
CAVES IN THE GEODHA SMOO –

THE EXCAVATION OF THREE CAVES
NEAR DURNES, SUTHERLAND



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*Archaeological excavation at three caves in the
Geodha Smoo, for Historic Scotland, carried out by*

Glasgow University Archaeological Research Division

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*Front cover: Glassknapper's Cave (left) and Antler Cave (right)
with eroding section.*

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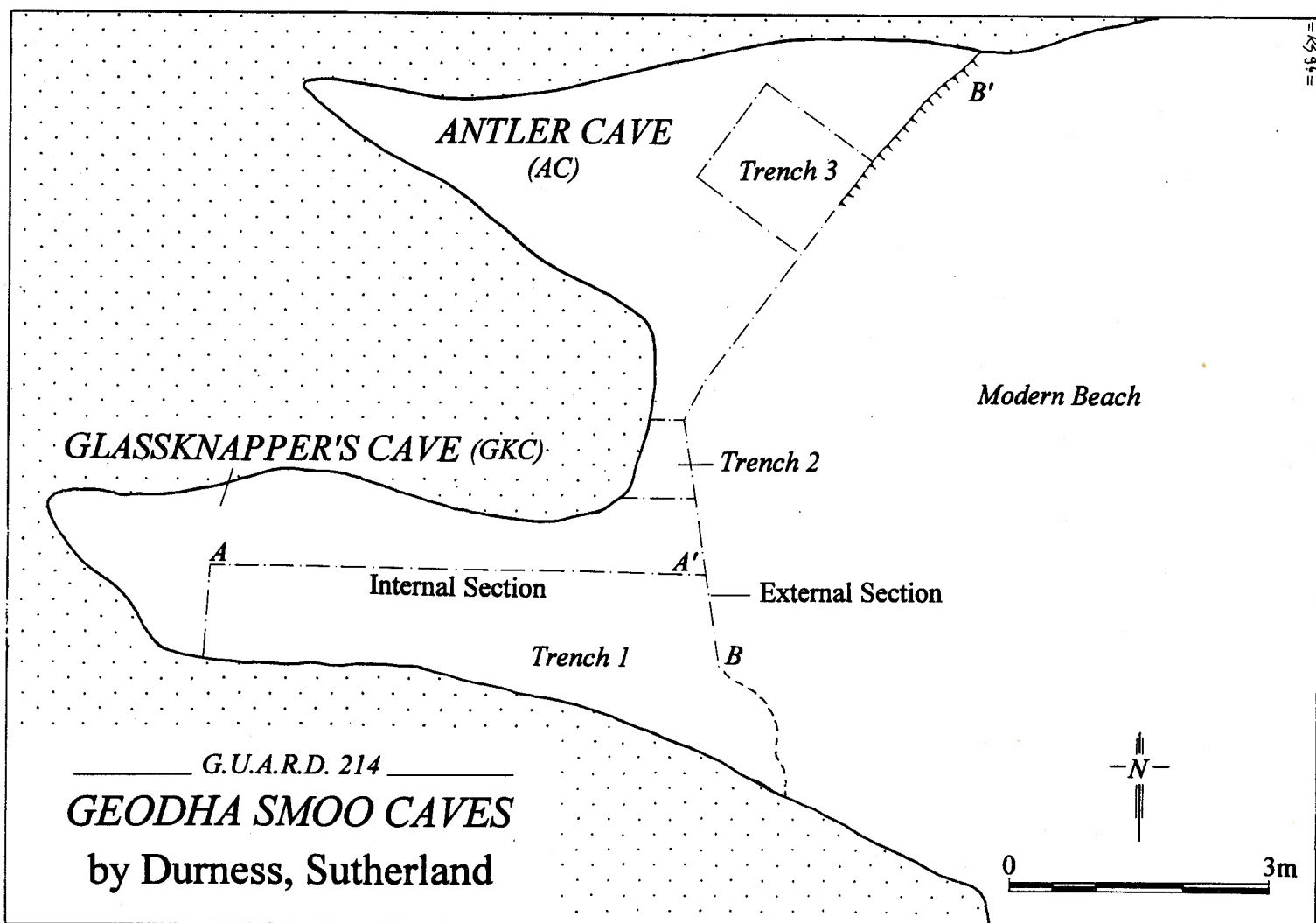
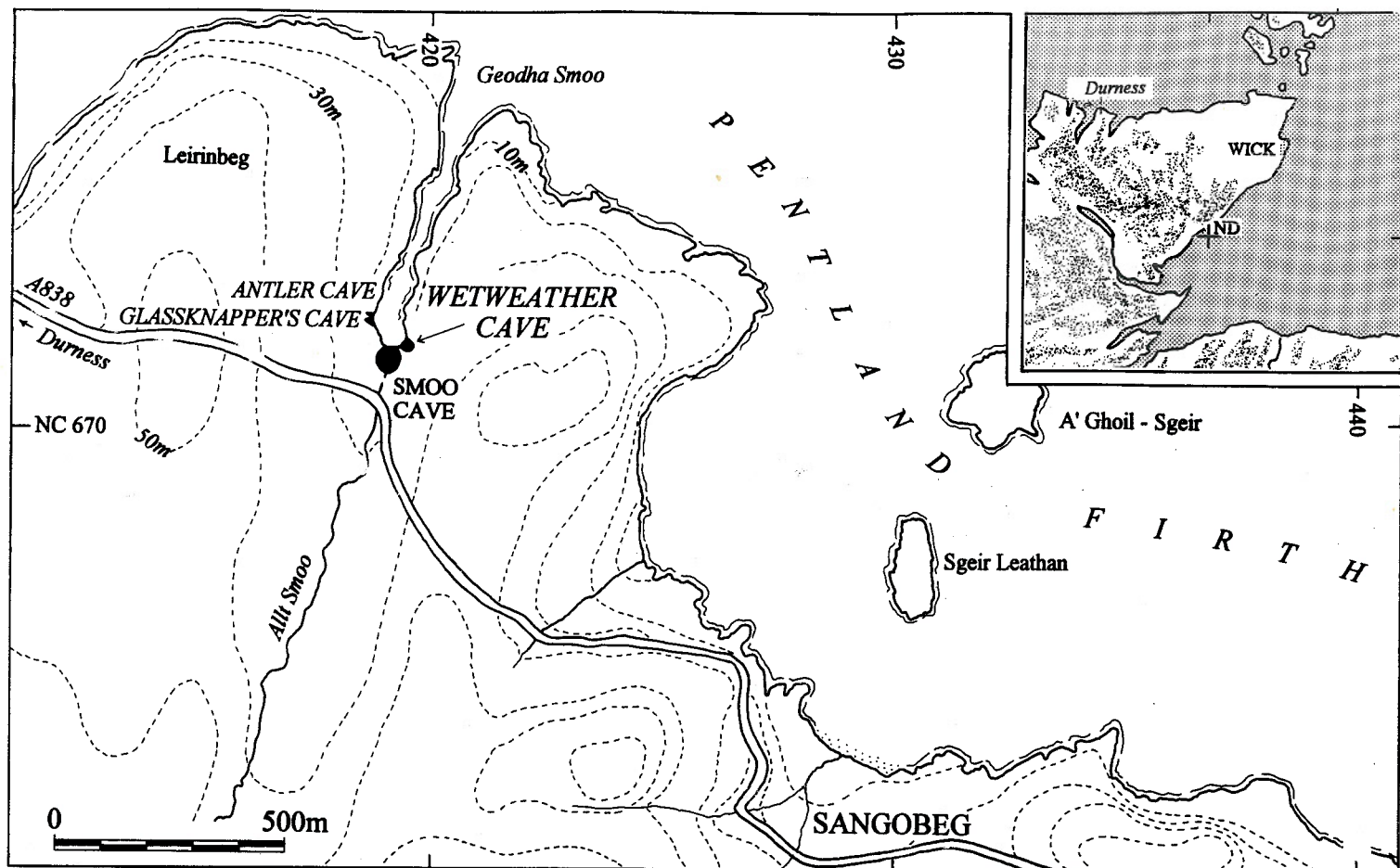
CAVES IN THE GEODHA SMOO – THE EXCAVATION OF THREE CAVES NEAR DURNES, SUTHERLAND

by

TONY POLLARD

1996

GLASGOW UNIVERSITY ARCHAEOLOGICAL RESEARCH DIVISION
Glasgow



1 Executive summary

This report summarises the results of the excavation of deeply stratified archaeological deposits in two adjacent caves situated in the narrow inlet known as the Geodha Smoo, near Durness, Sutherland. This work was carried out prior to the loss of this important archaeological resource to marine erosion. The caves were found to contain various deposits which included marine shells and well preserved mammal and fish bones. A number of artefacts were recovered, the most notable of which were pieces of worked deer antler and animal bone. Pottery sherds suggest the build-up of at least some of the deposits during the late Norse period, with large square headed rivets indicating the use of the inlet for the shelter and repair of boats, which, given the presence of quantities of large fish bones, appear to have been used in deep sea fishing. The deposits were excavated down onto the present beach and no evidence was found for prehistoric activity, although some of the lower deposits may relate to Iron Age activity.

*Figure 1 (facing):
Site location and plan.*

Cursory investigation of a third cave, located on higher ground on the opposite (east) side of the inlet, did reveal evidence for prehistoric use, with the recovery of sherds of heavy impressed ware suggestive of a late Neolithic/early Bronze Age presence.

This report includes, as an appendix, a costed post excavation programme, designed to ensure that the evidence recovered during the excavation fulfils its true potential. This further programme of work will include the specialist analysis of palaeobotanical, faunal remains and material culture and will result in the production of a full report suitable for publication.

