There are four caves in a limestone cliff, about 200ft. above Allt nan Uamh - a tributary of the Loanan, near Inchnadamp.

In 1889, Dr. J. Horne and Dr. B.N. Peach explored the third cave from the west and found bones of a rich Arctic fauna with traces of human habitation (a). Further excavations were made in 1926 by J.E. Cree, caves 1 and 2 from the west being dug and a trial bench dug in the 1889 cave. Finds included animal bones, human skeletons - one a definate burial, an iron blade a bone pin and an awl, a reindeer horn implement, cut and scratched antler and charcoal. The nature of the fauna, state of fossilisation of the bones, and the geological evidence suggest an Upper Palaeolithic date, certainly belonging to Magdalenian or earlier.

'Refers to the late Upper Pa. date suggested for the occupation of the caves. The animal remains apparently represent a late arctic fauna surviving in a refuge area into - (over)
52. early post glacial times. It suggests that the human habitation was not earlier than NE or even NE in date. '(3) 'The material from Allt nan Uamh is at the Royal Scottish Museum, Chambers St. Edinburgh.' (4).
'The most easterly cave is very shallow and little more than a rock shelter, the other three are true caves and have narrow tunnels leading off them.'(5)
(OSPI:GHP:6.6.62)

"See folder for (8)."

"NC 268 170. "Creag nam Uamh, caves". (5)

8. LAWSON, TJ & BONSALL, C:1986:EARLY SETT'T. IN SCOT.:QUATERNARY NEWSLETTER, NO.49

In the summer of 1925 Mr. James E. Clee found on the surface of the floor of a cave in the valley of Allt nan Uamh, near Inchdamph, Sutherland, two pieces of horn which turned out to be the antler of a young red deer. These were buried, and in the autumn the area was disturbed except for a rabbit's burrow, and the presumption was that the bones had been brought to the surface from lower layers by the rabbit's activities. The cave in question was one of a series of four in a limestone bluff some 300 feet above the present-day bed of the stream, Allt nan Uamh or "Horn of the Caves," a tributary of the Leannan, which flows into Loch Assynt. In 1926 Dr. John Hosie and the late Dr. Benjamin N. Peach explored another of these caves—No. 3 from the west, termed by them the "Bone Cave"—and discovered therein remains of a rich Arctic fauna containing several animals now extinct in Scotland, associated with traces of human habitation.

The outstanding results obtained by these excavations, and Mr. Clee's find in an undisturbed cave suggested the possibility of further discoveries, and with the consent of General Stewart of Assynt and assistance of his factor, Mr. Murdo Kerr, and by the aid of a grant from the Government Research Fund of the Royal Society of London, made to a committee composed of the authors of this paper, excavations were carried on during three full months in the summer of 1926. Throughout this period Mr. Clee superintended the work of excavation.

Excavations of 1926.

Work was confined to three caves and their subsidiaries. The most westerly cave (No. 1), in the series of four, was excavated by a medium trench and entrance was made to a second cave in the rear of No. 1. The second (No. 2), or the Reindeer Cave, was completely excavated to the rock floor, and behind it a newly revealed cave of considerable dimensions was sufficiently worked, to still of great difficulties, to show the character of the deposit and the nature of a fauna which was represented in their upper portions. Lastly, for purposes of comparison with the very different deposits found in these caves, a short trial trench was dug in the deposits of the cave partially excavated by Dr. Peach and Horne in 1899 (No. 3, the Bone Cave).

Summary of Results Obtained in 1926.

Cave No. 1 contained deposits very largely composed of cave-earth and roof debris, and it was in the cave-earth that relics were found. They consisted of animal bones of species still existing in Scotland, and a single artefact, a portion of a broad iron blade. In the subsidiary cave behind No. 1 were found bones of present-day species of animals, a human femur and a single artefact, a well-dressed bone shaft. The general aspect of the relics suggests that the upper deposits in this cave were of relatively recent date.

In Cave No. 2, or the Reindeer Cave, two bone-bearing deposits were discovered—the cave-earth and an underlying slightly rolled gravel. Beneath this, over part of the cave, lay a barren gravel of much more eroded appearance.

During the accumulation of both bone-bearing series man was undoubtedly present.

The more recent series, the cave-earth, contained many bones of species of animals still surviving in Scotland, but in addition there were also bones of bears, and the condition of some of the bones indicates considerable age. In this deposit were found a human skeleton in the better portion of another, the latter which was found at the base of the cave earth, having been definitely introverted. This is the only formal interment yet recorded from a Scottish cave. The mode of burial showed some features of interest, and the skull is long-handled or dolichocephalic. Two bone implements, an awl and a pin of peculiar form, represent the handiwork of man in this deposit.

The older layer of the bone-bearing deposits presented features of great interest. It contained vast numbers of shed antlers of young reindeer, mostly broken, representing over four hundred individual deer. Along with these bones were remains of several other members of an Arctic fauna, but the reindeer was by far the most numerous, and on the account the cave has been named the Reindeer Cave. No human interment was found in the reindeer gravel, but there was clear evidence of the presence of man, indicated by a simple reindeer-bone implement, by human cut and scratched reindeer antlers, and fragments of charcoal.

The evidence derived from the bone relics and the geological evidence points to this deposit having been re-sorted in the cave by a stream (and from personal observations of Mr. Marlin Kerr) which traveled along the margin or off the surface of a valley glacier, the surface of which stood above the level of the cave.

The strong indications, therefore, conveyed by the nature of the fauna, by the a state of fossilisation of the bones, and by the geological evidence we that there are being born with me of the periods in the Upper Palaeolithic series, certainly belonging to Magdalenian or earlier times. Lack of artefacts of cultural significance prevents more definite decision in the meantime.

Behind the Reindeer cave, and entirely blocked by a large and removal of much material allowed of entry by way of a narrow vertical shaft, was a cave (No. 2a) of considerable dimensions. It contained deposits of glacial silt with a lithic layer of well worked and polished pebbles. These deposits apparently point at an earlier period when the limestone bluff in which the cave lies was almost or wholly under the ice-field. The superficial eighteen inches of the deposit here contain a few bones of reindeer, of the long extant cave-hare (Ursus spelaeus), Arctic fox, etc. This association represents an Arctic fauna, not hitherto found in Scotland, which was probably present during an interglacial period preceding the emergence of the valley glaciers at the final ice age.

New Information Gained.

(1) More definite information has been gained regarding the glaciation of this part of Sutherland.

(2) The period of the early fauna with human associations has been more definitely fixed, and has been shown both to the final valley glaciers of the Ice Age.

(3) The number of reindeer has been found in a limited space and remarkable; an accumulation of such a nature has not hitherto been found in Europe, and we do not remember a parallel case even on the Continent of Europe.

(4) For the first time evidence of the presence of palaeolithic man in Scotland has been found.

(5) For the first time the Arctic fauna of the cave-bear and Arctic fox has been found in Scotland.

Future Excavations.

The value of the discoveries made during the present season, and the facts (1) that there is still much field for exploration in the series of caves; (2) that the cultural stage of the palaeolithic people has still to be defined; and (3) that the newly discovered cave-bear interglacial fauna is still scantily known, points to the need for further investigation. We propose to carry out during the summer of the present year.

