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The Newsletter of the Cumbria Amenity Trust Mining History Society

CATMHS chairman Warren Allison, leading meets at Greenside Mine.
Photo by Jeremy Hunt

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Cumbria Amenity Trust Mining History Society
Newsletter No 131, May 2018

Contents:

Membership

Dave Bridge	Page 2
Pete Blezard	Page 4
General Data Protection Regulations	Page 5
Editorial	Page 6
New members	Page 6

News

Archaeology in the Lake District conference	Page 6
Coniston Copper Project Update	Page 6
Rydal Estate Mine Plans digitised	Page 7
Cumbria Archive Service closures	Page 7
North West Regional Research Framework	Page 8
Ted Bowness	Page 8
Mines Forum, 22nd Feb	Page 9

CAT Meets and Activities

Greenside, 21st Jan	Page 11
Smallcleugh, 25th Feb	Page 13
Welsh Slate weekend, 17-18 March	Page 23
Gaping Gill, 25th March	Page 27
Down at Ding Dong	Page 29
Rhiwbach Slate Quarry	Page 30

Articles

A Journey in Underground Photography	Page 32
Ore dressing at Coniston in the 19thC	Page 35
Smelting advances at Keswick and Wales in the late sixteenth century	Page 37
Yacob Tornblad's letters	Page 40
The Ray family	Page 44
Eagle Crag Mine	Page 46

Society Officers and Committee Members Back cover

Dave Bridge

It is with great sadness that we report on the death of Dave Bridge. Dave was a member of the Cumberland Geological Society from 1960, and he carried out a lot of mine exploration on his own before he joined CAT in 1983. His contribution to our Society, both physical and intellectual, was considerable. He was a long standing committee member and was chairman for nine years. He was a member of COMRU (mine rescue unit) which was initially formed by mine explorers to deal with potential incidents underground, and he wrote numerous articles for our Newsletter and Journals.

He was a leader and instigator, and sought to investigate in more detail the early discoveries, especially at Coniston. This led to a project, with Mark Simpson and Angela Wilson, to survey and record the whole of the recently explored underground workings of Paddy End, an arduous undertaking which took 5 years of regular visits to complete.

Dave was an innovator. An example; he invented a technique for measuring the height of stopes using fishing line and a helium balloon. At a time when IT was young, before the millenium, he produced an interactive CD-ROM, ‘A Pictorial Tour of the Coniston Copper Mines’, 300 pages of pictures, plans, sections and clear text, sales of which have earned CATMHS a lot of money.

He was thorough and meticulous in everything he did and shared his knowledge. He was the ‘go to’ person for technical information on mine geology. Amongst his researches he produced a timeline of events at Coniston Copper Mines, he transcribed Ray Bland’s paper on the Coniston Mines in the Barrow Record Office, and he re-wrote in a readable form ‘Extracts Relating Mainly to Coniston from Daniel Hechstetter’s Notebooks 1600 – 1639.’

A nicer, more humble person and all round good egg would be hard to find. Dave was always a very safe mine explorer, someone you know will make the right decisions; there was no posing, no bravado, no "I'm an expert" attitude. His knowledge of both the mines and mining literature was second to none. He will be greatly missed.

Dave Bridge

I first got to really know Dave when he retired from his work at Selafield. He was chairman of CATMHS and I was on the committee. This was some 15 years or so ago and we were both interested in the Coniston Copper Mines and their history, especially how the accessible workings related to the mine plans. I was interested in carrying out a measured survey of the Paddy End workings, building on Peter Fleming's work, and persuaded Dave, who had done much mine exploring with Angela Wilson, to help with the project.

We started at the top, Simons Nick, and some five years later arrived at Hospital Level. Our equipment was basic - tape compass and clino. On top of this was our SRT kit, rope, drill and other stuff. I recorded the survey, Dave the geology. We went so regular that Dave said it was like going to work. Some places we went to were, as one would put it, character forming, bolting up, down, across stopes, surveying all the way, sometimes in places up to thigh depth in water.

Dave was inventive in many ways, like needing a way to measure the height of stopes. The balloon and fishing line, and it worked. Mind you, pulling the balloon down when it had disappeared into some dark hole above was interesting. When Dave put his mind to something he stuck at it. As he put it, one day when we were walking down from Levers Water, "we survived another trip! Ready for the next one." Anyway, all this Dave wrote up for the CATMHS newsletter, and I drew up the plans. This, mark you, was in conjunction with his passion for piano music. Thus he was very careful with his hands.

Finally we got down to Hospital Level and had had enough, so, by mutual consent we decided there was life beyond mine surveying. It was about this time that Dave gave up being chairman of CATMHS and left the committee to concentrate on other interests, walking and music.

Dave was a good companion, with wide knowledge of many things. It is truly amazing what came up in conversation, in obscure parts of the earth, at lunch-time. I know Dave had not been well for some time and it is with sadness that I received an email to say he was no longer with us.

Mark Simpson

Plaque in memory of Pete Blezard

Pete was a great friend to the digging team and none of the underground digs undertaken, from the first one at Greenside Mine in 1992, would have happened without him. He was a great loss to the digging team (and is still greatly missed), who decided that it would be a fitting tribute to him to place a plaque on his tub, which is in the Horse Crag Level at Tilberthwaite Mine, and is still affectionally known as "Pete's Tub". After speaking to Anne Danson, the inscription below was agreed and on the first April, Anne, Phil Meridith, Deidre Ryan, Margaret Fleming, Colin Woollard, John Brown, Pete Sedgewick, Warren Allison, Ian Matheson, Mark Scott and Liz Withey, who had kindly offered to take the photographs of the occasion, went to Tilberthwaite Horse Level install the plaque on Pete's tub. Although the plaque had been ready for some time, we waited until Phil and Deidre could make it, as they had been friends with Pete and Anne since the 1960's.

