

JOURNAL OF THE

GREAT ORME

EXPLORATION SOCIETY LTD



2023



Hello Readers,

Welcome to the 2023 edition of the Great Orme Exploration Society Journal. Once again it contains a wealth of information. The lives of several people associated with the early development of Llandudno give us a fascinating insight into the past. We look back further with an appraisal of Bronze Age stone circles, and even further with help on hand to better understand the age of the earth itself. There are articles about the Great Orme mines, underground exploration and of course GOES Summer Walks, with this year's itinerary and photos from last year.

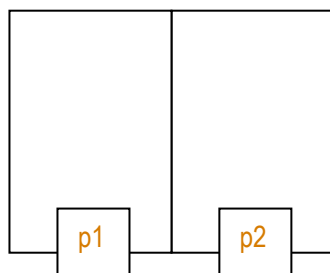
As always, a great deal of thanks to all contributors and those who have given me advice.

Regards

Dave Wrennall

GOES Journal Editor 2023

It is possible to rectify any errors or omissions before the Journal is made available to the public and placed onto the GOES website in a few months' time. Please feel free to contact the Editor



PRINTING the JOURNAL

With inkjet printers use at least 90gsm paper (200gsm for the front cover). In order to optimise page sequencing page 1 should be placed on the back of the front cover with page 2 opposite on the next sheet of paper.

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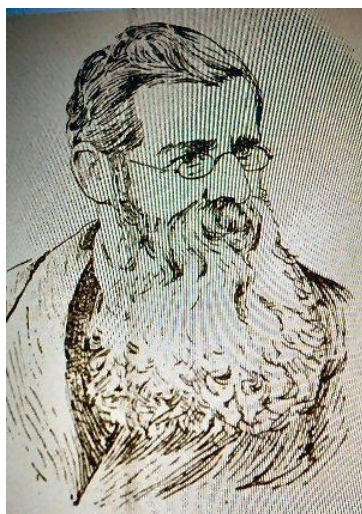
Front Cover: A picture of Steve Lea in the Ty Gwyn Mine with one of the many groups he has shown around over the years, his knowledge and enthusiasm always providing our visitors with a memorable experience. (Photo: Adrian Hughes).

At this year's AGM, Steve Lea stepped down from the GOES Committee after thirty years' service, mostly as Treasurer with stints as Vice Chairman (2004-7) and Secretary (2001-3). The Society is hugely indebted to him for the time, effort and wise counsel he has given to the Committee over such a long period. Looking through old journals it would appear he took a year off in 2003, so you never know, he might be back!

Thomas Williams – Chemist and Entrepreneur

Williams is best remembered as the builder of what we know today as the Empire Hotel, but he had other claims to fame being a significant player in the development of the town in the 19th century. Surprisingly, very little seems to have been documented about this extraordinary fellow, so a little digging is necessary to record his contribution to the life of the town.

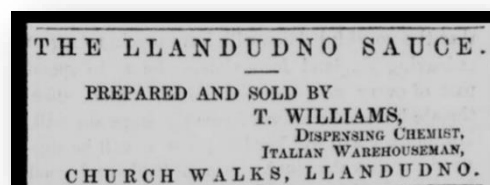
Thomas Williams was born in 1829 at Nantglyn, a village near Denbigh. He worked as a chemist in Denbigh and then in Liverpool. He moved to Llandudno when he was 23 and rented premises at Redclyffe House in Church Walks trading as a chemist.



Thomas Williams 1829 – 1899

Business was clearly good, since in 1854, he could afford to construct Llandudno's first departmental store, now called the Empire Hotel. It was described as a chemist/Italian warehouse – the classic name for a grocer – and also sold wines and spirits. Within the pharmaceutical department he sold commodities including Atkinson's Bear Grease, fresh German leeches, Dr. Erasmus Wilson's Hair Wash, gunpowder, Oriental Toothpaste even fire insurance.

Establishing the premises may have been an expensive gamble, but Williams was an enterprising fellow, an entrepreneur as we shall see.



A Hughes

In 1855, Williams married Elizabeth Jones at St George's Church (*p.6) and the new couple moved to a substantial home on the Prom called Morannedd, later named the Bay Court Hotel. (The building dates from 1850 – possibly earlier).

Bay Court Hotel on the Prom opposite the pier - formerly Morannedd, home of Thomas Williams.

(Picture used with permission from the hotel owners).



In the same year, Williams established the “Llandudno Directory”, a sort of newspaper published weekly, on Saturdays. Price 2d (about 0.4p). The paper mostly listed visitors to the town, where they were staying and where they were from. The newspaper could be bought at Williams's shopping centre.

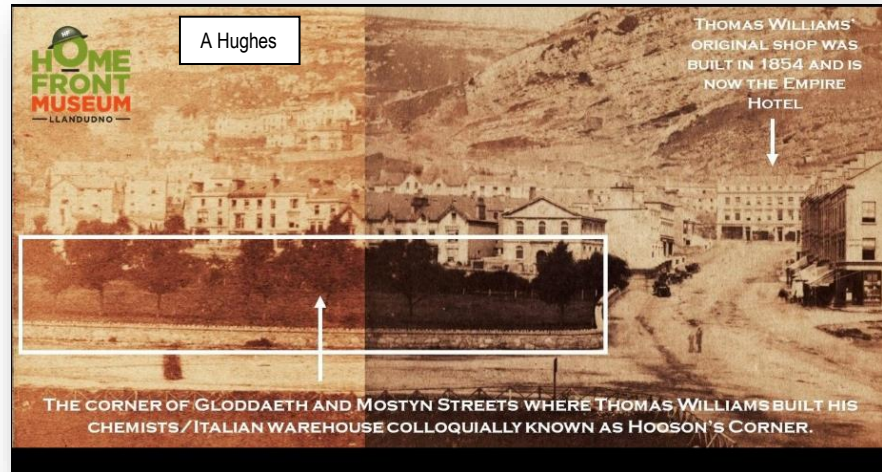


Williams's Shopping Centre in Church Walks before it became the Empire Hotel.

Another enterprising business venture was the establishment of a two-storey building for Turkish Baths in Ty Gwyn Rd, “a most advantageous part of town”. It was the only oriental baths in North Wales. (One wonders what the chapels made of this facility?). Williams sold the premises in 1867 for £350 – equivalent today to about £42,000.

Around 1863, Williams moved his shopping businesses to the corner of Gloddaeth and Mostyn Street a more central place for his customers. The new premises sold a huge range of goods and included the so-called Italian Warehouse which

sold “the choicest delicacies” and everything needed for luncheons, picnics and suppers. In 1868 Williams built a sweeping four storey building on the site which, when it was purchased by an assistant manager Thomas Esmor Hooson in 1887, became known as Hooson’s Corner.



Another publishing success for Williams was “The Complete Guide To Llandudno” which sold many thousand copies. Not missing a trick, the canny businessman included 16 pages detailing all the goods he was selling at his store. (The book and the advertising pages will be explored later in another article).

Williams was a member of the Congregational Church. At that time, the church had an English and a Welsh section; Williams attended the latter. When a Welsh Independent Chapel was being discussed, Williams both made donations and raised funds for the new building.

Along with a few associates, Williams successfully negotiated a 50% reduction in tolls for carriages crossing the Conway Suspension Bridge. In another direction, he was a large shareholder in the toll road from Llandudno to Colwyn Bay.

By the 1870s, William was a wealthy and influential figure about town. Before the Pier Company was even set up, Williams and others drew up a scheme for a pier. And in 1873, with the construction of Marine Drive, he took a leading role in the development of the scheme and became a Director of the company. The following year, 1874, he was elected unopposed to the Board of the Improvement Commissioners.

In 1875 there was another initiative for the construction of a pier, Williams become a founder member of the Pier Company which built today's pier. At first, acting as Company Secretary, then a Director and finally serving as Chairman. William's was also instrumental in the creation of the Llandudno Town Band.

In 1876, Williams again moved house. This time to Bron Meillion in Abbey Road. Described as "a luxurious abode" and a "commodious mansion". Apparently it was famous for its grapes, grown in glasshouses kept by head gardener Mr Quinn. They were sold to local fruiterers to sell in their shops. Sadly it no longer exists. (Redclyffe House a previous abode is now the Seaclyffe Hotel on Church Walks).

Thomas Williams died aged 70 in 1899. The funeral procession was very long and was headed by half a dozen carriages including that of Lady Augusta Mostyn. As a mark of respect, curtains were drawn along the route of the procession. The burial took place in St Tudno's Churchyard where the grave side service was conducted by the Rev R. Perris Williams and the Archdruid of Wales, Rev Rowland Williams. (Wonder if they were all related?).

