

JOURNAL OF THE GREAT

ORME EXPLORATION SOCIETY



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LLANDUDNO

JOURNAL OF THE GREAT ORME EXPLORATION SOCIETY 1992(2)

| Title | Author | Page |
|---|----------------------------|------|
| News Roundup | Don Smith | 1 |
| EGM report | GOES | 4 |
| Location of Bronze Age Smelting Sites | Nigel Bannerman | 5 |
| The Great Orme Bronze Age Mining Centre | Mike Wayman & Andrew Lewis | 6 |
| German Smelting Technology | Don Smith & George Nedham | 9 |
| Edgar's Tale | Don Smith | 12 |
| The Round Trip - An Alternative Version | Helen Jones | 14 |
| A Little Gentle Winter's Grovel | Geoff David | 15 |
| The Penmorfa Drainage Level | Tom Parry | 19 |
| Safety Underground | GOES | 20 |

Front Cover: Llandudno in the mid 19th century. Courtesy of Marcus Farrington

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NEWS ROUNDUP

VIVIANA: In the last few months I have had a number of lucky breaks in my search for our Captain William Vivian; there are on record no fewer than eight Captains Vivian, William. I have now learned just who William Vivian was, when and where he was born, and have traced his descendants to date, i.e. down to his Great-Great-Grandchildren. However, not all the facts have been verified, let alone followed up to find more, but as soon as I am able I shall commit it them print.

THE KENDRICKS: While working in Durham I came across a Claire Kendrick whose family I soon learned came from North Wales. Immediately I sat up and took notice. Well, this isn't strictly true, since she was rather attractive, something of a traffic stopper, I was already sitting up, but I digress. I very soon realised she was from the Conwy Kendricks rather than the Llandudno Kendricks and therefore not related to Thomas Kendrick, lapidary, retired miner and cave excavator. However, it seems that the Conwy Kendricks also have a Cornish metal mining connection having gone from Cornwall to the Carlisle area from whence they came to Conwy.

MINE EXPLORATION: Since the last issue of the Journal a level underneath the Engine house has been exposed. From a shaft at the corner of the foundations the level is driven through a deep shale band and heads ~ south-west with Vivian's shaft in transit (~4'x~4.5'x~40'). The most likely explanation for the shaft and level is to transmit power from the engine to the pitwork with as few bends as possible.

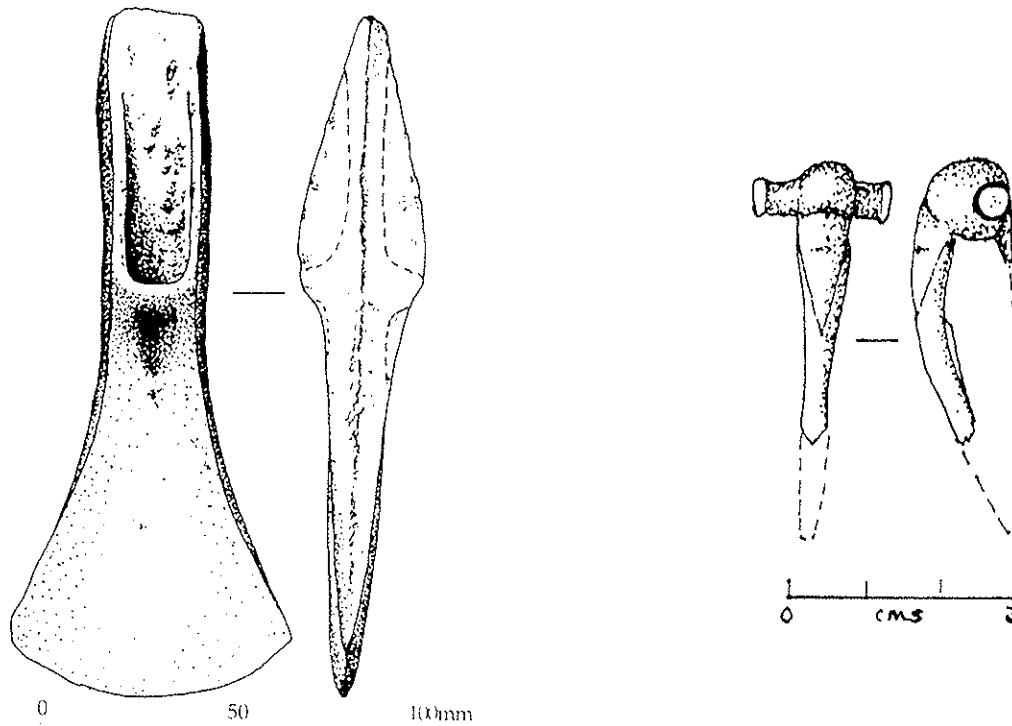
Earlier this year Ian Norman, Edric Roberts and Billy Davies laid the ghost of the Snowden wine-cellar to rest. The cellar of the Snowden pub has an arched wall behind which was supposed to be a mine or level. The wall was breached and conceals no more than naked limestone.

On Sunday 24th May the Society were working in the 'Roman' workings placing rope handlines in the tramway winze. Due to battery failure in the electric drill, bolthole drilling was abandoned until a later date.

ARCHAEOLOGY AND ARTIFACTS: During the winter Geoff David, working underground in the east vein, found small metal fragments in the spoil when using a metal detector on excavated material brought to surface for closer examination. Whether they are copper or bronze has yet to be determined by Oxford University where they have been sent for metallurgical examination. However, to confuse the issue, a bead found at the same site, close a C₁₄ proven Bronze Age working, and thought to be bronze is in fact iron. "Curiouser and curiouser," said Alice. A full report is available later in this issue.

In *Archaeology in Wales* (1991;31:), Frances Lynch (UCNW) reports two finds of interest, both found on the beach. The first, a Shield Pattern palstave (left), which was found in 1990 on the north shore at Llandudno and is similar to one found circa 1941 near Gloddaeth (*Arch Camb* 1941;96:205) and the second, a small copper or bronze brooch (right) dating to the 1st or early 2nd centuries, which was

found on the beach at Rhos on Sea in 1988. Both artifacts are on loan to Great Orme Mines for display. In the same issue Danny Dutton has two short progress reports from the Great Orme Mine and a detailed report about Cyffty Mine.



Shield Pattern palstave from North Shore, Llandudno

Simon Timberlake describes his most recent activities at Copa Hill for the Early Mines Research Group. He reports finding plentiful charcoal remnants from firesetting and C_{14} dates of 830 ± 130 years BP (BM2760), 2850 ± 80 years BP (BM 2759) and 950 ± 50 years BP (2780) on wood, peat and peat, respectively.

