Lynx Cave
Denbighshire

50 years of Excavation
1962-2012

by John Denton Blore

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Entrance as it would have looked during the Late Upper Palaeolithic

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Acknowledgements

In 1961 I was given the opportunity to join a team of archaeologists from the Peakland Archaeological Society with their excavation in Fox Hole Cave, in the Peak District, under the direction of the late Dr. Don Bramwell. His knowledge of the subject was immense, a knowledge that he freely shared with those who were eager to learn. He inspired and encouraged me to start my own excavation, and would remain my friend and mentor for the next 14 years, to which I am indebted. This final report on Lynx Cave is the culmination of a 50 years study into the prehistory of the area around Bryn Alyn, of its wildlife and more unexpectedly of the peoples that once hunted Reindeer and Red Deer in what was then, a polar desert, at the end of the last Ice-Age. Had Dr. Bramwell still been with us, I hope he would have been pleased with the outcome.

This whole voyage of discovery would never have been possible without the support of professional archaeologists, and a band of enthusiasts that have assisted with the excavation over the years. The dig has not always been straightforward; a few professional bodies made their disapproval apparent with their total lack of interest in what has been a unique find for north Wales. Fortunately the majority of Universities and Museum have been extremely helpful and contributed significantly to the excavation.

The dig could never have taken place without the trustees of W R Lloyd, (landowners) kindly granting me permission to excavate, and the tenant farmers past and present, Tudor Jones and Roger Lightfoot, allowing me free access across their farming land. I would like to thank the many Museums and Universities that have provided me with identification of some of the fragmentary bones and artefacts, and allowed me access to their collections and archives, Dr. Juliet Jewel, Dr Oakley, Dr C Stringer and Dr. Anthony Sutcliffe, (British Museum). Tom Lord, (Lower Winskill, Settle). Dr C B McBurney, (Cambridge University). F H Thomson, (Grosvenor Museum Chester). Dr. P O'Donoghue (Chester University), Dr. P. Thomas, Keele University. Dr. J Lageard and James Hegarty, (Manchester Metropolitan University). Clem Fisher and Philip Phillips, (Merseyside County Museum). J M Lewis, Ministry of Public Buildings & Works. Jo Bailey, (Natural History Museum, Tring). The Oxford Accelerator Unit. Pengelly Cave Research Centre. John Wymer, (Reading Museum). Mrs J Chance, University of Liverpool, (Small Animal Practice). Prof. K Branigan Dr M Dearne, and Dr. P Pettitt (University of Sheffield). & The Ancient Human Occupation of Britain project (AHOB) for funding, in part, some of the Radiocarbon tests.

Special thanks go to Dr. Roger Jacobi, from the British Museum, who is without doubt the leading authority on the stone and bone tools from the Upper Palaeolithic, he started work on the flint implements in 1980 whilst at Lancaster University and continued right through until his untimely death in 2009. His contribution to the dig has been immeasurable, obtaining identification of some of the more difficult fragments of bone, acquiring radiocarbon dating on some of the more important finds; (most of what is not accessible to the amateur). And leaving no stone unturned in his quest for answers to some of the issues raised by the excavation, but most of all for sharing his unrivalled knowledge of the subject, on a personal basis.

Last, but by no means least, the army of volunteers who have steadfastly excavated in the cold and wet confines of the cave and suffered the indignity of excavating for whole week-ends, only to find nothing! Over the 50 years of excavating the list of helpers is extensive, far too many to remember all their names, but not too many to thank. Over the years the following have played a major part in the excavation: my co-discoverer, the late Brian Nuttall, The Merseyside Naturalists Association, Bill Blore, John Lloyd, Ron Redfern, Len Robinson, Nick Simpson, with a special mention to my nephew, Chris Addison, who has assisted with the excavation and has been a constant companion at the cave for the last 6 years, and whose thought provoking questions have often forced me to reassess some of my earlier assumptions.

Cleaning the Lynx Mandible on site, April 1962
The first of the many interesting finds recovered from Lynx Cave in the last 50 Years

1.0 A Brief History

In the spring of 1962, the discovery of a small unnamed cave in the foothills of Mold, north Wales, led to an excavation that has unearthed evidence of use by humans for habitation and sepulchral purpose. The unobtrusive entrance has enabled the cave to keep its anonymity throughout most of the years of excavation. Its discoverers, J Blore and B Nuttall felt it appropriate to name it Lynx Cave after finding a complete Lynx mandible in the early stages of the dig. The ensuing years of excavation have uncovered human remains and artefacts dating from the Romano-British and the Bronze Age, along with evidence from the Late Upper Palaeolithic. The cave has been greatly disturbed on a number of occasions in the last 3,000 years, and at one point, the excavation was almost abandoned because of the difficulty of dating the finds. Fortunately not all has been lost and some of the important lower levels appear to be in situ, in particular the entrance and talus and a short section of deposit in the burial chamber. The added luxury of radiocarbon dating from the Oxford accelerator has enabled us to be more specific. The importance of such finds was justification for the cave to be scheduled as an Ancient Monument in December 1963, (SAM De 176).

'The Excavation of Lynx Cave 1962-1964' was privately published at the end of the third season and a preliminary report was later published in the Peakland Archaeological Society Newsletter in March 1965. A second report was published in 1981, followed by **'The Enigmatic Lynx'** published in 2002 which chronicles the full history of the excavation from its out-set.

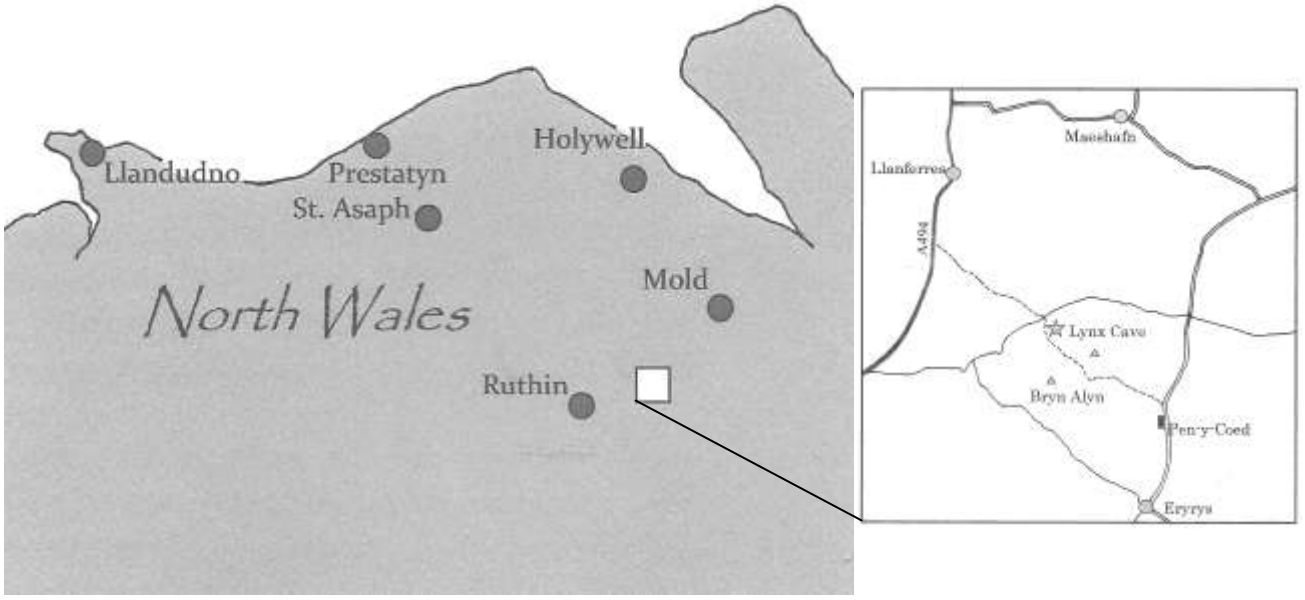
For 50 years now the dig has been almost continuous, unfortunately there have been some occasions when the pressure of work has restricted the frequency of site visits. The conditions inside the cave are not always ideal; a week of continual rain can render excavation impossible.

A small section of the archived material is housed in the National Museum of Wales, the remainder is held by the recorder for further research. It is expected, that the collection in its entirety, will be presented to the National Museum of Wales on completion of the excavation. The following report is the culmination of 50 years of excavation and research into the archaeology and zoological evidence recovered from Lynx Cave. To many people it would appear that 50 years is a long time to excavate such a small cave, but it has to be remembered, that for the best part of 40 years it has been a one man task. The task being to record and draw the finds, write all research correspondence and archive the entire collection for the duration of the excavation.

2.0 Location

The land mass that is north Wales consists of a wide variety of rock-types, from the ancient Pre-Cambrian rocks that make up the Isle of Anglesey in the west, to the more recent Carboniferous Limestone and Coal Measures in the east. The flat fertile lowlands of the Vale of Clwyd in the north east, is dominated by a chain of hills that form the Clwydian Range. On the eastern rim of this Range, and running almost parallel to it, sits the Carboniferous Limestone ridges that are of interest to the speleologist, geologist and the cave archaeologist. The ridge starts near Prestatyn in the north and ends at Llangollen in the south and contains a number of small caves. Some of these small caves have been excavated, albeit some time ago in the late nineteenth century.

Lynx Cave is situated in the foothills of Mold, close to the Flintshire/Denbighshire border. The well concealed entrance, (NGR SJ 1976-5931) lies at the base of a small limestone outcrop on the southern flank of the secluded Pot-Hole Valley, between the twin peaks of Bryn Alyn, around the 320 metre contour. Bryn Alyn is part of the Pen-y-Graig estate and lies in the parish of Llanarmon-yn-Ial. The valley is situated 1.5 kilometres north-west of Eryrys Village, and 1.5 kilometres south east of the village of Llanferres, (Fig 1).



Location of Lynx Cave Figure 1

3.0 Description

The majority of caves in north Wales are small compared to the cave systems and pot-holes of Derbyshire and Yorkshire. Lynx Cave is no exception, and at only 14 metres in length is typical of all the currently known caves that are scattered around the cliffs of Bryn Alyn. The small entrance leads to a tight passage, at its narrowest point it is 55cms wide and only 27cms high, this narrow crawl continues for 3 metres on a gentle incline. The roof then rises sharply, giving ample headroom, though still quite narrow. Halfway along its total length, the roof drops again to only 25cms, this created many problems in the early stages of excavation. This very restricted crawl, leads to a small chamber slightly wider than the rest of the cave. The last 2 metres is a dry narrow passage that ends in a tight aven that rises some 3.5 metres above, in the cave roof. A survey of the cave floor carried out prior to the excavation, revealed a series of undulations that were far more pronounced than that normally found in caves, (Fig 32).

4.0 Excavation

As can be seen from the report title the excavation of Lynx Cave has been a long process, in the early years there were plenty of volunteers and most weekends there would be at least two or three people to assist with the digging and sorting. After the first few years and the quantity of bones dwindled, so did the volunteers, to such an extent that for 40 of the 50 years it remained a one man excavation. Excavation in the burial chamber was extremely slow because of the restricted height, but once the burial mound had been removed it was hoped the dig could continue at its usual pace. The underlying deposit was thick, sticky clay and in fact slowed the dig down further as each tray that was removed, had to be sorted outside by hand. Nowhere in the cave have the deposits allowed us the luxury of being able to sieve them as the whole length of the cave is continually wet, the burial chamber at the back of the cave remains wet even after a prolonged dry spell. Transporting the steel trays full of clay out of the

cramped chamber, over the rock walls and out through the upward sloping, narrow entrance passage, has been an arduous task; only five or six tray loads can be managed singlehanded in a day. The difficulty in removing all this deposit from the back chamber led us to what was deemed an easy option; sort the clay by hand in the chamber and store the spoils in the back passage. It was inevitable that at some time over the 50 year period of excavation that the cave would be discovered by pot-holers. On both occasions, in an attempt to push the cave further, they have dug out the spoils and returned them to the burial chamber. Both incidents seriously hampered the excavation until we could return it to its recorded excavation level. Finally, bats have added to the extended excavation as they now use the cave for hibernation, they did not appear till 2001 but now the excavation is halted in November when the bats arrive, and does not commence until March/April when they leave.

Although there were a multitude of problems understanding the sedimentary sequence in the early stages of excavation, the recording of the finds was to be relatively straightforward by comparison. The narrowness of the passage, on average 60cms to a maximum of 100cms, enabled us to record the location of each box two dimensionally, rather than the conventional, three dimensional. Similar methods of recording have been applied to other caves, (Armstrong, Pin Hole Cave, Creswell) where the cave has consisted of narrow passages rather than large spacious chambers. The longitudinal datum started at the steel door, located 3 metres from the entrance, each box was 30cms long, and was designated a sequential number starting from the datum, to the far end of the cave, (Wall Mark 1 etc). The depth of each box was 10cms and started at floor level from the steel door and designated sequential numbers, (Spit 1 etc.). A total of 5, one metre wide trenches were dug throughout the length of the cave to enable us to accurately plot the individual layers, (see cross sectional drawings (Figs. 2,3 & 5).

5.0 Geology

5.1 Introduction

At a very early stage in the excavation it was apparent that there had been considerable upheaval at some time in the caves past. There appeared to be no limit to this disturbance as it extended to the whole length of the cave, the tell-tale evidence being artefacts, typically Late Upper Palaeolithic, within a few centimetres of the surface. Was this disorder a single event, or a number of events over a period of time?

The answer was never going to be easy, and at one stage in the excavation it was felt that while the artefacts being recovered were of immense importance, without any provenance to their age the whole dig would become pointless. From the outset the general consensus from leading experts (McBurney, Bramwell et al) was that the flint implements did belonged to, or were similar to, artefacts from the Late Upper Palaeolithic.

Of the many caves to be found amongst the limestone ridges and escarpments that encompass the Vale of Clwyd there are less than a handful that can claim artefacts of such significance or age. Without datable, coeval evidence to the Lynx Cave artefacts, little would be added to our knowledge or understanding of the early re-colonisation of north Wales after the last glaciations. If, as appeared, the depth of the disturbance was to the Late Upper Palaeolithic, then to what extent and more to the point, was there any of the original deposit still in situ that would offer us some datable material? Although we did not know the answers to these questions, it was felt however, that the magnitude of such a discovery could not go unchallenged and so the excavation would continue in the hope that eventually, undisturbed layers would be reached.

The analysis and subsequent interpretation of the cave deposits has been a long drawn-out and complex process. For the greater part of the excavation it has been difficult to understand, often sending confusing messages when datable material has been recovered but does not appear to have been laid down in any coherent sequence. There are many examples we could use to illustrate this, the earliest and most unexpected being the recovery of the mandible of an Arctic Lemming from the Late Glacial period, found above a Romano-British brooch!

As is normal with a cave site, the stratigraphy of the internal cave sediments differ greatly with the external sediments found at the talus. In general, the deposits are not comparable but there is some correlation between the layers, with some showing a common element, they have been described individually to avoid any confusion.

5.2 Sediment Sequence, Cave Interior

Internal deposits:
The initial reports on Lynx Cave defined layers A and B as two separate layers; in some areas it was often hard to distinguish one from the other and it was soon realised that the disturbed nature of the deposit extended much deeper than was initially envisaged. As the content of the layers was a complete mix of ancient and modern artefacts, it made sense to class layers A & B as one. In all, eight distinct layers have been recorded and can be described as follows.

Layer A/B:
Uppermost layer; consists of a rich dark brown/black humus, interspersed with a light clay material containing a high quantity of medium to coarse scree, small granules of calcareous breccia and large pieces of broken stalagmite base. There is no special significance to this description as it is an amalgamation of the most recent deposits and the underlying layers. This layer extends the full length of the cave and is very variable in thickness. At the entrance it is extremely thin only showing any depth at its outer edges, against the cave walls, the average depth being 45mm.
Content: For mammalian content see appendix 1

Layer C:
This was again a disturbed deposit, but to a far lesser degree than the previous layers. A light brown deposit containing medium to coarse scree material, the bulk of the deposit contains a high percentage of calcareous breccia, most of this breccia is the remnants of a series of thin stalagmite floors that have been broken. The depth of the deposit varies greatly throughout the length of the cave, deep at the entrance, but much thinner in the back section. (See section 5.4 for details). Radiocarbon dating placed it in the late Bronze Age.
Content: Burial mound, for mammalian content see appendix 1

Layer D:
This is the uppermost Pleistocene deposit and extends the full length of the cave. The disturbance to this layer is only slight, but in some places it has been enough to remove some of the important finds transferring them to later layers. Its physical appearance changes radically when comparing deposit samples taken from the entrance to those taken from the back chamber. The entrance passage material is a dark brown medium silt containing medium to coarse gravel and some thermoclastic scree, that diminishes in volume the further from the entrance, it extends all the way to the burial chamber (10 metres). The deposit is continuous, but in the burial chamber it is a lighter brown in colour, due entirely to the high content of the calcareous breccia, up to 50% in some samples. The deposit also contains balls of clay, orange/brown or dark brown in colour. This area of the cave remains wet even after a prolonged dry spell. Radiocarbon dates from this layer are in the range of 11,015 BP to 11,910 BP, placing it in the Late Glacial Interstadial. Content: Hearths, Artefacts, for mammalian content see appendix 1

Cross-Section @ D-D Facing Entrance
(Refer to Side Elevation & Plan for location)

Layer A/B:
This top layer consists of rich dark brown/black humus, interspersed with a lighter clay material containing medium to coarse scree rock, small granules of calcareous breccia and large pieces of broken stalagmite. There is no special significance to this description as it is an amalgamation of the underlying layers.

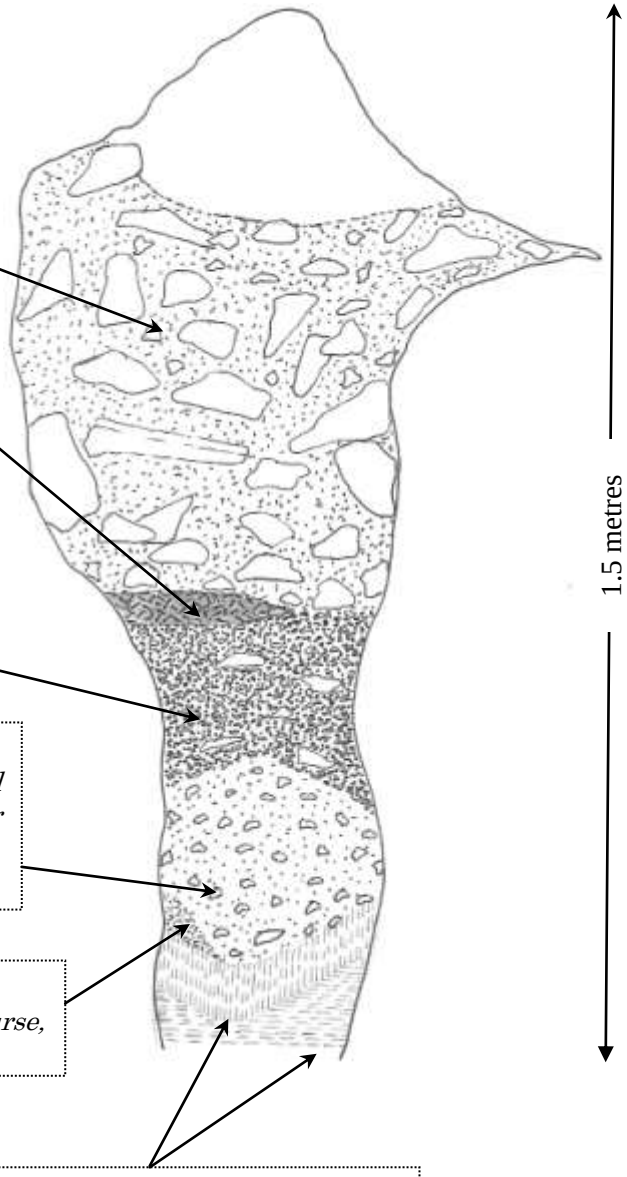
Hearth:
Blue / grey friable matrix

Layer C:
A light brown deposit containing medium to coarse scree material, the bulk of the deposit contains a high percentage of calcareous breccia, most of this breccia is the remnants of a series of thin stalagmite floors that have been broken.

Layer D:
Dark brown silt layer containing fine and course gravel, the base of the layer contains large boulders 200 kgs. plus, predominately in the entrance passage.

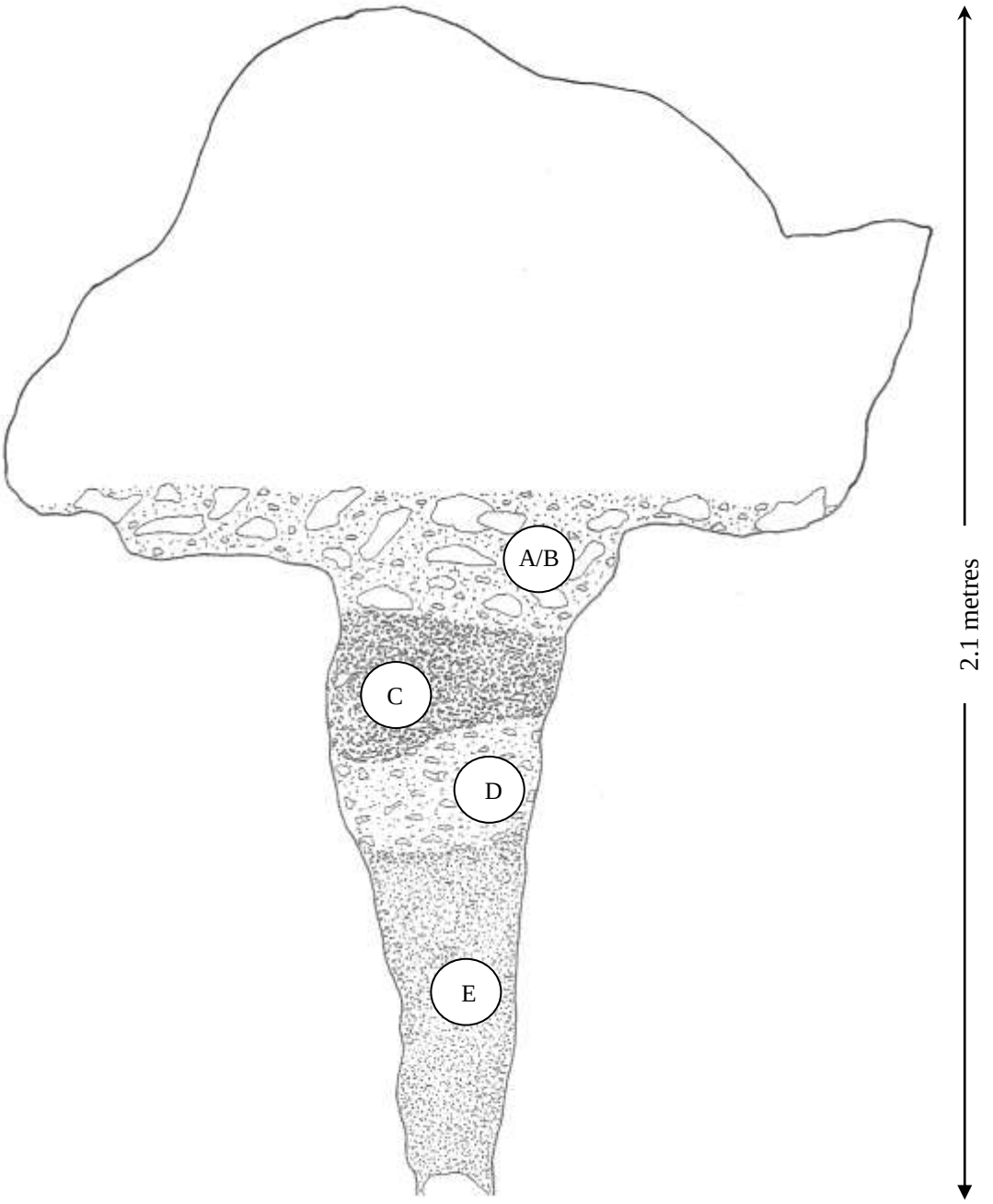
Layer E:
Dark ochre coloured medium to course, sand matrix.

Layer F & G:
Sticky clay layers, Orange and yellow respectively.



Typical Cross-section Figure 2

Cross-Section @ C-C Facing Entrance
(Refer to Side Elevation & Plan for Location)

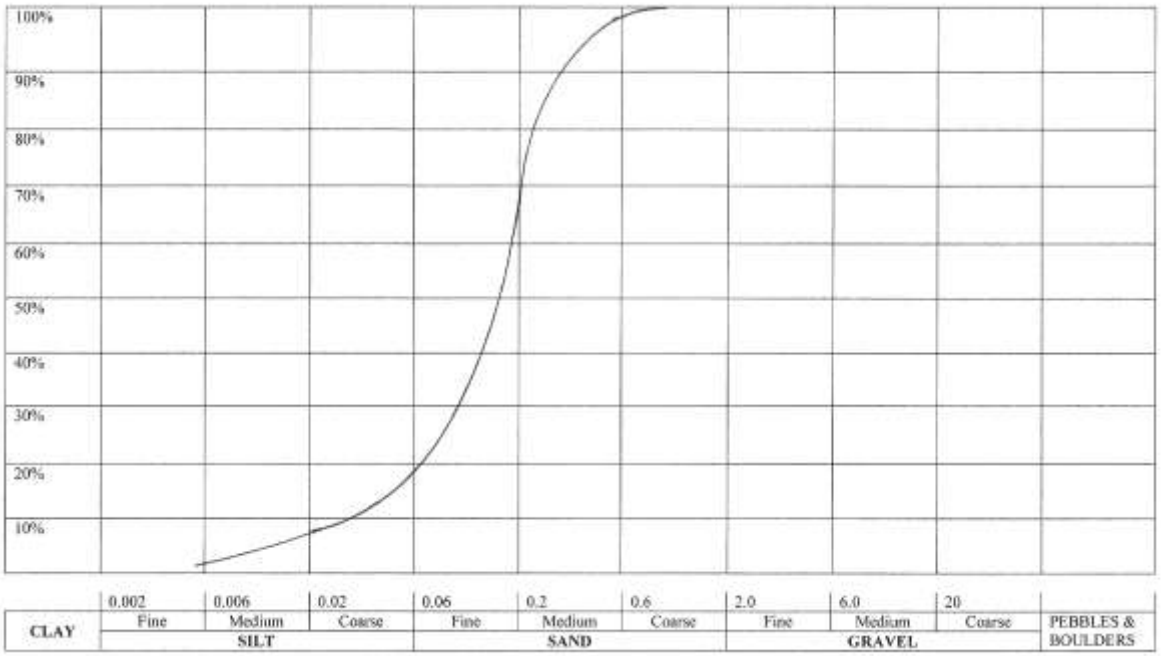


Section at Mid Point Figure 3

Layer D[1]:
Lies directly beneath layer D in the back section only, and is a sticky mud deposit, grey brown in colour and contains dark brown balls of clay. It is difficult to excavate and is littered with a high content of coarse gravel and pebble size rock. No datable evidence has been found in this layer.
Content: For mammalian content see appendix 1

Layer E:
The deposit only extends 9 metres into the cave, at this point it is 800mm deep, and ends in a 45° slope where the cave width is reduced (Fig. 3) and alters course slightly. This sand layer is yellow ochre in colour and is wet and gritty to touch, the majority of the grain particles falling into medium sand category. The quartz type particles were slightly irregular in shape but were all uniformly rounded and polished, and varied in colour from clear to milky pale buff. An accumulative graph taken from a mid section sample (See below, Fig. 4), shows the material to be windblown and is typical of all samples analysed throughout the depth of the deposit. Although there is no difference in colour or texture throughout the deposit, an analysis of the grain size shows there is a minor variance, suggesting the deposit could have been laid down at different periods. Within the deposit are some concretions of flattened clay coated in sand. Other concretions appear to be coral like in appearance formed much the same way as stalagmites only with fine clay and held together with sand particles.

Its position directly beneath the Late Upper Palaeolithic layer suggests that it is a Late Glacial aeolian deposit.
Content: Charcoal at the top of the layer and a shattered Reindeer bone.



