Archaeological Excavation
at
North Face Cave

Little Ormes Head,
Gwynedd

1962-1976
(Updated 2012)

Human Mandible of 10-12 year old

By John Denton Blore

Discovered by J. D. Blore 1959

The Little Ormes Head, Llandudno

This updated report contains much of the previously unpublished report written in 1977, titled, "Excavations on the Little Orme's Head". This new detailed report encompasses much of the subsequent research into the cave once the excavation had been completed. It also looks at the findings from the discovery of the Copper Mines of the Great Orme in 1987 and from the recent excavations at Snail Cave, also on the Great Orme.

CONTENTS:

Access to the cave is gained through the limestone curtain Fig. 1

1.0 INTRODUCTION:

The entrance to this Cave is located on the sheer northern face of the Rhiwledyn Ridge, around the 70M level. Note: access to the cave is extremely dangerous. Take the cliff path from the northern end of the quarry till you come to a narrow promontory, to the west of the cairn there is a steep gully that appears to end in a sheer drop. Descend the gully and skirt around a rock face to the west, from this position observe the large overhang above; the North Face Cave lies directly beneath it. A short steep climb will take you to the talus, even from this position it is difficult to see the entrance as it is hidden behind a natural limestone curtain (Fig. 1). Entrance to the cave is made under the curtain and up a high stalagmite step. The cave interior extends for six metres with an average width of 1.75 metres. The height varies throughout its length, but to generalise the first two metres are cramped though there is ample headroom for the remaining length (Fig. 23 side elevation). The cave floor is a stalagmite base and is over one metre thick in places; this base has been broken through in the back section to reveal a layer of mixed sediments. It is assumed that this breakthrough was done recently by Pot-holers trying to push the cave further. The hole was cut in a series of steps and caused some confusion during the early stages of the dig; material had been moved by man as well as animals into the steps and created a problem as to what was contemporary to each step.

Permission to excavate was granted by the local farmer, who in all honesty showed no real interest in the fact that we wanted to excavate. Although the cave was first discovered in 1959 whilst searching for bat hibernation sites, it was not till April 1962 when the cave was first examined with a view to excavate. Many recent bones of birds and animals were found scattered over the cave floor, amongst this recent material the occasional bone was recovered that was obviously quite ancient. The largest concentration of bones and artefacts were recovered from a narrow strip that runs the length of the cave (Fig. 24 Plan) in a hollow formed by the stalagmite base and the cave wall (Fig.24 Typical cross section)

2.0 GEOLOGY:

As the deposit was narrow and appeared to have little depth, excavation was carried out by removing 300mm sections from the length of the cave to its full depth (stalagmite base). Each 300mm section representing one wall Mark; part of the grid system. By employing this method it enabled each bone to be readily located in its true layer. Geologically there are six distinct layers within the cave deposits but for recording purposes the Steps area has been added.

Top Soil: Complete floor area including stalagmite base.

- Layer I: Distinct first true layer in main deposit, Wall Mark 0-15
- Layer II: Middle layer of main deposit, Wall Mark 0-15
- Layer III: Lower Layer in main deposit, Wall Mark 0-15
- Layer IV: Stalagmite base
- Layer V: Unknown volume of mixed deposit beneath stalagmite base
- Steps: Area around breakthrough extending to Wall Mark 0

TOP SOIL:

A thin layer of light sandy material, 1-2cms thick, slightly thicker at the rear of the cave than at the entrance. This suggests that it mainly consists of wind-blown material, picked up from the dry sheltered talus by the eddies that swirl around the entrance during high winds sending this light material to the rear of the cave.

LAYER I:

A rich dark brown soil mixed with light grey, 10-12cms thick. The richness of the deposit is indicative of continual use or occupation, the accumulation of extraneous material such as vegetation brought in for bedding and the decaying corpses of prey and predator all enhance the richness of the deposit. The grey hue on the other hand is purely an internal deposit and is formed by small calcareous granules, 1-3mm in diameter; samples taken throughout the layer contained 10% of granules. This calcareous material is formed by water dripping from the roof; each drop containing calcium carbonate, after the water has evaporated in the warm air the calcium is left to form a deposit. Such deposits are broken up if the cave is in continual use by animals or humans and appears in the deposit as fine breccia. The percentage of calcareous material is low, suggesting a climate of intermittent wet and warm conditions, similar to that of the present day.

LAYER II:

By complete contrast this is a layer of sterile red/brown clay (grain diameters less than 0.002mms) the deposit being 10cms thick on average. As the clay type sediment contained no other material except the bones of Frogs and Toads, it is reasonable to suggest a period when conditions were too damp for habitation. It is thought the deposit has been form by the accumulation of insoluble residue continually being washed from the cave roof and walls during a wet period. The absence of any calcareous material would imply that whilst the climate was wet it was too cool for evaporation to take place.

LAYER III:

Similar in texture to Layer I, and although the deposit contains many small pieces of charcoal it is of a much lighter shade, it varies in thickness from 10-15cms. The large amount of calcareous material is the main factor in the light colour of the deposit; samples taken throughout the layer contained approximately 30%of calcareous material. The size of this material ranged from small granules 1-3mm in diameter to much larger pieces of irregular shaped breccia, up to 70mm in size. These larger pieces suggest a climate ideal for the formation of a stalagmite base.

LAYER IV:
A solid stalagmite layer up to 1 Metre thick, indicating a climate that was warm and damp, allowing for such a build-up of material. The thickness of the stalagmite suggests that such ideal conditions lasted for a considerable time, with little or no outside interference.

LAYER V:
Above this layer is a pocket of air, it is thought that the breakthrough in the back section of the stalagmite layer allowed the water to seep through the deposit; the water reappearing at the entrance. Not only did this movement wash away the deposit, it also introduced material from the layers above into the lower Layers. To illustrate this mixed origin of the material, the recent bones of Guillemot and Rabbit were found alongside the much older bones of Pig and Horse. It would be difficult therefore to identify the contemporary geological evidence from the mixed sediments with such a restricted access to the deposit.

The top 4 layers rest in a hollow on the stalagmite base and run the length of the cave, the surface of this hollow is rough, unlike the smooth surface of the exposed stalagmite (flowstone) this strengthens the theory that the hollow was formed through erosion.

3.0 FAUNA CONTENT;

During excavation a considerable number of bones were recovered, they were located in each of the seven areas described in the geological section. In all some 518 bones were recovered, this does not include the many hundreds of small bones of Frogs and Toads or the 600+ small splinters of unidentifiable bone. The percentage of fragmentary bone was high compared to other site of a comparable size. There are three main contributory factors to this, (a) Many of the bones are the crushed, gnawed and chewed over remains, left by predators. (b) Only 20% of the floor is soil deposit the remainder is solid stalagmite; many of the bones brought in by the predators would lie on this hard floor and become broken in time by the use of the cave by Humans and animals alike. (c) The deposit at the entrance is thin and is walked on as soon as the cave is entered, breaking many of the more fragile bird bones.

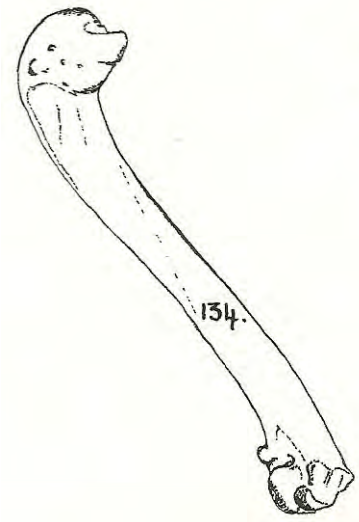
The condition of the bones varied greatly, even those from the same layer. On excavation the sediments could be described as moist, however any lengthy dry spells are sufficient to dry the whole deposit out. As the geological evidence shows, previous climatic changes have contrasted greatly with that of the present day, where periods of wetness have prevailed for some considerable time. Bones deposited before this wet period have naturally suffered more than those from the recent deposits. Some of the earlier bones show little deterioration, most noticeable are those coated in a thin stalagmite layer, whereas some of the bones found in exposed locations under the stalagmite curtain show a marked deterioration. No doubt the alternating conditions from wet to rapid drying out will have accelerated the deterioration process. Two good examples of these contrasting conditions can be observed on the mandible of the 4 year old child, and the mandible of the 10/11 year old. The 4 year old mandible had a 30% coating of stalagmite and although broken was in otherwise perfect condition. On the other hand the 10/11 year old mandible was in poor condition the compacted surface bone having cracked in many places, this was recovered in an exposed area at wall mark 7/8.
The breakthrough in the back section has meant the deposit is exposed in vertical section; this has given rise to some of the confusion concerning misplaced material. Use of the cave by pot-holers attempting to find new passages, has resulted in bones from the lower levels ending up the stalagmite surface. Many examples of this contamination can be found; for example the recent bones of Chough were found along-side the much older and worn bones of Ox.

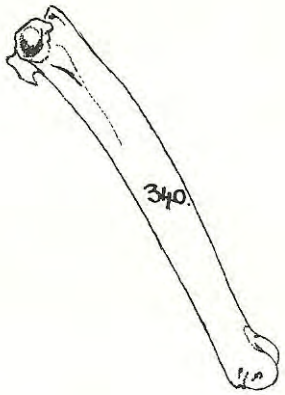
We can, by careful examination and without much confusion place most of the finds within their true horizons, however there are a few that will remain puzzling.

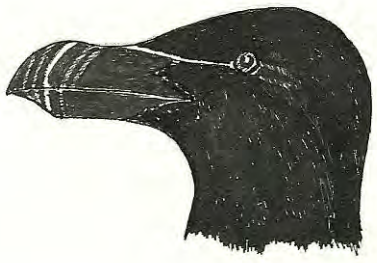
The following analysis and interpretations are dealt with layer by layer; a complete catalogue of each species identified is recorded at the end of each section. Bones not thought to belong to the layer are marked with an asterisk followed by the probable layer of origin. The number of young and adult individuals is given for each species, these figures represent the least possible number; in many cases the number could be higher. It is felt that the number of individuals estimated is reasonably accurate with the exception of layer III, were it is difficult to make any assessment as most of the material is the fragmentary butchered remains.

TOP SOIL

		Adult	Young
Vulpes vulpes	Fox	1	1
Ovis aries	Sheep	1	1
Oryctolagus cuniculus	Rabbit	1	-
Apodemus sylvaticus	Wood Mouse	2	-
Microtus agrestis	Field Vole	1	
Rattus norvegicus	Brown Rat	2	1
Corvus corone	Carrion Crow	2	-
Phrrhocorax	Chough	2	-
Sturnus vulgaris	Starling	2	-
Columba sp.	Rock/Stock Dove	1	-
Anthus sp.	Pipit	1	-
Perdix perdix	Partridge	1	-
Gallus Sp.	Domestic Fowl	1	-
Phalacrocorax carbo	Cormorant	1	1
Uria aalge	Guillemot	3	-
Bufo sp.	Toad	Numerous	
Rana sp.	Frog	Numerous	
✸*Sus scrofa*	Pig	Layer III	
✸*Capreolus capreolus*	Roe Deer	Layer III	
✸*Bos taurus*	Ox	Layer III	







RAZORBILL

This, the most recent layer contains a good cross-section of to-days indigenous species, from the small nesting birds to a large carnivore. Guillemot and Cormorant (Fig. 10) are both breeding species that nest in colonies on the lower cliff ledges, Razorbill (Fig. 2) and Herring Gull have also been recovered from the steps area and can be attributed to this recent layer. Rock Doves (Fig 3), Pipits, Starlings and Carrion Crow all nest in the cliff crevices as does the Chough. The first record of Chough breeding on the Little Ormes Head was in 1960, the site chosen was in a small inaccessible cave directly above the entrance to the North Face Cave. The same site was used again the following year. When excavation at the cave commenced in 1962 the site had been abandoned, the subsequent discovery of their remains in the Top Soil could well explain the apparent abandoning of the site and locality. They did return to the Head before the excavation was completed.
The rodents, Wood Mouse, Field Vole and Brown Rat are normal occupants of caves and their remains are self explanatory, as are the remains of Rabbit; although the later could equally be the left over meal of a predator. The active presence of a number of Foxes on the Head would explain the large number of bird remains, including the Partridge (Fig. 4) and Domestic Fowl, probably stolen from the nearby farm.

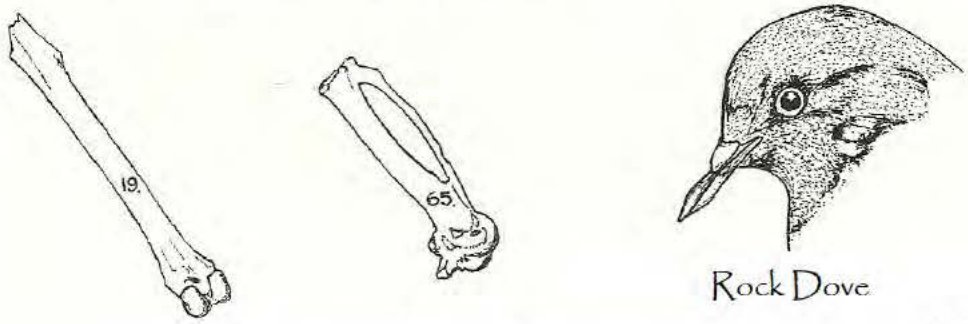


Fig. 3

From the 72 bones recovered from this layer, 20 species have been identified, at least 2 more can be added to the total from the 'STEPS' area, and possibly a third, the Mole, this species is represented by a small fragment of the ulna, it appears fresh and is believed to belong to this layer.

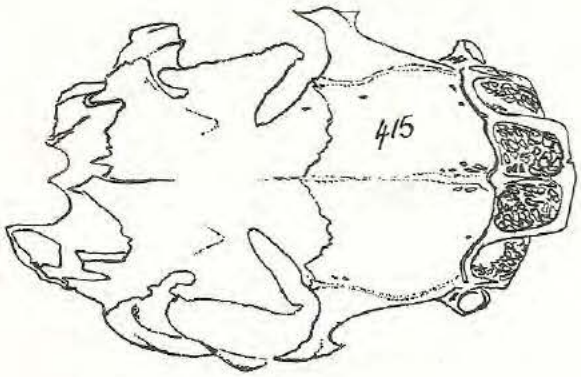
Fig. 4

The Layer is dominated by bird remains, the nesting ledges provide in abundance, this readily available source of food for any predator, the flightless young of Razorbills, Guillemots and Herring Gulls are prime examples. In most cases the bird remains are represented by bones of the wings, humerus, ulna etc. Implying that the body has been devoured, leaving only the wings, this again is indicative of the Fox. The Pig, (Fig. 7), Roe Deer and Ox (Fig. 8) are misplaced and belong to layer III.

LAYER I

		Adult	Young
Felis Sp.	Cat	1	1
Mustela ermina	Stoat	2	
Ovis aries	Sheep	2	1
Lepus europaeus	Hare	-	1
Oryctolagus cuniculus	Rabbit	2	1

Rattus norvegicus	Brown Rat	1	-
Corvus corone	Carrion Crow	1	-
Phrrhocorax	Chough	1	-
Sturnus vulgaris	Starling	2	-
Uria aalge	Guillemot	1	-
Alca torda	Razorbill	1	-
Bufo sp.	Toad	Numerous	
Rana sp.	Frog	Numerous	
✱*Sus scrofa*	Pig	Layer III	



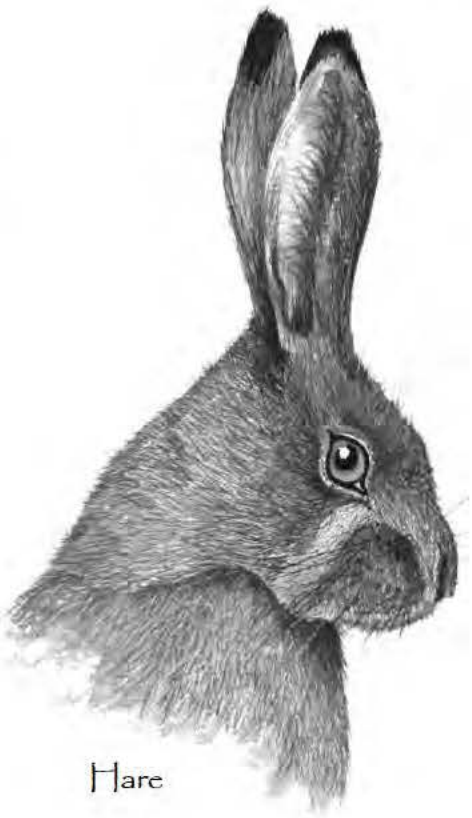
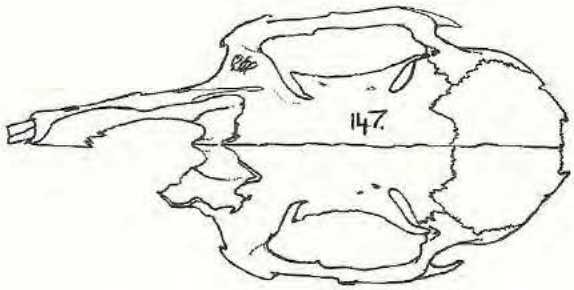


Fig. 5

14 species have been identified from the 78 bones recovered from this layer. The most noticeable difference in the fauna content between this and the previous layer is the decrease in the number of bird remains. Some species like the Razorbill, Chough and the Guillemot were located at the top of the layer having been deposited there some time during the transitional period and are therefore more recent than the rest of the deposit. Only Carrion Crow and Starling (Fig. 11) are left to represent the remaining span of the deposit. This would appear to suggest that the breeding seabirds that enjoy the security that a colony provides have not been established for any length of time. The presence of the 2 small carnivores, Cat (Fig. 9) and Stoat strengthen this theory, both are represented by at least 2 individuals, implying that the cave was in regular use during this period; had the colonies been established then there would be evidence to support this. The remains of a young Hare (Fig. 5) were also recovered.

