

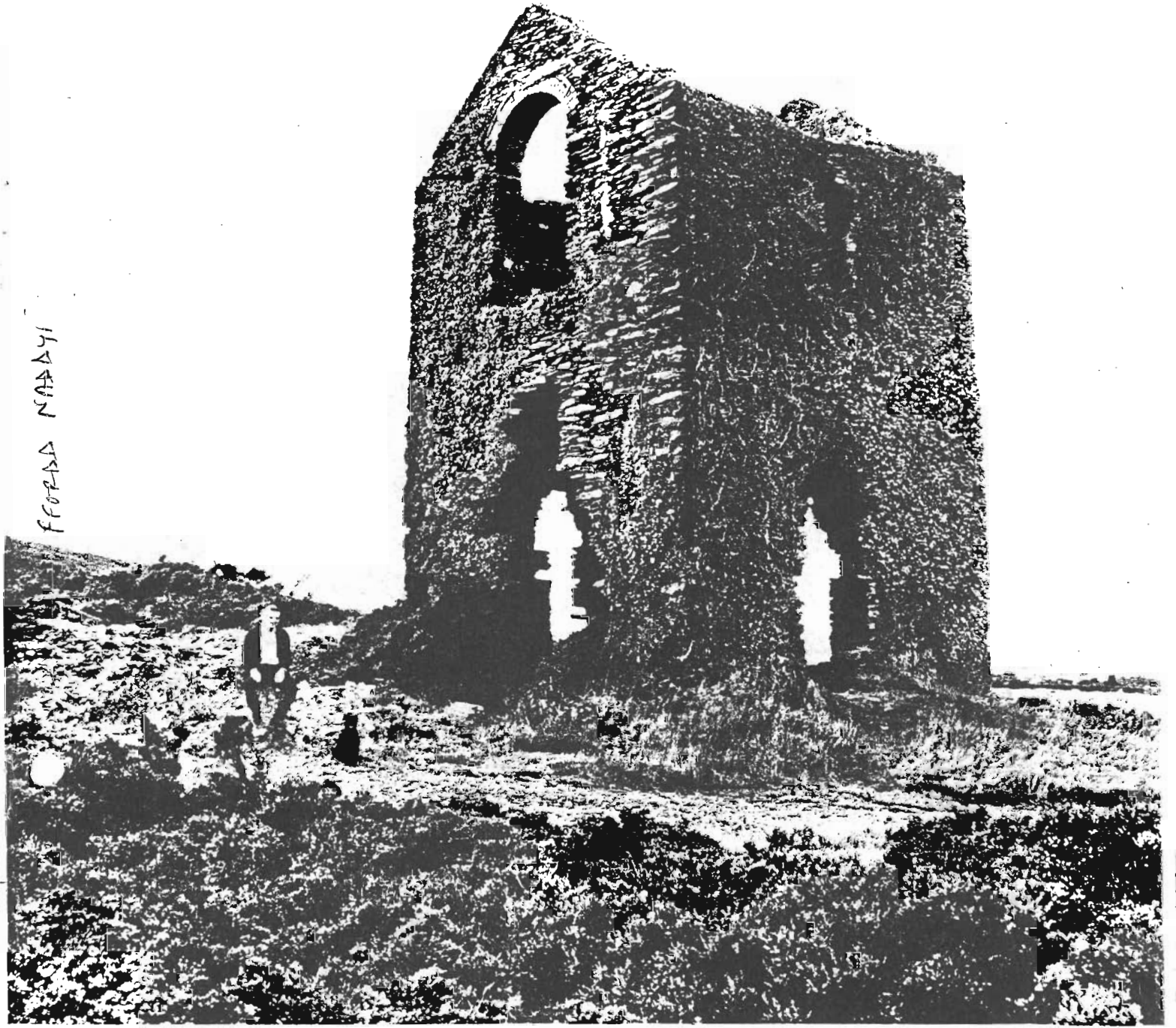
# Great Orme Exploration

Sec 4

## Society Newsletter

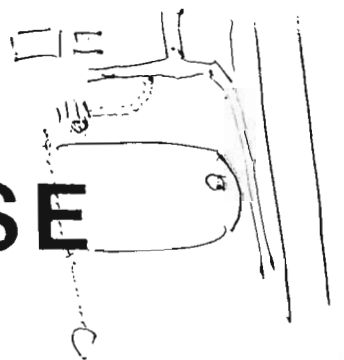
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# Great Orme attractions to get new lease of life

By Suzy Michaels

**A** CENTURY AFTER closing, the old Victorian copper mine workings deep inside Llandudno's Great Orme could take on a new lease of life as a tourist attraction for the popular North Wales resort.

Interest in Britain's industrial heritage has never been greater than it is today, and a number of old slate and copper mines in Snowdonia have been transformed into tourist attractions.

Now the Great Orme Exploration Society — a group of local archaeologists, historians, and cavers who have investigated the old copper mines on Llandudno's headland for years — is hoping to assist Ashton Mining, of Colwyn Bay, which has conducted a feasibility study with a view to reopening them to the public.

## ENVIRONMENT

Ashton Mining will today seek permission in principle from Aberconwy Borough Council to provide a visitor attraction which will operate alongside archaeological excavations out by the Gwynedd Archeological Trust and the Society.

However, the reopening of the old workings is just one facet of an exciting plan by Ashton Mining and the Society to promote the Orme as a conservation area and a visitor attraction.