In a letter to acknowledge our indebtedness to Mr. Norman, Inchdamph Hotel, for the kind assistance he rendered to us in many ways during the excavations.
Caves History

Some of Scotland's earliest traces of man can be found in the limestone caves in the Buchanadamp nature reserve, lying between Ben More Assynt and Loch Assynt.

The traces are of reindeer antler shards which have been fashioned into tools by humans who were able to live by following the deer herds. They date back 10,000 years, immediately after the last Ice Age.

According to Dr Tim Lawson, an Edinburgh lecturer, who tells Radio Scotland listeners how the caves were formed when "In the Country" visits the area on Monday.

With him is Alex Scott, the reserve's warden, who comments on the unusual richness of the plant life in this particular area of the Highlands, where elsewhere limestone is virtually unknown. The story will be broadcast from 1.30 - 1.58 pm (Repeated 7.02 pm).

Northern Times

30-8-91
MAP 1a
ALLT NAN UAMH.

KEY
1 Fuaran Allt nan Uamh (Main Rising)
2 Lower Otter Hole
3 Otter Hole
4 Creag nan Uamh Rocks Caves
5 Rana Hole
6 Uamh an Claonaite
7 Toll Raddain
8 Uamha Latha na Coinneir
9 Bear Cave
10 Allt nan Uamh Stream Cave
13 July 1994
Bob Gourlay
Regional Archaeologist
Clachnaharry Old School
High Street
Clachnaharry
Inverness

Dear Bob

INCHNADAMPH BONE CAVES

I connect with our discussions yesterday I thought it might be useful if I let you see what is actually proposed for Inchnadamph. Also enclosed is some bumph about the LIFE programme which let’s you see what we are about.

Yours sincerely

George Campbell
LIFE Programme
INCHNADAMPH BONE CAVE

1 PROJECT CONTEXT

The Bone Caves are a site of significant archaeological interest located in the hills to the south east of the Inchnadamph hotel. The caves are accessed by a path leaving the A835/A837 at GR 253 179 which runs initially eastwards on a fish farm access track before swinging south east and following the course of the Allt nan Uamh to the caves, a distance of approximately 1.5 km.

The caves are regularly visited by geologists, climbers, guided walks and the general public and the existing footpath has become severely eroded in places. Looking to the future it is likely that the level of use will increase significantly as a result of:

- increased awareness of the Caves;
- indication of the footpath for the first time on the new OS map;
- continuing pressure to increase the availability of guided walks;
- proposed promotion of the Caves by the local Tourist Board;
- imminent construction of a public car park by Inchnadamph Hotel, close to the path leading to the Caves.

This will lead to increased erosion of the footpath which, if unchecked, will result in a spreading of the path thereby threatening rare and sensitive plant species.

In addition, the lack of a public car park results in random parking along the roadside verge which is a traffic hazard and also leads to erosion of the verge. The popularity of this area for hill walking and climbing (Ben More Assynt) further increases the need for improved car parking facilities.

2 OBJECTIVES

The aim of the project is to introduce a managed approach which will allow the Caves to be promoted as a site of interest to tourists, whilst at the same time using informal methods to limit the number of visitors (low key signposting and off-site interpretation).

The project demonstrates an integrated approach to site management by HRC (with a remit for traffic management and car parking), SNH (with a remit to safeguard the natural environment whilst simultaneously enabling public access), Sutherland Tourist
Board (with a remit to promote tourism and the development of visitor attractions) and the local community of Assynt (involved in development of the local tourism economy, including the provision of guided walks).

3 PROJECT PROPOSAL

The project comprises the following elements:

Phase 1

- upgrading of the footpath (fish farm to NNR);
- provision of off-site car parking;
- provision of low key signposting and interpretation (off-site);
- monitoring environmental impact;
- production of information leaflet.

Phase 2

- footpath extension to bone caves;
- provision of on-site car parking & associated footpath.

The project will be undertaken on a phased basis so that the off-site carpark and the pathworks are completed prior to any further promotion of the Caves to visitors.

The impact of increased visitor numbers will be monitored to ensure that the need for path maintenance and other works is adequately identified and undertaken.

The local SNH Area Manager will adopt overall responsibility for co-ordination of the project and will maintain close contact with HRC as the project progresses.

4 PROJECT COSTS AND FUNDING

4.1 Costs

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>(£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of off-site car park</td>
<td>39,400</td>
</tr>
<tr>
<td>Footpath upgrading (Phase 1)</td>
<td>43,000</td>
</tr>
<tr>
<td>Signposting</td>
<td>2,000</td>
</tr>
<tr>
<td>Interpretation Board at off-site car park</td>
<td>1,500</td>
</tr>
<tr>
<td>Printed leaflets</td>
<td>1,000</td>
</tr>
<tr>
<td>Monitoring - People Counters</td>
<td>2,000</td>
</tr>
<tr>
<td>Visitor Surveys</td>
<td></td>
</tr>
</tbody>
</table>

Total 85,900
Phase 2
Footpath upgrading (Phase 2) 18,000 (est)
Construction of: on-site car park )
roadside footpath ) 15,000 (est)

Total 33,000

4.2 Sources Of Funding

Caithness & Sutherland Enterprise:
- off site car park 39,400
- footpath ?

Scottish Natural Heritage
- footpath 20,000
- signposting 2,000
- interpretation board 1,500
- printed leaflets 1,000
- monitoring 2,000 +

LIFE ?

5 ASSESSMENT

This successful implementation of this project will demonstrate how a site of considerable archaeological interest, but which is located in a particularly sensitive natural environment, can be made more accessible to visitors without leading to deterioration of ground conditions and damage to habitats and flora.

The project will demonstrate a managed and sensitive approach to the development of tourism attractions based on the natural environment, encompassing improvements to tourist infrastructure (car parking, footpath maintenance); interpretation and signposting; controlled promotion of the site to visitors; and a structured approach to monitoring impact.

As one of a group of integrated tourism development projects in Assynt, the Inchnadamph Bone Caves will help to support growth of tourism which is a key sector of the local economy. The project will also demonstrate good practice in developing tourism which is sustainable in environmental terms.

The project is recommended for support through the LIFE programme.
COLD WATER CAVE

This is an interesting system, which bisects the corner of the Abhainn a'Choillinn at a prominent rocky bluff. It is best approached by walking up the wide flat valley of this river from Knockan village. The limestone corner will be plainly seen some distance before it is reached.

There are several entrances to the system, and they are described in a clockwise direction as reached from Knockan. The first, in a low arch, leading to a strong flow of water. Immediately inside is a large flat stone crawl passes a tiny overhang on the left and continues as a hard and knee crawl (Baptismal Canal) for 30 feet, ending in a small square chamber. Straight ahead a bank of silt leads to an eye level into a further stretch of streamway, but this is impassable. On the far left of the chamber a very narrow rift crawl extends for 30 feet to a narrowing, where an awful connection had been made with passageway entered from the far side. It is possible that this connection could be physically made by clearing flood debris.