"Pete's Tub"

In Memory of

Peter Blezard

09/05/1949 –22/05/2015

A Mining Engineer, Mineral Dealer and Entrepreneur
Friend, Mentor and inspiration to the CATMHS Digging Team
Without whom this and many other projects would not have succeeded
Cumbria Amenity Trust Mining History Society 2017

We walked up to the entrance where a group photo was taken, before we slowly made our way up the level, pausing at the tub before going on to the bottom of the shaft. Returning to the tub, Phil said a few words about Pete and how he would have appreciated the plaque being placed in his memory. There was then a short debate as to where best to place the plaque on the tub and it was carefully measured out (using a walking pole) to make sure it was in the right place.

Returning to the cars we headed to the Swallows and Amazons café near Brantwood for tea and cake, which completed a lovely afternoon.

Warren Allison

GDPR
General Data Protection Regulations come into force 25th May 2018. The Society will be required to tell all members what information we hold on them, obtain their consent to such data holding, explain how they can have their data deleted and what steps we take to ensure that their data is held securely.

Since it has to be introduced in the middle of CATMHS's year, all current members are deemed to have read it and agreed to its terms:

General Data Protection Regulations and CATMHS

Upon applying for CATMHS Membership or renewing an existing CATMHS membership the applicant/renewing member agrees to CATMHS recording and retaining the following items of personal data.

Given Names and Surname*
Postal Address including Postcode*
Sex*
Year of Birth*
Telephone Numbers (fixed and mobile)
Email address*
Membership of the CATMHS Facebook Group
Members of CATMHS are eligible to join the CATMHS Members Facebook Group. The data held on members of that Group will be the minimum necessary for Facebook Group membership, including Facebook Name, Events you have signed up for and any postings you have made to that Group.
Insured Status (Underground/Surface/None. If None then details of insurance held with any other organisation along with the organisation's Name will be held)
Style of Newsletter (Electronic or Printed)
Gift Aid status

All of the above will be made available to the Society's Officers so they may carry out the day to day running of the Society

Items marked with an asterisk are the details that will be provided to the BCA in order to obtain Public Liability Insurance.

The names and addresses of members who have signed up for Gift Aid will be supplied to HMRC once annually when a Gift Aid reclaim is made.

Apart from the above named two organisations no data will be provided to anyone else.

Any member may request CATMHS to delete their data; this will be done as soon as possible. Once the data is deleted then membership of the Society is terminated. Under these circumstances there will be no refund of any subscription already paid.

Editorial
This is a bumper edition of the CATMHS Newsletter, it is pleasing to have contributions from more than 12 members. Thank you all, please keep it up. It is also good to note that several new people have come forward as meet leaders. IM

New members
Tim Clarke, from Glenridding

Lynda Hill, from Windermere
Volunteer walk leader for LDNP and also involved in the HLF Coniston Copper project.
One of her relatives worked in the Greenside Mine.

Martin Taylor, from Camberley n Surrey
Martin is involved in filming and aerial mapping

Annual LDNPA Archaeology Conference
The annual Archaeology in the Lake District conference will be held on Saturday 10 November at the Rheged Centre, Redhills, Penrith, CA11 0DQ. Following feedback from last year's event, in particular the parking issues, we have decided to try a new venue.

Coniston Copper Project HLF grant update
HLF have extended the deadline for the project until the end of May to ensure that its completion is not rushed. The contractors have virtually finished the conservation work, and Historic England will be visiting the site to inspect the work and will hopefully take Coniston Copper Mines off the "at risk register".

On the 5th March, Lisa Keys from Minerva Heritage, who has been working on the interpretation part of the project, and myself took year 11 for a field trip to the mines. As part of the curriculum, they were learning about electrolysis, so Lisa took a class in the morning explaining about the electrolysing plant the French built at the mines just before the First World War. Arriving at the mines in the late morning, the children used photographs and plans to identify where the various parts of the process happened on the Upper Bonsor Mill area. Philip Johnstone had kindly given permission for the children to go where ever they wanted on the site.

We then walked up to the area around the Paddy End Mill and one of the children wanted a sample of mine water to see if they could produce any copper by putting it through the electrolysing process at school. I got a sample out of the flooded sump in Courtney's cross-cut and the children did produce a minute amount of copper when they got back to the school.

From there we walked round the leat to the Old Engine Shaft where we explained what went on there before walking back to the school. On the way back, I mentioned to one of the teachers about the letters, written in French, which were in the Ruskin Museum and that they had not been translated. She immediately said that this would be a good project for the children who were learning French. The Ruskin Museum are more than happy for the school to take this on as a project. Ian Matheson and Mark Simpson have already scanned the letters, which will make it easier to for the children to transcribe them. Year 10 are doing the same field trip in mid-May.

We are currently looking at the curriculum to see what else the school could make use of in the valley and I have committed the next five years to carry on leading field trips for the school as one part of the legacy from the project.

There will be two publications on the history of Tilberthwaite mine and Coniston village, using material from the archive research, so much of it is new. The content of the trail leaflets and guided walks has been finalised.

The content of the interpretation panels has also been confirmed and they are currently being made, ready for installation before the end of May.

There will be a final report on the project in the August edition. Warren Allison

Rydal Estate mine plans digitised

Several years ago, at the offices of property consultants Carter Jonas, who took over as Agent to the Le Fleming Estates, Peter Fleming discovered a metal tube containing five old mine plans. Through the good offices of Carter Jonas Partner, Julian Lambton, CATMHS was allowed to open the container and to view and photograph the plans, which have become known as 'The Lambton Plans'. One in particular, of Tilberthwaite Copper Mine, signed by William Bawden, has been very useful for managing the recently completed dig to re-open the Penny Rigg Adit. Another, of the Coniston Copper mine in the same style, is also signed William Bawden. Neither are dated but I suspect that they were drawn about the time of the change of ownership in 1875, when William Bawden was the mine manager.

At the time they were discovered it wasn't possible to scan the plans because their width was too great to fit in available scanners. Now however, Mike Mitchell has discovered a company at Staveley who are able to scan documents of virtually any size. Mike telephoned Julian Lambton and he very kindly contacted Richard Le Fleming in Cornwall, who agreed to bring the plans to Coniston on his next visit. Mike, together with Ian Matheson and at CATMHS expense, has had all the plans scanned to a very high definition, and we intend to make them available to interested parties via the CATMHs archive.