2 Introduction

GUARD were commissioned by Historic Scotland to preserve by record the archaeological deposits contained within two marine caves situated in the western wall of the deeply penetrating gorge-like inlet known as the Geodha Smoo, near Durness, Sutherland (Figure 1). The locality is best known for the spectacular Smoo Cave (NGR 4138 6714) which is situated at the inland

terminus of the inlet. It was during the examination of midden deposits within Smoo Cave that the presence of archaeological deposits in the caves reported upon here was first noted (Pollard 1992). At that time it was obvious that these deposits, which manifested themselves as an exposed section containing midden material situated at the rear of the shingle beach, were subject to serious erosion caused by high tides and storm driven waves. Consequently a grant was provided by Historic Scotland to enable the thorough investigation and recording of these deposits before they were lost in their entirety to the sea. This work was carried out over a period of four weeks in March – April 1995 by a team of four archaeologists.

3 Site location and description (Fig. 1) ———

The presence of caves in the vicinity of the Geodha Smoo, and indeed the presence of the Geodha itself, is a reflection of the character of the local geology, which is dominated by Cambrian Durness Limestone. Smoo Cave was formed over many thousands of years, carved along the line of a weak fault, both by the river which today flows through it and by the sea, which at times of high tide still laps the back wall of the cave. The inlet itself was created as the cave roof progressively collapsed with the deepening of the cavern (Gleed-Owen 1992).

The caves reported here may have, at some point in the distant past, existed as side chambers within the main cavern now represented by Smoo Cave. With the landward retreat of the main cavern these now exist as separate shelters opening out from the cliff walls of the Geodha. It is likely that further cave systems exist in the vicinity, with passages perhaps extending underground for some considerable distance. Indeed, work on the third of the sites discussed here brought to light a partially collapsed passage at the rear of the cave.

The first two caves (Glassknapper's Cave and Antler Cave – see note on cave names in section 4) are immediate neighbours, and are situated in the western wall of the Geodha. It was the presence of deep archaeological deposits visible in an eroding section face which extends

across the mouth of both caves (cover plate) which prompted the present work. These deposits rise up from the rear of the present beach to a height of around 1.5m, but at some time in the past the cave floor would have been at the same level as the beach as it appears today, and in fact probably lower. These caves, like the parent cave, appear to have undergone considerable collapse through time, with fragments of limestone visible within the eroding deposits. The third of the caves to be discussed here (Wetweather Cave) is located in the eastern wall of the Geodha, where it curves to the southwest to meet the entrance of Smoo Cave (Figure 1). The cave is situated at the juncture of a grass covered slope, which may itself represent cave roof collapse, and the present cliff face, around 10m above sea level.

4 Excavation strategy

Prior to investigation the site was recorded as a midden deposit, and in the original report and project design was referred to as the Inlet Midden (Pollard 1992). The project design defined several clear objectives. These were to assess the depth of midden, extent of midden, nature and date of stratigraphy forming the midden, and the nature of any internal structure within the midden. A further important priority was to remove samples which would provide a suite of environmental and economic data. The excavation succeeded in fulfilling all of these requirements and the discussion which follows outlines the strategy adopted in order to achieve this.

Prior to the commencement of work the exposed section (Figure 1) was partially concealed behind a loose deposit of earth and stones which appeared to represent material which had collapsed from the section face (cover plate). Indeed, much of this material appeared to have accumulated since the site was first identified in 1992, clearly attesting to the constant process of erosion. In order to obtain an impression of the nature and depth of the deposits it was necessary to remove this material. As there was a possibility that the heaped material, at least in its lower levels, may have contained residual elements of in-situ deposits two slots were carefully excavated

through this material in spits. This controlled removal and the examination of the sections confirmed that the material heaped against the section was entirely constituted from loose material which had fallen from the section.

With the removal of the tumble the section was trowel cleaned and drawn. With cleaning it became immediately obvious that there was some difference between the deposits in the southern cave and those in the northern cave (Figure 2 - external section). The southern cave appeared to contain a far more complex series of deposits, which included several strata containing marine shells and animal bones. The deposits in the northern cave were less well defined and varied, with marine shells at this stage visible at only one level within the deposits. However, the tumbled material in front of the northern cave was found to contain fragments of red deer antler, which were also observed in this part of the cleaned back section.

For the purposes of site recording and in order to prevent future confusion with Smoo Cave it was decided to allocate each of the caves reported here with a name. The northern cave is henceforth referred to as the Antler Cave (AC), after the early finds of red deer antler. The southern cave was labelled Glassknapper's Cave (GKC) following the recovery of bottle glass which appears to have been deliberately retouched.

The presence of substantial fragments of rock in the various parts of the section indicated that the upper parts of both caves had suffered serious collapse at some point in the past. The caves may therefore have been considerably larger than they are now, a factor which may have made them more fitting for human use than they appear today. Nevertheless, the presence of tractor batteries and boating equipment in the southern cave clearly indicates its use as an equipment store in recent times.

Having completed a survey of the cave interiors it became apparent that the most efficient means of fulfilling the objectives of the excavation would be to cut a single trench from the exposed section to the back of Glassknapper's Cave. The same would also be attempted

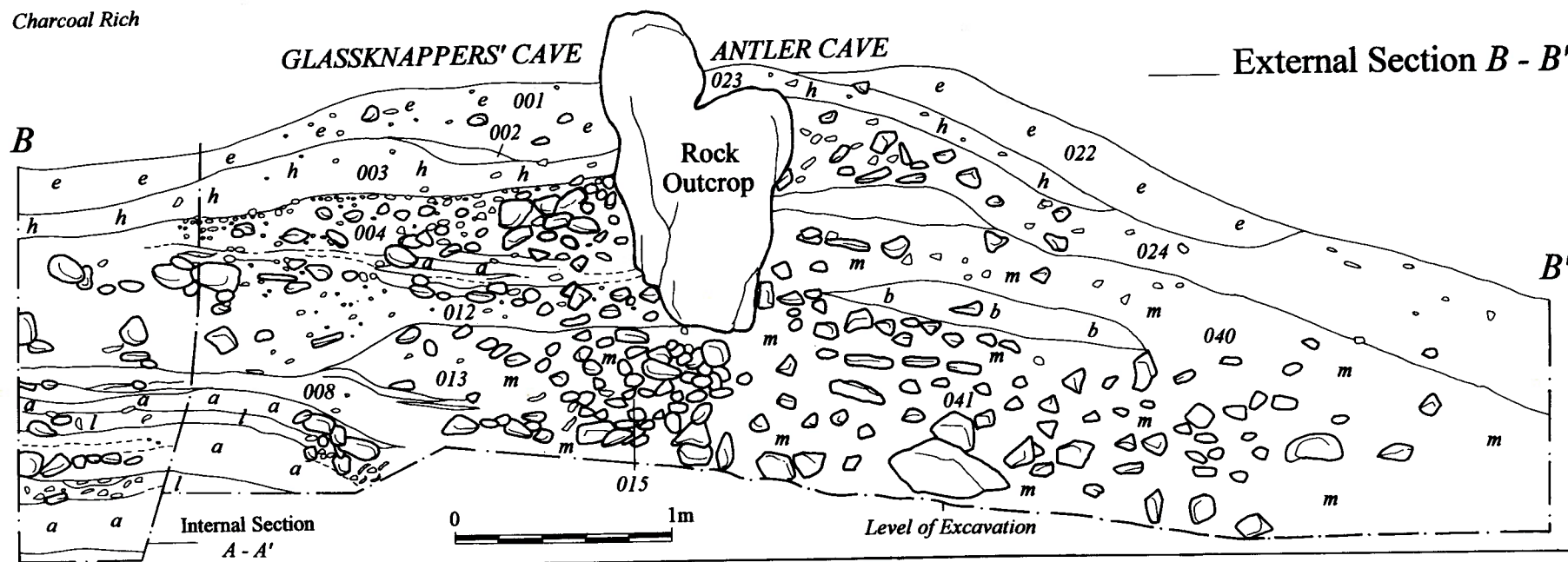
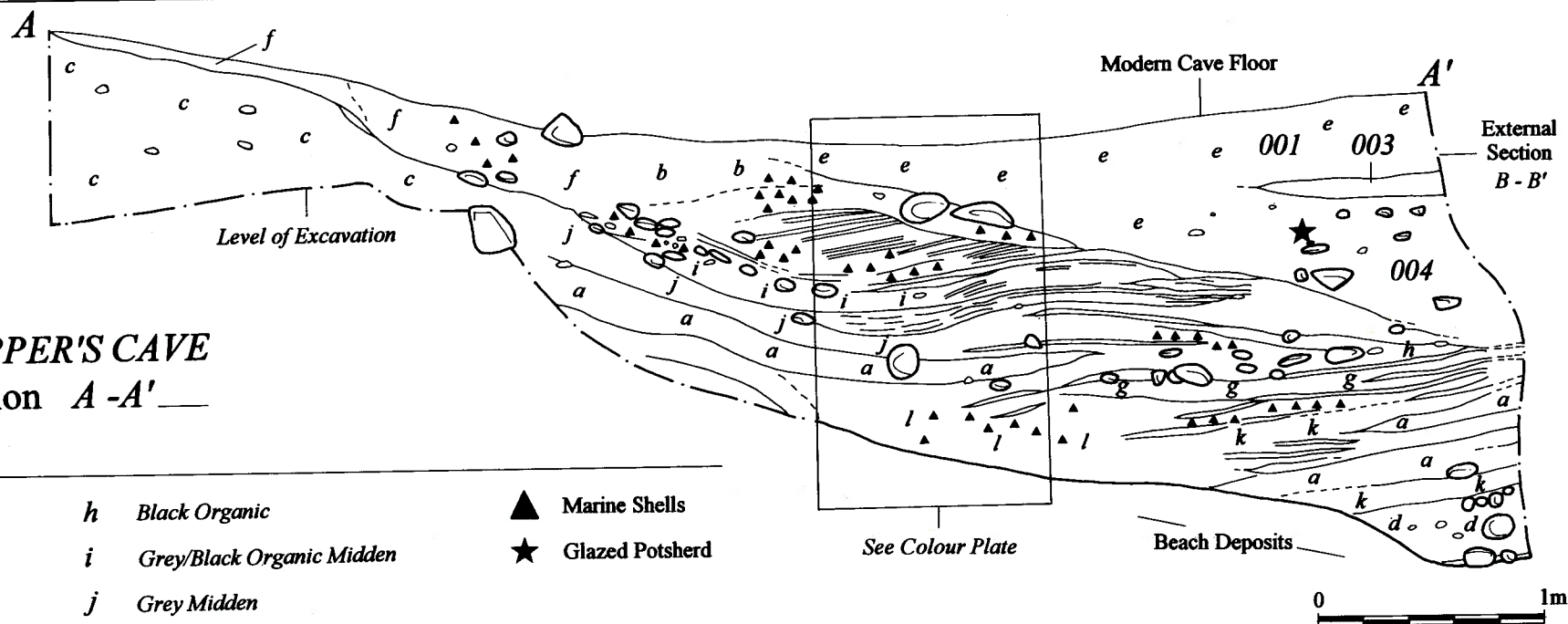
Figure 2 (facing): External section and internal section (GKC).

