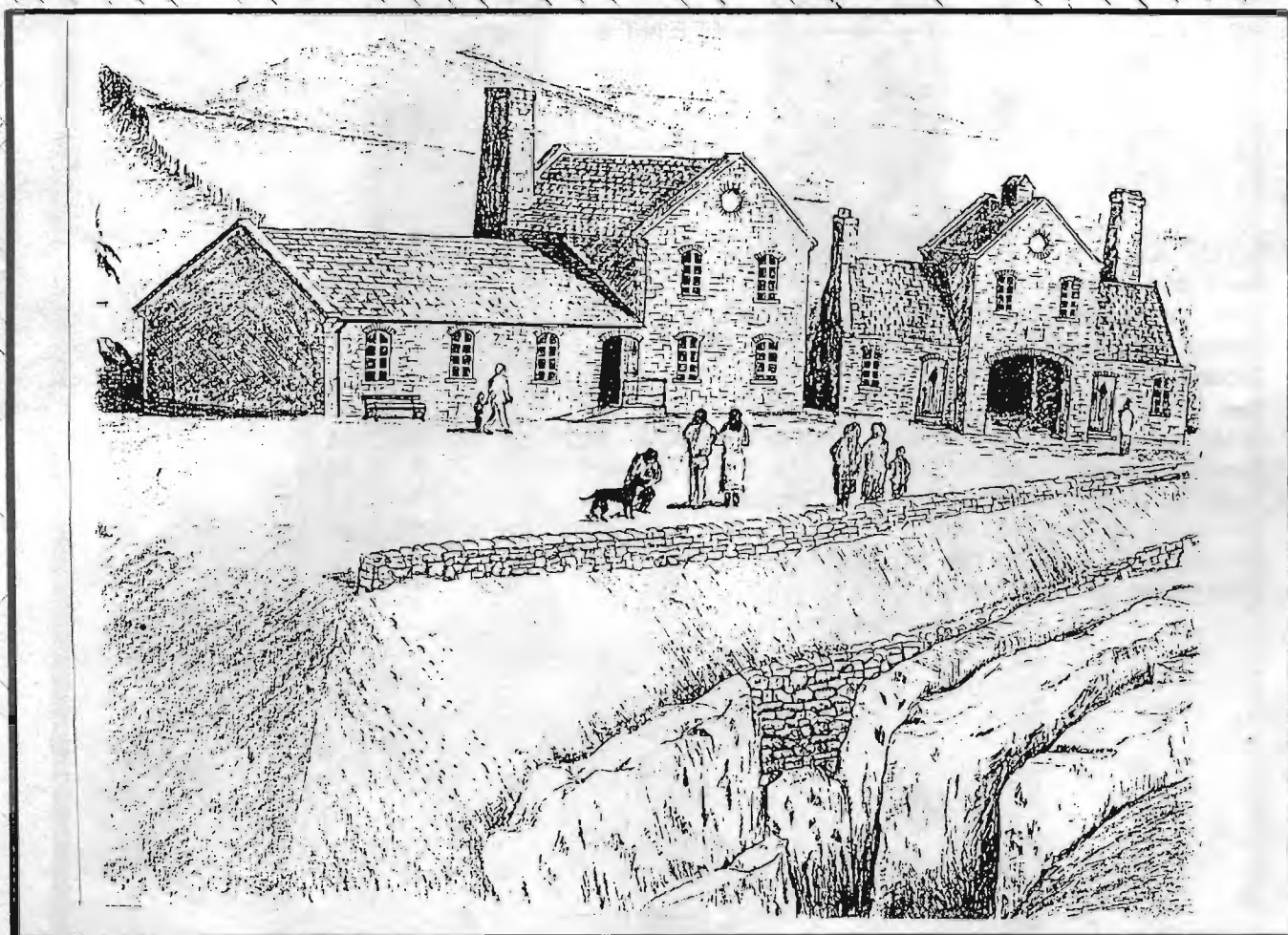


# GREAT ORME EXPLORATION SOCIETY **NEWSLETTER**



**MINING HISTORY**

**ARCHAEOLOGY**

**VICTORIAN EXTRAVAGANZA  
1989 SPECIAL ISSUE**

# Great Orme Exploration Society

MAY 1989

This the seventh edition of the Gt Orme Exploration Society (GOES) Newsletter has been prepared to coincide with the 1989 Llandudno Victorian Extravaganza. To people parting with hard earned cash to purchase a copy thank you for your support and some details about the Society its objectives and the mines are given below.

The Society is composed of a small group of enthusiasts interested in exploring and researching the Great Orme Copper Mines. Evidence of working can still be seen on the Great Orme but this gives little impression of the true scale of these old mines and much of the Great Orme is permeated by a system of tunnels some of which are at least 3700 years old. The workings range in size from small tunnels barely large enough to admit a man to impressive caverns 40 or 50 feet high. Equally spectacular are the brilliantly coloured mineral formations that abound. Mining finally ended in about 1870 but not before many thousands of tons of copper ore had been raised mainly during the nineteenth century when hundreds of men were employed and several great pumping and winding engines were at work. Two of these pumps were located on the site of the present Empire Hotel and belonged to the Ty Gwyn mine which was wholly a Victorian venture having been developed from the original discovery of ore in the Happy Valley in 1834 until the sea drowned the workings in 1856. A tramming adit ran from close to the present pier entrance into the Great Orme and in 1985 the Society members succeeded in locating and entering the mine for the first time in over 120 years. Most of the workings are flooded but many interesting features remain including clog prints of old miners impressed into the clay floor as fresh as the day they were made. Part of the Societies work is to restore and preserve the mine and to assess its potential as a possible tourist attraction.

The other two mines known as the Old and the New mines have a much longer history and are now known to have been at work at least 1700 years before the Roman invasion of Britain. It is clear that a major Celtic mining operation was well underway during the Bronze age with workings at a considerable depth below surface. Indirect evidence also suggests that mining was active during the Roman occupation and probably continued intermittently through to the seventeenth and eighteenth centuries when the final and most productive phase of working started.

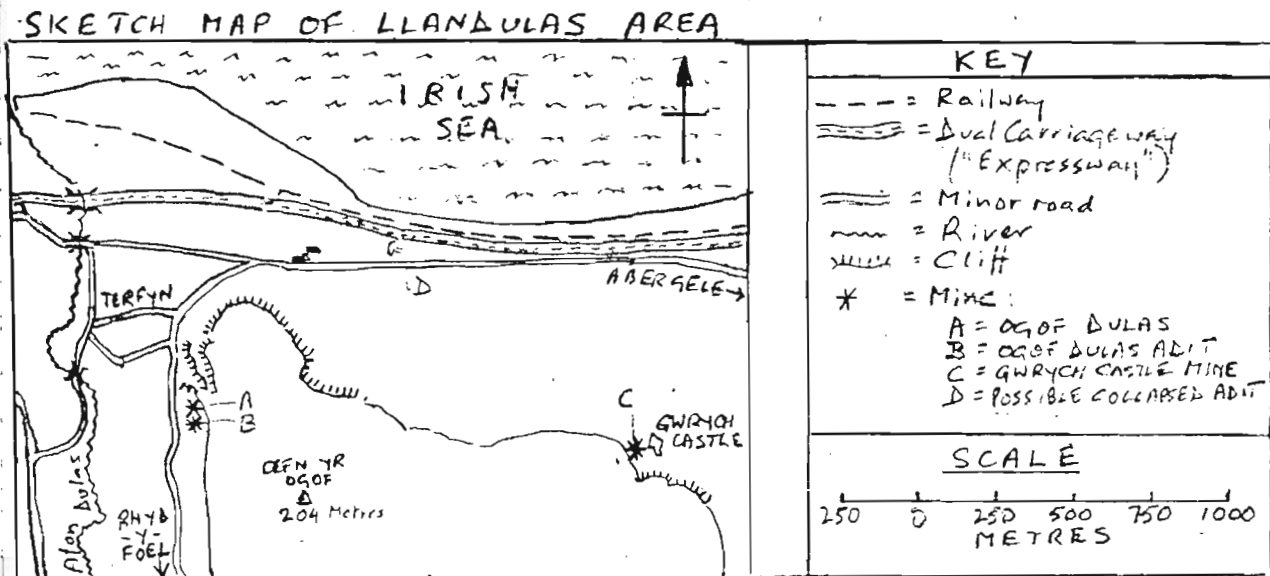
Society members have and continue to play a major part in the investigations into these unique mines and work in close liaison with bodies such as Gwynedd Archeological trust, the British Museum and the Welsh Museum of Geological Science. The society also works in close cooperation with Aberconwy council and Mostyn Estates on whose land the old mine workings lie. Without their help and cooperation none of this would have been possible. It is hoped that this newsletter will prompt readers further interest and the definitive work on the subject is the Great Orme Copper Mines by Don Smith available from any of the Societies officers listed in this Newsletter. Finally thanks to all the contributors

and to Tony Hammond without whose help and provision of facilities this newsletter would not have been possible.



