likelihood the starling (*Sturnus vulgaris*) which was present in contexts 102, 202, 304 and 103 (Sample 1). Seabirds were the guillemot (*Uria aalge*), represented by a pair of coracoids, (from the shoulder girdle) presumably from the same individual, and one coracoid from a cormorant (*Phalacrocorax carbo*), both found in the spoilheap (layer 304). An upper beak fragment and an immature tarsometatarsus form the spoilheap (layer 304) came from a medium-sized gull species, thought be a kittiwake (*Rissa tridactyla*).

Table 15: Micro-fauna from Caird's Cave

Trench	Context	Sample/Bag number	Description	Size	Taxonomic group
1	103	SS 1, 1 mm residue	L tibia, proximal	small mammal	cf Rodent
2	202		tibia	small mammal	Rodent
2	202	SS 2	small mammal femur, distal small mammal humerus; shaft small mammal tibia	small mammal	Rodent
2	202	SS 2, 4 mm residue/Bag A	mammal incisor tooth	small mammal	Rodent
2	202	SS 2, 4 mm residue/Bag A	mammal ulna mammal fragment	small mammal	cf Rodent
2	202	SS 2, 4 mm residue/Bag B	cervical vertebra		amphibian
2	202	SS 2, 4 mm residue/Bag B	mammal fragments	small mammal	
2	202	SS 2, 4 mm residue/Bag C	humerus; proximal		amphibian
2	202	SS 2, 4 mm residue/Bag C	incisor tooth	small mammal	cf Rodent
2	202	SS 2, 4 mm residue/Bag C	mammal fragments	small mammal	
2	202	SS 2, 4 mm residue/Bag D	mammal femur; proximal	small mammal	cf Rodent
2	210	SS 11, 1 mm residue	mammal incisor tooth	small mammal	Rodent
2	210	SS 11, 1 mm residue	tibia shaft metapodial	small mammal	cf Rodent
2	210	SS 11, 4 mm residue	mammal mandible; no teeth but characteristic alveolar pattern	small mammal	Vole *Microtus* sp
2	210	SS 11, 1 mm residue	mammal maxilla fragment	small mammal	cf Vole
3	302	SS 4, 1 mm residue	mammal incisor tooth x 3	small mammal	Rodent
4	403		vole L mandible	small mammal	Field Vole (*Microtus agrestis*)
5	500		rat R mandible	small mammal	Rat cf Brown (*Rattus* cf *norvegicus*)
5	501	SS 9, 1 mm residue	rodent incisors x 5	small mammal	Rodent
5	501	SS 9, 1 mm residue	vole molar	small mammal	*Microtus* sp
5	501	SS 9, 1 mm residue	small mammal humerus; distal probable radius	small mammal	
5	501	SS 9, 4 mm residue	small mammal incisors	small mammal	Rodent
5	503	SS 8, 1 mm residue	rodent incisors x 3	small mammal	Rodent
5	503	SS 8, 1 mm residue	small mammal humerus; distal femur; distal tibia; distal ulna	small mammal	cf Rodent

7.2.3. Results: micro-fauna

Field vole (*Microtus agrestis*) was positively identified from a mandible in layer 403. A molar tooth from *Microtus* sp, presumably also the field vole, was present in layer 501 (Sample 9) and a mandibular fragment with characteristically shaped alveoli (empty tooth sockets) from layer 210

(Sample 11). The remainder of the small mammal incisor teeth and long bones were of a size which indicated they were also from small rodents, most likely voles or indeed mice.

One mandible from a rat, most probably the brown rat (*Rattus* cf *norvegicus*) was found in layer 500.

Amphibian bones, a cervical vertebra and a proximal humerus, were present in layer 202 (Sample 2).

7.2.4. Evidence of human activity

Knife cuts were possibly present on a femur thought to have come from domestic fowl (context 100), although the marks were abraded and the bone was bleached white by exposure to the elements, presumably after the layer containing it was disturbed.

Knife cuts were also observed on both the anterior and posterior surfaces of a goose coracoid, (layer 500). A coracoid from a cormorant exhibited a clean break and had almost certainly been chopped across the bone shaft; incidentally this bone showed the characteristic signs of having been gnawed by a rodent (304).

One example of burning was noted on the distal part of a fowl tibiotarsus (501). This is the end of the bone which protrudes from the 'drumstick' indicating the burning occurred during roasting. Equally this could also have occurred if rubbish had been swept into the fire after a meal.

7.2.5. Discussion

Some of the bones in this collection are those of birds which contributed to the human diet. Domestic fowl and geese are still widely eaten in Scotland at the present day, while although they were a common component of the coastal subsistence diet, especially on the islands, until the early modern period, cormorants, guillemots and kittiwakes are generally not now utilised as food.

The majority of the bones of domestic fowl were recovered from surface deposits in the cave (layers 100 and 500) and this may indicate that these bones are comparatively recent. In contrast, the bones of seabirds were exclusively recovered from re-deposited midden deposits (304) in Maclean and Hall's spoil-heap. These bones may therefore reflect the consumption of seabirds at some point past. It may be significant that the bones of sea-birds were not recovered from the *in situ* later prehistoric deposits within the cave, perhaps indicating these species were only present in the early historic to post medieval horizons excavated by Maclean and Hall.

Bones gnawed by carnivores and rodents were noted on many bones and the remains of rodents were themselves recovered. Most of these seem to have been voles, which do indeed appear to gnaw bones; excavations on Orkney generally recover numerous bones of the local subspecies as well as bones on which they have left characteristic parallel incisor marks. However, one bone of rat

was also present. This was probably the brown rat, accidentally introduced into the country in the late 17th-early 18th century. It is very likely that the cave provided a safe, warm haven for small rodents as well as humans and may well have been commensal with people, particularly if stored food or food scraps were present.

Finally, there is the question of the small bird bones. These were thought to be from starlings and were found in Trenches 1, 2 and 3. Starlings are resident in Britain all year round and it is not impossible that some birds may have chosen to nest inside natural rock cavities within or near to the cave. They are highly gregarious birds which can form large roosts especially in winter when Continental visitors arrive and this may also explain their presence in the cave; there is no evidence for their consumption by people.

7.3. Fish bone

By Ruby Ceron-Carrasco

7.3.1. Introduction and quantification

Sixty-nine pieces of fish bone were recovered from the excavations at Caird's Cave (Table 16 and Table 17). These bones were recovered from twelve contexts in Trenches 1, 2, 3 and 5. Forty-seven of these bones were identifiable to family and twenty-two bones were identifiable to species. Gadidae dominate the assemblage (44 fragments) with cod (*Gadus morhua*), haddock (*Gadus morhua*) and Saithe (*Pollachius virens*) represented by 15, 4 and 3 bones, respectively. The Clupeidae family is represented by two bones from herring (*Clupea harengus*) and the Salmonidae family is represented by a single bone of either salmon (*Salmo salar*) or trout (*Salmo trutta*). Eighteen bone fragments were unidentifiable.

7.3.2. Methodology

The fish remains from Caird's Cave were recovered by hand during the excavation and from soil samples sieved through a 1 mm mesh. Identification of species was made using modern comparative reference collections of fish skeletons and by reference to a standard guide (Watt *et al* 1997). All bone elements were identified to the highest taxonomic level possible, usually to species or to the family group. Nomenclature follows Wheeler and Jones (1989, 122-123). Where appropriate, all major paired elements were assigned to the left or right side of the skeleton. All elements were examined for signs of butchery and burning. Measurements were not taken on the identified elements; instead, these were classified into size categories by reference to modern specimens of known size allowing estimation of the Total Body Length (TL). For specimens belonging to the Gadidae (cod family group), some elements were categorized as 'very small' (15-20 cm), 'small' (20-30 cm), 'medium' (30-60 cm), 'large' (60-120 cm) or 'very large' (120-150 cm). For the non-gadoid species a classification of either 'juvenile' or 'adult' was made. Unless otherwise stated, information on the habitat and size of the species described below derives from Wheeler 1969 and 1978.

Bone preservation was calculated on two characteristics: texture and erosion. Texture was recorded on a scale of 1 to 5 (fresh to extremely crumbly) and erosion also on a scale of 1 to 5 (none to extreme). The sum of both was used as an indication of bone condition; fresh bone would score 2 while extremely poorly preserved bone would score 10 (after Nicholson 1991).

Quantification was calculated as the number of identified species (NISP) by fragment count, regardless of the retrieval methods used. The sieved samples contained most of the smaller elements while the hand-retrieved samples contained the larger most robust material as well as

elements from small specimens. This was considered to be a well-balanced representation as most contexts also produced both sieved and hand-collected material.

After this report was completed re-examination of the sieved residues yielded additional fish remains. These comprise: one unidentified small vertebra and a dentary from context 304 and a small number of unidentified fragments in contexts 210, 302, 304, 501, 502 and 503; these pieces are not considered in this report.

7.3.3. Condition

The level of preservation of the fish bone was consistent throughout the site, in terms of fragment size and condition. Identifiable elements were most frequently 40-70% complete. Their condition score was generally in the range of 7-9, indicating well-preserved to extremely poorly preserved bone.

7.3.4. Species representation

The main group represented was the Gadidae (44 bone fragments). The Gadidae are marine cod-family fishes, in Scotland this group includes some of the well-known species including cod, haddock and saithe which were represented in the assemblage by 15, 4 and 3 bones, respectively.

Cod (*Gadus morhua*) has been one of the most important food fishes of the British fish fauna, and exploited ever since man begun to fish the seas of Europe. Its value as prime food is enormous its firm flesh allows for preservation as 'stock fish', dried or salted and it keeps well for winter consumption or trade. In the northern North Sea, cod spawns in February and early March. Its growth rate varies with different populations, in the North Sea it can grow to an average of 18 cm in their first year, 36 cm in their second year, 55 cm in their third year and 68 cm in their fourth year. A mature cod can reach 150 cm in length and weigh up to 40 kg.

The cod is widely distributed in a variety of habitats from the shoreline to well down the continental shelf, in depths of 600 m. Young, smaller fish, usually live close inshore. Cod represented at Caird's Cave were 'small' (20-30 cm TL), 'medium' (30-60-cm TL), 'large' (60-120 cm TL) and 'very large' (120-150 cm TL) specimens.

Haddock is another important food fish and in the North Sea, spawning takes place from late February to early June. The haddock size and quality vary with location, it may attain up to 120 cm though nowadays it is found at 65 cm, the best quality fish coming in the main from deep-water and in Scotland from the East Coast. This species, once caught, needs to be handled well and is generally gutted at sea; the skin is kept on to avoid tearing of the soft flesh and it is mainly cured by drying and

by smoking (Lockhart 1997). At Caird's Cave haddock remains were from 'small' (20-30 cm TL) and 'medium' (30-60 cm TL) size fish.

Saithe (*Pollachius virens*) is a common fish occurring in northern inshore waters, some of its most important spawning areas are in the north-west of Scotland. It spawns from January to April and by midsummer the young fish are found close inshore among weed-covered rocks and open bays. This 'immature' phase lasts for at least two years, mature fish are found slightly offshore. Its growth pattern is of an approximate average of 15 cm increase in length annually for the first three years followed by a pattern of 10 cm annual growth for the next three years. Saithe can reach a total length of 100 cm in their eleventh year. This species was mainly represented only by 'small' (20-30 cm TL) specimens in the Caird's Cave fish bone assemblage.

The only other marine fish species present at Caird's Cave was herring (*Clupea harengus*). Two vertebrae from adult specimens of up to 30 cm TL were recovered from midden deposit 503; herring can grow up to 43 cm total length.

A single vertebra of a freshwater or anadromous Salmonidae was recovered from talus layer 500 in Trench 5. The vertebra was fragmentary and it was not possibly to identify this bone to species, but it could be from a trout (*Salmo trutta*) or salmon (*Salmo salar*). The bone was possibly from an adult specimen of less than 60 cm TL.

7.3.5. Provenance

Fish remains were recovered from twelve contexts in Trenches 1, 2, 3 and 5. The fish bone from Trench 1 was recovered from an occupation deposit disturbed by the previous excavations (103) and the majority of the fish remains from Trench 3 were recovered from the spoil of the previous excavation (layers 302, 304 and 305). Trenches 2 and 5 yielded fish bone from stratified occupation deposits (202, 205, 210, 501 and 503) and the modern talus (500). The fish bone from the occupation layers in Trenches 2 and 5 was dominated by unidentifiable fragments, but 'very small' (15-20 cm TL), 'medium' (30-60 cm TL) and 'large' (60-120 cm) gadids, 'large' cod (60-120 cm TL), 'small' (20-30 cm TL) saithe and adult herring (30-40 cm TL) was recorded. A Salmonidae vertebra from the talus (500) may result from modern activity in the cave.

Trench 3 yielded the largest assemblage of fish bone with a total of 40 pieces. Thirty-seven of these bones were recovered from the spoil-heap of Maclean and Hall's excavation (302, 304 and 305) and three bones were recovered from the small spoil-heap (301 and 303). The fish remains recovered were all of gadids, including cod, haddock and saithe. Small to very large fish were present but almost half of the bones (15) came from 'large' fish (60-120 cm TL). The size range of the fish present

in the spoil-heap and the occupation deposits in the cave provide evidence of inshore and offshore fishing of young and adult cod family fishes.

The recovery of fish bones from the spoil of the previous excavations also highlights that a number of smaller bones were missed or not collected during the original excavation. However, the comparatively small number of bones recovered confirms Maclean's (1913) observation that fish bone was poorly represented in the occupation deposits in relation to marine shell and animal bone.