The titles are as follows:
Plan of Tilberthwaite Copper Mine. William Bawden
Plan of the Coniston Copper Mines. William Bawden
Map of Skirwith Moors in the Township of Skirwith in the Parish of Kirkland in the county of Cumberland. FE.MM –EB. Dated 24.2.16
Plan of the Manors of Kirkland and Skirwith in the County of Cumberland. Surveyed by J Dickenson 1825. Shows Cashburn Smelt mill and mine workings on Crofs Fell New Vein.
A second Plan of the Manors of Kirkland and Skirwith covering the same area. Probably a contemporary copy of the first.

Cumbria Archive Service.

Major changes will be taking place in Cumbria Archive Service over the next 18 months. In particular Kendal and Whitehaven Archive Centres will see significant investment that will bring a major improvement to the accommodation of their archive collections.

To facilitate the improvement works, closure periods at both Kendal and Whitehaven will be necessary. Kendal Archive Centre will close for six months from 2 May 2018, re-opening on 7 November. Whitehaven Archive Centre is expected to close towards the end of 2018 for approximately 12 months.

The investment in storage facilities and a greater focus on collections management goes hand in hand with a significant increase in digitisation to improve remote access, facilitate research and the protection of irreplaceable original documents and records.

North West Regional Research Framework for the Historic Environment Community Archaeology Research Workshop and Networking

This project was an update to the previous North West Regional Research Framework which was commissioned by Historic England and hosted by Salford University Manchester School of Environment and Life Sciences. As part of the project, ten workshops or conferences had been organised with a specific period of time, or an agenda. The workshop, which was held in Penrith in March, was the final one prior to the end of the project conference in April and was focussed on the community aspect of archaeology. Something it was felt was lacking in the previous framework.

The day was to allow community group members and members of other historically based groups the chance to view and comment on the updates so far and allow members to note down what they felt was missing from the framework and what their requirements within the frame work were.

Eleanor Kingston was asked to speak on "The national survey on voluntary groups and archaeological research impact from the Lake District" and I was asked on behalf of CATMHS to speak on the research the Society had done over the years which has involved other groups or agencies.It is fair to say that all the people in the room were very impressed with what the Society had done over many years and could see it as blue print for other "amateur" groups to work with various agencies.

Warren Allison

Ted Bowness. Sorry report the death of Ted Bowness, originally from Chapel Style. Ted was born into a slate-quarrying family where his father, Norman, was lease holder and operator of the Banks Quarry above Elterwater. Ted didn't take up the lease for Banks but instead trained to become a school master.

Ted was also an acknowledged landscape photographer and researched the history of the many slate mines and quarries in the Langdale / Coniston area. Many of his images included large quarry machinery 'to give contrast'.

I first met Ted in early teenage years when my brother, myself, treasurer Aird, his sister Helen and two other friends were amusing ourselves throwing large stones down the engine-shaft at Thrang Quarry, a common pastime at that time. Rather than shouting at us, Ted took the time to explain what was down there and how important it was to preserve it. Alastair Cameron.

Lake District Mines Forum. Threlkeld National Park Office, Feb 22nd.
Present: LPDNA: Eleanor Kingston, Environment Agency: Liz Withey, Hugh Potter, NAMHO: Peter Claughton, National Trust: John Malley. Coniston History Society and Honister Quarry: Alastair Cameron. Honister Quarry & Threlkeld: Donald Angus, CATMHS: Warren Allison, Ian Matheson and Mike Mitchell. Coal Authority, three delegates.

Updates:
Coniston Copper Mines
The Coal Authority is working with the Environment Agency regarding diffuse pollution and its effects on the water course. There is to be a drone survey of the area and a hydrospectral survey. This should determine the mineral pollutants in the water and locate their sources. Once the results are known targeted work will be carried out.
Alastair Cameron reported an Extreme Weather Event that took place at Coniston and Tilberthwaite last October, causing minor damage and washout

Force Crag
John Malley reported two instances of attempted forced entry. The experimental water treatment plant was removing 80-90% of metals. However the target of 3m/sec was not being achieved, 2m/sec being the norm. They are considering ways to improve the permeability of the material, perhaps adding gravel. The system only copes with dry weather flows from No 1 Level. There are probably about 2/3 tons of zinc in the lagoons with traces of cadmium and lead. This will have to be extracted at some point in the future.

The crown hole above Level 0 is discharging again. If the problem of surface water entering Level 3 was solved then this should stabilise. Delay in tackling this work, which was agreed to be carried out by CATMHS, is due to legal and technical problems regarding accountability for potential problems in the future. It is hoped that the Coal Authority will take over responsibility.

A conservation management plan for the whole area is to be prepared. Warren Allison suggested that the NT might purchase the rail that CAT bought when the mine closed and reinstate it outside No 1 Level. The rail is stored at Ashfell Farm, Ravenstonedale, and is now surplus to requirements.

Greenside
The John Muir Trust is taking a lease of the area, but most of the mine is outside the area of the lease. The LDNPA are talking to the JMT. Warren Allison is to conduct a field trip for the John Muir Trust in May.

Greenburn
Alastair Cameron reported that some dressing machinery, probably the base of a set of stamps had been exposed by water flushing during work on the hydro-electric scheme in the valley.

Goldscope
The Elizabethan(?) dam at the head of valley had been damaged by storm Desmond. The NT has carried out repairs.

Tilberthwaite
A report is imminent on the Tilberthwaite Mine survey for the Coniston Copper Project. Conservation work has now been completed.

Threlkeld
Donald Angus reported that repair work to Blue Dam and Yellow Dam has been completed. A penstock has been installed to control water flow and a catchment for the outflow provided. A site has not yet been chosen for a prospective treatment plant.

Honister
The Alastair Cameron and Liz Withey book on the history of Honister quarry is due out soon. Income from the operation is increasing year on year, 55% from manufacturing, 45% from tourism. A long term resource of dark green slate had been obtained by developing Kimberly No 5 level.