Also buried in the family grave was Elizabeth, wife to Williams. Elizabeth died aged 60 in 1897. Only one child was listed on the gravestone, namely Edward Roberts Williams who died in 1857 aged four months.



Thomas' Gravestone at St Tudno's

* It is interesting to note that Elizabeth was the daughter of Thomas Jones of Fron Deg. He was agent of the New Mine and instrumental in both the Brammock Rods / Tom and Jerry pumping system (Article on p7) and the Pen Morfa adit he also brought Congregationalism to Llandudno opening Fron Deg up as a place of worship until enough funds could be attained to build the now demolished chapel on Deganwy Avenue.

A Hughes

Author: Keith Morris

(With additional text + pictures from Adrian Hughes)



A glass bottle found recently by Jason Potts in the Ty Gwyn mine is embossed T. Williams Chemist Llandudno. It is likely to date from between 1854 and 1887.

Some Thoughts on Brammock and Tom & Jerry

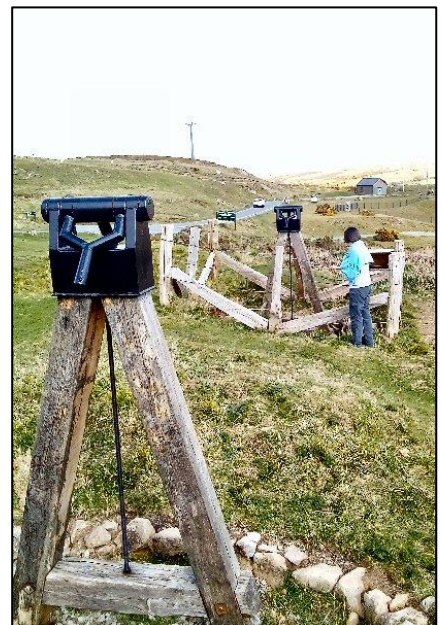
After Jason and Adrian did some splendid work in January 2022 on renovating the Brammock Rod “A” Frame and pit on the Great Orme, I started to wonder about this crazy Tom & Jerry pumping method. After some research on the Net, I was amused to see the different names given to the system:-

Tom & Jerry engine	Water bucket engine	Water power engine
Water pressure engine	Flop Jack engine	Flap Jack engine

We are told that this pumping system came from Germany, but it seems that it most likely came from Hungary where it was commonplace. Wherever it originated, the system had one big advantage: there were no running costs, and it could be left to operate – unattended – round the clock. Water for the system was freely available on the Orme whereas for a steam driven pump, coal would have to be hauled from a distant coal field. Clearly Tom & Jerry was a more economical proposition.

On the other hand, the system devised for the Orme was expensive to construct. The Brammock rods had to cover a good distance. Some reports detail that the rods covered a distance of 700 metres while other reports suggest the rods would have to move 1300 yards (1188 metres) from the west side of the Orme to the copper mine. With a pit every ten yards or so, this meant 130 pits had to be dug out. Lining the pits with stone, fabricating 130 “A” Frames with their bearings and fitting the Brammock rods would have been very time consuming and pretty expensive. In addition, at the business end, the system needed 250 yards of chains (or whatever) stretching down the shaft to reach the water it was to pump out.

Just above what is now Marine Drive, there used to be the Tom and Jerry Engine House. Surprisingly, the engine house was lower down the hill than the Gogarth Spring which supplied the water to power the engine. Why was the engine house positioned there? Were there other



water sources that could be diverted to speed the filling of the water bucket, thus making a faster pumping action? (Or was it just more convenient to build the cottage there?).

Brammock rods were usually called flat rods, but where did the word Brammock come from? There was no entry in the Oxford English Dictionary, so Brammock wasn't the word for a method or technique. Possibly there a mining engineer called Brammock? however, none of the surname reference books listed it as a surname. What about a place name? Nothing doing said Mr Google!

Brammock was thought to be a local word, I heard – but it's not in our Welsh dictionary. However, I can claim some success: a report for the Geological Survey in 1921 by Bernard Smith mentioned a Brammock's Shaft and a Brammock's Vein at the Great Holway Lead Mine near Holywell in Flintshire. So it looks like a surname after all. Brammock could be a corruption of the homonym Brannock, an Irish surname, though there are links with both Scotland and Wales. St Brannock, for instance, migrated across the border from South Wales in the 6th century to try and civilise the English!

The engineer credited with our Brammock rod construction was Thomas Jones who in 1827 was appointed Agent for the New Mine. Oddly enough, Jones was a Flintshire man coming from Newmarket. Perhaps this Flintshire man was involved with the use of Brammock rods there and possibly his knowledge of the system secured him the Great Orme job. Pure speculation but an interesting suggestion.

Two more thoughts to ponder. Why were the "A" Frames sunk in pits? And did the "A" frames actually rock to and fro? Could they not just be supports for the moving rods? When you think about it, making 130 heavy "A" frames move back and forward would use up much of the power supplied by the water engine. Sounds very inefficient to me.

~ Further information ~

1. Conwy Archives have a small collection of documents apparently collected by one Don Smith and a certain cove called Stephen Lea. The file reference is CX589/2; The file consists of articles, letters, research work and plans.
2. The GOES Journal contains two articles about the reconstruction of the "A" Frame and the pits. Search the splendid GOES website at www.goes.org.uk and look under the heading **Articles** to see Journal 2012 (No.1 page 6) & Journal 2013 (No.1 page 6).
3. For an animation of the working Tom and Jerry system head to the GOES website, click on **Exploration** and then **Places of Interest** and look for Brammock Rods.
4. For more info on Thomas Jones, please see the article by Tom Party in GOES Journal 1997 No.1 page 5.

Author: Keith Morris

Shafft Yr Odin (Kiln Shaft)

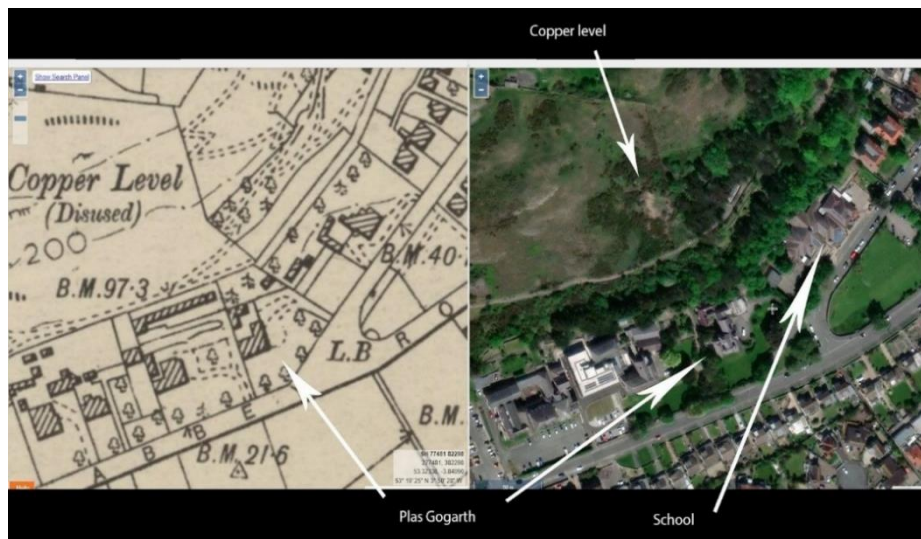
Over the years I have heard mention of the capped well in the grounds of the new St. Georges school. The Great Orme explained by N. Bannerman mentions the well as the Lime Kiln Shaft. "Now a decorative well, it was used as a well when the place was a nursery and was possibly associated with implied Lime Kiln which could have been near to the Quarry where it is located. An original village well.

Ref.Thos.Rowlands." Ref. 136 [The Great Orme Explained.pdf \(nbannerman.co.uk\)](http://nbannerman.co.uk/The_Great_Orme_Explained.pdf)

Trawling the internet for information on the Great Ormes mines, I came across the following from the Llandudno Advertiser and List of Visitors, 22nd Dec. 1899. [A Short History of Old Llandudno.1899-12-22Llandudno Advertiser and List of Visitors - Welsh Newspapers \(library.wales\)](http://library.wales/A_Short_History_of_Old_Llandudno.1899-12-22Llandudno_Advertiser_and_List_of_Visitors_-_Welsh_Newspapers) "Coming through another gate we join another road running from Conway Shore to Llandudno Shore, known as Ffordd Isa (Lower Road), and just at the corner of Plas Gogarth garden there was a sharp turning to the left, which led up past Shafft yr Odin (Kiln shaft) about 10 yds deep, and once connected with the mines, but eventually abandoned. Here was a good spring of water, and at all hours of the day small groups of men, women and children, could be seen with their pitchers, and by means of long ropes were drawing water for the well, this being the only source of supply for the western part of the village. A little higher up, by the side of the road, was a lime kiln, from which the shaft derived its name. The shaft is still there, only covered over in Craigle garden."