VISITORS: Dave Gale from Bradford University has been studying at the mine collecting data for his PhD. From reports in Archaeology in Wales and other journals members will be aware of his interest in stone hammers. Work on site has demonstrated a tri-modal size/weight distribution, the bulk of the hammers falling into three size categories (small, large and fetch Bob) all showing little or no sign of modification. He has been working in the Great Stope and on the Gogarth beach studying the number and size distribution of suitable dolerite rocks at various locations. No doubt to establish the need for going to Penmaenmawr for new material, or the lack of it, and to find any correlation between the size distributions at the beach (ie source?) and the mine.

In the last month Keith from the Dudley Cave Rescue Society and the Mid Wales Caving club have visited us for trips into 'Roman' where they were given the guided tour of the workings ancient and modern.

SOCIETY SWEATSHIRTS Our newly co-opted sweatshirt secretary (Ros Barber) has the matter in hand. They will be green with a modified Society logo (gold) on the left breast and will be available very soon, we hope at not more £10.00 each.

CIA MEETING: Although the turnout by the Council for Independent Archaeology (CIA) at the Risboro Hotel on Saturday May 16th was disappointing the meeting was well supported by the Society. Tom gave an excellent presentation about the Society's activities which was supported by an exhibition and a special issue (Supplement 1) of J GOES which was made available to delegates at the meeting. Since the bulk of the supplement is previously published material and the remainder appears in this issue the Society has not been circulated. However, there are some spare copies available for members who would like a copy. Rolland Pickering, Catherine Gibson and Tony Hammond also gave presentations following which we had lunch before going up to the mine and then for a walk upon the Orme where what appears to be a stone cannon was discovered.

During the meeting I was given some copies of the Monmouth Archaeological Society monograph 'Discoveries in Monnow Street, Monmouth' (2nd edition, 1990) describing the dig and finds in Monmouth which may be of interest to members. CIA membership forms are available from Tony Davies (£3.00 pa) as are the register of experts forms. Subscription to 'Current Archaeology' costs £12.00 for one year (6 issues).

SMELTING SLAG: Congratulations to Nigel Bannerman for his leading article which was of considerable interest at the CIA meeting when it appeared in J GOES 1992, Supplement 1. A mass spectrographic analysis is awaited and further recesses of beaches in the area will follow. In the absence of any other significant evidence of smelting on the Great Orme are there any volunteers for some amphibious archaeological operations this summer?

VICTORIAN EXTRAVAGANZA: As in previous years the Society put on an exhibition, this year in the Central Halls. Sadly the material was rather weary but this deficiency had been partially rectified by the time the CIA conference arrived in Llandudno, when we also had access to the library's exhibition stands. By next year, VE or not, we shall have a creditable selection of material prepared for display. One significant plus was the video-presentation prepared by Tony Davies and Tom Parry which had a number of people gridlocked and is something we should enhance for the future.

Some 700 people entered the hall to visit our and other exhibitions in the Halls. With one exception, interest seemed rather less than previously. David Schilling of the Talking Newspaper came to our stand; he wants to go into the Ty Gwyn Mine to record the sounds and describe the mine first hand to his listeners. The sounds down the Penmorfa would be interest too if we could record them for him. Anyone interested?

On the Sunday a display of abseiling and SRT techniques was given in Upper Mostyn Street from a cage suspended from a Buckley's crane 60ft above the

street. This drew a good crowd and is perhaps would be a good idea upon which to draw next year, perhaps with a co-located exhibition.

ROPE: With much of the Society rope in a sorry state, particularly after the abseiling and SRT display, the Society has arranged a 300m bulk purchase direct from the manufacturer at a very reasonable rate. We shall be allocating certain lengths for specific purposes, and the remainder will be put into storage or sold to Society members.

NEW BOOKS: Beneath the Lakeland Fells, ISBN 0 9512946 3 6. This book has just been published at £14.99 plus £2.50 p&p for Cumbria Amenity Trust Mining History Society. It contains 192 pages and 128 B&W plates and is published by Red Earth Publications, 7 Silver Street, Marton, Ulverston, Cumbria, LA212 0NQ.

Ice Age Hunters, Neanderthal and Early Modern Hunters in Wales has been published by the National Museum of Wales, October 1991, ISBN 0 7200 0358X at £7.50. This book describes many of the best studied caves in Wales including Kendrick's cave (chapter 4, pp56-57) as well as promising caves such as Ogof Tan y Bryn though sadly not Tom Stone's Ogof Pant y Wennol.

BBQ: Before the summer is out I think a BBQ will be in order, perhaps combined with a continuation of the firesetting experiments. Because the British weather is predictably unpredictable we may have to arrange things at fairly short notice.

EGM REPORT

The EGM on April 30th opened without the necessary quorum for constitutional reform and as more members arrived, slightly delayed, and paid their arrears of membership, that elusive figure remained intangible. Nevertheless, a useful discussion was held, many valid points were raised and issues clarified. Since, in the absence of a quorum, the constitution could not be accepted it was referred back to the working party.

It was decided by those assembled that a postal ratification would be sought once the working party had completed its task. Matters of other business included planned activities during the Victorian Extravaganza, the presentation and acceptance of the auditor's report and discussion about the waterboard hut vs alternative Society accommodation.

LOCATION OF BRONZE AGE SMELTING SITES

Early in 1991 discussions with members of the Great Orme Exploration Society brought out the problem of the location of the site or sites of Bronze Age smelting of ore from the Great Orme. A few visits to the Copper Mine site made it obvious that considerable ore had been removed in prehistoric times and although a volumetric survey of Bronze Age workings has not been done a figure of 50,000 tons has been suggested by an informed source.

This amount of ore when smelted would of course produce a large amount of slag, tens of thousands of tons. A lot of slag to be discovered. Experience gained whilst working in metalliferous mines in Northern Derbyshire and in association with Eldon Pothole Club, Peak District Mines Historical Society etc. caused me to consider the following:-

Pressure on local sources of timber in the 16th century, not only for smelting, but for props and firesetting, not to mention domestic requirements, made it necessary to transport lead ore over the Derbyshire moors with packhorses and carts, to more abundant fuel supplies.

This journey, though only some 16 kilometres, due to the rugged terrain is a strenuous one on foot in good weather, for which Derbyshire is not well known.

Fresh water for 'Buddling', (the washing and refining of ore) is also a problem in limestone areas due to the lack of surface water.