Use of tramways to move materials is to be discontinued, all future movement of materials will be carried out by front end loaders or dumper tucks. A new computerised saw has been installed and most of the polishing machinery has been replaced. The lease expires in 2042.

Two mine tours are currently available and an underground climbing facility is envisaged. There has been trespassing by individuals abseiling into the mine. Eleanor Kingston raised a concern that an emphasis on so called 'Adventure Activities' might take over from Heritage. Donald Angus said he thought that he was the only guide who talked about history on his tours; a new automated self guiding system(?) to be installed might lose even this. Honister is to re-apply for their zip wire project.

Coniston Copper Project
This project is coming to its conclusion. Approximately half of the Heritage Lottery Grant has been spent on conservation and half on education, local involvement and interpretation. Conservation work should be completed by the end of March. Contingency money has been used to stabilise quarry closeheads and buildings above Penny Rigg mill. Deep Level entrance will be stabilised unobtrusively by installing a drain and repairing the portal. Mike Mitchell asked if a footbridge could be placed across the beck below Deep Level Adit. Ian Matheson asked if ivy could be removed from Miner's Bridge, but it is outside the area and special permission will have to be obtained from the owner.

A celebration event will be held in May. Two publications are being produced, one on Tilberthwaite and one on the researches carried out by volunteers. There is to be a computer model of the Bonsor Dressing Floors circa 1850. Donald Angus pointed out that similar models on lime kilns and on the Yew Crag incline could be found on the LDNPA website.

Other business
Concerns have been expressed regarding the condition of Yew Crag Incline. It was suggested that it might be scheduled. Alastair Cameron said that he had put the results of his enquiries regarding cave pearls on the CATMHS website.

Water Environment Grant.
A Water environment grant can provide up to 100% funding for improvements to water status in rural areas. Phase 1, which expires end March has £9m; a prospective second tranche would provide a further £11m. This is European funding to deal with problems such as those at Goldscope or level 0 at Force Crag.

Next meeting will be held on June 26th at Coniston.

Greenside Mine meets

There were close to 50 people who put their names down for this meet, so Mark Hatton and I decided to run the meet over three weekends, so everyone would have the opportunity to visit the mine. I didn't mind running that number of trips as for me it is place that I have had a huge amount of affection for since I was eight years old, when my mum took me to see where she and her family had worked. I remember then saying I would see the mine re-opened one day and in 1996 that wish came true.

21st January 2018

Present: Warren Allison (ML), Mark Hatton, Tim Clarke, Anne Clarke, Prof Edward Truch from Lancaster University, Michael Oddie, Martin Doherty, Chris Twigg, Julian Cruickshank, Rosemary Vidler, Charlie Fowler, Sue Fowler, Chris Bunker, Richard Beadnell, Stephe Cove and Dave Hughes

Meeting on a very snowy day and after digging out the entrance, we descended into the warmth of the Lucy level. It was a slow walk up the cross-cut, plenty of photographs were taken, before we reached the flooded stopes on the Southern ore body. We carried on to Smiths shaft before lunching and then on up the level looking at the area which the mine rented out to rock drill companies to test their latest drilling machinery. Past Hick's sump (the family came up from Cornwall and one of the relations still lives in the village), calling in at the Blue Lagoon (a stope under the Lucy level which is flooded), to the area around the Alma Stope and then on the way back to the entrance, going up into the stope above the area near Hick's Sump.

The area where the rock drills were tested

Mother's office, which she said when there was snow, there was always a coal fire going when she got to work, and it was the best job she ever had.

28th January 2018

Present: Warren Allison (ML), Carl Barrow, Anthony Brooke, Derek Mitchell, Michael Pringle, James Frecs Eccles, Steve Sim, Magnus Macintosh and Abigail Mann.

This time there was no snow and we dropped into the level to repeat the trip from the week before.

Stalactite formation on the Lucy level

4th February 2018

Present: Warren Allison (ML), David Heatherington, Graham Derbyshire, Sam Harvey, Garry Parsons, Martin Langley, Charley Hunt, Rachel Chilton, Chris Chilton, Sandra Hall, Bob Adams, Will Barron, Steven Dagleish and Mark Hatton.

Personally, all the days were very enjoyable, meeting lovely and interesting people and a fourth one to go, what could be better.

Warren Allison

Smallcleugh Mine Nenthead 25th February 2018 – Group 3 (Easy Option)

From my perspective the 'Nenthead Mines', located near the town of Alston, have always been more over to the North East, therefore logically more part of Northumbria than Cumbria, and I can only assume that the pen slipped off the Pennines when they were defining the county boundaries. From living on the other side of the Pennines in Cumbria, most of my underground time has been spent in the lakes and when the CATMHS trip came up for Smallcleugh I was keen to attend.

The day was typical of late February with a winter sun and conditions that can only be described as Arctic, with a wind chill of minus five degrees or less when I arrived in Nenthead. I'd allocated myself to the third, easy option, group which initially planned to be a trip to a 'flat' known as the Ballroom; however we were to bypass that and head much deeper into the mine. Alongside myself on the trip where Rosemary Vidler, Allan Richardson and the meet lead Peter Jackson.

The trip started from the 'Assay Office Bunkhouse' with a walk of roughly half a mile up to the Smallcleugh mine entrance following well laid tracks and the more advanced group, who were off to undertake a through trip from Middlecleugh to Smallcleugh. They quickly disappeared over the horizon not to be seen again until a light appeared at the end of the tunnel later in the day! Ourselves and the middle group headed towards the Smallcleugh entrance, where, after a brief explanation about the history and other mines in the locality from Pete Jackson and Nick Green, we headed underground.

Once underground we headed past the 'water blast shaft', took a right turn and then passed 'Proud's Sump' before having to take a bypass off the main through route, due to several recent roof falls and concerns about its stability. The alternative route involved several sections of ascending, descending and crawling over roof collapses before we eventually emerged into what is known as 'Wheel Flats'.