Accumulative Graph Figure 4

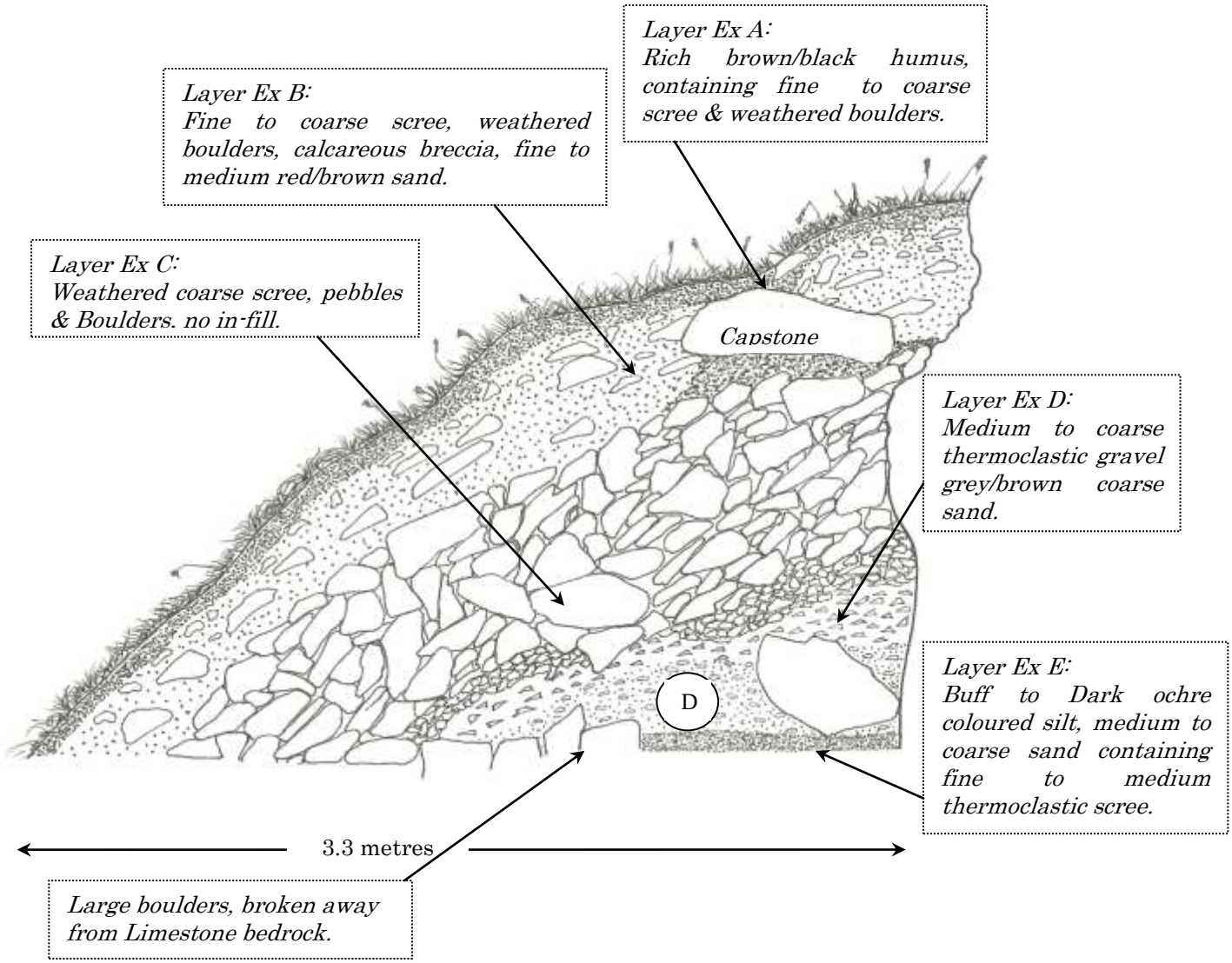
Layer F:
Sticky orange clay layer, only exposed in short section between the end of the sand layer and Layer D[1]
Content: Void
Layer G:
Sticky yellow clay layer, only exposed in short section between the end of the sand layer and Layer D
Content: Void

5.3 Sediment Sequence, Exterior

The Cave Entrance and Talus:

Access to the cave is gained up a steep grass bank which forms part of a large mound, and in effect, hides the entrance from the passer-by. With just a few shrubs and some distant birch trees in the vicinity, the cave is quite exposed.

Cross-section @ A-A viewed from entrance
(refer to Side Elevation & Plan for location)



Cross - Section through Talus Figure 5

The open aspect of the cave entrance has always created a problem in so much as it would, if excavated, be exposed to the passer-by and anyone observing from the opposite side of the valley. Over the past

forty odd years of excavation the Birch trees directly in front of the entrance have grown considerably acting as a screen, and the Hawthorns, while slow growing, have spread out restricting most routes to the cave. The far side of the valley was quite barren, with just a few Scots Pines, Beech and Silver Birch, dotted about the scree. It has been transformed in recent years by the Forestry Commission, into a dense Pine forest and makes the cave almost impossible to see from any of the forest paths. This added protection has enabled us to proceed with the excavation of the talus in the knowledge that whilst it won't stop anyone stumbling upon it by accident, it should keep the entrance well concealed from the average walker. In all, six distinct external layers have been revealed, they bear little resemblance to the layer structure inside the cave and accordingly they have been designated with the prefix "Ex", denoting exterior; (Fig. 5), the layers could variously be described as follows:

Layer Ex A:
The depth of this layer is reasonably constant and covers the whole of the mound to a depth of 100mm-150mm. It consists of dark brown/black humus in a predominately medium to coarse sandy matrix, containing coarse angular scree (gravel), with some weathered boulders.
Content: Fibrous roots, leaf mould snail shells & rodents teeth.

Layer Ex B:
This layer is at its thickest at the crest of the mound 450mm-500mm and reduces in thickness towards the lower slope. It consists of red/brown sandy matrix, containing fine to coarse scree, weathered boulders and calcareous breccia. Many of the slab shaped rocks lay flat following the contours of the mound.
Content: Large tree roots, snail shells, rodent teeth and a small number of fragmentary sheep bones.

Layer Ex C:
This layer is the result of a catastrophic rock fall that has plunged down a gully adjacent to the cave and amounts to many tons of loose rock. The layer is up to a metre deep and consists of clean weathered coarse scree pebbles and boulders, white with brown staining and no infill. The lower level of the deposit consists of a smaller fraction of gravel, suggesting there may have been two separate falls.
Content: Void of other material.

Layer Ex D:
A thin layer 200mm thick and tapering to nothing away from the rock face, consisting of medium to coarse thermoclastic gravel, held in grey/brown coarse sand.
Content: Crushed Snail shell

Layer D
The only layer that relates to the internal deposit, as described previously.

Layer Ex E:
Buff to dark ochre in colour containing fine to medium thermoclastic scree contained in medium to coarse sand. The rounded sand grains are similar in size and shape to the wind-blown Late Glacial deposit of the internal deposit E. The width of the deposit is 1 metre and is contained between the rock-face and a row of rocks that extend out from the cave entrance (Fig. 5). The deposit is only 100mm thick against the rock wall but increases to 300mm at its full width of 1 metre; this appears as infill amongst the large, underlying, angular boulders.
Content: Crushed Snail shell and teeth of rodents.

Layer Ex F:
The depth of the deposit is unknown as there are many large angular bolder beneath that have broken away from the bedrock, making further excavation difficult. The spaces between the boulders are filled with medium to coarse thermoclastic scree with sparse grey infill.

5.4 Understanding the Sedimentary Sequence

In 1962 when the cave was being mapped out, the undulations that we noticed along the cave floor was our first indication that the cave had been disturbed. Although there was no suggestion as to what caused this disturbance and when it took place, it was not thought to be of a serious nature. The first few weeks of excavation told a different story and it would be 40 years later, before the real answers were to be unravelled from the disorder that had been revealed. It was not until the entrance passage and part of the talus was excavated that we began to understand how each layer had been deposited and subsequently disturbed and how such confusion came about. For many years it was believed that Badgers were solely to blame for this disarrangement, while they certainly played their part, other evidence has recently come to light. Had it been a single event that was responsible for the turmoil, then it should have been reasonably easy to salvage some understanding from the evidence as it was uncovered. It now appears that there were a number of events each one compounding the next as it redistributed the bones and artefacts further and further along the cave. The remains of the Lynx vividly illustrate this migration of bone material throughout the length of the cave. The bones from this single individual have been randomly spread over the length of the cave, the furthest apart, being 7.5 metres; it has to be more than just Badgers. With no evidence to suggest they were carried there by other carnivores and no evidence of water action, it would appear that Human intervention was the probable cause. It now appears from the extracted evidence that there have been at least five separate and distinct events that have influenced what should have been a natural sequence of deposits.

The earliest evidence we have comes from circa the Bronze Age, when an artificial wall was built against the back wall of the burial chamber, adjacent to the small dry passage, and we presume it was meant to conceal the entrance. The underlying deposit was removed to accommodate the base stones for the wall to sit on. The details of this wall are dealt with in Late Bronze Age Archaeology, section 8.1

The second event also took place in the Burial Chamber when the burial mound was being assembled, here the depth of Layer C has been reduced, either to accommodate the height of the mound or to give access to the builders; at this point the roof is only 85cms above the floor. It is difficult to generalise about the height of this layer as it is variable but the relatively undisturbed sections are on average, 300mm thick. Beneath the mound it has been reduced considerably and is none existent in some places where the deposit has been scraped away to make headroom in the confined space that the back chamber offers. The number of journeys required to assemble the mound would be considerable, and each one of these journeys would disturb the deposits further.

The last event that took place during this period was probably the final phase of the burial process, and entailed the blocking off of the cave entrance. At the entrance the deposit is 1.0 metre thick and tapers down to just 100mm thick at the end of the entrance passage, this shallow deposit continues for a further 2.5 metres where the deposit has been scraped up to build the entrance mound. A large flat capstone (200kgs +), was placed on its end at the top of the entrance mound to seal off the opening. When the capstone was uncovered it was laying flat, its shape, size and position, suggesting that it had been placed there rather than having been part of a natural process. Beneath the capstone was a small void, initially puzzling, until it became apparent that it was the pocket where the capstone had sat when upright (Fig. 21), before being pulled down to exposes the entrance.

It is unfortunate, but one of the legacies left by the Lead Miners of the 18th. and 19th. century, is the irreversible damage that they have inadvertently caused to some of the local caves in their quest for good, viable lead seams. The surrounding area is pockmarked with exploratory digs into the mountainside, including the expansion of small cave entrances. The neighbouring archaeological site of Maeshafn Cave shows extensive mining 50 metres from the entrance; here a vein has been chased for a

further 40 metres at a tangent to the main passage. The only evidence of Man being in the Lynx Cave during this period is the broken fragment from the stem of a clay pipe. This in itself is not sufficient to say it was belonging to a miner, but other circumstantial evidence points in that direction. The mound in the back Burial Chamber was built with stones from the scree, an unknown amount of this scree along with the disarticulated Human bones were removed from the chamber and thrown into the mid section of the cave. (see Lynx Cave Excavations 1962-1981). This is hardly the work of Pot-holers, as they would only have removed a minimal amount, sufficient to gain further access.

A recent culprit is without doubt the Badger, whose remains have been recovered from all levels down to the Late Glacial deposits. Their remains represent all ages, from adults to young cubs, indicative of its use as a sett. In winter months they prepare the sett in readiness for the birth of the cubs, this entails cleaning out the whole sett, removing all the old bedding and soil. This would undoubtedly have caused some mixing of the deposits, to what extent and over what period of time is more difficult to assess. In the years prior to the excavation; judging by the number of discarded cartridge cases it was used by locals as a hide for Rabbit shooting, whether or not they contributed to the disturbed nature of the deposit is not known. Finally there will have been a number of Pot-holers who will be partly to blame for some of the more recent upheaval.

There appears to be a discrepancy in relationship to age, between the datable material in Layer C and the adjacent layer, D. A single bone from Layer C, has been AMS dated (Accelerator Mass Spectrometry) to the Late Bronze Age, circa 3,000 BP. Whilst the bone material recovered from Layer D has been AMS dated to the last Interstadial in the region of 11,000 – 12,000BP. Whilst some of Layer D could be assigned to the early Mesolithic there is still a considerable deficiency relating to the remaining Mesolithic and Neolithic layers. The absence of any intermediate sediment is probably due to the huge rock-fall that inundated the entrance shortly after the end of the Pleistocene period. Layer Ex C, (Fig 3). To the right of the cave entrance is a wide gully that rises steeply to the plateau above, it is this gully that has acted as a funnel and channelled the rocks over the cave entrance. This massive rock-fall appears to have been a single event or two similar events occurring close to one another, far in excess of normal rock-falls found beneath a cliff face, and could well have left the entrance sealed for a number of millennia. As can be seen in layer Ex B, (Fig. 4) there has been a slow but continual deposit of loose rock, this is more typical of naturally occurring deposits beneath a rock face.

As can be seen from the chronological record above, the cave has had a chequered history of disturbance; the combination of all the above events has made a coherent interpretation of the finds almost impossible. This whole sequence of events has compounded the extent of the disturbance, moving bones and artefacts, not just from one layer to the next, but has managed to move them through all the layers. This has made the reasonably straightforward task of determining which bones and artefacts are contemporaneous to one another, almost unattainable.

The remainder of the report reflects these unfortunate circumstances, and forces us to place some of the finds in a miscellaneous section. For others, we have opted for making comparisons with others cave sites and making just a tentative suggestion as to its layer of origin, by far the biggest gain has been the radiocarbon dating that has enabled us, in many areas, to be more precise.

6.0 Zoology

6.1 The Vertebrate Fauna content from Layers A/B:

The Fauna content of this layer, in essence, is from the historic period, Romano-British to the present day. Disturbance of the layers during the Late Bronze Age and onwards, has resulted in almost all the species represented in the last 12,000 years, being recovered from this, the uppermost layer. It is not possible to be more specific but some species clearly do not belong to this layer, Lynx, Dog, Lemmings, Root Voles, Red Deer and Reindeer and are dealt with briefly in Section 6.1.1. The remainder of wild mammals, with the exception of the Roe Deer, Wild Cat and probably the Water Vole, are all common to the locality today and can be seen on a regular basis.

Shrews, Common and Pygmy are plentiful and can be regularly heard squabbling in the undergrowth; at certain times of the year their dead bodies can be found along the pathways all over the mountain. Hedgehogs are by nature, quite secretive creatures, and are rarely observed, their habitat being the damp valley floor. The remains of 3 individuals found in this layer are represented by broken mandibles, the ascending ramus separated from the horizontal ramus. This is invariably indicative of being killed by a Fox, the head being targeted by the fox as soon as the creature uncurls itself, the upper canines piercing the skull or eye socket whilst the lower canines crush the mandible, breaking it at its weakest point.

Only one bat species has been recovered, the Lesser Horseshoe Bat. When excavation started there was no evidence to suggest that bats were using the cave for hibernation, although they were reasonably common in the neighbouring Lead Mines. It was not until the early 1980's that the first Lesser Horseshoe bat appeared; this was later joined by another 2 species, Daubentons and Whiskered. And by the turn of the century, they were joined by a Natterers.

Hares and Rabbits are indigenous to Bryn Alyn, Hare numbers fluctuating from year to year and have survived here for thousands of years. The Rabbit, on the other hand, is a relative newcomer whose fortunes vary greatly. The large population was decimated in the mid 1950's when myxomatosis took its toll, along with it went its main predator, the Buzzard. Its recovery was fairly rapid but it was a couple of decades before the Buzzards returned. Today, the population is strong but the recent increase in Buzzard numbers has reduced the population marginally.

Wood Mice, Field and Bank Voles are common as well as the Rat, but strangely the later has not been recovered from the sediments.

Carnivores are dominant, with 6 different species recovered; the Fox and Badger are both prevalent. The Fox is confident to hunt during daylight hours, and is regularly observed where and when the Rabbit population is at its greatest. The Badger on the other hand is far more secretive and is only noticeable by its activity around the setts. Four other caves on the Lynx Cave side of the mountain are in regular use by the Badger. The Wild cat, now extinct in Wales is represented by a single fragmentary bone, and there is insufficient evidence to say if they belong to a true Wild Cat or a Domestic Cat, *Felis silvestris catus*, it could possibly belong to the later. The Weasel is also widespread, the many kilometres of dry stone walls making the ideal refuge. Lynx And Wolf/Dog are also present but belong to earlier deposits.

The Roe Deer was reasonably common in the last century; the local small herd dwindled in number until its disappearance from the area in the 1950's.

The remains of domestic species, Sheep, Goat, Ox and Pig are found in all the local caves, mostly brought in by predators. The Pig/Wild Boar, became extinct in the 17th century, but like the Wild Cat is difficult determine without some of the more diagnostic or complete bones. Many of the bones of domestic and nondomestic species found in this layer show signs of butchery and are dealt with in Section 7.3.

The bird remains from layer A/B are unexpectedly scant, even though many washed/sieved samples were taken; each species represented by just one or two bones. Bird bones are more fragile than their mammal counterparts. It is often the case that the majority of bones tend to be fragmentary; which is certainly the case in Lynx Cave. They are notoriously difficult to identify especially some of the smaller species (passerines); the bones of larger birds are not quite so problematic, their diagnostic features are more pronounced and are readily identifiable. In some species from the same family the morphological differences are negligible. Where this occurs, it is not possible to be more specific other than to identify the genus or family. This is not exclusive to the perching birds, as in the case of the Grouse (*Lagopus*). Both Black Grouse and Red Grouse were common to the area in the middle of the last century, though today, their numbers are in decline. The remaining bird species, Dunnock, Robin, Blackbird, Thrush, Crow, and Starling, are all indigenous to Bryn Alyn.

6.1.1 Miscellaneous Vertebrate Fauna content from Layers A/B:

Human:
A total of 21 human bones were recovered, all were fragmentary, all had been gnawed by a large carnivore and all represented the main long bones. For a full indepth examination see Taphanomic Analysis sheet II and their subsequent interpretation Section 8.3.3.

Lynx:
The majority of Lynx bones have been recovered from Layer A/B, with the whole assemblage being distributed evenly throughout the length of the cave. The absence of gnawing marks by carnivores or rodents would suggests, that this severe disturbance could be attributed to human intrusion. It appears from the collective evidence that it originated from Layer C. The species is dealt with in more detail in section 6.2

Dog:
The dog bones are more difficult to place; again the majority of bones were recovered from Layer A/B. Here, we are dealing with at least two individuals, a small breed represented by 3 vertebrae only, and a large breed, that shows interesting signs of butchery on quite a few bones (Fig. 11). A single canine tooth belonging to this large breed was found on a shelf above the floor of the cave. We can be confident to say they are not recent, but without radiocarbon dating, we are unable to be more specific.

Lemmings & Voles:
Two species from the assemblage, Arctic Lemming (Collard Lemming) *Dicrostonyx torquatus* and the Root Vole (Northern Vole) *Microtus oeconomus*, are both boreal species associated with a cold climate, Late Glacial and Post Glacial respectively. The former is well adapted to a life under the snow mantle feeding on dwarf Willow and Birch, the later preferring wetter conditions feeding on sedges. The skeletal remains of these species are fragile and no radiocarbon testing method has been developed for dating them, current dating is by association with datable material and the present comparable condition under which the species survives today. It seems reasonable to assume, that in all probability, both species originated in Layer D.

Red Deer:
None of the 7 bones found in this layer give the appearance of belonging to it, however, there are 3 bones that are distinctly more recent than the bones recovered from Layer D and show signs of butchery. They are discussed in more detail in Section 7.3. The remainder of the bones are comparable in condition to those from Layer D.

Reindeer:

6 bones of Reindeer were recovered from this layer; their physical appearance and condition is comparable to the Reindeer assemblage from Layer D.

6.2 The Vertebrate Fauna content from Layer C:

The archaeological evidence from this layer suggests a date during the transitional period from Bronze Age to early Iron Age. An uncalibrated radiocarbon date taken from the humerus of a Black Stork confirms this, placing it in the late Bronze Age 2,945 BP. The Black Stork was the unexpected find in this layer but the fauna content in general is a cross-section of herbivores and carnivores typical for the period,

Herbivores:
Domestic stock dominate this layer, Sheep, Goat, Cattle, and Horse, the Sheep/Goat bones show no signs of butchery suggesting that they somehow strayed into the cave much as they are found today in many of the local caves. The absence of skulls or horn cores make it difficult to determine the exact species, Sheep or Goat, but the mix of Sheep and Goat bones in layer A/B suggests that both species were present. Unlike the Sheep bones, the bones of Ox/Cattle, show extensive signs of butchery and are dealt with in more detail in Section 8.6 The Horse is poorly represented considering that we have evidence of them being of significance to the peoples who built and buried their dead in the cave. A single bone, a complete tibia that was found deliberately placed in the entrance, (See Section 8.6).

The Red deer is represented by a single bone and may well have been deposited there during the period that the cave was disturbed. On the other hand there is evidence to say that Roe deer was present and as a browser would have been suited to the environment. Of the lesser herbivores, the Hare is represented by a single Calcaneum and therefore difficult to determine whether it is a Mountain Hare (*timidus*) or a Brown Hare (*europaeus*). The Mountain Hare is poorly represented after the early Mesolithic through lack of habitat especially in Wales and England. It was not until the late Neolithic/Bronze Age that their numbers appeared to recover. Although the occurrence of Hares is scant during this period, it was not until the Iron Age that the Brown Hare appears. Based on this evidence it is felt that the Lynx Cave bone represents a Mountain Hare. Both Field Vole and Water Vole are present during this period and have both been recovered from within the loose rocks of burial mound. The Water Vole, *Arvicola terrestris* is normally associated with the riverbank but during the winter they tend to move to a drier place, often away from the river's edge, providing there is a plentiful supply of grasses to see them through the winter. All the Vole remains in the mound, including the Field Vole, *Microtus agrestis* were clean and found in small pockets. In most cases the hundreds of small bones found alongside them belonged to Frogs and Toads that had probably died during the winter hibernation. Rodents are frequently found to be absent from the record, especially from some of the early excavations, but both these species appear to dominate any faunal records of the smaller mammals, where detailed reports exist. They are regularly found in burial sites from the Neolithic, Bronze Age and onwards. It is thought that those found in open air burial site are from Owl or Buzzard pellets, but this is obviously not the case in Lynx Cave.

Carnivores:
The most interesting of the carnivores found in this layer is the Lynx, *Lynx lynx*. The total assemblage of Lynx bones from layers A/B & C amounted to 41 and whilst only a few bones were recovered from this layer (C), they lead us to believe that it is its layer of origin. Interpretation of the remains is not straightforward because of the disturbed nature of the finds (evenly spread over a length of 7.5 metres) but it is almost certain that we are dealing with just one individual. There is no duplication of bones and there is a persuasive similarity in colour that would also suggest that they probably belong to the same creature. The most convincing evidence for this assumption is the age at death, as the fusion dates from the long bones would place them around the same age 15-18 months old. Fusion of the toe

bone metacarpals and metatarsals are complete as would be expected from an individual of this age. The overall length of the mandible (105.1mm) Fig 6, would suggest that it is a male.

As a relatively young animal its death would appear untimely; it is possibly that it was killed for its pelt. Lynx kittens are born in early summer, by the time they reach15-18 months it would have been winter, or at least the onset of the cold weather making its demise coincide with the fact that its coat would have been in perfect condition to see it through the harsh winter months. The Roe Deer is the perfect food source for the Lynx, although there is nothing in the Roe Deer remains that suggest that they were part of the diet of this particular Lynx. Further investigations are being carried out on the Lynx bones (see Section 12.0)

Scale = Full size *Right Mandible Lynx* Figure 6

Its smaller cousin the Wild Cat, *Felis silvestris,* appears to have met its demise in the relatively powerful jaws of a Fox. The Red Fox, *Vulpes vulpes* and the Badger *Meles meles* both frequent caves on a regular basis, and in many areas use caves for their dens/setts. The remains of Dog, *Canis domestic,* would probably have been living alongside or at least close to the local human population, scavenging for scraps, but would later become a food source on their death, see (Section 8.6).

Insectivores:
The Hedgehog, *Erinaceous europaeus*, is represented by 2 bones only, the mandible was fractured in the same way as those found in Layer A/B, indicative of being killed by a Fox. The mandibles of two Common Shrews, *Sorex araneus*, were recovered probably also brought in by the Red Fox or the Badger.

A few soil samples were taken from this layer for washing and sieving but did not produce anything startling other than the teeth of Voles and Mice. Surprisingly no bird bones were recovered from these samples. The only bird bone to be recovered was the Black Stork and is dealt with in some detail in Section 6.5 & 8.6

6.3 The Vertebrate Fauna content from Layers D & D[1]

The bone assemblage from this layer is scant, some species being represented by a single bone only with a slight improvement for some of the larger herbivores. Radiocarbon dating on some of these larger bones have given us uncalibrated dates between 11,000 and 12,000 BP, (See appendix III for summary of Radiocarbon Dates) placing the deposit in the late Devensian at the end of the Pleistocene period. Evidence from charcoal see Section 9.2 and some of the smaller mammal bones suggest that the early

Mesolithic period is also represented in the upper levels of this layer. The conditions in the back chamber, an area of the cave where layer D is undisturbed, are such that the only possibility of extracting any small mammal bones has entailed the removal of the samples from site for washing and sieving. Fifty, 1kg samples have been removed from various sections in this layer for content analysis. The process employed to recover these small bones, teeth and snail shell fragments is labour intensive, each sample has to be washed and sieved through a series of variable sized mesh and examined closely through a magnifier at each stage.

Herbivores:
The larger herbivores, Elk, *Alces alces*, Aurochs, *Bos primigenius* & *Bos taurus*, Red Deer *Cervus elaphus* and Reindeer, *Rangifer tarandus*, account for almost 50% of the bone material, in most cases they appear to have been butchered for marrow extraction and are dealt with in more detail in Section 9.4. The Mountain Hare *Lepus timidus* was recovered from this Layer but was represented by a single tooth only; it was also recovered from layer D[1], the largest mammal found in this clay rich layer. Wood Mouse, *Apodemus sylvaticus* and Field Vole, *Microtus agrestis* are both present and seem unlikely species to survive a cold climate but nevertheless they do appear frequently amongst the fauna recorded from other cave sites.

Carnivores:
Dog, *Canis domestic* and Badger, *Meles meles,* have both been recovered, the later represented by single canines only. The mandible of the Dog would appear to be of a large breed but not quite large enough to be identified as Wolf. The Fox is represented by a single scapula but it could well be the case that some of the many Fox bones recovered from Layer A/B could be from this layer. The physical appearance of some of the bones would certainly suggest this is the case.

Insectivores:
Only one species was recovered, the Common Shrew *Sorex araneus,* the blood red tooth crowns still quite distinct. Its position in the upper levels of the deposit suggested that it was possible from the Mesolithic.

Chiroptera:
Bat remains are fragile but are occasionally found in ancient deposits, usually the maxilla and mandibles are all that's left but their teeth are readily identifiable. The mandibles of at least 2 Lesser Horseshoes, *Rhinolophus hipposideros,* were recovered from the sieved material taken from the back chamber. One of the mandibles looked reasonably fresh; the probable explanation for this would be that the individual died during the early part of hibernation (November) when the excavation season has finished. Decomposition is quite rapid in the back section of the cave and such a small mammal would soon be reduced to bone. When excavation was resumed in April the bones would appear fresh.

6.4 The Vertebrate Fauna content from Layers E:

This late glacial, aeolian sand layer can be said to be void of any remains with the exception of some bones found at the top of the layer. From the assemblage of 7 fragments, 4 can be identified as Red Deer; the remainder are small fragments with no diagnostic features and unidentifiable. The appearance of bones from this layer are quite distinct, they are mottled all over, a result of lying in the well drained sand. They almost certainly originate from Layer D and have been compressed into the sand layer from the upper deposit as people and animals have trampled through the cave. A washed sample from deposit also revealed fragments of Voles teeth.

NOTE: For a summary of the fauna content of all the layers (see Appendix I.)

6.5 Interpretation:

The almost continual wet conditions inside the cave have not always been ideal for the preservation of bones and whilst many of the bones (particularly those from the burial mound) are in good condition, many bones have not survived the passage of time well. Some bones affected by the wet section of the cave are fragmentary and in poor condition and great care has been taken in removing them. The upheaval in the deposits has meant that in all layers we have a whole variety of bones in various stages of preservation, fragmentary and complete, old and new. Despite the difficult conditions every effort has been made to recover as many bones, fragmentary or otherwise from the deposits by the double sorting of each bucket full. A further consequence of this upheaval is the estimation of the least number of individuals present in any one layer. This has been extremely challenging in Lynx Cave and we have had to resort to a collective evaluation of each species throughout all layers rather than a layer by layer assessment. The results shown in Appendix II, can only be a tentative suggestion, the actual figures will be far in access of those recorded.

The vertebrate fauna of the individual layers as presented above leaves us in no doubt as to the full extent of the disturbance that has been bestowed upon the cave in the last few thousand years. Layer A/B has borne the brunt of this upheaval, having amassed bones from all layers. The other layers have suffered also, but not on the same scale. These subsequent layers contain a relatively low number of bones found out of context, usually found where the layers merge, leaving a question mark over which layer they belong to. The morphology of the cave can explain, to some degree why many of the bones appear to be found in an adjacent layer, as for example those of the Red Deer recovered from Layer E. Lynx cave is a passage cave, the width varying from 60cms to 100cms; use of the cave by humans or animals results in the cave floor being trampled within this enclosed area. Larger caves, especially those that are of habitable size, tend to have areas that are seldom walked on, unlike a narrow passage that takes constant wear across the full width, compressing bones into the surface of the underlying layers.