THAT THING AT LLANDULAS

Do you have a "King Charles's Head" ? A "Bee in Your Bonnet" ? A stoutly-held conviction about something that no amount of frustration and disappointment will shift ? I have one, and it is doing very nicely, thank you - and it is all to do with Ogof Dulas, that fine cave-cum-mine on the East side of the Llandulas Valley, between Terfyn and Rhyd-y-Foel (see Sketch Map below)



I first felt the stirrings of interest in 1980, when I was introduced to the delights of the Gwrych Castle Mine (marked "C" on Sketch Map), thanks to Duncan James and Keith Griffiths, and a posse of Troggs from St. David's College. Trying to read up all I could about this mine beforehand, I came across the well-known report by Tiddeman - "The Geology of the Coasts adjoining Rhyll, Abergelle, and Colwyn" (Memoir of the Geological Survey, 1885). This report is so interesting that I quote the relevant paragraph here in full :-

"Cefn-yr-Ogof. Two lead veins cross this hill, and have been extensively worked. The Northernmost has been entered from the Dulas Valley at Ty-newydd, and crosses the hill in a direction E. 20° N. towards a recess in the other side of the hill. A level has been driven to it from below the carriage-drive, and shafts are seen at intervals all the way. The other vein ranges for a much greater distance. It lies about 50 yards South of the former at the Dulas Valley end, and runs at first E. 20° S. with a hade to the South. It appears to have been a cave before it was opened out by the mining operations, and contains at its entrance beds of gravel cemented by stalagmite. The workings extend all the way to Gwrych Castle, a distance of one mile, and are well marked through the entire length. Through half its course it runs as stated, then for half the remainder of its course goes East, and for the rest comes out a little to the North West of Gwrych Castle with a North-Easterly range. An adit-level is seen here. In a little plantation amongst the fields, about half-way along the vein, are to be seen many small open shafts, only just about large enough to admit the body of an average-sized man.

Three hundred yards East of Tan-yr-Ogof, a mining level crosses under the road to Llandulas; it has fallen in, in the field to the North, but its entrance may be seen on the shore close to the railway. It certainly was intended to drain one or other or both of these mines, but the direction which it seems to be taking would lead it past the Northerly vein to the further. I saw no evidence of any rock but limestone having been met with in it. But very little of the resulting rubbish had been left by the sea."

What particularly excited me at the time was that sentence - "The workings extend all the way to Gwrych Castle, a distance of one mile." If that meant that there was an adit going all the way from Terfyn to Gwrych Castle, that might indeed

## THAT THING AT LLANDULAS

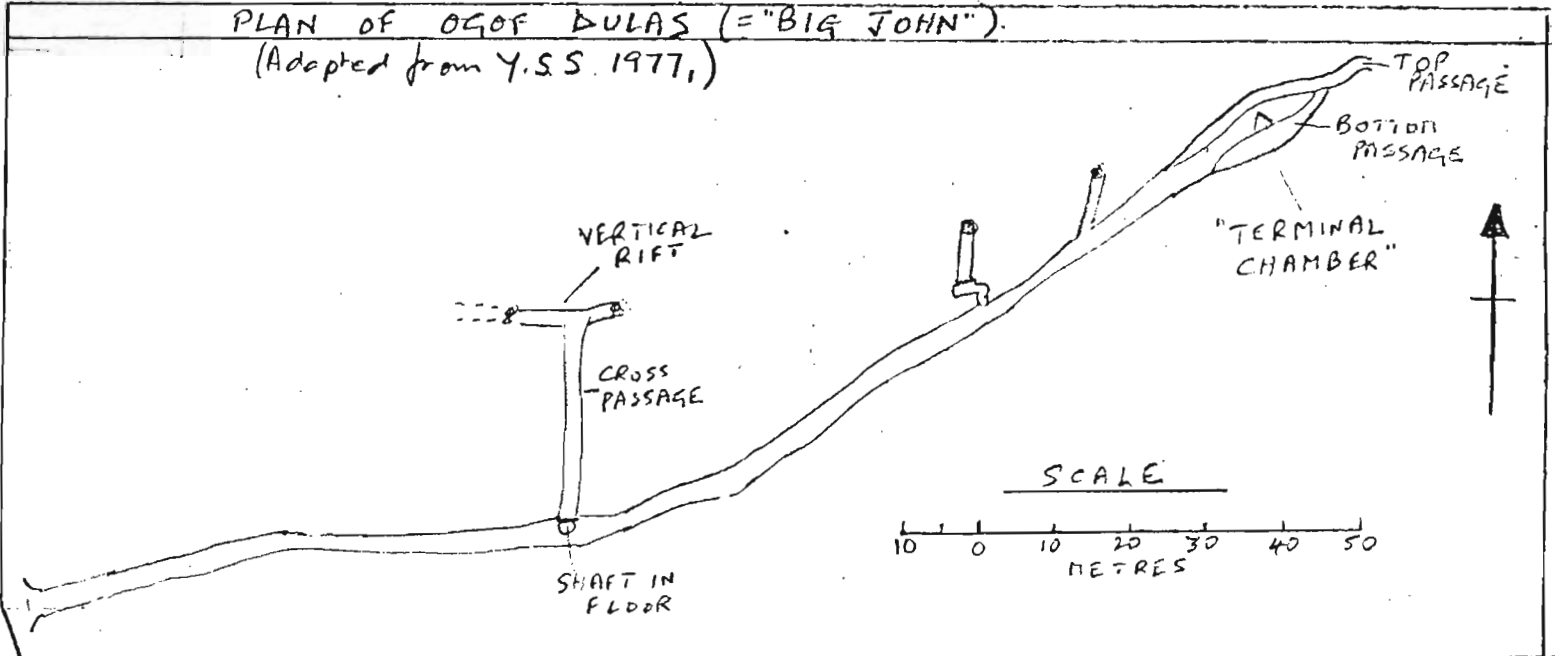
make a fascinating underground trip, so we tackled the exploration of the Gwrych Castle mine with great excitement. But alas for our hopes! Though we succeeded in getting to the bottom of the main shaft - over 30 metres down, with several levels leading off it, in a Southerly direction, all of these levels went "dead" (or seemed to) in 5 metres or less, and none of them offered any promise of a breakthrough in the direction of Ogof Dulas.

So we turned our attention to Ogof Dulas - known to generations of St. David's College Trogs as "Big John", to distinguish it from the Ogof Dulas Adit 50 metres further South which is known as "Long John". "Long John" was rediscovered by a St. David's College party in 1977, but our delight as the little dark hole suddenly appeared in front of our shovels was tempered by the discovery that it only went in about 100 metres, had no cross-passages and only three very small stopes, and finally came to a very definite end against a blank wall of solid rock.

"So "Big John" remains, in my opinion, the most promising possibility, especially as the so-called "Terminal Chamber" at the far end (over 200 metres from the entrance) is not really "terminal". (See Plan below)

### PLAN OF OGOF DULAS (= "BIG JOHN").

(Adapted from Y.S.S. 1977.)



Both the "Bottom Passage" and the "Top Passage" leading off Eastward from this "Terminal Chamber" obviously "went" further originally, but they are now both so hopelessly blocked by loose rubble that they are at present impassable. (Mel Davies used to relate that he once tried some "chemical persuasion" there, but unluckily for him the soft clay absorbed the whole force of the explosion and nothing shifted at all).

Last Autumn Chris and I, and a few gallant Trogs from St. David's College, tried excavating to the left of the "Top Passage", but after digging about 10 metres along beneath an obvious water-worn roof we came to another impasse - solid rock in front and to our left, and a huge pile of this nasty unstable rubble to our right (and the STICKIEST mud - the memory of it haunts me still!). In desperation, we had a go at the two little blocked passages which go off Northwards from the main passage, roughly half way between the Terminal Chamber and the Cross Passage to the Vertical Rift (see Plan). But both of these terminate in less than 10 metres at the foot of vertical shafts blocked with loose rubble, and eventually Chris decided - after some nasty moments - that they were too hairy to dig. A pity, as they both seemed to be draughting slightly, and the Easternmost one shows by the direction of its drill holes that it was mined from the North.

## THAT THING AT LLANDULAS

There remain the workings reached by climbing up the "Vertical Rift" (see Plan on previous page). These certainly "go" - but seemingly in the wrong direction, i.e: Westward instead of Eastward. Andy found a way through from near the furthest point of these, back to the bottom of the Vertical Rift, but described it as extremely loose and somewhat hairy.

So there, at the moment, the matter rests, almost. Look again, if you will, at that description on the first page - "300 yards East of Tan yr Ogof, a mining level crosses under the road to Llandulas...." The place where this has "fallen in, in the field to the North", is easily visible from the new Expressway ("Dual Carriageway"), and is now marked by a little depression with a pool in it. Richard (The Yeti) Burton has designs on this, and I must not anticipate him by saying too much at this stage.

Two final points (again quoting from the Tiddeman report) -

- 1) (Describing the Northernmost vein) - "A level has been driven to it from below the carriage drive." But what is meant by the "carriage drive" ? If, as is at least possible, this is the modern minor road which runs North-South along the East side of the Llandulas valley, linking Terfyn and Rhyd-y-Poel, then surely the level in question must have come out in one of the fields between this road and the River Dulas. I have inspected these fields closely (through binoculars) from the West side of the valley, and (with the landowner's permission) searched through the little copse just South East of the bridge, but without seeing anything remotely resembling an adit entrance. Is it perhaps in somebody's garden ? Comments from some of the present-day inhabitants of the Terfyn area would be welcomed.
  