GLASSKNAPPER'S CAVE

Internal Section A - A'

Key

- | | | |
|--------------------|-----------------------------------|-------------------|
| a Sand | h Black Organic | ▲ Marine Shells |
| b Silty Clay | i Grey/Black Organic Midden | ★ Glazed Potsherd |
| c Clay & Sand | j Grey Midden | |
| d Pebbles & Sand | k General Midden | |
| e Silty Overburden | l Grey/Black Charcoal-rich Midden | |
| f Grey Silt | m Roof Collapse Midden | |
| g Charcoal Rich | | |



for the Antler Cave, but priority was given to the first cave as this appeared to contain more complex archaeological deposits. The cave floor was divided into two, roughly along its central axis (Figure 1). By the time the excavation had been completed much of the southern half had been removed, while the northern portion remained intact, providing a full section through the cave deposits. Several sections were cut through the southern half of the cave, at right angles to the axial section, thus providing an insight into the nature of the stratigraphy in a north-south plane (across the cave interior) as well as in an east-west plane (cave mouth to cave interior). The deposits were excavated down onto the former beach surface, where the concreted nature of the gravels and health and safety considerations prevented further investigation.

5 Wetweather Cave (Fig. 3)

One problem encountered during the project was caused by water, at various times either rain or melted snow, dripping from the roofs of the caves. At times the quantity of water made working within the caves very difficult, turning the deposits into a sticky dark mud, the problem being most acute in the Antler Cave where water was always present. In order to reduce the amount of time wasted due to wet conditions, which also made working within these caves dangerous, it was decided to carry out a smaller scale investigation in a further cave within the Geodha Smoo complex. The deposits in this third cave were nowhere near as deep as those in the other caves and its roof was relatively water-proof, hence its name, the Wetweather Cave.

The Wetweather Cave was situated to the north-east of the mouth of the largest cave (Smoo Cave), where the foot of the cliff meets with a steeply rising grass covered slope. This cave differed in having a wide mouth which gave way, for much of its width at least, to a head high overhang, some 3-4m deep. As such the site would probably be described as an overhang or rock-shelter in the earlier literature on cave archaeology. However, to the rear of the overhang were at least two inner chambers, neither of which was examined.

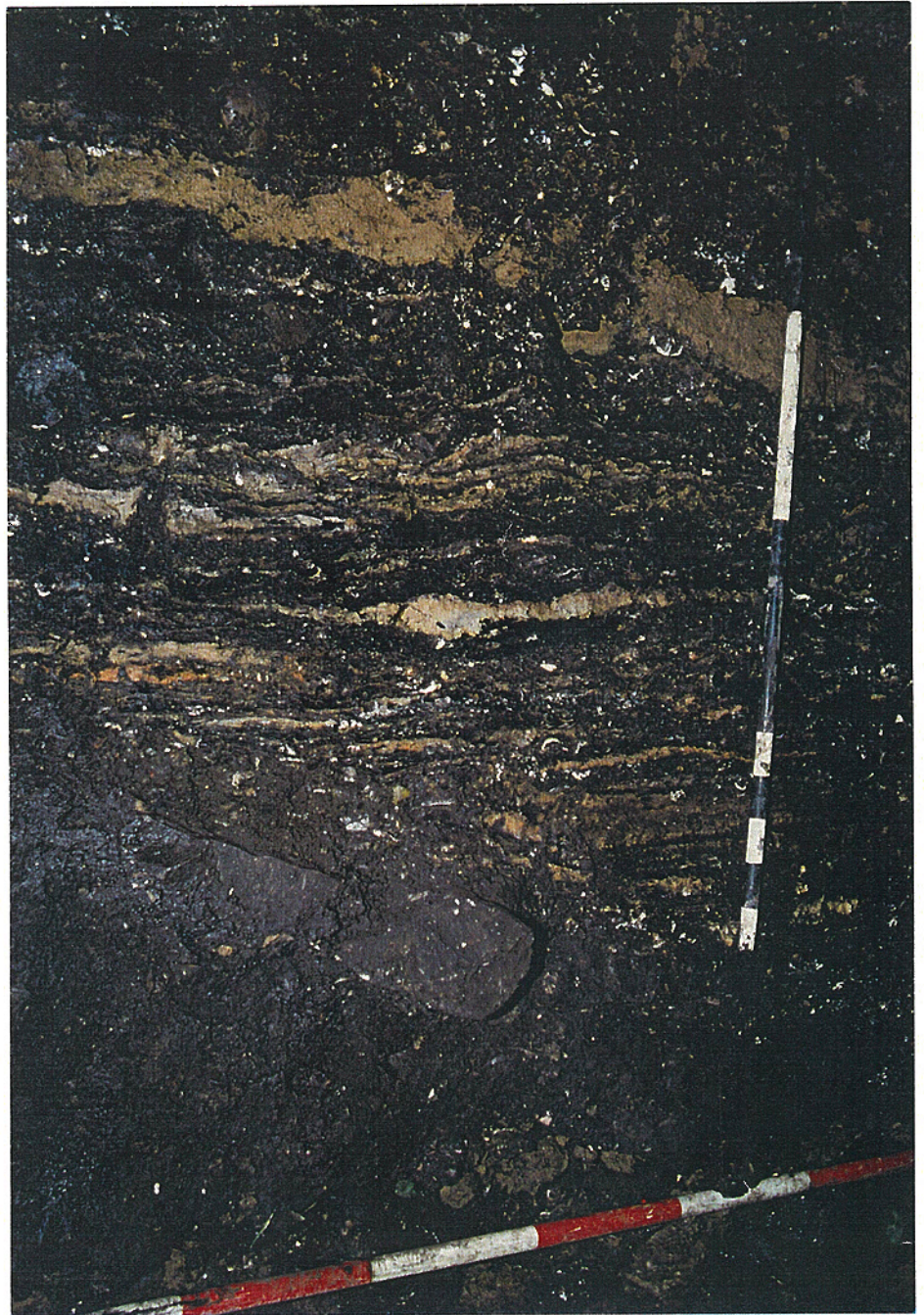


Figure 3: Cultural deposits in GKC (see Fig. 2 for location).

6 Sampling

An important aim of the project was to recover bulk samples from the excavated deposits, as coastal deposits rich in marine shells represent a rare opportunity to recover well preserved faunal, palaeobotanical and organic artefactual evidence.

Where possible samples were removed from individual deposits. However, the stratigraphy in Glassknapper's Cave was of such complexity (see plate) that sampling individual contexts was not always possible. In order to overcome this problem a column sample was taken through the deposits, with samples removed in spits. An intact column sample was also removed from the axial section with the aim of submitting it for micro morphological analysis. It was intended to sieve all of the samples on site, thus reducing the amount of material to be carried back to Glasgow and the expense involved at the post-excavation stage. On-site sieving proceeded successfully until a mechanical fault prevented the further use of the generator. Thus, a number of unprocessed samples were brought back to Glasgow for sieving during the post-excavation phase of the project. A list of the samples taken is included as an appendix.

7 Excavation results ---

7.1 Glassknapper's Cave (GKC)

Glassknapper's Cave displayed the most extensive and complex series of archaeological deposits (Figure 2 – external and internal sections). The external section displayed a considerable amount of overburden in its upper portion, with a gritty deposit containing some stones (001) overlying a black humic layer which contained many small fragments of quartz and other stone (003). It was the upper deposit (001) which contained shards of bottle glass, some of which appears to have been modified, hence the name, Glassknapper's Cave. The humic deposit (003) appears to represent the accumulation of organic soils washed down from the cliff face above the cave, a conclusion not at odds with the fact that this deposit appeared only at the cave mouth and did not extend into the cave itself.

An earlier episode of largely natural build up (004) was evident directly beneath the humic deposit (003). However, the presence of angular fragments of limestone, more marked toward the northern end where they appeared virtually free of earth matrix, suggests that this deposit

(004) was at least partially composed of cave roof collapse. As in the case of the humic layer the roof collapse appeared to be limited to the area of the cave mouth. However, rounded stones, of various types, were also present and may have been driven there by high tides and storm waves. Excavation of the trench through the cave (internal section) revealed relatively little difference between 003 and 004 within the cave, 003 merging into 004 beyond the limits of the humic deposit (002) which served to separate the two deposits at the cave mouth. Although these deposits were largely sterile the presence of the bottle glass and a number of glazed pottery sherds strongly suggests their accumulation during the 19th and 20th centuries.