The faunal content from Layer C is evenly split between two groups, carnivores and domestic species, the former, suggesting a reasonable amount of ground cover, possibly within the valley itself. The later, suggesting a moderate area of grazing land, in all probability the region would not look a great deal different than today. The steep sided valley with all its rock outcrops is not ideal grazing land but would suit deciduous woodland suitable for Deer and predatory carnivores alike. The Lynx is probably the most researched species from all the mammals recovered in the cave. Its identification was a long drawn out process, with so few reference specimens to work with. In the early 1960's, the Lynx was regarded, by most palaeontologists to have lived here during the Mesolithic, the reforestation that took place after the Ice Age and an abundance of small Deer was deemed the ideal habitat. It tied in well with the few specimens that had been unearthed and the associated datable material recovered with them. Slowly, with more and more Lynx being recovered, the evidence appeared to contradict the early hypothesis. Radiocarbon dating of a few specimens confirmed this new evidence to be correct. Today we have a much broader picture of the Lynx, with skeletal remains spread throughout the British Isles. The remains from Dog Hole fissure in Derbyshire, and Kitley Shelter Cave in Devon, date from around 9,000 – 9,500 BP, fitting in nicely with the Mesolithic theme. The oldest known remains originate from Gough's Cave Somerset, dating from the end of the last Ice Age, 12,600 BP, the most recent came as a surprise to all when it was dated 1,550 BP, from Kinsey Cave in Yorkshire.

Bird bones are notoriously difficult to determine, especially when trying to tie it down to an exact species, none more so when looking at Stork bones, as there are only minor differences between, Black (*Ciconia nigra*) and White (*Ciconia Ciconia*) especially if the find is only a fragment of a large bone. The Lynx Cave bone was examined at Tring, and comparisons made to their reference specimens. The piece of bone is small and contains little in the way of diagnostic features, nevertheless, after much deliberation it was felt that a single diagnostic feature that determined a White Stork was absent on

the Lynx Cave bone. On this basis, it was felt that in all probability it belong to a Black Stork. The Black Stork is a rare visitor to our shores to-day and there is no reason to believe it was any different in our past, with only one other record from an archaeological site, Tornewton Cave in Devon, and was attributed to the Devensian period by association. Unlike the White Stork that prefers wet meadows and marsh-land, the Black Stork inhabits wooded regions around lakes and rivers. Yalden, in "The History of British Birds" suggests that it would be an interesting indicator of former wooded condition. This may be true if the bird was resident, but there is nothing in the fossil record to suggest other than this was an accidental visitor, probably blown off course when migrating from its breeding ground around the Baltic to its winter retreat in Spain and Portugal. To support this statement, the most recent visit by a Black Stork to north Wales was on Anglesey; it arrived on the Alaw estuary, a quite barren area, and stayed for a week.

Climatic conditions in north east Wales during the later part of the Windermere Interstadial were quite dramatic with temperature swings from cold to warm and back to cold. This fluctuation is not visible in the internal sedimentary sequence, the transitional changes making little difference in the physical appearance of layer D; the external deposits though, indicate a different picture. The thermoclastic scree that is evident in the external deposits above and below layer D are indicative of rapidly changing temperatures, freezing and then thawing, inevitably leading to a disintegration of the rock structure around the entrance. In many respects, without the benefits from the radiocarbon dates from layer D a reasonable interpretation would have been difficult to achieve.

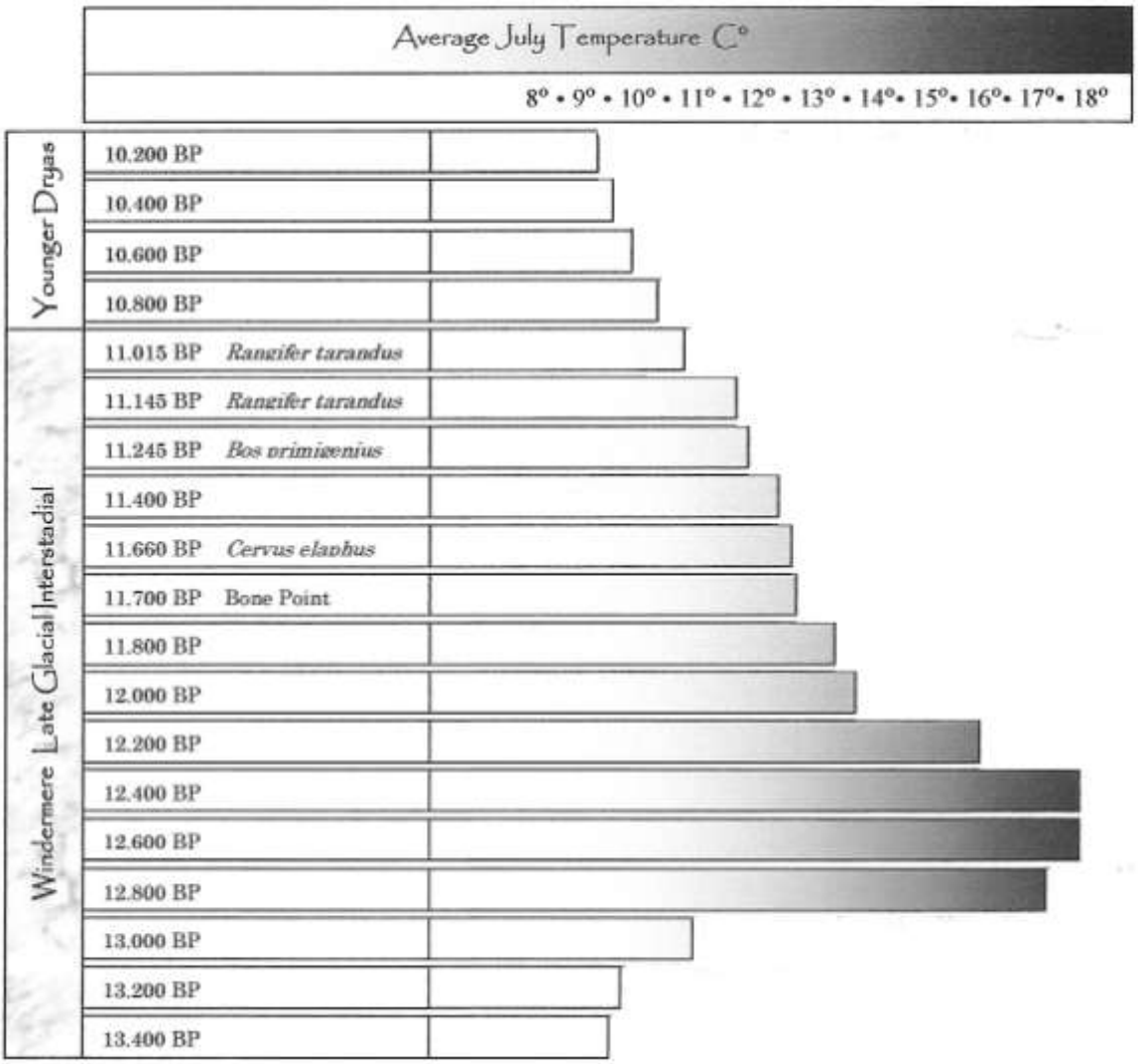
The carnivore content is sparse and tells us little of the environment; the Badgers food range is extensive, being omnivorous it can survive on almost anything from earthworms to beetles to voles to Frogs, with a wide variety of vegetation from grasses to nuts and fruit. It would quickly adapt to any changes in its environment, either by moving out of its territory or temporarily varying its diet. Its ability to store food for a harsh winter would also serve it well during the end of the late glacial period.

The sparse remains of the Dog are difficult to interpret; its size not large enough to say with confidence that it is Wolf, suggesting possible domestication. A Wolf/Dogs hunting range would be widespread and over a variety of terrains, and vegetation zones but in this situation it is felt we are looking at a domesticated or semi domesticated species, one that was in all probability part of the hunter gatherers group or at least a scavenger that survived on the periphery of the camp.

The larger herbivores (Ungulates) on the other hand are quite specific in their requirements for habitat and more importantly their diet, requiring different types of vegetation on which they are dependant and therefore are good indicators of the prevailing palaeoenvironment. The assemblage of large herbivore bones from this layer is small and most, if not all, show signs of butchery, interestingly all the radiocarbon dates are from the later part of the Late Glacial Interstadial (See Fig. 7). The oldest being the Red Deer. Initial radiocarbon dates placed the 2 specimens, an astragalus and a distal fragment of a tibia at 11,900 BP and 11,600 BP respectively. As the articulation facets were a perfect fit we felt that both bones were from the same individual. A subsequent submission for a retest using the ultra-filtration method, were returned with revised dates being 11,640 BP and 11,680 BP +/- 45 respectively, suggesting there was a strong likelihood that both bones were from the same individual. As a woodland species it is typically associated with a temperate climate but as more and more research is being carried out on the species it has become clear that theses dates are representative for the species in Britain during the Late Glacial Interstadial. The Birch, which we know to be present from the charcoal samples (See Section 9.2) will have been sufficient for them to forage on and also provide adequate protection during the cold harsh winter months. The Aurochs (*Bos primigenius*), dated to 11,245 BP, is also a woodland species, despite its massive build and enormous horns; grazing and browsing on grasses leaves and herbs it is well adapted to the cold climate towards the end of the Interstadial and is a regularly recovered alongside the Red Deer on many cave sites. The Reindeer is more specific in its diet specialising on lichens that it can gather from under the snow, in particular Reindeer Moss. Two bone samples were submitted for radiocarbon dating and came back with dates

from 11,145 BP and 11,015 BP at the end of the Interstadial and approaching the frozen tundra conditions experienced during the Late Dryas. It is probably from this period that the Arctic Lemming was present, as discussed in section 6.1.1

The modern-day North American and Scandinavian Moose (Elk) is a well researched species, but of all the mammals that migrated to the British Isles during the Late Glacial period, the Elk, (*Alces alces*) is probably the most enigmatic and the least documented. The number of this large Cervidae found on archaeological sites is small, leaving many gaps in our knowledge of the species. Of the small number recovered, only a few have been radiocarbon dated; those that have, placed them around 11,500 BP to 12,400 BP. Pollen analysis associated to the later showed it palaeoenvironment to be a Birch woodland along with Willow and Juniper, much the same as the present day species.
To-date, no radiocarbon tests have been carried out on the Lynx Cave phalanx but its location in Layer D (at the base of the layer) would suggest a date of 11,700 BP or earlier. (See section 12.0)



Temperature Fluctuations during the Windermere Interstadial Figure 7.

6.5.1 Mammal Assemblage Zone

The Lynx Cave Mammal Assemblage Zone (MAZ) for Layer D, the late Pleistocene, gives us a total of 10 species that can be safely assigned to the period. 3 other species are still open to question; the Human remains are represented by a single humerus only and is currently regarded as suspect (See section 8.3). We are hoping that will be able to secure a radiocarbon date for this particular bone within the next 12 months.

It must also be noted that the Collard/Arctic Lemming and the Northern/Root Vole, have been added to the Lynx Cave MAZ. We have no real evidence that they originated from Layer D, radiocarbon dates from this layer indicate that prevailing conditions were ideal for these small rodents and therefore the assumption being, that Layer D is probably the layer of origin. The bone spear point, probably manufactured from a large metapodial, has also been added as this dates from the same period.

The assemblage covers a period roughly 11,000 BP – 11,700BP, the later part of the Windermere Interstadial (Oxygen Isotope Stage 1), with no evidence as recent as the Younger Dryas, and interestingly no evidence from 12,500 BP when climatic conditions were similar to todays.

Gough's Cave in Somerset is probably the most researched cave in the British Isles and has gone through a most intense scrutiny and analysis over the years. There are a number of parallels that can be drawn between Lynx Cave and Gough's Cave, in particular the Mammalian Assemblage Zone, MAZ, which was drawn up by Dr. A Currant and Dr. Roger Jacobi in 2001. (See section 11)

Lynx Cave MAZ (Pleistocene Deposit)

Species		Lynx Cave MAZ
Homo sapiens	Human	?
Lepus timidus	Mountain Hare	■
Dicrostonyx torquatus	Collard Lemming	■
Microtus oeconomus	Northern Vole	■
Microtus agrestis	Field Vole	■
Apodemus sylvaticus	Wood Mouse	■
Rhinolophus hipposideros	Lesser horseshoe Bat	■
Canis Domestic	Dog	■
Meles meles	Badger	■
Vulpes vulpes	Red Fox	■
Cervus elaphus	Red Deer	✸
Rangifer tarandus	Reindeer	✸
Alces alces	Elk	■
Bos primigenius	Aurochs	✸
Bone artefact	Deer	✸

✸ AMS Dated

In general, the mammalian fauna recovered from the cave during the Late Pleistocene has illustrated what the palaeoenvironment was like during the latter half of the Windermere Interstadial. This has been enhanced by the knowledge that it was also a cave that has been utilised by Humans at various stages

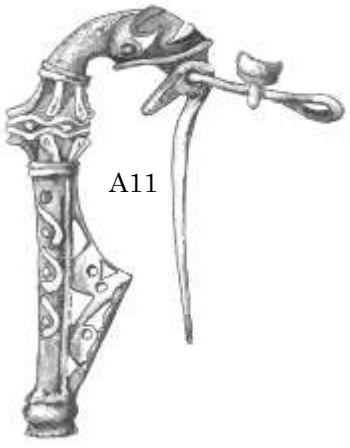
7.0 Archaeology of Layer A/B
Recent

7.1 Introduction:

The main objective of the excavation of Lynx Cave was to recover and establish a record of the animal species that lived in the area, past and present. Many of the local caves have been excavated, but the early excavators and some of the recent ones tended to look only at the larger species, ignoring some of the smaller species and what they could tell us of the early environment. There was no expectation of finding any archaeological evidence, so for us to find such a wide range of artefacts in such a small cave, came as a pleasant surprise. This unexpected bonus would also create difficulties similar to that experienced with the sediment analysis and the bone content. For some, the dating would be straightforward but for others, without any provenance, dating would be problematic. Of the nine artefacts that were recovered from this layer, only two can safely be said to belong to the recent (historic) layer.

The most recent of the artefacts is the clay pipe, of which only a mouthpiece and short length of the stem exists. Without any other diagnostic pieces of the pipe available it could widely be placed c. 1800's. Around this period the lead miners were all employed in the main Grosvenor Mines, Lynx Cave is not far from the Belgrave system and would almost certainly have been examined for lead seams along with all the other local caves.

The Romano-British brooch No.A11 (Fig. 8) was originally examined by Chester Museum and dated at 100-150 AD for this particular style of Trumpet brooch. The brooch, cast in bronze from a clay mould, has an overall height of 56mm, from base to head. The curved top section of the brooch (the upper bow) represents an elephants head and is inlaid with silver, red enamel, and niello, (a compound of silver, lead, copper and sulphur). Beneath the head is a small bracket that supports the spring clasp, the clasp pin and spring are cast as a length of bronze wire approximately 100mm long and wrap around each end of the spring pin to form a loop that rests under the head, making the tension required for the spring. Also attached to the spring pin is a figure of 8 wire loop, this enables the wearer to affix the brooch to the garment to prevent loss. The central part of the loop is joined together with a separate acorn style casting that could have held a precious stone? The catch plate is a delicate fretwork of 6 triangular and 3 round holes; both sides are incised with fine tool-work. The main stem (lower bow) is decorated on both sides with three crescents of raised silver; each has a dot of silver at its centre. An intricate moulding of raised acanthus leaves encircles the top of the stem and joins it to the mid bow where an inverted circle of acanthus leaves meets the upper bow.



Trumpet Brooch

Scale= Full Size Figure 8

A reassessment was made by Dr. M Dearn (Sheffield University) in 1991, whilst compiling "The Gazetteer of Romano-British Cave Sites and their Finds". The brooch is in near perfect condition with slight corrosion on the catch-plate only. The exquisite design of the catch-plate the head decoration and the raised silver crescents on the lower bow, has affinities with the Carmarthen Trumpet brooch (Boon & Savory 1975). Its design is thought to have been influenced by late Celtic decorative motifs, and originated in Wales and the Marches. Since its discovery in 1962 there has been considerable research

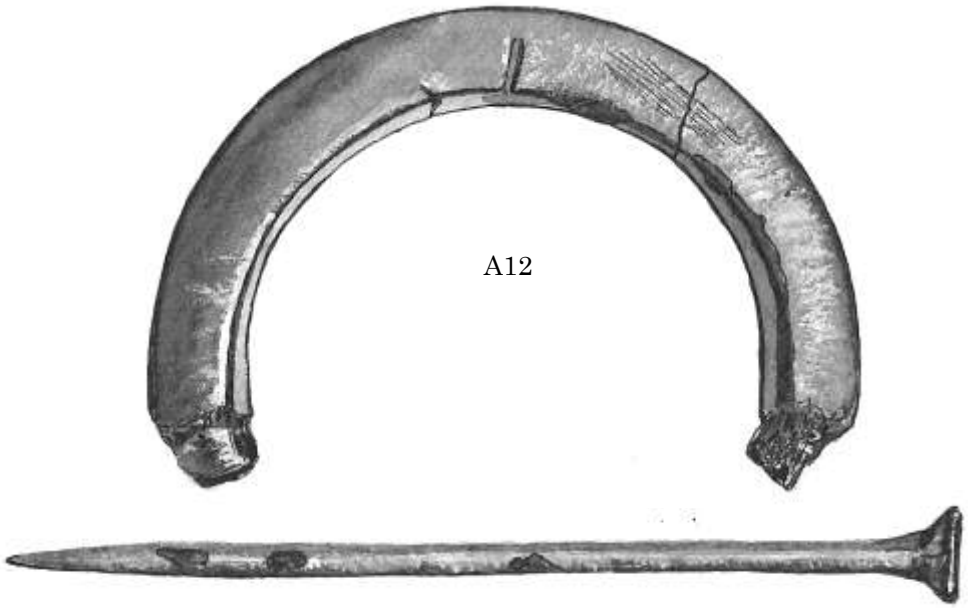
into its style and date of manufacture, nevertheless it is still under debate, present knowledge places it c. 80-150 AD, with a probability that it was manufactured c. 100-125 AD.

7.2 Miscellaneous Finds:

The very nature of this disturbed deposit has created many problems, none more so than the identification, and more importantly, the dating of these miscellaneous artefacts. It is unfortunate that such important artefacts should be recovered from a disturbed layer but it is often the case with many cave sites where water action or animal intrusions, cause havoc with the stratification. The artefacts appear to span a wide age range and do not fall into any one slot. Without knowing their true layer of origin and because there can be no other associated material, each item has to be assessed on its own merits, employing as many diagnostic features as possible to attain a realistic date. It is therefore not always possible to be too definite about them. The following seven artefacts unfortunately fall into this miscellaneous category.

The Romano-British brooch No.A11, the bracelet No.A12 and the bronze hair pin No.A13 were all examined by Chester Museum in the early stages of the dig, before the complications of the layering had been fully revealed. The consequence of this was that it was assumed that all three objects were contemporary. Unwittingly, we probably came to the conclusion that as the bronze Trumpet Brooch was undoubtedly from the Romano-British period then the remaining two items would also be Romano-British, and was published as such in all the early reports.

Regular reassessments are made of many of the finds, particularly if new evidence has come to light during research into the various objects. The Bronze Hair Pin or Nail-headed Pin No.A13 (Fig. 9), is one such artefact, measuring 126.5 mm in length with a pin diameter of 3.8mm, the head is formed with a slow taper from the pin, reaching its full diameter of 12.5mm. Dr M Dearn, who examined the pin in 1991, believed it to be Bronze Age and compared it favourably with other examples of a similar age. Bronze Pins along with other artefacts with affinities to the Bronze Age, are a common feature amongst grave goods from the period.



A12

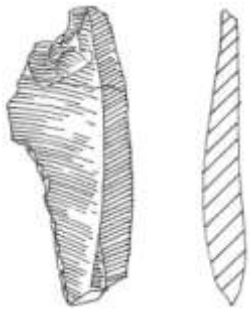
A13

Scale = Full Size *Miscellaneous Artefacts* Figure 9

The Shale Bracelet No.A12 (Fig. 9), on the other hand is more ambiguous and difficult to place. It was initially thought to be Romano-British, but such bracelets were manufactured from the Bronze Age right through to the Romano-British period. Manufactured from a single piece of shale roughly 11mm thick, the outer diameter being 94.4mm and the inner diameter is 70.0mm. Each end has been reduced to take a terminal of some description. The general finish is quite rough, given that the material is reasonably easy to polish, though most of the scratches and gouges could be down to everyday wear by the owner. Dimensions taken of the inner diameter suggested that the object had been turned, indicating a Romano-British date. Further investigations using a turned bung fitted into the bore suggested otherwise and likewise, measurements taken between the outer and inner diameters were not found to be consistent with that of a turned object. It may well be that the discrepancies were created through final polishing. Turned or hewn from a single slab of shale we are no nearer to being able to give an exact date, regardless of any comparable material being found. Its origins lie somewhere between the Bronze Age and the Romano-British period.

Some of the lithic artefacts from this layer were distinctly Late Upper Palaeolithic in appearance and gave us the first indication that we had layers in the lower deposits that could be of Pleistocene age. This was without doubt, a rare occurrence in the caves of north Wales and one that we hoped would lead to some "in situ" finds that would give more credence to these early finds. Lith No.A1 (Fig. 10) is the mesial portion of an anciently broken blade, possibly a single shoulder point, framed by steep retouch. Greyish white in colour, its original length could only be guessed at, but the portion remaining, measures 38mm in length. No.A3, (Fig. 10) is a straight backed blade showing retouch on both margins and has an ancient break at its distal end. The patination is a dense grey white with slight mottling throughout and measures 39.2mm in length. Dr. C McBurney was first to examine these flints and used the term Creswellian to describe them, using their morphology alone for his interpretation. He suggested that flints similar to No.A1, had a wide distribution, not only in Britain but in northern Europe where they first appeared in the Hamburgian culture south of the Baltic around 12,000BC but also suggested that they may still have been in use as late as the ninth millennium BC.
No.A3 was more difficult to place as it did not belong to any well-known type, but he suggested that it was manufactured from flint similar to that used by the Late Upper Palaeolithic peoples in south Wales in such sites as Cathole and Hoyles Mouth. Dr R Jacobi, who examined the same lithic collection 20 years later, drew parallels to artefact No.A3 from Dowel Hall Cave, King Arthur's Cave and Kirkhead Cavern, and placed them from around the Allerød Interstadial. Regardless of the fact that these two flints have been found out of context, their general appearance and blade proportions along with the comments from leading experts (Jacobi, McBurney et al) would suggest that in all probability they can be assigned to the Late Upper Palaeolithic.

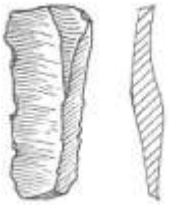
No. A2, A4 & A14 (Fig. 10) are more ambiguous. No. A2 is a mesial portion of an anciently broken blade, 26mm in length, its patination is unusual, being orange/yellow in colour; flints of an identical patination have been recovered from Layer D (see section 9.3). No. A4 is a small mesial section of a narrow bladelet, dense white in colour, measuring just 8.6mm in length. No. A14 is the proximal portion of an anciently broken bladelet, 38mm in length with a dense greyish/white patination. The proximal end has been modified along its right hand margin by abrupt direct retouch, making it burin like in appearance. Their general form does not easily fit any particular type and could belong to the Late Upper Palaeolithic or early Mesolithic depending on their context.



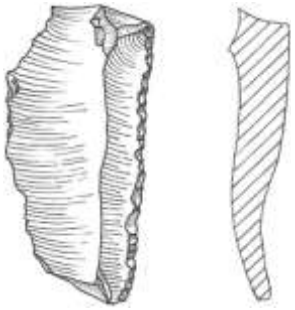
Lith No. A1
Location: Layer A/B
Dimensions:
Length: 38mm
Width: 15mm
Thk: 5.3mm
Patina: greyish/white

Drawn JDB

Lith No. A2
Location: Layer A/B
Dimensions:
Length: 25.9mm
Width: 11.1mm
Thk: 3.5mm
Patina: Matt orange/yellow



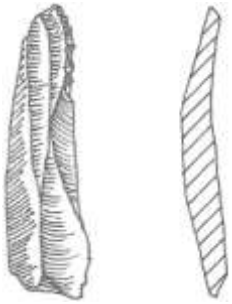
Drawn JDB



Lith No. A3
Location: Layer A/B
Dimensions:
Length: 39.2mm
Width: 18.4mm
Thk: 7.7mm
Patina: Dense grey/mottled

Drawn JDB

Lith No. A4
Location: Layer A/B
Dimensions:
L=8.6,
W=7.7,
Thk.=2.8
Patina: Dense white



Lith No. A14
Location: Layer A/B
Dimensions:
Length: 38.0mm
Width: 10.3mm
Thk: 3.8mm
Patina: Dense grey/white

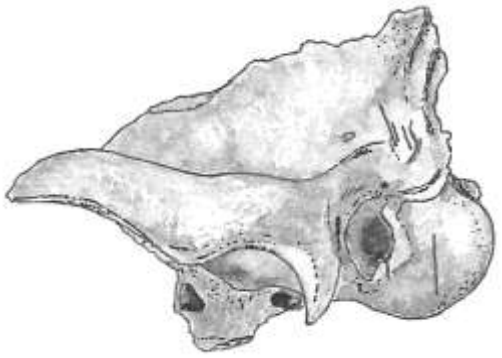
Drawn JDB

Miscellaneous Liths Figure 10

7.3 Archaeozoology from Layer A/B:

Amongst the many bones from Layer A/B were a number of bones that showed signs of butchery, in one form or another. The study of these bones, under normal circumstances, would be of great importance and would go some way to enhance the picture we have been able make from evidence of the early human occupants/users of the cave. The varied origin of this layer means we are not able to assign these butchered bones to a particular cultural period; nevertheless they are an important record of the early inhabitants. It is hoped that at a later date radiocarbon dating could give us the answers.

Dog:
In all, a total of 24 bones from dog have been recovered, from this assemblage, 3 show signs of butchery.
The distal end of a left femur, 132mm, long had been shattered for marrow extraction, further marks show where it has been gnawed by rodents. A second fragment, the proximal end of a right femur shows 3 cut marks where the ligaments have been severed to remove the femur from the pelvis. The bone colour is much paler than the rest of the dog assemblage, possibly a result of cooking? The third bone is part of the skull containing the tympanic bulla (Fig. 11). Above and around the auditory canal is a series of cut marks, 3 parallel cuts just above where the ear would have been, on the rim of the auditory canal there are a further 2 parallel cut marks. The longest and most obvious cut travels across the bulla in a downward stroke. All cuts appear to have been made with a sharp knife type tool. The only possible explanation for these cut marks is the removal of the ear, probably considered a worthwhile source of nourishment



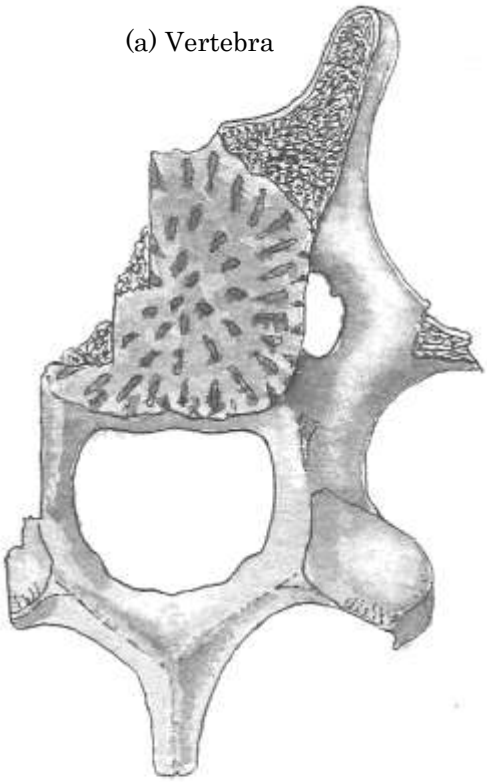
Butchered Dog remains
Scale = Full Size Figure 11

Horse:
The single horse bone found in this layer is a small fragment of shattered bone belonging to a main limb bone. Measuring 55mm in length, it appears to have been fashioned into an awl or piercing tool (Fig. 12c) the working end has been slightly burnt.

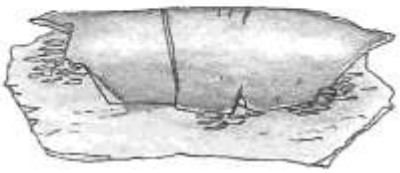
Red Deer:
This large fragment of bone is the mid section of a pelvic bone and has been shattered each side of the acetabulum by some heavy object as the bone is quite thick and solid where the Ischium and Ilium have been removed. This is often the quickest method employed to remove the limb from the main carcass. At a later date the bone has been the prize possession of a dog, the tell-tale polished appearance at the exposed ends where it has been constantly licked clean over a period of time.