- 2) Tiddeman's descriptions of the two veins seem accurate enough, if they are taken as applying to "Big John" and "Long John", except that he seems to have got them the wrong way round. The Northernmost (= "Big John" ?) does run about E. 20° North, and the Southernmost (= "Long John" ?) does run about E. 20° South, but the latter, as I have described, does NOT "range for a much greater distance." The rest of Tiddeman's description of this "Southernmost vein" most clearly fits the "Northernmost vein" (i.e: "Big John"). Peculiar: just a simple mistake, or is there some deeper significance ?

Over to you !

GCD.  
2/4/89

\* marked "D" on the Sketch Map.

### Mining Communities.

In 1391 the Welsh writer Daniel Owen published a novel, "Enoc Huws", set in a Flintshire lead mining community. It told the story of a mining enterprise at Pwlllygwyat, an unproductive mine. It provides fascinating glimpses of life in a nineteenth century mining community.

The industry it appears was bedevilled by unscrupulous entrepreneurs and mine captains of dubious honesty. Pwlllygwyat boasted a classic of the genre, Captain Trefor,

". . . . It was pretty obvious said those who remembered his arrival amongst us, that in those days he had very little 'about him' and that he was a man who 'juggled a living'. He moved about the lead mines and before long, although none knew how, he had a hand in this and a hand in that. It was commonly believed that Richard Trefor was a man who lived on his wits, and that he certainly had no shortage of them. He possessed the unusual ability of introducing himself to everyone, and very soon he was seen to be conversing with persons with whom many of the old residents had never exchanged a word. . . . The whole of Wales has heard of the Pwlllygwyat mine. But perhaps everyone does not know that Richard Trefor was it's founder, he was the discoverer of the, "big lode". From the day he made this discovery Richard Trefor's promotion was obvious to all. No longer was he Richard Trefor but Captain Trefor if you please."

It would appear that many people lost money on mining enterprises. A discussion on the prospects of Pwlllygwyat between the mine foreman, Sem Lloyd, and the local shoemaker, Thomas Bartley, illustrates this.

".. .. 'Tell me is there any prospect of the Pwlllygwyat re-opening ?

'None Thomas, as far as I know, and I know as much as anyone on that topic', said Sem.

'I suppose not', said Thomas, 'the amazing thing is that it lasted so long. You know Sem that old mine must have cost a huge amount amount of money to some people, and I'm sure lots of them, are cursing roundly and would be prepared to throw old Trefor down the shaft, as I'll take an oath that it was he who misled them.'

'Misled them, Thomas, what do you mean ? Had the Captain had his own way, and my way to for that matter, Pwlllygwyat would have paid handsomely, because there is a huge lode there, had they gone about it the right way,' said Sem.

'A huge lode Sem ? Don't talk nonsense man. If there is a huge lode, why didn't you bring some of it to the surface ?

You know Sem, I don't think there is a more dishonest lot than the miners on the face of the earth. I never saw a mine that the miners didn't claim had a huge lode, but that they had not reached it, or that the water prevented them or some such drivel. And if a mine closes everyone but them will be at fault forsooth' . . . . .

It is serious, Thomas', said ,Sea,'when a man talks about something outside his experience. I don't doubt, Thomas that you are the best shoemaker in this country, and as a judge of pigs, I know that none will beat you. But mining is outside your experience, you'll admit that, Thomas ?'

'What do you mean man?', said Thomas raising his voice a little.

'Did I not have a quarter ounce of the Top Mine, and spend twenty five pounds of which I never saw a brass farthing, over and above what I spent on drink !" Did we not have a meeting in the Brown Cow on the first Monday of every month in order to discuss matters and pay the money, and even on the last night the miners were saying that the mine 'looked better' than it ever did, and that we would all be gentlemen, and that I, like a fool, paid for rounds while thinking how rich I would be. The slobs.

'Thomas', said Sea rising to his feet to leave, 'did I not say hundreds of times that there would be no lead in the Top Mine'

'You Sem,' said Thomas, 'were not working in the Top Mine nor were you in the meetings at the Brown Cow. Had you been there who knows what you would have said ? But let us not quarrel'"

And when the inevitable crash came Daniel Owen describes the effect on the community,

" . . . . . Because in a few weeks the old mine was silent, or in the descriptive and prophetic words of the Captain, "Pwllgywynt had run its course". Not only was it stilled and no carts carried lead to Llanerchymor, (not that they ever had from Pwllgywynt) but even the engine was silent. In the vicinity of Pwllgywynt, the silence was painful to the inhabitants. Many of the children had been born and raised within earshot of the engine, had played had gone to school and to chapel in its noise. Parents and children had become accustomed to shouting in order to make themselves heard. Bob Mathews the birdcatcher received an extra sixpence for every goldfinch he caught in the neighbourhood of the engine as it was a fact that such birds sang louder and clearer than birds from other areas. . . . . For a while the inhabitants had difficulty sleeping at night. The mine engine had acted like a cradle to them all, and when it ceased to rock they remained awake."

Tom Parry. 19th. April 89. (Text translated from Welsh.)

*Editors note*

*This article contributed by Huw was originally written for the series Llandudno Past to Present published in the North Wales Weekly News in 1977.*

THOMAS KENDRICK

During the next few weeks I hope to submit to this paper several articles and old prints which may be of some interest to the lovers of the romantic past and the perhaps less romantic present. I cannot think of a better or more apt subject to commence this series than the grossly under written almost neglected story of Thomas Kendrick, a man who was responsible for perhaps the most significant and historically important discoveries made in this locality, which conclusively proved that man existed here in Neolithic times. Apart from an article from the Shrewsbury Chronicle in 1870 and one or two in the Llandudno Advertiser about the same time and of course an informative "paper" read to the Llandudno field club after their inspection of the cave on January 11<sup>th</sup>, 1908 by Mr C.A. Humphreys F.R.I.B.A, followed by a booklet retailing at sixpence (2½p today!) little or nothing followed during the next seven decades with the result that very few local residents if asked who Thomas Kendrick was would be able to answer the question.

Thomas Kendrick son of a Cornish miner was born in 1821 and worked in the copper mines on the Great Orme for some years. He built the first camera obscura made of stone in Llandudno - later in 1860 Lot Williams built his wooden one on Green Hill in Y Fach (Happy Valley) which closed down in 1964 and two years later was burnt down by irresponsible youngsters.

Tiring of mining and being an ambitious and talented craftsman he set himself up as a lapidary in a cave under Pen Dinas in the grounds of Ardwy Orme, Ty Gwyn road. The lower cave, his workshop remains and is a listed building (photograph). Upper Kendrick's is where the major finds were made. That also is still there. Finding business booming he decided to enlarge his cave. In doing so he broke into an inner cavern and amongst the boulders and rubble he came across human and animal remains.

The Shrewsbury Chronicle of 1890 quotes "A short time ago an old resident of Llandudno while digging in a cave in the side of Great Ormes Head for rough stones came across a number of pieces of bone and teeth, etc. These might probably have been consigned to the debris from which they had been removed had it not been for a medical gentleman from Bangor who recognised in them the remains of human beings and the work of human hands."

I hardly feel that the above statement by that paper did justice to Thomas Kendrick and it is highly improbable that a medical gentleman from Bangor would have been passing the then dangerous slope which housed the cave at the moment the lapidary made his find. It is far more feasible that Thomas Kendrick enquired about the origins of the remains and they were submitted to professors Boyd Dawkins, M'Kenny Hughes and other eminent palaeontologists of the time who concluded that they originated from internments of the Neolithic Age and that the cave had been used as a sepulchral vault by a family of Iberic Dwellers. The find was given national news prominence. The discovery was made in 1879 and the talented Mr R.A. Eskrigge, F.G.S, visited the cave about that time. From a section of a statement issued by him I quote "In this bed about one foot above the clay were found portions of the skeletons of four Human beings. The broken tibia of one skeleton and the foot of another remain to the seen in situ. I am sorry to say these bones were removed later".

continued.....

Mr G.A.Humphrey's booklet available for perusal at the Llandudno library gave an excellent description of the discoveries which incidentally are housed in a glass case at the library and can be viewed on request. The human bones consisted of remains of a family of four, Three adults and a child and date back between four and five thousand years. A description of the human remains was given by professor Dawkins: "The Human remains consist of portions of four skeletons at least three adults and one child-and present a combination of characters similar to that determined by Professor Bush and myself in the skeletons for the sepulchral caves at Perthi Chwarwen and Rhos Niger, near Ruthin and Tyddyn Bleidden near Cefn, St Asaph. Three of the four femora are strongly carinate and the other slightly, while the only tibia sent along with them is flattened laterally."

It was assessed, because the two most perfect measured 17.9" and 17.6" respectively that the approximate stature of the people in question was just over 5'4", the size of the small Iberic Aboriginies living in Europe, west of the Rhine and north of the Mediteranean in the Neolithic era.