The house called Plas Gogarth is still there, at the junction of Church Walks and Abbey Road. Was Craigle a house where St. Georges school stands (now called Ysgol San Sior)?

The shaft was likely associated with the copper workings on the hillside above Plas Gogarth. There seems to be no sign of it on the OS six-inch 1888 -1913 map.



[Side by side georeferenced maps viewer - Map images - National Library of Scotland \(nls.uk\)](#)

Author:
Dave
Flowers

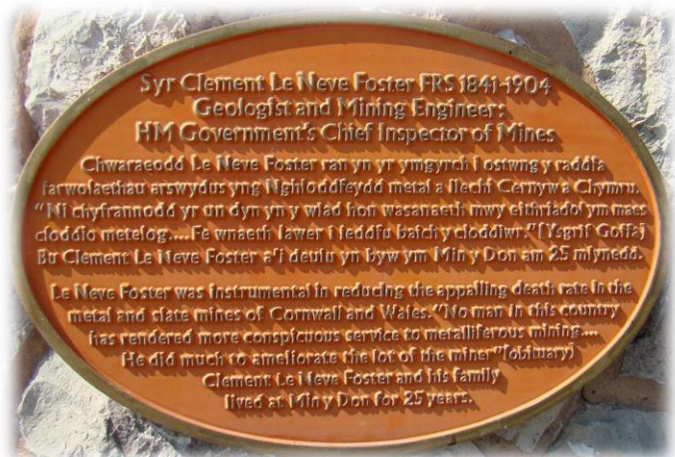
Clement Le Neve Foster

Across the nation blue heritage plaques can be found linking that particular location with a famous person or event. That said, in Llandudno the plaques tend to be orange rather than blue but the premise is the same and markers in the seaside town identify luminaries including solicitor Cecil Parke who incidentally was also a decent tennis player, architect Arthur Hewitt, former Australian prime minister Billy Hughes and Jess Yates the television personality.

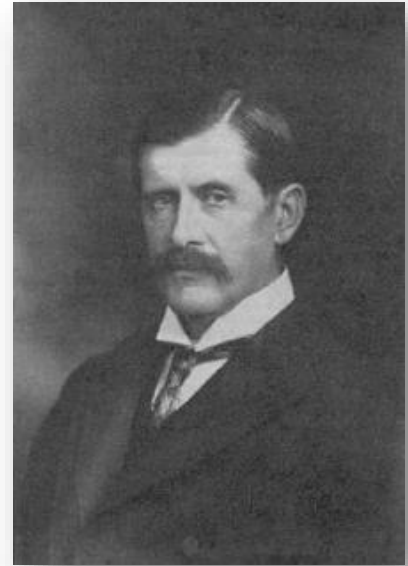
While leading a summer walk around the Church Walks area, GOES members and owners of the Min-y-Don Hotel Theresa and Rheinalt Hughes, pointed out an orange plaque on their property on North Parade dedicated to Sir Clement Le Neve Foster. Although only a stone's throw away from the entrance to Ty Gwyn mine, I had neither previously spotted the plaque nor heard of Dr Foster. So, who was this recipient of an orange plaque over 100 years after his death? Well rather aptly for GOES, he was a mines inspector.



Clement Le Neve Foster was born in Camberwell, London in 1841 the son of Peter Le Neve Foster who for many years was secretary of the Society of Arts. Aged 12, Clement was sent to France and schooled at College Communal, Boulogne, before he returned to Britain in 1857 and entered the Royal School of Mines where he flourished. He then continued his studies at the Freiburg Mining College in Saxony and even before he had graduated was appointed to the Geological Survey of Great Britain led by Sir Frederick Murchison. From 1860 to 1865 he was engaged in this seminal geological survey of the country before going to Sinai on an exploration tour for the Viceroy of Egypt and later examined gold mines in Venezuela. From 1869 to 1872 he was employed by the Pestarena Gold Mining Company in Italy - the most important historical gold mine complex in the Alps.



1872 was a significant year for mining in Britain after the passing of the Metalliferous Mines Regulation Act and Clement was appointed an inspector to carry out its provisions. He was first stationed to Devon and Cornwall where his efforts to improve old methods of working and develop safety caused considerable friction and maybe because of this he requested a transfer and relocated to north Wales and Llandudno. He was distinguished for his extensive scientific and practical knowledge of metalliferous mining and stone quarrying and regularly called to other parts of the country to investigate miner's deaths and their causes.



Perhaps the most famous investigation he was involved with, and indeed nearly cost him his life, was the Snaefell lead mine disaster on the Isle of Man in 1887 when he looked to find the cause of an underground fire which cost the lives of nineteen miners. In the lowest parts of the mine, some 1000 feet below the surface, there was little ventilation and because of inadequate safety measures a stray candle had been allowed to burn after the end of the working day. This set fire to a pit prop and ignited cotton waste impregnated with oil used by men working the rock drills to reduce friction and heat build-up, making drilling easier and prolonging the life of the drill bits. Before long the blaze had taken hold and spread, producing carbon monoxide which filled the lower parts of the shaft. When the men returned to work, they descended the ladders and on reaching the lower levels were overcome by the poisonous fumes. A rescue operation began and Clement Le Neve Foster was summoned from Llandudno but could not get there for four days by which time all but one of the bodies had been recovered and an inquest opened and adjourned. However, Foster descended the mine to find the cause of the disaster and to try and co-ordinate the rescue of the last cadaver. Writing notes as he descended his hand writing deteriorated rapidly as he too was overcome by noxious fumes. While awaiting rescue the plucky government inspector continued to make notes of his sensations for science. After two hours he was hauled out but never fully recovered and for a year afterwards was severely incapacitated.

In 1900, Thomas Jones, a Llandudno quarry proprietor pleaded guilty to a charge brought by Dr Le Neve Foster of having failed to report the injury of one of his workers after he was hurt in an explosion at the Bishop's Quarry on the Great Orme. The court heard how Edward Owen was one of three employees at the limestone quarry and when a fuse failed to detonate correctly he went back, only for it to discharge as he neared it. Mr Owen was injured but Mr Jones failed to report it however, Her Majesty's Inspector of Mines, Dr Foster, heard about the incident, inspected the quarry and found other shortcomings including a pound of gunpowder, wrapped in brown paper, left on a ledge instead of safely stored in a magazine.

While on the Great Orme, Clement Le Neve Foster checked in on Thomas Jones' neighbour, Hugh Roberts, who owned the adjoining quarry. Here Dr Foster found more gunpowder lying about and it was also evident Mr Roberts had been using an iron rammer when stemming charge holes rather than a non-conductive wooden one. For his misdemeanours, Hugh Roberts of Madoc Street was fined one pound.

While relatively little is known about Clement Le Neve Foster's time in Llandudno, the orange plaque reveals he and his family lived here for 25 years however it appears not all that time was at the Min-y-Don as the 1881 census discloses that he had previously lived at a property called Ael-y-Bryn on Ty Gwyn Road. Having travelled widely as a younger man, Clement was a popular raconteur giving talks and speeches about his travels to local organisations while his wife was a regular benefactor to the now demolished Sarah Nicol Memorial Hospital on Trinity Avenue.

Clement was knighted in 1903 and after his death in 1904 his family dedicated a stained-glass window to his memory at St Tudno's Church on the Great Orme. Warden and GOES member Christine Jones related the legend behind the glass of St Clement and St Barbara stating that St Clement was martyred by being thrown into the sea tied to an anchor. St. Barbara was locked in a tower by her father, who didn't want her to become a Christian. These saints were probably chosen to adorn the window as St Clement is the patron of marble workers and St Barbara the patron saint of mining. Clement's widow, Dame Sophia Chevallier Le Neve Foster died in 1922.

At a time when miners' safety was of little consequence to mine owners Sir Clement Le Neve Foster was undoubtedly a scourge to those who were proficient in malpractice in order to maximise profits regardless of human cost. Undoubtedly many a miner owes his life to Sir Clement who did his utmost to clamp down on such negligence.



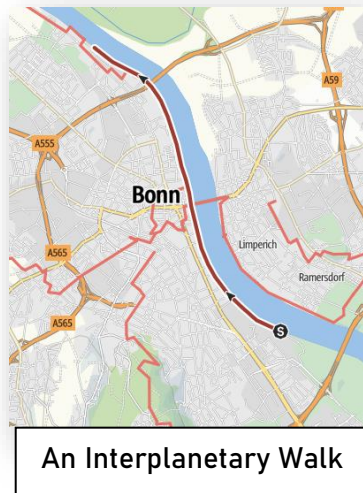
Author: Adrian Hughes.