The second entrance, lying some yards upstream, is a very neat squeeze through boulders, and is likely to be impassable in high water. It goes on to another hand and knee crawl parallel to the first, but with a very sharp limestone fringe on the floor. After 25 feet, a sharp left turn opens into bed of Naile Crawl, a savage heading place crawl out to Entrance No. 4. This is a straightforward entry underneath a pile of boulders. Two tiny side passages lead off Bed of Naile Crawl, one an overhang back to the canal, the other (on the right looking from entrance 2) a narrow rift connecting with the passage from entrance 1. This is a large rocky hole, sometime partially choked with mud or peat, and this bed will follow for 40 feet to a narrow rift where an ear canal connection was made with the main chamber. On the left not far from the surface a tiny fissure in the floor leads to a restricted streamway, penetrable up and downstream for a few feet only.

Cold Water Cave was first noted by R.M. Glyn in 1966, but the complete exploration was by the OSS in 1971.


CREAG NAM UAMH BONE CAVES

The most famous archaeologically caved sites in Scotland, the caves lie at the foot of a massive limestone cliff high up on the south side of the Allt nan Uamh glen. There are four caves presently open, but others are suggested by lying beneath at the east end of the caves. All entrances are obvious now, having been cleared out by excavators in 1865 and 1926. The caves are numbered and described from west to east.

No.1 cave commences as a spacious earth-floor chamber, but it diminishes into a boulder collapse after 50 feet of earth passage, and this bed will follow for 40 feet to a narrow rift where an ear canal connection was made with the main chamber. The cave is wide, low chamber blocked with sand and rubble.

No.2 cave is the largest in the series. The entrance chamber runs back into the hill for 45 feet, passing a low crawl on the left which connects to Cave No.3. At the end of the chamber a small hole in the floor leads to a low earthy room, which can be followed for 90 feet until the way on is choked with silt. At the far end, on the right, a small exit is stated to connect to the final chamber in Cave No.1 but this has not been noticed in recent years.

No.3 cave has a rocky entrance chamber 30 feet long, ending at a T-junction. To the left a few yards of cave ends in a tight choke, while to the right a crawl through wet mud joins Cave No.4. Cave No.4 is merely a rock shelter a few yards east of No.3. It is not possible to leave daylight.

Note: Cave No.2 is sometimes called Reindeer Cave.

The caves were first explored in 1865, and further extended in 1926. No additions of any extent have been made since.


CRIPPLES CANYON

Another tiny cave situated in the Allt Poll Droughinn in the lower Traigill valley. Follow the river downstream from the concrete bridge to a miniature canyon. The cave consists of two parallel fissures on the north bank roughly opposite Traigill nan Calum nan.

Both entrances are low wide slats, and descending crawls, dipping at 25 degrees to the east, continue for 50 feet, to a section too low to penetrate. Evidence shows the system as a flood sink, which takes water into a tiny side passage noted for a false floor.

The cave was opened and explored by Perring (Edinburgh) in 1963.


CUIL DUBH SINK

At the head of the Traigill valley a large river flows across the plateau before Surrounded and sinks into a large basin formed by rock culs-de-sac. Water under the left-hand end of this moor, which is evidently an old sink-hole for the presumed upper cavern of Traigill valley.

The wet sink can be descended through large blocks to a depth of 15 feet, where narrow fissures choked with peat debris obscure the way on.
**GROUP 1: N.W. SUTHERLAND**

**CAVE DESCRIPTIONS**

The caves in the north-west of Sutherland fall, insofar as this book is concerned, into two distinct groups. The first is centred round Durness village on the extreme north coast. Most of the caverns in this district are massive sea caves, but a few are attributable to inland formation processes. There is one pothole, lying at Beolane, which is not reported as not all low exploration, and thus nothing is known about it other than that it supplies drinking water to a nearby farm.

Away to the south is Scotland's classic caving region. The Cambrian limestones here house the deepest and most extensive caverns, and there is great potential for further discoveries. One cave included in this group, which appeared in an earlier guide, is Wilson's Cave, Ullapool. This was a stream cave some 200 ft. long lying beneath a narrow field. In the 13 years since it was accidentally found, the cave has been filled in and is virtually destroyed.

**ACH A' CHORRAIN CAVES**

Length 190 feet (total) Alt. 40 feet. Durness, Sutherland.

This isolated group of caves lies some four miles south of the village of Durness. A bridge across the A'Chorrain marks the point where the visitor should leave the road.

About 300 yards to the east of the A836 a dry streambed joins the main river. The caves will be found at the base of limestone outcrops at this junction.

There are three caves presently enterable.

No. 1. A small tube at the foot of the cliff on the east bank of the river just upstream of the junction. A small sandy-floored tube runs for 50 ft. to a duck-out blockage. A squeeze over fallen slabs leads into a 30 ft. long chamber, Sochriso Chamber, where water flows across the floor. Beyond, 15 ft. of low stream passage ends in a choke of flood debris. Take care of loose rock.

No. 2. On the west bank, roughly opposite No. 1, two openings behind a sheep fold lead via a boulder choke, into a series of tiny passages and chambers extending for 50 ft. into breakdown.

No. 3. Upstream of No. 1 on the east bank. A very tight through-trip along the limestone bluff may be had via a small rocky tube. Total length, 30 ft. approximately.

No. 4. Upstream of No. 2 on the west bank is a narrow tube leading steeply upwards.

The caves have been noted as early as 1935, but exploration proper was carried out by SMCC prior to 1959, and by SMCC and OSM in 1972–73.


**ALLT A' BHELAICH CAVE**

(Stream of two mountain Pass Cave) Dunn Beagh, Sutherland.

Following the Glenan Dhu upstream from Traigill to the foot of Conival, the cave will be found lying at the foot of an exposed bluff of limestone just after the river forks. The cave lies just to the right hand fork at the foot of the cliff.

An entrance partially filled with rubble descends some 20 ft. in a gradual slope, and becomes too tight at the foot.

The cave was first explored prior to 1959 by SMCC.


**ALLT A'CHALDA MOR STREAM CAVE**

(Stream of the Big Hazel Cave) RC 294235 NC Length 200 ft. Alt. 400 ft.

The Allt a'Chalda Mor stream, flowing off Scon or Draitheann, to the north of the A837 at Inchmahome, supplies the water for this cave. It is best approached by following the valley opposite ardveck Castle to a plateau and sweeping across to the far right where a prominent white limestone buttress can be seen. The entrance lies directly underneath a waterfall on the main river courses left of the Buttress.

There is a wet entrance right under the waterfall, but there is also more convenient to enter the cave on the left hand side of the cliff, where boulders obscure a dry route in. A descent of three feet and a crawl forward eight feet opens into a very wide cavern commencing at standing height but gradually lowering to a crawl. The roof is inclined at 30° and the walls descend to a more defined cavern in the centre of the floor. A very steep wall on the left descends down a vertical channel in the centre of the floor.

A passage of 60 ft. ends with a short passage into a more defied passage and eventually some 200 ft. beyond this, a narrow tunnel is reached which is very dry.

Several more passages follow in the streamway, which trends to the left and then veers right again. The final 50 ft. is low and wet, and in high water it can be very airy due to moving boulders underfoot. In dry weather, the cave ends in a bellowing gallon which gets too tight before apparently dropping two feet to another cave. In wet conditions this whole area is pumped.