The remains of the associated animals included those of the Bison, Red Deer, Badger, Brown Bear, Short Horned ox (Bos Longiferous), sheep or goat, Boar and Horse. Fuller details available at the library.

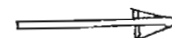
Thomas Kendrick died on the 31<sup>st</sup> December, 1897 at the age of 76 and was buried at St Tudnos church. The remains found in the cave were left in care of the family and were purchased by the committee of the Llandudno Library. Thomas Kendrick was a bachelor. The family are scattered throughout the world today. He lived in a house called "miners cottage" (now Lilac Cottage) in Tan Yr ogo terrace behind the towns first town hall, Capri, Church Walks. He owned a small museum-the first one in Llandudno.

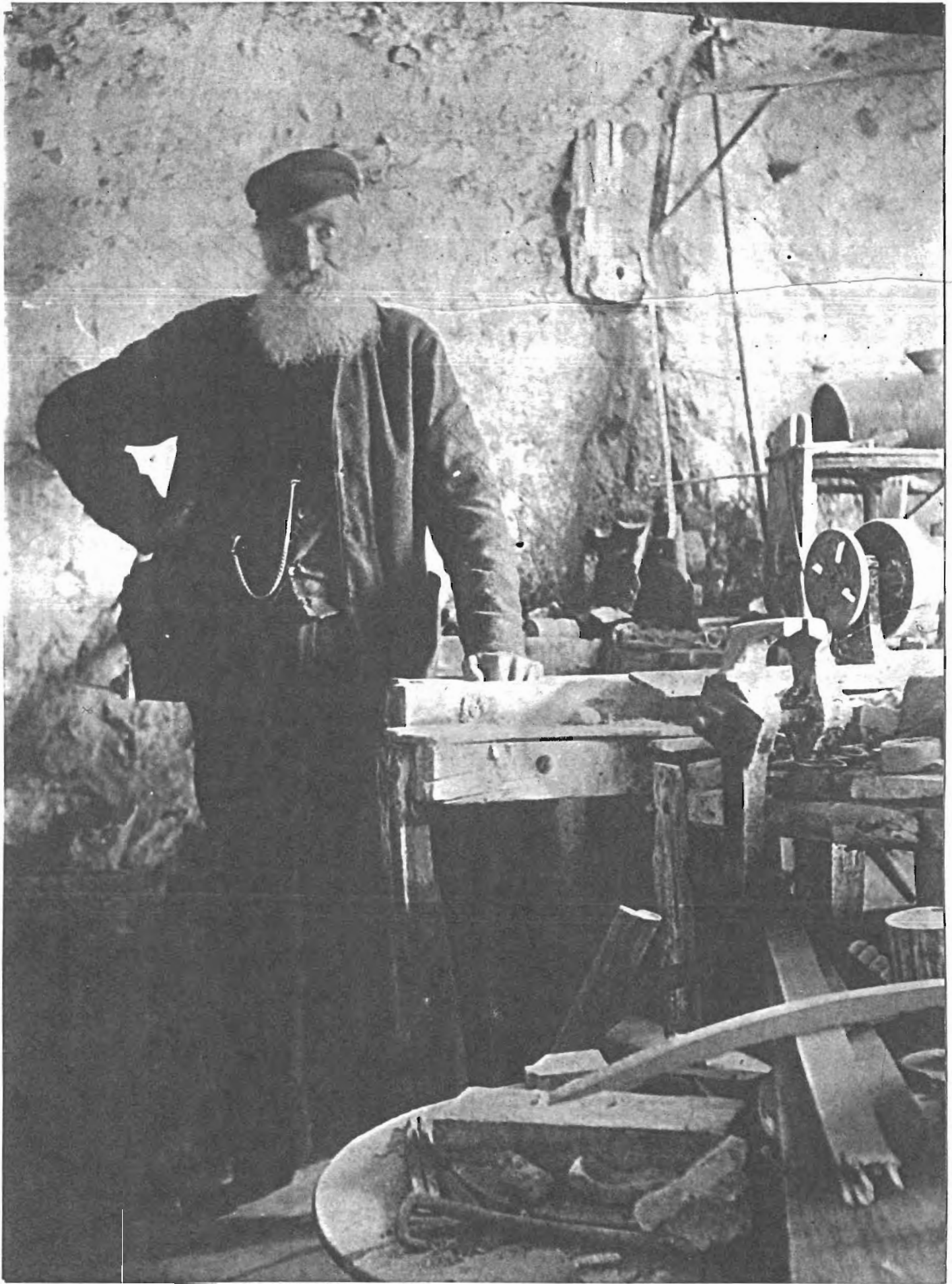
#### FOOTNOTE

Professor Dawkins made an elaborate classification of some of the remains found. Some of the broken bones were in a different mineral condition from the others. These consisted of bits of the marrow containing long bones of the Bison belonging to the pleistocene age. This era dates back one million, two hundred thousand years. badgers were first recorded 500,000 years ago. There is little doubt that even the oldest historical records know not when the cliffs of the Great Orme did not tower with their proud majestic aloofness and that they were there long before the creation of man.

H.T. Williams April, 1989

THOMAS KENDRICK IN HIS CAVE COME  
WORKSHOP-NOTE THE NOW RARE TOOLS OF  
TRADE THEN USED BY A LAPIDARY TO CUT  
AND POLISH STONES ETC





The Candle Rat. (Rattus Lumen).

Considerable interest has been displayed amongst naturalists following apparent evidence of Rattus Lumen in old Mine workings at Llandudno.

This animal, thought to be extinct, is known to have inhabited coastal mining areas, both coal and metalliferous, and appeared to favour workings extending under the seabed. The last confirmed sighting was at Parlwr Du Colliery (Point of Ayr) during the early twenties of this century. (R.O. Dent 1924).

The creature, once considered to be amphibious, appeared equally at home in both fresh and sea water and was able to swim prodigious distances. (V. Ofio 1897)

Recent prints found in wood fungi at the Ty Gwyn Mine in Llandudno appear to display the distinctive, "middle finger" toe length peculiar to this species. A quantity of silver sand has been spread around the area of fungi in the hope that sharper prints can be obtained, and photographed. Approaches have also been made to the NCC to instal an infra red beam triggered camera in the area.

R. Lumen was commonly known by miners as the, "Candle Rat" because of its behavioural peculiarity of carrying a lighted candle on its head on dull or overcast days in the darker levels and tunnels.



Next Month. Penmorfa Seals, fact or legend ?

SITES OF SPECIAL SCIENTIFIC INTEREST

GREAT ORMES HEAD

To some extent the term SSSI is self explanatory such sites being recognised and protected under the Wildlife and Country Side Act. The Nature Conservancy Council will receive and investigate notifications from individuals or organisations of localities that have rare or otherwise unusual scientific features usually because of flora, fauna or geology although other occurrences of special interest can be recognised. Notifications considered to be worthy of protection are declared SSSIs and given a grading according to their importance. Interested bodies such as planning officers of district councils are then notified.

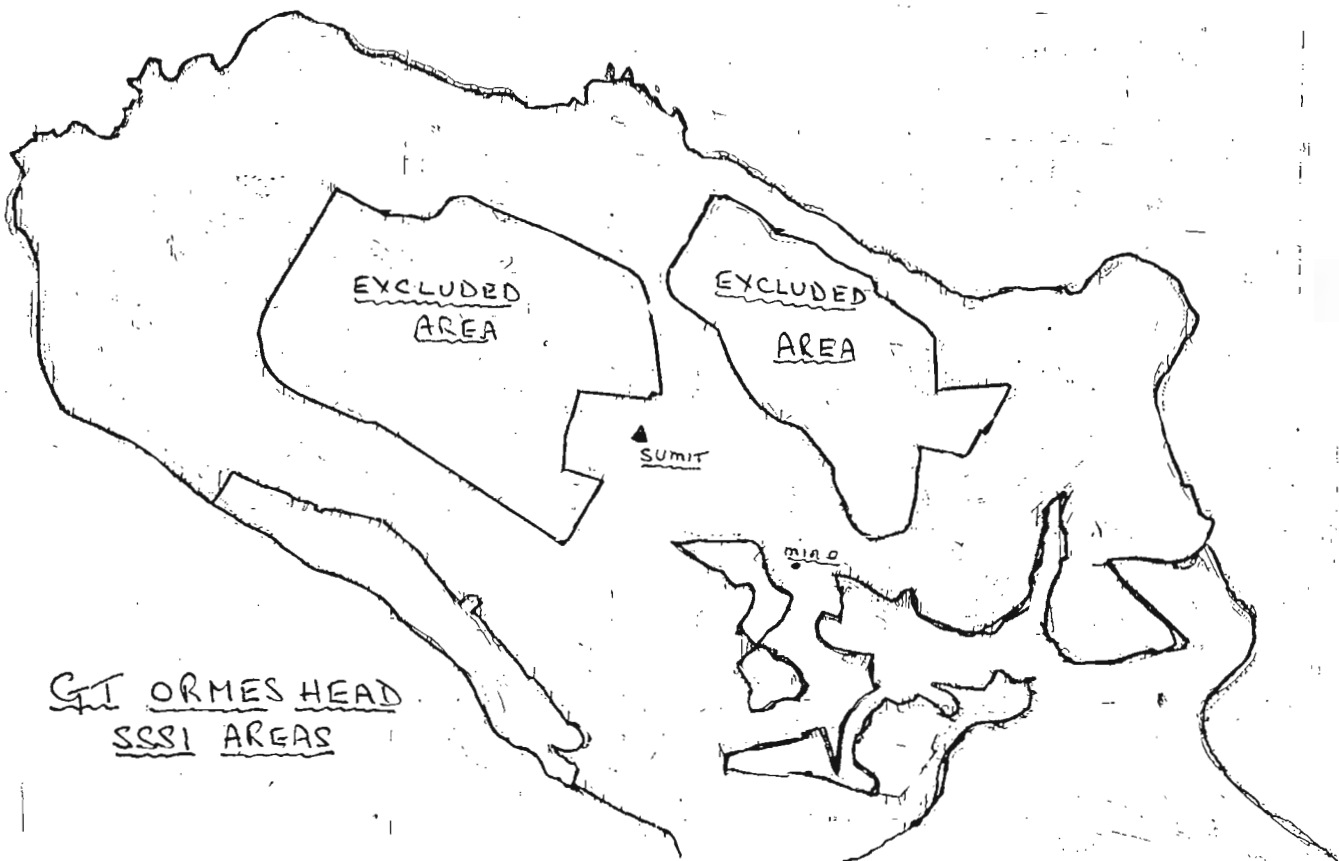
Various protective controls appropriate to the site and its interest will then apply for example there may be restrictions on spraying of herbicides at certain times or prohibition of destructive collection of geological specimens.