An Appreciation of Geological Time

“..... We find no vestige of a beginning, no prospect of an end.” - James Hutton writing about the processes operating on the earth, and the earth itself, in 1788.

“Space is big. You just won’t believe how, vastly, hugely, mind-bogglingly big it is.” – Douglas Adams in *Hitchhiker’s Guide to the Galaxy*, 1979. Although writing about distance and volume, it could just as easily have been written about time.

Along the Embankment of the river Rhine at Bonn, Germany, there is a depiction of the Solar System with its eight planets plus the dwarf planet Pluto, laid out on a scale of 1:1,000,000,000 (1 to 1 billion) which gives a wonderful, easily appreciated, sense of its vastness and the distances involved.



Mercury is 60m from the starting point of the Sun, representing the 60 million kilometres actual distance; Venus 108m away; the Earth 150m; Mars 228m; Jupiter 778m; Saturn 1,427m; Uranus 2,870m; Neptune 4,497m, until after 5,946m you reach Pluto. The Sun is represented by a sphere 1.5m in diameter and at the requisite distance from the Sun is a plaque displaying the basic statistics relating to each planet, such as the size, mean temperature and length of year.

Also incorporated in the plaque is a to-scale depiction of each planet, such that the earth is 1.4cms in diameter, with 40cms representing the distance to the moon, and the diameter of Jupiter is 15cms. The walk, apart from being good exercise, is much used by Bonn residents to educate their children, and many adults, about the Solar System. When ‘walking the Solar System’ what is particularly striking is how close to each other the inner four ‘rocky’ planets from Mercury to Mars are with a walk between them of 168m, compared with a walk of 5,168m from Jupiter past the outer four ‘gas giants’ and on to Pluto. A couple of extra thoughts would be that on the same scale Proxima Centauri (4.2 light years) would be about one earth circumference away, and if you walked from the Sun to Pluto in a leisurely one and a half hours, to scale you would have walked at an impossible 3.5 times the speed of light!

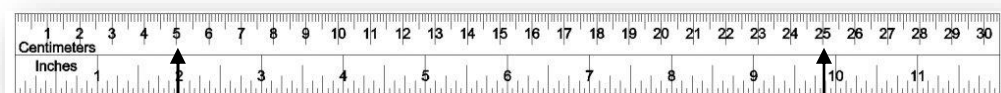
I have often thought about how it might be possible to depict the vast expanse of Geological Time in a similar way. It is obviously easy to scale down distance in a meaningful way as in the Bonn Solar System Walk, however it is difficult to scale down time in an easily visualised way. Often, the passing of time since the formation of the earth is represented by a clock face over a period of 12 or 24 hours. In the case of the former, 12 midnight is taken to be represent the formation of the earth approximately 4,600 million years ago and 12 noon is taken to be the present day.



Hang on a Second

This means every second represents approximately 104,000 years and every minute 6.25 million years, numbers that aren't that easy to visualise, particularly when the geological time that is of interest to most geologists is the Phanerozoic Eon which begins with the Cambrian Period about 541 million years ago, when early forms of complex life began to evolve. This is represented by the only the last 1hr 26 mins on the 12 hour clock. The first 10 hours 34 mins of our virtual clock represent the vast expanse of time encompassing the Hadean, Archean and Proterozoic Eons of the Precambrian, which preceded the Cambrian. Using the clock analogy the Carboniferous rocks comprising the Great Orme formed at 11.07 a.m. and the rocks of Silurian age on which they lie were deposited at 10.53 a.m. The first human species (*Homo habilis*) evolved at about 23 seconds before midday, and the Bronze Age mine on the Great Orme was operating at about 0.04 seconds to midday.

The clock analogy gives an impression of the scale of time but it isn't very easy to imagine in practice, and the smaller divisions are too small to be displayed graphically. It might be easier if time was traced out by only one revolution of minute hand, but in that case the time scaled would be too compressed to be meaningful. An alternative way to think about Geological Time is in terms of distance from a particular point, as is the case with the Bonn Solar System walk. If one millimetre is taken to represent one year, even quite small periods of time can be visualised. If someone is 50 they can fairly easily visualise their birth as being 50mm or 5cms away, the average lifespan of a person in the UK is 81 (8.1 cm) and the end of the Second World War in 1945 was 77mm (77 years) away.



50mm Born 50 yrs ago
HAPPY 50TH BIRTHDAY!

250mm 1773 Boston Tea Party,
prelude to the American Civil War

Using this analogy, the Battle of Hastings in 1066 would be 96cms away and the Great Orme Bronze Age mine about 4 metres (4000mm). This is somewhat easier to visualise than the 0.04 seconds using the clock analogy. The other advantage is that it is not a closed system like the 12 hour clock; the distance can go on almost ad infinitum – you can extend it for as long (or far) as you wish. The estimated age of the earth would be 4,600 kilometres from where you are, about the distance to Tehran in Iran from Llandudno, and the beginning of the universe would be 13,500 kilometres away, at 1 mm for every year. This is about the distance to the South Shetland Islands which are in the South Atlantic approximately 120 km north of the Antarctic Peninsula.



The End of the Universe!

The following table gives some examples of historical and geological events expressed in terms of distance, and hopefully gives an impression of the vast expanse of geological time. It should be noted that many of the dates, particularly the earlier ones, are approximations.

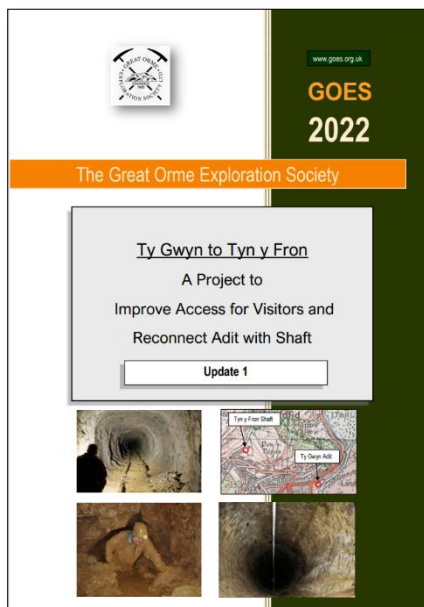
Historical / Geological Event	Years in the Past (Ma = Million Years)	'Distance' (1 mm = 1 year)	Examples of Approximate Distance from Llandudno (at 1 mm = 1year)	Notes
CENOZOIC Present Day – 66 Ma				
GOES formed	38 years	3.8 cms		
Ty Gwyn Mine closes	170 years	17.0 cms		Only open for 18 years, it was none-the-less the richest mine on the Orme
Ty Gwyn Mine opens	188 years	18.8 cms		
Plas Mawr, Conwy	447 years	44.7 cms		Construction of the Elizabethan Plas Mawr house in Conwy began in 1576
Prince Madog sails for America	853 years	85.3 cms		Prince Madog possibly set sail for America in 1170, from a harbour situated on what is now the golf course at Rhos on Sea, which was then the mouth of the River Conwy
Viking Raids in North Wales	1,130 years	1.13 m		The Vikings carried out raids along the North Wales coast, after being forced to leave Chester
St. Deiniol's Monastery, Bangor	1,493 years	1.49 m		St. Deiniol's Monastery in Bangor was founded in approximately 530, on the site of the present Bangor Cathedral
Bronze Age Great Orme Mines	4,000 years	4.00 m		The Great Orme mines, probably the largest prehistoric copper mines in the world, were producing copper from the mineral Malachite (CuCO_3) in the Bronze Age, approximately 4000 years ago