As the Great Orme is a fairly small area any local timber would soon be exhausted, not to mention the fresh water supply.

In recent times copper ores from both the Great Orme and Parys Mountain were taken by sea to distant smelting sites where fuel (coal) was plentiful. Even with coal, three tons of it was needed to smelt one ton of ore. Bearing this in mind it would not be unreasonable to propose that Bronze Age man would have also taken copper ores to smelting sites where fuel supplies were easier to obtain.

Bronze Age roads are an unknown quantity, as is any knowledge of the draught animals in that time. But as Victorian miners used sea transport and as a quarter ton can be transported in a very small and primitive boat with ease and safety I determined to examine local natural inlets and landing places which could have provided a suitable smelting site.

This of course had to take into account prevailing winds, currents, and runs of the tide. At one particularly favourable location I discovered a fair quantity of slag. Whether it is from Bronze Age smelting is open to question as much research is necessary in the field, laboratory and archive, before any conclusions can be reached.

Tom Parry and myself have already made some initial trips in the field as well as

references to various relevant documents with the result that slag samples of possible relevance have been found at two more sites. Two other likely locations have been brought to our notice and will be examined in the near future.

At present the results of the slag analysis are eagerly awaited. It is hoped that they will indicate the direction of further investigations. Whatever transpires they cannot however conclusively prove or disprove the original premise that Bronze Age smelting took place away from the mining areas.

Currently discrete negotiations are taking place to obtain permission from various landowners to carryout site investigations at several locations. It is hoped that permission will soon be granted and that field trips can be arranged for interested parties. Expert guidance and specialist knowledge would be greatly appreciated during these visits.

Further research: (not in order of priority)

- 1 To discover any other reason for slag or evidence of smelting on sites which come into a relevant category.
- 2 To build a theoretical model of a Bronze Age society of miners, smelters, and support industries such as farmers, charcoal burners, sailors etc.
- 3 Prove the feasibility of transporting ore to favourable sites by sea or other means.
- 4 Examine smelting methods for clues to finding and proving sites, ie subsoil analysis.

Nigel Bannerman, January 1992

THE GREAT ORME BRONZE AGE MINING CENTRE

A CANADIAN PERSPECTIVE

The last few years have seen increasing interest in our history, not just the architectural or art historical aspects of the past, but all facets of daily life including the industrial past. This is especially true of the mineral industry, as witnessed by numerous contributions to these *Historical Metallurgy Notes* in recent years when such institutions as the British Columbia Museum of Mining, the Nelson Mining Museum and the site of Les Forges du St Maurice have been featured. However, Britain, the birthplace of the Industrial Revolution and increasingly a tourist orientated country, has surpassed by orders of magnitude Canadian efforts in this direction.

April 1991 saw the opening, on a hillside above Llandudno, a picturesque Victorian

resort town on the north coast of Wales, of a mine museum which is one of the most important in the world and one to which everyone with an interest in the history of mining and the minerals industry must make a pilgrimage. The Mine Centre, a combined museum and archaeological site, offers underground tours into the abandoned mine workings. This in itself is not unique, indeed there are excellent underground tours available in many parts of Canada and elsewhere, but the difference is that many of the workings at the Great Orme date from the Bronze Age, nearly 4000 years ago.

The Great Orme's Head is a spectacular limestone promontory which projects northwest from the coast of North Wales, rising to a height of about 700 feet above sea level. In recent times, most actively during the mid 19th century, the Great Orme was extensively worked for copper, mainly in the form of chalcopyrite, although useful amounts of the weathering products malachite and azurite were also exploited. Other mineralisation includes cuprite as well as lead and manganese minerals. Much evidence survives from this mid 19th century working, notably abandoned surface workings, spoil (waste) tips, underground shafts and galleries and the remains of surface structures.

It has often been written that early mining evidence is impossible to obtain because later large scale mining operations destroy it as large volumes of material are removed. However, it is becoming increasingly clear that this is not true; on the contrary, much evidence is preserved beneath the waste piles of later mining, as at the Great Orme. Furthermore, the records of historic mining operations often provide clues to the occurrence of earlier, prehistoric, mining.

The first recorded mining lease on the Great Orme dates from 1692 but it has long been obvious that its mining history goes back much farther. Nineteenth century miners were well aware of this as they periodically broke into ancient workings, the 'Old Man's Workings,' in which were found stone and bone tools, heavily calcified cemented backfill including stalagmites, a few bronze objects, and charcoal remains from fires. These workings were attributed to the Romans or the ancient Celts, but the absence of iron tools which would certainly have been used by Roman miners suggested a pre-Roman, pre-Iron Age date.

During the past 15 years, and most actively during the last 5, a group of enthusiasts has been exploring the underground workings, with more than 4 kilometres having been surveyed to date. By careful observation they have come to recognise the characteristics of workings and mine waste from different periods. For example, the fire-setting technique used worldwide until recent times for breaking rock leaves characteristic topography on the rock face which is easily differentiated from that caused by iron picks or by drill and blast methods.

It appears, however, that the Bronze Age miners on the Great Orme were able to extract the ore, in this case mainly nodules of malachite, from the soft dolomitised limestone by using bone tools made from the long bones of cow, ox, pig, deer and goat, and in some cases pieces of antler. Hundreds of pieces of bone displaying wear consistent with use as tools are found throughout the early workings and

spoil piles, many stained green by the copper salts which are absorbed throughout the millennia. At one location on the site, wear marks made by these bone tools are so well preserved that they look as though they were created yesterday. At least 750 stone tools have been collected, some a mere 0.25 kg others up to 29 kg, were employed. Some charcoal has been found as well, suggesting that firesetting was used to some extent.

From the charcoal, and from the collagen extracted from the bone, radiocarbon dating has been possible. This has yielded dates between about 1800 and 800 BC. It appears that the mines were abandoned for several millennia until they were reopened a few hundred years ago, although evidence for mining in the intervening years may yet emerge.

During the winters of 1990-92, nearly 100,000 tonnes of 19th century wastes were cleared from areas of the site thereby exposing the surface workings of the Bronze Age miners as well as the surface opening into their underground workings. In addition, extensive amounts of spoil have been identified on the surface and as backfill in the underground galleries. The 19th century spoil is characterised by its content of drilled limestone and pottery, and by the absence of stone and bone tools and charcoal. Similarly, the Bronze Age workings contrast with the later ones in that the Bronze Age miners tended to exploit only that part of the deposit which was easiest to extract.