The cave was discovered in 1958 by members of ULMS and first explored to the bottom by the G30 in 1969.


**ALLT NANNAMH STREAM CAVE**

(Stream of the Caves Stream Cave) Norn Beag, SNC Length 4,736 ft. Alt. 1,050 ft. Nannan Uamh, Sutherland.

The Allt Nan Uamh Stream is the most complex site in Scottish caving. The hydrology of the system is not yet fully understood, and it is likely that major extensions still await exploration. The entrance lies high up the left hand branch of the Allt Nan Uamh valley, some 60 ft. downhill from a waterfall across the streambed. A usually dry boulderline streambed runs down the valley branch, and the entrance to the cave lies at the foot of a small grey cliff, a triangular opening surrounded by rocks, on the west side of the valley.

A small cavity leads beyond daylight into an awkward downhill tube, unpleasant when water flows into the cave. Beyond a throtl the floor drops away and a descent of 10 ft. leads into a narrow fissure passage, which to the left runs back underground the entrance. Ahead to the left a spacious cavern is entered. This is the Assembly Hall, and constitutes the downstream end of a large abandoned stream passage. To the immediate left the way quickly chokes but following the cavern right for 60 ft. in a very large passage, past two small sinks on the right, a climb down to a complex junction (Fisiodelly) is reached. Here several sections of the system merge at a common reference point.
Up on the right, a sandy inlet may be explored for 45 ft. to a series of chokes, while a hole floor level leads down to the Rift Stream Series described below. Opposite, on the north side of high rift also drops into the active Rift Stream Series.

To the left a side passage flooded with silt slopes gently down to the First Stream Chamber. Straight ahead at the junction a cleft in a steep wall gives access to the continuation of the lower rift which drains here called Oxford Street. A high rift of comfortable walking width ends after 130 ft. at a passage with a series of passages forming a bottleneck. A diminishing tunnel leads off to the left, while on the right the large passage ascends a boulder and opens into a huge hall, Breakdown Cavern, flooded with massive boulders. There are several low-level entry points leading off, and the far end of the hall runs up into a thrust plane liberally choked with rock debris, becoming blocked after 30 ft.

Note through boulders in the centre of this chamber, plus several tunnels on the left (not end of the Rift Stream Series described below). Above these, a dry sandy crevice also on the right leads up to a steeply climbing thrutch which widens to enter Private Dead End Chamber, another rift passage running for 50 ft. above parallel to the Rift Stream Series plugged out in mud to near the entrance to this chamber can be followed for 30 ft. back towards Breakdown Cavern.

Parallel Crawl and South-West Passage Series

Back at the T-junction at the north end of Oxford Street a diminishing tunnel runs straight up the left turn into a series of cavails over reddish sand, interspersed with small chambers. After 100 ft. the cave opens into a series of low cavails ending abruptly overlooking the first Rift Stream point can also be reached via a sloping tunnel dipping left from Piccadilly Junction. A descent involves a tricky free-climb of about 20 ft., but an easier approach was via a low crawl under the Francis Pit. The water at the bottom flows out of the Rift Stream Series and immediately on slopes down for 30 ft. the limit of exploration.

Crossing over the first Stream Chamber and entering a large passage on the west side, 40 ft. to a 25° bend where an interesting inlet passage on low levels can be explored to the left (Cueva section ends in a choke after 50 ft.). Continuing along the main route a dry passage opens a rising end chamber, a large circular cavern with interesting drip pockets on the floor. The main exit from Chamber, a large circular cavity with interesting drip pockets on the floor. After 40 ft. the roof lowers and a choke is encountered. After the roof continues 20 ft. to a dig.

The Pit and Second Stream Series

There is a junction on the left in South-West Passage just before its entry into Drip Chamber complex of interconnected tunnels opening into The Pit, a free-climbable rift chamber where a set of high rifts and flowed down an attractive rocky passage on the left. A few feet downstream is a small passage up to Drip Chamber, but a choice of high or low level routes follows the stream into a large chamber, the lower route may swell in wet weather) ultimately uniting in Second Stream Chamber, a spacious chamber. The water round the west side of this chamber, across the floor and down into lower section called Sink Chamber. The water here flows into a boulder pit and its course from rising at Phuarain Altman Ushang is unknown.

On the south side of the chamber, above the entrance to Sink Chamber, two small inlet passages. The one on the right is choked after 25 ft., but the other, a very warm stream through boulders runs for 40 ft., under the surface stream bed into a small choked area. This passage may rejoin ft. on the right of the Second Stream Chamber, as entered, a large sandy passage may be followed leading to a staticump pool. A duck in low water conditions given on to a further pump passage for 30 ft. in a downsloping rift which becomes too tight for a kitted diver. This pumped water was diverted into it recently.

Rift Stream Series

From the first stream chamber, described above, a low section of Altman Ushang Stream Cave is a complex of tight vauose rifts. The route is described in an upstream direction. A narrow rift chamber runs due south for 50 ft. before choking off. Some 15 ft. from the end a rift crosses rifts, and the stream may be traversed beneath Piccadilly Junction, passing two access climbs from on the other side of the junction. The rift is named and a series of low passages on the right similarly formed on the thrust plane near the surface. The main rift continues as a lowering passageway. A fine cascade is climbed, and after a short walk the passage becomes a tubular shaft ft. before closing down. To the left at this point a boulder crevasse leads into a low series of and rubbed for 150 ft., exiting within the choked floor of Breakdown Cavern. This section is now returning to Piccadilly Junction, a climb into the roof above West Rift leads to a high-level choked at a four height after 30 ft.

Fast Series

A large extension may be entered by passing a series of long sumps, commence at The Pit. A dive of 250 ft.上游 in aump positively sized leads to an airbell, and ten feet on to a large tunnel passage 70 ft. long and ending at Sump 2. This is 80 ft. long and ends at a large sump passage leads to a large impressive waterfall (Thunderphant Palla). The direct climb is impossible but to the left is a large cascade of 45 ft. to a large high-level passage leading off both left and right. To the right the passage is blocked by a large passage leads to Sump 4. An inlet series of 10 ft. cascade is passed and 100 ft. of very large passage leads to Sump 4. An inlet series of 80 ft. cascade is passed and 100 ft. of very large passage leads to Sump 4. A large passage leads to a height of 50 ft., to a blockage beyond. The upper sump ends.

The Altman Ushang Stream Cave was first entered in 1949 after hampering out the entrance, Extensions were added between 1956 and 1961 by the GC, and between 1964 and 1975 by the JCC. The sumps were discovered by 3MCC in 1976.


UAMH ARD (High Cave)

NGR NO 262179  
Length 300 ft.  
Depth 95 ft.  
Alt. 1,575 ft.  
Beinn nan Gmainheang, Sh

Uamh Ard is something of an oddity in Sutherland, since it is not a limestone sink. Only in the low does it break into limstone strata and the potential of the site is largely undetermined.