Some localities are designated as non statutory being of a lower grade importance but many grade 1 SSSI start out as non statutory sites. The Great Orme is listed as a grade 1 site and is described as being a nationally important geological and biological site .

Geologically the Gt Orme is one of the classic Dinantian sites in Wales with one of the most widely known Carboniferous faunal sites in Britain and is the type locality for numerous fossil species. The Asbian-Brigantian section (Bishops Quarry area) is said to have great research potential.

Botanical interest centres on a wealth of plant species some of which are rare and include Hoary Rock rose, Spring Angletail, Spotted Cats ear, Wild Conteaster and Vernal Sandwort.

There is also a rich entomological fauna and is the only location where dwarf forms of Greyline and Silver Studded Blue butterflies occur. Cliff nesting sea birds include Guillemot, Kittiwake, Fulmar and Cormorant.



## RANDOM THOUGHTS ON THE BRONZE AGE

The Beaker period commenced in North Wales probably about 2500 BC. It is conceivable in view of recent radio carbon dates that somewhere on the Orme we could have a date from the mines earlier than the one of 1700 BC that we have currently.

During the neolithic period the Stone axe factories at Graig lwyd, Dinas, and Carreg Fawr were in full swing. However as far as we know Neolithic man here gathered his stone for his axes from the screes. One site, though, was actually mined by him. At Mynydd Rhiw, down the Llyn Peninsula he followed the vein of stone, a shale altered by an igneous rock, down to a depth of eleven feet. We must not forget Neolithic expertise in mining for flint nodules as early as 3 to 4000 B.C though these mines were situated in the south of England.

There is no doubt that in view of our discoveries on the Great Orme, other areas should be looked into. The mines at Alderly Edge spring to mind. Here floors used by prehistoric man were found on the surface near the mines, last century. A characteristic of these floors was a grooved stone tool type obviously used as a hammer. These had been looked upon as Romano British, but my feeling is that they could be Bronze Age, the same reasoning applies to stone mauls from copper mines in Eire.

Cornish tin has always been presumed to have been worked in placer deposits in river beds, I think the cliffs should be searched for evidence of early tunnels. The old idea that all traces of early mining have disappeared due to more recent mining is definitely false.

The Bronze Age people who worked the Orme mines must have lived somewhere, one has the feeling that the hut circles that are scattered in different areas over the Orme could fit the bill. In North Wales we have in the past been inclined to accept uncritically that the huts that occur so abundantly in the mountain areas must be pre Roman Iron Age or Dark Age.

However the huts that occur on Dartmoor are proved to date from the Bronze age. One piece of corroborative evidence is that of stone rows. These are abundant on Dartmoor, on the Orme we have one at Hwlfar Caerau, but others may well have been destroyed.

At Dinorbern, above the village of St George, near Abergele, was once a hillfort. Unfortunately now destroyed by quarrying. During excavations over recent years Dinorbern has yielded a radio carbon date of the 12<sup>th</sup> century B.C. The hill was encircled by a clay rampart interlaced with wooden rafts, a very sophisticated method of rampart building.

In view of this, what about the hill fort of Pen y Dinas? When part of this was excavated at the beginning of the century, it was thought to have been done under Roman influence. It now seems to me that we may have to consider the possibility of this site being Bronze Age.

At Llandegai there was an important early henge monument complex, dating from Neolithic times and into Beaker and Lower Bronze Age periods. Perhaps here we have the link between the stone working people and the Beaker/Bronze Age metallurgists.

There is a record of about a hundred Bronze Axes being found on the Little Orme, a consignment, possibly from our copper mines, that went astray? I know of at least two areas on the Orme that might be investigated with profit. One of them a blocked shaft in an artificial cut, and the other sited near a well. It is obvious that we have to stop thinking in terms of Roman expertise and think largely of Bronze Age culture.

Perhaps now is the time to gather together some of the loose strands, and try to assess exactly what was happening on the Orme in the Bronze age and beyond.

F. J.

## PUSHING BACK THE DAWN

The Executive Editor of "International Mining", the world's largest circulation mining magazine with a readership of over 150,000 a month, recently paid a visit to Llandudno. He was taken underground by Andy Lewis and we all had lunch in the King's Head.

He has given permission for his article to be printed in the Newsletter prior to being included in a special European edition of the Magazine to be published in May 1989.

His article is reproduced in full below.

Tony Hammond

### SEVERAL YEARS' PAINSTAKING WORK REVEALS WESTERN EUROPEAN BRONZE AGE INDUSTRIAL CENTRE by Simon Walker

The period in man's history that marked the transition from the use of purely natural materials (wood, animal products and stone) to the first exploitation of metals is known as the Bronze Age. Bronze-making technology is conventionally understood to have originated in what is now the Middle East, probably some time about 3000 BC, and to have spread slowly from that region towards western Europe. In Britain, the period is known to have lasted between 2000 and 500 BC, and relics from the Bronze Age culture have been found widely throughout the whole of Europe, such is the durability of the range of copper-tin alloys that forms the group of metals known as bronzes.

Whilst the technology for the production and casting of bronze may have become relatively sophisticated the 'lost wax' casting process is still used today for precious metals. The level of mining industrialisation during the period has, up to now, generally been considered to have been rudimentary. Only in a very few European locations, principally in Bulgaria, Yugoslavia and southwest Spain, has clear evidence of Bronze Age mining been verified. In the British Isles, sites at Cwmystwyth in Wales and Mt Gabriel in Ireland have recently been identified as having been centres for Bronze Age copper mining, but in each case the level of activity was limited to shallow workings developed from surface vein outcrops.

The copper mines on the Great Ormes Head, a prominent headland that juts out from the north Wales coast into the Irish Sea, had their heyday in the 18th and 19th Centuries, when copper production provided one of the foundations of the local economy. The earliest records from this period of activity date from the 1690s, but it is clear that mining activity on an extensive scale actually took place in the area in much earlier times.

As with most other British sites, the early mining activity

at the Great Orme has up until recently been ascribed to the Romans, who were certainly present in the area some 2000 years ago. However, there is no physical evidence to support this, and recent work is now indicating that there was an unprecedented level of mining activity in the area well over 1000 years before the Roman occupation of Britain.

If this is the case, then the Great Orme mines represent one of the most significant industrial archaeological sites in Western Europe, for nowhere else is there clear evidence of such widespread mining activity at that time. The old workings, as would be expected, start at the surface outcrops of the copper veins, but it is the overall scale of the operations, in terms of extent and especially depth, that gives the site its singular significance.

The copper mineralisation was found in highly irregular vein structures contained in the massive limestones and dolomites that form the Great Orme headland, which rises to a height of 207m (679ft) above the surrounding sea. Near the surface, the veins were of malachite and azurite, while at deeper levels, sulphides formed the bulk of the ore. Mining in the 18th and 19th Centuries concentrated on the deeper sulphide mineralisation, but exploration was also undertaken in the areas of early working closer to the surface. It was from here that the first indications of the extreme antiquity of the area's mining history were found.

Shafts sunk during the 'recent' activity to access deep ore penetrated right through the older workings. The 18th and 19th Century miners reopened some parts of these workings in search of any residual ore, and often developed new drives through the now naturally cemented backfill in the old stopes. Artefacts such as bone and stone tools were found incorporated into this fill material, showing that their deposition was simultaneous.