7.3.6. Discussion

Fishing has been important in contributing to the food supply in Scotland since prehistory (Barrett *et al* 1999), and from medieval times onwards featured prominently in Scottish commerce (Coull 1996). The location of Caird's Cave on the shore of the inner Moray Firth would have allowed easy access to a year round supply of fish, but the quantity of bones recovered suggest this resource was not extensively exploited. The bones present are however likely to result from anthropomorphic activity as the majority were recovered from occupation deposits and no signs of animal intrusion were found (e.g. from mammals, such as rodents and otters, or birds).

Fishing from the safety of the shore and/or from rocky locations would have provided a catch of juvenile gadids such as cod, haddock and saithe. However, it would have been necessary to venture offshore to catch the mature cod and haddock present in the assemblage. The use of hooked lines may also have produced the occasional herring. The variety and size ranges of the species identified in the assemblage indicate that fishing was probably practiced throughout the year though particularly during summer and autumn. Young gadids may have been caught during autumn and winter periods whilst the larger offshore species may have been caught during summer when conditions were more favorable for venturing to sea. The assemblage of fish remains is too limited to allow comment on the representation of different skeletal elements, but the fact that bones from the head and vertebrae column of the fish skeleton are present indicates that the fish were probably brought to the site whole.

The presence of animal and particularly fish remains in caves and rock shelters in Scotland has been recorded, from deposits dating to the Mesolithic (Hardy and Wickham-Jones 2002; 2009), late Bronze Age and Iron Age occupations at High Pastures Cave in Skye (Ceron-Carrasco 2004; 2005) and to Neolithic and Norse deposits in the Smoo Caves in Southerland (Ceron-Carrasco 2005, Pollard 2005).

Table 16: Fish bone by species, size and element from trenches and contexts at Caird's Cave

			Tr. 1	*Tr. 1*	Tr. 2			*Tr. 2*	Tr. 3					*Tr. 3*	Tr. 5			*Tr. 5*	Grand
Species	Size	Element	103	*Total*	202	205	210	*Total*	301	302	303	304	305	*Total*	500	501	503	*Total*	Total
Cod	S	precaudal vertebra								1				*1*					1
	M	precaudal vertebra										1		*1*					1
	L	dentary/right							1					*1*					1
		maxilar/left										1		*1*					1
		maxilar/right										1		*1*					1
		precaudal vertebra										3	1	*4*			1	*1*	5
		precaudal veterbra									1			*1*					1
		premaxilla/left										1		*1*					1
		preopercular										1		*1*					1
	VL	articular/right										2		*2*					2
Cod Total									*1*	*1*	*1*	*10*	*1*	*14*			*1*	*1*	*15*
Haddock	S	precaudal vertebra								2				*2*					2
	M	posttemporal										1		*1*					1
		precaudal vertebra										1		*1*					1
Haddock Total										*2*		*2*		*4*					*4*
Saithe	VS	caudal vertebra								1				*1*					1
	S	caudal vertebra	1	*1*															1
		precaudal vertebra															1	*1*	1
Saithe Total			*1*	*1*						*1*				*1*			*1*	*1*	*3*
Gadidae	VS	cleithra				1		*1*											1
	S	caudal vertebra	5	*5*															5
		posttemporal								1				*1*					1
		precaudal vertebra								1				*1*					1
		pterytgoid										1		*1*		1		*1*	2
	M	ceratobranchial										1		*1*					1
		opercular										1		*1*					1
		parasphenoid															1	*1*	1
		pterytgoid							1					*1*					1
	L	branchiostegal										1		*1*			1	*1*	2
		opercular										1		*1*					1
		parasphenoid													1			*1*	1
		posttemporal											1	*1*					1
		preopercular										1		*1*					1
		pterygoid										1		*1*					1
	VL	hyomandibular										1		*1*					1
Gadidae Total			*5*	*5*		*1*		*1*	*1*	*2*		*8*	*1*	*12*	*1*	*1*	*2*	*4*	*22*
Herring	Adult	caudal vertebra															2	*2*	2
Salmonidae	Adult	caudal vertebra													1			*1*	1
Unidentifiable	Unknown	fragment			4	1	3	*8*				9		*9*		1	4	*5*	22
Grand Total			**6**	***6***	**4**	**2**	**3**	***9***	**2**	**6**	**1**	**29**	**2**	***40***	**2**	**2**	**10**	***14***	**69**

Table 17: Catalogue of fish bone from Caird's Cave

Context	Sample	Retrieval method	Element	No.	Species	Size	Erosion	Texture	Condition	Element % complete	Comments
103	1	sieved	caudal vertebra	1	Saithe	S	3	4	7	70%	
103	1	sieved	caudal vertebra	5	Gadidae	S	4	4	8	60%	fused
202	2	sieved	fragments	4	Unidentifiable	Unknown	4	5	9	5%	
205	5	sieved	cleithra	1	Gadidae	VS	4	4	8	60%	
205	5	sieved	fragment	1	Unidentifiable	Unknown	4	5	9	5%	
210	11	sieved	fragment	3	Unidentifiable	Unknown	4	5	9	5%	
301		hand-collected	dentary/right	1	Cod	L	4	4	8	60%	proximal
301		hand-collected	pterytgoid	1	Gadidae	M	4	4	8	50%	
302	4	sieved	precaudal vertebra	2	Haddock	S	4	4	8	70%	
302	4	sieved	precaudal vertebra	1	Cod	S	4	4	8	70%	
302	4	sieved	precaudal vertebra	1	Gadidae	S	4	4	8	50%	
302	4	sieved	caudal vertebra	1	Saithe	VS	3	4	7	60%	
302	4	sieved	posttemporal	1	Gadidae	S	3	4	7	60%	proximal
303		hand-collected	precaudal veterbra	1	Cod	L	4	4	8	60%	
304	6	sieved	opercular	1	Gadidae	M	4	4	8	40%	proximal
304	6	sieved	ceratobranchial	1	Gadidae	M	4	4	8	40%	
304	6	sieved	pterytgoid	1	Gadidae	S	3	4	7	60%	
304	6	sieved	fragment	4	Unidentifiable	Unknown	4	5	9	5%	
304		hand-collected	precaudal vertebra	1	Haddock	M	3	4	7	70%	
304		hand-collected	posttemporal	1	Haddock	M	3	4	7	60%	proximal
304		hand-collected	pterygoid	1	Gadidae	L	3	4	7	70%	
304		hand-collected	branchiostegal	1	Gadidae	L	4	4	8	50%	
304		hand-collected	preopercular	1	Gadidae	L	4	4	8	50%	
304		hand-collected	opercular	1	Gadidae	L	4	4	8	50%	
304		hand-collected	precaudal vertebra	1	Cod	L	4	4	8	60%	
304		hand-collected	precaudal vertebra	1	Cod	M	4	4	8	60%	
304		hand-collected	preopercular	1	Cod	L	4	4	8	40%	
304		hand-collected	precaudal vertebra	2	Cod	L	3	4	7	70%	
304		hand-collected	articular/right	2	Cod	VL	3	4	7	50%	
304		hand-collected	maxilar/right	1	Cod	L	4	4	8	60%	medial
304		hand-collected	maxilar/left	1	Cod	L	3	4	7	70%	proximal
304		hand-collected	premaxilla/left	1	Cod	L	3	4	7	70%	proximal
304		hand-collected	hyomandibular	1	Gadidae	VL	4	4	8	50%	
304		hand-collected	fragment	5	Unidentifiable	Unknown	4	5	9	5%	
305		hand-collected	precaudal vertebra	1	Cod	L	4	4	8	60%	
305		hand-collected	posttemporal	1	Gadidae	L	4	4	8	60%	
500		hand-collected	parasphenoid	1	Gadidae	L	4	4	8	60%	
500		hand-collected	caudal vertebra	1	Salmonidae	Adult	4	4	8	50%	
501	9	sieved	pterytgoid	1	Gadidae	S	4	4	8	60%	
501	9	sieved	fragment	1	Unidentifiable	Unknown	4	5	9	5%	
503	8	sieved	caudal vertebra	2	Herring	Adult	3	4	7	60%	
503	8	sieved	precaudal vertebra	1	Saithe	S	3	4	7	60%	

Table 17 continued											
Context	**Sample**	**Retrieval method**	**Element**	**No.**	**Species**	**Size**	**Erosion**	**Texture**	**Condition**	**Element % complete**	**Comments**
503	8	sieved	precaudal vertebra	1	Cod	L	3	4	7	70%	
503	8	sieved	branchiostegal	1	Gadidae	L	3	4	7	50%	
503	8	sieved	parasphenoid	1	Gadidae	M	4	4	8	40%	
503	8	sieved	fragments	4	Unidentifiable	Unknown	4	4	8	20%	

7.4. Mollusc and crustacean shell

By Catherine Smith

7.4.1. Introduction

A minimum of 10,294 mollusc shells, weighing 25.182 kg with a volume of 30.547 litres, was recovered from samples of soil taken during the excavations at Caird's Cave. The assemblage was dominated by periwinkle (*Littorina* cf *littorea*) and, to a lesser extent, limpet (*Patella* sp), although several other species are present in small numbers. In addition, a small quantity of crustacean shell was recovered. These species were being consumed and the volume of shells indicates that shellfish formed a major component of the diet for the inhabitants of Caird's Cave.

7.4.2. Methodology

Deposits from Trenches 1, 2, 3 and 5 were bulk sampled for mollusca and crustacean shell fragments, in order to quantify species present. The soil was wet-sieved through 5 mm, 4 mm and 1 mm sieves and all shell was collected from the residues; shell from the 5 mm-4 mm and 4 mm-1 mm residues was extracted under microscopy. The shells thus recovered were further washed and dried off-site in order to reduce the weight of soil matrix incorporated in the samples, since much soil remained trapped within the numerous gastropod shells. Shells were then quantified, weighed and the volume contained within each sample measured. Volume measurements stated in the tables below are necessarily approximate. The results obtained from the shell recovered from the >5 mm sieved residues form the bulk of this report. A small number of shells were also recovered by hand-excavation from deposits in Trenches 2, 3 and 5. These are tabulated separately.

The method of calculating the MNI (minimum number of individuals) involved counting only complete shells or apices, as recommended by Claassen (1998, 104-6). Incomplete shells were weighed but do not thus contribute to the MNI. This has the obvious disadvantage of some species being absent from the MNI count; fragile shells which are poorly preserved, such as the mussel (*Mytilus edulis*) may therefore be represented only by their weight or volume in the abundance tables.

7.4.3. Results: species present in the >5 mm sample residues

A number of bivalve and gastropod mollusc species were represented in the >5 mm sieved residues. These are catalogued by sample and context in Table 31 and summaries by sample are presented in Table 18 to Table 27.

Littorina species

Most abundant were the periwinkles (*Littorina* cf *littorea*) more usually known in the North-east of Scotland as wulks, wilks or even welks. These are not to be confused with the shellfish known in England as the whelk (*Buccinum ondatum*), a much larger species, popularly called the buckie in Scotland (Gaelic *bucull;* McAlpine 1877). The smaller flat periwinkles (*Littorina obtusata, L. mariae*) and two individuals tentatively identified as the rough periwinkle (*Littorina cf saxatilis*) are smaller than *L. littorea* and cannot have provided much food. They may have been collected coincidentally with seaweed. There are many difficulties in distinguishing between *Littorina* species when presented only with the empty shells, partly because identification may rest on different shell colours, which have almost certainly changed with time and burial. Other differences in the soft tissues, particularly the gonads, which are used to diagnose species are of no relevance to archaeological material in which only the hard shell survives.

Patella species

Limpets (*Patella* sp.) were second only in importance to wulks. There are several species of limpet but as these all have very similar shells, even more so in abraded or faded archaeological specimens, it is customary to describe them all as *Patella cf vulgata* (*cf* common limpet).

Nucella and Buccinum

Third in importance in the molluscan assemblage were the dog whelks (*Nucella lapillis*) and buckies (whelks: *Buccinum ondatum*)

Other molluscs and Crustacea

The remainder of the shell assemblage was made up of a surprisingly small volume of mussel fragments (most probably of the common mussel (*Mytilus edulis*) although the larger horse mussel (*Modiolus modiolus*) could not be ruled out). Tiny fragments of scallop (*Aequipecten opercularis*) were also present. A few complete shells of the blue-rayed limpet (*Helcion pellucidum*) and topshell (*Gibbula* sp) were also present. Finally, although fragments were generally small and undiagnostic, it was obvious that crustacea were also heavily exploited. Surviving fragments of cheliped, or claws were probably from the edible crab, *Cancer pagurus* (Gaelic and modern dialect Scots *partan*). Some of the crab shell was burnt.