It is normally approached from Traligill as from the Allt nan Uamh valley, but for convenience the latter will be followed. Follow directions for Allt nan Uamh Stream Cave, and continue upstream beyond the waterfall.

From there enter the Allt nan Uamh beyond the normal stream sink for A.M.U.S. cave, climb the bréck to the plateau and walk half a mile slightly northeast. The cave, which is not obvious, consists of a shallow depression in a solid wall, which passes through some limestone into the outcrop. A small rock pillow at the bottom opens into a limestone chamber, liberally entered by drop from the roof, and a twisting rift leads from the far end, with a slippery pitch in the floor.

At the foot of the pitch a fine rift extends for 30 ft. before ending in both directions an unexplored section.

This complex high altitude system has great potential, but vision should use extreme care in moving the sectioned sections.

On no account should the help be followed - it is laid in very unstable areas.

Uamh Ard was found and excavated by GOG members working from Thurso, 1977-1979.


BEGGA HOLE

NGR NO 257166  
Map No.1  
Length 25 ft.  
Alt. 350 ft.  
Traligill, Sutherland

The Allt Poll Drochign flow southward to enter the Traligill river at the foot of the glen. A small gully has been built over this river and by going downstream from this point a small gorge is entered. A short distance down the east bank past the small Calumnan stream, a low bedding plane cave becomes too tight after 25 ft.

Begga Hole was first explored by Queen Mary College, London, in 1959.


BETULA HOLE  

(Birch Tree Hole)

NGR NO 2774  
Map No.2  
Length 40 ft.  
Alt. 660 ft.  
Kippen, Sutherland

The area in which this hole lies is a mile south of Kippen village. The track runs from the road down a small stream valley and continues along a flat area, to the outcrop at its extreme right-hand end. The area is covered by a small stream valley and consists of a gently undulating area.

The first entrance is in the left bank of the stream some 25 ft. downstream, and is a rocky oval tube taking water. It is about 40 ft. and can be followed for 12 ft. to an impasse.missing. The second, main entrance lies in a small plateau above the first. Climb straight up the grassy bank.

Birch trees will be seen, occupied by a birch tree. The entrance to Betula Hole proper lies underneath this tree.

A rock bridge across the floor of the sinkhole gives access to a cavern floored with rubble. Water from a six foot long flat bedding plane on the right and flows down the rubble into a very narrow passage 2.5 m. wide formed by sharp rock fragments on the floor. After ten ft. the cave opens out into a small chamber with general small stalactites. The stream drains into a small hole on the right but straight ahead a large plane boulder can be climbed to further small formations. Although the largest boulder was blasted at the bottom on way on has been found from this point.

The cave was first entered by the BGC in the 1950s, but nothing was published until it was 'rediscovered' by the GOG in 1971.


UAMH 'BRISDEAUGH-DUILE  

(Cave of Disappointment)

NGR NO 262210  
Map No.1  
Length 35 ft.  
Alt. 525 ft.  
Traligill, Sutherland

Follow the dry stream of river bed upstream from Traligill Rising Stream, until the limestone thrust plane is seen on the right (facing east). About 100 yds. from the above cave a small entrance will be found in the corn a small cliff above a pool. This is Uamh 'Brisdeadh-Duiile.

An initial climb along the stream bed opens into a small chamber about 10 ft. long, squeezing through rubble and accessed to an inclined bedding plane with walls becoming too tight 15 ft. further on. Water can be heard flowing near the end.

Uamh 'Brisdeadh-Duiile was opened and explored by BGC in 1975.

BLACK FINGER POT

Lying about one third of a mile south of the G30 hut, in the north-west corner of the dep

Blar Nam Fiadh Pot (Field of the Deer Pot)

Situated in the centre of the plateau immediately west of the Alt Glaic Mhor, this pot is

UAMH CAILLICHIE PEIREAG (Cave of the Old Man of Peireag)

To the right of Uamh nam Umaich, a footpath follows a deep gorga. At the head of this gorge

CALCITE CAVE

The valley leading to Uamh Poll Koghainn from the Crannian Speleological Group Field Hut at

UAMH NAM CALUMAN (Cave of the Caves)

A small stream comes from a small spring at the foot of the rocks, then flows west into the Uamh na

UAMH AN CLAONAITHE (Cave of the Sloping Rock)

This fine system, the most sportive stream cave in Scotland, lies at the head of the right

References:

large cavern 30 ft. long before closing in again and turning sharp right to a deep pool. In flood conditions this may be a duck, but normally a chest-deep grovel to the left ends in a scramble over large blocks and a section of awkward going, before opening out once more into roomy caverns leading gradually down over rubble.

Sump 1.

**UAMH AN CLONAITE**

**ALLT NAN UAMH SUTHERLAND**
At the crux of the boulder pile, a marker indicates the point where an ascending and descending main route leaves the main route for the Bluff Block, described separately. The boulder pile begins to disappear beyond the marker and the slope intensifies the cave enters a prominent fissure and the floor deepens, green pool, Sump 3.

Glosane 4-6

Sump 3 is a pleasant dive of 66 ft., descending 15 ft., exiting through large blocks, a small chamber in a large, checked passage immediately above. The stream flows to the left of the entrance throat, a sloping crawl is entered, with very sharp, flaky inlets permeable for some distance. After 30 ft. a blockage leads to a collapse area - a small tunnel - checkered through, a continuing crawl, lead down along ledges above water. After 40 ft. of straight passage the floor and roof meet at Sump 4, a tight but very narrow passage. After some distance a large hole in the roof gives on to a set of tubes descending to the stream and a climb over a spacious cavern, steadily dropping to the main river down clean-washed limestone blocks. A chance connecting tunnel in the vicinity of the sump unites to form a large passage, culminating in emptying into the Sump 5 pool.

Sump 5 is a low, easy dive varying between 15 and 45 ft. depending on water conditions, of blocks. By climbing over one small stream passage can be followed for 40 ft. round, down a 30 ft. cascade to a low cavern containing Sump 6. Except in wet weather, no water at all, indicating another exit from Sump 5 an yet unknown.

Sump 6 begins as an awkward crawl over sharp flakes in the floor but gradually deepens after 150 ft. the way on appears to be choked.

Bluff Block Series

A major high level, and largely dry series of fossil passages can be reached by turning into a complex of blind passages. The first marked in the boulder cavern above Sump 3, a low crawl opens into a wide ab imit German, a low crawl flooded with mud and interrupted by several chokes. At the exit, 150 ft. in, a small split in the floor. By squeezing through and out of a shattered crawl, the cave enlarges into a Corridor, where a T-junction offers a choice of routes. Downwards, to the right, a low crawl of 150 ft. to choked ends, two of which are very close to sumps of the main passage in Clasona.

Turning left at the T-junction, the low passage climbs up into a standing height chamber flowing on down one wall - a rare sight in the system. The south side of the chamber contains some blocks with a tight passage through back to the T-junction. Stepping under the stalagmite (a tailed stream) a crawl opens into a very large trunk passage, sometimes partially filled with sand. The way for extends for 200 ft. to a spacious enlargement where blocked avenues lead off. A massive giant block may be passed down to a low earth crawl which clearly crosses the fault line but bares right at this choke, maintaining large dimensions for a further 60 ft. The way on appears to be choked.