This not impossible "marriage" would ensure that this unique headland finally receives the recognition it deserves, as it would give people a greater awareness of their rich heritage, while adequately protecting the local environment.

Because of its outstanding natural beauty, the headland is designated as part of the Heritage Coast, and is also a Grade 1 site of special scientific interest.

It was established eight years ago as a country park and nature reserve to ensure that tourism is compatible with conservation. Today, it is managed by Aberconwy Borough Council, and a full-time countryside officer, Mr Tom Gravett, is based on the Orme.

Of national importance because of its flora and geological structure, the Orme has 400 plants and flowers grow-

ing upon it, and is the only site in Great Britain where the rare flowering shrub *contoneaster integerimus* grows. Not long ago, only six of these plants were left, but, through a programme of reintroduction, the number is increasing.

In summer, the Orme is home to a large colony of migrating seabirds, which nest on the cliffs. As well as being an ornithologist's paradise, the Orme attracts many climbers, who, since the seventies, have been scaling the formidable limestone cliffs.

Many rabbits live on the Orme, as do foxes, weasels, and stoats. You will also find exotic long-haired Kashmir goats — the only place in Britain where they can be seen running wild.

They were introduced into this country by Shah of Persia as a Coronation present to Queen Victoria, who presented a pair to Lord Mostyn, who owned the Orme. He bred them into a herd, which today numbers about 50.

Since the Victorian era, the Orme has had its own tramway, which still runs today. Cable-cars, introduced in 1969, carry summer visitors from the busy seaside resort below up into the peace and tranquillity of the headland — a completely different world.

Historically, the Orme is of major interest, for it contains a wealth of fascinating remains dating back to pre-history — including relics from the stone and bronze ages, the Druids, Romans, and Vikings. Orme is a Viking work meaning serpent.

Recent important finds of stone implements and charcoal fragments dating to 1,000 BC have undergone preliminary radio carbon dating at the British Museum, which indicate that prehistoric man mined copper in Britain thousand of years before the coming of the Romans.

Further tests will have to be carried out but, if it is proved the tools were used for mining, history will have to be rewritten, as, until now, it was thought the Romans were the first miners in Britain.

"The more we have become involved with the rediscovery of the Victorian Ty Gwyn Mine, and the history of the Orme as a whole, the keener we are to conserve and protect it for future generations," said Eddic Roberts, the Society's secretary, who lives and breathes "Orme".

"As we have gone round the area, we have mapped out the old copper-mine trial levels and shafts and, when the map is completed, we will present it to the Borough Council as part of the local heritage."

The map survey is the Society's main project, which members say will keep them busy for years. For the last



EDDIC ROBERTS investigates an old shaft in the Ty Gwyn copper mine on Llandudno's Great Orme

two years, they have run a stand at the town's Victorian Extravaganza weekend at the beginning of May, where they have shown photographs of the mines, and sold historical handouts to help fund their activities.

Unfortunately, the original records of the Ty Gwyn Mine, which functioned from the 1830's to 50's, have been lost, so a great deal of preliminary research has gone on during the last two years, culminating in a major book by the Society's medical officer, Dr Don Smith.

## DESTRUCTION

Entitled *The Great Orme Copper Mines*, it will be published at the end of the year.

A senior registrar in geriatric medicine, Dr Smith is a keen amateur archaeologist, historian, and geologist, who has spent many hours researching at UCNW Bangor, and the National Library at Aberystwyth.

He received a great deal of help from the Society, and the Llandudno Historical Society.

Dr Smith discovered that the definitive book on the subject — *Llandudno Copper Mines* by C J Williams, the Clwyd County Archivist, was out of print.

"His book was a technical reference book, and I felt that, as there was an area in it which had not been adequately covered, it would be worth writing to give local people and visitors the chance of discovering some of the Orme's fascinating history for themselves," said Dr Smith.

Unfortunately, it is the Orme's many attractions that could, if not properly looked after, lead to its destruction.

Paul Frost, Aberconwy's Tourist and Amenities Officer, said that, because of these assets, the Orme was in danger of becoming over-exploited, so, in conjunction with the Countryside Commissions, they had undertaken its management.

A positive step, he said, which would encourage people to become aware of its different facets, and seek to inform and educate them into becoming aware of the importance of preserving their great local heritage.

## ition an o electorate

John (p. 28), whether they will Party's or any- (p. 28) seri- v have n. the but

## Investing in people



## LETTERS TO THE EDITOR

### Another M4 across Gwent not wanted

SIR. — The Conference on Regional Policy should reconsider its call for a second M4 across Gwent. The building of such a road will not solve traffic problems — it will merely increase traffic flows by attracting more

the Welsh Office and the Conference on Regional Policy have chosen to ignore these calls. Wales desperately needs a road to unite its people North and South, and to open up the

## More vital needs than Senate

SIR. — It was recently reported that a multi-party organisation was being set up to campaign for a Welsh Senate.

Surely there are more important political issues to be raised than the creation of another talking shop? Do we have to re-learn the lessons of the 1970's again

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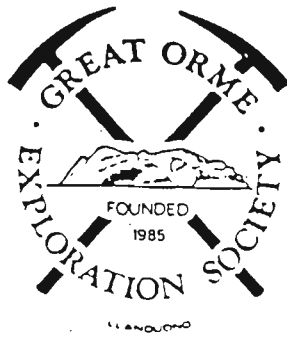
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November 1988.

News.

Les Smith our Chairman, we are glad to report is now up and about after his car accident.