These upper deposits, which appear to represent a prolonged period during which the cave witnessed only sporadic and low intensity human activity, sealed a series of deposits rich in archaeological material, possibly deposited over a long period of time (but see page 25). Evidence for this human activity was clearly visible within the eroding section (Figure 2), where deposits of marine shells rich in animal bone were visible throughout the lower half. The presence of midden rich layers stratified between washed sand layers suggested the periodic use of the site followed by periods when this practice was abandoned and high water levels, perhaps promoted by spring tides or winter storms, washed marine sands into the cave. The most substantial deposits of sand were confined toward the rear of the cave, where they sloped up from the base of the trench. This material was deposited by marine action at a time prior to the deposition of large amounts of archaeological material. It is, after all, only the presence of deep archaeological deposits which today prevent unrestricted access by the sea, and it is possible to view the erosion of the outer face as a result of the continuing effort by the sea to re-enter the cave.

As previously noted excavation within the cave was confined to the southern half, where material was, for the most part, removed and recorded in spits. The depth of the deposits did not permit the total removal of deposits within this portion of the cave, and instead a number of smaller slots were excavated down to what appeared to be

the original beach surface underlying the archaeological deposits.

Excavation and recording of both the main internal cave section and the internal lateral section (not illustrated in this report) revealed deposits of considerable complexity, which bore only limited resemblance to those observed in the external, eroding section. The internal deposits on the whole consisted of numerous thin layers and lenses of organic material, clays and silts, ash, charcoal, crushed shell, animal bones and washed sand (Figure 3). It was impossible to excavate each of these deposits individually, as these cultural strata represent many hundreds of individual contexts. In order to overcome this problem a substantial column sample, some 0.75m by 0.75m, was removed from the deepest portion of the deposits, with samples bagged in approximately 0.02m spits. Photography represented a vital recording technique in this instance, with the careful use of the flash producing a very informative series of section records.

Excavation continued down through the tightly stratified deposits within the cave, onto what appeared to be the primary floor of the cave, characterised by the presence of hard packed water-rolled stones. Although these appear to represent a beach surface it is not possible to state for certain that earlier archaeological deposits were not present beneath this level, although marine shells and animal bones were found to be inter-mixed with the loose beach gravels at the base of the external section. The earlier excavation carried out in Smoo Cave did establish the presence of an archaeological horizon some considerable depth beneath the present floor of the cave (Pollard 1992). Unfortunately, with the hard-packed nature of the basal deposit in GKC and the obvious dangers of digging the trench any deeper it was not possible to establish the presence or absence of earlier deposits.

Examination of the main section within the cave also revealed that very thin lenses of washed sand were present at various levels, and their presence quite high up in the section would appear to attest to the undoubted ability of the sea to alter the land. However, other forms

of deposition may also have played a part, and it is not unfeasible to envisage sand being introduced into the cave by people and scattered over parts of the floor, perhaps to minimise dampness or to cover unpleasant organic deposits.

Unlike the case of Smoo Cave (Pollard 1992) no convincing evidence for structural elements was identified within the Glassknapper's Cave. However, there were two instances where stones appeared to represent artificial arrangements. The first of these (038) was located toward the rear of the cave and consisted of a layer of limestone chunks and water-rolled stones, the latter probably collected from the beach (not visible in section drawing as it appeared to be isolated within the southern half of the cave). The rear portion of this tightly packed arrangement sat just beneath the modern surface but dipped down toward the mouth of the cave, following the contour of the sand deposit beneath it. The purpose of this apparently casual arrangement is uncertain but it did contain a beach pebble hammer stone and several sherds of pottery within the stone matrix.

The only other possible structural candidate was represented by a series of large angular chunks of limestone (018) stratified well within (approx 1.1m from the surface) the complex cultural deposits observed just within the cave mouth. These appeared to have been set into the deposits beneath them and may represent an attempt to cordon off the mouth of the cave. However, as in the case of the stones located toward the rear of the cave their appeared to be little regularity to this arrangement and it may simply represent a localised instance of roof collapse.

There was some variation between the deposits excavated within the cave interior and those visible in the external eroding section. In the northern portion of the external section the midden deposits were very loose and in places simply represented bones and shells lodged within the interstices between fragments of limestone and other rocks. This contrasted with the interior where deposits were on the whole highly compacted and stone free, apparently representing areas of trample, burning and other activities. In order to clarify the nature of the

deposits in the northern portion of the external section a trench was cut back into the section (Figure 1 - trench 2), its northern limit defined by the rock outcrop which marked the boundary between the GKC portion of the external section and that related to the AC (see Figure 2). The trench was cut back to the rock face which separates the entrances to both caves.

The deposits in trench 2 were found to be consistent with those initially observed in the eroding section, consisting for the most part of a loose accumulation of stones. Archaeological material was present throughout the lower deposits, those above representing the same process of silting and collapse observed elsewhere. However, the shells and bones were not present in distinct compact layers, as found in the interior, but on the whole appeared to be mixed within the rubble and stone, though in places higher concentrations of midden material existed independent of stone accumulation. A sheep's skull was recovered from the niche created by the outcrop and its juncture with the rock face, into which various other bones and shells had also become lodged.

The appearance of both water rolled stones and limestone fragments in this deposit (015) suggests that both roof collapse and marine action had resulted in the deposition of this material. Limestone fragments, indicative of roof collapse, were generally confined to the front part of the cave suggesting that the cave mouth was subject to the most severe collapse, a process similar to that envisaged for the Smoo Cave.

The presence of both water-rolled stones and washed sands within the deposits provides evidence for the complex nature of the processes related to the marine inundation and beach formation. Today the upper beach in front of the caves is composed of water-rolled stones, with sand only visible further down the beach at times of low tide. The dynamics of wave action and beach morphology must be studied in greater depth before the implications of the appearance of both types of beach deposit, each usually in exclusion of the other, within the cave are understood.

It is suggested here that the loose midden material identified in trench 2 represents refuse which was

removed from the cave interior and dumped into a semi-confined space otherwise occupied only by tumbled and wave deposited stones. As this area was not subject to trampling the deposits did not take on the compacted, greasy consistency of those inside the cave, each of which at some time in their history appear to have represented the floor of the cave.

7.2. Antler Cave (AC)

Archaeologically speaking the Antler Cave did not prove as productive as the Glassknapper's Cave. The relative paucity of archaeological deposits may in part be due to the distinct possibility that, as far as human activity is concerned, this cave has always been the poorer cousin of its deeper and drier neighbour. However, this is not to say that archaeological deposits were totally lacking, and it is important to note that the wet conditions always present regularly caused the sections to collapse and thus made it impossible to excavate as extensively as in GKC. It cannot therefore be stated for certain that more complex deposits similar to those in GKC do not exist within the largely unexplored body of the cave deposits. Excavation of the Antler Cave deposits was limited to a small trench cut back from the main section for little over a metre (Figure 1 - trench 3 - sections not illustrated here).

The upper deposits bore a very close similarity to those observed in the front section of the Glassknapper's Cave, with the same sequence of silting and collapse occupying the upper horizons (022, 023 and 024 equating with 001, 003 and 004). A number of distinct archaeological horizons were detected further down in the section. These were sealed beneath a considerable deposit (024/026), around 0.40m thick, of limestone fragments and chips which again appears to represent cave collapse. The first of these archaeological horizons was stratified directly beneath 024/026 and consisted of a thin layer (0.02m) of winks and animal bone in a orangey/brown matrix (036). This overlay a less clearly defined deposit, some 0.20m thick, which consisted of large angular stones within a silty brown matrix, which had shells, animal and

fish bones scattered through it. This overlay 029 which consisted of shells and fragments of charcoal within a silty grey matrix which again also contained angular stones. This deposit did not appear to extend far into the cave from the outer section face, but of course it is impossible to say how much of the deposit outwith the cave as it appears today has been lost to erosion. This overlay a sterile layer of orange silty clay with some stones (039), which itself sat above a deposit which contained large angular stones, grit and gravel (040). The lower limit of excavation was marked by a deposit of very large angular chunks of limestone with virtually no matrix (041) which continued beneath the level of the present beach.

Limited excavation of the Antler Cave has succeeded in identifying a series of deposits related to past human activity. Unlike the majority of archaeological deposits in the Glassknapper's Cave these were partially contained within what can perhaps be described as rubble horizons rather than in highly compacted lenses and layers. The deposits as a whole were looser and less dense than the majority of the GKC deposits. The cave appears to have been used on a much more casual basis, with features such as firespots and artefacts being largely absent.