Ox:
Three Ox bones from this layer show signs of butchery; they are similar in appearance to the Ox bones found in Layer C and probably originated from there. One small fragment of vertebra has been shattered but also shows cut marks made with a knife type tool. A second vertebra shows cut marks made with a heavy axe type tool and has a cut right through the Centrum (Fig. 12a). Two ribs carry marks made with a sharp knife tool as shown in (Fig. 12b).

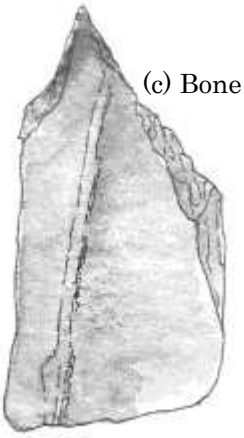
(a) Vertebra



(b) Rib



(c) Bone Awl



Scale = Full Size *Miscellaneous Butchered Bones* Figure 12

8.0 Archaeology of Layer C

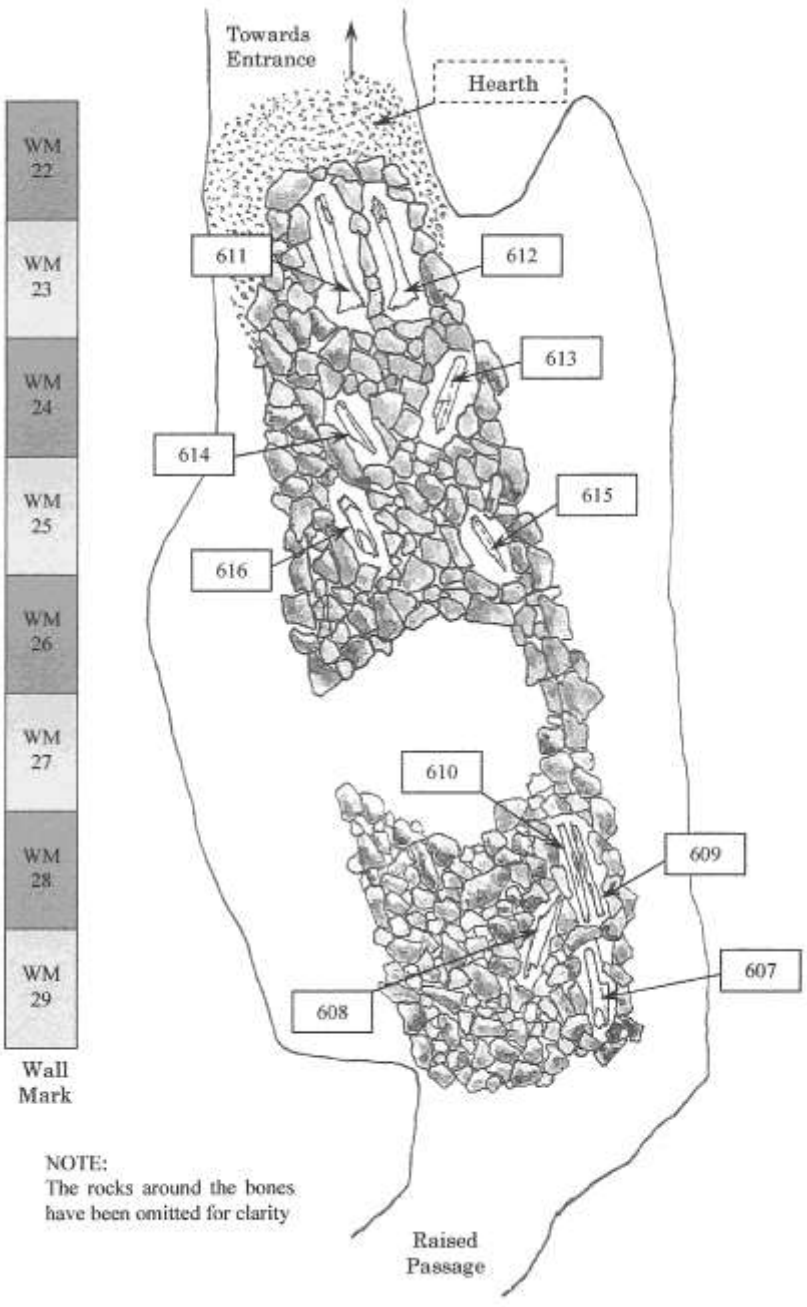
8.1 Introduction:

Some time during the Late Upper Palaeolithic/Early Mesolithic the cave entrance was blocked by a massive rock fall, at what period it was reopened is not clear but it would appear to be circa the Bronze Age. It is more than likely that animals may have been responsible for the original re-opening of the cave, albeit only a small bolt hole they made for themselves. Once exposed, it would have been down to human endeavour to remove all the rocks and boulders to gain access to the cave interior.

Most of the human activity took place in this layer and is undoubtedly the contributing factor to the disturbed nature of the preceding Pleistocene deposits. The first activity that took place was the building of a wall adjacent to the small dry passage at the far end of the cave. All that remains of the wall are 4 limestone boulders that are now fused together and attached to the south east wall of the burial chamber, the limestone dripping from the walls forming a durable bonding agent. The uppermost boulder weighs about 40kgs and would have been difficult to position in such a confined space. A further single boulder is similarly attached to the west wall suggesting that it is a continuation of the opposite wall and blocked the entrance to the dry passage. The second activity and probably the most intensive, is the construction of the burial mound. To gain access to the burial chamber would have entailed wriggling through a low narrow, passage; again an arduous task, ferrying small stones from the entrance to the chamber, in sufficient quantities to build a substantial mound. Details of the Burial Mound and its construction are given below in section 8.2. The last activity was the blocking of the entrance once the bones had been interred in the mound. This required the moving of approximately 3 tons of soil to build a mound high enough to almost reach the roof of the entrance passage. Some of the material came from the internal deposit but the remainder will undoubtedly have come from an external source. (See side elevation Fig. 21) Finally, the small entrance was sealed with a large capstone that stood upright; this was probably covered over with turf or moss.

8.2 Burial Chamber & Mound:

The burial chamber is situated in the back section of the cave 10 metres from the entrance, technically still regarded as the threshold, as light can still be seen from the entrance. Here the roof dips down, restricting movement to a crawl, but the width is marginally wider than that of the rest of the cave. At the time the Burial Mound was built the height in this restricted area would have been no more than 80 – 90cms. It is difficult be more precise as the roof at this point is very irregular. Beneath the Burial Mound the deposit (layer C) is thin, suggesting that the floor of the cave had been levelled off to make more room for the burial mound (See section 5.4). What remained of the Burial Mound was a construction of angular rocks; almost certainly originating from the readily available rocks that had blocked the entrance or from a nearby scree. The construction did not fill the floor area of the chamber but could roughly be described as rectangular in shape, 234cms long, by 45cms wide (Fig. 13). On excavation the height of the burial mound was only 16cms and covered in well compacted soil where people/animals have moved over the surface to gain access to the dry back passage. The rocks beneath this compacted deposit were in general, clean and free from any loose debris, some areas did have slight infill with occasional pockets of small bones, usually amphibians. Looking at all the evidence, the concentration of scree sized rocks in the disturbed deposits, and the many disarticulated and gnawed human bones also found there suggest that the burial mound was originally much larger. Not only has the mound been reduced in height, but it has also been burrowed into; just over half way along its length in a soil depression that extends for a further 50cms to the back of the mound. There is no obvious explanation for this but it is more likely to be from human activity rather than animal.



Plan view of Burial Chamber & Mound Figure 13

A feature that is linked to the Burial Mound is the remains of a small hearth at the entrance end of the construction (Fig. 13). It was built on the same level as the mound and was subsequently covered by some of the rocks from the mound, either as the mound was built upon or as some parts collapsed. It was a metre in length and almost filled the width of the cave, its depth varied but at its greatest it was 100mm and thinned out considerable at the sides and ends. There was very little in the way of charcoal the largest particles being no more than a few millimetres in diameter. Some larger pieces of charcoal were found in layer A/B and layer C in the back section of the cave, but could not be directly linked to the hearth.

8.3 Human Remains:

8.3.1 Introduction:

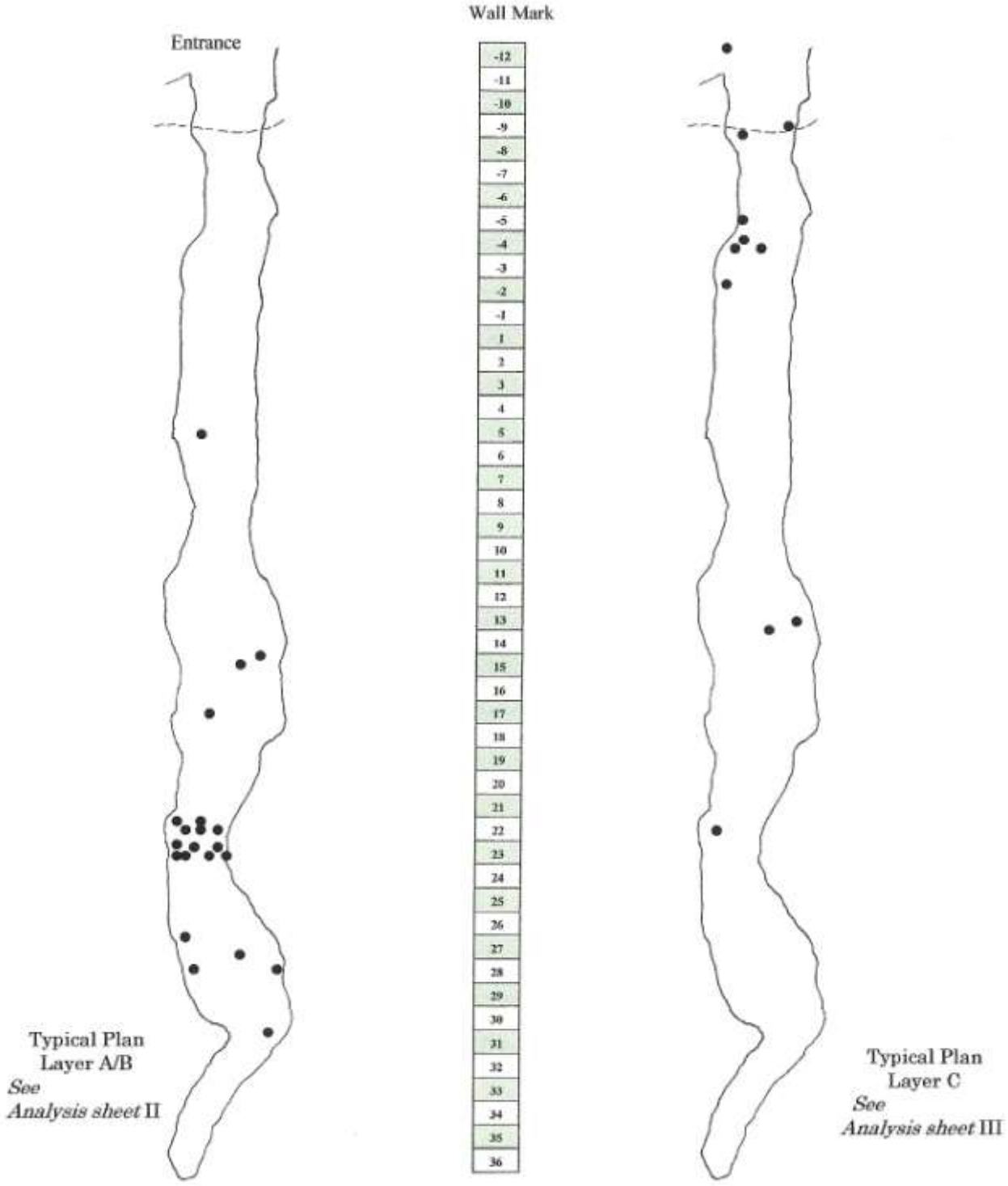
The total assemblage of human bones and teeth found within the cave totals 43, of these only 1 was found in Layer D and is discussed at the end of this section. The remaining 42 were recovered from 3 well-defined zones within the cave, Layer A/B, Layer C and the Burial Mound.

The highest percentages of human remains, (50%) were recovered from Layers A/B; all were disarticulated and appeared randomly spread through the layer (Fig. 14). A few were scattered around the mid section but the majority were concentrated just inside the burial chamber, above what was later found to be the Burial Mound. All the disturbed bones from the burial chamber were minus their distal and proximal articulations; the evidence as presented suggested that this was done when the bone was fresh, teeth mark on some of the bones were indicative of gnawing by large carnivores. The dissemination of the remains indicated some upheaval within the deposit but the cause was not immediately apparent. The child's mandible was one of the first bones recovered; it was unexpectedly found on the surface under a large boulder that was leaning against the cave wall in the burial chamber. The surface staining suggested a burial in a soil deposit, another indicator that the layers had been greatly disturbed. It became apparent when the bones from outside the burial chamber had been excavated that there was a preponderance of human long bones and in particular, fibulae, all had been gnawed at the extremities when fresh. Subsequent finds of a human tibia and humerus showed the same characteristics (Fig. 16). Human remains continued to be found regularly but what was not explainable was the absence of any vertebrae, skull fragments, ribs, metatarsals or phalanges. The only exception to this was the child's mandible, some individual teeth, a sternum and a clavicle.

Continued excavation in the back section of the cave, exposed what was left of a Burial Mound; amongst the rocks that formed the Burial Mound, 10 human bones were recovered. As with the bones from Layers A/B they had all been gnawed by some large carnivore, all that remained was the diaphysis. Both articular ends had been gnawed away to gain access to the bone marrow when the bone was fresh. The bones all looked clean and quite fresh with very little staining, similar in colour to those found in layer A/B.

Layer C would reveal a further 10 human bones and a single tooth, again, the bones were fresh in appearance and all missing their articular ends but in general were much smaller fragments than found in layers A/B or those from the burial mound. The majority were found in the entrance passage (Fig. 14) and were paler in colour. One fragment, 786, a small fragment of a tibia, fitted the tibia found in the burial mound. Finally a fragment of a human tibia was found outside the cave entrance in Layer Ex B, this external layer relates to Layer C. The spread of bones from the burial chamber to outside the cave entrance covered a distance of 12 metres.

Layer D was to reveal just a single human bone (662), the left humerus of a child around 10 years old. The general appearance of the bone was remarkably similar to the rest of the bones in the assemblage, it was, like the others bones, missing it extremities. The bone had been gnawed when fresh and teeth marks were visible at the ends. It was brown in colour, similar to the child's mandible and coincidentally around the same age. Its location in Layer D, is suspect (Jacobi Pers. Com.) not only was it close to the surface in a narrow section of the cave (see section 6.5), its condition was dissimilar to other bones from Layer D.



Scatter Plan of Human Remains Figure 14

The spread of the human remains throughout the cave, horizontal and vertical and covering 3 different zones was problematic, were they contemporaneous or were they 3 distinct periods in the caves past? The absence of any complete bones and the striking similarity between the bones recovered, suggested that we could be looking at a single assemblage that has been badly disturbed. If they were, then were their origins from within the burial mound? Only a full analysis of the bones would allow us a basis for interpretation and the subsequent answers to the many questions posed by the remains.

The following taphonomic analysis of all the human remains from the three different locations will assist in deciding if the material is contemporaneous to the burial mound or not. The Taphonomic analysis sheets, I, II & III, relate to the Burial Mound, Layers A/B and Layer C respectively.

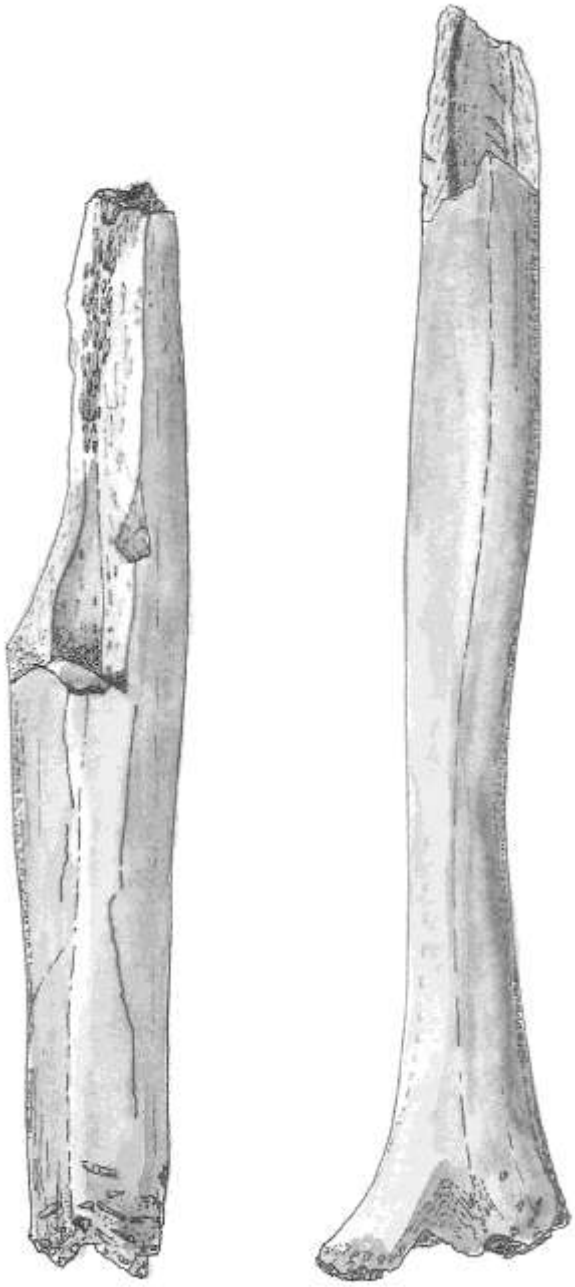
Notes on the criteria used for the analysis,

- Number: The numbering system used is of standard form, each individual bone, complete or fragmentary is assigned a specimen number which forms part of the overall 'Bone Schedule'. This is a complete osteological catalogue of all skeletal remains, and covers all species found in the cave.
- Location/Layer: The first digits refer to a horizontal grid location (wall mark), and allows us to reconstruct the spread of material throughout the length of the cave. The second set of digits/letters refers to it vertical location or Layer.
- Bone: Simply names the bone and where diagnostic feature allow, we can designate left or right side of the body.
- Age: The estimated age at death is problematic as none of the bones are complete; the removal by gnawing of the articular joints both proximal and distal in all cases leaves us with no indication as to the degree of fusion, if any, of the epiphyses. The only exception is the 10/12 year old mandible whose age is based on eruption dates (see X-ray Fig 16). The following analysis can only gives a best guess based on size and stature.
- Colour: The colour of bones has never been a method used to suggest age with any accuracy but here we are using it to estimate, if possible, the link between the 3 different locations of the bones.
- Length: The bones are all fragmentary but nevertheless the size of the each fragment is an important part of the recording method and can, in some cases, be important to the final interpretation.
- Sex: Without the luxury of a full anatomical collection of male, female, young and old it is difficult to be more precise about sexing the remains.
- Description: Documents all aspects not covered by the above: fragments that piece together, the extent of gnawing, disease, X-Rays etc.

At this stage in the excavation all the evidence pointed to the remains having lain in an exposed situation ready for natural defleshing to occur (excarnation), presumably, somewhere in the close proximity to the cave. At sometime, early on in the defleshing process they have been scavenged by carnivores. In theory, this external site would be the primary source for the human remains, but if we relate the archaeology to the cave excavation, then the burial mound becomes the primary source and the layers become the secondary source. The aim of the analysis is to establish whether the scattered gnawed fragments of human bone found throughout the length and breadth of the cave, are all linked to the Burial Mound.

X-Ray Childs mandible Figure 15

(a) Tibia



(b) Humerus

Gnawed Human Bones Figure 16

8.3.2 Taphonomic Analysis:

No.	Location (Layer)	Bone	Age	Colour	Length	Sex	Description
607	BM 29/4 (C)	Lt. Tibia	Adult	Natural	172mms	♀?	Gnawed by large Carnivore at distal and proximal ends, the posterior face is absent at the proximal end and surface cracks radiate along its entire length. Of the shaft. (X-Ray)
608 *	BM 29/4 (C)	Rt. Tibia	Adult	Pale yellow	192mms	♀?	Gnawed by large Carnivore at distal and proximal ends, Proximal half of the anterior border absent, crack along medial surface runs over half its length. Small fragment 786 found in entrance fits into the proximal break.
609 *	BM 28/4 (C)	Fibula	Adult	Pale yellow	249mms	♂?	Gnawed by large Carnivore at distal and proximal end. May possibly be paired with 610
610	BM 28/4 (C)	Fibula	Adult	Pale yellow	240mms	♂?	Gnawed by large Carnivore at distal and proximal end.
611	BM 23/4 (C)	Lt. Humerus	Adult	Pale yellow/grey	234mms	♂?	Gnawed by large Carnivore at distal and proximal end. Medullary canal not exposed at the distal end. Gnawed by rodent at distal end. (X-Ray)
612 *	BM 23/4 (C)	Lt. Humerus	Adult	Pale yellow	200mms	♀?	Gnawed by large Carnivore at distal and proximal end. Medullary canal not exposed at the distal end. (X-Ray)
613	BM 24/4 (C)	Rt. Humerus	10/12 year old	Pale yellow	146mms	♂?	Gnawed by large Carnivore at distal and proximal end
614	BM 24/4 (C)	Lt. Tibia	Adult	Pale yellow	110mms	♀?	Crushed fragment of anterior border
615	BM 25/4 (C)	Fibula	Adult	Pale yellow	125mms	?	Gnawed by large Carnivore at distal and proximal end. Gnawed by rodents along its length. May possibly be paired with 341
616	BM 25/4 (C)	Femur	Child	Pale yellow	107mm	?	Small fragment of mid section crushed by carnivore. Marks of broken tooth in a row where it has tried to crack the bone open.

* Bones examined by Dr. C Stringer

TAPHONOMIC ANALYSIS SHEET I Human Remains from Primary Source (Burial Mound)

No.	Location (Layer)	Bone	Age	Colour	Length	Sex	Description
7	15/2M (A/B)	Fibula	Adult	Red/brown	84mms	♂?	Both ends absent, small section towards proximal end. Teeth marks on one end, Carnivore.
33	15/2M(A/B)	Ulna	Infant	Red/Brown	118mm	?	Both ends absent, broken when fresh.
51	23/1M(A/B)	Mandible	10/12 years old	Brown/grey		♂?	Robust mandible for 11/12 year old age. Horizontal body only, both ascending rami absent, broken when fresh. Teeth marks from carnivore. Teeth present, deciduous 2nd premolar L & R Showing wear exposed dentine. 1st permanent molar L & R. Teeth ready for eruption 1st & 2nd permanent premolars ready for eruption. (X-Ray)
71	23/2M(A/B)	Fibula	Adult	Pale yellow	206mm	♀?	Showing bone disease. Gnawed by large Carnivore at distal and proximal ends. Small traces of calcium deposit.
72	23/2M(A/B)	Fibula	10/12 years old	Natural/yellow	185mm	?	Showing bone disease. Gnawed by large Carnivore at distal and proximal ends. Small traces of calcium deposit. Could pair with 74.
73	27/2M(A/B)	Fibula	Adult	Pale yellow	217mm	♀?	Gnawed by large Carnivore at distal and proximal ends.
74	22/2M(A/B)	Fibula	10/12 years old	Natural	196mm	?	Gnawed by large Carnivore at distal and proximal ends. Could pair with 72
75	23/2M(A/B)	Fibula	Adult	Pale yellow/ dark grey	197mm	♀?	Gnawed by large Carnivore at distal and proximal ends.
76	5/1M(A/B)	Fibula	Adult	Pale brown	253mm	♂?	Both ends absent, one end gnawed by Carnivore.
90	23/1M(A/B)	Rt. Tibia	Adult	Pale yellow grey	219mm	♂?	Gnawed by large Carnivore at distal and proximal ends, with cracks running towards centre. Mid section gnawed by rodents. (X-Ray)
339	22/1M(A/B)	Incisor	Adult	Natural	20mm	?	Upper 1st permanent Incisor chipped along occlusal edge.
340	31/1M(A/B)	Fibula	?	Pale yellow	146mm	?	Gnawed by large Carnivore at distal and proximal ends.
341	23/2M(A/B)	Fibula	Adult	Dark grey	110mm	♂?	Gnawed by large Carnivore at distal and proximal ends. Could pair with 615.
367	28/1M(A/B)	Sternum	Adult	Pale yellow/ grey	134mm	?	Small traces of calcium deposit.
368	22/2M(A/B)	Rt. Humerus	Adult	Pale yellow	218mm	♀?	Gnawed by large Carnivore at distal and proximal ends. Medullary canal not exposed at the distal end. Extensive gnawing by rodents around mid section. Showing bone disease.
370	28/1M(A/B)	Rt. Clavicle	Adult	Pale yellow	62mm	?	Gnawed by large Carnivore at distal and proximal ends.
424	23/2M(A/B)	Lt. Humerus	Adult	Pale yellow	201mm	♀?	Gnawed by large Carnivore at distal and proximal ends.
426	27/1M(A/B)	Fibula	Adult	Pale yellow/ dark grey	279mm	♂?	Gnawed by Carnivore at distal and proximal ends.
429	22/2M(A/B)	Rt. Tibia	10/12 years old ?	Pale yellow	157mm	?	Extensive Gnawing by Carnivore, distal and proximal ends absent, remaining shaft split in half.
459	22/2M(A/B)	Molar	10/12 years old	Natural	16.5mm	♂?	Lower 2nd permanent Molar. To fit 51.
559	17/1(A/B)	Incisor	10/12 year old	Natural	21mm	♂?	Lower 2nd right permanent incisor. To fit 51.

TAPHONOMIC ANALYSIS SHEET II Human Remains from Secondary Source (Layers A/B)

No.	Location (Layer)	Bone	Age	Colour	Length	Sex	Description
693	22/3 (C)	Fibula	Adult	Pale cream	59mm	?	Extensive Gnawing by Carnivore, distal and proximal ends absent.
744	-4/7 (C)	Rt. Tibia	Adult	Pale yellow	123mm	♂?	Anterior border only.
745	-4/7 (C)	Incisor	?	Natural	17mm	?	Lower 1st incisor, slight deformity.
767	-4/8 (C)	Sternum	?	Pale yellow	37mm	?	Small fragment.
786	-2/8 (C)	Rt. Tibia	Adult	Yellow/cream	66mm	♂?	Small fragment to fit 608. Large canine tooth mark where they join together.
830	-5/5 (C)	Fibula	Adult	Pale yellow mottled grey	102mm	♀?	Gnawed by Carnivore at distal and proximal ends. Could pair with 900 & 901.
890	13/6 (C)	Sternum	Adult	Pale yellow		?	Fragment.
900	-9/7 (C)	Fibula	Adult	Bleached	54mm	♂?	One end broken when fresh, recent natural break at opposite end fits 901.
901	-9/7 (C)	Fibula	Adult	Bleached	42mm	♂?	One end broken when fresh, recent natural break at opposite end fits 900.
934	13/5 (C)	Rt. Clavicle	10/12 year old	Pale Yellow	62mm	?	Gnawed by Carnivore at distal and proximal ends.
941	-12/8 (Ex B)	Rt. Tibia	Adult	Bleached weathered	102mm	♂?	Badly deteriorated, because of this it is difficult to say if it has been gnawed but there are a number of marks that could be made by teeth.

TAPHONOMIC ANALYSIS SHEET III Human Remains from Secondary Source (Layers C)

8.3.3 Interpretation:

The position of the Human bones contained within the rocks of the Burial Mound appear to suggest they had been placed there as a deliberate burial act and not just a random pile of rocks containing bones. The 2 fibulae 609 & 610 were found lying parallel to one another, their arrangement, in close proximity to each other suggested that they had been placed there in a single action, as if to keep the bones of an individual together. The 2 humerii, 611 & 612 were also found together but slightly apart with both distal ends pointing in the same direction. In this case both bones were of the same hand. They were all found at the same level suggesting that they could have been placed there about the same time.

As can be seen from taphonomic analysis sheets both secondary source bones show a great deal in common with the bones from the Burial Mound, they all appear to have been gnawed by some large carnivore whilst the bone was still fresh. The thickness of bone that has been split in two in one powerful bite (See tibia Fig. 16), would suggest something the size of Wolf or large breed of Dog. In each case, the distal and proximal articulations have been completely removed by the carnivore; the extent of gnawing has exposed the medullary canal (to extract marrow) in all cases. To a lesser degree, a number of them have been gnawed by small rodents at a later date.

The colour of the bones from Layer C and the Burial Mound are reasonably consistent, in most cases anywhere between natural and pale yellow. There are 3 exceptions from layer C that have a bleached appearance, and they were recovered from the entrance and would have been exposed to the elements for a short period. The Bones from Layers A/B are also of a similar natural colour, again with a few exceptions. From this assemblage, 4 bones have a distinct brown tinge to them. This darker colouring is indicative of being in a wet/damp soil deposit that allows the various elements within the soil to stain the bone. Rather than discount these 4 bones it is reasonable to suggest that as they are in the same gnawed state as the other bones that they originated from the fringe of the Burial Mound where the bone would be more susceptible to staining. The rest of the bones from Layers A/B bear a striking resemblance to those from the Burial Mound.