We have had permission from Aberconwy Council for the Ty-Gwyn Mine project to re-commence. Mostyn Estate is we hope about to give us permission in the next few days.

The Penmorfa Addit looks like being back on the list of trips.

BUT only after a good inspection by a small group of members.

South Wales Mumbles trip seems definitely set for January. This will be a weekend trip - Friday lunch to Sunday lunch time return to Llandudno, Accommodation is sketchy at present but Scotty thinks he can help.

The Christmas Dinner is heading for another good turn out- so please pay our Treasurer a.s.a.p.! or you will loose your rightful place.

A lead mine trip is on the cards-- see Bill or Chris if interested.

BATS...

We enclose a pamphlet on the furry little creatures, Bats Underground. So I will not go on about them, ~~except~~ to say they hibernate from October to March when if disturbed they will probably die, so be it on your own head as the saying goes.

*Ref: PENMORFA LEVEL KEYS WILL BE COLLECTED  
ON 16<sup>th</sup> DEC: 88 WORK 17-18<sup>th</sup> DECEMBER 88*

CHAIRMAN	L. SMITH
SECRETARY	E.R.D. ROBERTS
ASSISTANT SECRETARY	G.C. DAVID B.A

SUNDAY OBSERVER

# Bronze Age secrets uncovered by caver

165  
OCT  
1988

FOUR Bronze Age copper mines discovered by a freelance archaeologist in Wales are prompting a rethink of history.

The discoveries, which include unique stone tools, throw fresh light on the life of prehistoric man in Britain.

Until now many archaeologists have doubted whether there was any evidence of mining in Britain before Roman times. This is because mines were often worked at several times in history so that later activity obscured evidence of earlier occupation.

As a result, scholars have argued fiercely over specific sites, with one set of scientists dating the stone hammers found among the rubble to Victorian times, others to Tudor times, still others to the Roman occupation; rival scholars making up the Early Mines Research group, on the other hand, have instinctively believed that the hammers were much older — but they lacked the necessary techniques to prove their arguments.

Only now has radio carbon dating been used in this area — and put the issue beyond doubt.

Early mining used the 'fire setting' technique to break into the rock. Fires lit against the rock face burned for hours, then cold water was thrown over the hot rock to make it cool rapidly and crack. Stone hammers completed the job.

Charcoal remains of the firewood are what the British Museum Research Laboratory is radio carbon dating.

Not all the results are in,

by PETER WATSON

but so far the remains from two mines have been tested and found to date from the second millennium BC — between 1000 BC and 1800 BC (the Bronze Age in Britain ran from about 2300BC to 500 BC).

The mines are at Pary's Mountain, Anglesey; Great Orme's Head, near Llandudno; Nantyreira, three quarters of the way up Plynlimon in central Wales; and at Cwmystyth, Cardigan. The excavations, funded by the National Museum of Wales and the British Museum, will cause a substantial rewriting of British pre-history.

It had been assumed that, in order to fashion the many bronze objects known to have been in use in these islands, copper was imported.

Even more interesting, however, is the size and sophistication of the mine at Great Orme's Head. Three large galleries have been found, each so far below ground that they would have posed serious problems of ventilation and drainage.

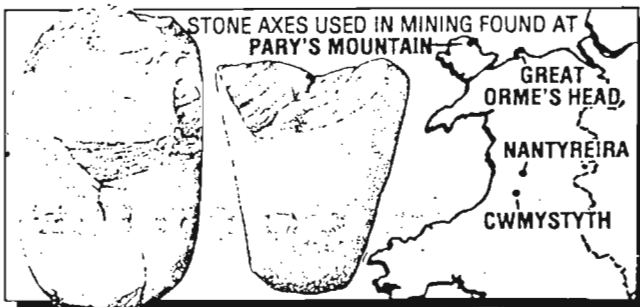
This mine was originally

investigated by Mr Duncan James, a freelance archaeologist and caver who spent months in the area poring over the rubble and remains that clogged the caves. The mine had been operated in Victorian times, and most professional archaeologists doubted that it had been worked much beforehand.

Mr James, however, noticed that whereas some debris in the mine was scarcely covered with travertine (caused by dripping from the ceiling of the cave) other debris was encased under a very thick layer.

He concluded that it had needed centuries for such a layer to accumulate and when he had some of the travertine latter carbon dated his hunch was vindicated.

With carbon dating still not completed it is a little early to draw too many conclusions from the new discoveries. But, as Dr Paul Craddock, principal scientific officer at the British Museum's Research Laboratory, said yesterday: 'Some things are beginning to fall into place. All the dates we have so far are from the second millennium BC, which may mean that these mines were not active later on.'



### WORTH WAITING FOR

It was a long time to wait, but last year all was revealed. Vivians shaft appeared, over 300ft. of void and a labyrinth of unexplored ground. For those of lucky enough to have seen it first we were pretty sure we were on to bigger things. The chambers as large as any in the Penmorfa and a damn site easier to get to.

Nick Jowett and myself decided the club rope needed decobwebbing so we dropped an end down the shaft (you know just to let the energy out of it) but I slipped and accidentally clipped on to the fixed rope and abseiled down. When I eventually regained my senses and realised where I was, I thought blow it!, I may as well be "hung for a sheep" and all that. No seriously folks the abseil was planned and all above board. I successfully reached the water (actually I was about 30ft. above it, as the water filling the shaft was flowing too much and I didn't fancy getting any wetter).