7.3 *Wetweather Cave (WWC) (Fig. 4)*

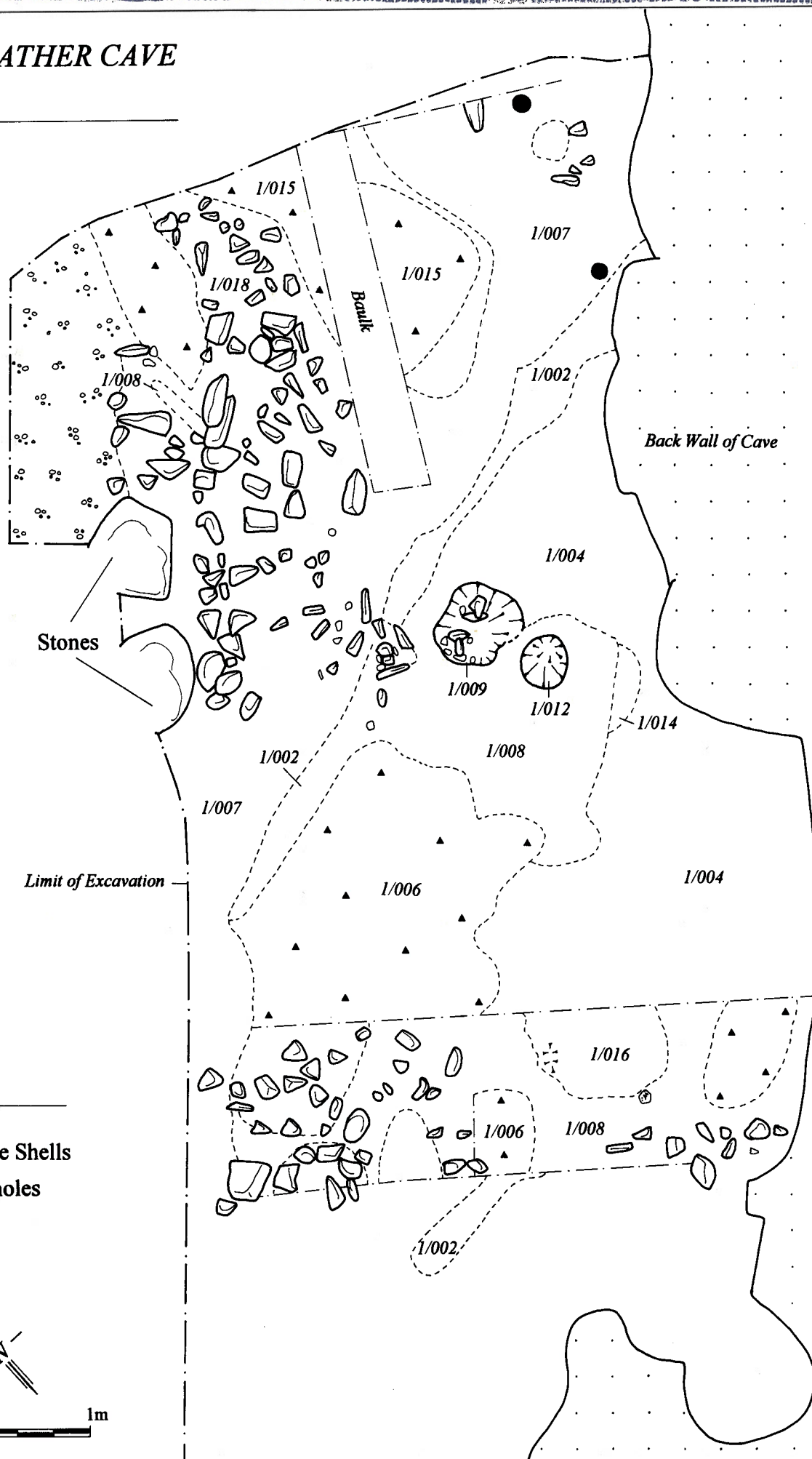
The cave consisted of three elements. The first of these was the outer chamber, which took the form of a deep overhang which opened out to the northwest. The rear part of the chamber closest to the entrance to Smoo Cave was occupied by a deposit of talus and limestone concretion behind which was a small chamber into which it was possible to gain access with relative ease. To the left of the entrance of this small inner chamber was a third, much larger chamber. However, gaining entry to this chamber was possible only by crawling through a narrow gap, which like the interior had been subject to cave roof collapse.

Excavation of the Wetweather Cave was confined to the outer chamber (Figure 3), where removal of several centimetres of sheep dung revealed archaeological

Figure 1 (facing): WWC preliminary plan.

WETWEATHER CAVE

Plan _____



Key _____

- ▲ Marine Shells
- Stakeholes



0 1m

deposits. The first feature to be identified was a concentration of marine shells, dominated by limpets (1/006), which also contained butchered and worked animal bones. A number of other features were identified with further cleaning. These included several stakeholes, a possible posthole (1/012) and a pit (1/009) which had been cut into the chalk-like soil which represented the cave floor. This highly mineralised deposit, which appears for the most part to be formed from dissolved limestone, was at first thought to be archaeological sterile. However, cleaning back in spits revealed animal bones and in several locations sherds of decorated pottery, which appears to be late Neolithic/early Bronze Age (see section 8). A further shell midden deposit (1/015) was identified located within the north easterly portion of the trench, sitting within a shallow scoop.

As the time devoted to this cave was dictated by the inability to work in the other caves it was not possible to achieve anything more than an assessment of the deposits. However, it does appear that the cave was occupied as far back as the Late Neolithic or early Bronze Age, with features of some considerable complexity cut into the floor of the cave. It is hoped that it will be possible to return to this site to carry out a more thorough investigation in the future. However, in the meantime the sheep dung deposit has been carefully reinstated along with the rest of the excavated material in order to preserve this potentially important archaeological site.

8 Material culture

8.1 Glassknapper's Cave

The excavation of the Glassknapper's Cave resulted in the recovery of a rich and varied assemblage of material culture, ranging from a section of 'Scalextric' track from the upper deposits to a finely worked bone pin from the lower deposits. This material awaits specialist analysis but some general comments can be made at this stage.

A number of sherds of pottery were recovered. The pottery sherds included at least one heavy wheel-thrown

vessel with reduced external surface and oxidised interior with mica and shell temper. These sherds are not dissimilar to examples recovered from Freswick Links (Colleen Batey pers comm) and appear to be a variety of East Coast gritty ware manufactured around the 12-13th century (late Norse/Medieval). The remaining sherds appear to represent hand made pots which were fired under reduced conditions and have a mixed temper of mica/?shell and vegetable material. These, again, are not dissimilar to sherds recovered from other northern Norse sites, including the fish middens at Roberts Haven, Caithness (Barrett 1994). Both types of pottery were recovered from various levels within the complex cultural deposits recorded in the main section. On the basis of stratigraphic evidence it does not therefore appear that one type appeared later than the other. What can be suggested is that the coarser hand-made pottery was made locally and that the wheel-thrown ware was imported from the East Coast.

Square or diamond headed iron rivets were present in some numbers, no doubt there are still more to be recovered from the bulk samples. These are typically Norse and were used in the construction of ships and boats. The dimensions of the larger pieces (5cm across the head, shaft 3.5cm long and 1cm thick) indicates boats of some considerable size. The recovery of lumps of iron slag would suggest that iron was being worked within the cave and may well have been used to manufacture rivets on site. This may further suggest that Norse boats were being hauled up onto the beach in front of the cave for repair.

One of the most striking results of the GKC excavation has been the recovery of worked bone and antler. The recovery of organic artefacts in immaculate condition is largely due to the fortuitous combination of damp and alkaline conditions, the latter promoted by both the limestone geology and the presence of concentrated marine shells.

These finds included a carved peg of red deer antler, on the surface of which the cut marks can be clearly seen. This artefact was made on an antler tang, with a carved cylindrical head topping a curved and pointed shaft. The

function of this piece is uncertain but in keeping with other elements of the material culture recovered from the site may represent a piece of ship's furniture, perhaps representing an alternative form of timber fastening to the iron rivets discussed above. Other pieces of worked antler and bone took the form of spatulate or pointed blades, the function of which is uncertain. One of the spatulate pieces of bone was perforated towards one end and may represent either the handle of a knife or a netting needle. Unfortunately, because the piece is snapped, it is not possible to say which of these functions is the most likely. Also recovered was a small finely worked bone pin with a round perforated head.

Cursory analysis of the sieved bulk samples suggests that further finds of worked bone and antler are still to be made at the processing stage. What is apparent is that many early (19th century) references to bones recovered from coastal midden deposits, split or cut to remove the marrow, may in reality have represented artefacts rather than waste.

8.2 Antler Cave

No artefacts were identified during the excavation of Antler Cave. However, a number of intact antler tines were recovered from the lower deposits but as yet their relationship to the finished antler artefacts recovered from the neighbouring cave is unclear - although it is tempting to suggest that the cave was used for the storage of this raw material.

8.3 Wetweather Cave

As in the case of the Glassknapper's Cave a number of pieces of worked bone were recovered from this site. However, the most noteworthy finds were a number of sherds of heavy pottery, decorated with impressed 'maggots'. This impressed ware is indicative of a late Neolithic/Early Bronze Age presence. However, the continued use of the cave over a longer period of time may be suggested by a fine bronze pin, with an incised globular head, which may be Norse or even Medieval.

9 Conclusion and discussion

The excavation of the Geodha Smoo Caves resulted in the identification of complex archaeological deposits and the recovery of valuable artefactual and environmental evidence. Optimum preservation levels were encountered, with animal bones and organic artefacts plentiful in a number of deposits. The presence of archaeological deposits in the three caves described here and in Smoo Cave itself clearly indicate the importance of this coastal location in the past. Prehistoric activity is evidenced by the deposits in the Wetweather Cave but the majority of the evidence, from all of the other caves, indicates their use during the Norse period.

Despite its confirmed occurrence in only one of the caves (but see Pollard 1992), the discovery of prehistoric activity in the Wetweather Cave is of some considerable importance. Our present understanding of the extent and character of prehistoric, and indeed later, settlement in this extreme northwest corner Scotland is limited, with very little fieldwork so far carried out in the area; a rare exception being Reid's survey of prehistoric monuments in the Durness area (1967). The prehistoric utilisation of coastal caves and marine resources in the northern fringes of mainland Scotland should perhaps come as no surprise and the patterns of activity evidenced may bear some similarity to those envisaged for the west coast of Scotland (Pollard 1994).

The evidence from the other caves clearly indicates that marine resources continued to play an important role in the historic period. The deposits within the Glassknapper's Cave strongly suggest that the Norse, in an area characterised by an exposed coastline regularly battered by heavy seas, regarded the Geodha Smoo as an important natural harbour. There is also place name evidence (Fraser 1995, 94) to suggest a Norse presence, with the name Smoo perhaps having its origins in the Norse *Smúga* (rift, cleft, cave).