Age of the Earth, as estimated by Ussher	6,027 years	6.00 m		In 1654 Archbishop Ussher of Armagh, using the ages of those mentioned in the Old Testament of the Bible, calculated that the Earth was created in 4004 BC
Retreat of last ice from Llandudno area	17,000 years	17.00 m		The Welsh and Irish Sea Ice Sheets retreated from the Llandudno area approximately 17,000 years ago
Neanderthal remains	230,000 years	230.00 m		Date of the Neanderthal remains found at Brontnewydd, near St. Asaph
Early human species	2.4 Ma	2.4 km	The length of Llandudno North Shore beach	<i>Homo habilis</i> is the earliest 'human' species was present between 2.4 and 1.5Ma
Cretaceous / Tertiary (K/T) Extinction Event	66 Ma	66 km	Mold	Extinction of the dinosaurs (except birds). Probably the combined effect of the Chicxulub impact event and the Deccan Traps volcanic activity in India.
MESOZOIC ERA 66 – 251 Ma				
First Dinosaurs	230 Ma	230 km	Hull	Dinosaurs evolved during the late Triassic
PALAEOZOIC ERA 251 – 451 Ma				
Carboniferous Rocks of the Great Orme	330 Ma	330 km	Portsmouth	The deposition of the rocks forming the Great Orme occurred during the Visean Stage of the Carboniferous 330-346 Ma
Silurian / Ordovician Rocks beneath the Great Orme Carboniferous deposits	450 Ma	450 km	Near Inverness	There is an unconformity representing a break of up to 100 Ma between the Silurian / Ordovician rocks and the Carboniferous sequence of the Orme above
PROTEROZOIC EON 541 – 2,500 Ma				
Banded Iron Formations	1,700–2,500 Ma	1,700 – 2500 km	Rome – Varna (in Bulgaria on the Black Sea coast)	During this time > 60% of the world iron ore reserves were deposited as Banded Iron Formations (particularly in Australia, South Africa and South America). A build-up of O ₂ in the sea reacted with dissolved Fe to form iron oxides which precipitated out in the form of Haematite Fe ₂ O ₃ and Magnetite Fe ₃ O ₄
Vredefort Impact Crater	±2,023 Ma	2,023 km	Naples	In South Africa, it is the largest known impact crater, caused by probably the largest asteroid (15km) to strike the earth since the Hadean Eon. Now much eroded, the original crater was 300km in diameter.
ARCHEAN EON 2,500 – 4,000 Ma				
First single-celled organism	±3,500 Ma	3,500 km	Cyprus	This is the widely accepted time by which single-celled life had evolved
HADEAN EON 4,000 – 4600 Ma				
Formation of the earth	±4,500 Ma	4,600 km	Tehran	This is approximately the time accepted for the formation of the Earth
For completeness - Formation of the Universe	±13,800 Ma	13,800 km	South Shetland Islands - (Off Antarctica)	The date thought to be that of the emergence of space-time in the Big Bang

Author: Martin Trevelyan-Jones

Ty Gwyn

Regular Wednesday evening work-parties, 6pm to 8pm, have taken place since last July. They have been led by Jason Potts, aided his son Daniel and Adrian Hughes, together with whoever turns up on the night. The aim is to improve the visitor experience and to look at the possibility of connecting up with Tyn y Fron shaft. A week by week diary of events can be found in a separate document at [Great Orme Exploration Society: Ty Gwyn to Tyn y Fron \(goes.org.uk\)](http://www.goes.org.uk) As work progresses the document will be updated.



Pictures:
Jason Potts +
colleagues

The Appleton Diaries: Some Reflections

Earlier this year Peter Appleton's diary of mine exploration on the Great Orme 1967 to 1972 was published. [Great Orme Exploration Society: Early Exploration \(goes.org.uk\)](http://www.goes.org.uk) His detailed and enthralling accounts provide us with numerous talking points, here are just a few.

- **ROMANS:** The shaft was deeper than it is now. Early pioneers discovering a better route 'swinging in' at 65ft, (diary p.31) this is exactly what we do today, however, it is now the bottom of the shaft, rubble filling the shaft from then on down, the result of material dropped in during capping operations in the late 80's.

- **TREWEEKS:** On March 10th 1968 Peter Appleton's team found the bottom of Treweek's to be 100ft further down that we can access today. (cf diary p.44). 'A rather damp descent was made to the shaft bottom at about 200ft,' (200ft below Wagongate, 110ft below Basecamp passage) 'which was found to be blocked. The shaft begins to open out here, a rubbly slope leading into a pool, with water reaching the roof. No prospects' (i.e. No levels found).

He also explored the levels 100ft higher, finding a dam one way (the 'Wet Way to GOML) and access to large workings the other namely Basecamp. Today, this is the lowest point we can reach, the shaft then being flooded, with, on very rare occasions when dry, a rubble blockage being seen approximately 15 ft (4.57m) down.

Question: During landscaping and the construction of the present day concrete tops would sufficient rubble have been dropped into Treweek's to totally fill 'the lost' cylindrical shaft approximately 2m in diameter and 25.91m high (30.48m minus 4.57m)? The formula, $\text{volume} = \pi \times r^2 \times h$ indicates that 81.40m³ of material would have been needed to fill the shaft to its current level.

To put this in perspective, a large 'builders skip' holds 8yd³ (6.1m³) of material. To fill up the shaft would have required 13.3 such skips, with each skip filling 1.9m of shaft. (Perhaps a little more may have been needed bearing in mind the 'widening' at the bottom observed by Peter).



4.5ft high, 6ft wide, 12ft long

A wholesale clearance of the surface tip, together with the square wall that was built around the shaft top, could well have been facilitated by pushing everything down the

shaft and no doubt creating footings for the concrete capping would have added a little more, but, did it actually equate to 14 skips-full?

If the answer is yes: The shaft below the blockage is now completely filled with a column of rubble.

If the answer is no: The logical, though less plausible conclusion must be that the present day blockage seen at 15ft does not in fact extend to the bottom of the shaft explored in the late 60's, and that somehow a suspended blockage has been created.



This old postcard shows trams moving through the areas of mine spoil prior to the landscaping that took place in the 80's.

An enlargement of the left-hand side which clearly reveals the square wall at the top of Treweek's Shaft and the surrounding spoil

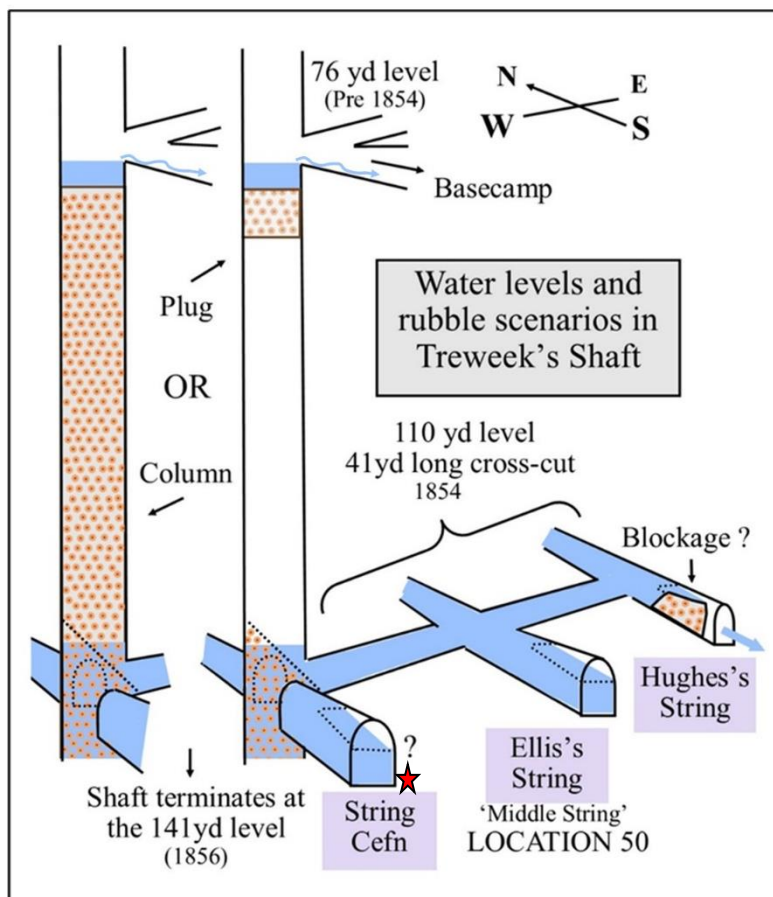


William Vivian the Mine Captain of the Old Mine in the 1850's referred to today's Basecamp passageway as the 76yd level, and he documented that further down at the 110yd level there were workings north and south on String Cefn and a crosscut, heading east, 41 yds in length, leading to other workings. These passages 102ft lower must have been tantalisingly close when Peter reached the bottom in 1968, in fact, they probably lay just below the waterline and rubble.

This waterline immediately above the 110 yard level can also be found today, in workings near to Basecamp reached by a 12.5m abseil. (This is Peter's '50ft winze', cf diary pp.36 - 37, which he didn't descend due to looseness at the top). When we surveyed these lower workings in 2019 we called it Location 50. [Journal 2019 \(goes.org.uk\)](http://www.goes.org.uk) p.28-30. Its position, SE of Treweek's Shaft with underwater passages gradually dipping northwards, together with several descriptions provided by William Vivian strongly suggest that they lie on Ellis's String, the 'middle string' on the 110yd crosscut.

If this is the case, and Location 50 links to Treweek's Shaft by the now submerged 110yd crosscut then, because water heights balance out, the water level seen by Peter Appleton in 1968 must still exist. This will be the case irrespective of the scenarios: a Treweek's now full of rubble, or one that has a suspended blockage with a void below.

In both cases the rubble at the top has become largely impermeable and supports the water we find in Treweek's today. Any seepage through either the column of rubble or the plug being compensated for by the constant shower of water coming down the shaft, any excess trickling along the Basecamp passageway.