Table 18: Summary of molluscan and crustacean shell from Sample 1, layer 103 (>5 mm sieved residues only)

Total volume of original unsieved Sample 1 = 24 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	560	91.6	1295	89.9	1050
Patella cf *vulgata*	39	6.4	122	8.5	158
Littorina cf *obtusata*	7	1.1	6	0.4	5
Nucella lapillis	5	0.8	16	1.1	15
Mytilus sp			>1	0.1	
Crustacea			>1	0.1	
Total	611	99.9	1441	100.1	1328

Table 19: Summary of molluscan and crustacean shell from Sample 2, layer 202 (>5 mm sieved residues only)

Total volume of original unsieved Sample 2 = 30 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	1006	81.3	3035	83.1	2358
Patella cf *vulgata*	199	16.1	543	14.9	850
Littorina cf *obtusata*	17	1.4	10	0.3	15
Nucella lapillis	12	1.0	47	1.3	50
Calliostoma sp	1	0.1	3	0.1	*
Mytilus sp	2	0.2	6	0.2	10
Aequipecten opercularis	1	0.1	>1	*	*
Crustacea			10	0.3	15
Total	1238	100.2	3655	100.2	3298

* volume is negligible

Table 20: Summary of molluscan and crustacean shell from Sample 4, layer 302 (>5 mm sieved residues only)

Total volume of original unsieved Sample 4 = 30 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	1178	81.4	2769	79.3	3095
Patella cf *vulgata*	212	14.6	590	16.9	1100
Littorina obtusata	26	1.8	21	0.6	30
Buccinum sp	3	0.2	8	0.2	25
Nucella lapillis	22	1.5	85	2.4	85
Helcion pellucidum	1	0.06	*		*
Mytilus sp	2	0.1	2	0.05	*
Aequipecten opercularis	4	0.3	2	0.05	*
Crustacea			15	0.4	15
Total	1448	100.0	3492	99.9	4350

* volume is negligible

Table 21: Summary of molluscan and crustacean shell from Sample 5, layer 205 (>5 mm sieved residues only)

Total volume of original unsieved Sample 5 = 30 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	747	83.7	1814	83.6	2030
Patella cf *vulgata*	122	13.7	308	14.2	530
Littorina obtusata	16	1.8	11	0.5	15
Nucella lapillis	5	0.6	25	1.2	30
Gibbula cf *cineraria*	1	0.1	>1	0.05	*
Mytilus sp	1	0.1	2	0.1	1
Crustacea			9	0.4	15
Total	892	100.0	2161	100.05	2611

* volume is negligible

Table 22: Summary of molluscan and crustacean shell from Sample 6, layer 304(>5 mm sieved residues only)

Total volume of original unsieved Sample 6 = 30 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	1369	76.1	3192	68.2	4050
Patella cf *vulgata*	369	20.5	1300	27.8	1300
Littorina obtusata	31	1.7	20	0.4	30
Nucella lapillis	24	1.3	137	2.9	150
cf *Buccinum*	1	0.05	>1	0.02	*
Helcion pellucidum	1	0.05	>1	0.02	*
Cerastoderma sp			1	0.02	*
Mytilus sp	3	0.2	10	0.2	10
Aequipecten			1	0.02	*
Crustacea			16	0.3	20
Total	1798	99.9	4679	99.9	5560

* volume is negligible

Table 23: Summary of molluscan and crustacean shell from Sample 7, layer 502 (>5 mm sieved residues only)

Total volume of original unsieved Sample 7 = 10 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	360	90.5	668	86.2	1020
Patella cf *vulgata*	30	7.5	97	11.2	150
Littorina cf *obtusata*	5	1.3	5	0.6	10
Nucella lapillis	3	0.8	12	1.5	10
Mytilus sp			>1	0.1	>1
Crustacea					>1
Total	398	100.1	775	99.9	1192

Table 24: Summary of molluscan and crustacean shell from Sample 8, layer 503 (>5 mm sieved residues only)

Total volume of original unsieved Sample 8 = 40 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	1218	87.2	2723	87.8	3080
Patella cf *vulgata*	152	10.9	340	11.0	600
Littorina cf *obtusata*	18	1.3	13	0.4	20
Littorina cf *saxatilis*	1	0.07	>1	0.03	*
Nucella lapillis	4	0.3	12	0.4	20
Gibbula cf *cineraria*	1	0.07	1	0.03	*
Mytilus sp	1	0.07	1	0.03	*
Ostrea edulis	1	0.07	>1	0.03	*
Crustacea			8	0.3	15
Total	1396	99.98	3101	100.02	3735

* volume is negligible

Table 25: Summary of molluscan and crustacean shell from Sample 9, layer 501 (>5 mm sieved residues only)

Total volume of original unsieved Sample 9 = 40 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	608	79.5	1418	75.0	2050
Patella cf *vulgata*	135	17.6	423	22.4	750
Littorina obtusata	18	2.4	12	0.6	15
Nucella lapillis	1	0.1	10	0.5	5
Gibbula cf *cineraria*	2	0.3	2	0.1	*
Mytilus sp	1	0.1	5	0.3	5
Crustacea			20	1.1	30
Total	765	100.0	1890	100.0	2855

* volume is negligible

Table 26: Summary of molluscan and crustacean shell from Sample 10, layer 207 (>5 mm sieved residues only)

Total volume of original unsieved Sample 10 = 4 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	127	96.9	295	91.6	470
Patella cf *vulgata*	3	2.3	17	5.3	30
Nucella lapillis	1	0.8	3	0.9	*
Crustacea			7	2.2	10
Total	131	100.0	322	100.0	510

* volume is negligible

Table 27: Summary of molluscan and crustacean shell from Sample 11, layer 210 (>5 mm sieved residues only)

Total volume of original unsieved Sample 11 =30 litres					
Species	**MNI**	**% abundance in sample**	**Weight (g)**	**%**	**Volume (ml)**
Littorina cf *littorea*	1365	87.9	3118	88.3	4025
Patella cf *vulgata*	153	9.9	374	10.6	650
Littorina cf *obtusata*	29	1.9	19	0.5	30
Littorina cf *saxatilis*	1	0.06	19	0.5	30
Nucella lapillis	4	0.3	8	0.2	10
Mytilus sp	1	0.06	2	0.06	*
Crustacea			11	0.3	20
Total	1553	100.12	3533	99.99	4735

* volume is negligible

The >5 mm sample residues contained a high proportion of shell, representing between 5.5% and 18.5% of the deposit by volume (Sample 1, layer 103 and Sample 7, layer 502, respectively). The *in situ* occupation deposits contain a minimum of 7.1% shell by volume (Sample 9, layer 501) and an average of 10.3%. *Littorina* and *Patella* shells are the by far the most common species present in the assemblage 85% and 13.8% of the assemblage by MNI and 81.2% and 15.1% of the shell assemblage by weight, respectively. The proportion of these two species is reasonably consistent, but *Patella* shells are poorly represented in layers 207, 103 and 502 at 2.3%, 6.4% and 7.5% respectively (Table 28). The respective volume of these species per soil sample is shown in Table 29.

Table 28: The representation of *Littorina* and *Patella* shells by MNI in the soil samples

		Species			
Sample No.	**Context**	***Littorina* Sp.**	***Patella* Sp.**	**Other Sp.**	**Grand Total**
1	103	92.5%	6.4%	1.1%	100.0%
2	202	82.6%	16.1%	1.4%	100.0%
4	302	83.0%	14.6%	2.3%	100.0%
5	205	85.5%	13.7%	0.8%	100.0%
6	304	77.8%	20.5%	1.7%	100.0%
7	502	91.7%	7.5%	0.8%	100.0%
8	503	88.5%	10.9%	0.6%	100.0%
9	501	81.9%	17.6%	0.5%	100.0%
10	207	96.9%	2.3%	0.8%	100.0%
11	210	89.8%	9.9%	0.4%	100.0%
Grand Total		85.0%	13.8%	1.2%	100.0%

Table 29: Summary comparison of *Littorina* and *Patella* by volume in each >5 mm sieved sample

Trench	Sample	Context	Sample volume (litres)	Volume *Littorina* (litres)	% *Littorina* in sample	Volume *Patella* (litres)	% *Patella* in sample
1	1	103	24	1.05	4.79	0.158	0.66
2	2	202	30	2.358	7.86	0.85	2.83
3	4	302	30	3.095	10.32	1.1	3.67
2	5	205	30	2.03	6.77	0.53	1.77
3	6	304	30	4.05	13.5	1.3	4.33
5	7	502	10	1.02	10.2	0.15	1.5
5	8	503	40	3.08	7.7	0.6	1.5
5	9	501	30	2.05	5.13	0.75	1.88
2	10	207	4	0.47	11.75	0.03	0.75
2	11	210	30	4.025	13.42	0.65	2.17

7.4.4. Results: 5 mm-4 mm and 4 mm-1 mm sieved residues

Numerous gastropods were identified, but all are very small (from approximately 2 mm to 4 mm high) and are presumed to be juveniles, with the exception of two adult shells from layer 501, and have been described as *Littorina* cf *littorea,* particularly since juveniles with spirally ridged shells may be confused with *L saxatilis* (Jackson 2008). Further detail is available in Table 32.

Table 30: Summary of hand-excavated shell

Trench	Context	Species	Details	Weight (g)
2	205	*Cancer* sp	cheliped	>1
2	210	*Ostrea edulis*	1 upper valve	75
2	210	*Mytilus edulis*	3 hinge; 7 fragments	9
2	210	Crustacea cf *Cancer* sp	18 cheliped; 16 leg/body fragments	30
2	210	*Patella* sp	2 fragments	1
3	304	*Ostrea edulis*	1 lower valve; 1 upper valve; 1 fragment	91
3	304	*Aequipecten opercularis*	8 hinge; 11 fragments	20
3	304	cf *Buccinum* sp	1 columella; 2 fragments	21
3	304	*Nucella lapillis*	3 fragments	3
3	304	*Patella* sp	4 fragments	6
3	304	Mollusc	1 fragment	4
3	304	Crustacea cf *Cancer* sp	34 cheliped; 14 fragments	56
3	304	Unidentified mollusc	perforated by parasitic organism	3
3	304	*Mytilus edulis*	2 hinge; 1 fragment	6
3	304	cf *Littorina* sp	1 fragment (poor condition)	2
3	304	Gastropoda	2 thick fragments	3
3	306	*Ostrea edulis*	1 ?lower valve	23
3	306	cf *Buccinum*	1 apex	2
5	500	Patella	1 apex	2
5	500	Crustacea cf *Cancer* sp	6 cheliped; 1 body fragment	7
5	501	*L*. cf *obtusata*	1	2
5	501	*Patella* sp	2 fragments	3
5	501	cf *Buccinum*	1 columella; 1 parasitised fragment	10
5	501	Mytilus edulis	1 fragment	>1
5	501	Small bivalve	1 fragment	1
5	501	Unidentified mollusc	1 fragment	1
5	501	Crustacea cf *Cancer* sp	16 cheliped; 34 body fragments	30

7.4.5. Results: hand-collected shell

The hand-collected shell is dominated by unsystematically retained fragments of crustacean, particularly cheliped (claws), and other common mollusc shell species (Table 30). Less common shells, such as those of oyster (*Ostrea edulis*), scallop (*Aequipecten opercularis*) and mussel (*Mytilus*

edulis), were specifically collected, but the small number recovered highlights their rarity in the assemblage.

7.4.6. Discussion

Distinct biases are apparent in the shell assemblages from Caird's Cave, depending on the method of sampling. The 4 mm-1 mm and 5 mm-4 mm sample residues contain, as might be expected, small fragments from both marine molluscs and crustaceans. However, complete individual wulks and dog whelks, measuring only a few millimetres in size, were abundant. These shells are from juveniles and would certainly not have been collected deliberately as they are too tiny to be of use for food or bait. The method by which they arrived in the cave is therefore of interest. One likely explanation for their presence is that they were transported there fortuitously, attached to seaweeds. Flat periwinkles (*Littorina obtusata* and *L. mariae*) are herbivores with a preference for the seaweeds *Ascophyllum nodosum* (egg wrack) and *Fucus serratus* (saw wrack) respectively (Williams 1990) while *L. littorea* is also to be found on wracks. It is probably no coincidence that these are seaweeds which have been economically important in the production of kelp, a substance much in demand in industrial processes such as glass-making, soap-making and bleaching from the late 17th to the early 19th centuries (Thomson and Coull 2008, 151). Kelp production contributed greatly to the economy of the Scottish highlands and islands in this period although those who carried out the unpleasant task of kelp-burning derived far less benefit from the process than did the landowners (ibid). Seaweed was also collected for use as fertiliser (Fenton 2008, 135-50), dried for use as fuel (Fenton 1978, 206-7) or even used as cattle feed in winter (ibid 428), in all of which it seems to have been of great importance to those living in coastal communities.

The larger shells from adults are predominantly from wulks (*L. littorea*), which are still exploited for food in Scotland today. They are easily obtained from rocks on the shoreline and are widely distributed around the British coast (Jackson 2008). A trip to a local fish shop in Perth revealed that wulks (picked in Aberdeenshire) are currently being sold by weight. However, in the recent past (the 1960s) they were sold by volume, most conveniently measured out in a pint tumbler (Bob Smith pers. comm.). A pint of boiled wulks, accompanied by bread and butter would have made a supper for one hungry person or a snack for two people (David Bowler pers. comm.). Marian MacNeill, an authority on Scottish food, recommends that a 'small pail-full' is needed to make a good winkle soup, as eaten in the Hebrides prior to 1929 (1974, 126). The *c*. 3 litres (5.3 pints) of wulks from Sample 4 might therefore provide a good meal for about 11 people. This certainly puts the quantities of shells recovered from Caird's Cave into proportion; although the volume of shells seems large, the meat would have served a limited number of people.

Dog whelks (*Nucella lapillis*) have much thicker shells than Littorea species, and it is interesting that some of the shells from Caird's Cave have been broken. While a purple dye may be obtained from this species, the quantity of shells needed to produce it is very large, in comparison to the numbers retrieved from the site, so this explanation for their presence is unlikely. Instead, they were probably eaten, although nowadays they are shunned by winkle pickers, and removed from gathered shell collections by the fishmonger. The species' carnivorous habits and its predilection for attaching itself to carrion may account for the fact that it is considered 'unclean' and not usually eaten at the present day. However, this was not always so, and it was certainly consumed at several prehistoric shell midden sites in the north of Scotland studied as part of the Scotland's First Settlers Project (Milner 2004; 2007). Ray Mears (2007, 64) has also observed that 'they make good eating' and that future experimental archaeology might identify the best way to prise the meat out of the thick shells.