In common with other northern Scottish sites, the presence of quantities of large fish bones in the Glassknapper's Cave suggests that deep sea fishing played an important role in the Norse economy. The importance of boats is further emphasised by the presence of rivets and

metal slag, both of which indicate the repair of boats. It is difficult to say whether this activity merely represents one component of a more complex Norse archaeological landscape, with settlements situated in reasonably close proximity to the caves. If this were the case then the caves may relate to the daily practice of marine exploitation, representing the place at which fish were landed and processed before being transported to the settlement, bait (shellfish?) prepared and boats maintained. However, as yet, no Norse settlements have been identified in this area, although the recovery of a Norse burial from the sand dunes at Balnakeil some 4 km to the northwest (Dorothy Low pers comm) does suggest that activity was not confined to the caves and their immediate environs.

As with the case of prehistoric settlement, our understanding of Norse activity along this part of the northern coast of mainland Scotland requires a more intensive programme of research. Excavations at Freswick Links and Robert's Haven have provided physical evidence for the Norse presence in Caithness suggested by a proliferation of Norse place names. More recently small scale excavation at Dunnet Bay, some 75km to the east of Smoo, has revealed the presence of a Norse settlement on the northern coast of Caithness (Pollard 1996). It remains to be seen whether this settlement pattern extends as far west as Smoo or whether the deposits in the caves were merely the results of temporary stop-overs by Norse mariners on their voyages from Scandinavia and the northern isles to the western Isles and more southerly destinations such as Ireland and the Isle of Man.

In the absence of further evidence this latter hypothesis is an attractive one, with the sheltered Geodha and the caves providing the ideal location in which to carry out repairs on boats which may have suffered damage in heavy seas, the beach allowing boats to be hauled ashore if necessary. This 'port in a storm' would also provide the opportunity to process fish caught on the voyage and to procure other foodstuffs, both wild and domestic, from the immediate environs of the caves. Although the deposits in both the GKC and AC were of considerable depth they may have resulted from regular visits, perhaps several times a year, and thus may have built up quite

rapidly, perhaps over a period no longer than one or two hundred years. Despite the fact that much of the activity does appear to relate to Norse activity the potential for earlier (perhaps Iron Age) and later (Medieval and post Medieval) phases of use should not be overlooked. It is hoped that radiocarbon dating will help to clarify these chronological issues.

Only with the completion of a full post-excavation programme will we begin to more fully understand the archaeological implications of the deposits reported here. However, in the meantime, it is hoped that this report has served to demonstrate the rich potential of these sites.

10 Acknowledgements

I would like to thank the excavation team, whose unstinting efforts allowed so much to be done in so little time and in such appalling conditions. They were: Michael Donnelly, Lorna Johnstone and Biddy Simpson. Thanks also goes to Richard Hingley of Historic Scotland for facilitating the grant which enabled this work to take place. Colleen Batey provided provisional comment on the pottery and Keith Speller produced the illustrations. Final thanks to Dorothy Low, Assistant Archaeologist, Highland Region, for her assistance throughout this project.

11 Bibliography

- Barrett, J.H. 1995. "Few know an earl in fishing clothes": Fish middens and the economy of the Viking Age and Late Norse Earldoms of Orkney and Caithness, Northern Scotland. Unpublished Ph.D. thesis, University of Glasgow.
- Fraser, I. 1995. Norse settlement on the north-west seaboard. In Crawford, B. (ed.), *Scandinavian Settlement in Northern Britain*. 94.

- Gleed-Owen, C. P. 1992. The Flandrian Palaeoenvironmental history of Smoo Cave, Sutherland: faunal and sedimentological evidence. Unpublished dissertation, Dept. of Geography, Coventry Polytechnic.
- Pollard, T. 1992. *Smoo Cave*. GUARD monograph report 60.
- Pollard, T. 1994. A study of marine exploitation in pre-historic Scotland: with special reference to marine shells and their archaeological contexts. Unpublished Ph.D. thesis, University of Glasgow.
- Pollard, T. 1996. *Assessment Excavation of a Norse coastal settlement at Marymas Green, Dunnet Bay, Caithness*. GUARD monograph report.
- Pollard, T. forthcoming. Rescue excavation of Norse midden deposits in Smoo Cave, Sutherland.
- Reid, R.W.K. 1967. Prehistoric settlement in Durness. *Proceedings of the Society of Antiquaries of Scotland* 99 (1966-67), 54-60.

Appendices

Appendix A. Environmental sampling: a provisional statement

by Diane Aldritt

Approximately 81 environmental samples were taken from the Geodha Smoo Caves during the 1995 excavation. The majority of these samples were wet sieved on site utilising a flotation machine. The remaining samples were either wet sieved at the University facility at Rowardennan, or sieved under laboratory conditions. This may enable some comparison of sample processing methods to be made – in particular use of differing sieve mesh sizes, and to ascertain whether there is any advantage to small scale indoor sieving as opposed to bulk sieving outdoors.

Almost all samples contained abundant quantities of marine mollusca, with Common Winkles (*Littorina littorea*), various species of Whelk (mostly Dog Whelk – *Nucella lapillus*), and Common Limpets (*Patella vulgata*), and also the occasional Mussel (*Mytilus edulis*) and Oyster shell (*Ostrea edulis*). Interestingly, Limpet shells of both rocky shore and sandy beach habitats were present (based upon measurement of height to base ratio) suggesting different collection areas, although further work is needed to establish if there is any particular sample variation. The samples also contained abundant quantities of fish bone (including some burnt fish bone) and small (rodent size) mammal bone, as well as the occasional larger mammal bone. One bone from sample GKC (008) Spit 3, has been tentatively identified as a pig humerus.

Carbonised plant remains were quite well preserved at the site, with most samples producing some macrofossils. Finds of *Hordeum vulgare* (Hulled Barley) were quite common, with some twisted grains present. *Avena* sp. (Oats) were also present but not in any great number. Other macrofossils included numerous species of Caryophyllaceae (Pinks) (in particular various *Silene* sp. (Campions), and *Stellaria* sp. (Chickweed) and a variety of *Carex* sp. (Sedges). Small quantities of carbonised sea-

weed measuring up to 1cm, and the occasional *Corylus* (Hazel) nut shell fragment were also recovered. Context GKC (008) produced numerous well preserved stem and leaf fragments, probably from *Calluna* sp. (Heather). Some of the charcoal from Smoo has been identified, with *Betula* (Birch) and *Corylus* (Hazel) as the main species present, although more work remains to be done in this area.

Overall, the sampling at the Smoo Caves has produced a wide variety of well preserved environmental remains. Further work on sorting and identifying the plant macrofossils from this site is currently being undertaken.

Sample list

GKC:

COLUMN SAMPLES:

(1995 Floted on site):

Spit 1 = >1mm, >250u. (2, with 1 lab sieved).

Spit 2 = >1mm, >250u.

Spit 3 = >250u. (2)

Spit 4 = >250u. (2)

Spit 5 = >1mm, >250u.

Spit 6 = >1mm, >250u.

Spit 7 = >250u.

(1996 Floted Rowardennan):

Spit 9 = >1mm, >500u.

Spit 10 = >1mm, >500u.

Spit 11 = >1mm, >500u.

Spit 13 = >1mm, >500u.

Spit 14 = >1mm, >500u.

Spit 15 = >1mm, >500u.

Spit 16 = >1mm, >500u.

Spit 17 = >1mm, >500u.

Spit 18 = >1mm, >500u.

Spit 19 = >1mm, >500u.

Spit 20 = >1mm, >500u.

Spit 21 = >1mm, >500u.

Spit 23 = >1mm, >500u.

Spit 24 = >1mm, >500u. (1 of 2)

Spit 24 = >1mm. (2 of 2).

Spit 25 = >1mm, >500u.

Spit 26 = >1mm, >500u.

Spit 27 = >1mm, >500u.

Spit 28 = >1mm, >500u.

Spit 29 = >1mm, >500u.

Spit 32 = >1mm, >500u.

Spit 33 = >1mm, >500u.

GKC:

CONTEXT (008):

(1995 Floted on site):

(008) Spit 1 = >1mm, >500u.

(008) Spit 2 = >1mm, >250u.

(008) Spit 3 = >1mm, >500u.

(008) Spit 4 = >250u.

(008) Spit 5 = >1mm, >250u.

(008) Spit 6 = >1mm, >250u.

(008) Slot 1, Trans 1 = >500u.

(008) Slot 1, Trans 1 Loose from extension =
>1mm.

(008) = >1mm, >500u.

(1996 Rowardennan floted):

(008) = >1mm, >500u.

(008/ 013) Slot 2, Spit 1 = >1mm, >500u.

(008) Slot 2, Spit 2 = >1mm, >500u.

(008) Slot 2, Spit 3 = >1mm, >500u.

(008/013) Slot 2, Spit 5 = >1mm, >500u.

(1995 Lab sieved):

(008) Spits 1 – 7 (7 samples in bag). Labelled = Spit
3, 4, 5, 6. My labelling = (i), (ii) (vii) (A).

All sieved to >250u.

(008) Spit 3 (B) = >250u.

(008) Spit 5 ? (B) = >250u.

(008) Spit 6 ? (B) = >250u.

GKC:

OTHER CONTEXTS:

(1995 Floted on site):

(013) Tumble = >1mm, > 500u.

(013) Slot 2, Spit 1 = >1mm.

(021) South Spit, Trans 1 = >1mm, >500u.

(021) North Spit, Trans 1 = >1mm, >250u.

(1995 Lab sieved):

(021) South Spit, Trans 1 (A) = >250u.

No Label (1) = >250u.

(1996 Rowardennan Floted):

(12) = >1mm, >500u.