At this point I realised I hadn't bought my camera, notebook or plan of the mine to trace progress so hoped I wouldn't have to write a meet report…… However, there is always ingenuity, memory and referencing other peoples work so thanks to Richard Beadnall I can show a picture of said flats and the wheels they are named after.

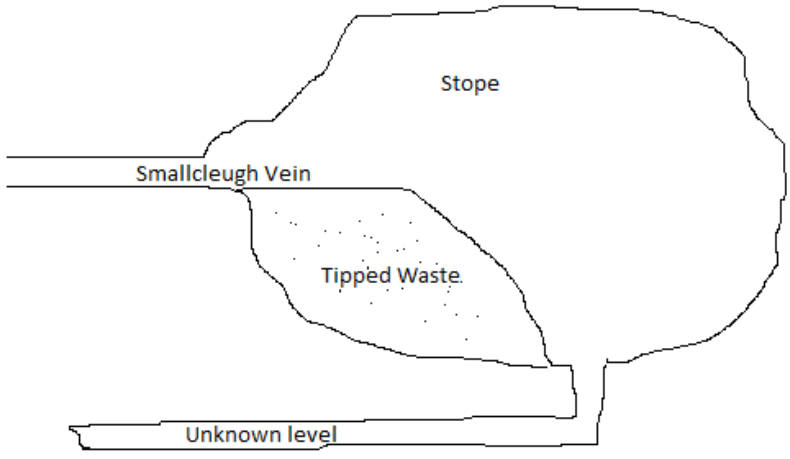
After some group discussion and clarity from Nick Green that I may need to dig my way through some of the crawls, I decided

to abandon any thoughts of hopping up to the middle group and stayed firmly put with what was termed the easy group.

From here we waved goodbye to the middle group and the easy group progressed through Hetherington's crosscut, which is too tall to crawl yet too low to walk in and I'd forgotten my knee pads anyway, which lead to a very ungainly stoop whilst attempting not to keep cracking my head on the ceiling! This crosscut emerges into what I assume from some research is the 'First Sun Vein', at which point we headed right along it and passed the entrance to the ballroom on our left-hand side but didn't enter. Instead we carried on to 'Gypsum Corner' where we took a left hand turn back into Smallcleugh vein and the world began to shrink both vertically and horizontally into what I can only describe as a bit of a squeeze in places.

Working our way along this passage we passed below another flat, which can be accessed only by climbing some wooden ladders that rest on top of a slightly rotten wooden platform. Once safely up these we began to pick up on the different minerals and geology of the mine, which in this case included a very nice sample of Galena, and commented on the potential for the miners to be following mineralised vents, the remains of which could be seen at the far end of the flat where there was a natural untouched void. Lunch was then had and we continued back down the ladder and deeper along the Smallcleugh vein.

Due to not taking notes it's all a bit of a geological haze for me from here on, with the different colours and names of the chemical compounds and suspensions we saw along the route; however I do know that there were several blends of zinc, copper, lead and iron with various intense colours of blues, reds and whites. Eventually we reached and entered a large stope that from our horizon reached upwards for possibly twenty metres and downwards for about 30 metres, and the miners had filled this to the level of the entry point with waste. To assist them with moving the waste to the end of the tip they had also laid a railway on what appeared to be jammed tree trunks across the stope and these logs are now slightly elevated above the waste tip due to the waste settling. For description clarity a diagram is shown below.



We walked along this tip and then descended to the floor of the stope before going down a small shaft, from which we walked back along another unknown level directly underneath the Smallcleugh vein before reaching a roof fall which marked the end of the trip into the mine. From this point we turned back on ourselves to begin the return trip roughly the same way we had come.

On the return journey along Smallcleugh vein we took a left-hand turn and crawled/wriggled through a collapse into an incline which we followed for around ten minutes before turning around and heading back onto the Smallcleugh vein. From here we headed towards gypsum corner where I was slightly ahead of the group and arrived at the intersection of three tunnels. The middle tunnel had lights from our group coming through and the left-hand tunnel had another light coming through, which turned out to be the through trip returning to surface themselves. We left them behind, as they were taking photos, and continued to Gypsum Corner where we turned right, continued past Hetherington's crosscut and eventually through this door.

From here we went through another set of flats and crawled/slithered our way back out into the Smallcleugh vein via some more very low and tight sections before emerging back to daylight. Total time underground was around five hours.

Chris Bunker.

CATMHS Meet on 25/02/2018 – Smallcleugh, Nenthead – Second Group.

This report covers the second of three groups that toured Smallcleugh Mine at Nenthead on 25/2/2018.

Led by Nick Green - Charlie & Sue Fowler, Richard Beadnall, Garry Parsons and Les Williams were the happy team, 2/3rds of whom were suitably bonded from a 'research' session the evening before in the Cumberland Arms! This group had selected the offered "Option 2 - Strenuous", leaving the "Option 3 - Challenging" & "Option 1 - Easy" routes to others.

The plan was to go through the mine to Barron's Sump. In detail, along Smallcleugh Horse Level > Smallcleugh Cross Vein > Luke Hall's Sump bypass > Old Flat Crosscut Flats > George Hetherington's Crosscut > Smallcleugh Horse Level > Middlecleugh First Sun Vein > Gypsum

Corner > Middlecleugh Second Sun Vein > Old Carr's Vein. Then through the 2 squeezes known as the Devil's Arsehole > Longcleugh Vein > Barron's Sump. (Lots of help from Nick Green on the names and route here. On the way out we looked at more flats - possibly Low Flats, and then a further detour to visit Ballroom Flat again.

It was a long hike in and out and a lot of tight crawling then some rises in a backfilled flat - but all worth it and we were amazed at the size and height of the magnificent sump and chamber. By accident or design we met the "Challenging" Team there who were having lunch. The trip was a great opportunity to see a bit more of this extensive mine which never ceases to impress us.

Although billed as the middle of the three trips ("more effort involved") the view of some of the participants was that it was as physically tough as the "challenging SRT technical trip" due to repeating the two squeezes and three free climb pitches on the way in and return trip …the 'tough' group had it easy :D. One of our group was so exhausted from the experience on the way to the chamber that he had to have a long lie down …… and again, and again …….