It is also interesting that the people who were using Caird's Cave do not seem to have troubled themselves much with obtaining shellfish from other than the rocks of the upper and middle shore, where species such as wulks, limpets and mussels are plentiful. To obtain oysters would require more effort in collection from below the shore line, by raking or dredging, and there is little evidence that they were exploited other than from a few shells recovered from the hand-excavated sample. It may be that oysters were never plentiful in the area, although they have been recovered from fieldwalking sites around the Beauly Firth, such as Tarradale House. Similarly cockles are burrowers in shallow sand and would have to be dug for at low tide, and apart from a few tiny fragments, they do not seem to have been exploited. Scallops too require some effort as recovering them from their sublittoral habitat requires dredging from boats.

Table 31: Catalogue of mollusc shell from >5 mm soil residues

Trench	Sample	Context	Species	MNI	weight (g)	vol (ml)
1	1	103	Littorina littorea	560	1170	1000
1	1	103	Littorina (frags)		125	150
1	1	103	Patella sp	39	62	100
1	1	103	Patella sp		60	58
1	1	103	Littorina obtusata	7	6	5
1	1	103	Nucella lapillis	5	16	15
1	1	103	Helicidae	2	>1	
1	1	103	Mytilus edulis		>1	
1	1	103	Crustacea		>1	
1	1	103	Unidentified		>1	
1	1	103	Mammal bone		5	
2	2	202	Littorina littorea	1006	3000	2313
2	2	202	Littorina (frags)		35	45
2	2	202	Patella sp	199	356	600
2	2	202	Patella (frags)		187	250
2	2	202	Nucella lapillis	12	47	50
2	2	202	Littorina obtusata	17	10	15
2	2	202	Mytilus edulis	2	6	10
2	2	202	Calliostoma zizyphinum	1	3	
2	2	202	Barnacle	1	>1	
2	2	202	Scallop (frag)	1	>1	
2	2	202	Crustacea		10	15
2	2	202	Fish bone		>1	
2	2	202	Mammal bone		>1	
2	2	202	Unidentified mollusc		72	60
3	4	302	Littorina littorea	1178	2734	3050
3	4	302	Littorina (frags)		35	45
3	4	302	Littorina (operculum)	1		
3	4	302	Patella sp	212	453	950
3	4	302	Patella (frags)		137	150
3	4	302	Nucella lapillis	22	85	85
3	4	302	Littorina obtusata	26	21	30
3	4	302	Helcion pellucidum	1	>1	
3	4	302	Mytilus edulis	2	2	
3	4	302	Aequipecten opercularis	4	2	
3	4	302	Buccinum ondatum	3	8	25
3	4	302	Gastropod	1	1	
3	4	302	Bivalve cf Veneridae		1	
3	4	302	Cepea sp	1	>1	
3	4	302	Crustacea		15	15
3	4	302	Unidentified mollusc		81	75
2	5	205	Littorina littorea	747	1793	2000
2	5	205	Littorina (frags)		21	30
2	5	205	Patella sp	122	222	400
2	5	205	Patella (frags)		86	130
2	5	205	Nucella lapillis	5	25	30
2	5	205	Littorina obtusata	16	11	15
2	5	205	Mytilus edulis	1	2	1
2	5	205	Gibbula cf cineraria	1	>1	
2	5	205	Bivalve		>1	
2	5	205	Solenidae (Razorshell)		>1	
2	5	205	Crustacea		9	15
2	5	205	Unidentified mollusc		36	30
2	5	205	Mammal tooth	1		
3	6	304	Littorina littorea	1369	3131	4000
3	6	304	Littorina (frags)		61	50
3	6	304	Patella sp	369	774	1000
3	6	304	Patella (frags)		225	300
3	6	304	Helcion pellucidum	1	>1	
3	6	304	Nucella lapillis	24	112	150
3	6	304	Nucella (frags)		25	25
3	6	304	Littorina obtusata	31	20	30
3	6	304	cf Buccinum	1	>1	
3	6	304	Mytilus edulis	3	10	10
3	6	304	Aequipecten opercularis		1	
3	6	304	Barnacle	2	2	
3	6	304	Cerastoderma sp		1	
3	6	304	Crustacea		16	20

Table 31: Catalogue of mollusc shell from >5 mm soil residues, continued						
Trench	**Sample**	**Context**	**Species**	**MNI**	**weight (g)**	**vol (ml)**
3	6	304	Unidentified		73	70
3	6	304	?calcined bone		>1	
5	7	502	Littorina littorea	360	653	1000
5	7	502	Littorina (frags)		15	20
5	7	502	Patella sp	30	53	100
5	7	502	Patella (frags)		34	50
5	7	502	Nucella lapillis	3	12	10
5	7	502	Littorina obtusata	5	5	10
5	7	502	Mytilus edulis		>1	>1
5	7	502	Crustacea		2	>1
5	8	503	Littorina littorea	1218	2667	3000
5	8	503	Littorina (frags)		56	80
5	8	503	Patella sp	152	238	450
5	8	503	Patella (frags)		102	150
5	8	503	Nucella lapillis	4	12	20
5	8	503	Littorina obtusata	18	13	20
5	8	503	L. cf saxatilis	1	>1	
5	8	503	Gibbula cf cineraria	1	>1	
5	8	503	Mytilus edulis	1	1	
5	8	503	Ostrea edulis	1	>1	
5	8	503	Crustacea		8	15
5	8	503	Unidentified mollusc	54	40	
5	8	503	Mammal bone		3	
5	9	501	Littorina littorea	608	1380	2000
5	9	501	Littorina (frags)		38	50
5	9	501	Littorina (operculum)	1		
5	9	501	Patella sp	135	227	500
5	9	501	Patella (frags)		196	250
5	9	501	Nucella lapillis	1	10	5
5	9	501	Littorina obtusata	18	12	15
5	9	501	Gibbula cf cineraria	2	2	
5	9	501	Mytilus edulis	1	5	5
5	9	501	Crustacea		20	30
5	9	501	Unidentified mollusc		55	45
5	9	501	Mammal bone		2	
2	10	207	Littorina littorea	127	283	450
2	10	207	Littorina (frags)		12	20
2	10	207	Patella sp	3	12	25
2	10	207	Patella (frags)		5	5
2	10	207	Nucella lapillis	1	3	
2	10	207	Crustacea		7	10
2	10	207	Mammal bone		>1	
2	11	210	Littorina littorea	1365	3094	4000
2	11	210	Littorina (frags)		24	25
2	11	210	Patella sp	153	293	550
2	11	210	Patella (frags)		81	100
2	11	210	Nucella lapillis	4	8	10
2	11	210	Littorina obtusata	29	19	30
2	11	210	L. cf saxatilis	1	1	
2	11	210	Mytilus edulis	1	2	
2	11	210	Unidentified mollusc		65	60
2	11	210	Crustacea		11	20

Table 32: Catalogue of mollusc shell from 5-4 mm and 4-1 mm soil residues

Trench	Context	Sample	Species	4-1 mm residue	5-4 mm residue
1	103	1	*L.* cf *littorea*		11
1	103	1	*Patella* sp	1	
1	103	1	Mollusc fragments	+	
1	103	1	Crustacean fragments	+	1
2	202	2	*L.* cf *littorea*	1	18
2	202	2	*L.* cf *obtusata*		12
2	202	2	*Nucella lapillis*		1
2	202	2	*Patella* sp		1
2	202	2	Mollusc fragments	+	+
2	202	2	Crustacean fragments	+	+
3	302	4	*L.* cf *littorea*	2	+++
3	302	4	*L* cf *obtusata*		+
3	302	4	*Helcion pellucidum*		1
3	302	4	*Patella* sp		3
3	302	4	Mollusc fragments	+	+
3	302	4	Crustacean fragments	+	++
2	205	5	*L.* cf *littorea*		8
2	205	5	*L.* cf *obtusata*	1	6
2	205	5	*Patella* sp		1
2	205	5	Mollusc fragments (including mussel)		++
2	205	5	Crustacean fragments	++	++
3	304	6	*L.* cf *littorea*	1	10
3	304	6	*L.* cf *obtusata*		4
3	304	6	cf *Mytilus*		1
3	304	6	Mollusc fragments	+	
3	304	6	Crustacean fragments	+	
5	502	7	*L.* cf *littorea*	1	6
5	502	7	*L.* cf *obtusata*	1	2
5	502	7	cf *Mytilus*		
5	502	7	Mollusc fragments	+	+
5	502	7	Crustacean fragments	++	+
5	503	8	*L.* cf *littorea*	4	23
5	503	8	*L.* cf *obtusata*	5	9
5	503	8	*Nucella lapillis*		1
5	503	8	cf *Mytilus*		
5	503	8	*Turritella communis*		1
5	503	8	Mollusc fragments	+	+
5	503	8	Crustacean fragments	+	+
5	501	9	*L.* cf *littorea*	5	26 + 1 adult
5	501	9	*L.* cf *obtusata*	2	14 + 1 adult
5	501	9	*Hinia* cf *reticulata*		1
5	501	9	Mollusc fragments	+	++
5	501	9	Crustacean fragments	++	++
2	207	10	*L.* cf *littorea*	6	3
2	207	10	*L.* cf *obtusata*		
2	207	10	Mollusc fragments	+	
2	207	10	Crustacean fragments	+	+
2	210	11	*L.* cf *littorea*	1	34
2	210	11	*L.* cf *obtusata*	1	12
2	210	11	*Patella* sp		1
2	210	11	*Mya* sp		1
2	210	11	Terrestrial mollusc	1	
2	210	11	Mollusc fragments	+	+
2	210	11	Crustacean fragments	+	+++

\+ 1-10 fragments approximately
++ 11-20 fragments approximately
+++ 21-30 fragments approximately

8. Radiocarbon dating

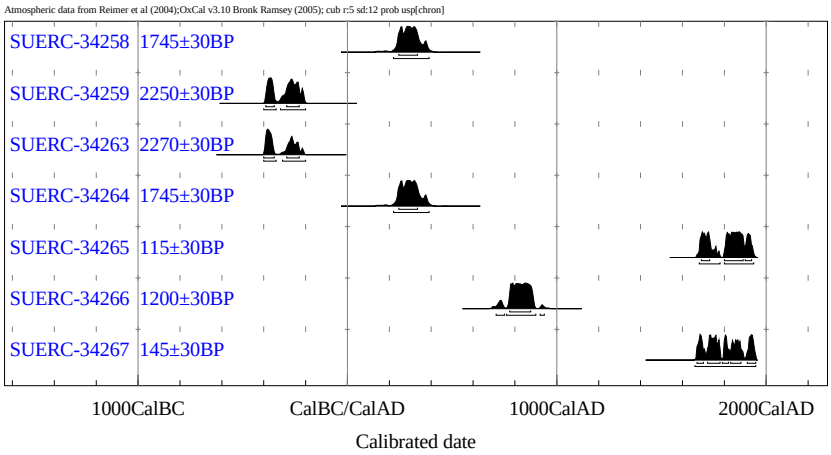
8.1.1. Introduction

Seven samples were submitted to the Scottish Universities Environmental Research Centre (SUERC) for AMS dating. Three samples were selected from *in situ* occupation deposits in Trench 2 with the aim of clarifying the date of these remains in the absence of chronologically diagnostic artefacts. A further four samples of worked bone from Maclean and Hall's excavation were selected from the NMS collections by Trevor Cowie. The latter dates were intended to clarify the date of the worked bone in Maclean's collection, and by association the date of the deposits he excavated. A summary of the samples and results is presented in Table 33 and Figure 11; certificates are reproduced in Appendix 2.

Table 33: Summary of radiocarbon samples and results

Sample No.	Context/ Accession No.	Sample type	Radiocarbon age BP	Calibrated (95.4% confidence)	Calibrated (68.2% confidence)
SUERC-34258 (GU-23932)	CC'10, layer 203	Splintered bone shaft fragment of a medium-sized mammal	1745±30	220-390 AD	245-335 AD
SUERC-34259 (GU-23933)	CC'10, layer 210	Splintered bone shaft fragment of a medium-sized mammal	2250±30	400-200 BC	390-230 BC
SUERC-34263 (GU-23934)	CC'10, layer 210	Pine charcoal	2270±30	400-200 BC	400-230 BC
SUERC-34264 (GU-23935)	NMS: X.HM 248	Red deer antler handle; antler beam handle cut on both sides but one end partially split away. Outer surface made smooth.	1745±30	220-390 AD	245-335 AD
SUERC-34265 (GU-23936)	NMS: X.HM 276	Worked bone; section of leg bone of ox, end sawn across, cancellous tissue removed, other end broken.	115±30	1680-1940 AD	1690-1930 AD
SUERC-34266 (GU-23937)	NMS: X.HM 443	Worked red deer antler; split piece of beam	1200±30	710-940 AD	775-875 AD
SUERC-34267 (GU-23938)	NMS: X.HM 444	Worked long bone of large ungulate	145±30	1660-1950 AD	1670-1950 AD

Figure 11: Calibrated radiocarbon dates



8.1.2. Results

Two dates were obtained for *in situ* occupation horizon 210 at the base of the cave. The first date on pine charcoal (SUERC-34263) calibrates to 400-230 cal BC at 68.2% confidence, while the second on a splinter of medium mammal bone (SUERC-34259) yielded a consistent date of 390-230 cal BC at 68.2% confidence. These dates indicate that earliest deposits present in the cave are Iron Age, dating from the 4th or 3rd century BC. A single date of 245-335 cal AD at 68.2% confidence (SUERC-34258) was obtained on a splinter of animal bone from deposit 203 located toward the top of the *in situ* sequence. This date has to be treated as a *terminus post quem* for the formation of deposit 203, as it is based on a splinter of bone, but it does indicate that the surviving stratigraphic sequence spans at least 500 years. The presence of this comparatively early date at the top of surviving stratigraphic sequence also indicates that Maclean and Hall's excavations have, in all probability, entirely removed any early historic deposits relating to the amber inlaid pin which they found.