(028) Ac = >1mm, >500u.

(029) Ac = >1mm, >500u.

(035) Ac = >1mm, >500u.

(036) Ac = >1mm, >500u.

(039) Ac = >1mm, >500u.

Other contexts GKC

(030) = >1mm, >500u.

TN 1 = >1mm, >500u.

TN 2 = >1mm, >500u.

BR ? 1of1 = >1mm, >500u.

WWC SAMPLES:

(1995 Floted on site):

(006) Slot 1, Spit 3 = >1mm, >500u.

(011) Spit 1 = >500u.

(011) Spit 2 = >1mm, >500u.

(008) = >1mm, >250u.(1995 Lab sieved):

(011) Spit 4 Fill = >250u (A).

(015) Slot 2, 2of2 = >250u (A).

(004) = >250u (A).

(1996 Rowardennan Floted):

(014) 1of1 = >1mm, >500u.

(026B) Fill 1of 1 = >1mm, >500u.

Appendix B

Context list (summary only)

- 001 GKC brown/grey sandy silt overburden
- 002 GKC lens of pink clay in external section
- 003 GKC Black humic layer
- 004 GKC Brown/grey silt matrix with limestone fragments
- 005 GKC upper layer of loose collapse
- 006 GKC lower layer of collapse
- 007 GKC pale orange sand deposit
- 008 GKC upper midden deposits
- 009 GKC deposit of yellow/grey sand
- 010 GKC thin band of dark humic material
- 011 GKC lower deposit of washed sand
- 012 GKC brown silty matrix with limestone/beach pebbles
- 013 GKC midden deposit in external section
- 014 GKC thin lens of brown gritty sand
- 015 GKC thin lens of gritty yellow/brown sand
- 016 GKC grey ashy deposit beneath 008
- 017 GKC orange/yellow gritty sand between 008/016
- 018 GKC arrangement of stones at cave mouth
- 019 GKC lower midden deposit
- 020 GKC midden deposit between 016 and 017
- 021 GKC stony deposit with midden
- 022 AC turf over gritty sandy loam
- 023 AC black humic layer
- 024 AC grey silty matric with limestone fragments
- 025 AC localised gritty deposit, some limestone frags
- 026 AC brown silty matrix with limestone fragments
- 027 AC orange/brown silty clay, stones, shells, fishbone
- 028 AC orange compact silty clay with few stones
- 029 AC grey midden deposit, shells and charcoal
- 030 GKC deposit rich in mussels
- 035 AC upper midden
- 036 AC second midden layer – periwinkles
- 037 GKC trench 2 – midden in rocky matrix
- 038 GKC stone deposit at rear of cave
- 039 AC grey/black midden – charcoal/ash matrix, shell

040 AC beige silty matrix with angular stones
 041 AC large angular stones with no matrix
 042 GKC winkie rich deposit in base of trench 2
 043 GKC oyster rich deposit toward rear of cave

1/001 WWC sheep dung deposit
 1/002 WWC orange/beige sand and gravel – limestone
 1/003 WWC grey ashy layer
 1/004 WWC brown silty clay deposit
 1/005 WWC midden deposit in northern part of cave
 1/006 WWC shell midden deposit in central area
 1/007 WWC dark brown silty clay with small stones
 1/008 WWC white degraded lime
 1/009 WWC cut for posthole
 1/010 WWC post packing in 1/009
 1/011 WWC fill of 1/009
 1/012 WWC cut of pit/posthole
 1/013 WWC fill of 1/012
 1/014 WWC light grey ashy deposit to east of midden area
 1/015 WWC midden deposit
 1/016 WWC firespot/charcoal spread
 1/017 WWC burnt material in hollow
 1/018 WWC large angular stones in brown loamy matrix
 1/019 WWC fill of cut 1/020
 1/020 WWC cut filled by 1/019
 1/021 WWC fill of possible posthole 1/022
 1/022 WWC cut filled by 1/022
 1/023 WWC shallow scoop containing midden 0/015
 1/024 WWC fill of 1/025
 1/025 WWC stakehole cut filled by 1/024
 1/026a WWC grey ashy layer beneath 1/008
 1/026b WWC fill of pit 1/027
 1/027 WWC cut of pit filled by 1/027
 1/028 WWC fill of possible pit (unexcavated)
 1/029 WWC possible stakehole fill
 1/030 cut filled by 1/029

Appendix C

Photo record

abbreviations

AC Antler cave
 BS Biddy Simpson
 GKC Glass knappers cave
 JOL non excavation photograph
 LJ Lorna Johnstone
 MD Mike Donnelly
 SC Smoo Cave
 SF special find
 SI Smoo inlet
 TP Tony Pollard
 WWC Wet weather cave

001 GKC general view E end slot 1
 002 WWC general view of features in main cleaned area
 003 WWC post holes in [008]
 004 WWC general view postholes in [008]
 005 WWC feature [026A] in [008]
 006 WWC [030] stakehole in [008]
 007 WWC [015] posthole/pit in [008]
 008 WWC [030] stakehole in [008]
 009 WWC main section and [012]
 010 GKC [008] midden after cleaning
 011 WWC spit through [008] also stakehole [030]
 012 GKC [008] and section through [008] and upper material
 013 WWC section through [008] plus [013]
 014 GKC main section through [008] note section collapse
 015 GKC general view E end slot 1
 016 JOL MD +LJ in front of the scheme from hell
 017 GKC section through [008]/upper material after cleaning
 018 GKC exterior section covered in snow and icicles
 019 WWC feature [015] in [008]
 020 JOL LJ in front of Sail Ghorm and Sail Gharbh
 021 SI view of GKC and others W side of smoo inlet
 022 WWC general view of WWC
 023 WWC talus outside WWC
 024 WWC feature [022]
 025 SI view of GKC + others including fallen roof in front
 026 GKC [042] oyster midden in slot 1
 027 AC main view of slot 3
 028 AC slot 3, North side
 029 WWC feature [023] within [008]
 030 AC slot 3, South side
 031 GKC MD the miner emerges
 032 WWC feature [022] within [008]
 033 AC exterior coated in ice
 034 WWC/SC snow falling
 035 GKC column sample in [008] slot 1
 036 GKC top material in section slot 1
 037 GKC column sample in [008] slot 1
 038 GKC rubbish inside cave and top of exterior section
 039 WWC/SC burst pipe, viewed from building
 040 GKC column sample in [008] slot 1
 041 SI smoo inlet
 042 AC main view of slot 3
 043 GKC view from back of cave including rubbish
 044 WWC/SC burst pipe on wintery day
 045 WWC LJ at work beside feature [009] in [008]
 046 WWC LJ at work on layer [008]
 047 WWC LJ excavating [012]
 048 WWC feature [012] eastern half
 049 WWC LJ cleaning up [008] and [013]
 050 WWC features [012]/[013]
 051 WWC feature [015]

- 052 WWC feature [012]
053 GKC MD at work on exterior section
054 WWC feature [012] after initial cleaning back
055 WWC feature [015]
056 WWC feature [015]
057 WWC feature [015] excavated
058 WWC feature [015] excavated
059 WWC feature [015] excavated
060 WWC feature [015]
061 WWC feature [015] excavated, blurred
062 WWC feature [015] excavated
063 WWC feature [013]/[012] LJ at work
064 WWC feature [015] excavated
065 GKC exterior section of cave
066 WWC general view of cave plus LJ
067 GKC\AC exterior section after cleaning
068 SI GKC and others, tide in
069 GKC general view of slot 2
070 GKC exterior section, slot 1 to the cave wall
071 GKC slot 2 and exterior section
072 WWC MD BS LJ at work
073 GKC exterior section, slot 1 to the cave wall
074 GKC exterior section showing many layers up to cave wall
075 SI GKC and others, smoo inlet tide in
076 WWC BS LJ MD working within WWC
077 GKC GKC and slot 1 and exterior section
078 GKC exterior view of GKC and slot 1
079 GKC\AC side section in slot 2, note antler
080 WWC MD LJ BS team at work in WWC
081 WWC BS MD LJ at work
082 GKC\AC side section in slot 2, note antler
083 GKC slot 1 and exterior section
084 GKC\AC slot 2 section, note antler
085 GKC\AC slot 2 section, note antler
086 GKC exterior section
087 GKC\AC slot 2 section, note antler
088 GKC exterior section
089 GKC from the interior looking out
090 GKC\AC MD with caves in background
091 GKC MD working in slot 1 and exterior section
092 GKC metal object for boarding, within main cave
093 GKC\AC MD and exterior section, pre-ex and tumble
094 GKC MD working on section, pre-ex
095 GKC MD working on section exterior
096 GKC slots 1 & 2 with MD inbetween
097 GKC\AC MD and LJ from above at work on section
098 GKC slot 1 and TP plus rubbish in GKC
099 GKC view from interior of GKC, includes rubbish
100 GKC\AC MD plus GKC\AC
101 SI view of GKC\AC and submerged causeway
102 GKC\AC general photo of exterior section and MD
103 SI SC, WWC, sieving station (SS) and BS
104 SS at SS, causway well above water line (see 101)
105 WWC feature [015], excavated
106 WWC features [009] and [015], excavated
107 GKC slot 1 and section cleaned up
108 GKC\AC MD at work on slot 2
109 GKC\AC slot 1 and slot 2, exterior section
110 GKC\AC slot 2 and exterior section
111 GKC slot 1 and midden [008]
112 GKC\AC slots 1&2 and MD with some sf's
113 GKC\AC MD at work in slot 2 with AC behind
114 GKC slot 1 and section in GKC (continues with 115)
115 GKC continued section in GKC (continues from 114)
116 GKC section across midden
117 GKC [008] top layer of midden
118 WWC feature [015], half excavated
119 GKC\AC slot 2 and section across GKC and AC
120 SS BS sieving from above
121 GKC\AC section across midden and slot 1
122 AC section across midden
123 GKC\AC section across midden and slot 1
124 GKC\AC section across middens layers
125 AC frozen tape across antler cave
126 SI caves, SS and submerged causeway
127 WWC BS, MD and LJ at tea break
128 GKC slot 1, North section
129 SC general picture of smoo cave
130 SC retaining wall at main midden showing erosion
131 GKC slot 1, North section
132 WWC from above
133 SC water lapping the sides of the protected midden
134 GKC slot 1, North section
135 GKC slot 2 and exterior section
136 WWC feature [026A], after excavation
137 GKC slot 2 and exterior section
138 GKC slot 1, midden [008] showing vividly its many layers
139 GKC feature [013], excavated in slot 2
140 GKC slot 2, MD at work; note bucket of bone
141 GKC [013] slot 2, above stone mass and edge of cave wall
142 AC feature [035], midden layer exposed
143 GKC feature [038] within slot 1, stone retaining wall
144 GKC feature [038] within slot 1, stone retaining wall
145 GKC\AC slots 1,2 and 3 and exterior section
146 GKC feature [038] within slot 1, stone retaining wall
147 GKC feature [038] within slot 1, stone retaining wall
148 AC feature [035], midden layer exposed
149 GKC slot 1 [008], near cave mouth
150 GKC slot 1 LJ at work
151 GKC transect 1 through [008]