The main tunnel bears right at this choke, maintaining large dimensions for a further 60 ft. The way on appears to be choked.

The main tunnel bears right at this choke, maintaining large dimensions for a further 60 ft. The way on appears to be choked.

Clasona Series

The bottomless Pillar Pool in Clasona 2, two entrances in the east wall open into the series, a collection of solutional chambers literally flooded with soft mud, and growing of 100 ft. each, before uniting at a pleasant junction. Some of this passage is permanent in extreme dryness. At the junction, Mud Chamber I, a low crawl through a very unstable chamber, followed by a 12 ft. climb down into a much smaller passage. Infinite lee-probable chamber, followed by a 12 ft. climb down into a much smaller passage. Infinite lee-probable chamber, followed by a 12 ft. climb down into a much smaller passage. Infinite lee-probable chamber, followed by a 12 ft. climb down into a much smaller passage.

On this pass, the way on appears to be choked.

Returning towards bottomless Pillar Pool from Mud Chamber junction, an issue at head passage is formed along a wet passage of 25 ft. to a sump, Levitation Sump. This is a small passage, probably fine-drivable, and leads to a small chamber with a rocky bank in it over this, a further pool will be found, with very little air space. Carefully passing the further pool and ducking open on to spacious dry passages running up to a large chamber, the lead down to the main Clasona streamway at the downstream end of Sump 1. Thus a sport trip can be made through Clasona Series, although neither sump is properly lined. Usan Clasona is thus the longest and most sporting cave in Scotland, but two legs be emphasised. First, the boulder choke at the entrance is not stable. The recent floods may have altered the configuration, making the first climb tighter and more awkward. A footpath may have closed off the cave altogether. Fissure should take great care when passing through this is the one cave in Scotland where real knowledge of flood dangers applies. It has been noted that the stream flow makes the Sump 1 bypass very wet, and frequently impassable. The flooded sump re- becomes hazardous in high water, and trips to get around should be avoided. Other sections of the streamway become hazardous in high water, and trips to get around should be avoided. Other sections of the streamway become hazardous in high water, and trips to get around should be avoided. Other sections of the streamway become hazardous in high water, and trips to get around should be avoided. Other sections of the streamway become hazardous in high water, and trips to get around should be avoided. Other sections of the streamway become hazardous in high water, and trips to get around should be avoided.

Usan Clasona was first opened up and explored to Sump 1 in 1960 by K.C. The exit streamway was added by C.G. in 1975. All other excavations have been made by C.G. in the

References:
By following the stream to the right, two entrances will be apparent. At water level a low arch takes a considerable flow into the hill, but by ascending 10 ft. up a rocky cliff face, a shaft will be found. An easy climb through sharp rock leads directly into the entrance. There are two low cavities some 10 ft. square, partially flooded to a depth of 6 ins. Daylight can be seen from the water entrance, an easy crawl over rubble, and to the left of it a low waterlogged passage extends some 4 ft. to a narrow mound. 5 ft. to the left of this passage, equally waterlogged, runs for 10 ft. to a boulder blocking. The main flow of water leaves the cave through a very low bedding plane to the left of the shaft entrance and emerges into daylight from an impenetrable hole on the far side of the hill.

The cave was first entered in June 1970 by the GSC.


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LOWER OTTER HOLE


Almost at the foot of the steep slope below the Cnoc an Doid, a shallow gully may be ascended for 20 ft. to a low opening under a rock lip. This is lower Otter Hole.

A throat down into the entrance passes round construction and opens into a rocky hands and knees crawl for 20 ft. At the end the cave narrows and a slight uphill crawl over boulders leads to a further 10 ft. of awkward crawl ending at a division of the way which is too tight to penetrate.

The cave was surveyed and explored by the GSC 1971-72.


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LOWER TRALIGILL CAVES

NGR NO 270209 Map No. 1 Length 150 ft. Alt. 575 ft. Traligill, Sutherland.

This is the main sink for the lower Traligill valley, and can be seen from some distance away, a dark grey cliff on the south side of the glen, standing at a corner of the Glenelg river, which it swallows. To approach the entrance follow the public footpath up-valley to the river at a small bridge. Turn right and walk down stream for one eighth of a mile.

In normal weather the entrance will be seen as a low, wide cliff at the foot of the cliff, and it will be necessary to walk through a shallow pond to gain access to the cave within. On occasion this pond will be reduced to a flow of water in the passage, but in wet weather the whole system will be pumped at this point, and be impenetrable.

From the entrance chamber, two routes lead off, both contained within a throat plane sloping at 30° to the south. A steep, gravel-lined cliff on the left leads to a series of small grottoes displaying interesting formations. A high level passage may be followed for approximately 150 ft. to a T-junction. The uphill passage at this point is too tight, but a steeply dropping crawl on the right runs down approximately 100 ft. to an active stream channel comprising the lower section of the cave. Halfway down this slope a series of narrow passages can be passed with difficulty on the right, to regain the streamway some 60 ft. towards the entrance.

Water issues into the cave from a channeled slot on the left and flows for 100 ft. to the main sinkpoint within the cave, a confluence with the Glenelg stream entering at the entrance. In dry weather it is possible to descend some 15 ft. below the upstream issue to a point where falling water can be heard behind null bunks, but no route arrangements have been engineered.

The lower passage can be followed for 150 ft. back to daylight at the entrance. A round trip is therefore possible within the cave.

Lower Traligill Cave was first explored by GSC in 1971. No additions have been made since.


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LOWER TRALIGILL FLOOD SINK

NGR NO 271309 Map No. 1 B.C. Length 75 ft. Alt. 500 ft. Traligill, Sutherland.

This cave lies directly opposite the large entrance of Lower Traligill Cave, at the top of the section of Traligill river that flows down the south side of the hill. In wet conditions theumped entrance of the latter forms water to sink into boulders opposite. This is Lower Traligill Flood Sink.

By diverting any water sinking into the entrance, a descent through boulders for 3 ft. leads to a water passage some 12 ft. long, a partial duck in wet weather. At the end a scramble up over fallen rocks opens into a comfortable chamber sloping down on the left into a huddled inclined bedding plane. This becomes too tight after a few yards and will be under water when levels are high.

Straight across the chamber an earthy crawl passes another shaft at roof level on the right where daylight can be seen, and enters a triangular crawl. 25 ft. on passage turns sharp left, through a pool and a very awkward splay into another small low passage. In dry weather a trench can be seen at the rear running from left to right, but too narrow to enter, and usually pumped. The proper stream course appears to be located further down the inclined bedding at a distance impenetrable to man.

The sink is mentioned in connection with explorations at Lower Traligill Cave in the 1950s but first exploration appears to be by the GSC in 1967. The main exploration was carried out in September 1972.


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UAMH MHOR

See Uamh an Turaithe.

Blaphain, Sutherland.

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OTTRE HOLE

NGR NO 268171 Map No. 1a B.C. Length 275 ft. Alt. 960 ft. Allt nan Dhuich, Sutherland.