As a result there is a great variability in the size and shape of the workings, some as narrow as 25 cm (~ 10 inches), others several metres wide. At least 30 north-south and 15 east-west trending mineralised joints and faults are known and the Bronze Age miners exploited these on surface by means of trench and opencast workings and underground by a system of interconnecting tunnels. These tunnels attain depths of at least 70 metres below the surface and extend for at least 240 metres into the hillside. Overall, an area of over 24,000 square metres shows evidence for Bronze Age mining activity, and calculations support the view that thousands of tonnes of ore-bearing rock could have been extracted minimum effort. Clearly the Great Orme was one of the major sources of copper for the British Bronze Age.

Quantities of ore as large as these would require a well organised system for processing, smelting and distribution, as well as a considerable workforce. Some evidence for ore processing in the vicinity is beginning to emerge but to date no evidence for smelting. This is one of the on-going archaeological programmes underway in the area, along with continuing underground exploration which will soon lead to the opening of new mine galleries to the visiting public.

The centre houses interpretive display boards, photographs, stone mauls and bone tools recovered from the prehistoric workings, as well as various artifacts found locally and a mineral collection. Underground tours are preceded by an audio-visual display which provides an unusual introduction to the Bronze Age. Part of the site is an archaeological dig under the auspices of the Gwynedd Archaeological Trust. It has been suggested that a young archaeologist starting on a career here could

well be employed until retirement; the potential of the site is immense.

Mike Wayman & Andrew Lewis, June 1992

Adapted from an article to be published shortly in Canadian Mining Metallurgy Bulletin

GERMAN TECHNOLOGY IN THE EARLY SWANSEA SMELTING INDUSTRY

During the reign of Elizabeth I there was a resurgence in interest in metal mining which led to the incorporation of the Mines Royal Society and the Mineral and Battery Works Society. Between them they monopolised the metal mining and processing industries until 1688 when the Mines Royal Act was repealed in the first year of William and Mary's reign. The Societies survived in the open market, merged, but did not finally disappear off the scene until the 19th century. The major English shareholders in the Mines Royal Society in 1580 included Lord Burleigh the Lord Treasurer (14%), the Earl of Pembroke (14%), the Earl of Leicester (7%) and Lord Mountjoy (2%). The remaining shareholders were commoners and included Thomas Smyth, a London Customs officer, who contributed to starting the smelting industry in the Swansea area in 1581. An equal number of shares appear to have been held by the Germans. During this period many, if not the majority, of the mining and smelting experts were recruited from Germany.

The following is an extract from *'The Smelting of Copper in the Swansea District of South Wales, from the time of Elizabeth to the present day'*, published in 1881. It describes the impurities or corruptions in copper ore and how they affect smelting. The German mining master, Jochim Gaunse, is being quoted in a letter from George Nedham to Sir Francis Walsingham, March 1582. The bracketed non-italicised comments are those of the author, Colonel Scot Francis.

Don Smith, April 1992

".....After copper ure be rosted and redie to smelting (w'ch roste is done in one fire,) then must the vitrall or coppris, or w'ch of them shalbe thought moste mete, be taken from the ure, before to come to the smeltinge, first w'ch is done by letting water passe through the ures: of w'ch water the coppris or vitrall must be made; and that water doth not onely drawe the vitrall and coppris from the ure, but also divers other hurtfull humours, being by nature enemyes to the Copper: as arsenic, sulpher, antimony, allome, and ironn; w'ch, being taken away as aforesaid, maketh the ure w'thin 4 dayes, by once raosting and once smelting to yeeld black copper and copper-stone, w'ch Mr Stembarger nor his Father coulde under 15 rostings and 15 weekes' time."

I have therefore thought necessarie to sett it downe in writeinge, that y'r Honnor might see the sveral names of the 9 infections w'ch ar in our copper ures, w'th the

nature and operation of every of them, by what meanes thei do hurt unto the Copper, before thei be corrected, and being corrected, by what meanes thei be helpfull to the copper.

The Names of the 9 infectyve and evill Humors:--

1 The first is Sulphur, being a mynerall substance w'ch verie quickly taketh fire, and wilbe consumed in smoke by blast, whereby it goeth very violently, and in goeing away will not onlly carry w'th it some of the copper or any other mettall it is joyned with, but also maketh the copper black and brette so that it wilbe broken w'th the hammar, in manner like glasse.

2 The 2nd corrupt humor is Arsineque, by nature a kinde of poyson, being in the like manner a minerall substance, wilbe consumed w'th fire in to Smoke, w'ch is a vere daungerous ayer or savor, and by his force maketh the copper white and brether then the sulpher doeth. This Arsenieque is not onely in great quantitie in our copper ures, but is by nature so forceable of it self, that it is Lorde and Ruller over all the rest, and consumes both ye sulpher, and antimony, so y't thei ar not to be seene: and in my opinion, by his dryness doth so dry and take away the force of the other iij liquid and tough humors, that thei have no force to let them from speedy smeltinge and departinge from his drosse.

3 The 3rd corruption is Antimony, w'ch is in like manner a mynerall substance, and by rosteing wilbe consumed into smoke. Ittis in nature much like to sulpher and arsenieque in makinge the copper black and brether; besides it is great let and hinderer to the copper in smeltinge; and by the opinion of some that in refining, it doeth consume part either golde, silver, or copper w'ch ar smolten w'th it.

4 The 4th corrupt humor is Vitriall, in like manner a mynerall substance, and if the force therof be not corrected by rosteinge before the ure wherin it groweth be smolten, it fretteth the Copper and maketh it brette and black coulered; but by stampeinge the copper ure into powder and by rostinge the same powder after Mr Jochim's rule before it be smolten, and then letting water passe through the same rosted powder, the water doth not onllie carry the vitriall from the powder or ure, but also carrieth w'th it the burnt powder or sinder of the sulpher, arsenicque, and antimony, whereby it is so clenseth the ure that when it cometh to the smeltinge the copper cometh forth easelie, w'thout such quantitie of slagges or drosse, as otherwise would be, if the ure were not rosted and the vitriall in the manner taken from it; thus is the vitriall, of an enimye made a friend.

5 The 5th corruption is Calcator (Iron Oxide), beinge the mother or corpus of vitriall, and a mynerall substance; this will not be consumed w'th smoke, but gathereth into a body and substance, and very forceable abideth the fire, although in nature it be not fullie hurtfull to the Copper as vitriall is, but carrieth away corrupt humors w'th it as vitriall doth.