Interest in the old mines has been reactivated in recent years. The stimulus for the present campaign was the necessity, for reasons of public safety, to cap the tops of the six vertical shafts that dated from the 'recent' mining period. One of the shafts, Vivians, which is believed to be over 150m (500ft) deep, could not be found, and a backhoe excavator was brought in to trench for the shaft collar. The shaft was plugged with loose spoil, which was suddenly freed as the excavator approached. The top of the now open shaft revealed clear evidence of old stoping, and it was decided that this shaft should not be capped, but should be left open to provide an access to the workings in the surrounding area.

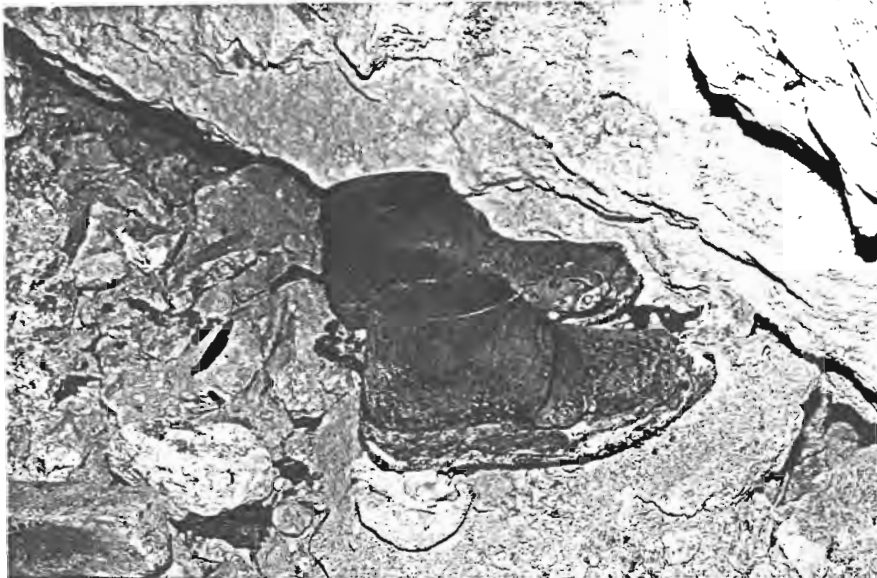
An initial underground survey by members of the Great Orme Exploration Society revealed the complexity of the near-surface workings - a labyrinth of interconnecting stopes and galleries, some backfilled, some reworked and some, in the areas furthest from the shaft, untouched. Charcoal derived from oak and alder wood supplies evidence of fire-setting having been used to break the rock, while large microdirorite stones, which have clearly been collected from the sea shore, show wear marks consistent with their use as hammers or anvils for breaking

the copper ore from the shattered country rock.

Even the surface shows evidence of early working. The Gwynedd Archaeological Trust has started excavations in the immediate surrounds of the shaft collar, and recent discoveries have included the burning marks of fire-setting and, perhaps most significantly, samples of charcoal that have revealed a radio-carbon dating of at least 3000 years - giving a latest date for the operations on the outcrop at about 1000 BC.

If this is the case, then the position of the Great Orme mines in the development of the Bronze Age culture in Western Europe takes on a radical new complexion. Nowhere else in the region have such extensive workings for metalliferous ores been found from such an early date. Nowhere else is there evidence for the social infrastructure that must have been in place to enable this centre of industry to operate. Never before have indications been found that this part of Europe may have been a major ore production and trading centre, concepts that may yet cause a radical reshaping of the commercial history of the Bronze Age period in Europe as a whole.

Authorities from the principal British scientific and historical institutions are now supporting this exciting theory. International experts have visited the site, and initial dating evidence has given added credence to its antiquity. Archaeological work is due to resume shortly at the shaft collar, but it will be some time before excavations proceed into the underground workings. Meanwhile, members of the Great Orme Exploration Society are continuing their work underground, endeavouring to piece together the spacial layout of the various stages of mining. Each visit underground explores new areas, and adds further information on this most fascinating jigsaw, which may yet prove to be the cradle of Western European underground metalliferous mining.



*A pair of miners clogs left as a good luck offering*

## THE JOHN

As the sun sank below the west horizon at the close of a warm August day, the Great Orme's Head was on the flat John's starboard beam. The onshore breeze had died to an occasional faint sigh and as the John rolled with the swell rising under her quarter, the rigging described lazy arcs in the sky slapping itself upon the mast, and the sails let out a thwack as they filled during a roll. There were two more hours of the flood tide to carry them round the Great Orme before the strong ebb tide off the headland would drive them back towards Anglesey, but the skipper had no intention of drifting around all night. Soon the offshore breeze would give him just enough way to make the anchorage below the town before darkness fell.

The familiar smell of hay came drifting across the water, quite noticeable after days of smelling nought but briny, then the bleating of sheep, the occasional bark of the sheep dog and his master's whistle. They were close, but the next hour would pass slowly. The oily swell took on a different appearance now, faint ripples drifted across the water as fingers of wind probed out from the land. The sails filled and the John began to move. It was not long before the fluky wind settled and the John ghosted round the headland into the open inviting bay.

When the town was well in view, the skipper began tacking inshore to anchor close up to the shore, so as to beach on the sand below Glan y Mor as the tide fell during the night. The crew were busy now, there were only two plus the skipper and there wouldn't be any rest until all was squared away after anchoring. As they drew closer lights began to twinkle from the houses which had lost their identity as the light failed, becoming silhouettes in the last of the gloaming.

There was about one cable to go on the final tack, the mate was standing by with the main anchor and the boy with the kedg anchor astern. The skipper had no intention of being blown too far inshore if the wind changed and the kedg would also be useful to haul himself into deeper water if necessary when he got underway again.

The helm was over, the bows began to creep to windward and the John lost way. The boy had let the kedg go and now came forward to scandalise the main gaff; he had just finished as the John gathered sternway. "Let go" cried the skipper, and the anchor crashed into the sea. The mate payed out the anchor cable as she drifted astern, the skipper conned her and the boy took in the slack on the kedg warp. In less than two minutes it was done, the warps were secure and work began hauling and stowing sail before it was time to go below for something to eat and a much deserved sleep. There would be plenty of work on the morrow drying the sails and loading cargo so they wasted no time.

It was a quite night and the John took the ground in the early hours of the morning. The keel nudged the sand a few times, the slapping of the water on the hull receded and then all was quite, but it hadn't

gone unnoticed. Tired though they were, the mate and skipper felt the change in motion. They were alerted by years of experience, had registered the change and were instantly fast asleep again.

The gulls were the first to wake, and once risen, they would let no-one rest. The boy was up, washed and in the tiny galley getting the first meal of the day ready. In another hour the tide would turn and they would be afloat by midday, that left only a few short hours to unload as much coal as time allowed, they could dry the sails during the afternoon.

Their cargo was destined for the beam engine at the Old Mine, well out of sight from the beach, but close by, smoke was rising from the chimneys of the Ty Gwyn Mine and already the ching, ching, ching, could be heard coming from its smithy. The town was awake, donkeys, horses and carts began coming over the dunes and down the beach to stop alongside. As usual, Daffyd Jones was there first, followed by other familiar faces of Thomas Lester and the Kendrick family, for it wasn't just the men who came to work. The rate was agreed, the hatches opened and soon the mate had the yard set to haul kibbles of coal out of the hold and into the carts.

By midmorning water was lapping at the rudder and work stopped until the sea would abandon the sand for a few more hours later in the day. The skipper had business ashore with the mine agent, John Williams, and went before she reloaded leaving the mate and boy to get on with the day to day maintenance. The stiff canvas sails were shaken out over the deck to dry and the tears repaired. Then came the multitude of other minor tasks always in need of attention on a wooden sailing ship. replacement of worn rigging, painting, greasing winches and pumps, and sorting cargo ready for discharge.

The skipper and hauliers were waiting at the water's edge in the late afternoon to get alongside as soon as the water retreated. Unloading resumed and by early evening the process was being reversed, parcels of copper ore were brought out from the warehouses and down to the ship. By the time the tide had advanced up the sand, and reclaimed the beach once more, all the loading was complete.

While the skipper paid the men and women for loading, the crew were battening down the hatches and clearing away the yard used for lifting cargo. As soon as the ship was floated off the sand, the skipper would move her out to deeper water before anchoring overnight, ready to sail at first light with a fair wind bound for Swansea.

Don Smith, London, ONT. April 1989

## ONTARIO PREHISTORY

Man crossed from Siberia onto the North American continent some 27,000 years ago. These Palaeolithic hunters migrated across the continent hunting big game now extinct but it was not until about 10,000 years ago that the ice fields retreated far enough north for the area now known as Ontario to be occupied by man. The water level of the lakes was some 60 feet higher than it is today and as a consequence many of the excavated settlements are far from the lakeside today or running water.

Ontario pre-history can be divided into 3 periods:

~10,000 BC - 7,000 BC	Palaeo-Indian
7,000 BC - 1,000 BC	Archaic
1,000 BC - 1535 AD	Woodland

### PALAEO-INDIAN PERIOD

The first settlers were nomadic hunters and gatherers. They used bone, antler and stone tools and hunted with stone tipped spears as many other cultures did at this time. One characteristic implement of this period and area is the fluted spearhead, a design where channels at the base of the point are chipped away to assist fitting of the shaft. There being no flint in the area all tools are chert based.