Half way down the grassy slope below the Cnoc an Doid, Allt nan Dhuich valley, Otter Hole may be seen as a large, overgrown archway at the head of a shallow gully. The entrance is wide, almost 30 ft., and runs into the dip of the limestone bed.
Crawling into the entrance chamber, a low side earth-flowered cavern, a route will be seen leading off on the left. An uneven bedding plane thrusts open into a small chamber (The Boreyhead) which rises slightly at the far end and gives access to 30 ft. of awkward crawl through small pools to a slightly higher section with a hole in the floor. On the right at this drop, a tight crawl runs for 40 ft. to an upper chamber ending in a boulder choke, but the main route lies down the hole, under a jambed slab at floor level and along a narrow descending passage sometimes flooded with pools. 20 ft. forward an S-bend is passed and 30 ft. after that a solid boulder choke bars the way on. This choke was dug to allow 30 ft. of dangerous passage to be penetrated through the choke. In the middle of the breakdown is a small chamber where it is possible to stand up. There are presently two ways forward, both choked by loose rocks and rubble, and the extension connects with both branches of the old cave.

Warning: This boulder choke is extremely loose, and intending visitors should exercise great care in the final section.

The cave was opened and explored by GC Student in the period 1973-75. The extension was made by GSG in 1975.

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The cover design of *Quaternary Newsletter* has been changed to achieve an appearance similar to that of other Q.R.A. publications.

The *Newsletter* welcomes advertisements, charges for which are currently £50 per full page and £30 per half-page. Members are requested to encourage advertisers to use the *Newsletter* as the extra income will help defer any future increases in subscriptions. Advertisements should be sent to the Editor by the usual closing dates for submission of copy.

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**QN* articles**

**EARLY SETTLEMENT IN SCOTLAND**

**THE EVIDENCE FROM REINDEER CAVE, ASSYNT**

by Tim Lawson & Clive Donnall

Creag nan Uamh (NC 260170) is a rocky crag formed by a dolomite outcrop on the south side of the Alt nan Uamh, 5 km SSW of Inchnadamph in the Assynt area of Sutherland (Fig. 1). Three large caves penetrate the base of the crag. Cleistos deposits in the entrance chambers to these caves were removed in excavations undertaken in 1889 and 1926-7 (Peach & Horne 1892, 1917; Collender et al. 1927; Lawson 1981). One stratum of particular interest uncovered in the latter series of excavations in the central of the three caves (Reindeer Cave) was a layer of angular and subangular, dolomite-rich gravel, approximately 0.5 m thick, containing hundreds of reindeer, *Rangifer tarandus*, antler fragments and other bones. A radiocarbon date of 10,090 ± 70 a.B.P. (890-1768) was obtained from a bulked sample of antler fragments from this layer (Lawson 1984). This date, together with the likely frost-shattered origin of the gravel and the presence of bones of several "arctic" species (e.g. arctic or collared lemming, *Dicrostonyx torquatus*, and tundra vole, *Microtus arvalis*; Lawson 1983), imply that the deposit accumulated during the Loch Lomond Stadial. Substantial accumulations of reindeer antler fragments are also known from caves in south Wales and the south-west of England, including Banwell Bone Cave in the Mendips (Sutcliffe 1955), Boscov's Den on the Gower Peninsula (Falchner 1968) and Torrington Cave in Devon (Sutcliffe & Bowman 1962). As little attention has been paid to the significance of these deposits, it was decided to make a detailed study of the material from Reindeer Cave to try to establish its origin.

**Analysis of the Antler Material**

The faunal remains from the 1926-7 excavations are housed in the Natural History Department of the Royal Museum of Scotland in Edinburgh. A careful study was made of the material labelled as having come from the layer of dolomite-rich gravel in the outer chamber of Reindeer Cave. The collection contains a minimum of 480 antlers (calculated by counting the number of basal fragments). The material is in a fragmentary condition,
accordingly. Measurements taken on the beam above the first brow tine (Fig. 2) suggest that the majority of the antlers are those of young animals. These measurements were compared with those taken by Sturdy (1975) on reindeer antlers from the late Upper Palaeolithic (Younger Dryas) site of Steallmoor, north Germany. The male antlers from Reindeer Cave correspond closely to the size-range of "young and yearling" males from Steallmoor (animals up to the beginning of their second year); none of the material from Reindeer Cave falls within the range of the adult male antlers from Steallmoor. The female antlers from Reindeer Cave conform to approximately the same size-range as the male antlers, and match the distribution of "young and sub-adult" female antlers (animals in their first to third years) from Steallmoor.

Provenance of the Material

In seeking an explanation for the accumulation of reindeer remains within the cave, three possibilities may be considered:

1. That reindeer were living or periodically sheltering in the cave, or were coming there specifically to shed their antlers. To the authors' knowledge this mode of behaviour is not normally associated with reindeer. Even if it could be shown that modern reindeer occasionally make use of caves for shelter or as convenient places for detaching their antlers, it is difficult to imagine how such behaviour could account for the uniformly small size of the antlers from Reindeer Cave - a random sample of shed antlers from a normal reindeer population would be expected to show far greater variation in size - or for the fact that the antlers were confined to one of three adjacent caves, when reindeer could have entered all three.

Fig. 1. Location of Reindeer Cave.

with no complete or near-complete antlers. There is no apparent bias in the sample towards particular parts of the antlers, nor are there signs of systematic fracturing. Hence, breakage was probably the result of post-depositional processes once the antlers had become brittle. Many of the fragments have the subcylindrical cross-section reported as characteristic of tundra reindeer, as distinct from the more flattened cross-section of the woodland ecotone (cf. Bouchud 1966). A small proportion (less than 5 %) shows unmistakable signs of having been nibbled by rodents, but there are no obvious puncture marks or other damage that can be attributed to gnawing by large carnivores; nor are there signs of chewing of the antlers by reindeer themselves. In contrast to the large number of antlers, very few skeletal remains of reindeer were present - only two bones recovered from the gravel can be positively identified as reindeer.

Age and sex of the reindeer represented by antlers were established by inspection and measurement following the procedure outlined by Bouchud (1966) and Sturdy (1975). Examination of the antler bases showed that all of them had been naturally shed. 47 % were from female animals, with 25 % from males; in the remaining cases the sex could not be determined accurately.
2. That the antlers were brought into the cave by carnivorous animals. The remains of both brown bear Ursus arctos and wolf Canis lupus were found in the Creag nan Uamh caves, the bones of the former within the same lithostratigraphic unit as the reindeer remains under study. However, since all the antlers were naturally shed, they can hardly represent animals killed by carnivores. On the other hand, it has been suggested to the authors that wolves habitually collect antler for their cubs to chew on (A.J. Stuart and K. Scott pers. comm.). As an explanation for the presence of shed antlers within the cave it cannot be dismissed entirely, but the lack of evidence for gnawing of the antler fragments and the dearth of other bones of reindeer within the cave make this hypothesis improbable.