The highlight of the day was when Nick and I made history. That long talked about trip down the "Roman" and through the Penmorfa was something Billy has dreamed about for years ( sorry Bill we beat you to it!, no not all the way through , we left the Penmorfa for you).

We set out with information on Vivians and past knowledge of the of my own on the Treweeks workings. A certain passage was lined with "deads" and there was a skeleton of a cat. Not a third cat as thought earlier, but the same cat as found a few years ago in Treweeks. So on that day after abbing Vivians to the platform we set off for Treweeks and successfully connected the two shafts via some tight squeezes. An excellent through trip in its' own right, another tick for Phil and Nick. What is ironic is that if we had explored these particular workings earlier we would have found the Vivians connection years ago.

Phil Smith, 15th October 1988.



A member of the Great Orme Exploration Society emerges from the shaft leading to the old mineworkings

GOES OVER THE HILL TO RHOSYDD.

There is a place in Gwynedd where they say it always rains.....

BLAENAU FFESTINIOG.

It was a fine day , the sun shone one of the best days this year.

Saturday 29th October 1988.

Members set off in a V.W. mini bus piloted by Tom Parry. We were heading for Tanygrisiau just outside Blaenau. From there we left the bus and with our local guide Delwyn Williams. We set off for Rhosydd slate mine which closed down in the 1940's. In its day it had had many levels and caverns but now they are mostly flooded and many areas have now collapsed.

We set off on foot through Gwynedd's forgotten valley Comorthyn, pasted ruined old buildings , a superb slate sculpture of a man climbing a slate wall which must be seen to be fully appreciated .

On our right stretched a lake used in the old days to power machinery then on up past the chapel now roofless. A quick detour took us to the mine manager's house now falling into decay but still retaining some of its former grandeur with a garden surrounded with fir and broad leafed trees. Back on the track we past a mini barracks with its cell like rooms in which the miners slept.

On again up past short trials and another stop to view the uncompleted water wheel that would have rivalled the Laxey Wheel in the Isle of Man. Moving on up to the plateau that is called Rhosydd Slate Mine past the ruins of the tile splitting sheds and sundry other buildings that once housed the smithy, engineering works and everything that kept a large slate mine working.

Delwyn pointed out an arch built of slabs of slate -- why go to that kind of trouble when a slate lintle would do?

We donned our safety helmets and caving lamps and our group entered the main tram tunnel, and in indian file we moved into the mine. The tunnel was slightly wet but no one complained, even those wearing 'summer wellies'. A double track with a continuous wire rope was apparent even though the track had gone, the rope had survived, and the large pulley wheel with its tension adjuster still working lay in place. Inclines that are now flooded can be seen dropping into the dark cold water below.

P.T.O.

1. Sec Bob Smith

Some interesting features are the vast caverns blasted to the right and left of the main tunnel, as big as rugby pitches.

Concern was expressed by members on meeting a badly equipped school party led by a teacher wearing no helmet or proper light and the rest of his party likewise unprotected, also unsuitably dressed.

We had lunch in one of the caverns, then proceeded up the incline with its rails and massive winding gear and iron trolleys still in place.

A balk of timber near the top of the incline had shifted and now lay in a precarious position across the rails. It looked as though some people had deliberately tried to shift it out of position to cause some damage.

The miners had worked out from the main tunnels making large galleries which sometimes collapsed one on top of each other like a pack of cards. Therefore it was possible to walk along a connecting tunnel and be met by a massive chasm and on the other side you could see the tunnel going on into the mountain. During the mines working life these chasms would be bridged with large timbers with rails across them for transportation. The mountains around Blaenau must be hollow !!

We arrived at the top of the mountain in glorious weather. We were assured that if we came again this type of weather would not happen, and the usual water proofs could be worn.

The weather was superb and as we followed the miners paths which are wide and level. We were rewarded with a view over towards Criŷeth and the Snowdon range from our position on the slopes of Moelwyn Mawr, the paths are built, so they are so a large horse can pull a cart in safety down to the rail head to take the slate to Porthmadog dock for transportation to the New World.

We wended our way down via Stulan dam back to our V.W.

With a bottle of good cheer for our intrepid guide we set off home via a Llanwrst pub, having had a most enjoyable trip and not too strenuous.

E.R. Nov 1988

## ROCKING STONE PLATE.

On Saturday 22nd of October members of the GOES assembled at Pen y Dinas to replace the plate on the Rocking Stone. The oblong metal plate housed in a recessed bed in the stone was fixed during the latter part of the last century. Some time in the sixties vandals succeeded in removing it. Its whereabouts during the last twenty years are not known but GOES members, "grovelling on the Orme" recently found it, and had it repaired and renovated.

The event was obviously viewed favourably as the weather was glorious ! It had been decided to bed the plate in commercial adhesive of the type used for rock anchors in addition to rescrewing it into the original plug sites.

In order to record this historic event a freelance reporter, turned up with a small dog and a photographer. The small dog took one look at Duke and wandered off until it was time to go home ! Duke was far too busy posing for pictures to notice. It soon became obvious that the lady reporter, although, until then almost totally unaware of the existence of Llandudno Mountain was fascinated by what she saw and was told. In fact the original object of the exercise receded rapidly as she became more and more enthralled with the history of Llandudno Copper Mining as related by Don Smith who quite by chance happened to have with him the MSS of his book and a collection of his usual excellent photographs !

As a result she announced that in place of the purely local piece she had originally envisaged it was now her intention to write a comprehensive article, for a quality national newspaper such as the Telegraph. This created such an impression that no one actually enquired whether she meant the weekday or the Sunday job ! (How many GOES members read either ?)