LAYER II

		Adult	Young
Bos Sp.	Small Ox	1	-
Ovis aries	Sheep	1	1
Oryctolagus cuniculus	Rabbit	1	
Bufo sp.	Toad	Numerous	
Rana sp.	Frog	Numerous	



Rabbit

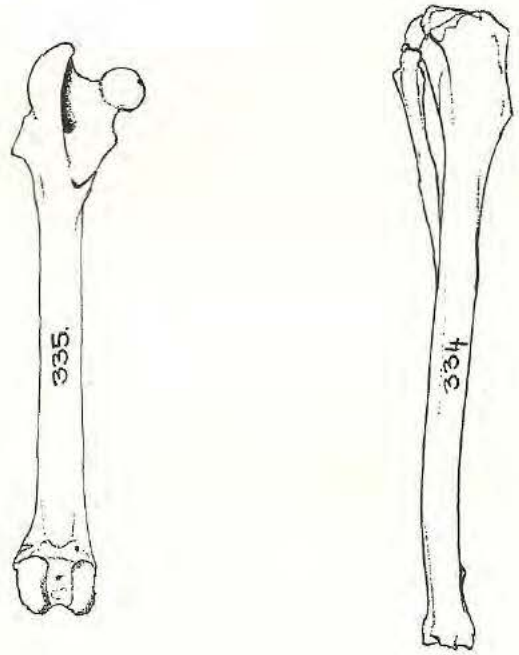


Fig. 6

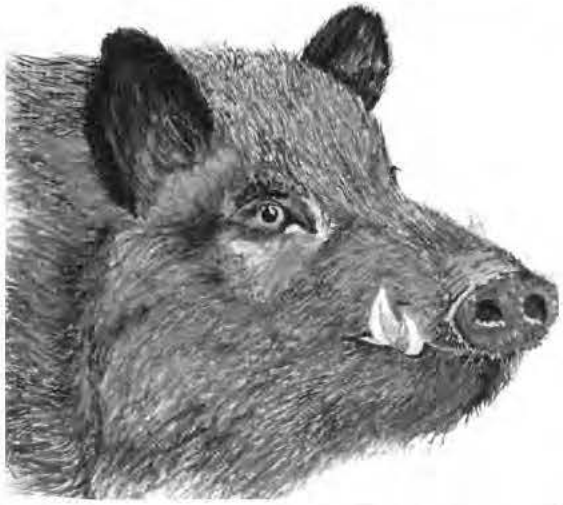
Very little bone material has been recovered from this layer; the only remains that can be said with confidence to be contemporary with the deposit are those of the Frogs and Toads. The many hundreds of these small bones, most of them fragmentary, were usually found in small pockets. The remains of 3 other species have been recovered, Rabbit, Sheep and Small Ox, these can be placed without any difficulty to their original horizons. The rabbit (Fig. 6) belongs to Layer I, the Sheep and the Small Ox to Layer III.

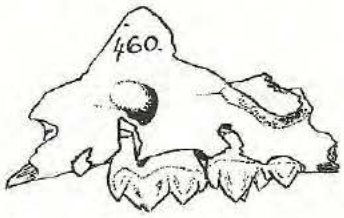
The total inactivity within the deposit in the form of bird or small mammal remains could be attributed to one of the following theories. Access to the cave may no longer have been possible as some of the more precarious ledges could well have been eroded away, or on the other hand the conditions within the cave could well have been to damp for the cave to be habitable. The geological evidence from Layer II lends itself to the later of these theories as does the evidence from the snail populations (section 8).

LAYER III

		Adult	Young
Sus scrofa	Pig	1	1

Capreolus capreolus	Roe Deer	1	-
Bos taurus	Ox	1	1
Bos species	Small Ox	1	1
Capra hircus	Goat	3	2
Ovis aries	Sheep		
Bufo sp.	Toad	Numerous	
Rana sp.	Frog	Numerous	





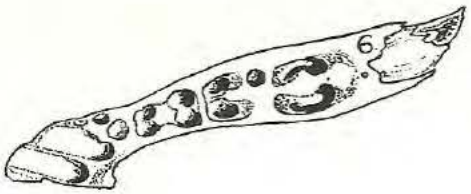
Pig
Wild Boar

This layer contained all the evidence of human occupation and burial, the finds were numerous and varied and covered a wide spectrum of archaeological wealth. The interpretation of the burial material is dealt with in the section on human remains.

The zoological evidence can be divided, albeit not distinctly, into two groups:-

(a) The remains of species that would naturally seek refuge in the cave along with those brought in by predators.

(b) The remains brought in by man i.e. Butchered bones.



Group (b) is examined in depth in the section on Midden Material. From the assemblage of 121 bone recovered 43 were human, a further 17 mammal bones showed definite signs of butchery; it is felt nevertheless that a great deal of the material can be attributed to mans presence in the cave. In all 6 species of mammal have been recovered, they are all species that have been exploited by for food from the Neolithic onwards. The sheep/Goat is the most well represented species and although their bones account for 75% of all material, not enough was recovered to make any comparisons or to determine, Sheep from Goat.

Fig. 7

How much of this material belongs to group (a) is difficult to estimate. The lower mandible of a lamb No. 446 & 447 shows signs of being killed by a carnivore. The ascending ramus has numerous teeth mark on it, the horizontal ramus has been bitten

right through on both mandibles, indicative of being held and carried by the throat. The remaining bones of sheep are broken, probably by humans.

No clear evidence was recovered to indicate whether the Roe Deer was used for food or not, although the pelvis was broken in a similar position to that of Sheep and Ox, no tool marks were evident. The horn core shows tool and wear marks where it has been fashioned into a pick. The Pig is the most confusing of all the Layer III species, the adult is represented by one complete vertebra and one incisor only, the young Pig was found in the disturbed layers but is assumed to originate from this layer as it was coated in stalagmite as is the rest of the material from this layer.

The bones of Ox and Small Ox are small in number; their size alone makes it inconceivable that they arrived there without the aid of Humans.

LAYER IV

		Adult	Young
Homo Sapiens	Human	1	1
Bos species	Small Ox	1	-
Ovis aries	Sheep	1	-

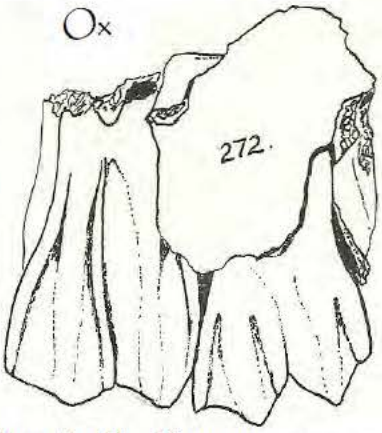


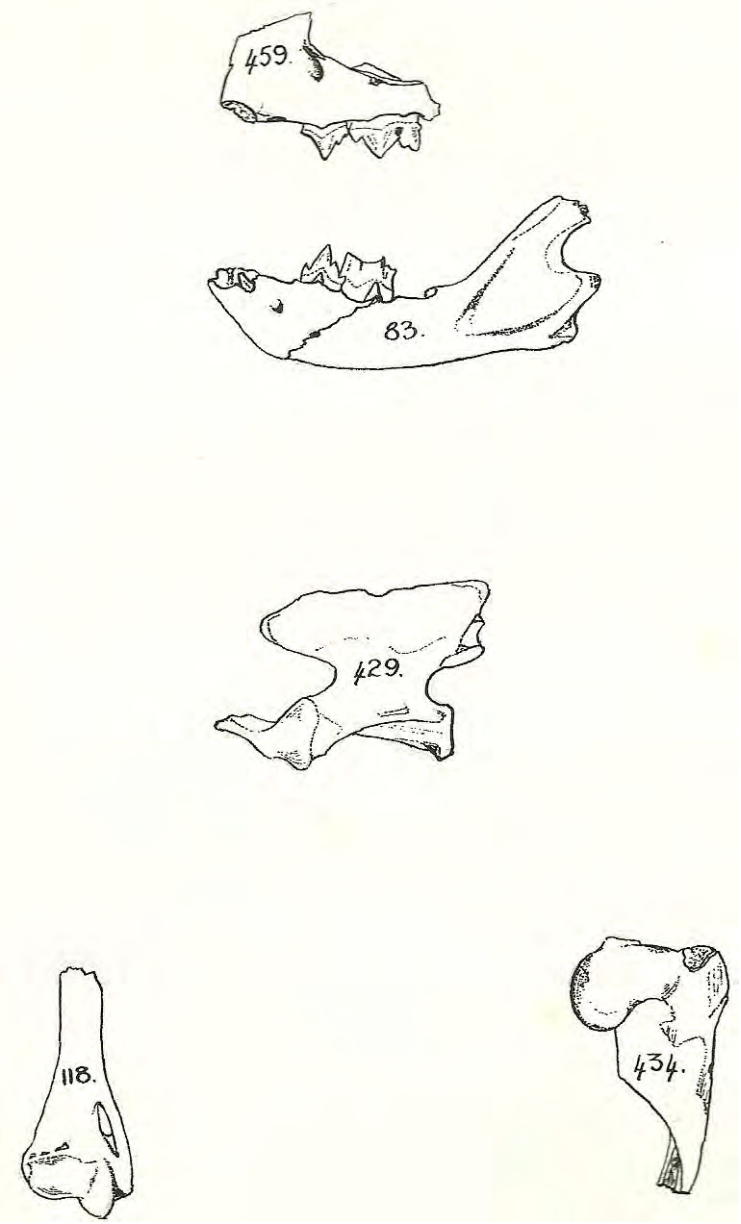
Fig. 8

Little can be said of this Layer as the true content is unknown The thickness of the stalagmite makes excavation virtually impossible and so no detailed examination has been undertaken. A number of fragmentary bones have been recovered from the top of the deposit; these were partially exposed on the removal of Layer III. The bones represent 3 species, Human, Sheep and a small breed of Ox; many small fragments of bone belonging to Ox were also visible. The 2 Human bones were found where the stalagmite is at its thinnest (around the breakthrough), the fragment of the near adult pelvis was partially exposed in the wall of the cave and the Ischium of the 3-4 year old was recovered from a piece of stalagmite that had broken loose from the main deposit. The Human remains can be directly linked to the remains from Layer III and it is felt that most of the fragmentary material from the top of the deposit is also contemporary with that of Layer III.

LAYER V

		Adult	Young
Felis sp.	Cat	1	-
Sus scrofa	Pig	-	1
Ovis Aries	Sheep	-	2
Equus cabalus	Horse	1	-
Oryctolagus cuniculus	Rabbit	2	-
Microtus agrestis	Field Vole	1	-

The position of this layer, beneath the stalagmite, makes it excavation difficult, it is impossible to excavate from the breakthrough in the back section as the aperture is too small. The only approach that can be made is from the entrance where the deposit is exposed. The washing away of the deposit as described in the Geology section has created a secondary cave within the main cave. The deposit contains a complete mix of material, old material from the original deposit before the stalagmite was laid down, material that has been washed down from the deposits above and material brought in by predators in recent times



Wild Cat

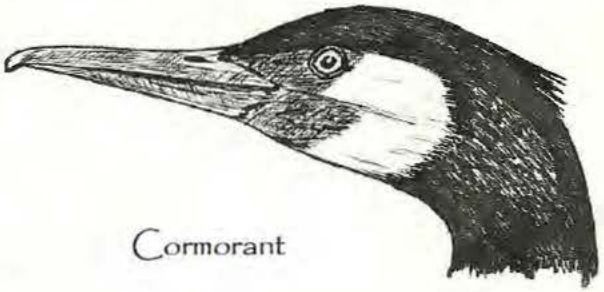
Fig. 9

From the assemblage of bones, 9 species have been identified, 6 mammals and 3 birds. It is difficult to be precise about the origin of most of the bones because of the complex way the deposit has been laid. There is no real evidence produced that can distinguish with any certainty between them. The best we can do, is suggest that the bones that look fresh are recent. The remains of Rabbit and Guillemot are without any doubt the most recent, some bones still had flesh attached. The Sheep bones are the left-over's of a predators meal, as both individuals are lambs they may have fallen prey to a Raven or more likely a Fox. The Finch, Cormorant and Field Vole are also recent surface finds. The single Cat bone appears to belong to the original deposit near the surface of the Layer and is also reasonably recent but not in the same context as the Finch, Cormorant etc. The young Pig is the same in appearance as the remains from Layer III? The Horse is probably the oldest bone; it belongs to the original deposit and is therefore older than the Stalagmite Layer.

STEPS

		Layer of Origin?
Talpa europaea	Mole	Top soil/I
Felis sp.	Cat	I
Mustela ermin	Stoat	I
Sus scrofa	Pig	III
Capreolus capreolus	Roe Deer	III
Bos taurus	Ox	III
Bos sp.	Small Ox	III
Ovis Aries	Sheep	Any
Capra hircus	Goat	III
Oryctolagus cuniculus	Rabbit	Top soil/I
Rattus norvegicus	Brown Rat	Top soil/I
Corvus Corone	Carrion Crow	Top soil/I
Phrrhocorax	Chough	Top soil/I
Sturnus vulgaris	Starling	Top soil/I
Columba sp.	Rock/Stock Dove	Top soil/I
Anthus sp.	Pipit	Top soil/I
Fringilla coelebs	Chaffinch	Top soil
Gallus sp.	Domestic Fowl	?
Gallopave sp.	Turkey	?
Phalacrocorax	Cormorant	Top soil
Larus argentatus	Herring Gull	Top soil
Uria aalge	Guillemot	Top soil
Alca torda	Razorbill	Top soil

This area of the cave was the first section to be excavated; the results were initially unexpected as it contained a varied selection of remains that did not appear to be coeval. No distinction could be made to define any Layer throughout its depth; on reaching Wall mark 0 4 well defined Layers could be observed. Although the finds from this area are of mixed origin they are nevertheless worthy of note. Some attempt by careful comparison has been made to give the Layer of origin wherever possible.



Cormorant

Fig. 10

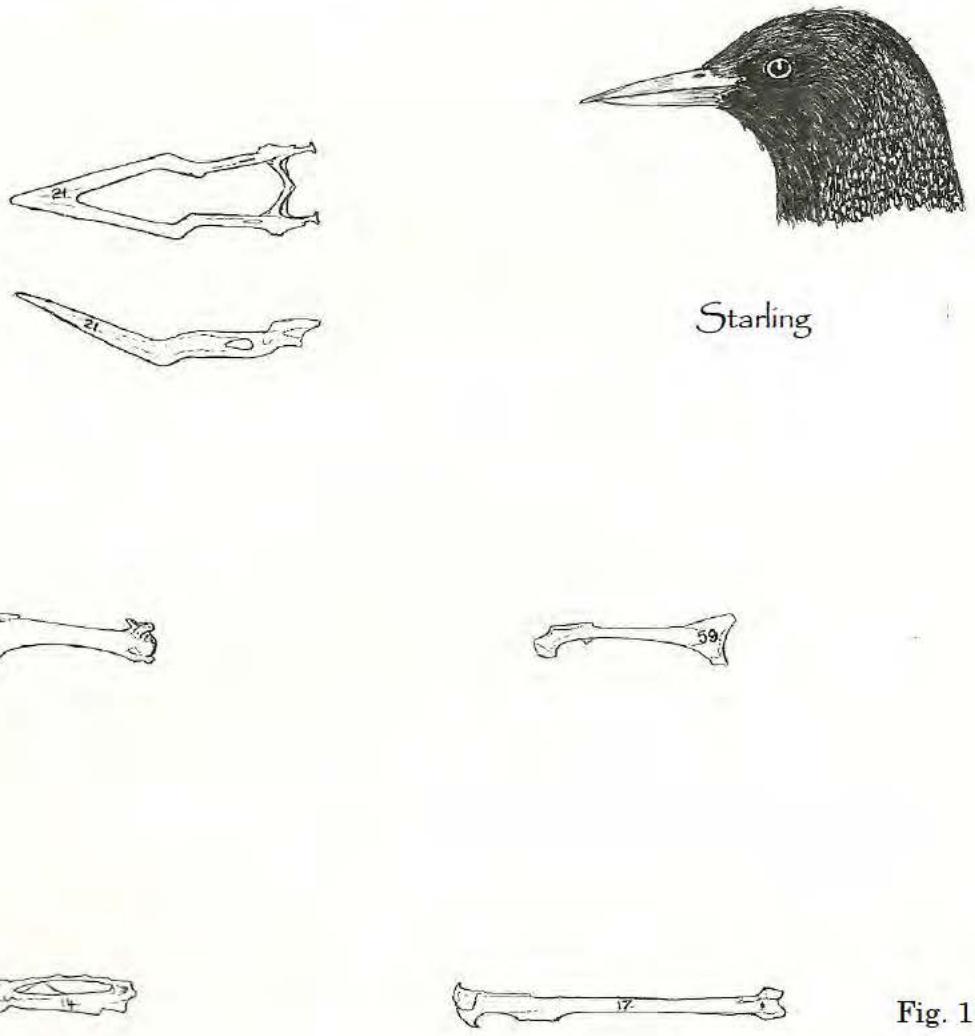


Fig. 11

4.0 OSTEOLOGY CATOLOGUE

No.	Location	Species	Bone	Notes
1	Steps	Domestic Fowl	Humerus	
2	Top Soil	Carrion Crow	Ulna	
3	Top Soil	Chough	Ulna	
4	Top Soil	Fox	Rt. Ramus	Young
5	Top Soil	Cormorant	Post Mandible.	
6	Steps	Pig	Rt. Ramus	V. young
7	Steps	Human	Lumbar Vert.	18+ years
8	Steps	Human	Lt. Ramus	8/9 years
9	Steps	Small Ox	Sacrum	Frag.
10	Steps	Small Ox	Dorsal vert	
11	Steps	Small Ox	Sacrum	Frag.
12	Steps	Ox	Hoof Core	
13	Steps	Domestic Fowl	Metacarpal	
14	Top Soil	Starling	Metacarpal	
15	Top Soil	Brown Rat	Pelvis	Small
16	Top Soil	Brown rat	Ulna	Large