The most telling piece of evidence is shown on the Scatter Plan, (Fig. 14). The spatial layout shown on the individual plans for Layer A/B and Layer C, show two distinct patterns between the ways the bones have been deposited. The plan for Layer A/B shows a few bones scattered around the periphery of the Burial Mound itself, the majority of bones are found to have collected at the restricted entrance to the burial chamber where the contents of the burial mound has been pushed back to gain access to the back of the chamber. The high content of scree material found in this layer (Section 5.2) can testifies this statement. A few bones have found their way toward the centre of the cave by secondary tunnelling through the restricted passage.

The Plan view for the bones from layer C shows a marked difference, here the bones are to be found in and around the entrance passage. The crucial difference is that the bones found in layer C are much smaller fragments. The fragments are what are left after the Wolves/Dogs have finished their meal. The absence of any epiphyses or articulated ends, suggest that it is secondary gnawing, perhaps by younger animals away from the dominant members of the pack.

It would appear from the above analysis that the fragmentary human remains from all 3 locations are in fact the result of a single occurrence. An examination of the remains produced no evidence to suggest that the perimortem marks were due to human processes and could therefore be attributed to carnivores. The prevalence of long bones being targeted by large carnivores and the absence of vertebrae, ribs, metatarsals, metacarpals and other small bones is indicative of only the main limbs being tugged from the carcass at the excarnation site.

Figures 17 & 18 give a pictorial reference of the total assemblage of human remains recovered, from the cave. The remains represent a mix of male, female, young and adult; the absence of distal and proximal epiphyses and fussed articulated ends has hampered the ageing and sexing of the remains.

The more fragmentary the remains the more difficult it is to determine the number of individuals involved, in some cases we were able to piece together some of the bones. From the current evidence we have from the total assemblage, the fragments of bone and teeth represent at least 8 individuals.

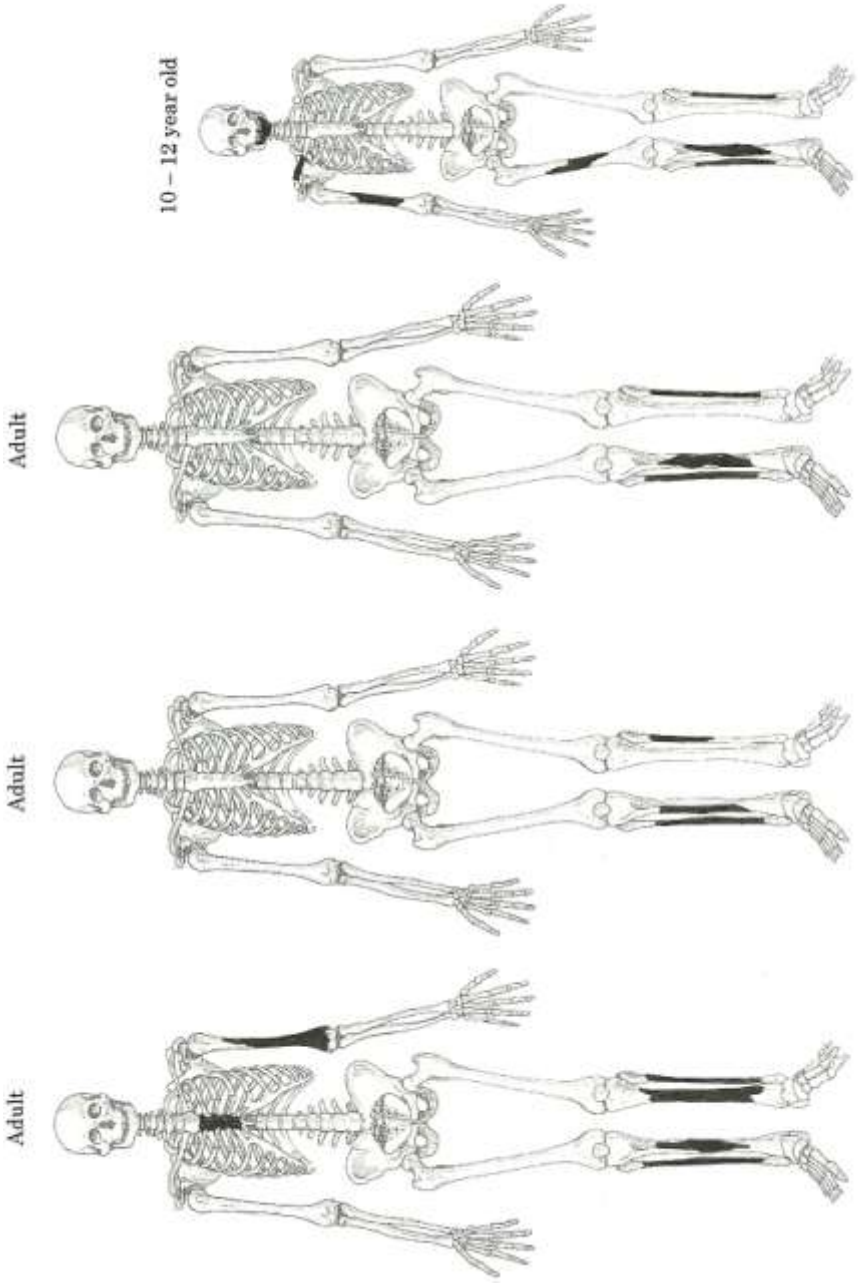


Figure 17 *Scavenged Human remains (Male?)*

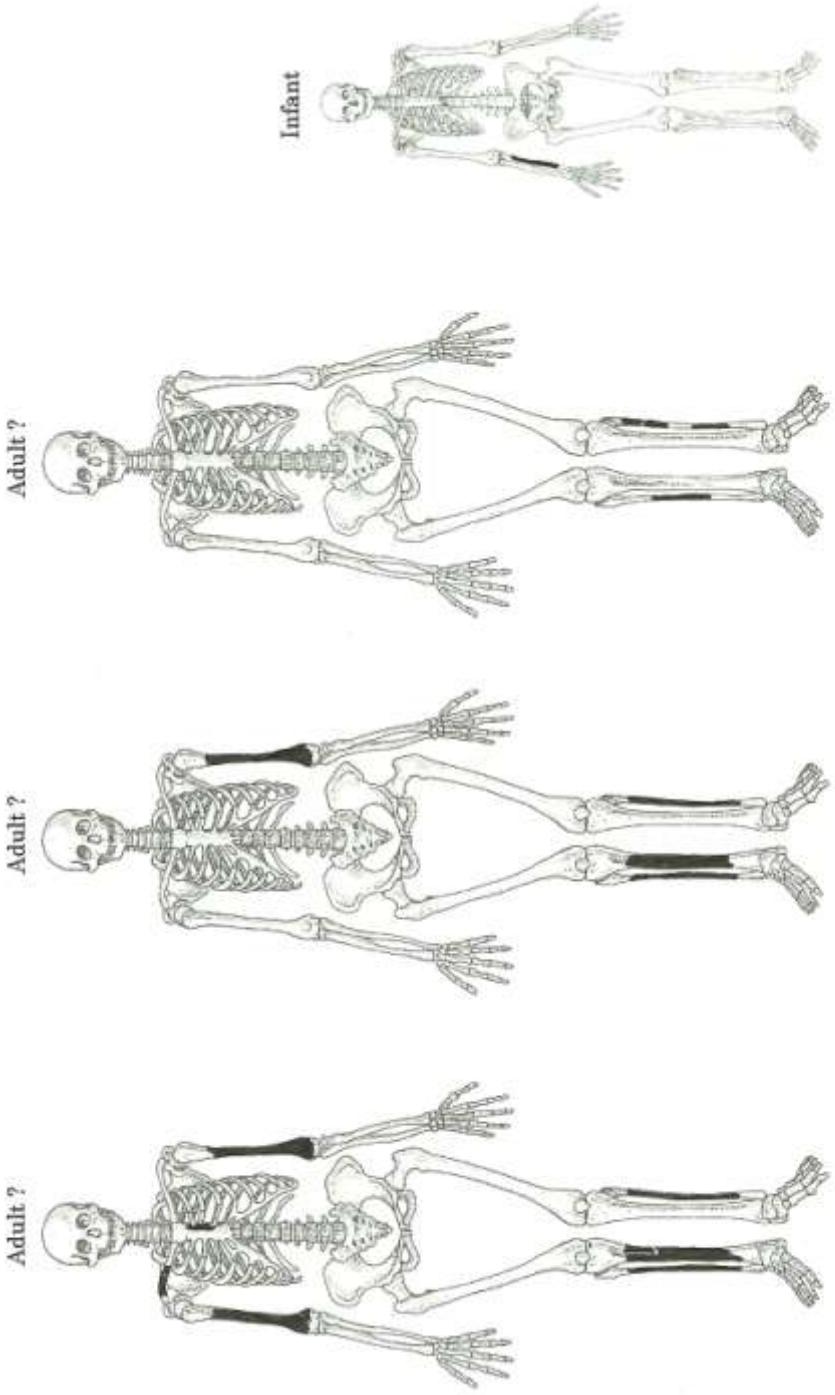


Figure 18

Scavenged Human remains (Female?)

8.4 Artefacts:

The quantity and quality of the artefacts from this layer is extremely disappointing considering all the archaeology that it contained. The Burial Mound and the associated Human remains hinted at a rich deposit but unfortunately grave goods were sparse.

At the base of the Burial Mound a single flint (A9, Fig. 19) was recovered from the hearth perimeter; its condition was poor due to slight fire damage. It was suggested, (Bramwell Pers. Com.) that it might be an incomplete leaf point but the extent of the damage makes it questionable. A further fragment of a recently broken flint (A26, Fig. 19) was recovered 300mm from the edge of the hearth; there was evidence that it had been modified along its margin. There is insufficient of the flint remaining to be more specific as to its purpose.

Adjacent to the Burial Mound base, but within the soil deposit three broken pieces of a carved antler tine were recovered, the pieces were in close proximity to one another but the artefact itself was incomplete. The pieces represented two sections of the antler base, (A17 & A18, Fig. 19) and a small section of the tip of the tine, the mid section was missing. The Antler base was split in three, a quarter section of this was also missing. The base had been bored through with a neat hole, 6.8mm in diameter; the centre-line of the hole, 18mm from the base had been marked of with two crossed lines inscribed onto the antler. The coarse outer covering of the antler had been the removed and the remaining antler polished. The tip of the tine (A19, Fig. 19) had been polished smooth and ground with an angular face. Despite the effort used to grind this angular face smooth, it was covered in a series of parallel scratch marks.

The artefact is typical of a late Bronze Age/early Iron Age, Horse's Cheek Piece. Many examples of cheek pieces have been recovered throughout the country; most cheek pieces are often covered in carved decoration, even if only in a simple pattern and are regularly depicted with more than one bored hole. This particular piece is polished smooth and there is no evidence on the broken extremities to suggest that it was carved. Around the upper perimeter of the hole shows considerable wear, where it has been suspended on a thong, this is in keeping with it being a cheek piece as it is hung decoratively from the bridle harness. Where this comes into question is what if any, is the significance of the parallel scratch marks on the polished end? One suggestion is that this artefact is a tool that was carried around by the owner, possibly suspended from a belt and used to retouch flint tools when necessary. This explanation for the artefact, is pure conjecture, but would nevertheless answer the question, why are there marks on the highly polished end of the antler?

A fourth sliver of polished antler was also recovered, again in close proximity to the previous pieces, but not believed to be part of the Horses cheek piece. The fragment contained a rough shaped half hole along its edge; its small size gave no hint as to its original purpose.

Amongst the debris that was used to seal the entrance a badly damaged shale bracelet was recovered (A31, Fig. 19). Its size, smaller than the one recovered from the disturbed deposit, suggests it would have been suitable for a child. Only the mid section has survived, unlike the shale bracelet (A12) this one shows no evidence of terminals at either end. It is not known if this bracelet was originally in bangle form (a complete circle) as it only represents 150° of a complete circle, and no other fragments were recovered. Despite the alternating damp/dry conditions encountered at the entrance, traces of red ochre were visible along the bracelets length. The spread of the coating that remained indicated that it had once covered the whole bracelet. The tooling marks were quite coarse and showed that the bracelet had been polished in a number of directions. Its position in the entrance rubble could imply that the bracelet became broken during the sealing of the entrance.

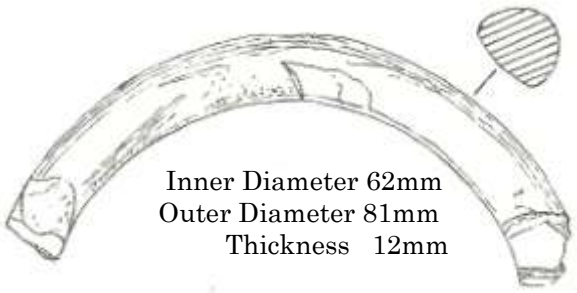
Shale jewellery was in manufacture during the late Bronze Age, the discovery of a shale bracelet industry at Margetts Pit beside the river Medway in Kent is one example. The remains of hundreds of roughly worked bracelets in various stages of manufacture were recovered along with many complete examples from within the workshop and can be dated to the Late Bronze Age, 1150-800 BC.

We are confident that the bracelet/bangle found in the entrance passage can be linked to the Burial Mound and it may be worth considering the shale bracelet from the disturbed deposit (A12, Fig. 9) as being contemporaneous with the Burial Mound. Also the Bronze Pin (A13, Fig. 9) regarded as Bronze Age (Dearn et al.).

Lith No. A9
Length. 24.3mm
Width. 13.1mm
Thk. 4.1mm
Colour. Dull cream, buff blotches

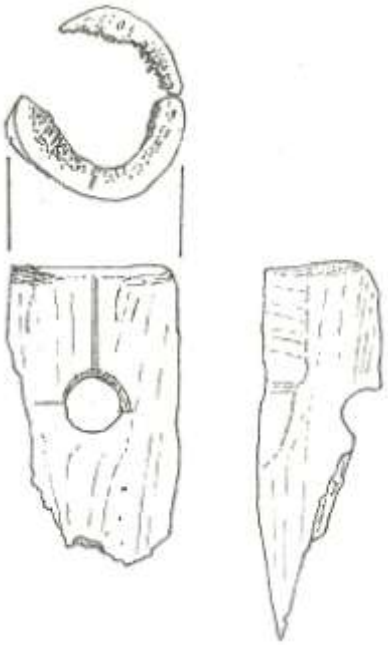
Reconstruction of burnt flint

Shale Bracelet A31



Inner Diameter 62mm
Outer Diameter 81mm
Thickness 12mm

Carved & Polished Antler Tine
A17 & A18



Carved & Polished
Tip of Antler Tine
A19

Lith No. A26

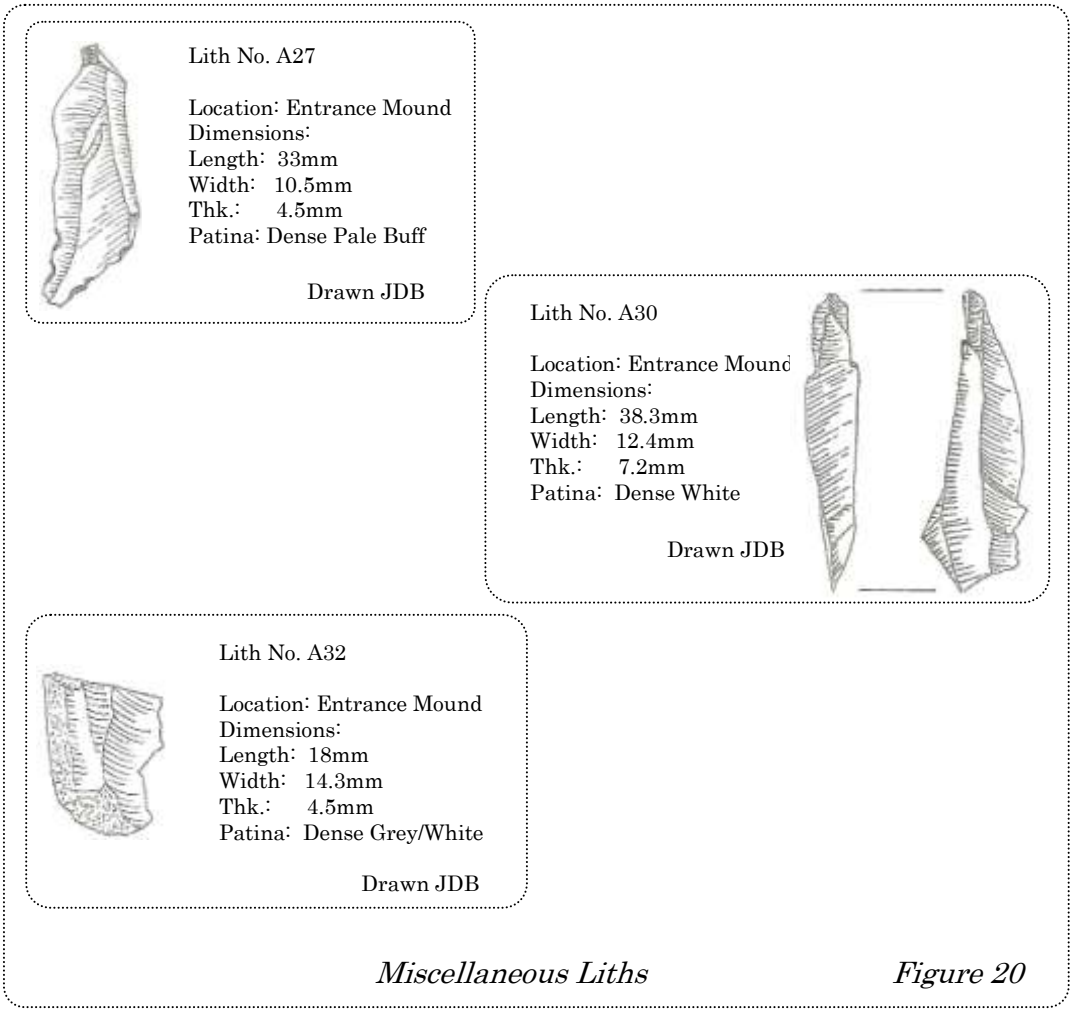
Recently broken
fragment

Drawn JDB *Late Bronze Age Artefacts* Figure 19

8.5 Miscellaneous artefacts:

The complex nature of the disturbance within this layer (ibid 8.1) has raised a question mark over some of the finds, with particular emphasis to the lithic artefacts. One specific area of concern is the entrance mound; the mound has been constructed with soils from the cave exterior and interior. To what extent the interior soils have been re-deposited into the mound is difficult to assess, and on this basis, the liths from within it will have to remain from a miscellaneous source.

There are 3 artefacts that fall within this category. A27 (Fig. 20) is a small bladelet with an ancient break to its tip, from the tip to just over half its length the bladelet has a thin film of residue that could be resin or some other bonding agent, evidence that maybe the implement was hafted when in use. The opposing end is burin like in appearance and shows a small degree of micro-wear at its tip. A further lith, A30 (Fig. 20) is also burin like in appearance (Dr. P Pettitt Pers. Comm.), there is also evidence of micro-wear at its tip, only here the pair of modified facets are more pronounced. The final example is Lith No. A32 (Fig. 20) and is a broken fragment, too damaged to show any diagnostic features that might assist with its identification. Two "miscellaneous" artefacts, bone spears, were recovered from the perimeter of the Burial Mound their credence was doubtful and fell into the miscellaneous category. Subsequent radio carbon dates placed one of them from the Late Upper Palaeolithic, both artefacts are discussed fully in section 9.3.



Miscellaneous Liths *Figure 20*

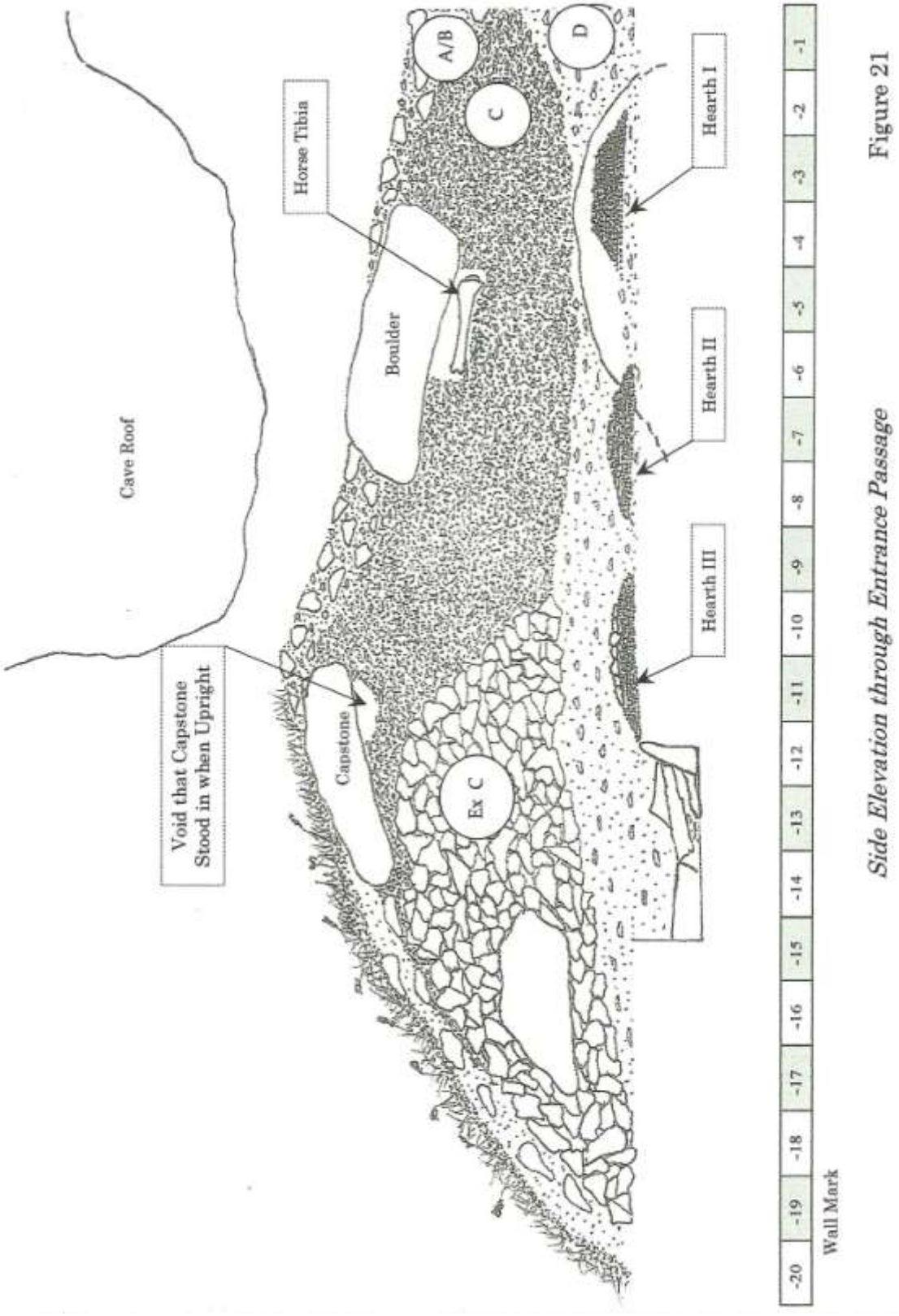


Figure 21

Side Elevation through Entrance Passage

8.6 Archaeozoology:

Within the assemblage of bones from Layer C are a number of bones that show signs of butchery, some have been cut with a very fine sharp cutting tool, probably a flint knife and others show a much heavier, but equally as sharp a tool, an axe. The bones are very similar to those depicted in Figure 12, and in all probability the majority of butchered bones from the disturbed layers almost certainly originated from Layer C. The bones are of one species only, an Ox, both young and adult are represented as well as a small breed of the same species. All the Sheep bones have been scrutinised for tool marks but strangely none have been found, it is possible that some of the sheep bones found in the entrance passage have been disturbed and are recent.

There are, however two bones that are of great significance from an archaeozoological standpoint. Firstly there is the fragment of a humerus from a Black Stork. The portion of bone, just 40mm long, represents the distal end of the humerus; man-made marks on the bone shows where it has been 'ringed' around its circumference with numerous score marks made with a sharp implement. The structure of bird bones is considerably different to mammal bones, they have reduced wall thickness to the main limb bones to decrease their overall weight and so facilitate flight. This reduction in thickness makes the bone appear more brittle, and enables the bones to be snapped in two quite easily. The snapping of the humerus at its distal end allows the wing to be removed without the need to cut through muscle and ligaments. The remaining bones on the wing, radius/ulna and the metacarpal contain all the primary and secondary wing feathers (Fig. 22). These would be the most sought after feathers for the manufacture of arrows flights. The absence of any other bones from the carcass strengthens the theory that it was the wing bones complete with feathers that the hunter wanted. Similar butchered bones have been recovered from other ancient sites and are also believed to be associated with the manufacture of arrow flights.

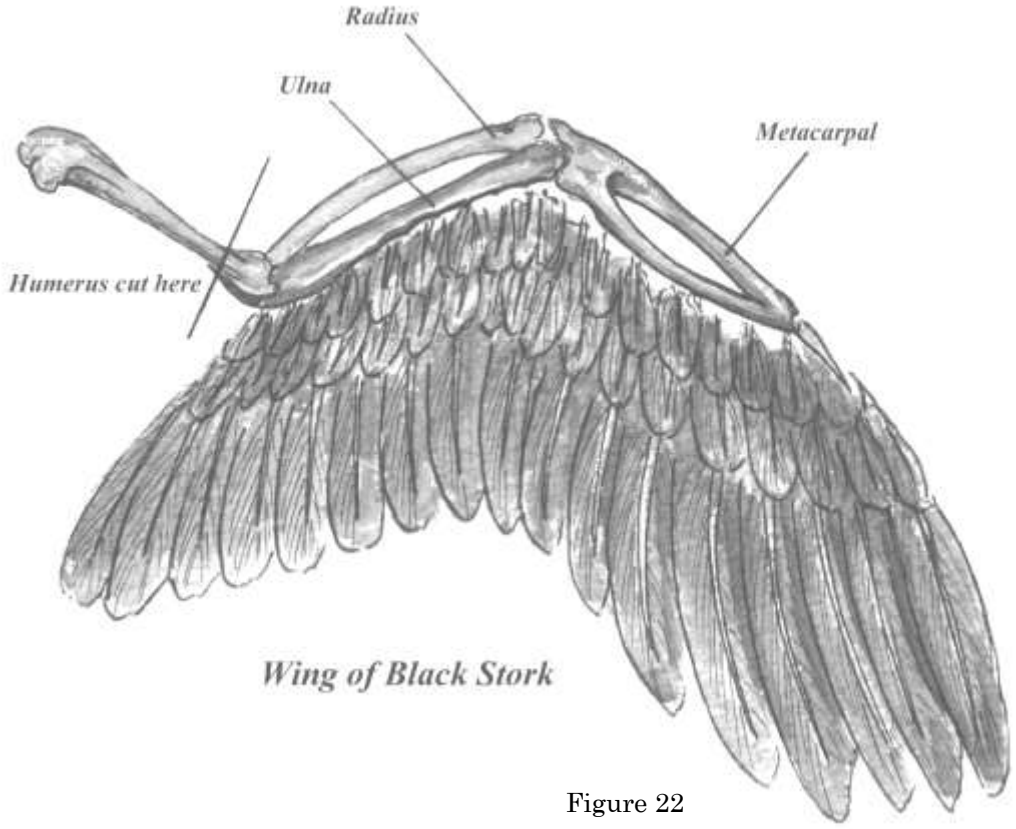


Figure 22

It would appear from the fossil record that our Bronze Age hunter was more than lucky to kill or find a Black Stork; there nothing among the records to suggest that during this period the species was anything other than extremely rare. The only other known record of a Black Stork is from Tornewton cave in Devon that has been attributed to the Devensian Period. The discovery of the Black Stork

humerus was an extremely rare and interesting find, not only because of its archaeological link but purely from a zoological interest.

The second, and equally intriguing find, was the tibia of a Horse found in the entrance passage (Fig. 21). Halfway down the sloping entrance passage was a large smooth rectangular boulder weighing roughly 150kgs. On its removal it revealed the complete undamaged tibia. The distal end of the bone pointed out through the entrance and had been placed in a small dug out section in the soil deposit. The hollowed out section was larger than the bone 400mm long by 180mm wide and deeper so that the boulder protected it but did not touch it. The bone had the appearance of a white bleached bone that has been left exposed to the elements and had a number of short hairline cracks had formed along its length as it had dried out. Apart from evidence that it had been gnawed by some rodents it was intact. There is no doubt that the placing of the bone in this position was intentional, but the reason behind it is obscure.