3. That the antlers were collected and brought into the cave by man. Of the three possibilities under consideration, this seems to offer the most satisfactory explanation. Late Glacial reindeer-hunting communities throughout northern Europe are known to have made extensive use of antler as a raw material for the manufacture of a variety of tools and weapons; straight beam portions of large antlers were most often used for this purpose (Clark 1938). Freshly shed antlers are ideal, since they contain the maximum amount of compact antler surrounding the spongy inner tissue of the core. The most striking feature of the antlers from Reindeer Cave is their small size and restricted size-range, implying a high degree of selection either in the collection or discard of the material. The absence of large antlers of both sexes cannot be explained by seasonal factors. In the absence of any clear evidence of actual habitation of the Creag nan Uamh caves, in the form of artifacts or hearths, and of any traces of either, the antlers we would suggest that the site functioned primarily as a cache or repository where shed antlers, collected perhaps on hunting expeditions, were stored and sorted according to their usefulness as raw material. The larger antlers - those that would have been of most value for the manufacture of artifacts - were subsequently removed to a processing or residential site elsewhere, and the rest discarded inside the cave.

It may be argued that climatic conditions in Scotland during the Loch Lomond Stadial would have been too severe for human occupation. However, there is overwhelming evidence (both archaeological and ethnographic) to suggest that by the Late Pleistocene many hunting societies had adapted successfully to life in the arctic zone (e.g. Klein 1974). The antler evidence from Reindeer Cave demonstrates quite clearly that reindeer were present in the Assynt area for at least part of the year. Such a major potential food resource would almost certainly have attracted predators - man included.

The wider implications

The conventional view of the earliest settlement of Scotland is that people were absent until about 2,000 years into the Flandrian (e.g. Price 1982, Edwards & Raiston 1984). This is based partly on the apparent absence of late Palaeolithic finds, and partly on a series of radiocarbon dates for supposedly "early" Mesolithic occupations at the sites of Lussa Wood I on the island of Jura (Mercer 1974, 1960) and Morton site A in Fife (Coles 1971). These dates, however, are poorly associated with archaeological material and have little relevance to a discussion of early settlement.

Notwithstanding the limitations of the radiocarbon chronology, a strong case can be made on archaeological grounds for placing the earliest Mesolithic settlement of Scotland much closer to the beginning of the Flandrian. Amongst Mesolithic industries in northern England a broad distinction can be made between broad blade and narrow blade microlith technologies (Radley & Mellars 1964). These contrasting technologies occupy different time-ranges. Radiocarbon evidence suggests that narrow blade technology was in use from c. 8800-5300 B.P. The chronology of broad blade industries is less secure, although present evidence would indicate a time-range from c. 9400-8600 B.P.

A similar distinction can be made within the Scottish Mesolithic (Fig. 3). The earliest radiocarbon estimate for a narrow blade industry is 8550 ± 90 B.P. (mean of two determinations) from the recently excavated site of Farm Fields, Kinloch, on the island of Rhum (Wickham-Jones in press). This is statistically indistinguishable from dates for the earliest narrow blade technology in northern England (cf. Jacob 1976, p. 71). More reliable radiocarbon dates are yet available for broad blade microlithic industries, but it is reasonable to infer that their appearance in Scotland was only slightly later than in the north of England and took place between c. 9500-9000 B.P. (Morrison & Bonsall in press).

If man's role in the accumulation of the antler material in Reindeer Cave is accepted, this site provides back the evidence for human occupation in Scotland even further - into the closing stages of the Late Glacial period. It also extends considerably the known range of Late Glacial settlement in Britain. This interpretation of the Reindeer Cave site, taken together with the above arguments based on artifact typology, suggests there is a strong likelihood of human occupation throughout Scotland in the time period 10,000-8500 B.P.
Acknowledgements

We would like to thank Antony Sutcliffe, Donald Sutherland and Richard Tipping for reading and commenting on early drafts of this paper; Lin Barnetson, Jenny Bradbury, Andrew Currant, Nicola Murray, and Donna Yorkston for help with the faunal analyses; and J.H. Lister and R. McGowan (Royal Museum of Scotland) for access to the collections in their care. Figures 2 and 3 were drawn by Maire Anna Birkeland.

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POSSIBLE PERIGLACIAL INJECTION STRUCTURES OBSERVED NEAR STANSTEAD ABBOTS, HERTFORDSHIRE

by D.T. Shilton

A road cutting for the Stanstead Abbots by-pass, lodged as part of a gravel resource survey in 1984, revealed a superficial deposit of glacial gravel over a gently dipping eroded surface of Tertiary Clay. In the cutting the interface between the gravel and the Tertiary strata was seen to be severely modified by laterally extensive flame structures. The structures have also been identified as crop-marks on an aerial photograph, taken for archaeological purposes in 1984. This note describes these structures and suggests that they may have been formed by periglacial injection processes.

Geology of the site

The Terbets Hill cutting of the Stanstead Abbots by-pass is orientated approximately normal to the contours of the southwest facing side of the
**ARCHAEOLOGICAL SITES AND MONUMENTS RECORD**

**ABSTRACT**

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<th>Site Name:</th>
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<td>Description:</td>
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**SMR Generic Type:** CAVES, HUMAN OCCUPATION

**STATUS (✓) Guardship | Scheduled | ✓ Other**

**DETAILS OF SCHEDULE**

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**Other Locational Details:** THE EIGHT CAVES SLOPING DOWN TO THE AULT NAM UAMH, TO THE NORTH OF AN CLAONAITE AND TO THE SOUTH OF CREAG NA H-IOLAIRE.

**COMMENT AND ASSESSMENT**

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IN THE MATTER OF THE ANCIENT MONUMENTS
ACTS, 1913 AND 1931.

To Ronald Arthur Vestey, per J. W. L. Farren, Factor, Assynt Estate Office,
Lochinver, the owner of the Monument known as Caves, Creag nan Uamph,
consisting of eight caves sloping down to the Allt nan Uamph, to the north of
An Glenaiste and to the south of Creag na h-Iolaire

being the subjects indicated in red colour on the annexed plan and being
part of the property known as lands and Barony or reputed Barony of ASSINT or
ASSIN,
situated in the Parish of Assynt and
County of Sutherland.

In accordance with the provisions of Section 6 of the Ancient
Monuments Act, 1931, the Minister of Public Building and Works hereby
gives you notice that it is his intention to include the Monument above
specified in a list of monuments to be published by him under Section 12
of the Ancient Monuments Consolidation and Amendment Act, 1913.

Dated this twenty-sixth day of April 1964.

By Order of the Minister.

[Signature]
Under Secretary.

______________________________
I Geoffrey David Crane, Principal
in the Office of the Minister of Public Building and Works duly authorised by
him in that behalf hereby certify that the notice of which the foregoing
is a duplicate together with a copy of the plan annexed and signed as
relative hereto was served on the before named, Ronald Arthur Vestey
by posting on the twenty-sixth day of April 1964
Between the hours of 5 o'clock and 6 o'clock after noon at the
Hope Street Post Office, Edinburgh, a copy of the same to him
by recorded delivery service addressed as follows: - Ronald A. Vestey, Esq.,
per J. W. L. Farren, Esq., Factor, Assynt Estate Office, Lochinver, Sutherland.

______________________________
Register on behalf of the within named the Minister of Public Building
and Works in the Register of the County of Sutherland.

[Signature]
Edinburgh, Agent.

M.O.W. 1106B.