17	Top Soil	Starling	Tibia	
18	Top Soil	Guillemot	Dorsal Vert.	
19	Steps	Rock/Stock Dove	Tibia	
20	Steps	Turkey	Toe Joint	
21	Steps	Starling	Beak	
22	Top Soil	Pipit	Beak	
23	Top Soil	Sheep	Vert.	Frag.
24	Top Soil	Guillemot	Sternum	
25	Top Soil	Sheep	Vert.	
26	Top Soil	Sheep	Vert.	
27	Top Soil	Fox	Dorsal Vert	
28	Top Soil	Brown rat	Skull frag.	Frag. Old Large
29	Top Soil	Guillemot	Skull	
30	Steps	Turkey?	Skull	Frag. Young
31	Steps	Pipit	Skull	
32	Steps	Brown Rat	Scapula	Large
33	Steps	Brown Rat	Pelvis	
34	Steps	Brown Rat	Femur	
35	Steps	Brown Rat	Humerus	
36	Steps	Brown Rat	Tibia/Fibula	
37	Top Soil	Chough	Rt. Ulna	Large
38	Top Soil	Guillemot	Rt. Ulna	
39	Top Soil	Domestic Fowl	Lt. Ulna	
40	Top Soil	Guillemot	Rt. Humerus	
41	Top Soil	Chough	Lt. Humerus	Large
42	Top Soil	Guillemot	Coracoid	
43	Top Soil	Sheep/Goat	Scapula	
44	Steps	Sheep/Goat	Metatarsal	
45	Steps	Sheep/Goat	Toe joint	
46	Steps	Turkey?	Lt. Femur	Small
47	Top Soil	Chaffinch	Humerus	
48	Top Soil	Partridge	Coracoid	
49	Top Soil	Brown rat	Pelvis	
50	Top Soil	Rock/Stock Dove	Metacarpal	
51	Top Soil	Wood Mouse	Rt. Ramus	
52	Top Soil	Field Vole	Rt. Ramus	
53	Top Soil	Field Vole	Rt. Ramus	
54	Top Soil	Brown rat	Maxilla	Old large
55	Top Soil	Brown rat	Lt. Ramus	
56	Top Soil	Starling	Humerus	
57	Top Soil	Domestic Foal	Metacarpal	
58	Top Soil	Domestic Fowl	Metacarpal	
59	Top Soil	Starling	Coracoid	
60	Top Soil	Brown rat	Scapula	Large
61	Top Soil	Brown rat	Femur	Large
62	Top Soil	Brown rat	Maxilla	
63	Top Soil	Starling	Humerus	
64	Top Soil	Starling	Humerus	
65	Top Soil	Rock/Stock Dove	Femur	
66	Steps	Guillemot	Radius	
67	Steps	Carrion crow	Ulna	
68	Steps	Domestic Fowl	Metacarpal	
69	Steps	Domestic Fowl	Metacarpal	
70	Top Soil	Rabbit	Humerus	
71	Top Soil	Rabbit	Humerus	

72	Top Soil	Rabbit	Femur	
73	Top Soil	Rabbit	Radius	
74	Steps	Sheep/Goat	Ulna	
75	Steps	Sheep/Goat	Calcaneum	Small
76	Steps	Sheep/Goat	Lt. Ramus	
77	Steps	Sheep/Goat	Rt. Ramus	
78	Steps	Rabbit	Lt. Ramus	
79	Steps	Rabbit	Ulna	
80	Steps	Human	Fibula	
81	Steps	Sheep/Goat	Cannon	
82	Steps	Sheep/Goat	Incisor	
83	Steps	Cat	Lt. Ramus	young
84	Steps	Roe deer	Scapula	
85	Steps	Sheep/Goat	Tibia	Prox end
86	Steps	Cormorant	Vert.	
87	Steps	Bird?	Tibia	Frag.
88	Steps	Bird?	Coracoid	Frag.
89	Steps	Guillemot	Metacarpal	
90	Steps	Herring Gull	Humerus	
91	Steps	Roe Deer	Tibia	Prox end
92	Steps	Small Ox	Thoracic vert	
93	Steps	Bird?	Humerus	Frag.
94	Steps	Bird?	Sternum	Frag.
95	Steps	Bird?	Tibia	Frag.
96	Steps	Rabbit	Metatarsal	
97	Steps	Rabbit	Metatarsal	
98	Steps	Rock/Stock Dove	Metacarpal	
99	Steps	Carrion Crow	Rib cage	Frag.
100	Steps	Guillemot	Metacarpal	
101	Steps	Cormorant	Ulna	Frag.
102	Steps	Starling	Humerus	Frag.
103	Steps	Cormorant	Ulna	Frag.
104	Steps	Sheep	Ulna	
105	Steps	Bird?	Femur	Frag.
106	Steps	Rabbit	Vert.	
107	Steps	Brown rat	Femur	
108	Steps	Ox	Pelvis	Frag.
109	Steps	Human	Lt. Ischium	3-4 year
110	Steps	Human	4th Cervical	8-9 year
111	Steps	Bird	Beak	Frag
112	Steps	Human	Phalanx	10-12 year
113	Steps	Human	Rt. Clavicle	3-4 year
114	Steps	Rabbit	Rib	
115	Steps	Bird?	Tibia	
116	Steps	Bird?	Metatarsal	Frag.
117	Steps	Carrion crow	Lt. Humerus	
118	Steps	Cat	Humerus	
119	Steps	Stoat	Rt. Ramus	
120	Steps	Sheep Goat	Ulna	Young
121	Steps	Roe deer	Metatarsal	
122	Steps	Roe deer	Metacarpal	
123	Steps	Sheep/Goat	Rib	Young
124	Steps	Bird?	Tibia	Frag.
125	Steps	Bird?	Humerus	Frag.
126	Steps	Bird?	Humerus	Frag.

127	Steps	Sheep	Vert.	Frag. Young
128	Steps	Stoat	Femur	
129	Steps	Mole	Ulna	
130	Steps	Rabbit	Toe Joint	
131	Steps	Rabbit	Vert.	Frag.
132	Steps	Sheep	Sacrum	Young
133	Steps	Small Ox	Metatarsal	Young
134	Steps	Razorbill	Humerus	
135	Steps	?	-	Frag.
136	Steps	Razorbill	Ulna	
137	Steps	?	-	Frag.
138	Steps	Sheep	Rib	
139	Steps	Brown Rat	Femur	
140	Steps	Bird?	Metatarsal	Frag
141	Steps	?		Frag
142	Steps	Bird?	Coracoid	Frag.
143	Steps	Bird?	Coracoid	Frag.
144	Steps	Sheep	Rib	Frag.
145	Steps	Rabbit	Metatarsal	
146	Steps	Rabbit	Metatarsal	
147	Steps	Rabbit	Skull	Frag
148	Steps	?		Frag.
149	Steps	?		Frag.
150	Steps	?		Frag.
151	Steps	Bird?	Sternum	Frag.
152	Steps	?		Frag.
153	Steps	?		Frag.
154	Steps	?		Frag.
155	Steps	?		Frag.
156	Layer I	Rabbit	Phalanx	
157	Layer I	Rabbit	Vert.	
158	Layer I	Brown Rat	Femur	Dist.
159	Layer I	Rabbit	Tibia	Frag.
160	Layer I	Bird?	Tibia	Frag.
161	Layer I	Rabbit	Vert.	
162	Layer I	Rabbit	Vert.	
163	Layer I	Rabbit	Vert.	
164	Layer I	Rabbit	Metatarsal	
165	Layer I	?		Frag.
166	Layer I	Carrion Crow	Ulna	Frag.
167	Layer I	Bird?	Coracoid	Frag.
168	Layer I	Bird?	Ulna	Frag.
169	Layer I	?		Frag.
170	Layer I	Rabbit	Tibia	Frag.
171	Layer I	Rabbit	Tibia	Frag.
172	Steps	Sheep	Vert.	
173	Steps	Roe Deer	Cannon	Frag.
174	Steps	Sheep/Goat/Roe	Vert.	Frag.
175	Steps	Human	Thoracic	4 years
176	Steps	?		Frag.
177	Steps	Sheep	Cannon	Frag., v young
178	Steps	Human	Fibula	Frag. 4 years
179	Steps	?		Frag.
180	Steps	Bird?	Tibia	Frag.
181	Steps	Brown rat	Femur	Foetal?

182	Layer I	Sheep	Phalanx	Young
183	Layer I	Rabbit	Scapula	Frag.
184	Layer I	Rabbit	Foot Bone	
185	Layer I	Rabbit	Rib	
186	Layer I	Bird?	Ulna	Frag.
187	Layer I	Brown rat	Femur	
188	Layer I	?		Frag.
189	Steps	Sheep	Radius/ulna	Dist.
190	Steps	Sheep	Lt. Ramus	
191	Steps	?		Frag.
192	Steps	Human	Fibula Frag.	10/12 year
193	Steps	Sheep	Scapula	Young
194	Steps	Sheep	Metatarsal	Young
195	Steps	?		Frag.
196	Steps	Human	Rt. Femur	4 years
197	Steps	?		Frag.
198	Steps	Guillemot	Pelvis	
199	Steps	Bird?	Coracoid	Frag.
200	Steps	Chough	Ulna	
201	Steps	Roe deer	Antler tine	
202	Steps	Bird?	Metatarsal	Frag.
203	Steps	Sheep/Goat	Humerus	Frag.
204	Steps	Rabbit	Fibula	Frag.
205	Steps	Ox	Phalanx	Young
206	Steps	Ox	Phalanx	Young
207	Steps	Sheep/Goat	Vert.	Young
208	Steps	Human	Cervical	10/12 year
209	Steps	Human	Maxilla	8/9 year
210	Steps	Herring Gull	Coracoid	
211	Steps	Ox	Phalanx	Young
212	Top Soil	Rabbit	Femur	Young
213	Top Soil	Sheep/Goat	Maxilla	Young
214	Top Soil	Sheep/Goat	Calcaneum	
215	Top Soil	Sheep/Goat	Premolar	Young
216	Top Soil	Ox	Molar	
217	Top Soil	Bird?	Femur	Dist frag.
218	Steps	Cat	Canine	
219	Steps	Human	Incisor	10/12 year
220	Steps	Sheep/Goat	Foot bone	
221	Steps	Human	Lt. Illium	18+ year
222	Steps 0/1	Human	Rt. Patella	8/9 year
223	Steps 0/1	Human	Lt. metatarsal	10/12 year
224	Steps 0/1	Sheep	Lumbar vert.	
225	Steps 0/1	Bird?	Femur	Frag.
226	Steps 0/1	Rabbit	Tibia	
227	Steps 0/1	Rabbit	Humerus	
228	Steps 0/1	Bird?	Tibia	Frag.
229	Steps 0/1	Sheep	Radius	Frag.
230	Steps	Sheep/Goat	Cannon	
231	Steps	Guillemot	Coracoid	
232	Steps	Sheep/Goat	Calcaneum	
233	Steps	Sheep/Goat	Calcaneum	Young
234	Steps	Sheep/Goat	Phalanx	Young
235	Steps	Sheep/Goat	Astragalus	Young
236	Steps	?		Frag.

237	Steps	Sheep/Goat	Patella	
238	Steps	Rabbit	Radius	
239	Steps	Sheep/Goat	Astragalus	
240	Steps	Sheep/Goat	Vert.	Frag.
241	Steps	Roe Deer	Cannon	Dist
242	Steps	Pig	Incisor	
243	Steps	Sheep/Goat	Premolar	
244	Steps	Fox	Canine	
245	Layer III 0/1	Human	Incisor	10/12 year
246	Layer III 0/1	Human	Fibula	10/12 year
247	Layer III 0/1	Sheep/Goat	Rib	Frag.
248	Layer III 0/1	Sheep/Goat	Vert.	Frag
249	Layer III 0/1	Human	R4ib	8/9 year
250	Layer III 0/1	Human	Rib	10/12 year
251	Top Soil	Sheep/Goat	Scapula	Young
252	Top Soil	Bird?	Pelvis	Frag.
253	Top Soil	Carrion Crow	Ulna	
254	Top Soil	Ox	Phalanx	Young
255	Top Soil	Hare?	Pelvis	Frag.
256	Top Soil	Cormorant	Coracoid	Frag. Young
257	Top Soil	Guillemot	Skull	
258	Top Soil	Guillemot	Skull	
259	Top Soil	Bird?	Ulna	Frag
260	Top Soil	Sheep/Goat	Premolar	
261	Top Soil	Sheep/Goat	Premolar	
262	Top Soil	Sheep/Goat	Cannon	Young
263	Top Soil BS	Sheep/Goat	Incisor	Young
264	Top Soil BS	Sheep/Goat	Calcaneum	
265	Top Soil BS	?		
266	Top Soil BS	Roe Deer	Femur	Dist
267	Top Soil BS	Roe Deer	Femur	Dist
268	Top Soil BS	Human	Thoracic	8/9 year
269	Top Soil BS	?		
270	Top Soil BS	Sheep/Goat	Patella	Frag.
271	Layer II 1/2	Small Ox	Molar	Fit 273
272	Layer II 1/2	Small Ox	Molar	Fit 273
273	Layer II 1/2	Small Ox	Ramus	
274	Layer II 1/2	Sheep/Goat	Cannon	Young
275	Layer II 1/2	Sheep/Goat	Cannon	Young
276	Layer II 1/2	Sheep/Goat	Calcaneum	Young
277	Layer III 1/2	?		Frag.
278	Layer III 1/2	?		Frag.
279	Layer III 1/2	Human	Metatarsal	18+ year
280	Layer III 1/2	?		Frag.
281	Layer 1 1/2	Starling	Ulna	
282	Layer 1 1/2	?		Frag.
283	Layer 1 1/2	?		Frag.
284	Layer 1 1/2	Starling	Coracoid	Frag.
285	Layer II 1/2	?		Frag.
286	Layer II 1/2	Sheep/Goat	Phalanx	
287	Layer II 1/2	Sheep/Goat	Phalanx	
288	Layer II 1/2	Sheep/Goat	Premolar	
289	Layer II 1/2	Rabbit	Humerus	Frag.
290	Layer III 2/3	Sheep/Goat	Vert.	Frag.
291	Layer III 2/3	Small Ox	Patella	

292	Layer III 2/3	Sheep/Goat	Ulna	Dist. Young
293	Layer III 2/3	Human	Ramus	3/4 year
294	Layer III 2/3	Roe Deer	Pelvis	
295	Layer III 2/3	Sheep/Goat	Rib	Rib
296	Layer III 2/3	Human	3rd. lumbar	18+ year
297	Layer III 2/3	Human	Thoracic	10/12 year
298	Layer III 2/3	Human	Scapula	10/12 year
299	Layer III 2/3	Sheep/Goat	Rib	Frag.
300	Layer III 2/3	Human	Tibia	10/12 year
301	Layer III 2/3	?		Frag.
301	Layer III 2/3	Human	Fibula	8/9 year
301	Layer III 2/3	Human	Rib	8/9 year
304	Layer III 2/3	Sheep/Goat	Rib	
305	Layer III 2/3	Sheep/Goat	Rib	
306	Layer III 2/3	Human	Molar	8/9 year
307	Layer III 2/3	Human	Molar	3/4 year
308	Layer III 2/3	Human	Incisor	18+ year
309	Layer III 2/3	Human	Molar	3/4 year
310	Layer III 2/3	Human	Canine	8/9 year
311	Layer III 2/3	Human	Molar	3/4 year
312	Layer III 8/9	Human	Fibula	8/9 year
313	Layer III 8/9	Human	Canine	18+ year
314	Layer III 8/9	Human	Thoracic	8/9 year
315	Layer III 8/9	Human	Thoracic	8/9 year
316	Layer III 9/10	Human	Phalanx	10/12 year
317	Layer III 9/10	Human?	Metacarpal	18+ year
318	Layer III 9/10	Human	Rib	18+ year
319	Layer III 9/10	Sheep/Goat	Vert	Frag.
320	Layer III 9/10	Sheep/Goat	Hoof core	
321	Layer III 8/9	Sheep/Goat	Humerus	Dist
322	Layer III 8/9	Sheep/Goat	Femur	Dist.
323	Layer III 8/9	Small Ox	Tibia	Dist. Young
324	Layer III 8/9	Sheep/Goat	Vert.	Frag.
325	Layer III 8/9	?		Frag.
326	Layer III 8/9	Ox	Phalanx	Young
327	Layer III 9/10	Sheep/Goat	Illium	
328	Layer III 9/10	Sheep/Goat	Rib	
329	Layer III 9/10	Sheep/Goat	Trochanter	Young
330	Layer III 9/10	Sheep/Goat	Incisor	
331	Layer III 9/10	Ox	Vert.	
332	Layer III 9/10	?		
333	Layer III 9/10	Roe deer	Cannon	
334	Layer I 3/4	Rabbit	Tibia	
335	Layer I 3/4	Rabbit	Femur	
336	Layer I 3/4	Sheep/Goat	Pelvis	Frag.
337	Layer I 3/4	?		
338	Layer I 3/4	Sheep/Goat	Radius	Young
339	Layer I 3/4	Brown rat	Femur	
340	Layer I 3/4	Razorbill	Ulna	
341	Layer I 3/4	Chough	Ulna	
342	Layer I 3/4	Cat	Scapula	
343	Layer I 3/4	?		
344	Layer I 3/4	Sheep/Goat	Pelvis	Young
345	Layer I 3/4	Sheep/Goat	Ramus	Young
346	Layer I 3/4	Rabbit	Calcaneum	