Those with a good memory might recall this theory was first mooted in the 2019 Journal. (Link above)

Discovering that in 1968 Peter Appleton had observed the lower water table in Treweek's only gives it additional credence.

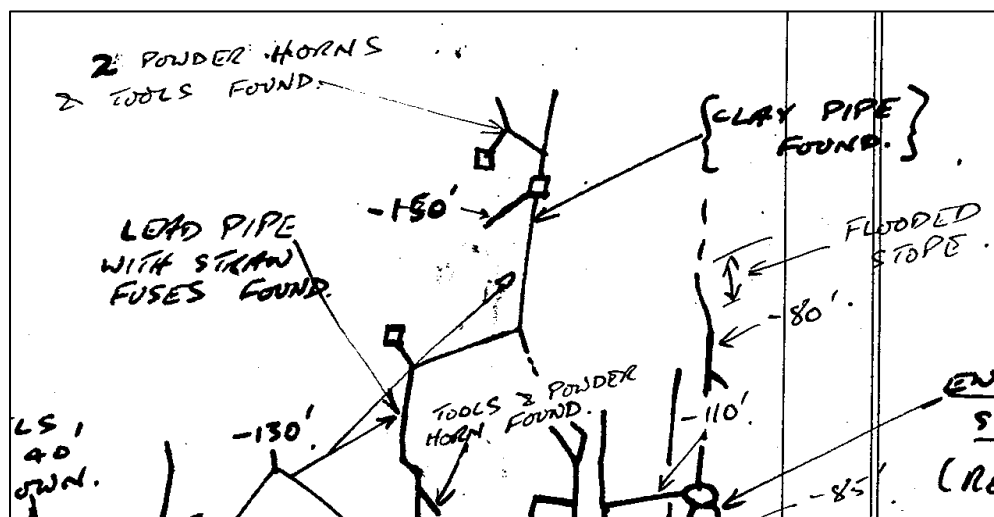
★ Lost workings may exit above the waterline on any of the strings north or south of the cross-cut.

The reason that these lower passages are flooded has to be some sort of blockage either at the eastern end of the crosscut or in Hughes's String. South on this string leads directly to Higher and then Vivian's Shaft, the latter still being a major drainage route today.

Presently some water finds its way out under a false floor within Ellis's workings, although this has backed up significantly in recent years. If this blocks completely, much, or all, of our Location 50 will flood until water finds another escape route.

- **ARTEFACTS:** The number of these found in the late 1960's and the fact that they were taken to surface as a matter of course needs to be put into perspective. At the time this was accepted practice. If you didn't take it, then someone else would.

In recent years we have come to value leaving discoveries in situ so that they can be appreciated in context and by future explorers, rather than find their way onto mantlepieces. Occasionally, as with some of the Orme pieces, they found their way to museums and the like, but all too often they were eventually lost or discarded as worthless tat. Peter is to be commended for documenting the items and where they were found on his mine plans, which is interesting in itself.



A section of Peter's Romans plan showing the location of artefacts

Whilst leading groups underground the sight of a clay pipe bole, a few rusted tools or a part dismantled boot has resulted in much photography and discussion. How much more interesting it would be if there were more 'mini-museums' such as that still found in Penmorfa, right.

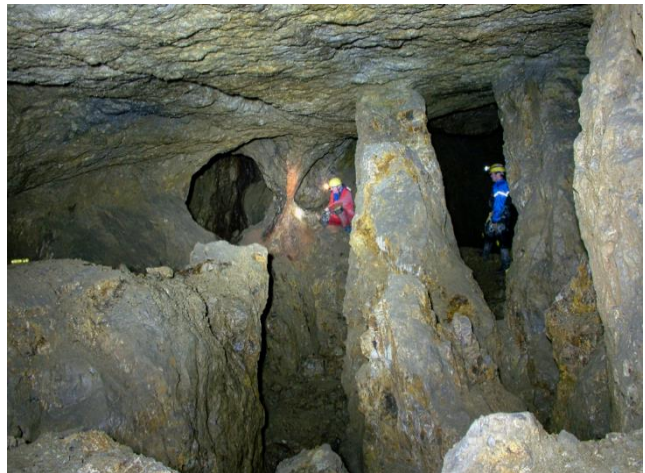


A mini-museum in Penmorfa

- **PENMORFA:** It would appear that much of Peter's early exploration of the system was made by following the waterfall near the tally board. This obviously led to higher workings and following the water offered a logical way to find a through route to surface via Pyllau or Treweeks. The latter wasn't to be as the water eventually flows from inaccessible crevasses, but the higher areas of Penmorfa were explored including the Main Stemple Shaft and the '3' attics above, which at the time could all be reached by simply walking along the level. (In 2000 we dug through a major collapse to re-establish the lost link [Journal 2001 \(goes.org.uk\)](http://www.goes.org.uk)) pp.4-5.

Oddly, from our perspective today, Pinnacle Chamber, which Peter clearly describes in the following, seems to have been found from above.

The hole leading into a large stope, previously visited by Len and myself was rigged with a ladder. From this point an extremely stoped out area was explored, some of the chambers being the largest so far seen in Llandudno. Irregular pillars and frequent precipitous drops gave this part of the mine and unreal effect. Again there were no levels as such, merely irregular pathways, sometimes with handrails and short ladders. It was easy to get lost with frequent openings to further workings on all sides. Someone had beaten us to it however, as in one place was a heap of plastic clothes line and in another stope was a heap of seven small rectangular mirrors the significance of which was not appreciated. Mel had remained at the top of the little pitch into these workings so I was exploring alone, and was at a loss for a few minutes to find the way back to him. An easier route was found into the stopes via a narrow traverse and down a short wooden ladder.



Pinnacle Chamber

The hole rigged to give access to Pinnacle Chamber is most likely Gaz's 'Second Ladder Climb' of Nov 2000, found down the rubble slope from our 'Canteen' area. ([Journal 2001 \(goes.org.uk\)](http://www.goes.org.uk) p.4 'Getting nowhere...') Peter's easier route in, the narrow traverse and short wooden ladder, being our regular roped traverse found at the top of the said rubble slope, immediately below the Canteen, a short wooden ladder was reintroduced a few years ago.

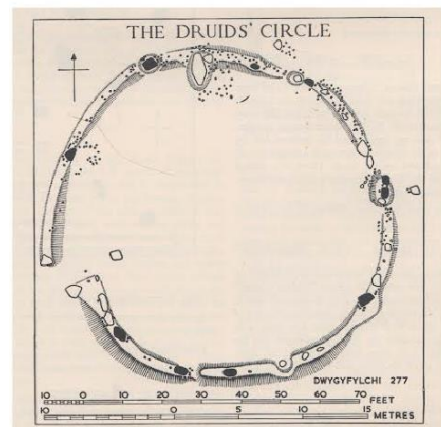
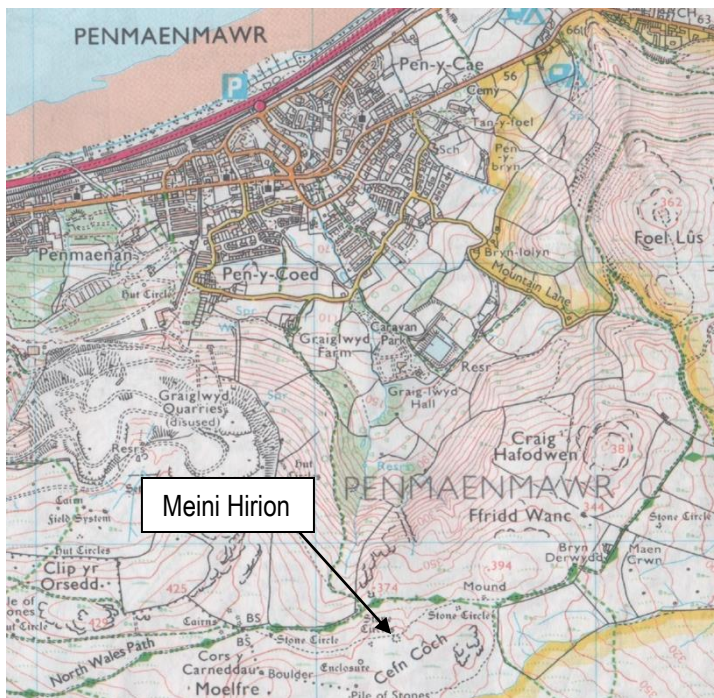
I have sent Peter a number of photographs of the 'Ice Bridge' our present day normal route up though the workings but he is unable to recollect the feature. It is highly probable that other explorers, those leaving behind the clothes line and mirrors had found and used it as a point of access.

Author: Dave Wrennall.