- 152 GKC [008] after cleaning back, North side becomes slot 1
- 153 GKC [008] and top of slot 1 section
- 154 GKC [015] periwinkle midden below [008]
- 155 GKC slot 1/trans 1 in [008] MD at work
- 156 GKC slot 2 LJ at work from AC above
- 157 WWC feature [019] after excavation, in [008]
- 158 GKC transect 1 through [008]
- 159 GKC midden [008] and section
- 160 GKC transect 1 through [008]
- 161 GKC transect 1 through [008]
- 162 GKC trans 1 southern half under excavation by MD
- 163 GKC trans 1, N half will become slot 1
- 164 GKC exterior section LJ in slot 1, MD in trans 1
- 165 GKC trans 1 from above
- 166 WWC feature [019], excavated
- 167 GKC [008] midden exposed after initial cleaning
- 168 GKC transect 1 note sand at bottom
- 169 GKC features [008]/[016] midden within cave, slot 1
- 170 GKC features [008]/[016] midden within cave, slot 1
- 171 WWC feature [018], layer of large angular stones
- 172 WWC feature [012] after excavation
- 173 WWC feature [012] after excavation
- 174 WWC feature [012] after excavation
- 175 WWC feature [019] after excavation
- 176 WWC feature [018], layer of large angular stones
- 177 WWC feature [019] half excavated
- 178 WWC feature [019] half excavated
- 179 WWC feature [012] after excavation
- 180 GKC [018] large angular stone structure at cave mouth
- 181 GKC [018] large angular stone structure at cave mouth
- 182 GKC [008] slot 1 extended and MD working at back
- 183 GKC [038] from back of cave, oyster midden
- 184 WWC dark photo of main slot in [008]
- 185 WWC feature [015]
- 186 GKC South face of slot 1 near entrance
- 187 GKC feature [015]
- 188 WWC feature [018], dark oblique photo
- 189 GKC beach pebbles outside GKC
- 190 WWC feature [002]
- 191 WWC feature [002]
- 192 WWC initial cleaning general shot
- 193 WWC initial cleaning general shot
- 194 GKC extreme lower section in tumble outside
- 195 GKC lower section showing antler tine and bone
- 196 WWC back chamber behind WWC
- 197 AC slot 3
- 198 WWC back chamber behind WWC
- 199 GKC main section slot 1, entrance to cave
- 200 GKC main section slot 1
- 201 GKC exterior section face, note antler
- 202 SC general view of smoo cave
- 203 GKC general view MD at work in slot 1
- 204 WWC view of MD, BS and LJ at work
- 205 GKC trans1 in slot 1 Western section, note clean sand
- 206 GKC MD emerging from GKC, slot 1 visible
- 207 WWC\SC fallen roof and view of WWC and SC
- 208 GKC MD at work in trans 1, [008]
- 209 GKC [008] cleaned up, slot 1 to the right
- 210 GKC\AC slot 2 and MD initial cleaning up
- 211 SI smoo and snow and LJ in foreground
- 212 SS LJ near sieving station
- 213 GKC slot 1 and cleaned up section between GKC and AC214 SI GKC and AC with tide in, snow lying
- 215 WWC icicles on roof of WWC looking towards GKC
- 216 WWC feature [009] excavated, in [008]
- 217 GKC feature [043] oyster rich layer in midden
- 218 GKC\AC slots 1-3, LJ in slot 2, cave wall exposed
- 219 WWC features [008] and [030]
- 220 WWC back chamber behind WWC
- 221 WWC BS at work in WWC
- 222 GKC LJ at work in slot 1, exterior section
- 223 GKC slot 1, North section near cave mouth
- 224 SI smoo inlet, tide out; showing GKC and sheep

Appendix D. Post excavation strategy and costing

The excavations at the caves in the Geodha Smoo resulted in the recovery of a large number of bulk samples, the majority of which contain well preserved organic remains. This material will provide a detailed picture of the economy practised by those responsible for the build-up of these deposits and the environment within which this activity took place. However, in order for these samples to fulfil their potential an intensive programme of post-excavation work aimed at the processing of material and its specialists' analysis must be carried out. It is understood that this must take place within the confines of a modest budget and so accordingly a number of measures have been taken to minimise the cost involved.

As the project corresponds to the research interests of GUARD's environmental specialist, Diane Aldritt, it has been agreed that the palaeobotanical work will be carried out at very little cost to Historic Scotland. The results of this work will feed directly into Ms Aldritt's PhD research, which is centred on the analysis of Norse midden deposits in northern Scotland. Another major saving will be made at the sample sorting state, where a group of student volunteers will carry out the work under close supervision as part of their undergraduate work experience programme. Again, this measure is a reflection of the quality of the material recovered and its potential to further the research interests of the Department of Archaeology at the University of Glasgow.

In order to bring this project to publication a number of costs remain necessary. These are outlined below.

Sieving (material not sieved on site)

| | |
|---------|------|
| sieving | £500 |
|---------|------|

Environmental analysis

As noted above this analysis will be carried out by Diane Aldritt of the Botany Department at Glasgow University. This work is currently underway and a summary of the charred plant remains already identified from preliminary examination of material sieved during the excavation is presented here as an appendix.

A small sum is requested to cover the cost of bench fees, boxes, bags etc.

| | |
|------------------------|------|
| environmental analysis | £500 |
|------------------------|------|

Artefactual analysis (metalwork and metal slags)

A number of iron rivets were recovered from GKC and these will be examined by a metalwork specialist, along with the lumps of slag recovered from bulk samples. The analysis of the slag will be carried out by E. Photos-Jones of Scottish Analytical Services.

analysis of metalwork and slag

£500

Artefactual analysis (pottery)

A modest pottery assemblage was recovered from the excavation but it is likely that this will be augmented by material recovered from the bulk samples during sorting. This assemblage will be examined by a pottery specialist and the results integrated within the final publication report.

pottery analysis

£500

Artefactual analysis (bone and antler)

The greatest component of the total material culture assemblage is represented by pieces of worked bone and antler. A number of striking pieces, including a bone pin and antler peg, were recovered from the excavation but any more await recovery from the bulk samples during sorting. It is apparent that bones which in the past may have simply been described as split or butchered are actually manufactured artefacts and an attempt will be made in this work to identify and categorise this material.

bone and antler analysis

£800

Faunal analysis

A large number of animal bones were recovered from the excavation and await sorting from the bulk samples. These include large terrestrial mammals such as sheep and deer as well as marine fish. Marine shells were also present in some quantity and will be subject to limited analysis. The assemblage will be examined by a faunal expert (J. Barrett), the end result being a report which will be integrated within the final publication.

analysis of mammal, bird bone, etc.

£1000

analysis of fish bone

£800

Radiocarbon dates

Large quantities of charcoal were recovered from a number of contexts. The submission of a number of samples for radiocarbon dating will provide a valuable insight into the chronology of the site, particularly important in establishing the period of time over which the deposits accumulated – artefacts suggest that this may have been quite rapid.

| | |
|---------------------|-------|
| 5 radiocarbon dates | £1500 |
|---------------------|-------|

Illustration – artefacts and site drawings

Site plans and sections will be drawn by K. Speller. Artefacts will be drawn by J. Sievewright.

| | |
|--------------|-------|
| illustration | £1000 |
|--------------|-------|

Main report writing

This will take 25 days and will be carried out by Tony Pollard.

| | |
|---------------------|-------|
| writing main report | £2750 |
|---------------------|-------|

| | |
|--------------|--------------|
| Total | £9850 |
|--------------|--------------|

Summary breakdown

| | |
|-------------------------------------|-------|
| sieving | £500 |
| environmental analysis | £500 |
| analysis of metalwork and slag | £500 |
| pottery analysis | £500 |
| bone and antler analysis | £800 |
| analysis of mammal, bird bone, etc. | £1000 |
| analysis of fish bone | £800 |
| 5 radiocarbon dates | £1500 |
| illustration | £1000 |
| writing main report | £2750 |

| | |
|--------------|--------------|
| total | £9850 |
|--------------|--------------|

As this project contributes to research no VAT will be charged.



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ERRATA

**GUARD 214: CAVES IN THE GEODHA SMOO -
The Excavation of Three Caves Near Durness, Sutherland**

Page 11, *Figure 3: Cultural deposits in GKC* - this photograph has been erroneously inserted upside down.