347	Layer I 3/4	Rabbit	Metatarsal	
348	Layer I 3/4	Brown Rat	Pelvis	
349	Layer I 3/4	Rabbit	Metatarsal	
350	Layer I 3/4	Rabbit	Phalanx	
351	Layer III 4/5	Sheep/Goat	Ulna	
352	Layer III 4/5	Human	Cervical	8/9 year
353	Layer III 4/5	Human	Cervical	10/12 year
354	Layer III 4/5	Human	Cervical	8/9 year
355	Layer III 4/5	Human	Calcaneum	18+ year
356	Layer III 4/5	Human	Rt. Ramus	8/9 year
357	Layer III 4/5	Human	Incisor	10/12 year
358	Layer III 4/5	Sheep/Goat	Rib	
359	Layer III 4/5	Sheep/Goat	Vert.	
360	Layer III 4/5	Sheep/Goat	Vert.	
361	Layer II 3/4	Sheep/Goat	Tibia	Young
362	Layer II 3/4	Sheep/Goat	Foot bone	
363	Layer II 3/4	Sheep/Goat	Astragalus	
364	Layer II 3/4	Sheep/Goat	Skull	
365	Layer II 3/4	Sheep/Goat	Vert.	
366	Layer III 3/4	Human	Thoracic	8/9 year
367	Layer III 3/4	Sheep/Goat	Tibia	v. young
368	Layer III 3/4	Sheep/Goat	Astragalus	v. young
369	Layer III 3/4	Sheep/Goat	Foot bone	Young
370	Layer IV 9/10	Sheep/Goat	Astragalus	
371	Layer IV 9/10	?		Frag.
372	Layer IV 9/10	Ox	Humerus	Frag.
373	Layer IV 9/10	Sheep/Goat	Sacrum	Frag.
374	Layer IV 9/10	Sheep/Goat	Rib	
375	Layer III 7/8	Human	Patella	10/12 years
376	Layer III 7/8	Sheep/Goat	Rib	
377	Layer III 7/8	Sheep/Goat	Tibia	Distal
378	Layer III 8/9	Man	Thoracic	8/9 years
379	Layer III 8/9	Man	Axis	8/9 years
380	Layer III 7/8	Sheep/Goat	Skull	Frag.
381	Layer III 7/8	Human	Thoracic	8/9 years
382	Layer III 7/8	Ox	Vert.	
383	Layer III 8/9	Human	Humerus	8/9 years
384	Layer III 8/9	Ox	Pelvis	Frag.
385	Layer III 8/9	Ox	Femur	Proximal
386	Layer III 8/9	Ox	Pelvis	Frag. Young
387	Layer III 8/9	Sheep/Goat	Humerus	Proximal
388	Layer III 8/9	Sheep/Goat	Femur	Proximal
389	Layer III 8/9	Human	Scapula	8/9 years
390	Layer III 9/10	Sheep/Goat	Vert.	
391	Layer III 9/10	Pig	Vert.	
392	Layer III 9/10	?		
393	Layer III 9/10	Sheep/Goat	Vert.	Epiphysis
394	Layer III 9/10	Sheep/Goat	Skull	Frag.
395	Layer III 9/10	?		Frag.
396	Layer III 9/10	Small Ox	Astragalus	
397	Layer III 9/10	Sheep/Goat	Vert.	Young
398	Talus	Hare	Scapula	
399	Layer I 7/8			
400	Layer I 7/8	?	Skull	Frag.
401	Layer I 7/8	?	Skull	Frag.

402	Layer I 7/8	Chough	Humerus	
403	Layer I 7/8	Hare	Ulna	
404	Layer I 7/8	?		
405	Layer I 7/8	Stoat	Ramus	
406	Layer III 7/8	Ox	Rib	
407	Layer III 7/8	Small Ox	Phalanx	
408	Layer III 7/8	?		
409	Layer III 7/8	?		
410	Layer III 7/8	Sheep/Goat	Vert.	Frag.
411	Layer III 7/8	Ox	Vert.	Frag.
412	Layer III 7/8	Sheep/Goat	Vert.	Frag. Young
413	Layer III 7/8	Sheep/Goat	Cannon	Young
414	Layer III 7/8	Sheep/Goat	Phalanx	
415	Layer I 10/11	Hare	Skull	Young
416	Layer I 10/11	Hare	Skull	Young
417	Layer I 10/11	Sheep/Goat	Pelvis	
418	Layer I 10/11	Sheep/Goat	Humerus	Small breed
419	Layer I 10/11	Bird?	Humerus	Frag.
420	Layer I 10/11	Hare	Vert	
421	Layer I 10/11	Hare	Vert.	
422	Layer I 10/11	Sheep/Goat	Sacral	Young
423	Layer I 10/11	?	Pelvis	Frag.
424	Layer V 13/15	Cat	Ramus	Young
425	Layer V 13/15	Rabbit	Ramus	
426	Layer V 13/15	Bird	Beak	Frag.
427	Layer V 13/15	Finch	Beak	Frag.
428	Layer V 13/15	Horse	Incisor	
429	Layer V 13/15	Cat	Axis	
430	Layer V 13/15	Rabbit	Incisor	
431	Layer V 13/15	Guillemot	Skull	Frag.
432	Layer V 13/15	Guillemot	Skull	Frag.
433	Layer V 13/15	Sheep/Goat	Ulna	Young
434	Layer V 13/15	Cat	Humerus	Proximal
435	Layer V 13/15	Pig	Humerus	Young
436	Layer V 13/15	?		
437	Layer V 13/15	Sheep/Goat	Radius	v. young
438	Layer V 13/15	?		Frag.
449	Layer V 13/15	Bird?	Femur	Frag.
440	Layer V 13/15	?		Frag.
441	Layer V 13/15	Bird?	Ulna	Frag.
442	Layer V 13/15	Sheep/Goat	Tibia	Foetal?
443	Layer I 10/11	Sheep size	Vert.	Frag.
444	Layer I 10/11	Sheep/Goat	Vert.	Frag.
445	Layer I 10/11	Guillemot	Skull	Frag.
446	Layer III 10/11	Sheep/Goat	Ramus	Young 4 month
447	Layer III 10/11	Sheep/Goat	Ramus	Young 4 month
448	Layer III 10/11	Sheep/Goat	Femur	Distal
449	Layer III 10/11	Human	Ramus	10/12 years
450	Layer I 10/11	Hare	Ulna	
451	Layer I 10/11	Bird?	Femur	Frag.
452	Layer I 10/11	Hare	Femur	Distal
453	Layer I 10/11	Sheep/Goat	Pelvis	Frag.
454	Layer I 10/11	Cat	Skull	Frag. Young
455	Layer III 10/11	Sheep/Goat	Vert.	Frag.
456	Layer III 10/11	Sheep/Goat	Femur	Proximal

457	Layer III 10/11	Sheep/Goat	Tibia	Proximal young
458	Layer III 10/11	Ox	Vert.	Frag.
459	Layer I 10/11	Cat	Maxilla	Young
460	Layer I 10/11	Pig	Maxilla	Young 6 month
461	Layer I 10/11	?		Frag.
462	Layer I 10/11	Rabbit	Ramus	v. young
463	Layer I 10/11	Rabbit	Ramus	v. young
464	Layer I 10/11	Starling	Lower beak	
465	Layer I 10/11	Sheep/Goat	Vert.	Frag.
466	Layer I 10/11	Rabbit	Skull	Frag.
467	Layer I 10/11	Hare	Scapula	Young
468	Layer I 10/11	Rabbit	Scapula	v. young
469	Layer I 10/11	Rabbit	Scapula	v. young
470	Layer III 11/12	Sheep/Goat	Molar	Young
471	Layer III 11/12	Sheep/Goat	Molar	Young
472	Layer III 11/12	Sheep/Goat	Vert.	Frag.
473	Layer III 11/12	Sheep/Goat	Humerus	Distal, small b
474	Layer III 11/12	Sheep/Goat	Vert.	Frag.
475	Layer III 11/12	Human	Scapula	
476	Layer III 10/11	Human	Thoracic	3/4 years
477	Layer III 10/11	Human	Lumbar	10/12 years
478	Layer III 10/11	Human	Phalanx	18+ years
479	Layer III 10/11	Ox	Vert.	10/12 years
480	Layer III 10/11	Ox	Astragalus	
481	Layer III 10/11	Human	Cervical	8/9 years
482	Layer III 10/11	Auk?	Egg shell	
483	Layer III 10/11	Ox	Scapula	Frag.
484	Layer V 13/15	Sheep/Goat	Humerus	
485	Layer V 13/15	?		Frag.
486	Layer V 13/15	?		Frag.
487	Layer V 13/15		Femur	
488	Layer V 13/15		Femur	
489	Layer V 13/15	Rabbit	Rib	
490	Layer V 13/15	Rabbit	Metatarsal	
491	Layer V 13/15	Rabbit	Rib	
492	Layer V 13/15	Cormorant	Femur	Frag.
493	Layer V 13/15	Sheep/Goat	Cannon	v. young
494	Layer V 13/15	?		
495	Layer V 13/15	Cat	Canine	
496	Layer V 13/15	Rabbit	Phalanx	
497	Layer V 13/15	Rabbit	Pelvis	
498	Layer V 13/15	Rabbit	Femur	
499	Layer V 13/15	Rabbit	Femur	
500	Layer V 13/15	Sheep/Goat	Rib	Frag.
501	Layer V 13/15	Rabbit	Pelvis	
502	Layer V 13/15	Bird?	Tibia	Frag.
503	Layer V 13/15	Rabbit	Rib	
504	Layer V 13/15	Rabbit	Metatarsal	
505	Layer V 13/15	Guillemot	Sternum	
506	Layer V 13/15	Sheep/Goat	Vert	Frag.
507	Layer V 13/15	Sheep/Goat	Vert.	Frag.
508	Layer V 13/15	Sheep/Goat	Cuboid	
509	Layer V 13/15	Sheep/Goat	Cannon	Young
510	Layer V 13/15	Sheep/Goat	Hyoid	
511	Layer V 13/15	Sheep/Goat	Rib	

512	Layer V 13/15	?		Frag.
513	Layer V 13/15	Sheep/Goat	Ulna	Young
514	Layer V 13/15	Rabbit	Ramus	
515	Layer V 13/15	Rabbit	Ramus	
516	Layer V 13/15	Guillemot	Metacarpal	
517	Layer V 13/15	Field Vole	Ramus	
518	Layer V 13/15	Rabbit	Tibia	Frag.

4.1 SOME MEASUREMENTS of COMPLETE BONES:

Species	Layer	Bone	Measurement
Stoat	Top soil	Ramus	22mm
Stoat	I	Ramus	22mm
Cat	I	Ramus	65.5mm
Roe Deer	Top soil	Metatarsal	125mm
Roe Deer	Top soil	Metatarsal	125mm
Roe Deer	Top soil	Metacarpal	121mm
Sheep	Top soil	Ramus	151mm
Sheep	Top soil	Metatarsal	127mm
Sheep	Top soil	Metacarpal	116mm
Sheep	Top soil	Calcaneum	52mm
Sheep	I	Calcaneum	50mm
Sheep	I	Astragalus	29mm
Sheep	I	Metacarpal	120mm
Sheep	I	Radius	134mm
Sheep	III	Tibia	174mm
Sheep	III	Humerus	155mm
Sheep	III	Cuboid	22mm
Rabbit	Top soil	Skull	79mm
Rabbit	Top soil	Ramus	58mm
Rabbit	Top soil	Humerus	64mm
Rabbit	Top soil	Humerus	64mm
Rabbit	Top soil	Radius	59.5mm
Rabbit	Top soil	Ulna	71mm
Rabbit	Top soil	Metacarpal	29mm
Rabbit	Top soil	Metacarpal	32.5mm
Rabbit	Top soil	Metacarpal	34mm
Rabbit	Top soil	Metatarsal	32mm
Rabbit	Top soil	Phalanx	16mm
Rabbit	I	Humerus	62mm
Rabbit	I	Radius	57mm
Rabbit	I	Femur	79mm
Rabbit	I	Tibia	90mm
Rabbit	I	Metatarsal	34mm
Rabbit	I	Calcaneum	23mm
Rabbit	V	Ramus	59mm
Rabbit	V	Ramus	59.5mm
Rabbit	V	Femur	79mm
Rabbit	V	Femur	78.5mm
Rabbit	V	Tibia	90mm
Rabbit	V	Metacarpal	28mm
Wood Mouse	Top Soil	Ramus	13.5mm
Field Vole	Top Soil	Ramus	18mm

Field Vole	Top Soil	Ramus	18mm
Brown Rat	Top Soil	Scapula	31mm
Brown Rat	Top Soil	Scapula	31mm
Brown Rat	Top Soil	Humerus	32mm
Brown Rat	Top Soil	Ulna	33mm
Brown Rat	Top Soil	Femur	42mm
Brown Rat	Top Soil	Femur	42mm
Brown Rat	Top Soil	Femur	44mm
Brown Rat	Top Soil	Tibia	43mm
Brown Rat	Top Soil	Skull	49mm
Carrion Crow	Top Soil	Ulna	75.5mm
Carrion Crow	Steps	Ulna	75mm
Carrion Crow	Steps	Humerus	61mm.
Chough	Top Soil	Ulna	71.5mm.
Chough	Top Soil	Ulna	71.5mm
Chough	Steps	Ulna	71mm
Chough	I	Ulna	71.5mm
Chough	Top Soil	Humerus	57.5mm
Chough	I	Humerus	78.5mm
Starling	Top Soil	Metacarpal	21mm
Starling	Top Soil	Tibia	44.5mm
Starling	Steps	Beak	38.5mm
Starling	Top Soil	Humerus	27mm
Starling	Top Soil	Humerus	27mm
Starling	Steps	Humerus	27mm
Starling	Top Soil	Coracoid	26.5mm
Chaffinch	Steps	Humerus	18mm
R/S Dove	Top Soil	Metacarpal	33mm
R/S Dove	Top Soil	Metacarpal	32.5
Guillemot	Top Soil	Ulna	62.5mm
Guillemot	Top Soil	Humerus	77mm
Guillemot	Top Soil	Coracoid	37mm
Guillemot	Top Soil	Coracoid	37mm
Guillemot	Steps	Metacarpal	45.5mm
Guillemot	Steps	Metacarpal	45.5mm
Razorbill	Top Soil	Ulna	73mm
Razorbill	I	Ulna	57mm
Herring Gull	Steps	Coracoid	48mm
Partridge	Top Soil	Coracoid	37mm
Domestic Fowl	Top Soil	Metacarpal	34mm
Domestic Fowl	Steps	Ulna	71mm

5.0 HUMAN REMAINS:

Note:
Without a full anatomical collection for reference the ages are all estimated.

109	Lt. Ischium	3-4 year old	Steps 0 Layer IV
Well preserved, slight deterioration at acetabulum end, exposed ends both coated in stalagmite.			

113	Rt. Clavicle	3-4 year old	Steps 0
Mid shaft remain, both articulated end facets missing. 70% covered in stalagmite			

178	Fibula	3-4 year old	Steps 0
Almost perfect condition, mid shaft section, both end facets broken off at early date. 40% coated in stalagmite.			

196	Rt. Femur	3-4 year old	Steps 0
Poor condition, distal end absent, ossification incomplete and therefore head and greater trochanter not yet formed. 40% coated in stalagmite			

293	Mandible Fig. 12	3-4 year old	Layer III

Condition:-
Mandible broken in two, right ascending ramus 150mm from rest of mandible, 30% of surface coated in stalagmite. No other teeth belonging to this individual found in the close proximity. Both condyles sponge like in appearance, ossification complete except for 4 small gaps on the lingual side of the alveoli of the incisors.

Dentition:-
Rt. m1 the only tooth intact. Under X-Ray the four adult incisors are ready for eruption, the germ of the canine can be clearly observed in its crypt, there is no sign of the crypts or germs of the adult premolars. M1 is present and can be clearly seen through the alveoli of m2.

Measurement:-

Angle of ascending ramus	140°
Gonion – Gonion	67mm
Mental eminence – condyle	66mm
Gonion – coronoid process	30mm

There are no figures available for the frequency at which 1st & 2nd mandibular premolar hypodontia occurs but must be considerably less than 0.5%.

Notes on Hypodontia:-
The absence of one or more of the deciduous and/or the permanent is not as uncommon as might be imagined, it may affect the maxillary or mandibular teeth and in some cases a complete dentition has been recorded, this is extremely rare. The Order of frequency that the absent teeth occur is given by Salzmann (1957) as follows:-
Third Molars.
Maxillary lateral incisors.
Maxillary or mandibular second premolars.
Mandibular central incisors.
Maxillary first premolars.

Discussion:-
There are 5 contributory factors that warrant consideration as to a possible cause for hypodontia.

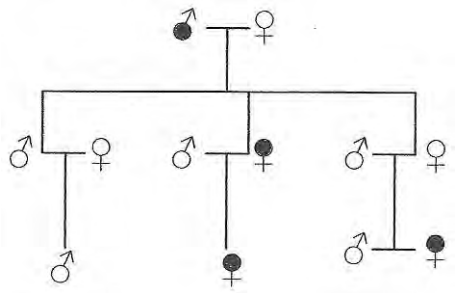
(a) Local influence to the tooth germs
(b) Constitutional disease.
(c) Nutritional disturbance

(d) Evolutionary changes in jaw size
(e) Heredity

There is no conclusive evidence to support the first three factors except in modern populations and would therefore seem little point in discussing them in their anthropological context. The hypothesis that the evolutionary trend towards smaller jaws as a contributory factor was considered by Darwin as early as 1865, but examples of hypodontia have been found in specimens with ample dental arch size and spacing. This is contradictory to hypodontia being related to such evolutionary theories.

Heredity on the other hand is certainly the most important determinant of hypodontia. Considering all forms of hypodontia together, there is clearly a wide genetic range of factors with which it may be associated. Absence of teeth is sometimes associated with mongolism, the result of a chromosomal anomaly. The absence of maxillary lateral incisors (see genetic diagram below) is mainly due to a dominant gene but occasionally to a recessive gene.

Shaded symbol denotes members with hypodontia.