Richard very politely put up with our fairly inept attempts at underground photography – as you can see we have a lot to learn! Any further plans for an underground photography advice and coaching trip would be much appreciated!!!

Many, many thanks to Nenthead Mines – and to Nick Green for leading.

Charlie and Sue Fowler

Barron's Sump

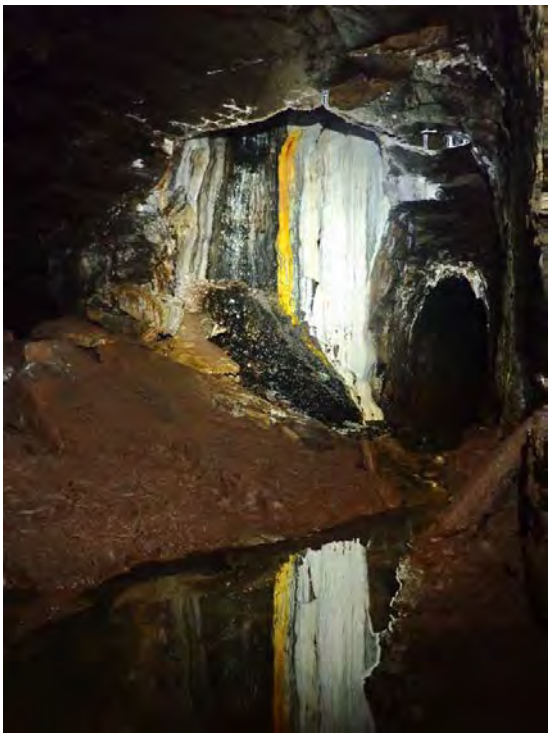
Middlecleugh to Smallcleugh Through Trip, Third Group (Hard men!)
On a cold but sunny February morning, seven intrepid explorers chose to follow the "challenging technical route" from Middlecleugh down into Smallcleugh via Barron's Sump. Fair warning was given that this involved SRT in tight wet conditions with some small free-climbs and interesting squeezes.

A biting strong wind pushed against us as we walked up from the Assay House where a number of late risers had spent the Saturday night, with patches of frozen snow tempting the less mature members of the group to throw a few ice balls. As we walked towards the hills our 5* guides, Martyn Langley and Colin Agnew, explained the full extent of the route that would take us approximately 6 hours to complete. The scale of this network of tunnels is incredible and today we would only uncover a small fraction of its beauty.

Photo: Michael Oddie squats to capture the gated entrance, while Kevin Timmins, Martyn Langley, David Hetherington, Dave Donkin, Colin Agnew and Jeremy Hunt prepare to enter.

After freeing the frozen lock, a tight squeeze past an ore truck took us into a long tunnel that was driven for ventilation. A commemorative plaque recognises the achievements of the CATMHS team who reopened the level in 2007/8. The level is very straight and knee deep in water, but of course it's lovely and warm compared to the sub-zero temperatures at Nenthead.

We pass through well constructed tunnels into loose shale and our guides warn us not to touch the roof or walls at this point to avoid any damage.



Photos: Approx 1000m in, beautiful flowstone ***features of calcite, sulphur and other minerals appear****, including an educated guess of manganese. Also in this area, some interesting graffiti can be seen, dating from the late 18th century.*

It was at this point, whilst posing manfully next to the calcite waterfall, that Martyn brought us all up to speed on the benefits of upgrading your IPhone6 battery to improve its performance. Sadly, the Middlecleugh wifi network was down, so none of us were able to validate his claim with a quick Google search until much later.

Several wet tunnels and a small squeeze later, we came upon the first sump rigged for descent. Our guides encouraged us to proceed past the sump to find The Rabbit Hole, while they replaced some corroded anchor points.

Photos: Michael Oddie plays Alice *Looking down the rabbit hole*

Our morning exercise ended with lunch at the spectacular Barron's Sump, a large chamber constructed to house pumping equipment that was apparently never used. The size of this room is impressive and many of us attempted to capture its grandeur - the winner being Richard Beadnall from group 2, who had entered at Smallcleugh and climbed up to Barron's Sump. Richard seemed a little miffed that our group had arrived only 15 minutes ahead of him. Of course, his picture is not included here!

Photos: Kev Timmins' quiet contemplation is spoiled by a rowdy second gang

The route from Barron's Sump took us to the epically proportioned Barron Flats, some say more impressive than The Ballroom in Smallcleugh, which of course we also visited on the exit route.


Photos: Barron Flats, featuring delicate glassy extrusions on the ceiling

The exit route from Barron Flats took us through a series of tight to very tight crawls, which we all enjoyed immensely. Some of us wanted to go and do them again!






Photos: Various tight squeezes (and some small tunnels too!)

My favourite manoeuvre involved stretching your arms over your head to reduce the profile of your shoulders so you could fit in, as demonstrated by Martyn (left).

Moving on at a faster pace, we visited The Ballroom, Tunnel of a 1000 Stars and Wheel Flats, taking in some beautiful sights before emerging into the bright sunshine and bitter winter cold. It's lucky we weren't there the following weekend!

A massive thank you to Martyn Langley and Colin Agnew for their expert guidance and to the rest of the group for an entertaining trip.

Jeremy Hunt

Wales weekend 17th & 18th March 2018
Attendees: Jon Knowles (ML) Chris Cowdery, Joanne Cowdery, John Ashby (PT), Mark Waite, John Aird (PT), Charlie Fowler, Sue Fowler, Carl Barrow (PT)

Saturday – The Hydro-Electric Schemes of J.W.Greaves
Saturday dawned bright but cold and windy with light snow showers. The group met at Llechwedd Quarry and then walked uphill, passing the entrance to the Llechwedd Quarry diversion tunnels, where, at the third attempt, the Afon Barlwyd had successfully been diverted around the workings. Attaining a quarry road and passing near to the remains of the Olwyn Goch water wheel and winding/pumping shaft, the group made their way uphill to Llyn Barlwyd (1888). Whilst currently drained for investigation work, this and its now disused neighbour Llyn Barlwyd Uchaf (circa 1883) supplied the Quarry with water to power water wheels and, from 1904, the Pant-yr-afon Power Station alongside the A470 in Blaenau Ffestiniog.