The dates on the worked bone recovered by Maclean exhibit considerable variation and indicate that cave was a focus for activity in several periods. A date of 245-335 cal AD at 68.2% confidence (SUERC-34264) was obtained on a handle manufactured from red deer antler. This date precisely correlates with the date obtained on a bone splinter from the *in situ* layer 203 and indicates that Maclean and Hall excavated deposits of a comparable date elsewhere in the cave; in this respect it is notable that the rear of the cave was excavated to bedrock. A second piece of worked red deer antler yielded a considerably later date of 775-875 cal AD at 68.2% confidence (SUERC-34266). This date is notable as Dr S. Foster (1990) proposed an 8th or early 9th century date for the amber inlaid pin from the cave and this date confirms activity during this period. The two remaining dates, both on pieces of worked cattle bone, fall in the post medieval/modern periods (SUERC-34265, 1690-1930 cal AD at 68.2% confidence; SUERC-34267, 1670-1950 cal AD at 68.2% confidence). The wider significance of these dates is explored in the discussion below.

9. THE NATURE AND EXTENT OF THE PREVIOUS EXCAVATIONS

9.1. Was Caird's Cave Maclean's 'Cave'?

The recent investigation has confirmed that Caird's Cave was previously excavated and that this activity removed a significant depth of archaeological deposits from the cave's interior and left a substantial spoil-heap outside the cave's entrance.

The character of the occupation debris in the spoil-heap correlates with the brief description of the 'shell midden' deposits excavated by Maclean (1913). The bone pins recovered from the current excavations can be paralleled with the artefacts in Maclean's collection. Moreover, recent artefacts contained within the spoil-heap, including clay pipe fragments, indicate that the excavation occurred in the early years of the 20th century. These points provide a very strong indication that Caird's Cave was the cave that Maclean and Hall excavated.

9.2. Reconstructing Maclean and Hall's excavation strategies

9.2.1. The style of excavation

Maclean and Hall's excavation strategy can be partially re-constructed from the excavation evidence although additional detail may be gleaned from further excavation of the cave and spoil-heap. The identification of talus at the base of the spoil-heap indicates that this material was removed from the cave at the very beginning of the excavation. The talus was certainly removed from the surface of Trench 5 and the majority of Trench 2, although it does not appear to have been removed from beyond the cave entrance to the north western side of Trench 2. This process would have revealed the extent of the occupation deposits within the cave.

The series of dumped horizons in Trench 3 (304 and 302) indicate that occupation deposits were then excavated. No excavation edges were identified within the cave, so it was not possible to determine if the cave was excavated systematically, for example within squares or trenches, or by more *ad hoc* excavation. The absence of deposits from the south eastern half of the cave and the rear of the cave, however, indicate that the deposits in these areas were systematically removed. The presence of encrusted shell on the cave wall at a maximum height of 9.46 m above O.D. to the west of Trench 5 may imply that the deposits were originally deepest to the rear of the cave, and for this reason they may have been removed, while the deposits on the north eastern side of the entrance were comparatively thin and left untouched.

9.2.2. The nature of artefact recovery

Re-excavation of the spoil-heap indicates that numerous pieces of worked bone and stone, and occasional pottery sherds, were either missed or deliberately not retained during the original the excavation. The presence of these materials throughout the sequence may indicate that: 1) the deposit was not sieved; 2) artefacts were not identified by the excavators; or, 3) decisions over artefact retention were made while the deposit was being excavated either by Maclean or Hall, or by the workmen. The third option appears most probably as the Maclean's collection of artefacts is almost entirely composed of worked and utilised pieces of bone while artefacts of stone, pottery and small fragments of bone, which dominate the assemblage from the re-excavated spoil-heap, are notably absent. This degree of selectivity is likely to reflect Maclean's interests, regardless of whether he personally collected the artefacts or advised the workmen.

The recovery of four medieval pottery sherds from the spoil-heap is of particular interest as these may imply that pottery was not collected. It may be that pottery was only recovered from certain levels and that it was deliberately not retained as it was considered to be of recent origin. This view may be supported by the identification of thirteen bone fragments in the Maclean Collection that were not originally catalogued upon deposition in the NMS in 1931 and were labelled 'From the collection of Dr Maclean, Dingwall. Objects of bone and horn probably not old & therefore not registered' (X.HM 434-447). Visually these bones are no different from the others in the collection, so it is possible that the note reflects information provided at the time of deposition. However, two of these bone artefacts were radiocarbon dated and one proved to be early historic (SUERC-34266, 775-875 cal AD at 68.2% confidence) while the other was post-medieval/modern (SUERC-34267, 1670-1950 cal AD at 68.2% confidence). The reliability of the information in this note can therefore be questioned.

9.3. Nature of the surviving *in situ* deposits

The recent excavations demonstrated that *in situ* deposits survive in the south east quadrant of the cave, despite the removal of deposits up to 1 m in depth from the western side and rear of the cave. These deposits are up to 0.6 m deep and comprise a series of distinct well stratified occupation layers that have been punctuated by episodes of roof collapse. The presence of 20th century artefacts in the talus deposits directly overlaying the occupation layers, and a few artefacts within the upper occupation layer 501, indicate that the original overlying deposits have been removed, probably by Maclean and Hall's excavation. This raises the possibility that overlying occupation layers may also have been removed; an assertion supported by the presence of shell encrusted on the cave wall at 9.46 m above O.D. and a small area of midden deposits adhering to the wall of the

cave above Trench 5. However, the sequence in Section 5 (Figure 5) along at the front of the cave does not appear to have been truncated. This implies that the surviving stratigraphy may represent only a thin sequence, potentially extending into the north eastern corner of the cave and outside the cave to the west, that were peripheral to deeper deposits present toward the rear of the cave.

9.4. Preservation and conservation

9.4.1. Caird's Cave

The excavation provided no evidence for significant roof-falls or collapse since the previous excavations. The structure of the cave is therefore considered stable. The cave has however been disfigured by graffiti and sooting from recent fires within the cave.

9.4.2. In situ archaeological deposits

The excavation has revealed the presence of *in situ* deposits within north-eastern half of the cave. These are currently sealed by upwards 0.3 m of talus that has eroded into the cave since the previous excavations. This deposit is protecting the *in situ* deposits from activity and foot traffic within the cave and the depth of this deposit is likely to increase with time, further protecting the archaeological remains.

9.4.3. Archaeological deposits outside the cave

The spoil-heap of Maclean and Hall's excavation has been demonstrated to have considerable archaeological potential. The spoil-heap contains numerous artefacts that were not collected during the original excavation that have considerable potential to add to the story of human activity on the site. The structure of the spoil-heap also has considerable potential to reveal further details regarding the methodology of the previous excavation and the character of deposits encountered.

The spoil-heap is currently subject to erosion from foot traffic and bracken roots have already significantly disturbed and homogenised upper layers of the mound. The mound is also susceptible to animal burrowing and the southern end of the mound exhibits considerable disturbance. The archaeological potential of the spoil-heap is considered to be under threat from natural agencies and will be subject to deterioration over time.

9.4.4. The structure

The form of the structure recorded in the current excavations is comparable to the HER record from 1966 and no deterioration appears to have occurred. The structure is largely buried and is under no immediate threat.

10. DISCUSSION

The current excavations have demonstrated that Caird's Cave was previously excavated and, on the basis of similarities in the archaeological deposits and finds, it is argued that these early investigations were those of Dr Maclean and Colonel Hall, undertaken between 1907 and 1912. The results of the recent excavations and radiocarbon dating can therefore be used to place Maclean's collection of worked bone and bone working debris in context.

The surviving stratigraphy and radiocarbon dating provide evidence that Caird's Cave witnessed activity on numerous occasions between the Iron Age and the modern day; no evidence for earlier prehistoric activity, in the form of stone tools or pottery, was identified. The recent excavations revealed a shallow depth of surviving *in situ* deposits dated between the 4th or 3rd century BC and the 2nd or 3rd century AD. These *in situ* horizons can be characterised as shell-rich occupation deposits. The presence of numerous shells of periwinkles and, to a lesser extent, limpets and crabs, indicate that easily obtainable resources from the shore provided a significant contribution to the local diet. In contrast, the remains of fish and land mammals were scarce and these species may have only been consumed occasionally. The excavations provide little indication of activities associated with these early deposits.

The 2nd or 3rd century AD date obtained for the top of the preserved stratigraphic sequence indicates that all later archaeological deposits were probably removed from Caird's Cave by Maclean and Hall's excavation. In the absence of *in situ* stratigraphy, the date and nature of any later activity can only be deduced from the re-excavation of Maclean and Hall's spoil-heap and analysis of the small number of artefacts retained by Maclean. These indicate that the cave witnessed multiple episodes of activity, although the duration of each event is not known. A radiocarbon date on a piece of worked antler indicates activity in the 7th or 8th century AD and this is corroborated by the 8th or early 9th century AD date proposed for the amber inlaid pin recovered by Maclean. In addition, three sherds of Scottish Red Ware indicate activity in the 13th- 15th centuries AD and radiocarbon dates on two piece of worked cattle bone indicate activity at some point from the 16th century to the modern day. It is therefore reasonable to conclude that the Caird's Cave contained a complex stratigraphic sequence, which was not identified or understood in Maclean and Hall's excavations.

Re-excavation of Maclean and Hall's spoil-heap revealed that it was largely composed of shell-rich occupation horizons, comparable to the *in situ* deposits surviving in the cave. This may indicate that the deposits from all periods were rich in shell fish, but it is more likely that Maclean and Hall's excavation admixed discrete early historic and later deposits with the later prehistoric midden. A few significant differences can, however, be observed between the composition of the *in situ*

deposits and those in the spoil-heap. Firstly, fish bone, which was all but absent from the *in situ* deposits, was comparatively common in the spoil heap. These bones were predominately of cod, although haddock and saithe were also present, and include the remains of both juvenile and adult fish; the former reflect inshore fishing while the latter would have been obtained from offshore fishing. The spoil heap was also the only context to yield the bones seabirds that may have been consumed. The presence of the bones of fish and sea birds may indicate changes in the post 2nd or 3rd century diet, although it is unclear in precisely which period these species were consumed.

The high proportion of worked bone and antler objects in Maclean's collection previously appeared to indicate that Caird's Cave was a centre for the manufacture of bone artefacts, potentially in the early historic period due to the presence of the amber inlaid pin. The recent excavations recovered two further pins and a quantity of cut, sawn and split pieces of bone that may reflect bone working, however the recent excavations also recovered a broad range of other materials and tools, particularly of stone, that were not retained by Maclean and Hall. The emphasis on worked bone and antler in Maclean's collection therefore results from collection bias during the original excavation. Bone working should therefore be viewed as one of a range of activities, rather than the primary activity at this location. Moreover, many of the bone tools are broken or worn, indicating that they were probably used at this location. The range of bone tools, such as pins, needles and spatula, along with stone burnishers, may be indicative of various activities, including leather and vellum working. Therefore, it is possible that Caird's Cave was a workshop, comparable to those identified at Portmahomack, which served the nearby early historic monastic site at Rosemarkie. Radiocarbon dating, however, indicates that the worked bone and bone working debris derives from several disparate episodes of activity in 3rd or 4th century AD, early historic and post medieval to modern periods. This spread of dates raises several problems as, beyond the four dated pieces of worked bone, it is unclear from which periods the other worked bone artefacts are derived. It is therefore not possible to assign these artefacts, including the pins, needles and spatula to a specific period of activity.

The archaeological evidence for the use of the Caird's Cave by travelling people is comparatively sparse, but the some of the late 19th and early 20th century artefacts may relate to this activity. Moreover, two pieces of worked cattle bone radiocarbon dated to the post-medieval or modern periods and various metal off-cuts indicate that some craft activity was being undertaken at this location. It is, however, unclear what was being manufactured. In addition to the artefactual evidence, the structure in Trench 4, while originally well constructed and possibly intended for use in

the Salmon fishing industry, exhibits several phases of *ad hoc* construction that may relate to more ephemeral use of the site by travellers, such as 'Captain' Devine in the early 20th century.

11. RECOMMENDATIONS

The recent excavations at Caird's Cave have yielded significant discoveries that provide additional context for an important collection of worked bone and bone working debris, which include a rare early historic amber inlaid pin. It is, therefore, recommended that a journal article is prepared for submission to the *Proceedings of the Society of Antiquaries of Scotland*. This article will concisely summarise results of the excavations at Caird's Cave and incorporate additional reporting and discussion of Maclean's collection held in the NMS. A publication proposal is outlined below:

Title: Caird's Cave, Rosemarkie: Dr William Maclean and Colonel William Hall's 1902-1912 excavations in context

Introduction (100 words)

Location, geology and topography (150 words, 1 figure)

Archaeological and historical background (500 words)

Maclean's collection of worked bone (750 words, 1 table, 3 plates)

Archaeological description (2000 words, 6 figures, 3 plates)

Specialist reports:

Worked bone (200 words, 2 plates)

Worked stone (400 words, 2 plates)

Other artefacts (400 words)

Animal bone (500 words, 2 tables)

Fish bone (300 words, 1 table)

Bird and micro-fauna (200 words, 2 tables)

Shell (500 words, 2 tables)

Radiocarbon dating (300 words, 1 table, 1 figure)

Discussion (1000 words)

Conclusion (200 words)

Acknowledgements

Bibliography

Total: 7500 words, 8 figures, 10 plates and 9 tables.