Example of Hypodontia in modern population

Frequency of third molar absence in early populations

Author	Population	No. Of Specimens	% Hypodontia
Brothwell	Neanderthal	28	0
Brothwell	Upper Palaeolithic	34	11.8%
Brothwell	Mesolithic	53	1.9%
Brothwell	Neolithic	156	16.7%

Miscellaneous teeth Fig. 17		3-4 year old	W/M 2-3 Layer III
307	Upper Lt. First molar.		
309	Upper Rt. First molar		
311	Lower Rt. Second molar		

Miscellaneous teeth Fig.17		3-4 year old	Steps O
G	Upper Lt. First incisor.		
O	Upper Rt. Second incisor		

475	Rt. Scapula	3 – 4 year old	W/M 10-11 Layer III
Almost complete, 20% coated in stalagmite			

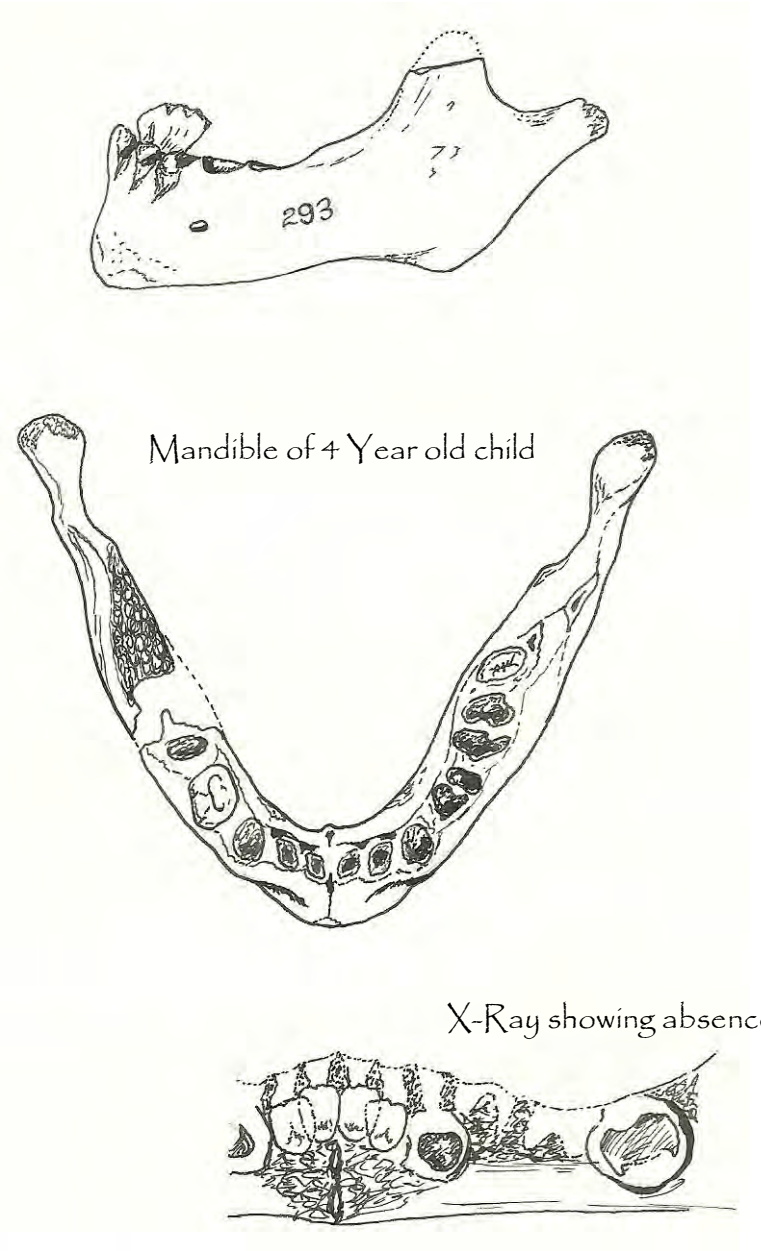


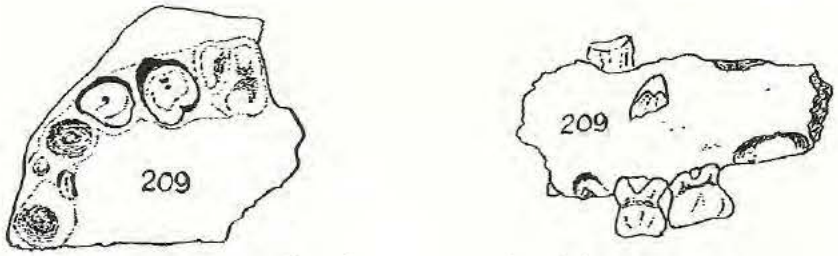
Fig. 12

01	Cervical Vertebra	8-9 year old	Steps 0
Well preserved neural spine absent 5% stalagmite			

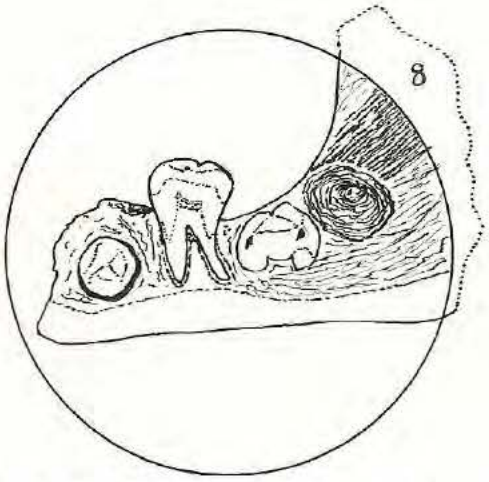
04	Rt. Calcaneum	8-9 year old	Steps 0
Poor condition, small section of articular surface identifiable, cancellous bone exposed 40% stalagmite			

08	Lt. Ramus Fig. 13	8-9 year old	Steps 0
Horizontal ramus only, ascending ramus broken off 10mm from crypt of M3, M1 present, under x-ray M2 also PM2 can be seen ready for eruption in the lateral plane. 20% stal. Notes: The abnormal growth of PM2 is by no means rare and is often found in modern populations, there are no figures available for the frequency it occurs but it is considered quite common.			

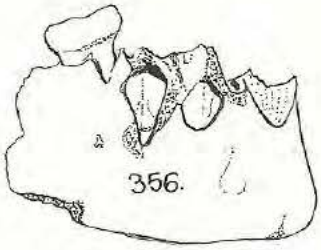
110	Cervical Vertebra	8-9 year old	Steps 0
Well preserved, neural spine absent. 90% stalagmite			



Maxilla of 8-9 Year old child



Detail of X-Ray showing abnormal growth



Mandible of 8-9 Year old child

Fig. 13

209	Lt. Maxilla Fig. 13	8-9 year old	Steps 0
Badly fractured, m1 & m2 present showing considerable wear on cusps, I2 can be observed through alveoli, C1 can be observed from the inside. PM1 can be observed through a small lateral aperture. 50 % stalagmite			

222	Lt. Patella	8-9 year old	Steps 0/1
Good condition, complete. 10% stalagmite			

249	Rib	8-9 year old	W/M 0-1 Layer III
Mid section only, 20% stalagmite			

268	Thoracic vertebra	8-9 year old	Back section
Found in three parts, badly deteriorated. 90% stalagmite			

302	Fibula	8-9 year old	W/M 2-3 Layer III
Fragment of proximal end. 60% stalagmite			

303	Rib	8-9 year old	W/M 2-3 Layer III
Mid section only, 30% stalagmite			

306	Molar	8-9 year old	W/M 2-3 Layer III
First permanent, lower right.			

310	Canine	8-9 year old	W/M 2-3 Layer III
Upper right, in good condition.			

312	Fibula	8-9 year old	W/M 8-9 Layer III
Mid section only. 5% stalagmite			

314	Thoracic Vertebra	8-9 year old	W/M 8-9 Layer III
Good condition, neural spine absent. 15% stalagmite			

315	Lumbar Vertebra	8-9 year old	W/M 8-9 Layer III
Poor condition, neural spine & transverse process absent. 40% stalagmite			

352	3rd. Cervical Vertebra	8-9 year old	W/M 4-5 Layer III
Poor condition, Centrum only. 60% stalagmite			

354	6th Cervical Vertebra	8-9 year old	W/M 4-5 Layer III
Poor condition, neural spine absent. 80% stalagmite			

356	Lt. Ramus Fig. 13	8-9 year old	W/M 4-5 Layer III
Small section of horizontal ramus from symphysis to mesial face of M1, M2 intact, and PM1 can be observed through lateral aperture, germ of PM2 can be observed through aperture on lingual side. Considerable wear on m2. 40% stalagmite			

366	Thoracic vertebra	8-9 year old	W/M 3-4 Layer III
Poor condition, Centrum absent. 5% stalagmite			

378	Thoracic vertebra	8-9 year old	W/M 8-9 Layer III
Poor condition, transverse process absent. 10% stalagmite			

379	2nd. Cervical vertebra	8-9 year old	W/M 8-9 Layer III
Axis in good condition almost complete. 80% stalagmite			

381	Thoracic vertebra	8-9 year old	W/M 7-8 Layer III
Fragment of Centrum, poor condition. 5% stalagmite			

383	Lt. Humerus	8-9 year old	W/M 8-9 Layer III
Mid section only, poor condition nearly all compacted bone has deteriorated, small hole in middle appears to have been made post mortem? 5% stalagmite			

389	Lt. Scapula	8-9 year old	W/M 9-10 Layer III
Poor condition, fragment only, glenoid cavity and coracoids process. 80% stalagmite			

481	5th. Cervical vertebra	8-9 year old	W/M 10-11 Layer III
Poor condition neural spine absent, Centrum badly deteriorated. 10% stalagmite.			

112	Phalanx	10-12 year old	Steps
Poor condition, cancellous bone exposed at proximal end. 20% stalagmite			

192	Fibula	10-12 year old	Steps
Mid fragment to fit 246 80% stalagmite			

208	Cervical vertebra	10-12 year old	Steps
Perfect condition no sign of deterioration. 5% stalagmite			

219	Incisor	10-12 year old	Steps
Left lower 2nd, considerable wear on occlusal face			

223	Rt. Metacarpal III	10-12 year old	Steps
Proximal end absent, small hole on the dorsal face at the point of fusion, distal epiphysis and shaft. 40% stalagmite. Similar to 223 40% stalagmite			

245	Incisor	10-12 year old	W/M 0-1 Layer III
Lower Rt. first, good condition, slight wear on occlusal face.			

246	Fibula	10-12 year old	W/M 0-1 Layer III
Mid fragment to fit 192 40% stalagmite			

250	Rib	10-12 year old	W/M 0-1 Layer III
Mid fragment 75% stalagmite			

297	Lumbar vertebra	10-12 year old	W/M 2-3 Layer III
Almost complete although in poor condition. 90% stalagmite			

298	Lt. Scapula	10-12 year old	W/M 2-3 Layer III
Fragment of infra-spinous fossae only			

300	Tibia	10-12 year old	W/M 2-3 Layer III
Mid fragment 30% stalagmite			

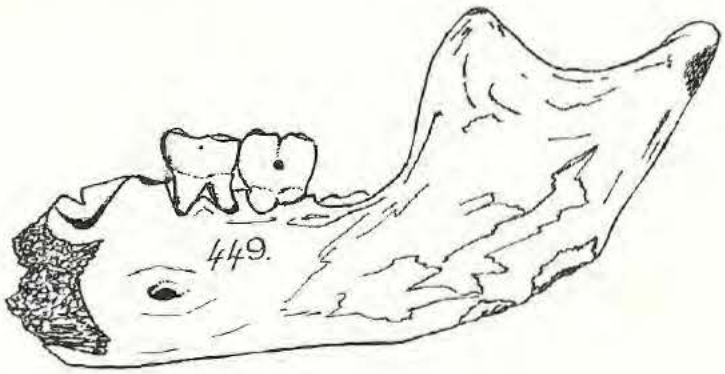
316	Lt. Metacarpal III	10-12 year old	W/M 9-10 Layer III
Good condition, small hole on the dorsal face at the point of fusion, distal epiphysis and shaft. 40% stalagmite. Similar to 223 40% stalagmite			

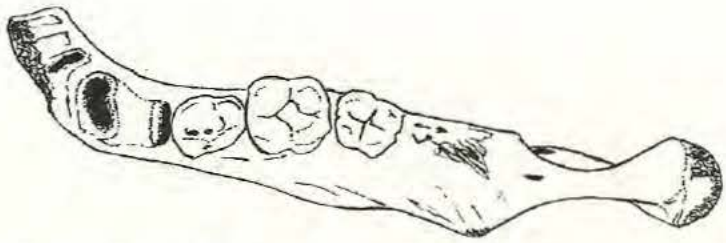
353	6th. Cervical vertebra	10-12 year old	W/M 4-5 Layer III
Complete, good condition			

357	Incisor	10-12 year old	W/M 4-5 Layer III
Lt. Upper second, good condition			

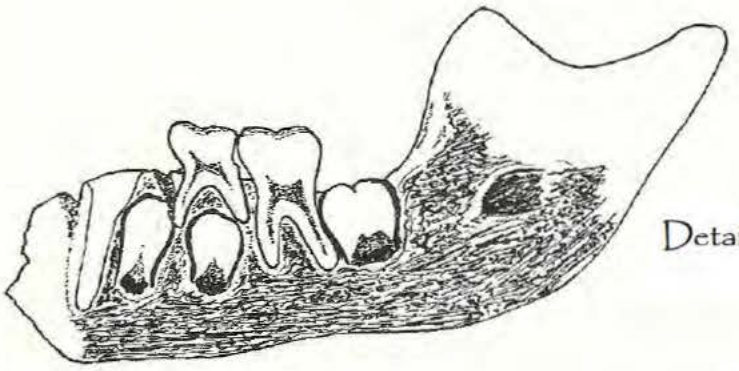
375	Rt. Patella	10-12 year old	W/M 7-8 Layer III
Good condition	50% stalagmite		

449	Lt. Ramus Fig. 14	10-12 year old	W/M 7-8 Layer III
Poor condition, compacted bone covered in surface cracks, broken close to symphysis. m2 & M1 present, M2 can be observed ready for eruption, from x-ray PM1 & PM2 can be observed but there is no evidence of germ or crypt of M3			





Mandible of 10-12 Year old



Detail of X-Ray

Fig. 14

476	Thoracic vertebra	10-12 year old	W/M 10-11 Layer III
Poor condition, neural spine and transverse process absent		5% stalagmite	

478	Phalanx	10-12 year old	W/M 10-11 Layer III
Good condition 95% stalagmite			

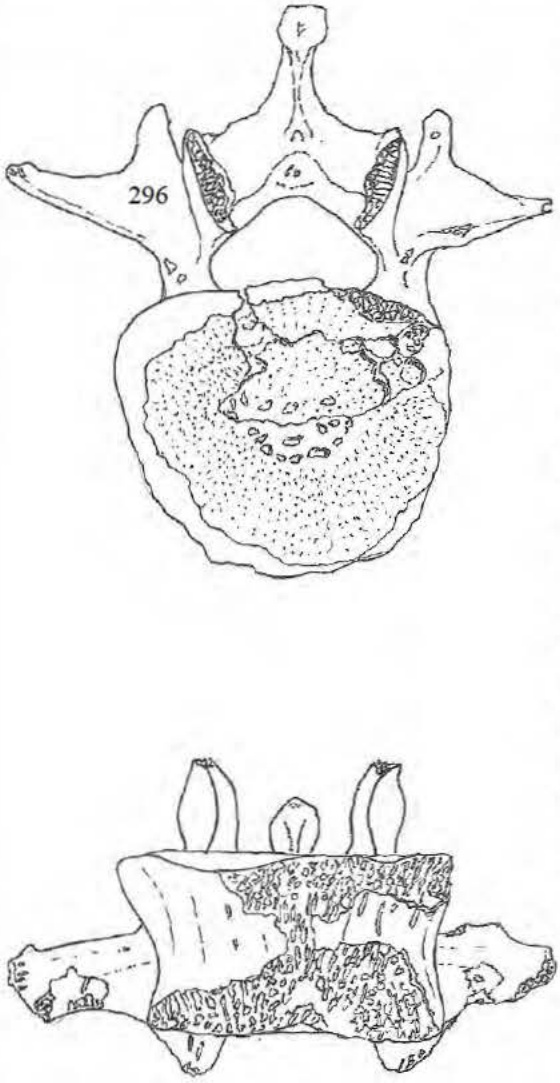
Miscellaneous teeth Fig. 17		10-12 year old	Steps 0
A	Lower Rt. Second molar, root incomplete.		
C	Upper Lt. First incisor.		

7	Lumber Vertebra	18+ year old	Steps
Poor condition, Centrum badly deteriorated transverse process absent 5% stalagmite			

221	Lt. Ilium	18+ year old	W/M 0-1 Layer IV
Small fragment containing the sacro-iliac, embedded in lower stalagmite base			

279	Lt. Metatarsal	18+ year old	W/M 1-2 Layer III
Good condition 20% stalagmite			

296	Lumber Vertebra Fig. 15	18+ year old	W/M 2-3 Layer III
Centrum badly deteriorated 20% stalagmite			



Lumbar Vertebra Human Fig. 15

An examination of the 19 human vertebrae recovered from layer III, showed varying degrees of abnormal compression to the centrum. The deterioration of the bone in general and in particular the centrum, is quite severe. In many cases it is difficult to determine the true extent of wear or compression to the anterior and posterior surfaces of the body. The best examples we have is from the three adult lumbar vertebrae.

No. 296 (left) shows considerable wear to the anterior face (shown), with just a small area of the original bone still intact around the outer perimeter. There is also damage to the centrum inside the neural canal, though because of its general condition it is difficult to determine whether this was post mortem damage.