Leave These Stones Unturned

For those of us living on either side of the estuary of the River Conwy and are interested in such things, when it comes to stone circles we would immediately think of The Druid's Circle above Penmaenmawr.

More properly referred to as Meini Hirion (Long Stones) the circle stands on the area called Cefn Coch at grid reference SH72287466, on the broad area of upland that sweeps seaward down and away from Tal y Fan. Though a lot of druidic activity would have, and still does, centre around stone circles, calling this The Druid's Circle is misleading. The earliest known records of Druids come from 300 BC (Encyclopaedia Britannica), stone circles are predominantly Bronze Age so Meini Hirion could well date back to 3000 BC.



Drawing above courtesy of
The Royal Commission on
Ancient or Historical
Monuments in Wales and
Monmouthshire 1956



The Meini Hiron
stone circle on
the upland of
Cefn Coch

Picture from Prehistoric
stone circles - History
Points

The most frustrating point about stone circles is that no one knows for sure what purpose they served. When it comes to Meini Hirion we know this stands beside an important prehistoric roadway, traces of it remain between Bryn Derwydd farm and Cors y Carneddau. We also know that this area was important well before the Bronze Age as there was a nearby stone age axe factory, with Penmaenmawr axe heads being found as far north as Scotland, as east as Yorkshire and as south as the Thames Valley.

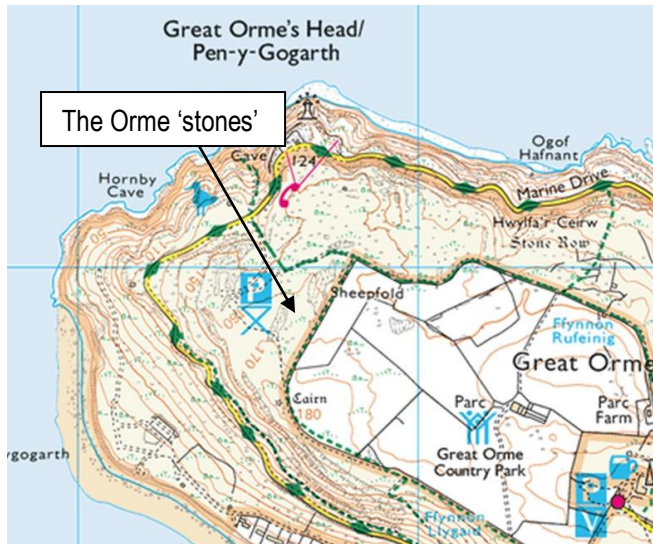
So, were they an early livestock corral, were they places of worship or something more sinister, or something more astronomical? We cannot say, but there were the cremated remains of children buried in urns discovered by a mid-twentieth century excavation of Meini Hirion, this type of burial fell out of use by around 1400 BC. However, apart from helping to date this stone circle there is no knowing what the original purpose of the circle was.

This detail about the Meini Hirion stone circle is by way of introduction to the big question: do we have an unrecorded stone circle on the Great Orme?

This investigation was prompted by the photograph, reproduced here by kind permission of Nigel Bannerman, found in the tremendous tract "The Great Orme Explained" which is available on-line as a PDF download. www.nbannerman.co.uk



The stones revealed by a gorse fire in 1996



Location of the Orme stones, outside the Parc Wall near the limestone pavement

In the Great Orme Explained, this is part of the description appended to the photograph: *After inspecting the site, and an aerial photograph taken by Coastal Command on 20th. January 1947, it was realised that the curved feature was a segment of a large circle, 70m in diameter, which had been partially robbed of its stone. This possibly occurred when the 'Park Wall' was built in the 1890's*

Finding no other written record of this circle we conducted a very rudimentary survey of the stones that we could find, this was not easy as the photograph below on the left shows. This is our attempt at reproducing the 1996 photograph, and on the right is the only stone not hidden in the gorse.



In this photograph the survey notes on a clipboard show up next to one of the stones, hidden in the gorse.

Photographs taken in November 2022



Rob Carter helping with the surveying, stood next to a stone.

Going old school we used a hand held compass and tape measure to plot what stones we could locate. We did, however, have access to modern plotting software and this was the result:



Plot courtesy of Juan Corrin of the Manchester University Speleological Society.
The yellow pins place each of the stones that we located.

The disappointing aspect of this plot is that the locations of the stones (that we could find and determined were part of the circle) do not describe the perfect arc of a circle. Though if the 6 most westerly plots were discounted as outliers (that have been moved or wrongly taken to be part of the stone circle) then the plots get closer to resembling part of a circular feature. Someone needs to go back with more modern mapping technology to verify our rough and ready survey. However, it does show curvature and that is unlikely to be how a field boundary was constructed, we would expect field boundaries to run in straight lines. If this is an incomplete stone circle, then it is very easy to conclude that any missing stones were taken and used in the construction of the nearby drystone wall. If some of the stones that we can find today were moved during the time of the wall construction, but not actually placed in the wall, this might also account for some of the stones being out of perfect alignment for a circle.

What does appear in the 1956 record of local historical monuments is a reference to the nearby cairn, which some sources suggest could be a bronze age burial site, and with the bronze age copper mines not so far off, then why not a nearby bronze age stone circle? We would be very grateful to learn if this is simply a rediscovery of something that is already known and documented, or is it yet another Great Orme mystery?

Author: Philip Berrie

Last Years Summer Walks



1 - Pen Trwyn



2 - Phil's Archaeological Walk



3 - Conwy Mountain



4 - Underneath the (Pier) Arches



5 - Church Walks



6 - St Tudno's Church



7 - Haulfre + Ogof Arth



8 - The Vardre



9 - Wyddfyd + Black Gate



10 - Marl Woods



11 - Limestone Pavement



12 - Ty'n y Coed

Other outings...



December:
Boxing Day Walk



November:
Remembrance Walk

Pictures from Adrian Hughes and other Society Members

GOES SUMMER WALKS 2023

All walks start at 7pm and are usually gentle strolls which can last up to 2 hours. Sturdy footwear and waterproofs are recommended for all walks. If the weather is poor, then the walk is likely to be postponed until a later date.

25 May – Summit Up! - Meet at the summit carpark (parking charges may apply).

1 June – Little Orme – Meet at five bar gate on Penrhyn Close off Penrhyn Beach West.

8 June – Tudno's Well – (With guide Christine Jones). Meet at St Tudno's Church.

15 June – The Monk's Path - Meet at West Shore Toll House.

22 June – Pant-y-wennol and the Holy City - Meet at 'Welcome to Llandudno' sign.

29 June – Well, Well, Well - Meet at water pumping station above Great Orme Mines..

6 July – The Gunsites - Meet at junction of Llys Helyg and Marine Drives (very limited parking) at 7pm or at West Shore Toll House 6:40pm to walk to meeting point for 7pm.

13 July – Granny's Armchair - Meet outside Llandudno Hospital.

20 July – Phil's Mystery Walk – (With guide Philip Berrie) Meet at 'the bench', ski slope car park.

27 July – Brammock Rods and Llety'r Filiast - Meet at water pumping station above Great Orme Mines.

3 August – Hubert Stone Memorial - Meet at Little Orme end of promenade. Low tide 1.1 metres @ c. 19.30. Warning slippery rocks and wet feet likely.

10 August – Happy Valley and Pen Dinas - Meet at North Shore Toll House.

Walk Coordinator: Adrian Hughes (07833 109505)