Trying not to linger in the cold the group then followed the line of the leat from the dams across country to a header pond, known as Llyn Flaggs, at the head of the pressure pipeline which descends the hillside to Pant-yr-afon.

Immediately adjacent to Llyn Flags lies the remains of the "Cyfiawnor", which roughly translates as "justice" where the water which had already passed through the Maenofferen Power Station was split between the Llechwedd and Votty Quarries. The Llechwedd share fed into Llyn Flaggs whilst the Votty share was used to power their three water power mills. Interestingly, although as owners of the scheme we didn't realise it until the Monday, the extremely cold weather was causing the water to freeze in Llyn Flaggs.

Following the water course uphill the group entered Maenofferen Power Station which provided some shelter for lunch. This power station, which also dates from 1904 was built by the Maenofferen Slate Quarry and used water from Llyn Bowydd and Llyn Newydd, which were jointly owned by Llechwedd, Votty & Bowydd and Maenofferen Quarries and operated under a tri-partite agreement.

The power station had two parts, one containing a pelton wheel, the other boilers and a steam engine to provide power when there was insufficient water. Although re-engineered in 2007 the pelton wheel, dating from 1927 remains the prime mover, generating about 190kw when sufficient water is available.

Leaving the relative warmth of the power station behind we again headed uphill and saw where the overflow channel for Llyn Newydd and Llyn Bowydd passes through a spur of rock above Maenofferen Quarry. What is interesting here is the efforts all parties made to conserve water. Whilst Maenofferen, being higher up the hill, used the water from the dams first, any which they did not use and entered the overflow channel passed. together with the water exiting the Maenofferen Power Station, to the Cyfiawnor where it was shared between Votty and Llechwedd.

On the plateau between Cwm Bowydd and Cwm Penmachno lie Llyn Bowydd (by 1863) and Llyn Newydd (by 1868). Bowydd was originally a natural lake and had been enlarged by the erection of a dam by the time the Rhiwbach tramway was built across its crest in 1863.

All of the dams are constructed of stone walls filled with peat and built up on the uphill side with whatever material could be found locally. Many readers will not be aware that North Wales holds a particular distinction in UK reservoir history. On Monday 2nd November 1925 the failure of the Llyn Eigiau Dam and subsequent failure of the Coedty Dam below it resulted in what became known as the Dolgarrog Dam Disaster, in which sixteen people lost their lives, an event which finally resulted in there being a requirement for large reservoirs to be inspected. The regime instigated by the 1930 Reservoirs Act, although modified by later legislation, continues to this day. All these reservoirs require a Supervising Engineer who should be available to attend at any time of day or night in the event of a problem, and who also visits the reservoirs twice a year. In addition, every 10 years a separate Inspecting Engineer has to make a full survey. All reservoir engineers need to be members of the All Reservoirs Panel.

Having looked at the reservoirs and their spillways, a return to Llechwedd was made via Maenofferen Mill.

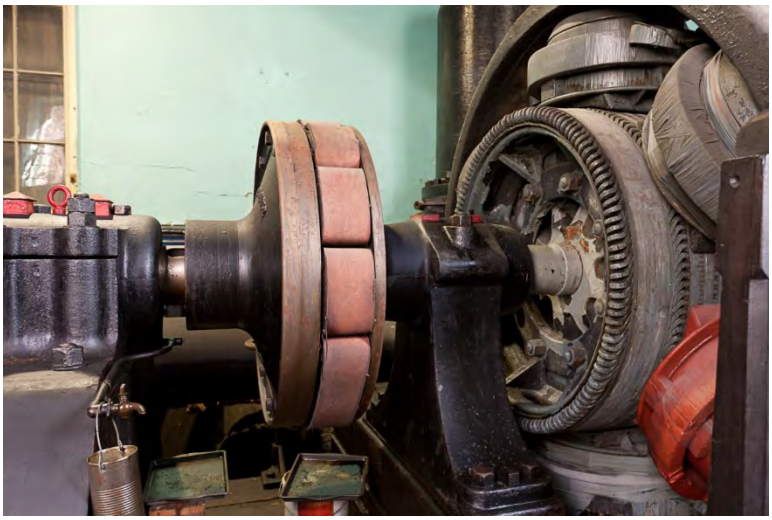
Following a short drive down the A470, the group entered the Pant-yr-afon Power Station. The station opened in 1904 and remains in constant operation with a maximum output of 350 kW. When the station was updated 10 years ago a new turbine and generator were installed. However the original Gilbert Gilkes turbines and Johnson and Philips generators were retained in situ and the new equipment installed alongside; this provides a fascinating museum of early hydro-electric equipment, including its slate switchboard.

One of the two original turbine generator sets. The Gilkes water turbine is on left and the dc generator is on the right. Between the two is a flywheel and flexible coupling. Behind the water turbine is the slate switchboard.

Saturday night was spent in the Royal Sportsman in Porthmadog with the usual banter.

Makers plate on generator.

Flexible coupling between pelton wheel and generator.



Detail of governor.

Sunday

On Sunday Mr Aird left immediately after arriving sounding very rough and was replaced by Carl Barrow, who had valiantly driven down from Barrow through the snow. With snow on the ground and strong winds everybody got underground as quickly as possible.

Ascending through the snow.