12. ACKNOWLEDGEMENTS

The Caird's Cave excavation was directed by the Rosemarkie Caves Project. The Steering Committee, Dr Eric Grant (Chair), Simon Gunn (Secretary/Coordinator), Alastair Morton, John Wood and John Wombell, and the author, would like to express our deep gratitude to many people who have made this project possible. Firstly, we would like to thanks Phillip Anderson for permission to excavate on his land, Scottish Natural Heritage for granting permission to excavate in a SSSI, and our sponsors: Highland Council Black Isle Ward Discretionary Fund; Highland LEADER 2007-13; The Cromarty Firth Port Authority; The Cromarty Trust; Groam House Museum; Fortrose & Rosemarkie Common Good Fund; Workers' Education Association (North Highland Local Association); Mr Neil MacKinnon and Mr Donald Cameron. Six radiocarbon dates were also funded by the NMS. Without your support this project could not have happened.

We are also very grateful to the following people for advice and assistance with various administrative, logistical and practical tasks: Cait McCullagh, Chris & Dave Rendell, Ingrid Rochford, Steven Grigor, Paul Monk, Paul Young, Douglas Simpson (Fortrose Academy), Anne Law & Imogen Young (Resolis Primary School), Liz Whiteford and Diane Agnew. The project has also received archaeological advice and support from: Trevor Cowie & Alison Sheridan (National Museum of Scotland), Tom Dawson (SCAPE), Stephen Birch (University of Aberdeen), Barbara Cohen (Groam House Museum), plus Anne Coombs, David Findlay, Meryl Marshall and many other members of NOSAS (North of Scotland Archaeological Society). Thanks are also due to Derek Hall for identifying the medieval pottery sherds.

The excavation team was: Tim Blackie, Ben Brown, Duncan Collard, Olivia Dalsème, Brian Duff, Paul Dungey, David & Susan Findlay, Jonie & Richard Guest, Bob & Rosemary Jones, Elspeth Kennedy, Matthew MacDonald, Allan MacKenzie, Paul Monk, Christine and Fraser Simpson, Illya Sparkes-Santos, Samantha Williamson, Christine Yuill, Amelia Donald, William Fraser and Elliot Stirling.

Catherine Smith would like to thank Eric Grant for picking over and extracting shell fragments from the 1 mm and 4 mm samples, a tedious and time-consuming task if ever there was one. Thanks are also due to the staff of *Granite City Fish* shop, South Street, Perth and to Gerry Boylan, Bob Smith and David Bowler, for sharing recollections and advice about wulks, whelk-stalls and related matters.

13. BIBLIOGRAPHY

Anon. 1913 Report on Inverness Scientific Society and Field Club Meeting, 11 February 1913. *Transactions of the Inverness Scientific Society and Field Club 1912-1918* **8***,* 42.

Anon. 1931 Donations to the Museum. *Proceedings of the Society of Antiquaries of Scotland* **65**, 411-412.

Anson, P. 1950 *Scots Fisherfolk*. The Saltire Society, Edinburgh.

Barrett, J. H., Nicholson, R. A. and Ceron-Carrasco, R. 1999 Archaeo-icthyological Evidence for Long-Term Economic Trends in Northern Scotland: 3500 BC to 1500 AD. *Journal of Archaeological Science* **26**:4, 353-388.

Binford, L. R. 1981 *Bones: Ancient Men and Modern Myths*. Academic Press, London.

Ceron-Carrasco, R. 2004 Specialist Report: High Pasture Cave, Skye: Analysis of the Fish Remains. http://high-pasture-cave.org.

Ceron-Carrasco, R. 2005 Specialist Report: High Pasture Cave, Skye: Analysis of the Fish Remains. http://www.high-pasture-cave.org.

Ceron-Carrasco, R. 2005 The fish remains from Glassknapper's Cave, Antler Cave and Wetweather Cave, in Pollard, T. The excavation of four caves in the Geodha Smoo near Durness, Sutherland. *Scottish Archaeological Internet Reports*, **18**.

Coull, R. J. 1996 *The Sea Fisheries of Scotland: A Historical Geography*. John Donald, Edinburgh.

Claassen, C. 1998 *Shells*. Cambridge Manuals in Archaeology. Cambridge.

Davis, S. J. 1995 *The Archaeology of Animals*. Routledge, London.

Emery, K. F. 2008 Techniques of Ancient Maya Bone Working Evidence from a Classic Maya Deposit. *Latin American Antiquity* **19**:2, 204-221.

Fenton, A. 1978 *The Northern Isles: Orkney and Shetland.* Edinburgh.

Fenton, A. 2008 Seaweed as fertiliser. In Coull, J. R., Fenton, A. and Veitch, K. (eds) *Boats, Fishing and the Sea. A Compendium of Scottish Ethnology*, 4, 135-50. Edinburgh.

Foster, S. M. 1990 Pins, combs and the chronology of later Altantic Iron Age settlement. In Armit, I. (ed) *Beyond the brochs: changing perspectives on the Atlantic Scottish Iron Age*. Edinburgh University Press, Edinburgh.

Frison, G. C. 1982 Bone Butchery Tools in Archaeological Sites. *Canadian Journal of Anthropology **2**, 159-167.*

Hall, D. W. 1996 Blind date – Scottish Medieval pottery industries. *Tayside and Fife Archaeological Journal* **2**, 126-129.

Hardy, K. and Wickham-Jones, C. R. 2002 Scotland's First Settlers: the Mesolithic Seascape of the Inner Sound, Skye and its contribution to the early prehistory of Scotland. *Antiquity* **76**:293, 825-833.

Hardy, K. and Wickham-Jones, C. R. 2009 Mesolithic and later sites around the Inner Sound, Scotland: the work of the Scotland's First Settlers Project 1998 – 2004, *Scottish Archaeological Internet Reports*, **31**.

Jackson, A. 2008 *Littorina littorea*. Common periwinkle. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 16/09/2010]. http://www.marlin.ac.uk/speciesfullreview .php?speciesID=3713.

Lockhart, G. W. 1997 *The Scots and their Fish*. Birliin, Edinburgh.

MacGregor, A., Mainman, A. J. and Rogers, N. S. H. 1999 Craft, Industry and Everyday Life- Bone, Antler, Ivory and Horn from Anglo-Scandinavian and Medieval York. In *The Archaeology of York: The Small Finds 17/12.* Thornton & Pearson Ltd, Bradford.

McNeill, F. M. 1974 *The Scots Kitchen. Its Lore and Recipes.* London.

Mears, R. and Hillman, G. 2007 *Wild Foods.* London.

Milner, N. 2004 An analysis of the marine molluscs from the Mesolithic site of Sand, Scotland. In Hardy, K. and Wickham-Jones, C. *Scotland's First Settlers.* http://ads.ahds.ac.uk/ catalogue/adsdata/arch-471-1/dissemination/pdf/Specialists_reports/SLS_marine_mollusc_report,_ Milner.pdf.

Milner, N. 2007 Sea Loch Survey: an analysis of the marine molluscs. In Hardy, K. and Wickham-Jones, C. *Scotland's First Settlers.* http://ads.ahds.ac.uk/catalogue/adsdata/arch-471-1/dissemination/pdf/Specialists_reports/SLS_marine_mollusc_report,_Milner.pdf.

Nicholson, R. 1991 *An investigation into variability within archaeologically recovered assemblages of faunal remains: the influence of pre-depositional taphonomic processes*. D.Phil. Thesis. University of York.

Plug, I. 1982 Bone Tools and Shell, Bone and Ostrich Eggshell Beads from Bushman Rock Shelter (BRS), Eastern Transvaal. *The South African Archaeological Bulletin,* **37**:136, 57-62.

Pollard, T. 2005 The excavation of four caves in the Geodha Smoo near Durness, Sutherland. *Scottish Archaeological Internet Reports*, **18**.

Rendell, C. and Rendell, D. 2010 *Dr William Maclean: A Forgotten Black Isle Antiquary*. Dingwall.

Thomson, W. P. L. and Coull, J. R. 2008 Kelp, in Coull, J. R., Fenton, A. and Veitch, K. (eds) *Boats, Fishing and the Sea. A Compendium of Scottish Ethnology,* 4, 151-68. Edinburgh.

Watt, J., Pierce, G. J. and Boyle, P. R. 1997 *Guide to the Identification of North Sea Fish using Premaxilla and vertebra*. ICES. Cooperative Research Report No. **220**. Denmark.

Wheeler, A. and Jones, A. K. G. 1989 *Fishes*. Cambridge Manuals in Archaeology. Cambridge University Press, Cambridge.

Wheeler, A. 1969 *The fishes of the British Isles and North-West Europe*. Macmillan, London.

Wheeler, A. 1978 *Key to the fishes of Northern Europe*. Frederick Warne, London.

Williams, G. A. 1990 The comparative ecology of the flat periwinkles *Littorina obtusata* (L.) and *L. mariae* Sacchi et Rastelli. *Field Studies* **7**, 469-482.

Woodham, A. A. 1956 A survey of prehistoric monuments in the Black Isle. *Proceedings of the Society of Antiquaries of Scotland* **88**, 65-93.

APPENDIX 1: CONTEXT SUMMARY

Tr.	Context No.	Description	Relationships	Spot date
1	100	Layer: talus	Surface layer	Modern
1	101	Structure: line of stones in cave	Below 100, above 102	Modern
1	102	Layer: talus with hearths	Below 101, above 103	20th Century
1	103	Layer: shell midden, probably re-deposited	Below 102, above 104	20th Century
1	104	Layer: raised beach deposits	Below 103, above cave floor	Holocene
2	200	Layer: talus	Surface layer	Modern/20th Century
2	201	Layer: soil in cave	Below 200, above 202	20th Century
2	202	Layer: shell midden/occupation layer	Below 212, above 203	Early Historic
2	203	Layer: shell midden/occupation layer	Below 202, butts 211	Early Historic
2	204	Layer: shell midden/occupation layer	Above 206, below 203, possibly same as 209	Early Historic
2	205	Void	-	-
2	206	Cave floor	-	Holocene
2	207	Layer: shell midden/occupation layer, charcoal rich.	Below 208, above 206	Early Historic
2	208	Layer: sterile sand, erosion of raised beach deposits	Below 209, above 206	Early Historic
2	209	Layer: shell midden/occupation layer, charcoal rich.	Below 211, above 208, possibly same as 204	Early Historic
2	210	Deposit: shell midden	Below 204, above 206	Early Historic
2	211	Deposit: roof collapse	Abutted by 203, above 209	Early Historic
2	212	Layer: talus	Below 201, above 202	Pre 20th Century
2	213	Layer: soil and talus	Surface layer	Modern/20th Century
3	300	Layer: Soil and stone in small spoil heap	Top layer, above 301	20th Century
3	301	Layer: Soil in small spoil heap	Below 301, above 303	20th Century
3	302	Disturbed and heavily rooted surface layer of pervious excavation spoil heap	Top layer, above 304	20th Century with Early Historic artefacts
3	303	Layer: soil horizon below small midden	Below 301	20th Century
3	304	Layers: sequence of tips of shell-midden type deposit onto large spoil heap	Below 302, above 305	20th Century with Early Historic artefacts
3	305	Layer of rubble at base of previous excavation spoil heap. Removal of talus, before excavation of shell-midden deposits.	Above 20th Century ground surface, below 304	20th Century with Early Historic artefacts
3	306	Fill of 307, contains material eroded from large spoil heap		20th Century
3	307	Cut: below foot path		20th Century
4	400	Structure: lime mortared wall		Late 19th/early 20th Century
4	401	Structure: rebuild of 400 with lime mortar	Post-dates 400	Late 19th/early 20th Century
4	402	Structure: rebuild of 400/401 without mortar	Post-dates 401	Late 19th/early 20th Century
4	403	Fill of structure/modern soil	Top deposits	Modern
4	404	Fill of structure/wind-blown sand	Below 403	Late 19th/early 20th Century
5	500	Layer: talus	Top layer	20th Century to Modern
5	501	Layer: shell midden/occupation layer	Below 500, above 505, possibly same as 203	Early Historic
5	502	Layer: shell midden/occupation layer, charcoal rich.	Below 505, abuts 503, possibly similar to 204	Early Historic
5	503	Deposit: shell midden with stone and roof collapse	Below 505, above 504	Early Historic
5	504	Layer: roof collapse	Above 506, below 503	Early Historic
5	505	Lense of sand in midden/occupation layers. Disturbed by rabbit.	Above 503 and 502, below 501	Early Historic
5	506	Layer: raised beach deposits	Below 504	Holocene

APPENDIX 2: RADIOCARBON DATING CERTIFICATES

Scottish Universities Environmental Research Centre
Director: Professor A B MacKenzie Director of Research: Professor R M Ellam
Rankine Avenue, Scottish Enterprise Technology Park,
East Kilbride, Glasgow G75 0QF, Scotland, UK
Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE 18 May 2011