Miscellany



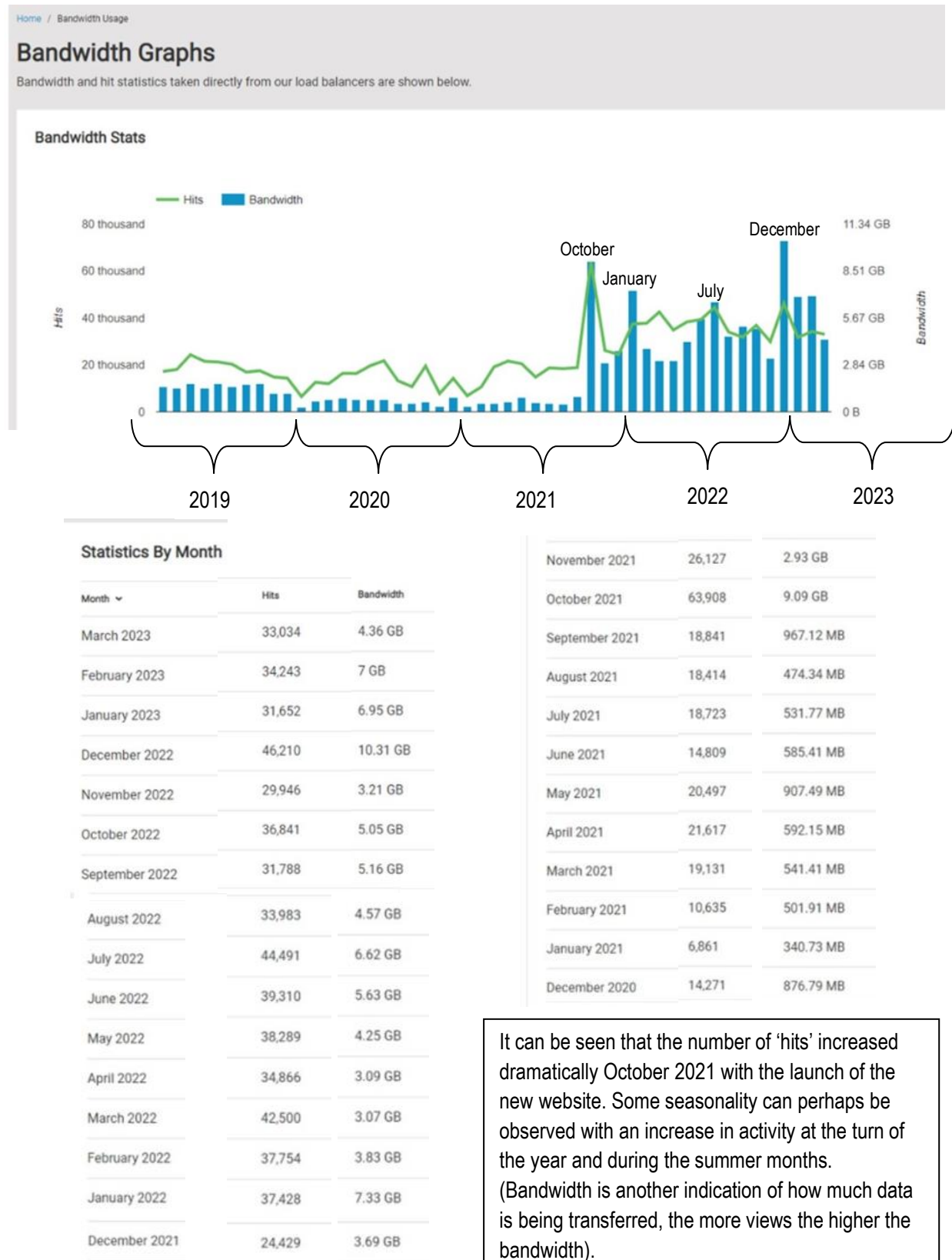
Andy Lewis provided this black and white photograph of the 'hollow' taken in the mid 80's before the development of Great Orme Mines Limited. An attempt to replicate the scene today proved difficult. The Editor later found out why, the earlier picture having been taken from the cable car! As well as Vivian's Shaft with its protective fence, centre left, the circular wall around Pyllau Shaft can be seen, just above centre at a high point in the track.



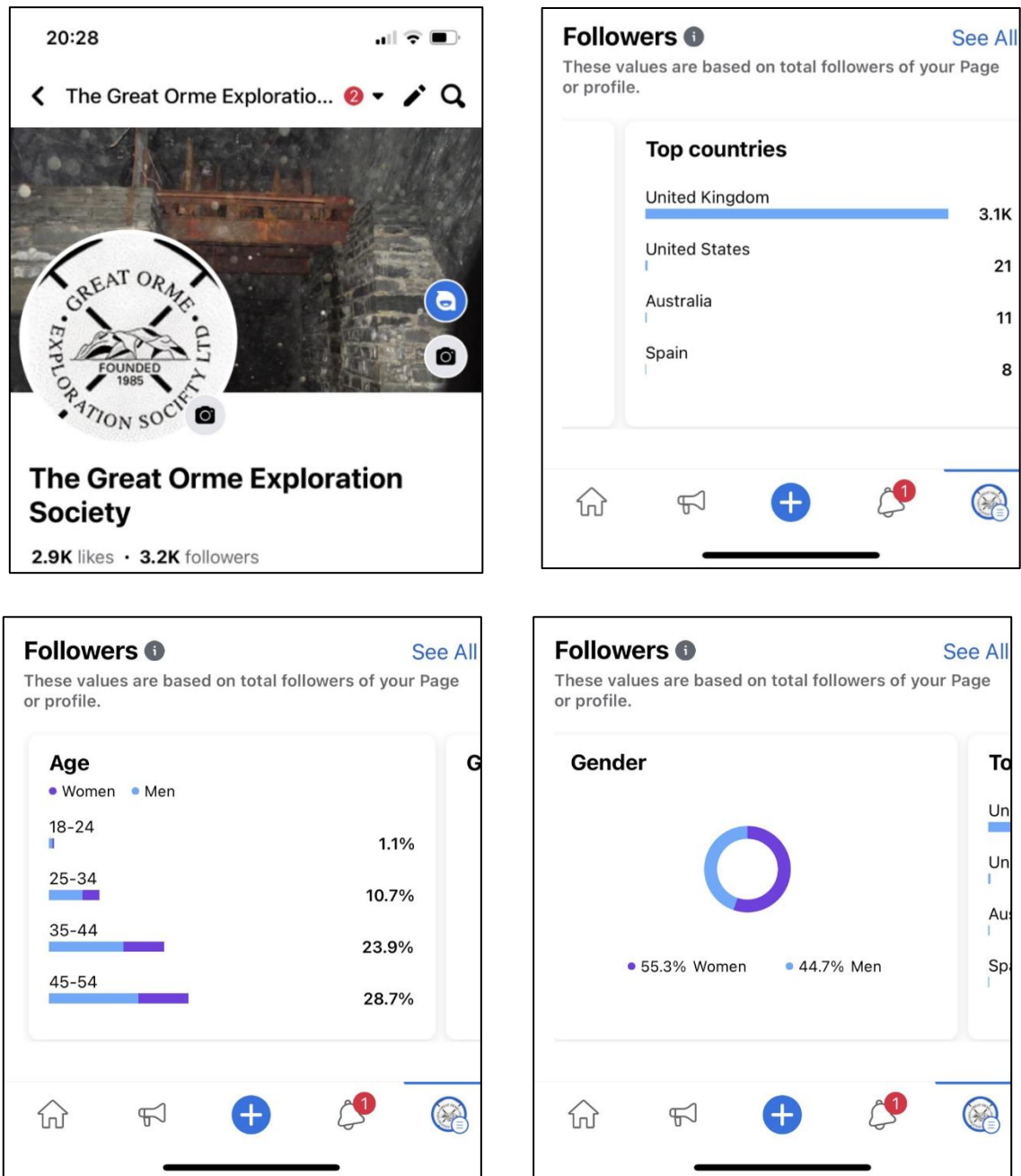
The 2022 GOES Christmas Dinner was held at The Min-y-Don's Copper Mill Restaurant. Hosts Theresa and Rheinalt, both members, provided an occasion to remember with fine food, drink and hospitality.

Social Media Data

Bandwidth Statistics for the GOES Web Site



Facebook Data



Recent data from Facebook shows that our Page has 3.2 thousand followers and 2.9 thousand likes with even some international interest. Oddly, the Gender profile suggests more women than men but the Age profiles at each category more men than women! This has to mean that if older categories were included i.e. 65-74 etc there would be more women than men interested in our activities. All this assumes that when people join FB they are truthful about their gender (probably) and age (maybe not!)

Pictures from some of our Facebook Posts.



April 23rd 2023. A team from Goodluck Mine in the Peak District and other visitors were shown around Ty Gwyn Mine by Steve Lea and Adrian Hughes



March 2nd 2023. Left: Adrian Hughes, Drew Dickson, Dave Wrennall + Andy Lewis emerge from the Ali Series. Right: Drew looking down the Treweeks Shaft.



Above: March 2023: We were filmed by S4C, seen here at the Victorian Reservoir, and appeared in their Cynefin programme. [BBC iPlayer - Cynefin - Cyfres 6: Llandudno](#)



Left: May 1st 2022. The Editor in the GOES tent(s) at the Victorian Extravaganza. There were plenty of visitors, honestly! Right: The novelty spoons which proved such a best seller on the day



Data: Jason Potts + Adrian Hughes
Photo's: Society Members

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GOES meets informally Thursday evenings in The Snowdon, 11 Tudno Street, Llandudno from 9.30pm. <http://www.the-snowdonhotel.co.uk/> All are welcome.

The Great Orme Exploration Society (GOES) was formed in 1985 and became a Company Limited by Guarantee and not having a share capital on 7th April 1999. It is a member of the National Association of Mining History Organisation (NAMHO), British Caving Association (BCA), and works in association with the Gwynedd Archaeological Trust (GAT), the Early Mines Research Group (EMRG) and the Gwynedd Bat Group (GBG). Views and opinions expressed are those of the author(s) and not necessarily those of the Society.

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