The centrum in some specimens are distorted as shown (bottom left), the flattening of the anterior surface appears to have spread the body of the centrum to the right hand side of the spinal column. As can be seen the anterior surface is much wider in the lateral plan than the posterior surface. This is common to some of the other vertebra but not as pronounced as vertebra 296.

This would suggest that external pressure from continually lifting/carrying heavy loads over a lengthy period of time has contributed to the compression and distortion of the centrum.

308	Incisor	18+ year old	W/M 2-3 Layer III
Upper Rt. First Incisor, wear on occlusal face 10% stalagmite			

313	Canine	18+ year old	W/M 8-9 Layer III
Lower Lt. Canine good condition			

318	Rib	18+ year old	W/M 9-10 Layer III
Mid section only 35% stalagmite			

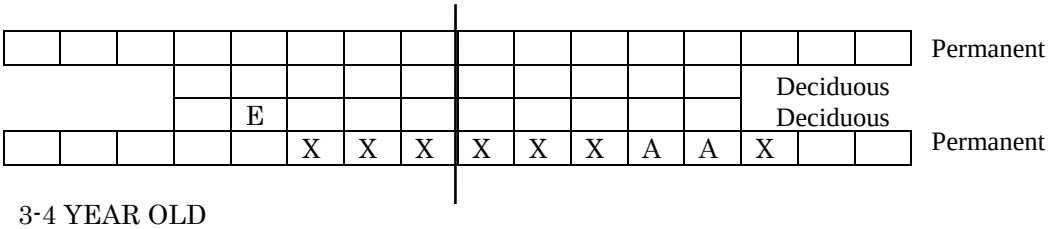
355	Lt. Calcaneum	18+ year old	W/M 4-5 Layer III
Badly deteriorated at distal end 50% stalagmite			

477	Lumber Vertebra	18+ year old	W/M 10-11 Layer III
Poor condition 10% stalagmite			

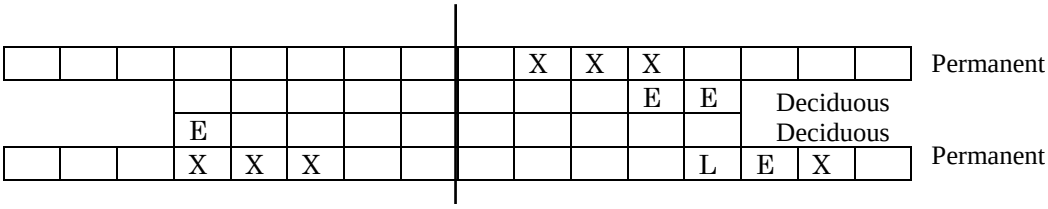
Miscellaneous teeth Fig. 17		18+ year old	Steps 0
B	Lower Rt. Second premolar		
D	Upper Lt. Second premolar		
E	Lower third molar		
F	Lower Rt. Second incisor		

5.1 INTACT DENTITION:

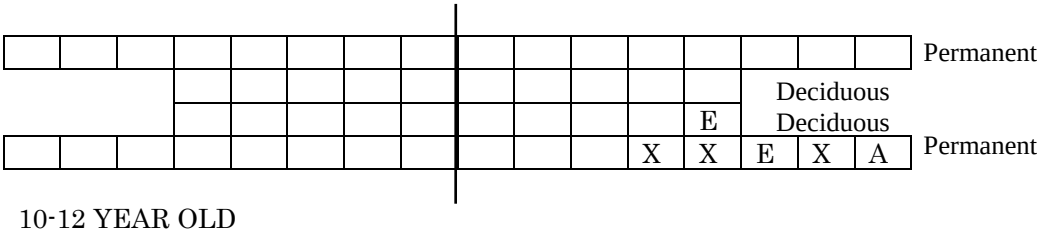
Legend:
A-Absent from x-ray
E-Erupted
L-Abnormal lateral growth
X-Observed from x-ray or alveoli



3-4 YEAR OLD



8-9 YEAR OLD



10-12 YEAR OLD

Fig. 16

5.2 INDIVIDUAL DENTION:

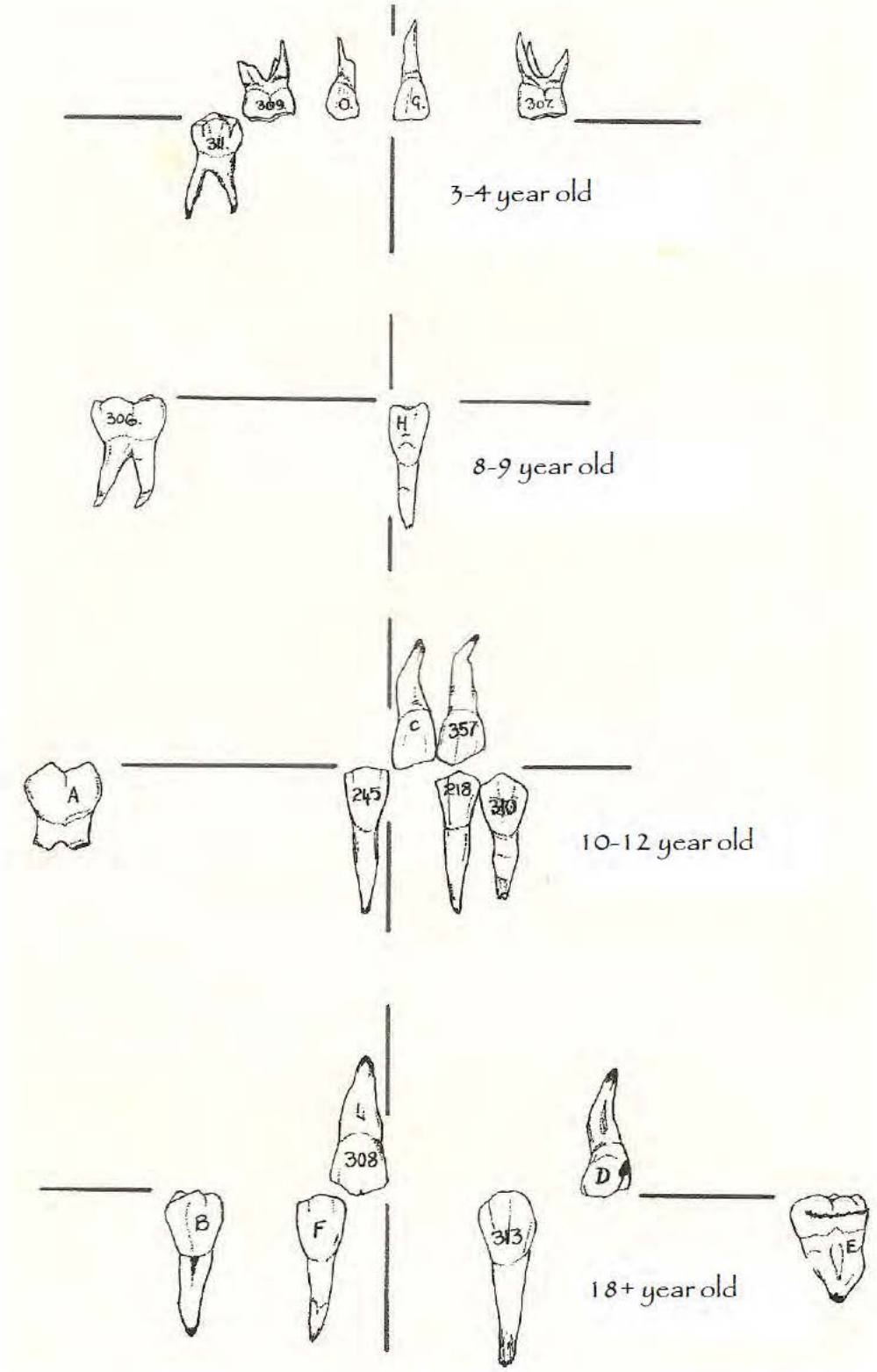
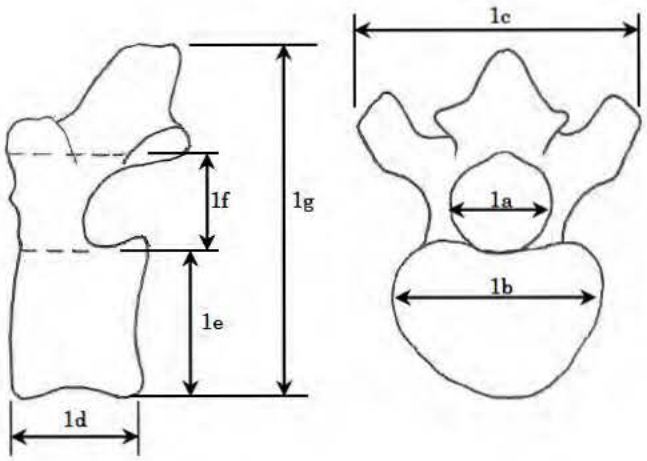


Fig. 17

5.3 MEASUREMENTS of HUMAN VERTEBRAE:

MEASUREMENT OF VERTEBRAE



Legend:

1a	Maximum transverse width, Neural arch
1b	Maximum transverse width, Centrum (posterior)
1c	Width transverse process
1d	Centrum thickness
1e	Centrum length
1f	Neural arch height
1g	Maximum length

No.	Age	Vertebra	1a	1b	1c	1d	1e	1f	1g
379	8-9	Axis	21mm	20mm	47mm*	26mm	12mm	17mm	-
352	8-9	3rd. Cervical	-	20mm	-	12mm*	14mm	-	-
110	8-9	4th. Cervical	22.5mm	19mm	-	12mm	15.5mm	14mm	-
481	8-9	5th. Cervical	23mm	21mm*	-	-	14mm*	15mm	-
354	8-9	6th. Cervical	22mm	20mm	-	-	13mm	14mm	-
01	8-9	7th. Cervical	24.mm	21mm	-	11mm*	16mm*	-	-
314	8-9	Thoracic	17mm	31mm	58mm*	14mm	18.5mm	5mm	-
378	8-9	Thoracic	17mm	29mm	59mm*	17mm	20mm	16mm	-
315	8-9	Thoracic	17mm	25mm	62mm*	18mm	21.5mm	14mm	-
297	10-12	Lumbar	18mm	33mm	39mm*	18mm	23mm	18.5mm	-
208	10-12	4th. Cervical	26mm	21mm	59mm	13.5mm	14mm	16mm	45.5mm*
353	10-12	6th. Cervical	25mm	22mm	-	12.5mm	16mm	15.5mm	51mm
476	10-12	Thoracic	15mm	34mm	-	20.5mm	25mm	14mm	-
07	18+	Lumbar	21.5mm	42mm*	-	-	29mm	15.5mm	72mm
477	18+	Lumbar	20mm	39mm*	46mm*	21.5mm	24mm	17.5mm	-
296	18+	Lumbar	21.5mm	44mm	74mm	23mm*	34mm*	15mm	76mm

* Estimated measurement of deteriorated or broken bone where possible.

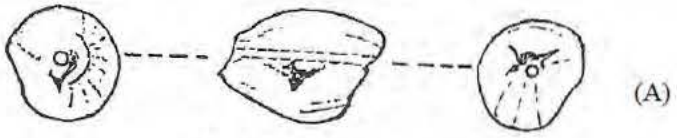
In many cases the deterioration of the bone is so severe that it has made it impossible to obtain or estimate a measurement with any accuracy and the boxes have remained blank.

Analysis of the human remains are covered in section 9.0

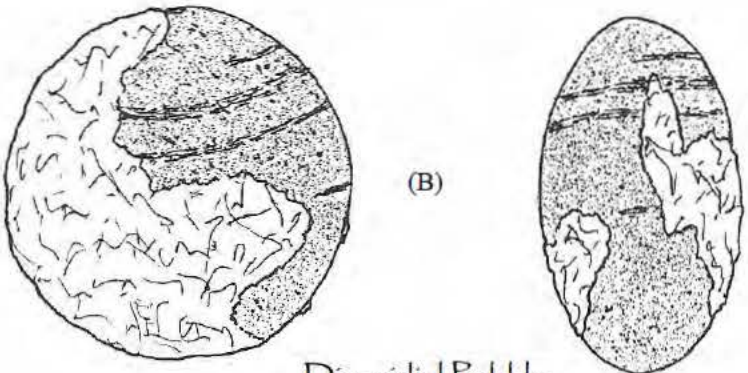
6.0 ARTEFACTS:

The artefacts found are small in number but varied in form and can't be assigned with any certainty to any one cultural form, with the exception of the amber bead. All the artefacts were found in Layer III and were evenly spread throughout the length of the deposit and are described as follows:

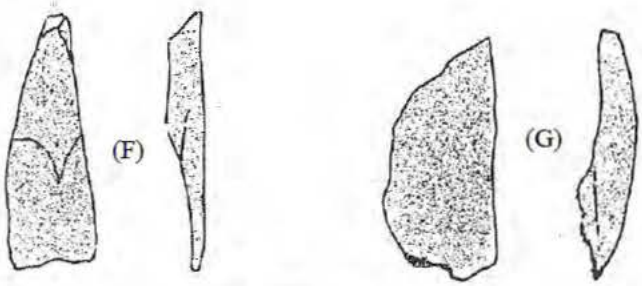
(A) AMBER BEAD- Beck classification D1F/D2F
Smooth surface texture, orange brown in colour, semi transparent, almost ruby colour when held in front of a light. Round parallel bore almost through centre 1.5mms in diameter. Weight 2.02 grams. (Preserved in Cedar oil and Beeswax)
Indicative of Beaker period, early Bronze Age.



Amber Bead



Discoidial Pebble



Slate Tools

Fig. 18

(B) DISCOIDIAL PEBBLE- 45mm Dia. X 26mm
(C) DISCOIDIAL PEBBLE- 53mm Dia. X 30mm
(D) DISCOIDIAL PEBBLE- 60mm Dia. X 28mm
(E) SPHERICAL PEBBLE- 32mm Dia.

The significance of the water washed pebbles (B, C, D & E) is somewhat obscure. Their size and the absence of any pecking marks would rule out their use as hammer stones. It is possible that they were used as pot boilers though there is no other evidence to support this, other than we know from the charred remains from the midden that they cooked their meat. The origin of the pebbles is the beach below and so they must have been transported by the occupiers of the cave and so played some part in the lives of the people that used the cave for shelter.

(F) SLATE POINT- 33.2mm in length
(G) SLATE POINT- 32.4mm in length

Slate is not common to the Little Ormes Head and to find two small pieces amongst the deposits came as a surprise. As they were obviously not part of any natural deposit it was worth recording their discovery. In 1976 the year the excavation was completed a report was published by the City of Stoke-on-Trent Museum Archaeological Society (Report No. 9) detailing the finds from Wetton Mill Rock Shelter. It contained details of slate tools used by the occupants (Early Bronze Age) and were thought to be leather working implements. Associated with the slate tools were Beaker corded ware pottery. It is highly possible that the two slate points were also used by the occupants for piercing leather work.

(H) BANDED FLINT
(I) CHERT FLAKE
(J) CHERT FLAKE

The above three liths show no signs of modification and do not conform to any recognised culture. They would appear if anything, to being chance finds amongst the debris found in the large fissure, in what is now a quarry. They may well have been used as tools for cutting or scraping but were not specifically knapped or designed to perform any particular task.

(K) ANTLER TOOL 110mm in length.

This artefact shows all the signs of being used as a pick and has been utilised from a Roe Deer antler tine. The end point is now significantly rounded through persistent hammering or digging. Mid way along its length are two shallow notches that might have held binding in place when being hafted.

(L) SHAPED BONE 29mm overall length

Part of a long bone (sheep size), shattered along both edges and at each end, black when recovered but was highly polished when dried out. The outer surface of the fragment was also polished where it meet the shattered edges. Taking into account the high polish on the outer surface and along the edges it would appear as if this small fragment of bone is all that remains of a larger implement, purpose unknown?

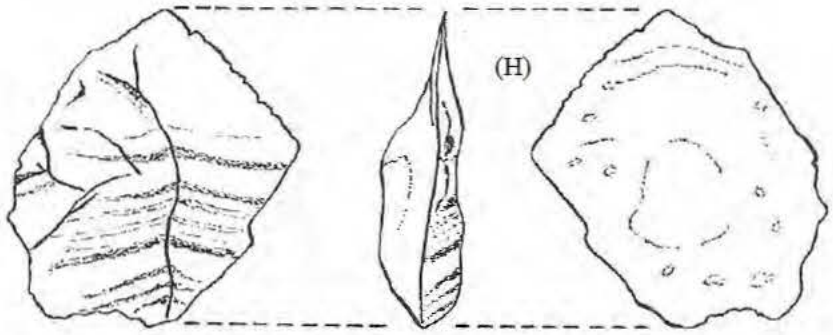
(M) PHALANX 34mm in length

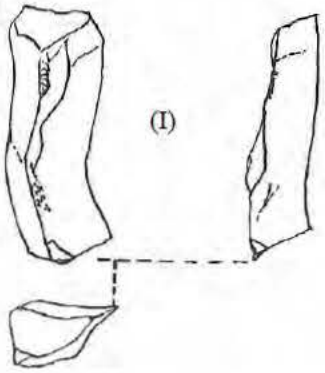
Phalanx of young sheep with small hole pierced 10mm on lateral face, 10mm from proximal end.