If the resulting article embraces all the subjects her attention was drawn to there will be very little else in that particular edition of the Telegraph, (which might not be such a bad idea) To date nothing has been heard from the lady, but it is hoped that her article will appear about the same time as Don's book surfaces.

A recent inspection of the site showed the plate to be securely bedded and bonded into the Rocking Stone. It seems to be proof against all but the most determined and best equipped of vandals. However should the worst happen there is a contingency plan !

F. PARRY / NOV: 88.

THE ROCKING STONE. Y MAEN SIGL.

Over the years many writers have described the Rocking Stone in various publications. Some have managed to make it rock and others have apparently failed. It will of course rock smoothly for paid up members of the Great Orme Exploration Society !

Here are four descriptions ranging over a hundred and twenty five years :-

"On the centre of the mountain is a rocking stone, called Cryd Tudno (or the Cradle of St. Tudno)."

Illustrated Hand-Book of Wales,  
By John Hicklin 1850.

". . . . .The rocking stone, Cryd Tudno- "Tudno's Cradle- does not rock, and quarrying has destroyed much of the Dinas."

North Wales, Part I, Baddeley and Ward, 1899.

"Lastly, the famous Rocking Stone on the Great Orme's Head. Gwalchmai, in his "Guide to Llandudno", says that this Rocking Stone, or Maen Sigl, is a curious Druidical remain, and is called, by the country people, "Cryd Tudno", or St. Tudno's Cradle.. He says,

"There are not many of these logan-stones, or Meini chwyf compared with the number of cromlechs. It is a conjecture that the Druids made these stones instruments of imposition on their votaries" There is a tradition that the Druids were in the habit of trying, at the upper Gorsedd mound, persons accused of certain misdemeanours, the prisoner being placed half-way down the mound, and the people assembled around the base. At the conclusion of the trial, the Druids announced, from the summit of the mound, that the case was too difficult for them to decide, but that the gods must decide by an ordeal, at the Rocking Stone, of the prisoner blind-folded. The Druids had, however, decided secretly as to the capital punishment, or severe fright, and accordingly, jostled the prisoner, so that he touched the pre-determined end of the stone. Touched at its northern end, the stone visibly moved, whereupon the Druids shouted, 'He is innocent, the gods have intervened, let him go' If the prisoner, however, touched the other end of the stone, it was immovable, and the Druids cried, "He is guilty, over the cliff with him"

In the 6th. century A.D., St. Tudno, the hermit founder of the first Christian Church on the headland, is believed to have used this stone as an open air preaching platform.

-

The Heart of Northern Wales, W. Bezant Law, 1912.

". . . . Opposite the picturesque Wyddfyd Cottage, with its incongruous palm tree, there is a footpath on to the headland known as Pen-y-Dinas where, among the remains of a prehistoric hill fort, there is a large altar-like stone which can be rocked by hand (despite statements that it is now immovable.). Seemingly a natural phenomenon, it was once believed to have Druidic associations and was used by the Welsh bards in the proclamation ceremony for their 1864 Eisteddfod.

Llandudno, Queen of the Welsh Resorts, Ivor Wynne Jones,

**LLANDUDNO**



# Advertiser

ESTABLISHED 1885

FRIDAY, DECEMBER 2, 1988

**Great Orme place stone has a bloody history**



Members of the Great Orme Exploration Society who have restored the Victorian name plate to the famous Rocking Stone on the Great Orme's head. They are (left to right) Bill Davies and Duke, Adrian Jones, Edric Roberts, secretary and Dr Don Smith, medical officer.

# A stone trial

## ● Julie Richards treks up the Great Orme to meet a band of explorers

THE GREAT ORME'S famous Rocking Stone, which had 'lost its identity' over 20 years ago, has now had its Victorian name plaque restored.

Thanks to the efforts of the Great Orme Exploration Society, a dedicated band of local archeologists, historians and cavers, the brass plate — placed there more than a century ago — is at last back in its original niche, centred on the stone which is situated above the Orme's artificial dry ski slope.

During the 1880's when Llandudno was enjoying its heyday, a great deal of interest was taken in the history of the area and as a result the city fathers installed a number of plaques on sites on the Orme as a guide to visitors.

### Fascinating

The Rocking Stone remained undisturbed until the 1960's when vandals struck and forcibly removed the plaque. It was feared lost, but recently quite by chance, was rediscovered by members of the Society whilst digging amongst the rubbish of the old Orme copper mines.

## could

## be death

The Rocking Stone or Cryd Ttudno (St. Tudno's Cradle) has a fascinating history for it is believed to have been used by the ancient druids, who held their courts of justice just a few hundred yards away at Gorsedd Uchaf and Gorsedd Isaf.

If in the trial of one of their subjects, the druids couldn't decide whether he was innocent or guilty, they announced that 'the gods must decide his fate by an ordeal.'

The poor unfortunate man was then led blindfolded to the stone and if he could make it rock, it would be taken as proof of innocence. If however, he failed, he was judged guilty and without further ado was hurled over the 200 ft. high precipice so conveniently near at hand.

The druids were a canny bunch and left nothing to chance. Secretly beforehand they had decided on the victim's fate. As the stone could only be made to move by pressing one particular spot at its northern end, they jostled the prisoner so that he touched the predetermined spot and would then either suffer just a severe fright or capital punishment!