8.7 Conclusions:

The utilization of the cave by Humans during the late Bronze Age is apparent; the dating of the butchered Black Stork bone (2,945 BP) confirms this. Current evidence would suggest that the cave's use during this period was for sepulchral purpose only; there is no evidence to support its use for habitation. The quantity of butchered domestic animal bones is minimal, and some of these indicate that they were brought into the cave by carnivores.

The sequence of events leading to the internment of the gnawed bones within the back section of the cave started with the excarnation of the Human remains. The body/bodies would have been left in a primary site, presumably not that distant from the cave and left for natural defleshing to have occurred. It is from this site that the Wolves/Dogs would have tugged at the main limbs and dismembered the body, removing the limbs for eating and subsequently gnawing them to extract the marrow. The younger animals of the pack possibly taking refuge in the cave entrance away from the adults to eat their share. The torso would remain at the primary site. The gnawed bones were then collected by the other tribe members and reinterred in the cave and covered by stones.

Did the number of individuals interred reflect some disease within the population or was there some nutritional deficiency that could explain this occurrence? To hopefully answer some of these questions, 3 of the long bones were chosen for x-ray, with the chance that they may have showed Harris lines, indicating a period of arrested growth. A tibia and 2 humerii were selected the 2 humerii were of the same hand, this way the bones represented at least 2 different individuals, all 3 x-rays proved negative. This being the case, then the number of Humans represented, at least 8, would suggest that this internment programme took place over a period of time rather than one single event. The method used to seal the cave would strengthen this hypothesis, rather than fill the complete entrance with soil; they built a large soil mound leaving a low narrow passage to gain entry. The entrance was then sealed with a large boulder that could be removed and replaced whenever required (Fig. 21). Similar evidence of excarnation has been uncovered on the Bronze Age site of Hambledon Hill, where the bodies of two children were exposed on the same excarnation site but from contexts that were from different time periods.

The occurrences of gnawed Human remains from a cave context and where only long bones are recovered are not unique. Raven Scar Cave in the Yorkshire Dales has yielded Human remains that mirror those recovered from Lynx Cave. The osteological profiles from both caves are remarkably similar not only in content but in appearance. In both cases the individuals are represented by main limb bones, clavicle and sternum and the gnawing patterns on the bones are impossible to tell apart (Lord Pers. Comm.). Bones found near the entrance also show signs of weathering where they have lain exposed to the elements, as do the Lynx Cave bones. The main difference between these caves is that in Raven Scar, the primary and secondary sites were both within the cave, but in different locations. The Human remains had been interred within the cave, not buried but placed in open cists near the

entrance and were subsequently scavenged by carnivores and removed to the back section of the cave to be gnawed. It was postulated, when comparisons were being made, that the bones may have been gnawed by Lynx. Both caves have Lynx present, but tooth patterns left in a scapula proved to be at a greater pitch than that of a Lynx, ruling out any connection. Dr. A Sutcliffe, who examined the bones, compared them favourably to other examples he had found at a cemetery in Kenya, here the human remains had been scavenged by Hyenas, but they showed the same characteristics as the gnawed bones from Lynx Cave.

The remains of the hearth in front of the Burial Mound, is replicated in Raven Scar; here the hearth was positioned between the open cist and the entrance. In both cases it is assumed that the fire was positioned to ward off predators whilst the building of the Mound and the subsequent internment was in progress.

The exact date that the man-made wall was erected against the back wall of the burial chamber is not known. The natural cementing together of the rocks that make up the wall is most likely to have occurred during the Atlantic period, when conditions were warm and damp, ideal for the build up of stalagmite. Its construction is previous to the Burial Mound but its precise purpose is obscure. The most likely explanation is that it was originally wider and covered the entrance to the dry passage, although there is no real evidence to support this, other than the cemented rocks are present on each side of the passage. There are some unusually large boulders amongst the debris in the back chamber and these may or may not have been part of the early construction. It still leaves the questions as to its purpose, unanswered. The final act of sealing off the entrance to the cave is a feature at both Raven Scar and Lynx Cave and is thought to be to deny scavengers access to the interred bodies.

Dating of the human bones from the burial chamber and the other human remains that can be safely associated with them has been problematic. The answer to which period and culture do they belong, has also been hampered by a lack of material evidence. The scant number of artefacts and the absence of any diagnostic pottery leave us with little to work on. There is nothing amongst the faunal remains that would indicate a specific period, the content being typical of anything from the Late Mesolithic to almost the present day. Ideally, a radiocarbon test would give us the answer, but until such time, the most promising option is to look at the burial practices and rituals and compare them to other sites. We can enhance our interpretation with what little we have in the way of anthropological and geological evidence to feel confident that a late Bronze Age estimate is not that far from a realistic date.

The Horse tibia found perfectly preserved and protected under the large bolder in the entrance passage will unfortunately remain a mystery. The Horse certainly played an important role in the lives of the Bronze Age people but exactly what significance this particular bone played is difficult to understand. Whether this act had some religious or ritualistic meaning is impossible to say, all we can say with confidence is that placing it in the entrance was a deliberate act.

An intact Burial Mound would have given us a much better understanding of the burial process; the unintentional desecration by Miners searching for a Lead seams has complicated the sequence of events. This has been further compounded by pot-holers and mammal interventions to such an extent that interpretation has been difficult. The complexity of this disturbance has been challenging and has unfortunately left us with many questions that still can't be answered at present. What has been salvaged has made the excavation worthwhile and has broadened the current picture we have of the Late Bronze Age peoples in the area.

9.0 Archaeology of Layer D
Late Upper Palaeolithic

9.1 Introduction:

For many years the only evidence we had that suggested a Pleistocene deposit, was a number of flint artefacts from Layer A/B that seemed to be typically Late Upper Palaeolithic in appearance. They were compatible with other flint assemblages from Kent's Cavern, Gough's Cave and Creswell Crag Caves and nearer home, Cefn Caves, St. Asaph. At the time (1962), they were described as Creswellian, as they were deemed to differ from those of our continental neighbours. Today, after a great deal of research and debate, the term Magdalenian is more appropriate as it is felt the salient points between British and continental flints have a great deal in common (*Jacobi pers. comm.*). The fluted bone spear-point found in Layer C was also described as Magdalenian in 1964, (*Wymer Pers. Comm.*) and would later be confirmed by radiocarbon dating. Without any provenance or radiocarbon dating, these artefacts would have had to remain "Late Upper Palaeolithic in appearance". This all changed once the relatively undisturbed layer D was reached. Here there appeared an abundance and diversity of evidence of human activity. It would be misleading to say occupation, as there is insufficient evidence to suggest there was any prolonged use of the cave. The hearths, stone and bone artefacts, the remains of their meals and the results from the radiocarbon dating would all play their part and assist in piecing together the lifestyle of these early inhabitants. The only Human bone recovered from this layer, the left humerus of a 10 year old child was suspect (see 8.3.1).

9.2 Hearths:

There is nowhere amongst the deposit that indicates a working floor, the consistency of the deposit is uniform with no evidence of a thin compacted deposit, again, suggesting there was no lengthy occupation/use of the cave. The nearest we can get to pinpoint a location within layer D is the positioning of the hearths. The hearths, three in all, are at different levels in the deposit and were all positioned in the entrance passage, that is, within the first 3 metres of the entrance (Fig. 21 & 23). They differ marginally in volume and content.

Hearth I

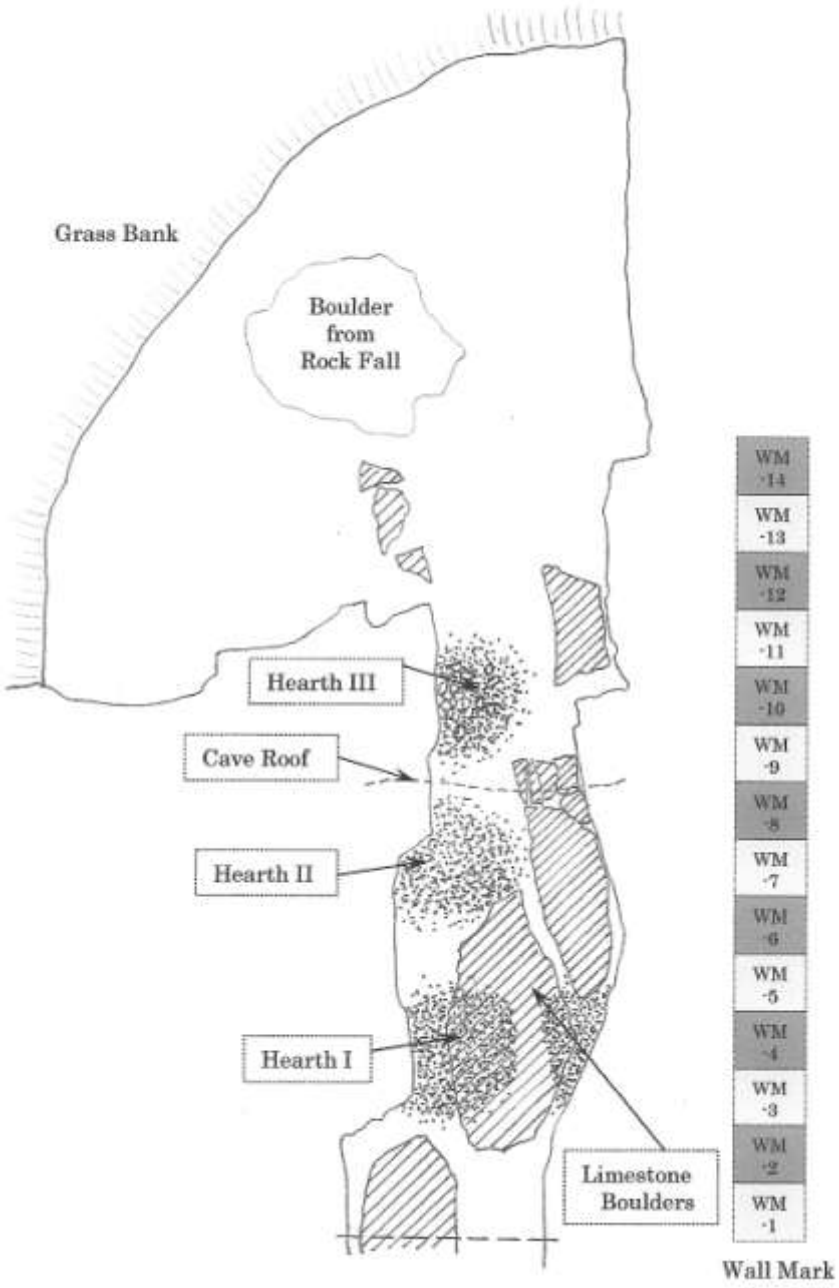
At 100mm above the base of Layer D, and positioned almost 2.6 metres from the entrance, this appears to be the most recent hearth. It is the largest of the three hearths and straddles a large limestone bolder (Fig. 23), and covers the full width of the cave which is 900mm at this point. Not only is its spread the widest it is also the tallest, being a 150mm high against the west wall of the entrance passage and slightly domed in cross section. Its colour and texture was unvarying throughout, a blue grey, damp, friable material that stood out in stark contrast to the dark brown of the surrounding contemporary deposit. There were no large pieces of charcoal within this matrix; most were barely visible to the naked eye, the largest being just 1-2mm in diameter. Larger pieces of charcoal were uncovered either side of the hearth within the scatter area, all were short round sections; none were larger than 12mm in diameter by 10mm in length.

Hearth II

The centre of this hearth is positioned just over 1.5 metres from the entrance and is similar in appearance and texture to hearth I. It appears older than the previous hearth; its base is just 20mm from the base of Layer D. With a spread of 600mm and a height of 100mm it is also smaller, roughly

semicircular in shape and again, placed against the west wall of the entrance passage. And like hearth I there are no sizeable pieces of charcoal to identify.

Plan View taken from base of Layer D
(Refer to Side Elevation & Plan for location)



Hearth Locations Figure 23

Hearth III

This would seem to be the earliest hearth as the base is just a few millimetres above layer E. Again the hearth is positioned against the west wall of the entrance passage, its centre approximately 0.5 metres from the entrance, but unlike the previous 2 hearths, this one sits outside the confines of the cave and is exposed to the elements above. It is semicircular in shape with a spread of 400mm and 100mm high. The main difference between this hearth and the other two is that the top is covered with small stones; they do not appear to have been selected for a particular purpose as they are of random shapes and of varying size. The size varies from 15mm to 60mm, the only commonality being they are all angular stones. The stones have collapsed over time, but give the impression that they covered the whole surface of the fire, the uppermost faces are covered in a hard residue; further tests should reveal the true nature of this coating.

Unlike the other hearths this one does contain pieces of charcoal; they are plentiful throughout the hearth and are clearly visible. In general the charcoal content is quite small, similar to the other hearths, but there are a few larger pieces (10mm max diameter) that we hoped held enough diagnostic elements to be identified. Dr. Peter Thomas, Keele University (School of Life Sciences) examined one of the larger pieces and made the following observation. Although the specimen was rather distorted he felt that the largest pores running through the wood suggested that they were growth features rather than post-mortem artefacts. Possibly indicating that the sample belonged to a ring-porous species, the most likely candidate being Oak (*Quercus*), the dimensional range from small vessels to large vessels (pores) was in keeping with it being Oak. Even though a variety of optical equipment was used, he felt that unfortunately there were none of the characteristic large rays visible, putting a serious question mark over its identification (*Pers. Comm.*).

Other samples of charcoal were recovered from between the hearths but in general they were only small fragments, washed soil samples from these areas revealed hundreds of minute particles, again too small for identification. Still in layer D but away from the cave entrance some larger samples were recovered, the furthest being 1.5 metres from hearth III. There was nothing to suggest that there had been a hearth on the talus but the samples found within this scatter area were larger than those found in and around the hearths.

From these external samples, a further two dissimilar pieces were selected and sent to Dr. Thomas for analysis. The results were more encouraging as he felt reasonably confident with the identification. The first was a gymnosperm (conifer), the sizable resin canals ruled out Juniper and there was evidence that the transition between early and late wood is abrupt leading him to the conclusion that the species was Scots Pine (*Pinus sylvestris*). The second external sample was an angiosperm (flowering plant) like the sample from the hearth. Here the pore size strongly suggested either Willow (*Salix*) or Birch (*Betula*). The presence of medium sized rays rather than very small rays is indicative of Birch. The sample was of irregular section, roughly elliptical and being 10mm at its widest and 16mm in length. It is difficult to be more specific on such a small sample but the pore size suggests one of the larger species, probably the Downy Birch (*Betula pubescens*) rather than the Dwarf Birch (*Betula nana*).

An earlier sample that was collected from 100mm above hearth III, roughly at the same level as hearth I, it position within the layer suggests that it probably originated from hearth I or was at least deposited there within a similar time frame. Unlike the first sample this was clearly identified as Oak (*Quercus sp*)

Further samples of charcoal were recovered extending 2 metres further than hearth I, into the cave interior. Soil samples taken from the back section of the cave for pollen analysis (see section 11.0) also contained large quantities of small charcoal particles.

9.3 Late Upper Palaeolithic Liths:

Lith No. A8
Location: Layer D
Dimensions:
Length: 25.7mm
Width: 8.2mm
Thk.: 3.2mm
Patina: Glossy White
Drawn Dr. R Jacobi

Lith No. A22
Location: Layer D
Dimensions:
Length: 32.3mm
Width: 12.6mm
Thk.: 3.0mm
Patina: Matt orange/Yellow
Drawn JDB

Lith No. A23
Location: Layer D
Dimensions:
Length: 29.4mm
Width: 14.2mm
Thk.: 5.5mm
Patina: Fine Black Chert
Drawn Dr. R Jacobi

Lith No. A24
Location: Layer D
Dimensions:
Length: 23.8mm
Width: 7.5mm
Thk.: 3.2mm
Patina: Matt White
Drawn Dr. R Jacobi

Lith No. A25
Location: Layer D
Dimensions:
Length: 30.2mm
Width: 12.6mm
Thk.: 3.8mm
Patina: Matt White
Drawn Dr. R Jacobi

Lith No. A34
Location: Layer D
Dimensions:
Length: 28.0mm
Width: 10.6mm
Thk.: 3.6mm
Patina: Dense White
Drawn JDB

Late Upper Palaeolithic Liths

Figure 24

Within weeks of the excavation starting artefacts were being unearthed that appeared to be of Late Upper Palaeolithic origin (section 7.2). The total count of the lithic element in this collection, including those without provenance from the disturbed sections, amounts to 26 pieces, of these, only 12 can be safely assigned to the Late Upper Palaeolithic period. Their provenance is secure having all been recovered from the undisturbed sections of Layer D. They are scattered throughout the length of the cave with a small cluster found in the back chamber. Unfortunately, their condition is not perfect; some show ancient breaks at their tips but appear to have maintained much of their overall length. They range in size from the smallest bladelet 23.5 mm long, to the largest backed Bi-Point at 56 mm long. Others show recent breaks (probably occurred during the disturbance), albeit, that the missing fragments have not been recovered. The materials used for the manufacture of these liths cover a wide range for such a small collection, from fine pure flints to coarse granular flint and fine black carboniferous chert, banded chert to a very coarse grey/white chert. Their patina also covers a whole range of colours from white tinged with blues, greys, yellow and orange, some so well matched they could be derived from the same core. No cores have been recovered and there is no other evidence to suggest that tool manufacture was ever carried out on site.

In most cases the blades are complete or near complete and show intentional retouch and seven of the blades show abrupt modification to one or more margins. Albeit that the collection is small there are a variety of blade types, knives, scrapers and borers. And in all cases the general morphology of the blades and bladelets suggest that they are Late Upper Palaeolithic.

Lith A23, (Fig. 24) is a Straight Backed-Blade with abrupt direct modification along its right hand margin, it was recovered in close proximity to the late glacial sand, and its morphology is typical of Late Devensian Backed-Blades, this date would fit with the radiocarbon dates we have from the butchered mammal bones recovered from Layer D (see 9.5). Liths A24 & A25, (Fig. 24) are also Straight Backed-Blades and are similar to blades recovered from Kirkhead Cave. Along with the Straight Backed-Blades there are two examples of

Curved Backed-Blades, one example, A36 is a Bi-Point (Fig. 25) and shows the curve formed by abrupt direct modification. Similar Bi-Points, only marginally larger have been recovered from Aveline's Hole Cave in Somerset. But as Jacobi points out, the backing scars on this lith and all the other 'Backed' liths from Lynx Cave all originate from the ventral face, whereas the Aveline's Hole examples have opposing scars. Radiocarbon determinates for this type of Bi-Point are in the range of 12,600-10,800BP. The curved backing on Lith A39 (Fig. 25) is formed by the cortex but the blade itself does show intentional retouch.

Lith No. A28

Location: Layer D
Dimensions:
Length: 41.0mm
Width: 10.0mm
Thk.: 5.0mm
Patina: Dense White

Drawn JDB

Lith No. A35

Location: Layer D
Dimensions:
Length: 23.5mm
Width: 7.5mm
Thk.: 3.5mm
Patina: Banded Black Chert

Drawn JDB

Lith No. A39

Location: Layer D
Dimensions:
Length: 51.5mm
Width: 23.0mm
Thk.: 8.8mm
Patina: Dense cream with pale Orange/Yellow tinge beneath cortex

Drawn JDB

Lith No. A33

Location: Layer D
Dimensions:
Length: 42.3mm
Width: 16.3mm
Thk.: 3.5mm
Patina: Dense White

Drawn JDB

Lith No. A36

Location: Layer D
Dimensions:
Length: 56.0mm
Width: 17.0mm
Thk.: 8.0 mm
Patina: Dense white with pale Buff tinge

Drawn JDB

Lith No. A40

Location: Layer D
Dimensions:
Length: 41.6mm
Width: 15.5mm
Thk.: 7.0mm
Patina: Coarse Grey/ White Chert

Drawn JDB

Late Upper Palaeolithic Liths Figure 25

The only stone artefact found outside the cave, apart from lith No. A36 was recovered from the entrance talus and was a smooth hammer stone with damage to one end. A similar, pear shaped hammer stone was recovered from the back chamber although its condition showed considerable deterioration. A third hammer stone has been recovered, also from the back chamber, but is more rounded in shape and adhered to one face is some hard, shiny brown substance (resin?).

9.3.1 Late Upper Palaeolithic Bone Points:

From the total artefact assemblage only two bone artefacts have been recovered from Layer D and D¹ both are interesting finds and of great significance to our understanding of the Late Upper Palaeolithic and the Upper Palaeolithic. Two other bone artefacts were recovered from the disturbed section of Layer C, in close proximity to the Burial Mound. They appear to be the mesial sections of a manufactured bone point/spear, the morphology of both pieces are strikingly similar, A6 & A7 (Fig. 26), their colour and condition would suggest that they are probably of the same or similar age. Both fragments are a red/brown colour, the surface texture looks polished and has a gloss to it; the smaller fragment has a greyish tinge to it with some black areas where it may have been close to a fire. Both fragments show root-marking and on one, the larger fragment some teeth marks from rodent gnawing.

The first fragment, the larger of the two, measures 89.2mm in length with breaks at each end, damage to the proximal end occurred in antiquity, but the distal end is more recent but pre-recovery. There is considerably tapering along the whole length, presumably finishing in a point had the fragment been complete. Running the whole length of the bone is the remnants of the medullary canal, the only natural feature of the bone fragment that has been left untouched. The whole of the outer surface has been shaped along its tapered length, each side of the medullary groove the bone has been scraped flat with two angular facets that reduce in width as they near the distal end. The remainder of the bone has been scraped into a semicircle shape; once the roughing out of the point has been completed the scraped faces have been polished smooth leaving fine longitudinal and radial tooling marks. The taper is constant throughout its length, the proximal end being 9.9mm thick, tapering to 6.7mm at its distal end.

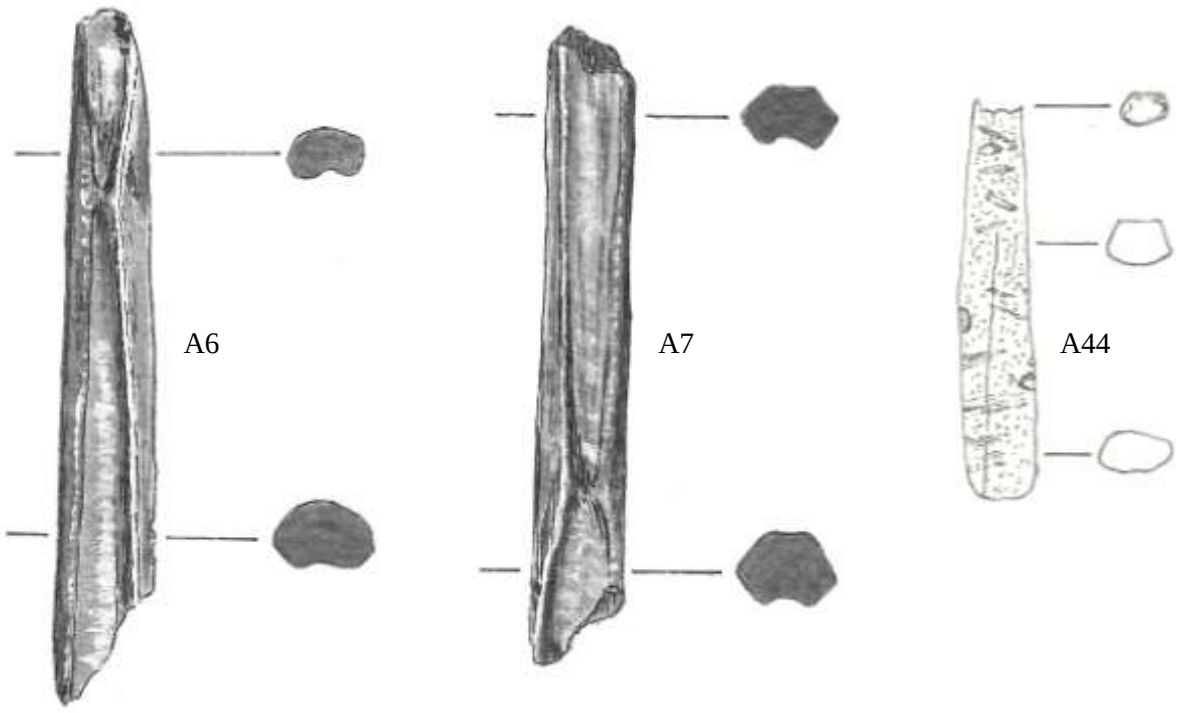
The second fragment measures 81.8mm in length with an ancient break at its proximal end and a recent break at it distal end. It is similar to the first fragment only the taper is not as pronounced, again the medullary canal has remained untouched. The sectional profile has changed considerably as there are now five flat facets that are somewhat equal in size that run the length of the fragment, this makes the section hexagonal in shape with the medullary groove forming the sixth face. The face opposing the medullary canal has a more pronounced flattened surface and it is this face that gives the fragment its overall taper. Again, the piece has been well shaped and polished but still leaving fine tooling marks along its length.

Reading Museum who examined the first fragment believed it to be a fluted spear-point, typical of the Magdalenian culture, (*Dr. John Wymer Pers. Comm.*) Radiocarbon dates taken from A6 gave a date of 11,700 BP (for details see Appendix II). It was hoped that radiocarbon dates taken from the second fragment would provide us with the same date, suggesting that they were possibly from the same spear, but samples taken from fragment A7 were for some reason, unsuccessful. Although both points were found in the disturbed section of Layer C it is clear that they originated in Layer D.

A similar bone point was recovered from Coniston Dib, Yorkshire; the point was almost complete, the overall length (270mms) suggested that it had been manufactured from the metapodial of an Elk. In cross section, it closely resembled the scraped and polished surfaces of the Lynx Cave example, although the angular faces were more clearly defined. It yielded a radiocarbon date of 11,000 BP.

The Bone Point A44, (Fig. 26) was recovered from the lower levels of Layer D its location suggesting that it may be older than the previous bone points. Its appearance is similar to many other slivers of bone that can be found in the lower levels of a deposit where ancient bones get crushed.

Although covered in a wet, heavy deposit, it felt smooth to the touch; when cleaned up it showed areas that had been polished. It has been manufactured from the wall of a long bone; possibly a large Deer? The proximal end has a ground radius on each corner and the tapered sides have been polished smooth leaving fine tooling marks across the bone, the distal end showed an ancient break. The overall length is 53mm, the proximal end measures 9.6mm wide and stays reasonably parallel for a further 30mm it then reduces over the remainder of its length to 7.4mm. Based on this taper, its original overall length could have been in excess of 100mm. The cross section develops a more circular profile as it nears the distal end. The surface finish is smooth to the touch but contains pitting and indentations, the indentations cross the bone diagonally as if whatever bound the point to the spear has left an impression.

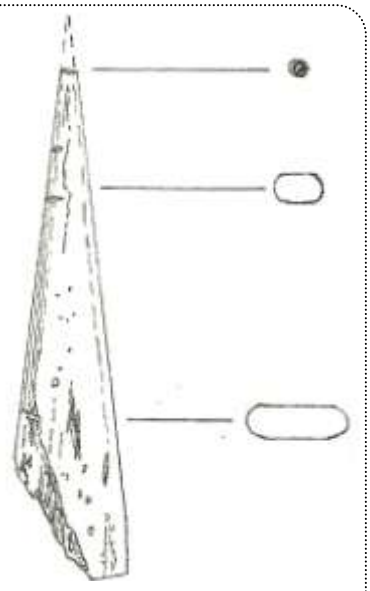


Late Upper Palaeolithic Bone points Figure 26

9.3.2 Palaeolithic Antler Point:

The final point A42, (Fig. 27) was recovered from a small void in the back chamber and was not actually within the deposit. It was attached to the side wall of the void and stood 100mm above the clay deposit termed Layer D[1]. Its condition is good considering its age although there are a number of small linear cracks along its length. The antler point has not been submitted to any treatment for fear of affecting any radiocarbon results. The distal end has an ancient break that has reduced the overall length by 9mm. The proximal end has an ancient diagonal break that has partially delaminated the antler, along the delaminated step there appears to be some ancient residue, possibly resin that was used to haft the point to its shaft. Once the artefact had dried out the resin was no longer visible. If the residue proves to be resin then its position at the proximal end would suggest that we are in possession of an almost complete point save the 9mm that was broken from the point. It would also indicate that the base was of the solid design, rather than a split base type. The overall length is 67.8mm, maximum width

12.9mm and maximum thickness 4.8mm. The angle of the converging lateral margins is 13°, these margins are straight and the full radius that runs along them is constant. The same can be said for the cross-sectional profile, the thickness remains constant until it nears its distal end. This constant profile would also indicate a solid base type. The finished point shows the skill of the craftsman as all the faces are polished smooth, the lateral margins show the final polish marks are not linear but follow the contour of the radius. The anterior faces have longitudinal and diagonal polish marks. 10mm and 16mm from the distal end are two small man-made grooves cut across the lateral margin their purpose are obscure.