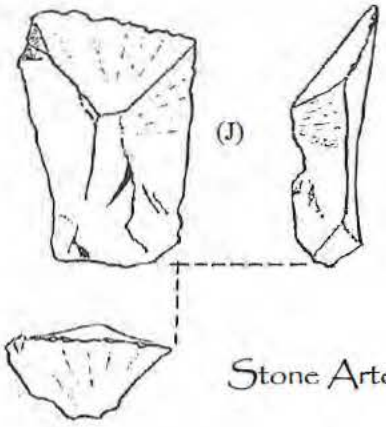
(M)

Pierced Phalanx

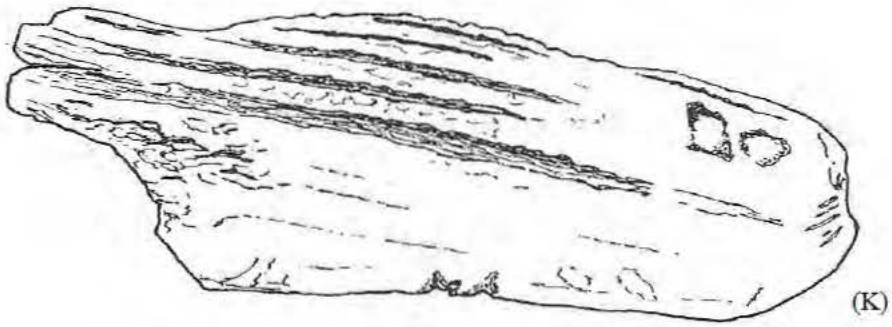
Fig. 19







Stone Artefacts

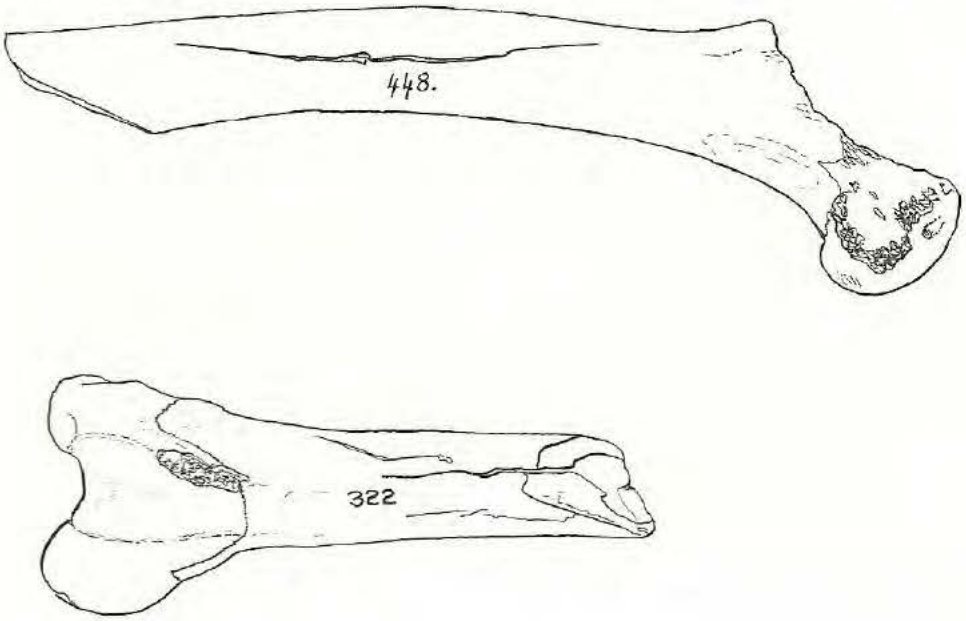


Antler Tool

Fig. 20

7.0 MIDDEN MATERIAL:

On most archaeological sites that have been in use by Humans there is often an extensive amount of fragmentary bone material to be examined and identified. Much of this fragmentary material is part of the natural processes that occur within the cave but some of the material will be by direct human involvement. The North Face Cave is no exception to this and a number of bones show signs of butchery. The detailed analysis of this material and the subsequent interpretation plays a big part in our understanding of the lifestyles of the inhabitants.



Shattered long bones

Fig. 21

7.1 CATALOGUE of MIDDEN MATERIAL

321	Sheep (Young) Fig. 21	Humerus	Length 47mm
Distal end of humerus, cut with heavy tool, cracked along length of shaft			

322	Sheep (Young) Fig. 21	Femur	Length 81mm
Distal end of humerus, cut with heavy tool, cracked along length of shaft			

448	Sheep (Young) Fig. 21	Femur	Length 130mm
Distal end of humerus, cut with heavy tool, cracked along length of shaft			

456	Sheep (Near Adult) Fig.21	Femur	Length 50mm
Proximal end of femur, trochanter cut, broken just below neck.			

388	Sheep (Young) Fig. 21	Femur	Length 32mm
Proximal end femur, epiphyses not fused, smashed below neck.			

453	Sheep (Adult)	Pelvis	Length 50mm
Fragment of pelvis mid section, two cut marks made each side of acetabulum with sharp tool.			

417	Sheep (Adult)	Ilium	Length 59mm
Fragment of pelvis, cut adjacent to acetabulum, cut with sharp tool.			

384	Small Ox (Adult)	Ischium	Length 100mm
Fragment of pelvis, two small cuts end adjacent to acetabulum, appears to have been smashed with heavy tool.			

10	Small Ox (Adult) Fig. 22	Vertebra	Length 77mm
Thoracic vertebra almost complete one cut each side, parallel to the MSP, cutting through anterior and posterior zygapophyses.			

458	Small Ox (Adult) Fig. 22	Vertebra	Length 51mm
Lumbar Vertebra, Centrum one cut parallel to MSP made with sharp heavy tool.			

331	Small Ox (Adult) Fig. 22	Vertebra	Length 45mm
Lumbar Vertebra, Centrum two cuts, one each side, parallel to MSP made with sharp heavy tool.			

382	Small Ox (Adult)	Vertebra	Length 62mm
Cervical vertebra, almost complete. One cut parallel to MSP, cutting through anterior and posterior zygapophyses. Made with sharp heavy tool.			

479	Ox (Young)	Vertebra	Length 57mm
Cervical vertebra, fragment of Centrum, epiphyses absent, charred along one edge, single cut parallel to MSP.			

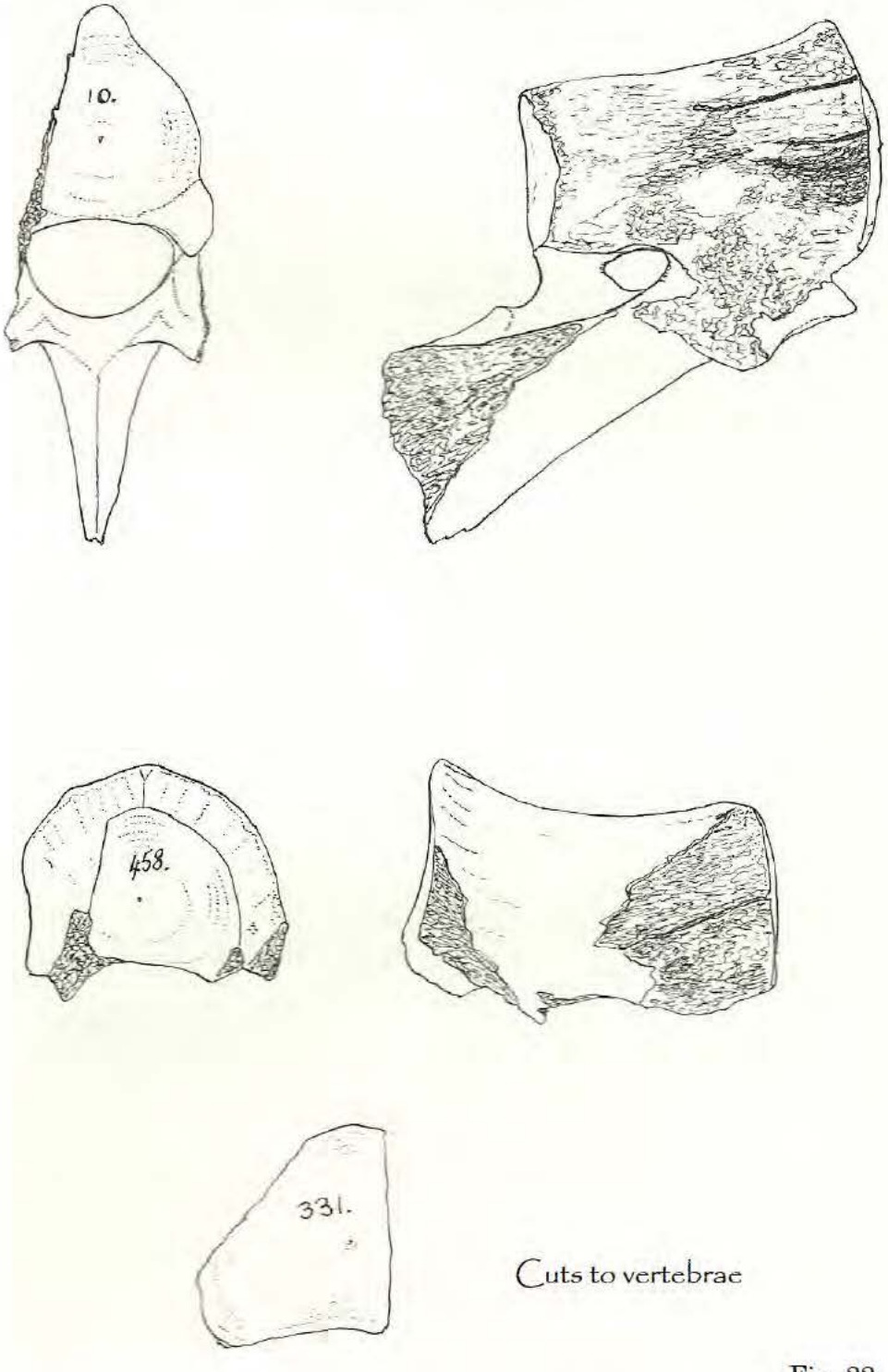
411	Small Ox (Adult)	Vertebra	Length
Thoracic Vertebra, fragment of transverse process, six small cuts in neural arch almost parallel to MSP			

104	Sheep (Young)	Ulna	Length 106mm
Two small cuts at head of olecranon.			

144	Sheep (Young)	Rib	Length 37mm
Proximal end only, two small cuts.			

445	Sheep (Young)	Vertebra	Length 21mm
Thoracic Vertebra, fragment of Centrum, epiphyses absent, one cut parallel to MSP made with heavy tool.			

482	Razorbill size	Egg Shell	Various
Four small fragments of egg shell belonging to same egg. White/cream colour could be due to weathering			



Cuts to vertebrae

Fig. 22

7.2 INTERPRETATION of MIDDEN MATERIAL:

The quantity of butchered bones from the cave interior is small but tells us something of the people that used the cave. In total, just 17 bones represent the young and old of Sheep, Ox and small Ox. 6 Fragmentary long bones all show signs of being smashed with a heavy tool to shatter the bones along their length (Fig. 21) and is a common method used to extract marrow. Three fragments of pelvis show cut marks adjacent to the acetabulum; this would suggest that the hind limbs were removed before roasting, leaving the muscle attachments and the acetabulum in situ on the head of the femur. This appears to be the preferred way to remove the hind limb and has been observed at other ancient site where a whole carcass has been cut up. In the case of the Ox Ischium, it is fair to assume that the bone being so large was smashed with a heavy tool rather than cut. A single rib, (proximal end) has been recovered that shows two small cut marks, both are quite sharp and follow round the ribs circumference, probable made with a flint knife type tool.

The final series of bones are vertebrae and show cut marks made with a heavy sharp tool, (Fig. 22) in the case of the Ox, cutting right through the centrum body with just one blow, indicative of a metal (bronze) axe. In each case the vertebra have all been cut parallel to MSP this suggests that the carcass was split down the middle first, making jointing the rest of the beast a much easier task. In analysing the cut marks is was readily noticeable that the cut starts from the ventral face and finishes slightly inclined towards the anterior end. This implies that the beast was lying on its back with its head between the butcher's legs, or alternatively, the beast may have been hung from a tree by its hind legs allowing the blood to drain from the body. This method is the same as the modern butcher employs.

Whilst the evidence provided by the scant remains give us a good indication as to the methods of butchery employed by these peoples, it unfortunately it tells us little of the preferences of the inhabitant's diet, sheep or ox, young or old, if any.

The remains of pig and roe deer are present in layer III, but none show any indication that they were butchered or used for food. The pig is represented by one adult incisor and the maxilla of a young animal, There is little chance of the pig accessing the cave of its own, it is not the most sure footed of beasts. Its introduction to the cave deposits can only have been made with human intervention. The roe deer on the other hand could have accessed the cave talus but it seems unlikely as there is nothing to tempt them to such a barren place. While no evidence is presented to suggest it was used as food, a single antler was used as a pick.

In the above interpretation of the midden remains it is pointed out the actual method employed by the inhabitants in jointing the carcass before roasting, this does not imply that this was the normal way of jointing a carcass. The difficulty in accessing the cave may have forced the inhabitants to butcher the carcass in such a way that it made transportation to the cave entrance accessible. Such a hypothesis would be difficult to prove; it would therefore be interesting to find similar or conflicting methods of butchery in other neighbouring caves or shelters with easy access. With this in mind it was decided to make a reappraisal of the scant midden remains from Chimney Cave (Site 5, Vol. 1) that was excavated in 1962 and was subsequently destroyed by vandals in 1963. It was revealed that two of the bones showed cut marks strikingly similar to the bones from the North Face Cave

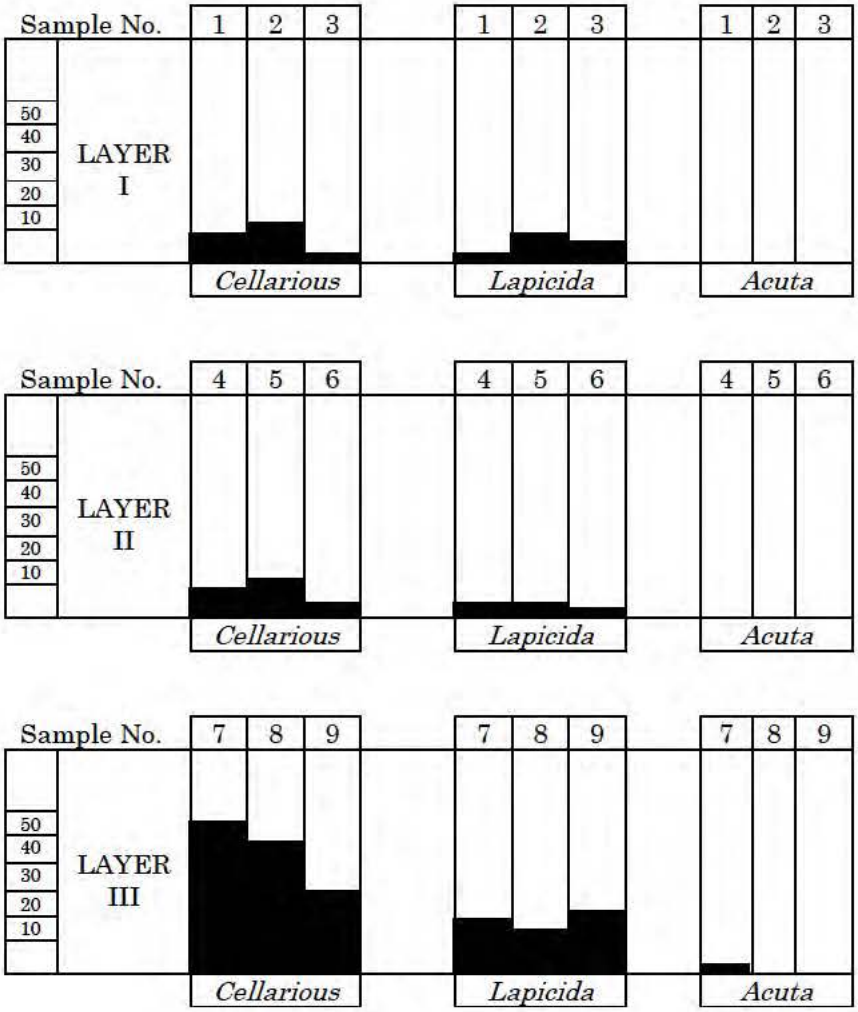
8.0 LAND SNAILS:

In the disturbed back section a number of snail shells were recovered, those identifiable were recorded but because of their insignificance in relationship to their layers of origin no count was made. Once the undisturbed layers were reached measured soil samples

were taken for further analysis. A total of nine samples were removed: taken from layers I, II & III in three different locations along the length of the deposit at wall mark 3,6 & 9. Each sample measured 320 cubic cms. By employing the floatation method to extract the shells from the sediments a total of 182 shells were recovered, 77% of these from layer III alone. Also contained in this layer were 5 snail eggs of an unknown species. In all, three different species were identified, as follows:

Cellar Snail, *Oxychilus cellarious*
Lapidary Snail *Helicigonia lapicida*
Pointed Snail *Cochlicella acuta*

The number of actual species could well have been greater as a vast amount of fragmentary shells were recovered, of these only the lapidary snail with its distinctive ribbing was identifiable. The results of the samples analysed can be seen in the diagram below.



The size and shape of the empty shells makes movement within the soil levels somewhat easy and therefore creates problems in presenting species thought to be coeval with other remains in the same horizon. As each sample shows a basic similarity to the other samples from the same layer, it is reasonable to suggest that that the results obtained give a fair picture of the snail population. Further evidence can be drawn from the 5 specimens of *Helicigonia lapicida* (less than 3%) that were found in the red brown clay

layer. They indicate favourably to there being little movement between layers as they are a species that dislikes damp conditions. All three species are common to limestone areas and are often recovered from archaeological sites. *Oxychilus cellarious* is a carnivorous snail and is frequently found in burial sites from the Neolithic period onwards, it has been recovered in all three layers, with the greatest concentration in Layer III. Although *cellarious* favours damp conditions, Layer II contained only 8% of the total cellarious population, this was possible caused by the lack of decaying matter.

The opposite result is obtained in the count from Layer III, the vast amount of decaying flesh could well have attracted such large numbers. A calculation based on the average number of shells from the three samples and the approximate volume of deposit in layer III, would give an estimated population of 12,000 *Oxychilus cellarious* snails!