6 Allom is the 6th corrupt humor, a mynerall substance, and by nature a let to ye smeltinge of the Copper; it also hindreth ye vitriall, and of all the rest of the ix

infections is least hurtfull to ye copper.

7 The 7th humor is Iron, being one of the 7 mettalls but no mynerall, w'ch being engendered and bred up in the earth w'th the copper ure, wrll not lightlie be gotten from it, and especialle when copper ure is smolten greene as it cometh from the myne, w'thout rosteinge, then the iron doth joyne and incorporat himself w'th the copper, by reasons of the other 2nd moist humors hereunder written as shall plainely apeire unto yo'r Honner by samples that I have shewe, w'ch is onely the greatest cause of so many chargable fires and a longe tyme w'ch Mr Daniell and his Sonne do spende before thei can make rough copper. And accordinge to Mr Jochim's order of workeinge the nature and substance of the iron yt is our copper ure being beaten into powder, and rosted as aforesaide, the drosse and corruption that is in the iron is so dried up, that when it cometh to smeltinge it is not able to runne or gether itselge together like a slagge as it doeth being smolten greene before the ure be rosted: and the best substance w'ch is the right iron ure, beinge by rostinge into the perfection of iron, by the water and strength of vitriall, converted into copper, as I have proved sundrie tymes: so as this cheefe of the hurtfull humors beinge corrected, it is made of an enemye a freinde and helper of the copper.

8 The 8th hurtfull humor that is in our copper ure, is a kinde of Black Stone (native matrix found in Cumberland), wherin the copper is bred and doth growe, and is incorporated w'th the copper, as shall plainely be shewwed unto yo'r Honnor, w'ch stone beinge a liquide and tough substance, and smolten before it be rosted, doth so joine itself w'th the iron and copper, being bred up, together, that thei will hardly be parted but by great charge and long tyme: but as is before declared, beinge rosted before it come to smeltinge (what force of the fire and of the venemous arsenicque) this hurtfull stone is so dried up, that when the ure cometh to smeltinge, it cannot incorporatitself to any substance to become a slagge or drosse, but is like sinder consumed w'th the force of the fire, wherby it can no way hinder or lett the copper.

9 The 9th and the last corrupt humor is a kinde of White Stone, named Sparr, w'ch in all respects is like to the black stone, and if in the same sort it be not corrected, it is no lesse prejudiciall to the smeltinge then the other."

George Nedham, March 1582, quoting Jochim Gaunse

EDGAR'S TALE

'Tragedy at Llandudno' was the headline in the newspapers¹ after an incident on the north escarpment of the Great Orme 89 years ago, on Tuesday March 3rd, 1903. Mrs Ellen Roberts of 24 Townsend Lane, Liverpool (Anfield), was a recently remarried 34 year old widow (nee Jackson) with three children, Lillian Gladys aged 2 years and 7 months, Elsie aged 5 and Edgar aged 7. She ran a chip shop in Townsend Lane and last saw her husband Arthur Richard Roberts, a tram inspector, at 04:30 when he went out to work unaware of what was to take place later that day. Ellen brought her children to Llandudno, probably by train, perhaps by packet steamer, and then brought them for a walk up the Marine Drive. They were stopped at the tollgate and charged 1d each by the keeper, David Owen, who, after some haggling, settled for 2d all-in and let them pass on their way.

An hour or so later Edgar found his way back to the tollgate, muddled and somewhat shaken and, as a message was passed to his father in Liverpool that he had been found on Llandudno Mountain, the story began to unfold. His mother had brought the children up to a grassy slope close to the Lighthouse, where clothing was later found, and had thrown each of them over the edge and then herself.

The cliff at this point about 150 yards east of the lighthouse (SH 75788444) is not a sheer drop into the sea but is interrupted by a steep grassy slope. Edgar had landed on a ledge and had found his way back up to the road and then back to the tollgate. Here he was noted to be covered in red mud, but no injuries were noted in the newspaper accounts, suggesting he had not fallen far or his fall had been broken in some way. The site was visited the following afternoon when signs were seen on the turf and rocks of falling bodies and the toll keeper was lowered over the edge on a rope to investigate.

The Weekly News details the following: "*In the afternoon, Inspector Owen came with Sgt Pugh, with ropes, and witness with rope made fast around him, went down to the ledge below the verge of the slope as seen from Marine Drive. Leading down from this ledge was a hole, and he tried to descend this, fancying that, something might have fallen down it. He found however, after proceeding some distance, that the cleft which the hole became after the first perpendicular descent was too narrow for him to pass through with the rope around him, and he returned.*" and "*The hole, after the first dip of some 2 yards, sloped right inward towards the mountain.*"

Help was summoned and a Professor Short from Rhyl came to the rescue. He penetrated the shaft and at the bottom found and recovered, with considerable difficulty, the body of the infant Lillian Gladys. He returned to establish her's was the only body in the cavity, which it was, and the depth of the system was estimated at 50 feet by paying out rope as he descended. Postmortem examination did not show evidence of significant external injury to this child who they supposed had died 12 to 24 hours after the event.

Elsie's body was observed by the lighthouse keeper on Wednesday morning March

4th, trapped between rocks at the base of the cliff, below the highwater mark. She was recovered by boat, though at the first attempt the police found her covered by the tide and had to return at low water. Despite searches, the body of Ellen Roberts appears not to have been recovered, at least not in the immediate area.

An inquest was held in Llandudno on Tuesday, March 10th, by the Caernarfonshire Coroner, Mr J L Bodwel Roberts, at which the jury returned a verdict of murder upon the deaths of the two sisters Jackson, Lillian and Elsie. The reason for the tragedy is not clear but when Mr Roberts gave evidence he indicated his wife might still have been grieving for the loss of her first husband. By Coroner's order, the girls' remains were interred at Llanrhos Churchyard on the Friday, March 13th, 1903, where their place is marked by a Celtic cross erected by their aunt (K037²).

The description in the 1903 reportage indicates a cavity which they attributed to copper mining activity and which had ceased some 22 years previously. Quite what feature the witnesses were describing is not clear, but a cave of some kind seems more likely than a mine since there is no known dolomitisation in the area or trials. Firsthand accounts as statements taken by the Coroner's officer would be very interesting and, being over 75 years old, should be accessible to the public. However, all Caernarfonshire inquest records between 1902 and 1907 are missing from the Caernarfon Record Office. They are not to be found at UCNW, Ruthin R.O. Hawarden R.O. or the National Library in Aberystwyth.