In the 6th century St Tudno, the hermit founder of the first Christian church on the headland, after whom Llandudno takes its name, is believed to have used the stone as an open air preaching platform.

Over the next twelve centuries it lay forgotten until rediscovered by the Victorians, and recently by the Great Orme Exploration Society.

"We are delighted to have restored the plaque and hopefully it will now remain in place for another hundred years," explained Mr Eddric Roberts, Society secretary.

"It is known other name plaques were put up on the Orme and now we are trying to discover if anyone remembers or knows of there whereabouts," he added.

# Rocking stone dealt out the Druid's ritual justice

## RADON

There has been some concern about potholiers and mining enthusiasts being exposed to radioactive Radon gas which can accumulate in mine workings. In view of this we have obtained the assistance of the National Radiological Protection Board (N.R.P.B.) to carry out a free survey into the radon levels in the Orme mines. This has involved the placing of twelve passive monitors in the workings and these are designed to react to radon gas in proportion to its concentration. After three weeks the monitors were collected and returned to N.R.P.B. for analysis and comment on the results. It is hoped that should further monitoring be required the N.R.P.B. would continue with free assistance. This will hinge on the possibility of a show mine being developed since the N.R.P.B. will only give free assistance where members of the public are likely to be entering the workings.

Perhaps a few details about radon will help clarify the issue, and there are more detailed notes as an appendix. Radon is a radioactive gas produced by the decay of Uranium that occurs naturally in most rocks and soils. It seeps to the ground surface and is normally dissipated into the atmosphere but can become trapped in underground cavities and buildings. Breathing in the gas causes the lungs to be irradiated and the degree of exposure is thought to increase the long term risk of lung cancer. To date some high levels of radon have been recorded in particular Cornish and Derbyshire mines and caves.

There are standards in the U.K. for a maximum dose rate per person in relation to Radon gas, but there is the possibility of these being revised downwards in the future since there is a continued debate on what is an acceptable level; and studies are underway into the long term incidence of cancer in Cornish tin miners. There is no doubt Radon will become a more important issue and it is felt the involvement N.R.P.B. at this early stage may help pre-empt future problems in the Orme mines.

When the results are known these will be communicated to members, but a final word is that even the most ardent of caver is unlikely to be at major risk.

## APPENDIX

The human body is constantly exposed to radiation the bulk of which is from natural sources.

### Table of Average Radiation Dose

37%	Radon/Thoron gas in homes
19%	Rocks and soil
17%	Internal, from natural radioactive elements in the body
14%	Cosmic rays from outer space
11.5%	Medical, mainly from X-Rays

1.5% Other

Table of Half Lives of Radon Daughters

Radon 222	3.8 days
Polonium 218	3.05 days
Polonium 214	165 micro-seconds
Bismuth 214	19.7 minutes
Lead 214	19.7 minutes

Radon daughters are solid and form an aerosol of particles which irradiate the lungs when inhaled. The risk of cancer developing increases in proportion to the radiated dose received. In commercial and show mines the Health and Safety at Work Act 1974 applies and a relevant statutory provision under the Act are The Ionising Radiations Regulation 1985 which lay down standards for exposure to Radon. In the event of high levels of Radon being found then the control measures that can be undertaken include:

1. Limitation of exposure by restricting time spent underground.
2. Improved ventilation
3. Piping off of mine water seeping into the working.
4. Controlled access to areas of high Radon.

Although as a society our activities are not subject to the H.S.W.A.

D.E.S. Oct 88

# Historic discoveries on the Orme

## Bronze-age tools indicate ancient copper mining

DISCOVERIES on Llandudno's Great Orme are helping to throw new light on life in prehistoric Britain.

Finds have included stone tools used by prehistoric man to mine copper.

It had been thought by archaeologists that there was no mining in Britain before the Romans.

But evidence unearthed on the Great Orme and at three other sites in Wales suggests that the history books will have to be re-written.

Tests have already been carried out at the British Museum and initial results indicate that the theory might be true - although there will have to be more tests before experts can say for sure.

Sophisticated radio carbon dating techniques have already suggested that finds on the Great Orme could date from between 1,000 BC and 1,800 BC.

The Romans did not start mining until almost 2,000 years later.

Early investigation of the sites on the Great Orme was carried out by a freelance archaeologist, Mr Duncan James, during the 1970s.

His work has been carried on by members of the Great Orme Exploration Society and the Early Mines Research Group.

Expressway engineer, Mr Andrew Lewis, who has been one of the team exploring the Bronze Age theory, said only further tests would prove conclusively that there was Bronze Age mining on the Orme, although

he had been encouraged by the findings so far.

He said the first clue that had suggested the true age of the Great Orme mines had come from stone tools.

Water dripping onto some of the implements in the mine's spoil heaps had built up a layer of calcite.

"It was of a thickness that would take centuries to form," he said.

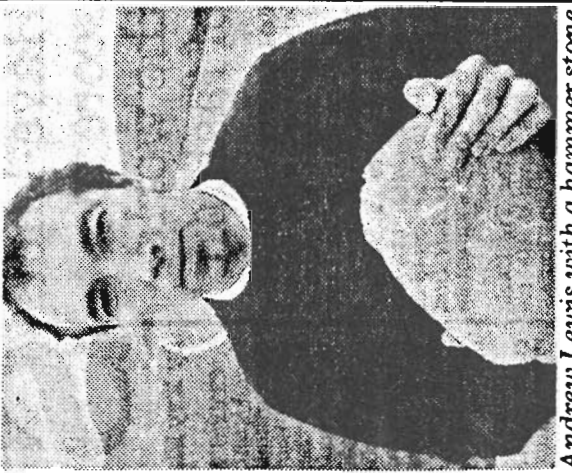
But conclusive evidence lay in the remains of fires which had been used in the mining process.