### ARCHAIC PERIOD

During the Archaic period the standard of workmanship improved and many stones were polished. Banner stones were a feature of this period but their exact function is not known. The period can be further classified to account for two cultures, one living in North and Central Ontario called the Shield Archaic and in Southern Ontario the Laurentian Archaic. In both cultures the settlements were sparse and they were still hunters, fishers and gatherers. Their weapons, spears, knives and arrowheads were still chert based and they continued to use bone tools for scrapers and needles. During this period copper goods were introduced as tools, ornaments and also grave goods. Native copper was available in the Lake Superior area, extractable from shallow opencasts, and processed by beating and annealing. There appears to be no evidence of mining of copper ore or of smelting in this area. Towards the end of this period burial became more elaborate.

### WOODLAND PERIOD

Early Woodland period: The way of life was much the same as in the previous period though pottery makes it's first appearance with carved stone vessels, bar amulets and gorgets. These may have been brought in by hunting parties returning from what is now New York State, acquired in trade or brought in by Indian colonists from the New York area.

Middle Woodland period: Three distinct cultures existed:

North Ontario	Laurel Culture
South Western Ontario	Saugeen Culture
South East Ontario	Point Peninsula Culture

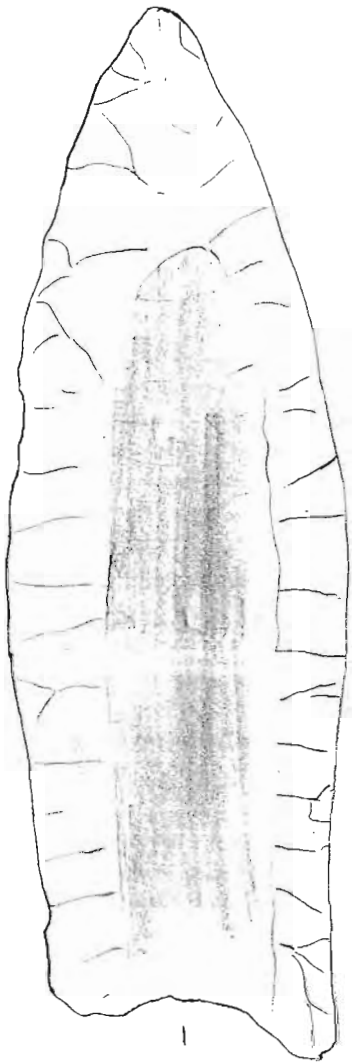
Their pottery goods were very similar in style but can be characterised by the clay type and different tools marks. In the Laurel and Point Peninsula regions large and impressive burial mounds were developed, probably an influence from the peoples of the Mississippi, Illinois and Ohio river valleys. Goods were acquired in trade such as marine shells from the Gulf of Mexico, mica, pipestone, copper spoils and many of these became grave goods. The burial mounds appear to have been built up gradually over 200-300 years rather than in one construction. The area of the mound probably had social significance as there are many burials around and in the mound, both with and without grave goods, the remains being aged from 4 months to 50 years old. It seems that high status was not a necessary prerequisite for burial in a mound, quite distinct from the peoples of Illinois and Ohio where mound burials were the privilege of the important and their retainers.

Late Woodland: Nomadic hunters and gatherers occupied North and Central Ontario and developed into the Algonquian speaking peoples eg the Cree and Ojibwa. Their graves were near their habitations though they also used scaffold burials in trees and reburied the bones in pottery vessels. Southern Ontario was more densely populated and developed into a farming community and they became village dwellers. These people were the Iroquois, a family of related tribes or nations, named after their locality such as Erie, Mohawk, Seneca and Oneida. They began cultivating corn in about 400 AD and later, around 1400 AD they were growing beans, squash, sunflowers for their seeds and also tobacco. In contrast to previous periods they didn't use burial mounds but favoured collective burial in ossuaries each probably serving several villages. Rock paintings of visions seen by their Shaman are characteristic of this period but can also be found in earlier periods.

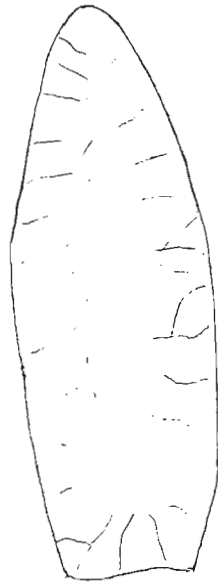
The Indian peoples made contact with the French in 1535, and within 100 hundred years, as a result of native warfare (fur trade) the culture was effectively destroyed. There are two well defined Indian villages in the London area, both have been excavated and at one there is a permanent exhibition. While I have been here an Iroquois burial pit (ossuary) has been uncovered discovered by while digging foundations for a house. The remains have since been reinterred at the insistence of the local Iroquois people.

### Don Smith

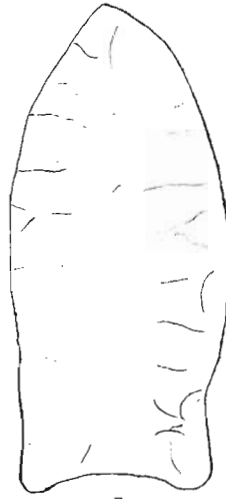
1	EARLY PALAEO-INDIAN FLUTED CHERT SPEAR POINT x 2.0
2&3	LATE PALAEO-INDIAN CHERT SPEAR POINT x 1.2
4	LATE PALAEO-INDIAN CHERT KNIFE x 1.2
5&6	EARLY/MIDDLE ARCHAIC CHERT POINTS x 0.9
7	LATE ARCHAIC POLISHED STONE ARTEFACT x 0.4
8	FISHING WEIGHT x 0.85
9&10	LATE ARCHAIC COPPER POINTS x 0.35
11	LATE ARCHAIC COPPER AXE HEAD x 0.35
12	LATE ARCHAIC COPPER TANGED KNIFE x 0.35
13	LATE ARCHAIC COPPER PIKE x 0.35
14	MIDDLE WOODLAND TOGGLED ANTLER HARPOON x 0.5



1



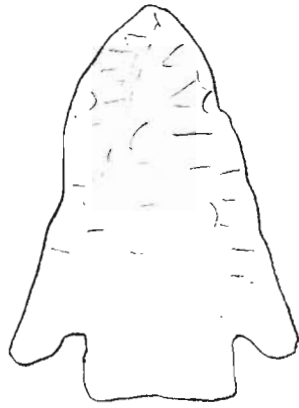
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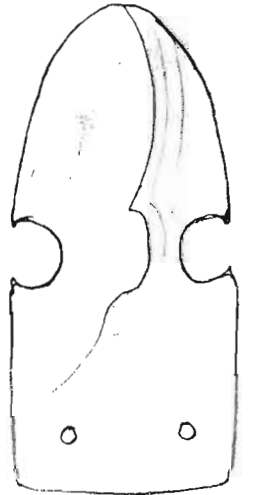
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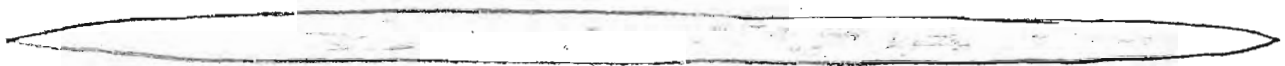
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## MYSTERIES OF THE "MINE CATS"

During 1985 members of the society extended their explorations into some of the deep workings accessed via Treweeks shaft situated on Bryniau Poethion. Each excursion to this area brought new discoveries of workings untouched since the mine closure in the 1860's, often these contained the tools the miners had left unintentionally without any thought they where never to return to collect them. On one particularly arduous trip to new ground an unusual find was made. The remains of a cat were noted lying at a depth of at least 150ft. under ground and situated away from any obvious direct route from the surface. It was almost as if the cat had been purposely placed here, laid out on its side in this remote section of the mine. Around the cat and within the neighbouring passages a number of bluebottle carcasses were recognised, surely suggesting that the cat was dead before being brought here having had time to attract bluebottles which had laid their eggs upon it. Little else was thought about this peculiar finding.

It was not until November 1987 for the significance of this first cat to be realised. At the time the Society were involved with Ashton Mining Associates conducting an underground survey for Aberconwy Borough Council in the area of Pyllau and Maes y fachrell. The objective was to locate any near surface workings that might affect the construction of a car park planned here. Three shafts sealed since the nineteenth century were accessed, enabling exploration of a system of extensive workings.

During this period a second cat was found under circumstances somewhat different to the first. Again the corpse lay in a remote section of the mine, this time about 120ft. below surface within a "blind" working. The extraordinary thing about this find were a line of black to dark-brown patches that extended from the cat to a stone about 20ft. away which was surrounded by a half circle of the same substance, appearing to be organic in nature. A sample collected from one of the deposits contained seeds, these were identified at Bangor University as being blackberries!