The site was visited by GOES on Sunday, February 23rd, where a 4-5 foot wide fissure filled with red clay was discovered 50+ feet below the lip of the cliff. The upper portion of this fissure might be described as a shaft, open on one side, but no cavity was found and the fissure is of ample size for the most portly to negotiate, even if girded with thick manilla rope. Of course, in 89 years the opening might have become filled by clay and debris, or even have been obstructed deliberately by the authorities. Another site 100 yards east of the first was tried where Ian Norman abseiled down to a ledge close to the sea but found no shafts, clefts or fissures that would fit the description.

Upon our return to the King's Head it was learned from Jerry Green that in his younger, more cavalier, days (1940s) he had descended Cable Gulley and the cliff below, hand-over-hand on a manilla rope, into a boat waiting below. During the descent two of the group detoured slightly off track and went into a small, obscure cavity into which he did not venture. With this information the Society's gladiators sallied forth the next weekend; sadly they returned empty-handed, but that's another story.

1) Weekly News, 1903. 2) Gwynedd Family History Society.

I am grateful to Howell Lloyd of the Gwynedd Family History Society, Eric Fawcett, Church Warden, St Hilary's Church, Llanrhos and Ken Birch, a Police Historian, for their assistance.

Don Smith, March 1992

THE ROUND TRIP - AN ALTERNATIVE VERSION

Excitement rising within us; what lay ahead in those dark passages? Who were those men who had been there before us? Strange words echoing in the unconscious memory - what language had they once spoken and would it have been recognisable to us today? Walking backwards in time as we descended below ground to become one with our ancestors, alone with the rock. Well not quite alone since there were nine of us together, yet each alone in their mind and free to paint images of the past if they so wished.

A century ago boys much younger than myself would have worked down here. What ogres did they see in the shadows, what fears haunted their young minds? Thanks to their fathers' hard work we could enter today this subterranean world and marvel at what lead man to put his life at risk for the blue-green rock. And before them, when progress was even slower and life even cheaper our distant forefathers had done much the same thing, if for slightly different reasons. What lives they must have lead, in darkness, cramped between the rock, driven by some master or allegiance to their community to bring the metal bearing rock to the surface. Did thoughts of rebellion ever cross their minds? Did mothers worry about their children under the cruel limestone? Did they remove the bodies of the dead - for surely there must have been accidents - or were they left as a peace offering to the gods of the underworld whose power it was to bring about such suffering?

Did they too discuss the faults in the rock, had they names for the different coloured minerals, did they map out their underground working or take measurements? Indeed did they keep any records at all except in their minds of the place in which they toiled and when they ceased working here, was the mine forgotten and left to decay?

But there are no prehistoric passages on the round trip - well not the type which have been left relatively undisturbed by later excavations of one sort or another. So there was little to feel from the distant past as we tramped through the larger Victorian workings with their open stopes and high roofed passages. Here there were clog prints still crisp within the mud; a dead cat lay as a sacrifice to the spirits of the mine, cats underground were supposed to be unlucky (especially true if you happened to be a cat). Remains of a tramming adit, an old rusty bucket and rotten wood, reminders of the men who once worked here.

Sitting in base-camp you could almost hear them, presumably they too needed a rest from their toil and would have sat down somewhere such as this to eat and drink before returning to the rock once more in the hope of finding profitable ore. Here was soot blackened rock, a sign of a candle embedded in a dollop of clay - would it have been one of theirs, perhaps a man's only source of light, or was it one of Tom's more recent additions?

Next the shaft, open to the air at the top, which we descend by rope these days. Images of men climbing one after another down rickety ladders daily, if one fell all

would be lost. And when tired after a day's work, eager to feel the cool fresh air on their faces and go home to their women and children, did any of them in their eagerness for freedom miss a rung and fall to their deaths? Now a wooden barrier which once kept back water, and in the passage behind a chalky line on the wall marked where the water level had once been. Would it not have been exciting to be there the day the water was released? And that was only a few years ago.

Almost over: the trip was almost over and we would have to enter the real world again. Out through the most recent phase of development, the tourist route, with its bright lights and staircases. Where soon others will be allowed a brief glimpse of the past but not the experience we are privileged to have had nor the hope of one day entering a place where no one other than yourself has entered for thousands of years.

Helen Jones, June 1992

A LITTLE GENTLE WINTER'S GROVEL

Last winter, while most sensible people were gambolling in Llandudno's famous sunshine, or maybe just watching the box, your truly was grovelling in a moderately cosy little passage inside the Great Orme Copper Mine, playing the archaeologist in a newly-discovered working which certainly looked as if it could be "undisturbed Bronze Age".

Originally, when Andy first explored it, there were two passages, one above the other. The lower one was quickly dismissed as "modern", as it was well decorated with drill-holes and the spoil was typically 19th century - big blocks, very angular, which could only be the result of blasting. So, after a quick look, it was filled in again by Andy and his companions.

But the upper passage was different. True, it did have three drill-holes in the ceiling in what I have called the "Far Chamber" (Figures 1 & 2), but for the most part the walls had the typically smooth well-rounded contours that have come to be associated with Bronze Age "firesetting", and - most important - on his first visit Andy picked up off the surface of the spoil two very tiny fragments of metal which have since been identified as bronze. Also, in the little crevice in the wall marked on Figure 2 just above point "B", he found some charcoal, and this, when tested later at the British Museum, produced a C₁₄ date of around 1400 BC. So it was thought that this could very likely be a reasonably unspoilt Bronze Age working, and I, being a spare number at the time, was brought in to give it an archaeological going-over.

The first job was obviously to survey it, and this proved fascinatingly awkward. As shown by Figures 1 & 2, the entrance - between my points "A" & "B" - is embarrassingly tight, particularly for a person of mature girth like myself. However, once within arm's reach of "B" you can at least stand up - but only provided that