The rock would be heated and then cooled quickly with cold water to make it crack.

The stone implements would be used to do the rest of the work.

Other sites in Wales that form part of the Bronze Age link are at Parys Mountain, Anglesey, Cwmystwyth in Cardigan and Nantylira in Plynlimmon in mid-Wales.

The Early Mines Research Group was formed to investigate the theory.



Andrew Lewis with a hammer stone

Daily Post, Friday

## WELSH NEWS

by Ian Lang

A UNIQUE project to exploit the tourist potential of the Great Orme's copper mining past has exciting potential, says Aberconwy's tourist chief.

The scheme could eventually see the creation of an interpretative centre, including a museum to house artifacts as well as a craft centre and smithy.

The proposals are put forward in a detailed feasibility study by Ashton Mining Associates.

They carried out the study as part of a WDA funded reclamation scheme to survey underground mineral workings near a new car park at Pwllau Farm on the Orme at Llandudno.

Other organisations involved include the Great Orme Exploration Society, Mostyn Estates and the Gwynedd Archaeological Trust.

The report proposes an excavation project centred around a shaft near the half-way tram station, which when made safe could be opened as a tourist attraction.

The first year-long phase of the project would involve site preparation, excavations

# Tours under the Orme

## Ancient mines could be opened to the public

and the creation of a temporary interpretative centre.

A miner's trail booklet would also be published outlining the history and value of the site.

The second phase, lasting three years would progressively open up sections of the underground mines which would be open for guided tours.

It would also see the opening of a permanent interpretative centre with a museum for artifacts, a craft centre and smithy.

Aberconwy's director of tourism and amenities, Mr Peter Hall, says in a report that a according to a business plan an investment of £749,000 over a five year period would be needed.

"The proposals detailed in the report illustrate exciting development potential utilising natural features to enhance and pre-

serve the heritage of the area," says Mr Hall.

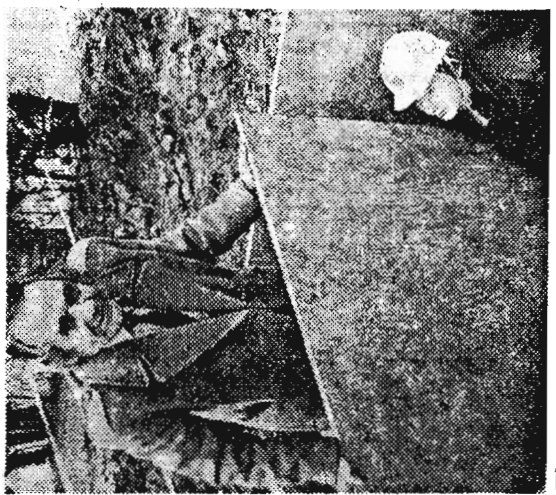
He says the project would be unique, located near a major population centre, yet within a country park.

He asks members of the council's tourism and amenities committee who meet next week to consider the principle of granting a lease so the project can progress.

He also recommends that the council become involved and produce a further report on the scheme's implications.

Copper mining on the Orme is believed to date back thousands of years, although much of the evidence was covered up by deep mining activity between 1820 and 1850.

However, in recent years there have been finds of bone and stone artifacts providing clues to the ancient origins of mining on the Orme.



The entrance to the Ty Gwyn mine on the Great Orme, with its re-discoverer Mr Huw Tudno Williams

DEC 24 1988

# Orme find could mean a re-write of history

By Judith Phillips

ARCHAEOLOGISTS say the Great Orme is potentially one of the most important early industrial sites in Europe.

Preliminary results of tests at the British Museum seem to prove there was Bronze Age mining there.

And if further tests confirm it the history books will have to be rewritten say the experts.

Up until now many archaeologists have believed that there was no mining in Britain before the Romans. But tests on stone implements found on the Orme and at three other sites in Wales seem to contradict this.

The sophisticated radio carbon dating process being used by scientists at the British Museum has so far indicated that the Great Orme finds could date from between 1,000 BC and 1,800 BC.

"That's nearly 2,000 years earlier than we had previously believed mining took place in Britain. Its very exciting," said Dr David Jenkins of Bangor University, co-ordinator of the North Wales Early Mining Group.

"This means that the Great Orme has the potential of being one of the most important industrial archaeological sites in Europe," he explained.

## Links

Local archaeologists had believed there was a link between the mine workings on the Orme and the Bronze Age since the 1970s. But it is only now that radio carbon dating is being used

that they are on the verge of proving it.

Much of the early work was done by a freelance archaeologist, Mr Duncan James who spent months in the late 70s sifting through rubble in the old copper mines.

Since then the work has been carried on by the Great Orme Exploration

Society who have a licence from Aberconwy Council to investigate the mines.

One of the most interesting findings is the size and sophistication of the Great Orme mine workings. Three large shafts have been found, each so far below ground as to have posed

serious problems of ventilation and drainage for the early miners.

—WEEKLY NEWS, Thursday, October 20, 1988



Members of the Early Mining Group, who visited the Great Orme earlier this year, study a plan of the mines

## Exploring

Society member, civil engineer, Mr Andrew Lewis has spent most of this year exploring the Bronze Age link, and some of his finds are at present being examined at the British Museum.