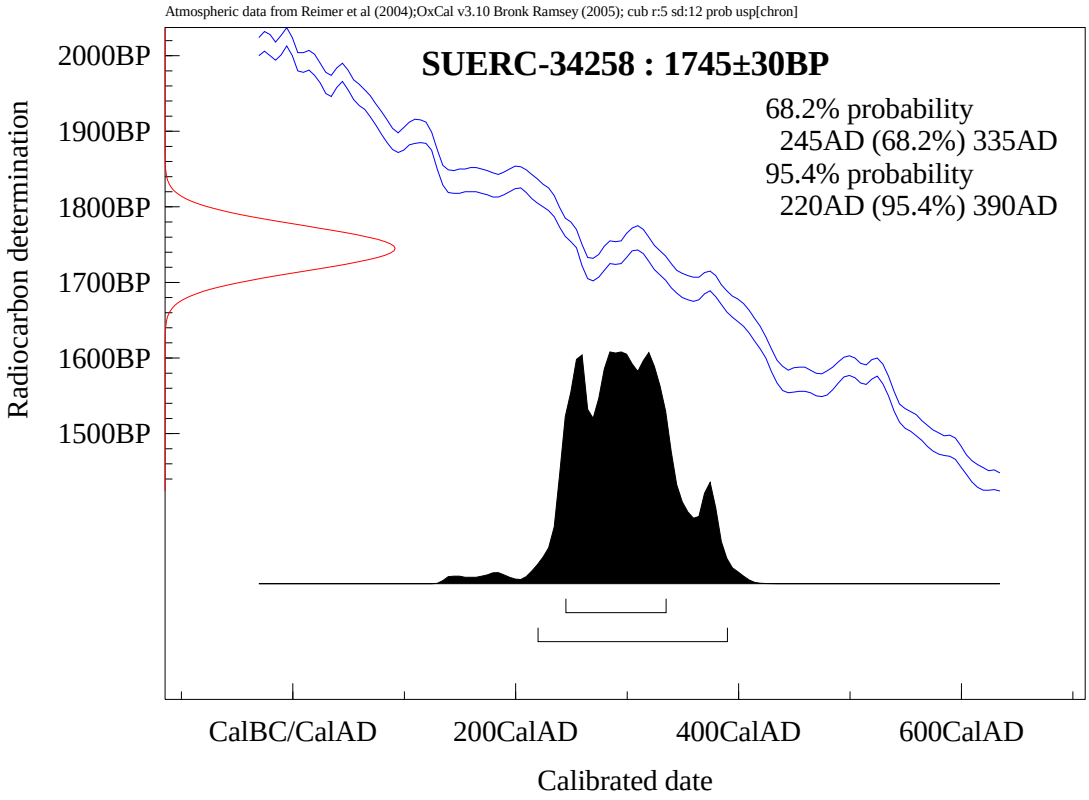
Laboratory Code	SUERC-34258 (GU-23932)
Submitter	Alison Sheridan Archaeology Department National Museums Scotland Chambers Street Edinburgh, EH1 1JF
Site Reference	Caird's Cave, Rosemarkie
Sample Reference	CC001
Material	Bone : Mammalian
$\delta^{13}C$ relative to VPDB	-21.3 ‰
$\delta^{15}N$ relative to air	7.1 ‰
C/N ratio(Molar)	3.2
Radiocarbon Age BP	1745 ± 30

N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-
Checked and signed off by :- Date :-

Calibration Plot



Scottish Universities Environmental Research Centre
Director: Professor A B MacKenzie Director of Research: Professor R M Ellam
Rankine Avenue, Scottish Enterprise Technology Park,
East Kilbride, Glasgow G75 0QF, Scotland, UK
Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE

18 May 2011

Laboratory Code	SUERC-34259 (GU-23933)
Submitter	Alison Sheridan Archaeology Department National Museums Scotland Chambers Street Edinburgh, EH1 1JF
Site Reference	Caird's Cave, Rosemarkie
Sample Reference	CC002
Material	Bone : Mammalian
δ^{13}C relative to VPDB	-22.2 ‰
δ^{15}N relative to air	6.7 ‰
C/N ratio(Molar)	3.2
Radiocarbon Age BP	2250 ± 30

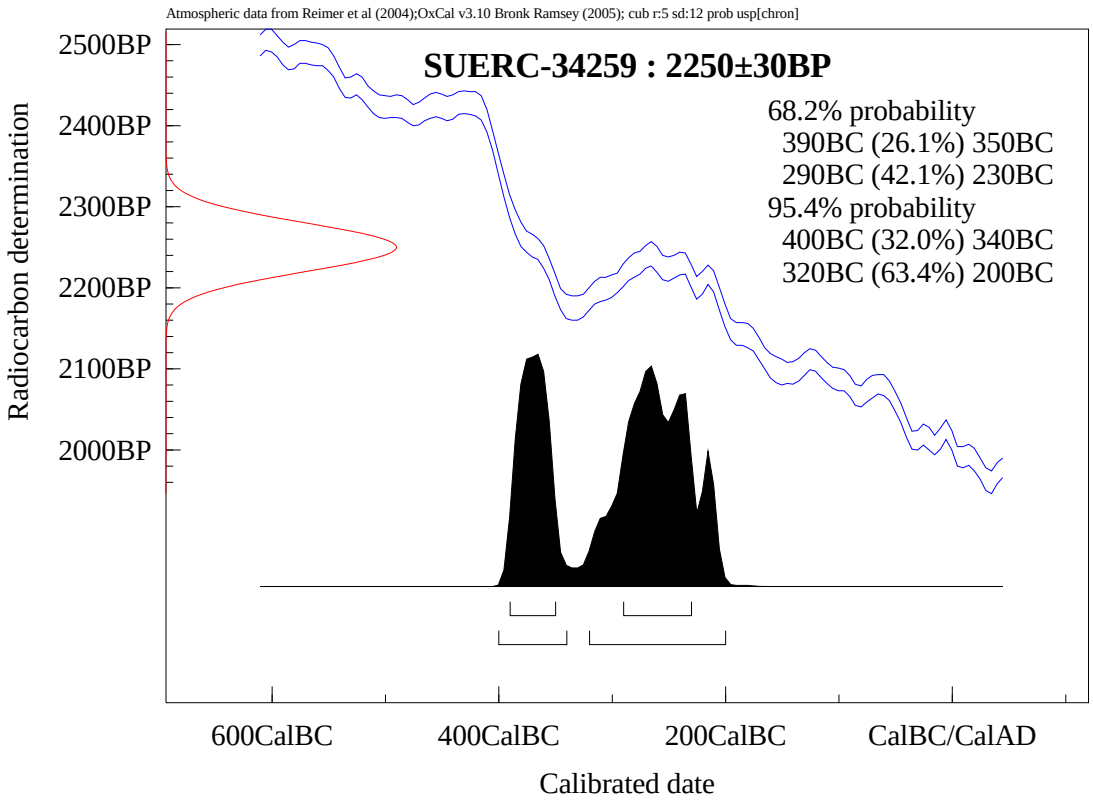
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Scottish Universities Environmental Research Centre
Director: Professor A B MacKenzie Director of Research: Professor R M Ellam
Rankine Avenue, Scottish Enterprise Technology Park,
East Kilbride, Glasgow G75 0QF, Scotland, UK
Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE

18 May 2011

Laboratory Code	SUERC-34263 (GU-23934)
Submitter	Alison Sheridan Archaeology Department National Museums Scotland Chambers Street Edinburgh, EH1 1JF
Site Reference	Caird's Cave, Rosemarkie
Sample Reference	CC003
Material	Charcoal : Pine
$\delta^{13}C$ relative to VPDB	-27.8 ‰
Radiocarbon Age BP	2270 ± 30

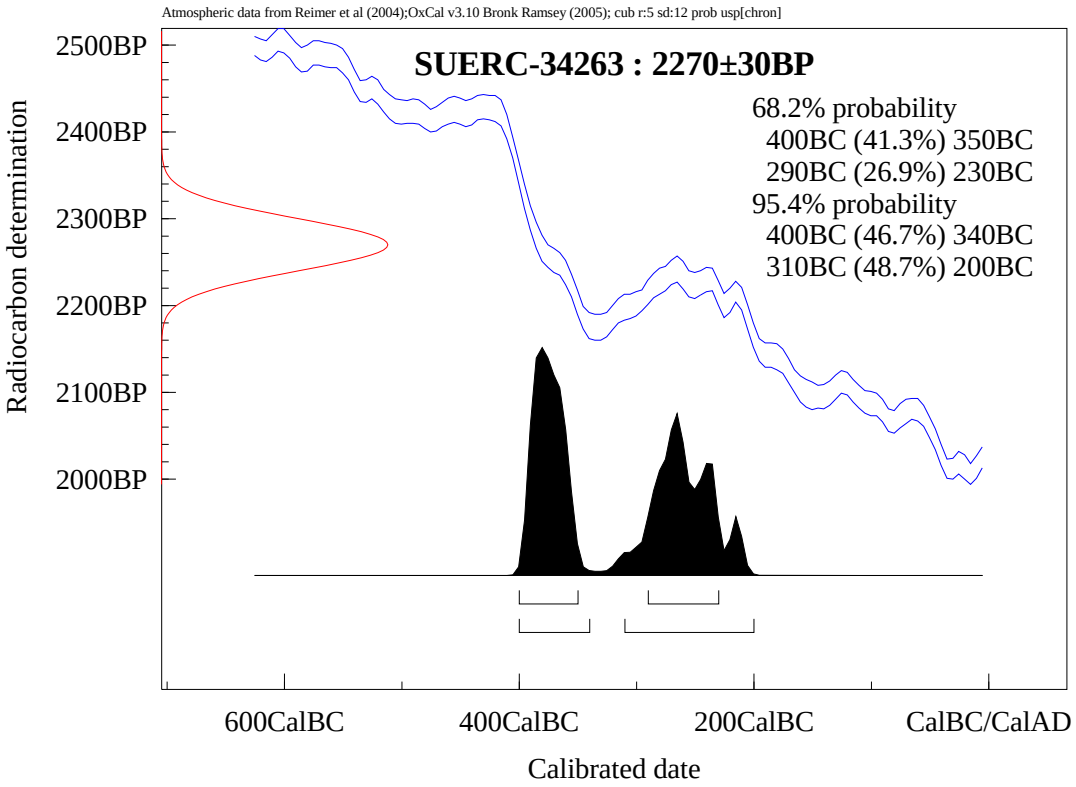
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Scottish Universities Environmental Research Centre
Director: Professor A B MacKenzie Director of Research: Professor R M Ellam
Rankine Avenue, Scottish Enterprise Technology Park,
East Kilbride, Glasgow G75 0QF, Scotland, UK
Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE

18 May 2011

Laboratory Code	SUERC-34264 (GU-23935)
Submitter	Alison Sheridan Archaeology Department National Museums Scotland Chambers Street Edinburgh, EH1 1JF
Site Reference	Caird's Cave, Rosemarkie
Sample Reference	CC004
Material	Antler : Red deer
δ^{13}C relative to VPDB	-21.0 ‰
δ^{15}N relative to air	4.5 ‰
C/N ratio(Molar)	3.2
Radiocarbon Age BP	1745 ± 30

N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

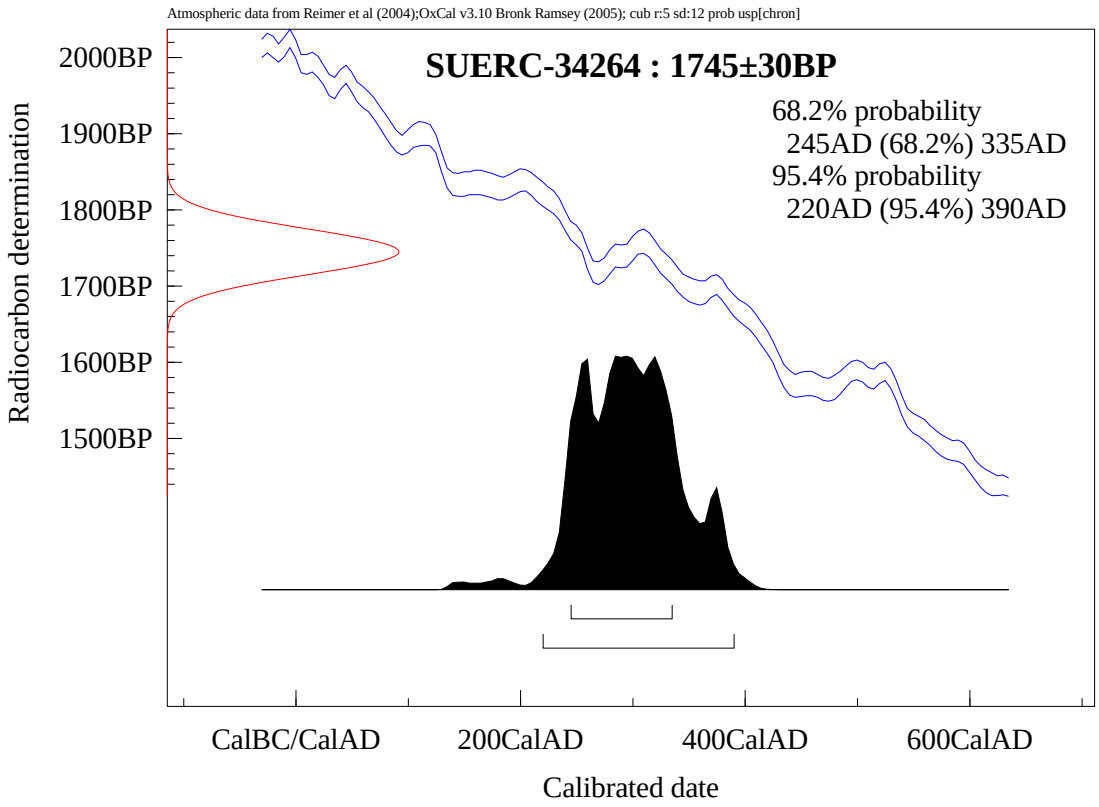
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).