Antler Point
Figure 27

9.4 Archaeozoology:

Of the 14 species of mammal recovered from this late Pleistocene deposit, (see MAZ page 26) only 4 species show any signs of butchery. It would appear that only the larger herbivores feature in this particular period of occupation/use of the cave by Humans. The smaller herbivores are present but there is no evidence from the scant remains we have, that they formed part of the Human food chain. Taking into account the size of the deposit, the use by humans, and the apparent time span over which this Human occupation/use occurred, it is interesting to note that only 28 fragments of bone show signs of butchery, and many of these, in all probability, belong to just a handful of individuals, see taphnomic analysis sheet IV. The fragmentary remains of Red Deer and Reindeer being the most frequent.

The Aurochs is represented by a single bone only, a substantial portion of a left femur, enough to identify it as (*Bos primigenius).* The bone has had both articular ends removed by shattering with large heavy rocks. The shattering is so severe, that all that remains of this relatively massive long bone is a large tube. There are some teeth marks belonging to large carnivores and also evidence of gnawing by rodents, but there is little doubt that the method used to gain access to the marrow can be attributed to Humans. The Elk is also represented by a single phalanx bone, possibly a female, and was recovered 1 metre from Hearth I, but at a lower level. It location, from the lower levels of Layer D, suggests it probably relates to the Windermere Interstadial. It is hoped that radiocarbon dates will soon be available for this bone. There is no tangible evidence to link it with Human activity other than it is the only Elk bone recovered, which might imply that it had been introduced into the deposit by Humans or had been scavenged by the hunters Dog. Had the bone been scavenged from an Elk carcass then it would surely have been a meatier bone than a phalanx. The majority of Reindeer and Red Deer bones are found within discarding distance of the hearths (Fig. 28) and were probably thrown there; the few meatier bones recovered from the cramped back chamber were almost certainly taken in there by scavengers probably the hunters dog.

The taphnomic analysis sheet IV (page 60) clearly shows that in the case of the Red Deer the bones represent the left hind limb only (with the exception of the antler burr). Metatarsals, astragalus, calcaneum, and tibia all from the same side of the body of an adult and the absence of any other bones would suggest that we are looking at the remains of a single individual rather than the scant remains of many individuals. The radiocarbon dates attained from the astragalus and from the tibia are close, and using the +/- factors, the dates do overlap, indicating that they could easily belong to the same individual. A similar case could be argued for the Reindeer remains; only here we have phalanx, metacarpals, radius, ulna and humerus, and nothing from the hind limbs or other parts of the carcass. In this species we are seeing both left and right fore-limbs have been butchered. From this analysis we are looking at, at least two if not three individuals. The radiocarbon dates for both humerii are separated by 130 years, even using the maximum and minimum extremes it would not be possible to

arrive at a single date. On this basis it is likely that we are looking at two, possibly three individuals, and would indicate that the Palaeolithic hunter had used the cave as a stop off point on at least two, possibly three hunting excursions.

9.4.1 Taphnomic Analysis

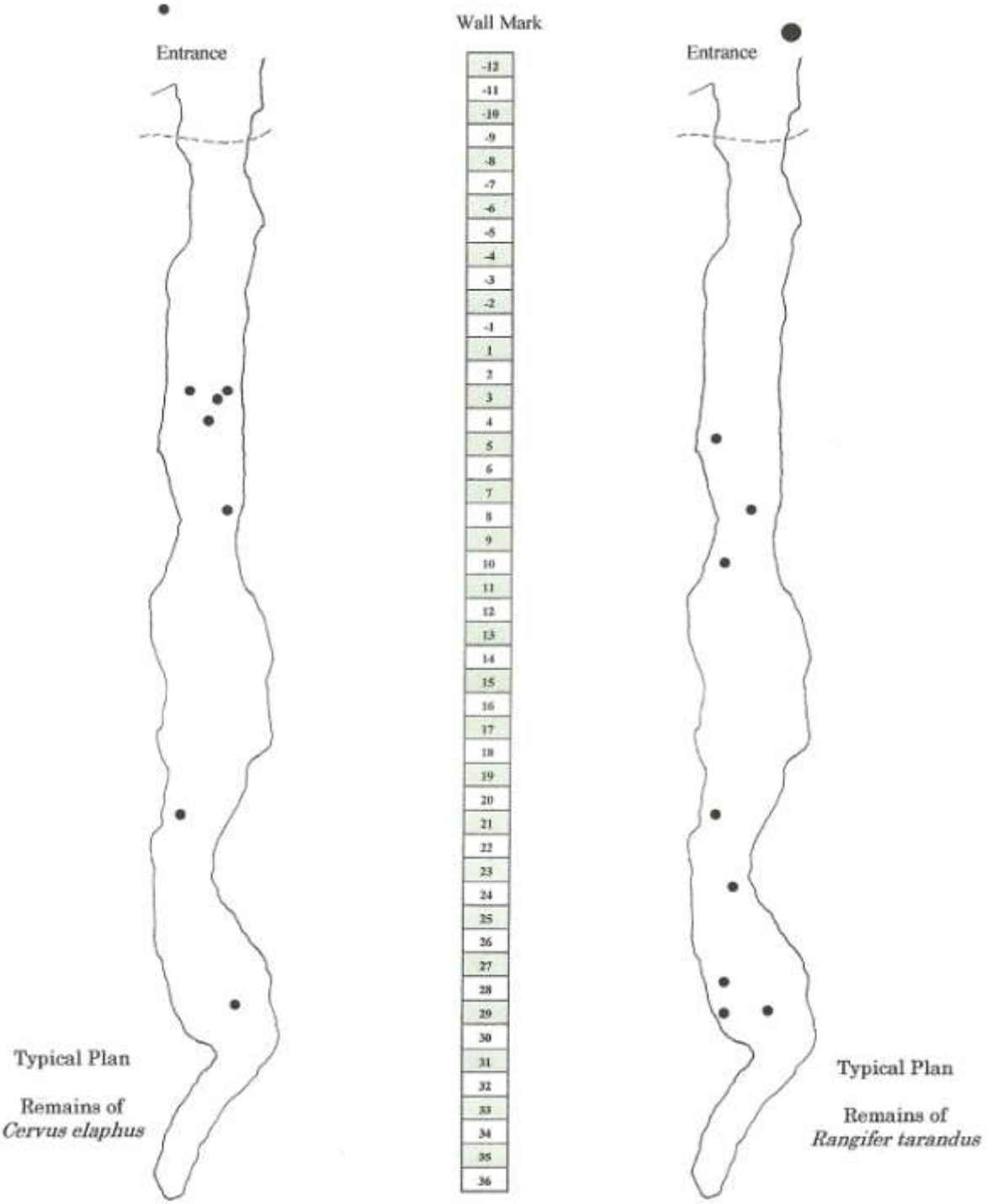
TAPHNOMIC ANALYSIS SHEET IV Red Deer & Reindeer remains from Primary Souvce (Layer D)

RED DEER

No.	Location (Layer)	Bone	Age	Sex	Description
597	3 (D)	Lt. Calcaneum	Adult	?	Gnawed at distal end & licked smooth
622	4 (D)	Lt. Astragalus	Adult	?	C14 date 11,640 BP +/- 45
629	8 (D)	Lt. Tibia	Adult	?	Poor condition, small fragment 155mm in length, shattered when fresh
630	29 (D)	Lt. Tibia	Adult	?	Shattered when fresh, 205mm in length, slight charring at ends
656	3 (D)	Lt. Metatarsal	Adult	?	Small fragment 95mm in length, shattered when fresh. (fits 658)
658	3 (D)	Lt. Metatarsal	Adult	?	Small fragment 75mm in length, shattered when fresh. (fits 656)
704	21 (D)	Lt. Tibia	Adult	?	Shattered when fresh. C14 date 11,680 BP +/- 45
951	-15 (D)	Antler Burr	Adult	♂	Small fragment, Shattered when fresh
Other					2 other fragments shattered when fresh found in Layer A/B

REINDEER

No.	Location (Layer)	Bone	Age	Sex	Description
594	10 (D)	Metacarpal	Adult	?	Distal fragment, shattered when fresh.
621	28 (D)	Rt. Humerus	Adult	?	Proximal end shattered and removed, split along length. C14 date 11,145 BP +/- 80
626	8 (D)	Rt. Metacarpal	Adult	?	Proximal fragment, shattered when fresh.
632	29 (D)	Rt. Radius	Adult	?	Proximal fragment, shattered when fresh
633	5 (D)	Lt. Metacarpal	Adult	?	Proximal fragment, shattered when fresh.
703	21 (D)	Lt. Humerus	Adult	?	Proximal end shattered and removed, split along length. Gnawed by carnivore.
940	24 (D)	Lt. Humerus	Adult	?	Distal Fragment, Shattered both ends when fresh. C14 date 11,015 BP +?- 50
942	-14 (D)	Lt. Radius	Adult	?	Badly shattered mid section, Shattered when fresh (part of 944)
943	-14 (D)	Phalanx	Adult	?	Gnawed by carnivores
944	-14 (D)	Lt. Radius	Adult	?	Shattered when fresh (part of 942)
1024	29 (D)	Lt. Radius	Adult	?	Almost complete Gnawed by rodents, possible knife mark mid point?
Others	-14 (D)	Lt. Radius	Adult	?	6 small fragments, (part of 942)
936	28 (D?)	Lt. Ulna	Adult	?	Lt. Ulna. Fragment, proximal end charred.



Scatter Plan of Deer Remains from Layer D Figure 28

9.5 Radiocarbon results:

The radiocarbon results obtained by Jacobi & Lageard have without doubt added credence to the early evidence we had from the disturbed layers A & B. Principally that the bones and artefacts pointed to a use of the cave sometime during the Late Upper Palaeolithic. All radiocarbon dating was undertaken at the Oxford accelerator to maintain the same high standard of testing on all material. The figures given (Appendix III) are uncalibrated; the actual figures would make the material marginally older (*Jacobi pers. com.*)

The initial results from the Red Deer astragalus (622), and the tibia (704) were problematic as far as the radiocarbon date indicated. Their recovery locations were almost 7 metres apart, but their condition and the wear on the articular surfaces lead us to believe that they belonged to the same individual. Yet the radiocarbon results came back suggesting that there was a 300 year gap between them. In 2006 the opportunity arose to have the same bones resampled using the pretreatment ultrafiltration method. The results were what we had hoped for, the margin for error allowing the dates to overlap, making it a distinct possibility that we are looking at the same individual (*ibid*). Bearing the above in mind it is equally a possibility that the bone point is from the same period. The same could not be said for the two Reindeer bones.

The current radiocarbon dates suggest the cave was in use on five separate occasions during the Windermere Interstadial, the above logic could reduce the number of occurrences the cave has been utilised by Humans, to just three. It would also help us understand why so few butchered bones have been recovered and also a possible explanation as to the absence of any Horse remains. It also, coincidentally, represents the number of hearths found in the entrance passage.

A similar example to illustrate this enhanced dating technique comes from Gough's Cave were the span of occupation covered 1,000-1,500 years, recent radiocarbon dating using ultrafiltration has reduced this to probably just three generations (*Jacobi Pers. Comm.*) this could well be the case with Lynx Cave.

9.6 Interpretation:

The three hearths found in the entrance passage are the most tangible pieces of evidence we have that our early ancestors actually exploited the cave rather than made just a fleeting visit. The many stone and bone artifacts, along with the butchered bones of the animals they hunted, all enhance the picture of their environment during the Windermere Interstadial. The current radiocarbon dates placing these intermittent visits between 11,000-12,000 BP. Not all the archaeozoological evidence has been radiocarbon dated and so the actual span could exceed the small window we have. The evidence points to it being used for a short stopover rather than a prolonged habitation. The cave was probably stumbled upon during a hunting foray and made the ideal shelter; what we have is merely a series of snapshots from the period.

The three hearths do show some commonality, they have all been positioned against the west wall of the entrance passage, presumably for added protection against adverse weather conditions, suggesting that the prevailing winds blew up the valley, the same as they do today. The tinder material was placed simply on the cave floor, there was no evidence to suggest that they were contained in a scooped out hollow nor was there any evidence that they were contained by a barrier of rocks. The absence of any substantial pieces of charcoal in hearths I and II is somewhat puzzling. It might imply that there was a dearth of dead wood lying around or they did not have the capability to chop down large branches. The majority of pieces recovered were of round section, few were of random shaped sections that could have been derived from logs, suggesting that only smaller branches and twigs were used. The diminutive pieces found within the hearth could also indicate that the fires were raked over, bringing as much unburned material to the surface, utilising all of the material they had.

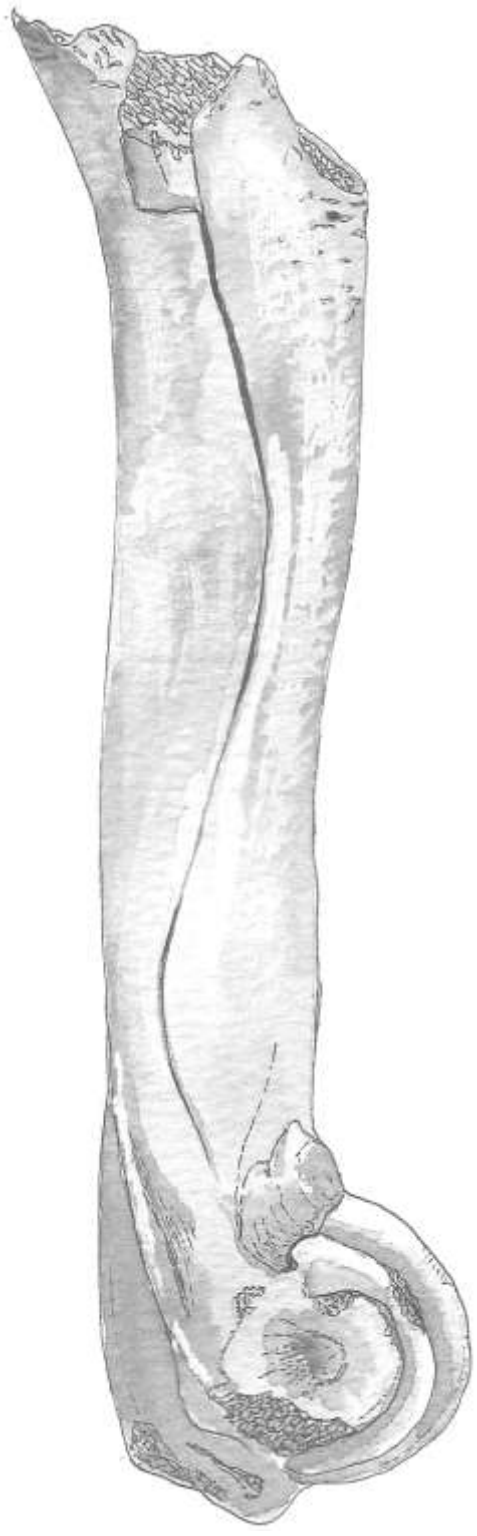
The fires would serve as a multipurpose utility, their position in the entrance passage would protect the occupiers from predators and uninvited scavengers; it would also offer them warmth, heating up the interior of such a small cave in a short period of time, albeit a smoke filled environment if using unseasoned material. Cooking would have been an essential part of any hunting stopover and there is evidence of this in the form of charred bones. Hearths I and II offer no evidence of cooking, the joints may have been simply placed on top of the fire or alternatively could have been hung from spit held between the entrance walls. Hearth III, on the other hand, was certainly used to cook on. The construction of the small stones placed on top of the fire would allow the heat through to cook the meat and at the same time protect the butchered joint from contamination of ash and charcoal to a limited degree. The residue that remained on the stones has not yet been identified but is currently waiting analysis (section 12).

The vertical position of the hearths in relationship to one another suggests that there is a time span between them, but to what extent is difficult to assess. It may be that the difference in their vertical positions is not related to age but is a natural progression, where windblown debris builds up and collects when it reaches the boulders at the end of the entrance passage. The use of the cave by humans and animals alike, could also exaggerate this possible distortion trampling the deposit at the entrance, but walking on the boulders once inside the passage (see Figures 21 & 23). As a consequence of this, hearth III could possibly be contemporary with hearth II. Hearth I on the other hand, at 100mm above the base of layer D is not considered to be associated. There is the possibility that there was a fourth hearth on the talus, a small area contained a higher concentration of charcoal particles than the surrounding area. There was no evidence of the grey friable material that was found at the location of the other hearths, this fine ash would almost certainly have been blown away by the winds that sweep up the valley, that is, if the rains had not already washed it away.

The relatively small entrance to the cave determines the size of mammal that could freely access it; the bones from the larger herbivores could only be brought in by scavengers or Humans.
The majority of the bones from the larger herbivores, whilst scarce do show signs of butchery. These fragmentary bones do not reveal any obvious differences in age, gender or size between the individual species. The earliest date we have of hunters using the cave is circa 11,660 BP. On this occasion the hunters only removed the left hind shank from the Red Deer, taking it from below the knee joint, this would provide an ample meal for two hunters during an overnight stopover. The following day, returning to their base camp and families, with an almost complete carcass. The single piece of evidence of a shattered Aurochs bone was over 400 years later. As the Windermere Interstadial drew to a close, climatic conditions became much cooler, the mid-summer Windermere maximum of 17°C, changed to tundra like conditions, with a maximum of only 10°C – 11°C, with winter temperatures barely rising above 1°C. This tundra-like condition was ideally suited to Reindeer and is reflected in the next two visits by the Late Upper Palaeolithic hunter. Circa 11,145 BP and later, circa 11,015 BP we have the evidence that the cave was used again as a stopover. On both occasions, the assemblage of butchered bones represented the fore shank only, this time the limb being removed from the shoulder. This is a much larger joint, suggesting that maybe the hunting party was greater than that of the hunters of the Red Deer. On each of the hunting trips it would appear that Dogs have taken some of the meatier bones to the back of the cave, some to gnaw at and others have been licked. This is not an isolated occurrence and has been witnessed in other cave sites like Gough's Cave (*Jacobi, Parkin et al*)

Interestingly, the Wild Horse is absent from the butchered remains, although the species was a highly targeted animal during the Late Upper Palaeolithic. The answer might be the environment, (see section 11). The sparseness of the butchered remains suggests that they are not representative of a typical cross section of the fauna population that may have been hunted during this period. And we can learn little about the preferences of the hunter from them.

Considering the quantity of liths recovered from such a small cave it is interesting to note that none of the butchered bones showed any definite signs of being cut. The ligaments and tendons would probably have been cut at the point where the limb was removed from the carcass; any cut marks would



Shattered Humerus, Reindeer
Figure 29

have been visible at these joints. In the case of the Red Deer this would have been where the tibia is jointed to the femur. The tibia that was recovered was badly fractured along its length and the proximal end was absent. The humerus from the Reindeer would have been more difficult to separate from the carcass. The head of the humerus is articulated with the glenoid cavity of the scapula, cut marks are frequently found around the head of the humerus where dismembering has taken place. In both humerii from Lynx Cave the complete proximal ends have been shattered to gain access to the marrow (Fig. 29). The bones were later gnawed by carnivores, obliterating any hope of finding telltale cut marks.

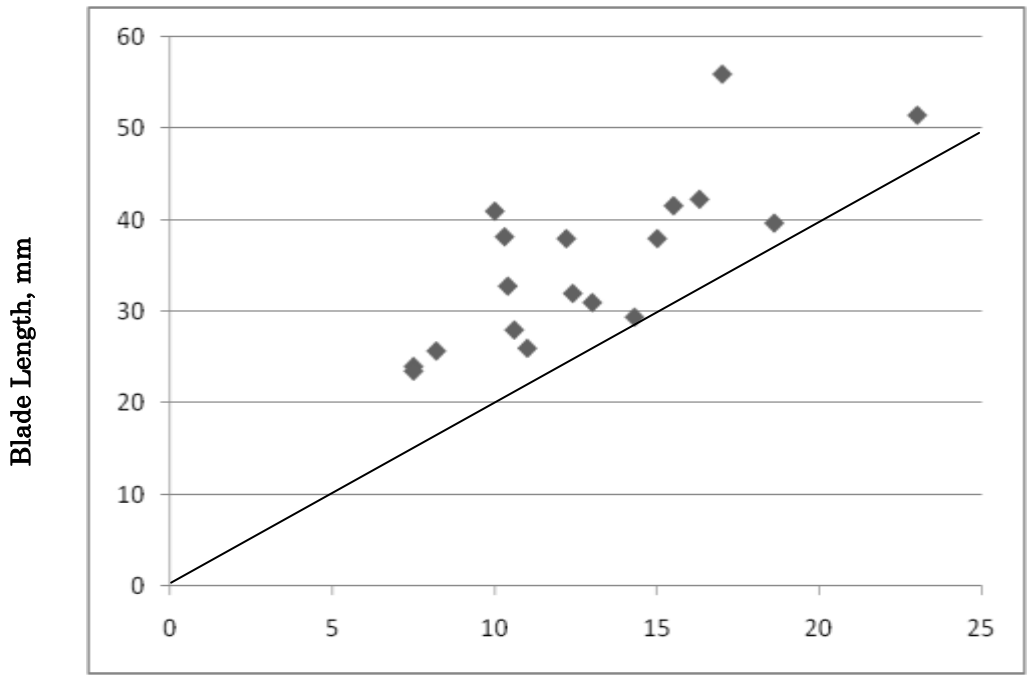
Whilst it is obvious that the hunter gatherer would have carried a full range of bone and stone tools with him on any hunting trips there is no evidence that any of the tools recovered were used during the short period that they stayed in the cave. There are no marks on the bones to suggest that the carcasses had been skinned nor was there any evidence to say that some of the bones had been utilised to manufacture bone implements, such as needles or spear-points. All the evidence we have is that the cave was used as a shelter and that they cooked some of the joints cut from the Red Deer and Reindeer and no other activities took place. It would appear that all the lithic artifacts carried (and lost) by the hunters were manufactured away from the cave as no evidence was found of flint knapping, although some retouch may have taken place. There is no visible working floor; this is due to the short span that the cave was occupied, even if we plot the horizontal positions of the Red Deer bones (the earliest series of bones) they fall anywhere within the lower 100mm of the layer.

There is a wide range of tool types, some recognisable and some obscure, and they are manufactured from a range of materials, suggesting that they were well travelled. In general the blades are typically Late Upper Palaeolithic with a length & breadth ratio greater than 2:1 (Fig. 30). Curved-backed blades are typically associated with the Magdalenian culture and were in use during the final phase of the Palaeolithic, dating from the latter half of the Windermere Interstadial. The radiocarbon dates support the comparisons drawn from other Magdalenian cave sites in Britain and on the continent.

The early reports on Lynx Cave hinted that there was possibly evidence from the Mesolithic, as the excavation has continued no other conclusive evidence has been unearthed. There are just two items that could possibly relate to the Mesolithic, firstly lith number A8 (Fig. 24) was recovered from the top of layer D and has the attributes of a Mesolithic lith, but equally, is similar to blades of the Late Upper

Palaeolithic and secondly the small piece of charcoal recovered from near the top of the layer identified as Oak, suggesting a period later than the Windermere Interstadial.

The recent discovery of the antler point (Fig. 27) could possibly push the earliest use of the cave further than the current radiocarbon dates permit. Its general appearance has no parallels from a Late Upper Palaeolithic context. The skills used to manufacture this point appear to be far superior to the craftsmanship shown on the Late Upper Palaeolithic Points in figure 26. This might imply that with technological advances in artifact manufacture that this point is from a later period. However, its location in the deposit sequence would suggest an earlier date rather than the Late Upper Palaeolithic date. Similar bone/antler points have been recovered from Aurignacian sites in France some with split bases and others with a solid base. The most compelling piece of evidence is the antler point found in Uphill Quarry Cave near Weston-super-Mare in 1898. The description given by (*Jacobi & Pettitt*), could be describing the Lynx Cave point, the only differences being the thickness; the Lynx Cave Point is 1.3mm thinner and the sectional profile is slightly more elliptical on the Uphill Point. Drawings and photographs of the Uphill Point compare favourably with the Lynx Cave Point. The only known Aurignacian site in north east Wales is Ffynnon Beuno Cave (see section 13 The Wider View) At this stage of the excavation we are only making comparisons to its shape and form, there is nothing to suggest that the layer it was recovered from dates from an earlier phase of the Upper Palaeolithic nor does any of the contemporaneous material suggest a fauna belonging to OIS 3.
The antler point is currently under investigation (see Section 12.0)



Length & Breadth Blade Ratio

Figure 30

10.0 Palynology:

In 2005, a request was made by the Department of Environmental & Geographical Sciences at Manchester Metropolitan University to take soil samples from the Pleistocene layers for pollen analysis. After many failed attempts to extract and identify pollen at home, this was an ideal opportunity to obtain some real results under laboratory conditions.

There is insufficient research into the pollen/vegetation patterns since the last Ice Age for north Wales in general and the area around Llanarmon-yn-Ial in particular, especially from a Late Upper Palaeolithic context. The nearest comparisons we can draw on today, is a pollen analysis (Grant F 2008) from various core samples taken along the Clwydian range, dating from the Mesolithic, circa 8,000 BP. And a regional overview of north Wales (Walker R 1978)

Lynx Cave offered the ideal site for a number of reasons; (1) undisturbed sections in the deposits where the sediments were of a late Pleistocene date (2) A MAZ (Mammal Assemblage Zone) that compared favourably to the Gough's Cave MAZ from a late Pleistocene context. (3) Radiocarbon dated bone material from the Oxford accelerator with dates in the range of 11,000 – 12,000 BP. (4) Archaeological evidence in the form of artifacts that are typically Late Upper Palaeolithic; with parallels to other sites of a similar date.

By September 2006, after all necessary documentation had been completed the laborious task of collecting samples took place. The samples were collected by James Heggarty, under the guidance of the project tutor Dr. Jonathan Lageard. Samples removed for analysis were taken from Hearth No. III, it was felt that as this area was certainly drier than the back section and held more promise for a broader view of the palaeoenvironment. Further samples were taken from the Late Glacial sand deposit around the mid section, and the bulk of the samples were taken from the back chamber, where a greater depth could be reached, possibly revealing a whole palaeoecological sequence. The range of samples taken for analysis covered the known Pleistocene deposit; in all a total of 130 samples were removed from the three areas. With such a range it was felt that the prospects of recovering pollen looked reasonable and had all the potential to enhance the palaeoecological record, building up a clearer picture of the past environment.

To extract the pollen and determine its density, various processes were employed; a measured pellet of exotic marker was introduced, in this case, *Lycopodium* (Club Moss) pollen. After all the various processes were used to dissolve and remove the none pollen material from the samples (acetolysis), the results were found to be disappointing.

Cave Palynology is fraught with problems; the excavation of the site can accidentally introduce recent pollen into the samples, conditions inside the cave sediments might by detrimental to the survival of ancient pollens and unnatural concentrations of pollen can be brought in by humans or mammals. No ancient pollen was recovered from the main sampling area in the back chamber. In this instant it appears that the environmental conditions inside the cave, the alternating wet and dry periods, have oxidised away any pollen (*Lageard pers. comm.*). Samples from around the hearth in the entrance did produce a few pollen grains *Taraxacum* (Dandelion). This solitary species is almost certainly recent. As these samples were taken close to the surface they have probably been introduced into the deposit by percolating water from the cave walls or by rain.

In view of this unfortunate failure to obtain any identifiable pollen, and before the excavation removed all traces of this late Pleistocene deposit, further uncontaminated soil samples have be extracted. The lower deposit in the back chamber suggested that this area of the cave has suffered the most from inundation, and was the least likely area to yield any ancient pollen. It was therefore felt that the remaining deposit at the entrance, being well drained, gave us our best hope of achieving a worthwhile result. A reasonable number of samples have been collected from the entrance passage and it is hoped that some time in the near future a further opportunity to extract pollen will become available and furnish us with the information that is sadly lacking from this period in the caves prehistory and in fact for this area of north east Wales.

11.0 Conclusions:

Despite the unprecedented length of time the excavation has taken and the numerous obstacles we had faced and overcome during the early part of the dig, the excavation has been unexpectedly rewarding. This, in the main, has been due to the professional assistance, guidance and support we have received on the diverse range of discoveries that have been made over the 50 years of excavation.

The actual location of Lynx Cave on the southern side of the valley is not the ideal position for Human occupation, seeing very little of the sun until after midday and in winter moths very little at all. This would explain the intermittent use of the cave. As is the case with Creswell Crags where the occupied caves were on the north facing side of the valley and the southern facing caves were in use but not for any sustained occupation.

It is clear from the evidence unearthed that Lynx Cave has been made use of almost continuously, throughout many millennia, and by different cultures. The rock fall in the Late Upper Palaeolithic/early Mesolithic, that blocked the entrance, has determined the span of occupation and with it any hope we had of finding substantial Mesolithic/Neolithic evidence.