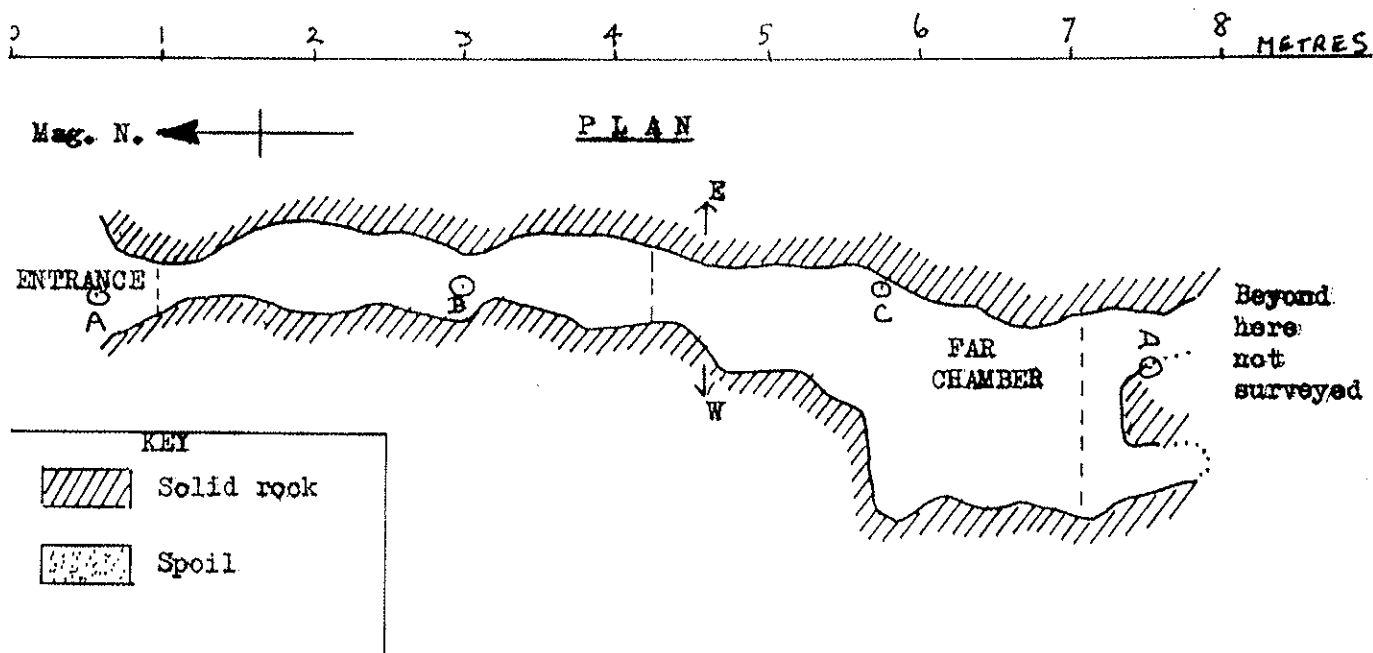


Figure 1

your head is small enough, as the upper part of the passage suddenly narrows (Figure 3) - obviously a crafty Bronze Age defence against those with big heads. So, between "B" & "C" all surveying had to be done lying on one's side, and the dark blue colour of the rock walls at this point is almost certainly the result of my language. Luckily, "C" marks the beginning of the "Far Chamber", a commodious little refuge with plenty of room to sit up and uncramp the muscles. Beyond the Far Chamber a little passage leads off, beyond point "D", through another very tight bit - Andy cheerfully assured me that if I go stuck beyond there "there would be no chance of rescue". So I chickened out of surveying it - this time.

However, in spite of all these little trials the surveying - by tape, compass and plumb bob - was eventually done, and digging began. Because of Andy's discovery of those tiny scraps of bronze, all spoil had to be carried up to daylight and there sieved, and the sievings checked over with a metal detector in case it contained any bronze.

To begin with, the only metal detector available was the one belonging to my old friend and colleague Ron Crane, the maintenance manager of St David's College. Ron very kindly agreed to help me out for the first few weeks, and this in fact stretched out to two months, during which Ron's expertise with the detector located over 50 fragments of metal which I would certainly not have noticed either in the digging or the sieving. After that, Ron had to stop giving up his lunch hour in this way - his wife was demanding his presence at home! - but Andy was luckily

ELEVATION (Same scale as Plan)

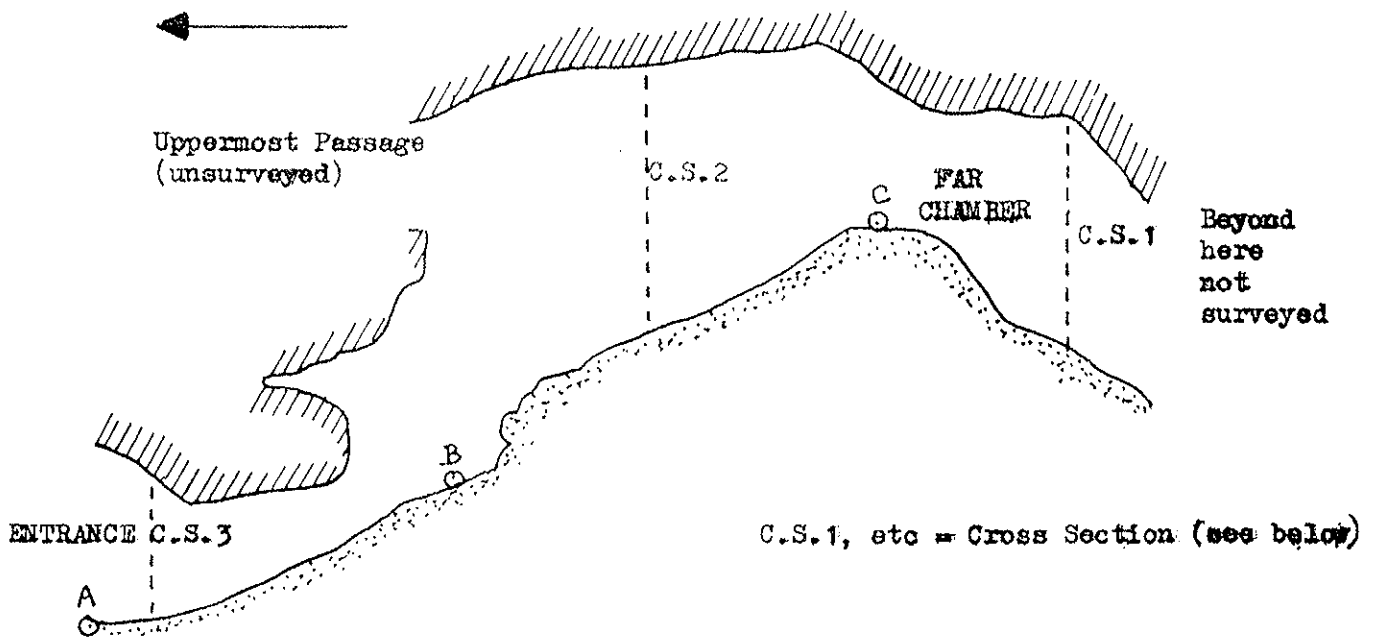


Figure 2

able to resurrect another metal detector from somewhere, so I carried on with that, and by the end of the dig in mid-March I had found nearly 30 more bits, making a total of over 80. A few samples of these enigmatic scraps have been sent away to various experts for analysis, in the hope that the metal would turn out to be bronze. Certainly one of these samples, analyzed by Dave Jenkins in Bangor, was found by him to be "arsenical bronze", i.e: bronze made by alloying copper and arsenic instead of the usual copper and tin: this could be quite promising as arsenical bronze is usually regarded as a very early alloy. Reports on the other samples are still awaited (June 1992).