Descriptions of the cats and their particular settings were made known to the Folklore Museum at St Fagans in South Wales and also to various mining history organisations. No explanations came forward, the only lead was reference to a cat that had been found in a Derbyshire lead mine, now preserved in a glass case at the Stags Heads public house in Wardlow Mires east of Tideswell. The only other reference was a connection with Cornish mining folklore that held the belief that it was deemed unlucky to mention the Cornish word for cat while working underground.

Ideas within the society to explain these strange discoveries ranged from the bizarre to the mundane, had the miners been involved with some occult practice associated with cats, could it be some element of forgotten folklore unique to the Orme or was it related to the offerings the miners made to the "little folk" known as knockers who were thought to inhabit many mines

throughout Britain and Europe up until the last century; and some believe up to the present. The significance of the organic deposits can not be overlooked, particularly the blackberries which suggest a seasonal aspect to the arrangement. Could they indicate some connection with the harvest months or is it purely coincidence.

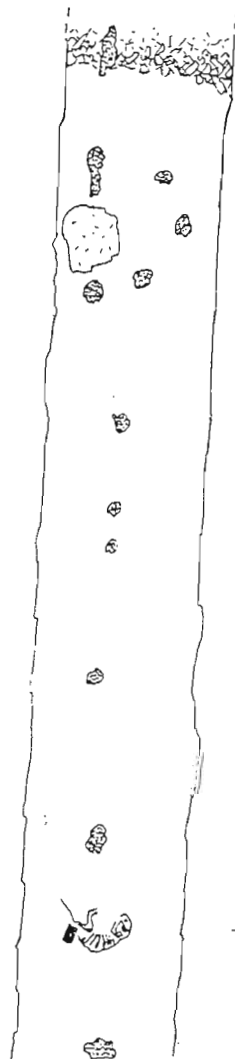
Earlier this year we had the opportunity to discuss our discoveries with an authority on Celtic studies who was staying in Llandudno for a week. She was very intrigued by our findings and related to us what she could interpret from our descriptions. Apparently the layout is typical of some paganistic ceremony, with the cat a form of sacrifice lying to the north, while the altar or sacrificial stone lies to the east of the line of deposits, these may be offerings to the various earth, plant and animal spirits. Surrounding the stone are five patches of material, these could indicate the number of people present at the ceremony representing the four points of the compass or the four elemental forces - earth, fire, air and water, with the fifth symbolising the high priest. The ceremony may have been a commemoration to the Great Orme, perhaps perpetuating some distant link with the norsemen who are thought to have inhabited these shores in Dark Age times. In fact the name Orme is considered to be derived from horma heva viking for great serpent. Or perhaps these offerings were left here when the mines closed, as a tribute to The Mountain that had supplied copper for so many centuries.

DEPOSITS (⊙)

THE DEPOSITS ARE BLACK TO DARK BROWN IN COLOUR, UPTO 10 mm THICK, WITH A WAXY SOMETIMES FIBROUS APPEARANCE. ONE DEPOSIT CONTAINS BLACKBERRY SEEDS

PASSAGE

HEIGHT 1.8 m  
WIDTH 1.0 m



EXTENT OF LOOSE SPOIL

C.A.L. 26.4.89.

BOULDER SURROUNDED BY DEPOSITS

Surveyed by C.A. Lewis and  
C. Jewett on 17<sup>th</sup> December 1987  
by tape and compass

DEPOSITS VERY FAINT

DEPOSIT WITH SEEDS

The "Mine Cat"

THE CAT - WITH FLAT PIECE OF WOOD AT  
JUNCTION BETWEEN BACK AND TAIL

1.0 m

### GOING DOWN THE MINE?

If you have never explored a disused mine before, remember that it can be **EXCITING** if done properly, but **LETHAL** if you do not know what you are doing.

Here are 12 basic rules for your survival.

#### 1. JOIN A MINING HISTORY GROUP.

There are 20 principal groups, which cover the whole of the country. Unless you are attending a special course, consider joining one of these, and they will teach you how to be safe underground.

#### 2. GET THE BASIC GEAR.

The basic things that you need are:

Warm clothing and boiler suit.  
Strong boots or wellingtons.  
Helmet.  
Lamp.

For simple mines, a torch is OK, but the best is a miners' electric headlamp. **ALWAYS** carry spare lighting, and **REMEMBER** a change of clothes.



#### 3. ALWAYS GET PERMISSION.

Always ask the mine owner for permission to enter. If you don't know the owner, ask the local mining history group. Never break in, or trespass, if permission is refused. Always leave mines safe by replacing gates or lids before you leave.

#### 4. TELL SOMEONE WHERE YOU ARE GOING.

If you have an accident, you want people to know where to locate you! Leave a message with a responsible person, giving the following details:

1. Name and location of the mine.
2. Anticipated time down the mine.
3. Anticipated time out of the mine.
4. Time due back to the person you have told.
5. Details of how to get the rescue service, if needed.

#### 5. NEVER GO UNDERGROUND ALONE OR INCAPABLE.

**FOUR** is the **MINIMUM** safe number underground, so that, in case of an accident, 1 can stay with the victim, and 2 can go for help. **NEVER** take alcohol or drugs before or during a trip, as this will reduce concentration, with potentially lethal results.



#### 6. DO NOT EXCEED YOUR CAPABILITY.

Choose easy trips at first, and leave the more difficult techniques until you are used to moving underground. Ladder climbing, for instance, can be very strenuous at times, and it is always harder climbing out!

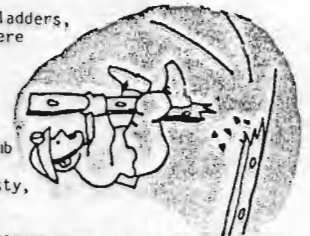
If in doubt, turning back is better than having to be rescued.

#### 7. DO NOT GET LOST.

Some mines are like mazes, and it is very easy to get lost. If there is a plan of the mine (your local mining history group can advise you) take a copy with you. One good idea is to cut small arrows from a bright coloured polythene bag and, whenever you come to a junction, leave one of them pointing towards the entrance. **ALWAYS** pick them up on the way out.

#### 8. NEVER CLIMB ON LADDERS AND MACHINERY

You may come across ladders, timbers etc. which were used by the miners. **NEVER** use these, as they are of uncertain age, and probably rotten. Similarly, don't climb on old machinery, as it is probably rusty, and may collapse.



#### 9. NEVER CLIMB ON STACKED ROCK OR WALLS.

For their convenience, the miners often left waste rock in the mine. It was stacked up, and supported by timbers, which have since rotted away, leaving the rock precariously balanced. **DON'T TOUCH**, or climb on, these features, or you may bring down tons of rock onto yourself and others.



#### 10. NEVER FOOL AROUND WHEN UNDERGROUND.



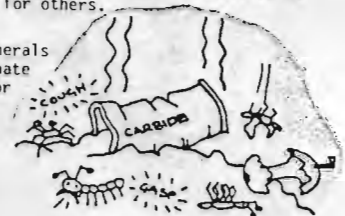
People in groups sometimes do silly things, but, with the dangers underground, practical jokes can have tragic endings. Be a steadying influence on your friends. They may laugh when you say better safe than sorry, but this is a small price to pay for your life and theirs.

#### 11. DO NOT RUIN THE MINE ENVIRONMENT

This is what you have come to see, so leave it in a good condition for others.

Don't: hammer minerals in an indiscriminate manner, destroy or remove artefacts or other archaeological features, interfere with any plant or animal life.

Never leave any litter, as this can destroy the mine life without your realising. Don't leave graffiti.



**TAKE** only photographs. **LEAVE** only footprints.

#### 12. KNOW WHAT TO DO IN AN EMERGENCY.

Mines are dangerous places, and accidents can happen to even the most experienced people. If, however, you don't panic, then the victim stands a good chance of surviving. Learn about simple First Aid, so that you can make them comfortable. Exposure is one of the most dangerous things - learn about its symptoms and treatment. Always leave someone with the victim, and send at least two people for help. The area Cave Rescue Organisations are very efficient, and can be called out by dialling 999 and asking for the Police. Tell them what has happened, the location of the mine, and the nature of the victim's injuries.

These 12 rules are the most basic knowledge that you need, but it will take a few years before you are anything like experienced. **THE BEST WAY TO GAIN THIS EXPERIENCE IS TO JOIN A RECOGNISED MINING HISTORY GROUP, AND TO GO UNDERGROUND WITH EXPERIENCED PEOPLE.** A list of such groups is obtainable from the address below, on receipt of a stamped addressed envelope. The Association's membership provides a national coverage, and, if you indicate which area you are interested in, it will advise you of the appropriate one(s) to approach.

Once you have gained experience, you may wish to take others underground. Remember, that as a leader of a party, you take on extra responsibilities. The Association has drawn up a leaflet giving advice to leaders of such groups, in which are listed all the most likely potential dangers to be met with in a mine. If you should wish to obtain a copy of this leaflet, send a stamped addressed envelope to the address below.

NATIONAL ASSOCIATION OF MINING HISTORY  
ORGANISATIONS  
c/o Peak District Mining Museum,  
The Pavilion,  
MATLOCK BATH,  
Derbyshire,  
DE4 3NR