9.0 CONCLUSIONS:

The general topography of the Little Ormes Head can have changed little in the past few millenniums or so, it is still a fairly barren outcrop. Today the only big change to the Head is the large man-made scar in the form of the old stone quarry along the north east coast. In the quarry can be found a large fissure filled with glacial drift where the inhabitants of the cave could well have obtained their flint and chert for tools. It is also presumably the fissure first explored by Mr. G. H. Morton in 1898 who recovered the remains of Rhinoceros, Bear, Hyena and a Human skull.

The only natural change is the deterioration of the rock faces due to winter fracturing, as pointed out in the preliminary report 1962-1967 on the investigation of the rock shelter and cave. It is hoped that now work has finished on the North Face Cave a full excavation can be carried out on the rock shelter at some future date.

As for the North Face Cave, we must assume that the only path giving access to the cave must have been considerably wider and safer in the past. The remains of the 4 year old child is testament to this as it would be impossible for such a young child to make the journey on foot down such a treacherous steep slope and around a precarious rock outcrop. Neither would it be possible to carry the child to the cave under present day conditions. Nor, might it be added that it would be foolhardy to carry large cuts of meat over such terrain. We must therefore conclude that the north face has suffered considerable deterioration over the last four thousand years.

It is not difficult to visualise why humans should chose the Little Ormes Head as a dwelling place as it contains a number of small caves and shelters, all ideal for habitation purpose. It also affords a panoramic view of a large part of north Wales, to the west, the Great Ormes Head, to the south west across the river Conwy to Penmaenmawr and to the east the whole of the north coast across Colwyn Bay as far as the Point of Ayr.

Before we draw any conclusions to the inhabitants of the cave it would be of use to examine other comparable cave sites in the area and draw parallels to the North Face Cave if there are any. One such cave can be found on the neighbouring Great Ormes Head. The cave was used by a local lapidary as a workshop Kendrick Cave, (site 60, Vol. 1). In 1879 when extending the cave further he found a section filled with calcareous breccia, amongst this were found the remains of Brown Bear, Pig, Small Ox, Horse and Sheep, also the remains of 4 Humans, 3 adults and a child. Sir Boyd Dawkins who examined the remains mentioned that they were comparable to other Neolithic finds in the area. Beaker and Peterborough Ware pottery was also recovered giving a date as early Bronze Age. The recent excavation at Snail Cave (2012) also revealed evidence that indicated use of the shelter during the early Bronze Age.

Further afield, other parallels to the cave can also be drawn from Heathery Burn Cave (Durham) and Kilgreany Cave (Co. Warterford), in both caves Human remains have been found embedded in the calcareous breccia, both with Bronze Age affinities, including amber beads.

To what extent the cave was used by humans is difficult to assess, there is no evidence to suggest one way or another if this was of prolonged or intermittent duration. The absence

of any hearth or any large quantities of charcoal implies that cooking was carried out on the talus, under the protective arch of the rock face above (Fig. 23). Any evidence of such a hearth has long since been washed away by rains and swept away by winds that buffet the caves entrance, especially in the winter months. There is not a wealth of butchered material and it would be more than obvious to suggest that in most cases the majority of food remains would have been thrown from the talus down the cliff face, only occasionally, when inclement weather would drive the occupants inside the cave would the remnants of a meal be discarded in the cave interior. It is not possible to determine the preferences of meat, (if there are any), we do know however that the cave was at one period occupied during the spring as the bones of young sheep indicate. Interestingly there has been no evidence recovered that would suggest the occupiers had any preference for sea food, no shells or bones from fish were found. Kendrick's Cave and Snail Cave, both on the Great Ormes Head, have revealed sea shells indicating that sea food played some part in the diets of their occupants.

The date the cave was occupied and ultimately that of the human remains is based on geological and anthropological evidence. The geological evidence is the positioning of the bones at the top of the stalagmite layer; the thick stalagmite layer (Layer IV) would have been formed mainly during the Atlantic period when the climate was warm and quite moist. These are ideal conditions for the formation of stalactites and stalagmites. Each droplet of water permeating through the cave roof carries with it a small particle of limestone washed from the cave walls, the warm air evaporates the water leaving behind a minute particle of limestone. Over thousands of years, providing the cave floor is not regularly disturbed, the stalagmite base (spelotherm) would build up, eventually attaining a considerable thickness, as it has in the North Face Cave. Climatic conditions within the cave will have been governed by its location, to the north the open sea and to the south the mountainous land mass that is Snowdonia. It would therefore not be surprising to note that similar stalagmite deposit have been uncovered on the neighbouring Great Orme. On the neighbouring Great Orme, Kendrick's cave has a similar thick stalagmite base that has produced evidence dating from the Late Upper Palaeolithic and through to the Neolithic at least and early Bronze Age.

The discovery of the human bones in the North Face cave came from three separate locations but are linked by a common factor, stalagmite. The majority of bones were recovered from layer III and all, to a varying degree, were coated in stalagmite. It is interesting to note, that whilst the majority of the butchered bones were also found in layer III they did not have such a marked coating of stalagmite. A few human bones were recovered from Layer IV, the stalagmite base; theses bones were partially exposed once layer III had been removed, the remainder of the bone was embedded in the stalagmite base. The third location is the Steps area; here the bones and teeth were exposed, but again partially embedded in the stalagmite. Note: the Steps area appears to be an area recently cut into, possibly by pot-holers trying to push the cave further? It is almost certain that a great deal of bone material is still embedded in the stalagmite base. The recovery of human material from the three locations, within the stalagmite, partially exposed and on the surface but coated in stalagmite, would place these individuals at the end of the Atlantic period and towards the sub-boreal period.

The tools used on the butchered bones can tell us something of the culture of the occupants. The cut marks on the Ox bones (Fig. 22) are extremely sharp and have chopped through over 30mm of fresh bone in one clean stroke, this would not only require some force but the tool would need to be shaped with an acute angle and be quite weighty. This evidence would suggest a metallic axe rather than a stone axe.

By far the most compelling piece of evidence is the single amber bead (Fig. 18). Amber or succinite, is a fossilised resin originating from a variety of pine trees, and is found in quantities around the Baltic coast. It was highly treasured during the early Bronze Age (Beaker people) and was looked upon as a high status material for the manufacture of beads and other decorations. The bored hole down the centre certainly indicates that it was designed for a necklace or bracelet but the single bead was all that was recovered. It is possible that the remainder of the necklace is still embedded in the stalagmite layer in the same deposit that retains many of the human bones. The finding of the slate tools (Fig. 18) supports the Early Bronze Age (Beaker) date, as similar slate

tools were recovered from Wetton Mill rock shelter in a Beaker context, with associated corded ware and comb-stamped decorated pottery and shard's.

The stalagmite layer in which the Neolithic people were found on the Great Ormes Head will have been formed during the warm and dry climatic conditions of the sub-Boreal period, as both cave will have experienced similar climatic conditions, it would be fair to suggest that the period the North Face Cave was occupied was at the later end of this period. In conclusion, the climatic conditions hint that the occupation of the cave was sometime during the Neolithic/Bronze Age transition circa 3,800 BP. The recovery of an amber bead would support this theory as amber was introduced by the Beaker people during the early Bronze Age. The cuts made to the Sheep and Ox bones were made with a sharp metallic axe would also indicate at the earliest Bronze Age.

The most spectacular archaeological site on the Great Ormes Head is without a doubt the ancient Copper Mines where the ore was first excavated during the early Bronze Age. 13 radiocarbon dates have been obtained from various material sources within the site, including charcoal; they give dates in the range of 3,880 BP – 3,200BP.

Other early Copper Mines give a similar range of dates, Alderly Edge 4,000BP, Copa Hill near Cwmystwyth 4,100 BP. And further afield, Mount Gabriel in Ireland 3,500 BP.

Unfortunately, no human remains have been found in associated with any of the early Bronze Age artefacts from the Great Orme. This includes the Copper Mines and the various caves that have produced evidence from this period. The human remains from North Face Cave are the only human remains found in the area that are currently known and that relate to the early Bronze Age. One final piece of evidence may link the human remains from the North Face Cave to the Copper Mines of the Great Ormes Head. The adult vertebra 296, (Fig. 15) clearly shows not only severe compression on the centrum but also that it is greatly distorted, indicative of carrying heavy loads over a sustained period of time. This maybe suggests that in some way the adults within this group were possibly involved in the excavation of the neighbouring Copper Mines?

The accumulative information recorded from the different sources within the cave enable us to reach a reasonable estimate as to the dates of the deposits, and could be interpreted as follows:

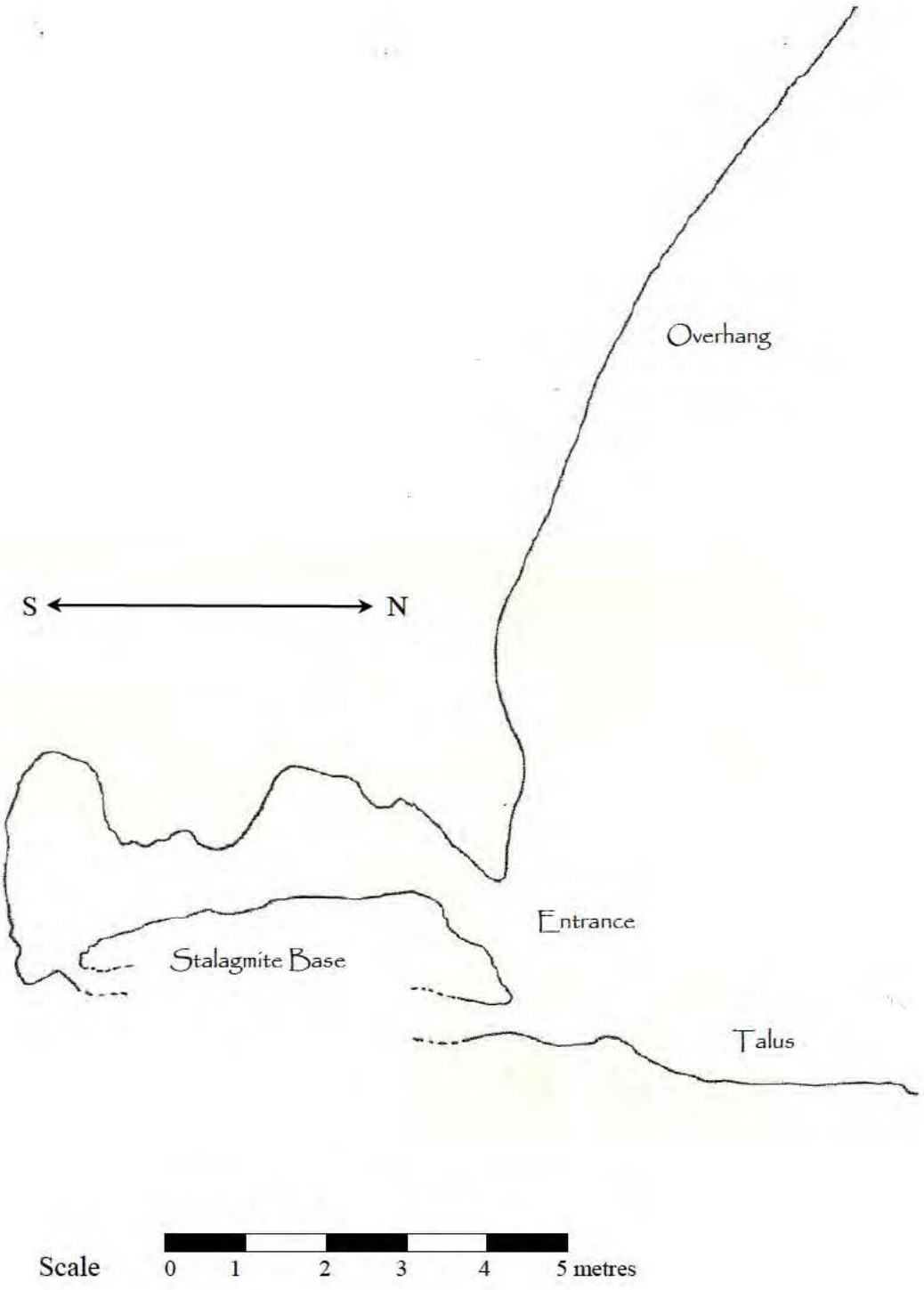
Layer	Archaeological Period	Climate Conditions	Geological Period	Dates
IV	Neolithic	Warm & Moist	Atlantic	4,500 BP
III	Early Bronze Age	Dry & Cooler	Sub Boreal	3,800BP
II	Iron Age/Roman	Cool & Wet	Sub-Atlantic	2,500 BP
I	Historic	Present Day		

Further Reading:

🕮	Archaeological Excavations at North Face Cave Little Ormes Head 1962-1976	J. D. Blore.	1976
🕮	The mineralogy of Bronze Age copper mines from the British Isles	R A Ixer & P Budd.	1998
🕮	The age of primitive copper mines on Mount Gabriel, County Cork	J Jackson.	1984
🕮	The excavation of Wetton Mill Rock Shelter, Manifold Valley, Staffs	J H Kelly.	1976
🕮	Prehistoric mining at the Great Orme	C A Lewis.	1996
🕮	Snail Cave Rock Shelter, Great Orme, Preliminary report	G. Smith.	2011

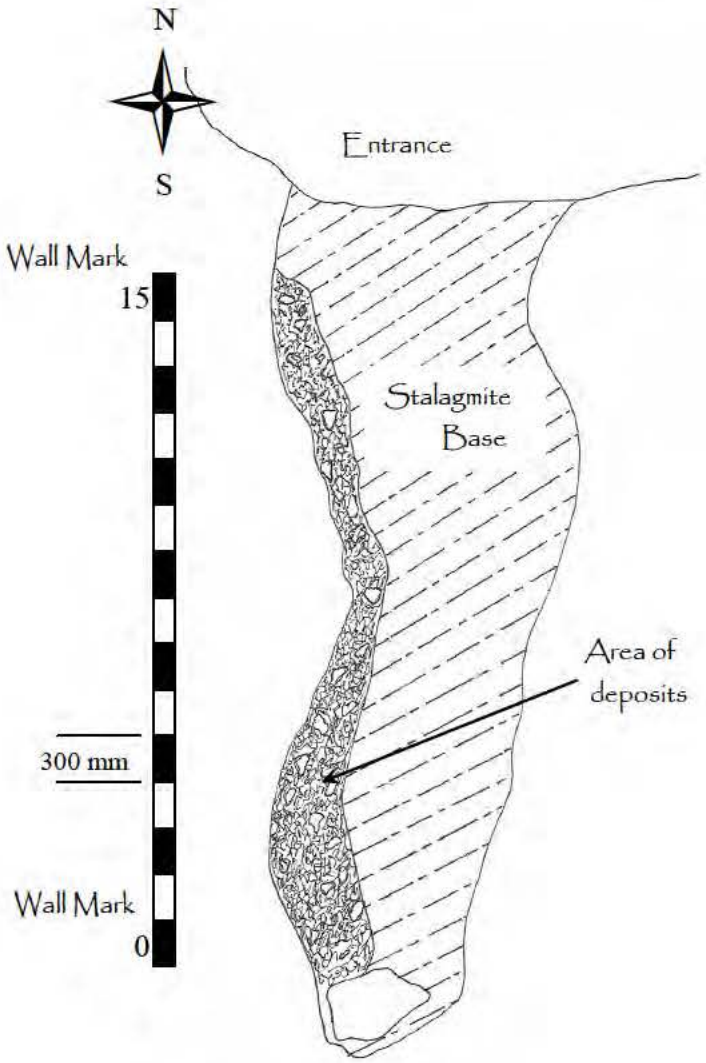
COMMENT:

There is still a soil deposit left under the 1 metre thick stalagmite base, excavation would be very difficult, but could prove to be very rewarding.

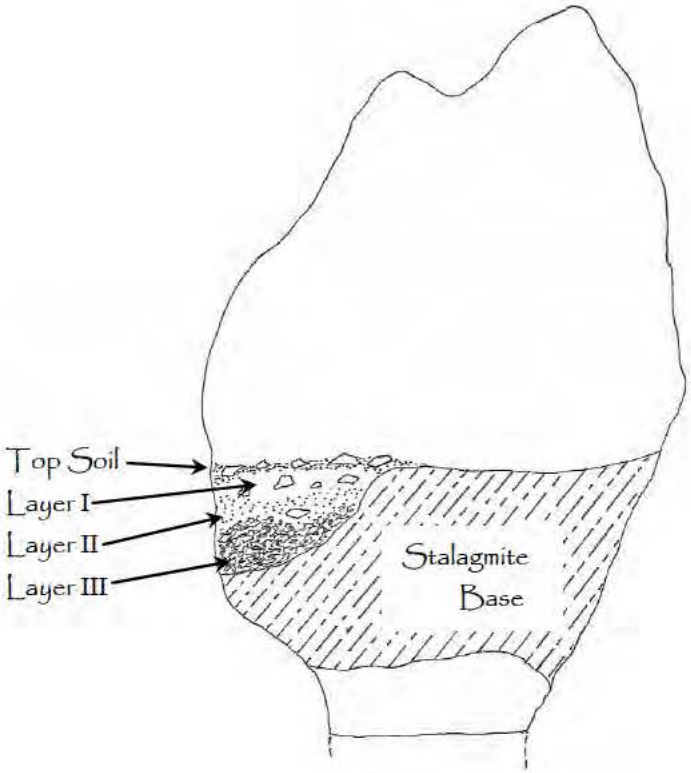


North Face Cave Side elevation

Fig. 23



North Face Cave Plan



North Face Cave
Typical Cross Section looking north

Fig. 24

10.0 ACKNOWLEDGEMENTS:

Dr. D Bramwell	For his identification of many of the bones and in particular the bird remains. Also for his constant guidance and advice throughout the dig.
Mr. J M E Cooper	Dental Surgeon, for the x-rays of the human mandibles.
Dr. Downes	Liverpool Museum, for her assistance with the amber bead.
Dr D H Goose	University of Liverpool for his paper on the "congenital absence of teeth in human populations"

And also to the many friends that have assisted with the excavation.