He was reluctant to speak in too much detail about the preliminary findings saying: "There is still a lot of work to be done."

But he said he hoped that the results of tests due to be released in the next six months would prove conclusive.

Also being examined by the museum are samples from three other early mining sites in Wales. They are at Parys Mountain, Anglesey; Nantyreira on Plynlimmon, mid-wales, and Cwmystwyth, Cardigan.

Dr Jenkins says that if the findings at the other sites tie in with those from the Great Orme the weight of evidence that there was Bronze Age mining in Wales will be overwhelming.

"This is an exciting concept. It will prove that Wales was an industrial centre long before anything happened in the South of England," he said.

# PREHISTORIC COPPER MINING

AT LLANDUDNO, GWYNEDD

3

## Introduction

Until relatively recently, known instances of "early" mining in the UK were generally ascribed, if at all, to the "Roman" period. Evidence took the form of suspected fire-setting, hammer stones, antler picks, inscribed ingots, coins, etc., (eg. Davies, 1937) but there was no direct evidence for the date of the initiation of these mining activities. It was also regretfully concluded that later intensive mining in the eighteenth-twentieth centuries had probably obliterated virtually all evidence of the earliest phases of mining (Tylecote 1986). Major prehistoric mining sites have since been identified and investigated in south and eastern Europe (eg. in Craddock 1980). Now, in the British Isles, C<sup>14</sup> evidence has recently accumulated from surface spoil or shallow workings which suggests significant mining activity in the late Bronze Age, both at Mount Gabriel in South West Ireland (Jackson 1968 & 1979) and also at Cwmystwyth in mid Wales (Timberlake 1987): confirmatory results of datings from similar excavations in spoil at Parys Mountain (Anglesey) and Nantyreira (in mid Wales) over the summer of 1988 are also awaited, although the hypothesis is still disputed by some (Briggs 1986; Slater 1986). The final evidence is now required to establish, unequivocally and specifically, that Bronze Age underground mining for copper occurred on a significant scale in Britain.

## The Great Orme, Llandudno

Mineralisation at the Great Orme comprises the brassy coloured copper/iron sulphide, chalcopyrite, in dolomitised vertical veins trending roughly North-south through the beds of Carboniferous Limestone. Much of the chalcopyrite near the surface has oxidised to the strikingly green carbonate mineral malachite, and this would certainly have attracted the attention of early miners. The earliest documented mining for copper on the Great Orme dates from 1692, and mining continued intermittently through to the 1880s, with peak production in the middle of that century (Williams, 1979). Evidence of earlier mining in the form of stone hammers and deer bone chisels was found by miners breaking into older workings in 1849 and 1876, but this evidence is now dispersed and undated, although stone hammers (unrilled) can still be found in the undefined context of present surface dumps. There was, however, an association with Roman coin hoards in the area dating from the end of the third century, and this prompted Oliver Davies in 1938-9, on behalf of the British Association, to carry out a surface excavation on a site near the outcrops of the ore veins at Gogarth on the southern shore. Davies (1948) had no doubt that the site represented a mining settlement, and this he ascribed to the Roman age.

In recent times the history of the mines has been documented (Williams 1979) and much of the accessible ramifying underground workings explored in detail. In the later phase of this exploration, it was recognised that some of the workings accessible by shafts at depths from 20-100m at Bryniau Poethion were of obvious antiquity, the "deads" containing stone mauls, charcoal, and bones *in situ*, and in some cases sealed by a significant layer of calcite. Some charcoal picked from these deposits gave a C<sup>14</sup> date of 990. bc confirming the antiquity of mining activity at this site and suggesting an Early-Middle Bronze Age, rather than Roman, date (James 1988). This is comparable with the uncalibrated dates obtained from Cwmystwyth (Timberlake 1987) and Ireland (Jackson 1969) and hints at widespread mining at this time and, at the Great Orme in particular, on a an impressive and remarkable underground scale.

Subsequently, as a result of the proposed development of a car park at Bryniau Poethion on the Great Orme, a further careful survey of underground workings has been undertaken by Mr A. Lewis and members of the Great Orme Exploration Society. In particular, the opening up of three previously sealed shafts has allowed access to further extensive underground workings, the upper sections of which have again shown evidence of prehistoric mining in the form of charcoal, bones, mauls, etc., in conditions that are as yet relatively undisturbed. Surface excavation by the Gwynedd Archaeological Trust is under way (summer 1988) around a major nineteenth century shaft head which is sited on outcrops of ore veins which may have been originally exploited in prehistoric times: from these further C<sup>14</sup> evidence is awaited to corroborate the antiquity of the workings.

## Conclusions

The mine workings on the Great Orme therefore present the possibility of a detailed *in situ* study of what is probably the earliest mining activity in the British Isles. The scale of these ancient workings, whose intricate pattern of tight passages extend over considerable areas below the surface of the Orme and at depths of up to 100m, are unprecedented in Europe: this would therefore be a major archaeological site of international significance. Unusually, the location of the possible evidence is already known and protected, yet "open" and relatively accessible through the good offices of the local Council. It is now hoped to be able to exploit this unique opportunity through an extended programme of careful exploration, survey, research, and C<sup>14</sup> dating in particular, using the specialist underground expertise of the Great Orme Exploration Society, combined with the professional skills of members of the recently formed Early Mines Research Group, and of the Gwynedd Archaeological Trust.

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18th October, 1988.