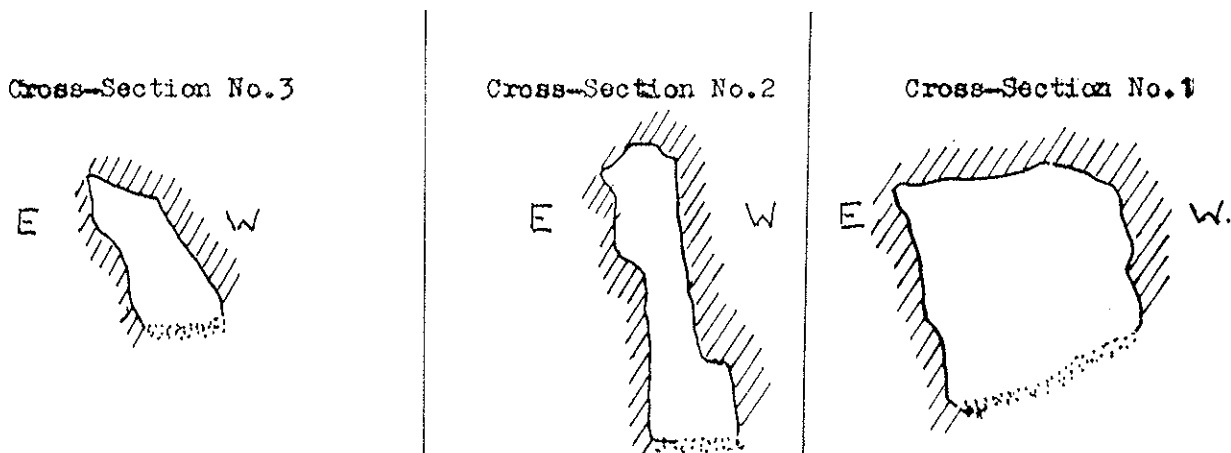


Figure 3

One oddity about all of them was their shape - none of them showed any trace of a smooth flat surface, such as a spall off the end of a tool would surely show: many of them in fact were jagged, almost like pieces of shrapnel. Could they have been the result of an accident in smelting - if, say, water had dripped onto the molten metal, thereby causing an explosion? But surely would not be done underground? Perhaps the experts will have the answers.

Unfortunately, what should have been the prize exhibit - a slightly bigger piece of metal with a hole through it, looking vaguely like a bead - has turned out to be **IRON** instead of bronze. This must be correct as the analyst is Dr Peter Northover, of Oxford University, a world-renowned expert in ancient metallurgy. But it does of course cast considerable doubt on the Bronze Age dating of this particular working. I am still very puzzled, as it came from a 2 cm thick layer of charcoal at least one metre beneath the original surface of the spoil, and lying on top of this charcoal bed was a large and beautiful stone maul - hitherto regarded as one of the most typical Bronze Age tools. I had previously found two more stone mauls - not quite so big nor so beautiful (in my eyes) - about 50 cm above it, and there was no sign that I could see suggesting that these layers had been disturbed. I trust we shall discover the answer in due course, but in the meantime it is worrying - when Dr Northover first broke the news to me over the 'phone I had a strong temptation to run and join the French Foreign Legion, but I do not suppose they would accept me now, with my attempts at French grammar.

One other peculiarity about this dig has been the surprising lack of bone tools - another typical Bronze Age artefact. I only found four of these altogether, in nearly five months of digging, and one usually finds them by the bucketful in any Bronze Age working. Perhaps I have not yet gone deep enough? By the time I finished digging, towards the end of March, I had cleared all the spoil down to bedrock in the entrance passage, as far south as "B" (Figure 2) and taken a fair slice off the rest of the pile of spoil, to a depth of just over one metre below "C". But there is still a lot more spoil to remove below that: perhaps the real "goodies" are still waiting to be discovered? If I am spared, I hope to return to the attack next Autumn - provided I can keep my waist-line down.

Geoff David, June 1992

THE PENMORFA DRAINAGE LEVEL

Since the inception of the Society, whenever that actually was, GOES members have engaged in endless discussion of the possibility of clearing up the adit and facilitating easier entry into the Penmorfa workings. Over the years several bizarre plans have been mooted and debated. One or two cunning schemes actually saw the light of day (or at least tunnel darkness). There was a time when entry into the mud slide was through a bottomless dustbin. Whatever happened to it?

Sunday 21st March saw an efficiently organised operation to mark the first stage of a serious and well thought out plan to 'clear out the adit'.

As with most GOES activities, involving hard work, the day started at 9 o'clock with coffee at Plas Road. The party consisting of Ian, Erik, Helen, Tony, Steve and myself then left for Abbey Place. Their arrival accurately coincided with that of Eifion Evans and his JCB.

The job went quietly and smoothly. Ian and Erik disappeared into the adit to clear a little of the mud slide. The remainder set to on the outside section. Aberconwy Borough Council had provided a skip. With Eifion's smiling assistance and operating skill rapid progress was made and the watercourse roughly dredged along its length. By this time another skip and lorry had made their appearance and proved very useful in allowing the excavator to concentrate on clearing without the need to return to the skip with each bucketful. The area in the vicinity of the two pipes slowed progress down a little but was safely negotiated and cleared. The operation was then reversed and the final clearance made in the opposite direction, the bucket being filled by hand when necessary. It had been thought that the old rails might have been uncovered but no definite traces of them were found. At the lower end of the stream some timber which might have been used as sleepers was uncovered.

Amongst the debris cleared from the stream was an old plastic bread tray which proved to be the exact size required to cover the sluice and protect the culvert from blockage. Obviously the old Penmorfa tunnel miners were looking after us!

Several of the residents of Abbey Place came over for a chat and generally seemed to be pleased that "something was being done" to the adit.

The exercise was a resounding success, and a heartening start to an optimistic and ambitious plan to make to Penmorfa trip a 'welly job'. Of course there could well be complications. Possibly the defective jingling and the mud slide will prove a little more difficult!

Tom Parry, March 1992