The earliest evidence we have of human activity from Lynx Cave is from the Upper Pleistocene deposits, towards the latter part of the Windermere Interstadial ('Allerød'). Interestingly there is no dateable evidence to suggest that there was human occupation/use of the cave during the earlier and considerably warmer period of the Interstadial. There are parallels that can be drawn from Robin Hood's Cave (Creswell) and Gough's Cave (Somerset) but evidence places the occupation/use of Lynx Cave to be more recent, at the end of the Late Upper Palaeolithic. Here, the undisturbed layers revealed a range of Late Upper Palaeolithic artefacts along with archaeozoological, zoological and botanical evidence that has given us a unique window to view the palaeoenvironment between 11,000 and 12,000 BP. on the eastern fringe of the Clwydian Range.

It is unfortunate that the pollen analysis did not produce any results that could enhance our knowledge of the palaeoenvironment at the time the cave was in use by our late Upper Palaeolithic ancestors. However, the identification of the two charcoal samples taken from the hearth scatter, confirms that both Birch (*Betula*) and Scots Pine (*Pinus silvestris*) were established during this period. This corroborates Walker's regional pollen profile (1978), suggesting a temperate woodland. A pollen diagram alone could have given us a broader picture of the prevailing climatic conditions; in its absence we have adequate geological, archaeological and zoological evidence to draw a reasonable picture of the palaeoenvironment during this late Devensian period, OIS 1 (Oxygen Isotope Stage 1).

Today, the valley floor is dry, the river/stream that ran through it during the Late Upper Palaeolithic and Mesolithic now runs underground in the old lead workings and rises in a spring at the lower end of the valley, eventually flowing into the river Alyn. The entrance to Lynx Cave would have been no more than 100M above the river, and so it is surprising that there was an absence of any fish remains from the earlier deposits, either brought in by animals or by the hunter gatherers. The interpretation of the late Pleistocene deposit showed that the cave's utilisation by Humans was for short stopovers where the hunter had an adequate supply of food and would therefore explain the absence of any fish bones. It would also explain the absence of any broken or discarded bone harpoons, an artefact common on Magdalenian sites. The dearth of any evidence relating to tool making (knapping) and the absence of any bone working is in stark contrast to the findings from Gough's Cave where it appears that very little was wasted. The Late Upper Palaeolithic collection of liths from Lynx Cave is quite small in comparison to many other collections of which Gough's cave is a good example. Nevertheless it is a significant find for north Wales, the tally of liths and other artefacts dating from the late Upper Palaeolithic exceeds all other local sites.

The fauna content for the late Pleistocene deposit can be divided into two quite distinct categories, species that could have arrived in the cave through natural processes, either as prey or predator, and the butchered bones of species brought into the cave by the hunter gatherer. There are, unfortunately bones from the disturbed layers (*ibid*) that do belong to the earlier layers that only radiocarbon dating can clarify. Any further radiocarbon dating using ultrafiltration would enhance the

present results we have and offer a more accurate timescale; this might also show that the use of the cave by Humans was more frequent than indicated by the current results.

Gough's Cave in Somerset is probably the most researched cave in the British Isles and has gone through a most intense scrutiny and analysis over the years. There are a number of parallels that can be drawn between Lynx Cave and Gough's Cave, in particular the Mammalian Assemblage Zone, (MAZ), drawn up by Currant and Jacobi in 2001. Whilst the content of the Lynx Cave assemblage falls short of the Gough's Cave assemblage, it is worth looking at the similarities. The MAZ below, (Fig. 31) compares the assemblages from both caves. It must be noted however that the Collard/Arctic Lemming and Northern Vole have been added to the Lynx Cave MAZ, we have no real evidence that they originated from Layer D and is therefore just a tentative suggestion based on the evidence we have from comparable fauna sites of a similar date. The assemblages from the caves listed below do not follow the conventional zoological nomenclature, but are designed to illustrate the transition from one group of mammals in OIS 2, pre 13,000 BP to OIS 1, post 13,000BP.

Species		Gough's Cave, Somerset		Lynx Cave Denbighshire
		OIS 2		OIS 1
Microtus agrestis	Field Vole	-		■
Apodemus sylvaticus	Wood Mouse	-		■
Meles meles	Badger	-		■
Alces alces	Elk	-		■
Homo sapiens	Human	✸		?
Lepus timidus	Mountain Hare	✸		■
Dicrostonyx torquatus	Collard Lemming	■		■
Microtus oeconomus	Northern Vole	■		■
Vulpes vulpes	Red Fox	■		■
Cervus elaphus	Red Deer	✸		✸
Rangifer tarandus	Reindeer	✸		✸
Bos primigenius	Aurochs	✸		✸
Canis lupus	Wolf	■		?
Bone Point	Deer			✸
Microtus gregalis	Narrow Skulled Vole	■		-
Lemmus lemmus	Norway Lemming	■		-
Vulpes lagopus	Arctic Fox	✸		-
Ursus arctos	Brown Bear	■		-
Lynx lynx	Lynx	✸		-
Equus ferus	Wild Horse	✸		-
Saiga tatarica	Saiga Antelope	✸		-
Mammuthus primigenius	Mammoth	✸Artefacts		
	Deer ?			✸Artefacts

✸ AMS Dated

Gough's Cave MAZ
(Currant & Jacobi) 2001

MAZ Comparisons Gough's Cave/Lynx Cave Figure 31

In the main, the fauna content from Lynx Cave suggests temperate woodland, the radiocarbon dates placing it in OIS 1, somewhere in the transitional stages between OIS 2 and OIS 1. The AMS dates we have from both caves are quite similar but Jacobi suggests that the occupation/use of Lynx Cave by Humans is slightly later that that of Gough's Cave (Pers. Comm.).

This is supported by the absence of some of the larger herbivores that preferred the open steppes that prevailed at the end of the last Great Ice Age. Some of the small herbivores are also absent from the Lynx Cave MAZ, they may well have been present, but their bones do not always lend themselves to preservation and can also be difficult to find amongst the glutinous mud and rocks in the back chamber. As far as records show and from numerous sources, the Wild Horse and the Reindeer were the most successfully hunted of the species by our early ancestors. The absence of the Horse, Saiga and Mammoth is not surprising as the woodland that emerged during the latter half of the Windermere Interstadial would have been unsuitable to these large herbivores and more suited to Red Deer and Aurochs. The remains of all these large herbivores found in the cave can all be attributed to Human hunting skills, one species that will not have been influenced by Human endeavour would be the Arctic Fox. This species, whilst not common has been found in a number of cave sites, Robin Hood Cave (Creswell), Long Hole Cave (Cheddar), as well as at Gough's, they appear to have been amongst the first species to have reclaimed the land back from the retreating ice. Evidence from Wetton Mill (Staffs) suggests that they survived through the warmer climes of the Windermere Interstadial (Bramwell, *pers. comm.*), at least until the early Mesolithic. Why they are not present in Lynx Cave is surprising but there is still some Pleistocene deposit left to search through.

The use of the cave for sepulchral purpose during the Late Bronze Age is unique to the area, but as there are many other caves that have yet to be excavated on an archaeological basis, it could be found to be common practice. The absence of any substantial grave goods from the burial mound is not unusual for Late Bronze Age burials. The ritual of interring a rich wealth of grave goods, gold, amber and bronze to accompany the dead, had ceased by the middle of the Bronze Age, the ritual being mostly practiced in Wessex. With the exception of the gold cape found in Mold just 6 kilometres from the cave.

The artefacts recovered, the bracelets and the carved and polished antler were damaged, and probably discarded items, the bronze pin on the other hand was complete, and may just have been mislaid. The discovery of such a large burial has raised a whole host of questions, none more important than, where did these upland people originate from? The nearest known settlement are some way off, it is inconceivable that they would have carried the bones over such a distance to reinter them in Lynx Cave. So where are the settlements or round huts used by the Late Bronze Age people who buried their dead in the cave? The answer must lie somewhere not that far from the cave, There are a number of likely sites but all have been destroyed in recent years. Nercwys forest is a recent development to the area, in the 1950's the area of scrub land with some smaller trees was cleared by the Forestry Commission to make way for a new plantation of conifers. Within the boundaries of the plantation is a Bronze Age burial mound; was this part of a local community with a nearby settlement? The same fate befell the Big Covert, this too was cleared in the 1960's and all trace of its previous history was removed, with the exception of the old lead mines and what was left undisturbed in some of the local caves. Nearer to the cave, is the cwm, just below the summit of Bryn Alyn, here the landscape has been transformed by the spoils from the early lead mines. What might have been a sheltered haven, ideal for habitation, and with its own small water supply, has been buried under tons of quartz.

There is plenty of other evidence that the area was occupied during the Bronze Age, the surrounding area is dotted with Bronze Age cairns, most from an earlier date. There are a number of Late Bronze Age finds, the 'Llanarmon Hoard' was recovered just 1.5 kilometres from the cave (The actual location is Eryrys) and consists of a socketed bronze axe that can be dated to circa 900 BP +/- 100, the inside cavity of the head contained two, tightly coiled gold penannular bracelets and a short damaged strap along with a small gold ingot. They were recovered from a small crevice in a limestone outcrop. A recent Late Bronze Age hoard has also been discovered with a metal detector, near Treuddyn just 6 kilometres from the cave it consist of a similar designed axe and is roughly dated to the same period. Further afield are the Late Bronze Age multi burial cairns on Moel Famau.

12.0 Further Research:

It was envisaged that the excavation of Lynx Cave would have been completed by the time this report was ready for publication. Excavation was hampered by the large boulders that straddle the cave floor in the entrance passage and beyond. The remaining sticky clay deposits containing rocks in the back chamber was difficult to excavate and remove through the restricted passage. And searching through this glutinous mud for slivers of bone was time consuming with little or no return, and deemed to be almost unworkable.

The discovery of the polished antler point (Fig. 27), in the back chamber, its location suggesting that it is earlier than the Late Upper Palaeolithic, has meant we have had to reassess what is workable and what is not. In view of the importance of this latest find the excavation will continue for another season at least.

This latest discovery has opened up new avenues of research but the results are not expected to be available for at least another 12 months. Further opportunities have also arisen for DNA analysis; if successful, it would allow us a glimpse into the origins of some of our early species.

Rather than delay the publication of this 50th anniversary (final) report, supplementary sheets detailing all the latest results and any further discoveries will be sent to all recipients of this report.

Research Items:

a) Antler Point: An analysis is to be undertaken of the hafting material thought to be resin. More importantly, we are hoping that a radiocarbon date can be established for this rare artefact.

b) Human Radius: The only human remains to be found in layer D is to be radiocarbon dated and should prove if layer D is the layer of origin or as believed, it originated in Layer C.

c) Lynx, Elk & Wolf Bone samples have been taken from all 3 species; it is hoped that there is sufficient material to be enable mitochondrial DNA to be extracted. Providing there is enough material left it is expected that radiocarbon dating of all 3 species can be procured.

d) Hearth Stones Stone from the surface of Hearth III have been submitted for analysis of the residue found on the upper surface.

e) Late Glacial Sand Analysis of a sand sample

13.0 The Wider View

The use of caves by our early ancestors for habitation and sepulchral purpose has been the norm for countless millennia, and in many places, continues to do so today. Essentially, a cave forms a natural ready-built shelter that can be utilised whenever it is deemed necessary. Their size can vary tremendously, from large and roomy, like Llanarmon Cave, to small and cramped as with Lynx Cave.

There are a number of caves in the north west of Wales that fit into the category of large and roomy; the archaeological evidence recovered from them suggest that they have been exploited by some of our earliest settlers. Pontnewydd Cave, near St. Asaph, is without doubt the most important and

significant cave site in the area, being the oldest site occupied by humans not just in Clwyd, but the whole of Wales. It has been the subjected of a number of excavations over the years, initially excavated in 1871 by T. McKenny Hughes, Boyd Dawkins (et al). Dawkins identified species associated with the Ipswichian period some 120,000 years ago, furthermore he identified a Human tooth he believed to be Neanderthal. In recent years, (1980's) it has again been under the most meticulous and intense scrutiny by Dr. S Green of the National Museum of Wales. His discoveries of ancient stone artefacts (300+) in the form of handaxes, scrapers and points would indicate an early use of the cave. A second Human tooth and a mandibular fragment was recovered and has been dated in the region of 240,000 years old, the oldest fossilised human remains in Wales and relates to the Lower Palaeolithic. This confirms the early beliefs postulated by Dawkins in 1871.

Cefn Caves, also in the Elwy Valley, has yielded evidence of Human occupation around the same period as Lynx Cave. Ffynnon Beuno and Cae Gwyn Caves have also produced various phases of Human occupation, the earliest, a large leaf point implement from the early Aurignacian phase around 38,000 BP and an Aurignacian burin from a later phase, around 30,000 BP. All these caves are larger than Lynx Cave and received all the attention of the archaeologists at the end of the 19th century.

What of the smaller caves like Lynx Cave? The truth is, that in general they have been overlooked, possibly because they appeared too small for human habitation and therefore would in all probability give little or no return for a great deal of effort. There are numerous small caves of similar size to Lynx Cave, not just locally to Lynx Cave but throughout the whole limestone regions of north east Wales. The main bulk of this carboniferous limestone outcrop starts at Prestatyn in the north and runs roughly south along the eastern ridge of the Clwydian Range, terminating at Llangollen. A second outcrop, starts at the Great Ormes Head in the north and runs roughly south east, along the western perimeter of the Vale of Clwyd, ending just short of Llangollen. Both these limestone ridges contain numerous caves; many of the larger caves are well documented as are some of the smaller archaeological sites. For a definitive guide to the many caves and cave systems that the region holds, visit the authoritative web site http://sites.google.com/site/thecavesofnorthwales/ written by Cris Ebbs, a leading expert who has firsthand knowledge of the sites documented.

There are a number of caves in close proximity to Lynx Cave, a handful on Bryn Alyn and possibly an equal number could be found amongst the wooded area of the Big Covert across the valley from Bryn Alyn. The Bryn Alyn caves are of a comparable size to Lynx Cave and have the potential to yield archaeological evidence. One site, Hawthorn Cave lies 30 metres below the summit of Bryn Alyn, the small entrance 70cms. high, by 90cms wide, leads to a single passage 5.5 metres long. The depth of the deposit is unknown. In 2009 it was our intention to excavate a 1 metre wide trench at the entrance; had the cave been utilised by humans at some period in the past, then we would expect to find some evidence in one form or another that would indicate signs of occupation or use. Unfortunately the trial excavation was halted by the Countryside Council for Wales on the grounds that the tenant farmer may lose his grant, as we would be disturbing an SSSI.

A second site, a short distance from Hawthorn Cave, also has potential. When the cave was first discovered in 1962, the small entrance led to a short passage that could only be crawled down, similar in many ways to Hawthorn Cave, only slightly shorter in length. Today the cave looks considerably different and is no longer accessible. For many years now the cave has been in use by Badgers, Their continual use of the cave, the taking in of fresh bedding material, and removing it at the end of the breeding season has slowly reduced the size of the entrance making Human access impossible. Whilst there is no suggestion of excavating the cave when the Badgers are present, it does show that there are other caves in the area that have good potential. I have measured the size of the entrance to many of the smaller caves using a probe in the entrance till I reached bedrock. Many of them would be large enough to allow Human access if excavated.

It is difficult to imagine that Lynx Cave had been singled specifically out by our early ancestors as a potential site of refuge and that other small caves in the area have been ignored. During the Late Upper Palaeolithic the hillside would have been a forested area and the cave entrance would have been hidden from view, nevertheless the cave was found and utilised on a number of occasions, not just during the Upper Palaeolithic but by various cultures over the 12,000 years.

Most of the local caves that are easily found and are well documented have been excavated at sometime in the recent past, although very few have been completed. The early excavators appear to have been interested in archaeological evidence only, often ignoring the zoological, botanical and climatic evidence contained within the deposits. Most of the caves that have been excavated have produced some evidence of Human use, whether it is for occupation or for sepulchral purpose.

Maeshafn Cave/Big Covert Cave, (first excavated in 1949) lies 1.5 kilometres north of Lynx Cave and has yielded artefacts suggesting use in the Bronze Age and during the Romano-British period. Human remains representing at least 5 adults and a child have been recovered; the associated artefacts would suggest that they are Romano-British. Sadly the excavation is far from complete, the trench that gives access to the entrance chamber against the east wall of the cave was excavated in 1950; the remaining deposit is as yet unexcavated. It is probably in this entrance chamber that is most likely to reveal further ancient artefacts. There is no real reason why the cave has not been completed, logistically this is a simple cave to excavate, the deposits being dry and easy to sieve and it is close to the entrance for easy disposal. It is in frequent use by schoolchildren and walkers and the graffiti in the lower section has obliterated some of the historical names that were carved there 300 years ago, the earliest is dated 1698.

100 metres east of Maeshafn Cave is Orchid Cave (excavated in 1981) another half excavated site. The entrance is difficult to find in this deeply wooded area where each rock escarpment looks like the next. I stumbled upon the cave in 2000 and noted that there was a considerable mound of soil at the entrance, its size and shape suggesting the cave had been excavated. Intrigued by the cave I took a trowel to the mound of soil and within minutes recovered a Boars tusk and more importantly a Human phalanx. Further visits to the cave revealed bags of bones left at the bottom of the shaft (Badger, Sheep, Pig and Human) Researching the areas caves I realised I was looking at Orchid Cave. The excavation recovered bone and flint artefacts and the remains of one Human with a radiocarbon date of 4170 BP (Neolithic). I would imagine that the cave has a lot of potential not just the area inside the cave that has not been excavated but also the spoils outside that have been ignored and abandoned.

3.5 Kilometres north of Lynx Cave, close to Loggerheads, is Ogof Colomendy (excavated 1975) Excavation yielded a burial containing 3 adults along with artefacts dating from the Neolithic. The long bones were all fractured but showed no evidence of gnawing (M Davies., Pers. Comm.).

3 Kilometres south of Lynx Cave is Llanarmon Cave. This large Cave was excavated as recently as 2005, but no details of the excavation have been published. And finally to a whole series of caves at Perthi-Chwareu and Llandegla, that lie 2.5 Kilometres south of Llanarmon. The caves were explored and excavated by Boyd Dawkins (et al) in 1869. The various caves had been used for sepulchral purpose and revealed the remains of at least 16 Humans. Artefacts associated with the remains were a polished stone axe and potsherds suggesting a Neolithic date.

All this evidence certainly points to the fact that many of the local caves were used for sepulchral purpose and for refuge but probably not occupation. It is inconceivable to imagine that of all the many caves in the area around Bryn Alyn that Lynx Cave was the only cave utilised by Late Upper Palaeolithic peoples. Somewhere in the locality there must be other caves that contain a wealth of evidence pertaining to this period, or even older, which is just waiting to be unearthed.

14.0 Appendix

Appendix I
Summary of Fauna Content

Species		Layers					
		A/B	C	D	D[1]	E	Ex E
Hedgehog	*Erinaceus europaeus*	✸	✸				
Common Shrew	*Sorex araneus*	✸		✸			
Pygmy Shrew	*Sorex Minutus*	✸					
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	✸		✸			
Rabbit	*Oryctolagus cuniculus*	✸					
Mountain Hare	*Lepus timidus*	✸	✸	✸	✸		
Arctic Lemming	*Dicrostonyx torquatus*	✸					
Field Vole	*Microtus agrestis*	✸	✸	✸			
Northern Vole	*Microtus oeconomus*	✸					
Water Vole	*Arvicola terrestris*	✸	✸				
Bank Vole	*Clethrionomys glareolus*						✸
Wood Mouse	*Apodemus sylvaticus*	✸		✸			
Cat	*Felis silvestris*	✸	✸				
Lynx	*Lynx lynx*	✸	✸				
Dog	*Canis domestic*	✸	✸	✸			
Badger	*Meles meles*	✸	✸	✸			
Red Fox	*Vulpes vulpes*	✸	✸	✸			
Weasel	*Mustela nivalis*	✸					
Horse	*Equus domestic*		✸				
Pig	*Sus scrofa*	✸					
Red Deer	*Cervus elaphus*	✸	✸	✸			
Roe Deer	*Capreolus capreolus*	✸	✸				
Reindeer	*Rangifer tarandus*	✸		✸		✸	
Elk	*Alces alces*			✸			
Ox	*Bos domestic*	✸	✸				
Ox (small breed)	*Bos domestic*	✸					
Aurochs	*Bos primigenius*			✸			
Sheep	*Ovis domestic*	✸	✸				
Goat	*Capra domestic*	✸	✸				
Grouse	*Lagopus species*	✸					
Dunnock	*Prunella modularis*	✸					
Robin	*Erithacus rubecula*	✸					
Blackbird	*Turdus merula*	✸					
Song Thrush	*Turdus philomelos*	✸					
Crow	*Corvus species*	✸					
Starling	*Sturnus vulgaris*	✸					
Black Stork	*Ciconia nigra*		✸				
Frog	*Rana species*	✸	✸	✸			
Toad	*Bufo species*	✸	✸	✸			

Note: Layer A/B is of mixed origin, and remains found there could belong to layers C or D.

Appendix II

Least number of individuals by layer

	Layer A & B					Layer C					Layer D					Layer D'					Layer Ex E					Least No. Individuals
INSECTIVORA	S	M	T	L	O	S	M	T	L	O	S	M	T	L	O	S	M	T	L	O	S	M	T	L	O	
Erinaceous europaeus	1	3	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Sorex araneus	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sorex minutus	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CHIROPTERA																										
Rhinolophus hipposideros	0	1	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	3
LAGOMORPHA																										
Oryctolagus cuniculus	7	7	0	29	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Lepus timidus	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	3
RODENTIA																										
Dicrostonyx torquatus	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Microtus agrestis	0	1	0	0	0	0	3	0	0	0	0	N	N	0	0	0	0	0	0	0	0	0	0	0	0	Numerous
Microtus oeconomus	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Clethrionomys glareolus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Arvicola terrestris	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Apodemus sylvaticus	5	12	N	0	0	2	0	0	0	0	N	N	N	0	0	0	0	0	0	0	0	0	0	0	0	Numerous
CARNIVORA																										
Felis silvestris	0	0	0	0	1	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Lynx lynx	1	2	0	7	29	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Canis domestic	6	0	2	3	13	0	0	2	1	3	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Meles meles	1	1	0	3	6	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
Vulpes vulpes	3	6	5	19	55	0	0	1	2	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	7
Mustela nivalis	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
UNGULATA																										
Sus scrofa	0	2	2	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Cervus elaphus	0	1	0	0	6	0	0	0	0	1	1	0	0	3	4	0	0	0	0	0	0	0	0	0	0	4
Capreolus capreolus	2	1	2	20	14	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Rangifer tarandus	1	0	0	0	5	0	0	0	0	0	0	0	0	9	4	0	0	0	0	0	0	0	0	0	0	3
Alces alces	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Bos domestic	1	1	5	7	11	0	0	0	0	9	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3
Bos primigenius	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Ovis domestic	10	10	13	42	231	0	7	9	5	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Capra domestic	5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
AVIES																										
Lagopus species	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Prunella modularis	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Erithacus rubecula	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Turdus merula	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Turdus philomelos	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Corvus species	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sturnus vulgaris	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Ciconia nigra	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
AMPHIBIA																										
Rana species				N	N				N	N				N	N				N	N						Numerous
Bufo species				N	N				N	N				N	N				N	N						Numerous

Anatomical Legend S=Skull M= Mandible T=Teeth L= Main Limb Bones O=Others N=Numerous

Appendix III

Summary of Radiocarbon Dates

Species		Bone	Number	Layer	Radiocarbon Date	Oxford Ref.
Aurochs	Bos Prim	Femur	620	C/D	11,245 +/- 65 BP	OxA - 12884
Rangifer tarandus	Reindeer	Humerus	621	C/D	11,145 +/- 80 BP	OxA - 7993
Cervus elaphus	Red Deer	Astragalus	622	D	11,910 +/- 80 BP	OxA –19206
Cervus elaphus	Red Deer	Tibia	704	C/D	11,600 +/- 75 BP	OxA - 19207
Ciconia nigra	Black Stork	Humerus	898	C	2,945 +/- 35 BP	OxA - 8070
Rangifer tarandus	Reindeer	Humerus	940	D	11,015 +/- 50 BP	OxA - 16854
	Bone Point	Metapodial	Artefact 6	C?	11,700 +/- 90 BP	OxA - 8164

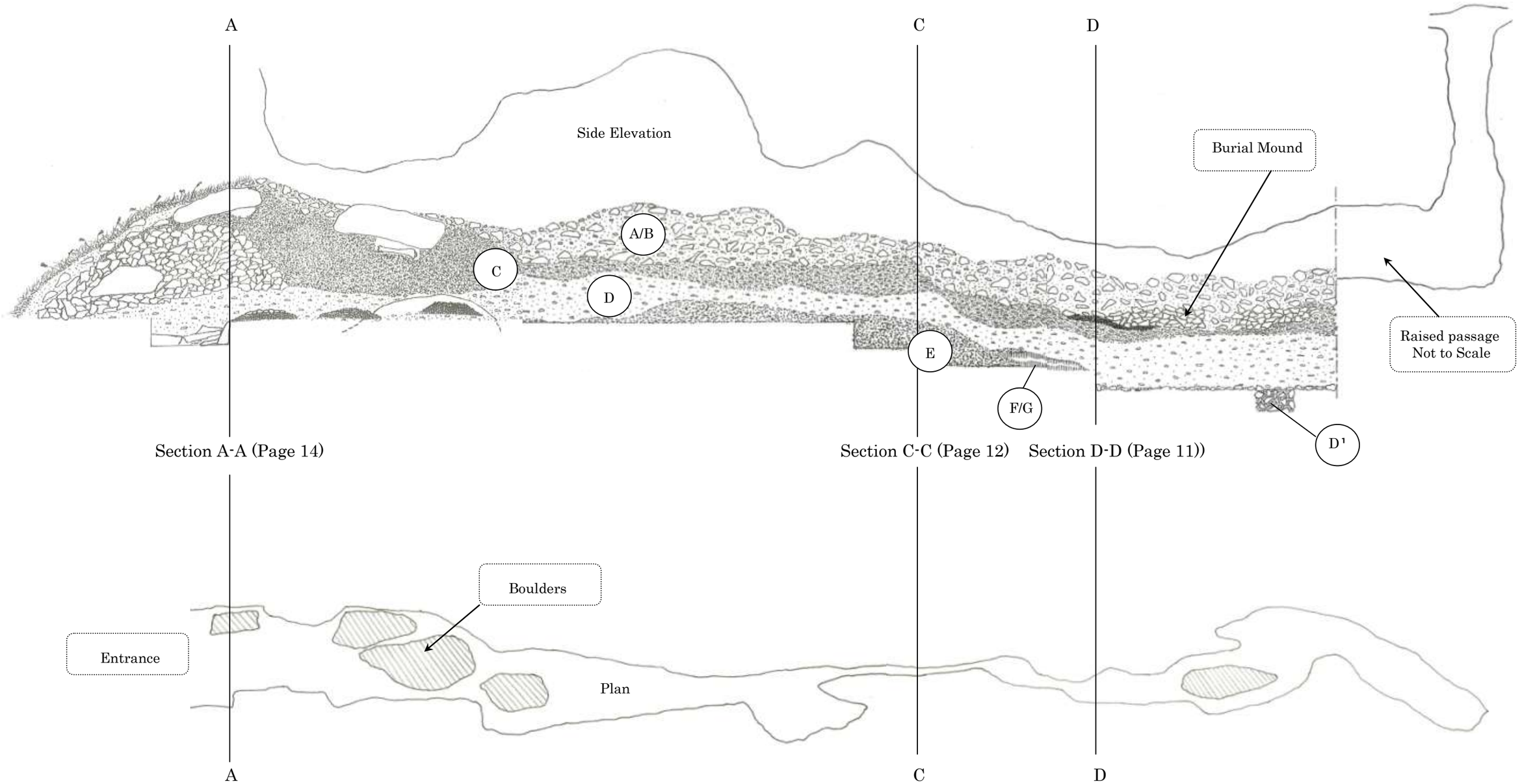
The processes used for radiocarbon dating have improved considerably in recent years with some significant developments in the methods used to pre-treat the bone samples prior to dating. This new ultra-filtration technique removes contaminants that may have some adverse effect upon the radiocarbon date. In 2007, Dr. Roger Jacobi suggested that we have some of the Lynx Cave material re-assessed and successfully submitted a number of bones for reanalysis.

The ultra-filtration tests carried out below were partially funded by the Ancient Human Occupation of Britain project (AHOB).

Radiocarbon dates using Ultra-filtration

Species		Bone	Number	Layer	Radiocarbon Date	Oxford Ref.
Cervus elaphus	Red Deer	Astragalus	622	D	11,640 +/- 45 BP	OxA - 19206
Cervus elaphus	Red Deer	Tibia	704	C/D	11,680 +/- 45 BP	OxA - 19207

NOTES:



Side Elevation & Plan *Drawn 2012*

Figure 32