3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Scottish Universities Environmental Research Centre
Director: Professor A B MacKenzie Director of Research: Professor R M Ellam
Rankine Avenue, Scottish Enterprise Technology Park,
East Kilbride, Glasgow G75 0QF, Scotland, UK
Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE

18 May 2011

Laboratory Code	SUERC-34265 (GU-23936)
Submitter	Alison Sheridan Archaeology Department National Museums Scotland Chambers Street Edinburgh, EH1 1JF
Site Reference	Caird's Cave, Rosemarkie
Sample Reference	CC005
Material	Bone : Cattle
δ^{13}C relative to VPDB	-22.1 ‰
δ^{15}N relative to air	6.7 ‰
C/N ratio(Molar)	3.2
Radiocarbon Age BP	115 ± 30

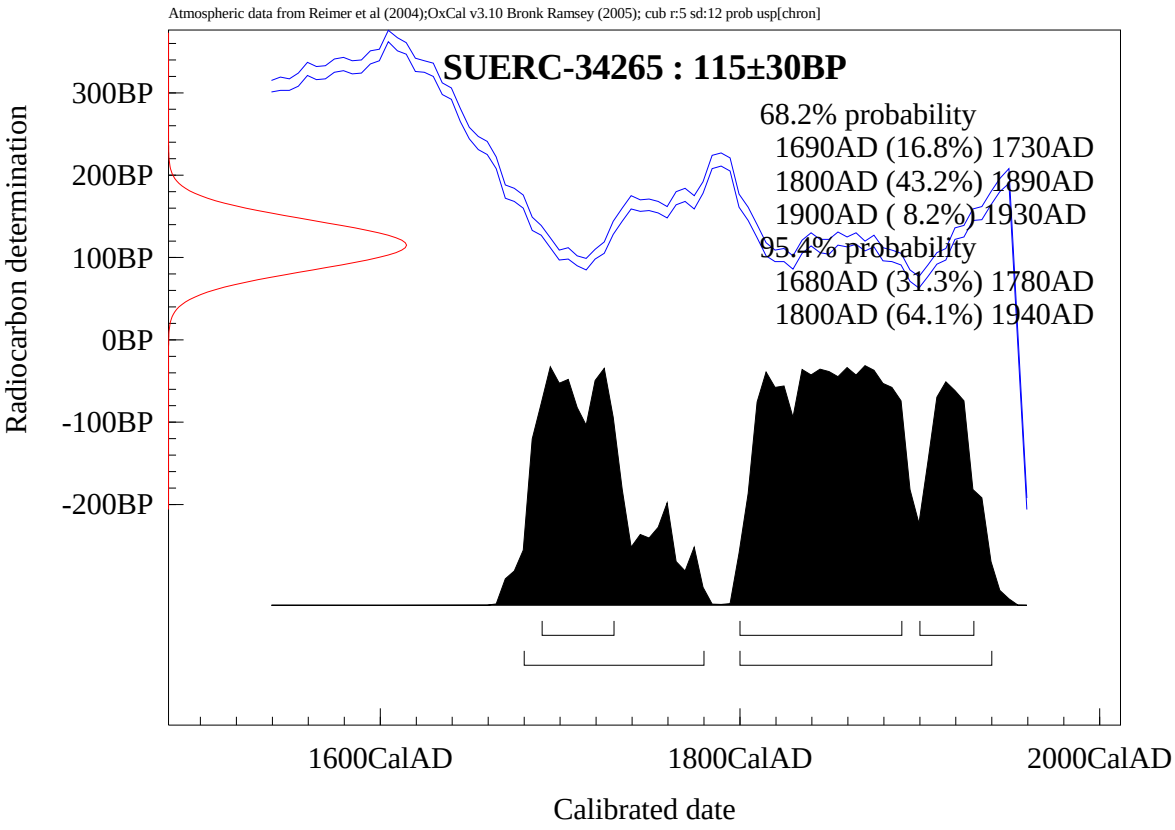
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Scottish Universities Environmental Research Centre
Director: Professor A B MacKenzie Director of Research: Professor R M Ellam
Rankine Avenue, Scottish Enterprise Technology Park,
East Kilbride, Glasgow G75 0QF, Scotland, UK
Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE

18 May 2011

Laboratory Code	SUERC-34266 (GU-23937)
Submitter	Alison Sheridan Archaeology Department National Museums Scotland Chambers Street Edinburgh, EH1 1JF
Site Reference	Caird's Cave, Rosemarkie
Sample Reference	CC006
Material	Antler : Red deer
δ^{13}C relative to VPDB	-22.2 ‰
δ^{15}N relative to air	3.2 ‰
C/N ratio(Molar)	3.2
Radiocarbon Age BP	1200 ± 30

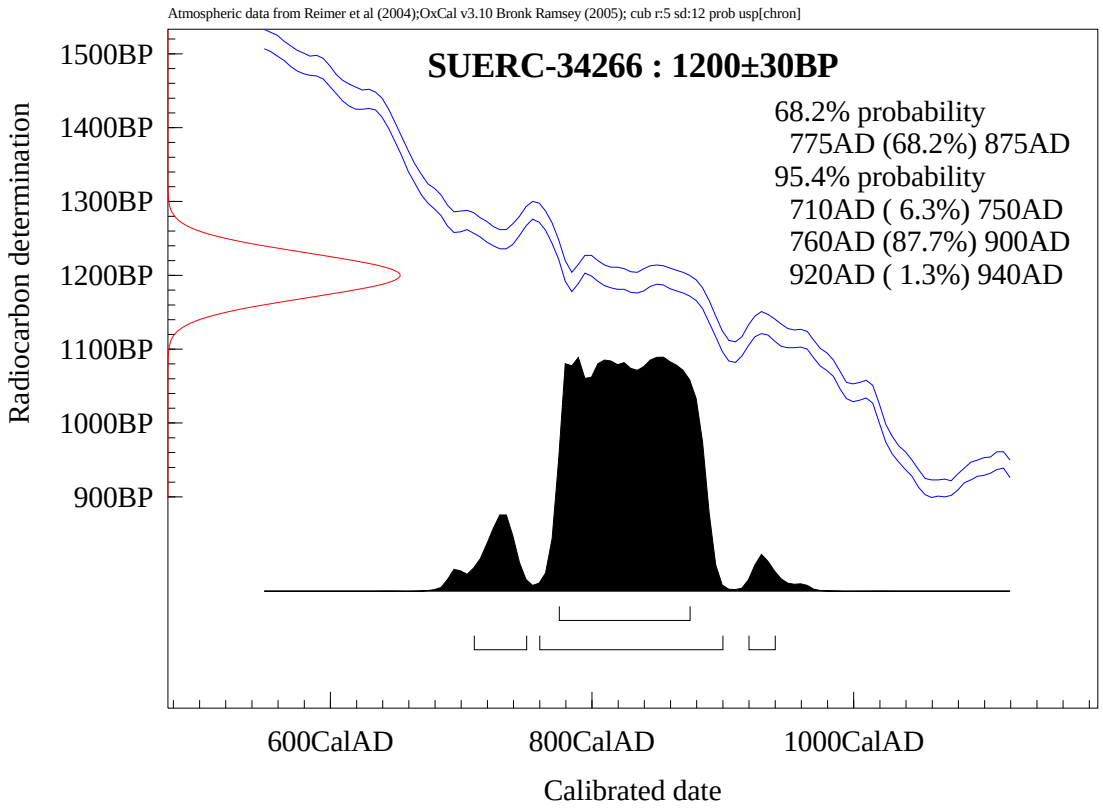
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Scottish Universities Environmental Research Centre
Director: Professor A B MacKenzie Director of Research: Professor R M Ellam
Rankine Avenue, Scottish Enterprise Technology Park,
East Kilbride, Glasgow G75 0QF, Scotland, UK
Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE

18 May 2011

Laboratory Code	SUERC-34267 (GU-23938)
Submitter	Alison Sheridan Archaeology Department National Museums Scotland Chambers Street Edinburgh, EH1 1JF
Site Reference	Caird's Cave, Rosemarkie
Sample Reference	CC007
Material	Worked Bone : No ID (large ungulate)
$\delta^{13}C$ relative to VPDB	-22.2 ‰
$\delta^{15}N$ relative to air	7.0 ‰
C/N ratio(Molar)	3.2
Radiocarbon Age BP	145 ± 30

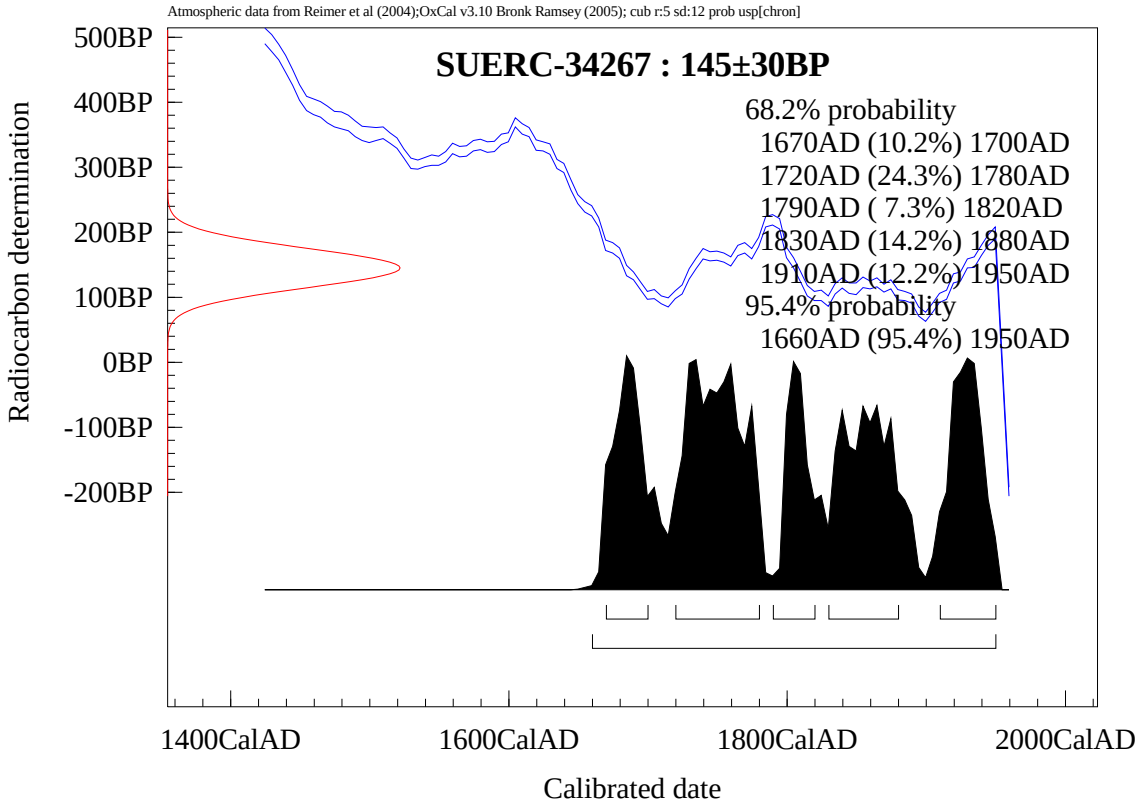
N.B.

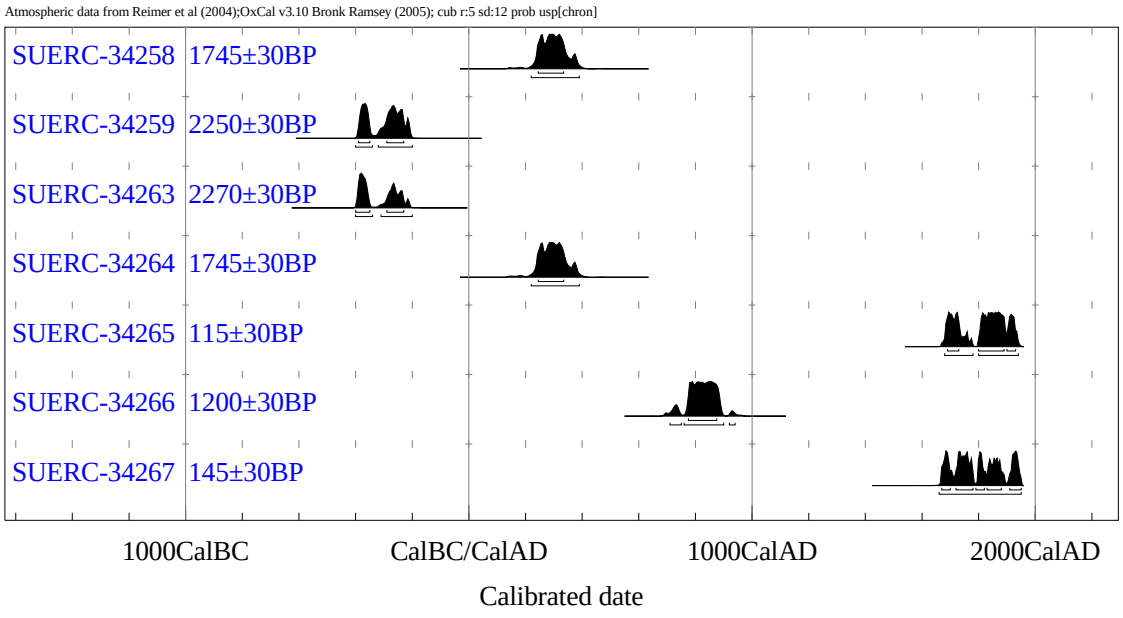
1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot





APPENDIX 3: QUANTIFICATION OF THE ARCHIVE

Quantification of the excavation records

Record type	Quantity
Context sheets	39
Site plans A1	1
Site plans A4	5
Site sections A4	9
Level sheets	4
Context checklists	5
Photographs (digital)	466

Quantification of the artefactual and environmental evidence with notes for commissioning specialists

Material	Quantity
Animal bone	376
Pins (animal bone)	2
Clay pipe	11
Copper alloy	5
Fish bone	49
Glass	117
Iron	52
Leather (shoe)	1
Pottery	103
Shell (selected pieces from hand excavation)	190
Shell from environmental samples (5 mm+)	10*
Slag	11
Stone	327

* number of bags rather than count of pieces