Chris had kindly collected the key from Go Below at Conwy Falls and after a little faffing with the lock we passed under the icicles and into the mine. As quite a few of those attending had not been into Cwmorthin before we followed the usual route to the back vein, deviating to see the launder and ships masts, used as roof supports on lake level, before descending the back vein to floor DE and then on to Floor G seeing all the artefacts on the way. After lunch in the caban in chamber 35 the group explored the bank vein workings on Floors G and puzzled as to why a level which drained into Oakeley was driven as far as chamber 44, yet this was never extended to chamber 46, which, together with chambers 47 to 49, had its own incline and required pumping. The group then ascended back to Floor DE before proceeding along Lefel French into the Back Vein. Those who have not been into Cwmorthin for a while will be pleased to see that Go Below have installed a basic walkway just below water level for a couple of chambers east of the BV incline, although same will be disappointed to know that this does not extend west of the incline, so it is still necessary to get wet almost up to a critical depth to see the incline winder and other artefacts in chamber 1 west. Once all had taken photos the group initially ascended the BV incline to Floor C before transferring to the stairways for the remainder of the ascent back to surface. Exiting into strong winds and snow when wet was not pleasant and little time was wasted in changing.

One strange feature in Cwmorthin which I had not spotted previously is that the old barrels on Floor E are marked “The Property of Anglo American Oil Company Ltd”. A quick web search revealed that Anglo American was formed in 1888 as the UK arm of J.D.Rockerfeller’s “Standard Oil” Ultimately this company became ESSO.

Jon Knowles

Bar Pot to Gaping Gill (also known as Gaping Ghyll)
Michael Oddie, Mark Hatton, Graham Derbyshire (meet leader), Dave Donkin, Carl Barrow, Colin Agnew

This meet sold out quicker than a Peter Kay concert, such was the interest in the location. The six intrepid explorers met at the Inglesport Café at 9am to fuel up and discuss the day ahead. I did notice Mark had rather a large bowl of porridge and I fear this may have been a deciding factor on what happened to him later that morning …..

We parked at Clapham and set off, but only after we had managed to prise a pound coin from Dave, who was aggrieved at the fact we had to pay "to walk on a footpath!!" haha. After a 30 min stroll in beautiful sunshine, we arrived at the entrance to Bar Pot where we changed into our SRT gear ready for the day's delights.

Bar Pot is one of the entrances to the Gaping Gill cave system and is located 340m south of the main Gaping Gill shaft. Graham asked for volunteers to rig the first pitch, to which I jumped at the chance to get my practice in, I slithered into the hole and immediately thought to myself "that looks snug!" I tied off the rope and made my way to the pitch head; Graham was happy with my rigging, so I hooked on my descender and set off, well more like moved down a bit then stopped. This was tighter than I thought and I had to take my hand from around my descender as it was getting squished and sort of prod at the lever to get myself down. Once through the tight section the rest of the abseil was fine and I landed to wait for the rest.

Graham was next, followed by Carl who agreed it was rather snug. Mark came next but was now regretting that extra large bowl of porridge as he became lodged in the gap. After much encouragement from the team and lots of wriggling Mark was still wedged fast, he was like Augustus Gloop in Willy Wonka's Chocolate factory, stuck fast not going up nor down. How Mark managed to attach his hand jammer and foot loop to escape I bet even he will never know, but sure enough he managed to free himself back to the pitch head. Dave followed with Colin as back marker with no further problem.

The next pitch is called the 90, purely on the height of it, 90ft. Graham offered the rigging out and Dave volunteered this time. A little traverse led to the pitch head, Dave did a great job and set off first into the abyss. Now I wasn't expecting anything like this pitch and was in awe at the beauty of the place, the descent had to be slow due the size of the pitch and to prevent

friction on the stop and rope. Once at the bottom we decanted our SRT gear and set off for the main chamber.

Carl, descending the 90ft pitch

After some crawling, head banging and plenty of "why did I bring a bloody bag!" we emerged into Gaping Gill's main chamber. I had seen photos of this place, but they don't do justice to seeing it in real life. The waterfall into the chamber is the highest unbroken fall in England at 98m, or 322ft. The chamber itself is the largest known in Britain; even the brightest torches we had struggled to illuminate this place.

We dispersed to take photos and marvel at the underground wonder, regrouping for a quick lunch before heading into Mud Hall, the 2nd largest underground chamber in Britain. Myself and Colin descended the chain in Mud Hall to check out the traverse after the collapse last year. It looked extremely dodgy even compared to the mines we normally explore, so we headed back up to meet the rest of the team.

Dave, in the main Gaping Gill chamber

The remainder of the trip back to the final prusik went smoothly with myself and Dave de-rigging on the way out. The final last squeeze to climb through wasn't as bad as we all thought.

The only hiccup was getting the bags pulled through the final ascent; sadly this resulted in the death of my bag which was left with no straps or a top.

We got to surface around 6.15pm and walked back to the cars discussing the day's excitement. Carl had to shoot off, leaving the rest of the team to debrief in the New Inn. A fantastic day enjoyed by all and it only leaves me to thank Graham for leading a most enjoyable trip.

Michael Oddie

Down at Ding Dong, 17th Feb
Michael Oddie, Mark Hatton, Graham Derbyshire

Myself and Graham arrived at Hatton Base Camp at 9am to discuss and deliberate the day's adventure. Much knot and rigging talk was happening while the morning's teas and coffees were consumed. The next decision to be made was who's vehicle we would go in. Mark's was looking far too shiny and my van only had two seats. This meant we all piled into Graham's Panda and set off to Lindal.

Arriving about 11 we parked in the lay by opposite the shaft and set about having another coffee before getting changed. The farmer drove into the field, so I popped over just to confirm we were still OK to access the mine. All he said was "I'm not pulling you out if you get stuck!!" Ha. Just before we set off Mark Scott pulled up in his car and chatted to us about the mines of the area and offered us tea and a hosepipe when we had finished.

Armed with the day's tools we set off over the incredibly gloopy and sticky field, which was in worse condition than some of the mines I've been in. We rigged round the trusty tree and Graham lowered himself into the pipe. I was next with Mark following up. I must say every time I descend the shaft I marvel at the work that CAT members and others did, digging it out and installing the pipes. Without this work the mines below would be lost.

Entering the main chamber I noticed a large block just at the base of the spoil which I didn't recall seeing on my previous visit; I kept this little nugget of info to myself as I didn't want to alarm the team within the first 30 seconds! The next few hours were spent exploring the easy to access areas and enjoying piecing the maze of this mine together.

Mark stayed in the main chamber to work on his National Geographic light painting while myself and Graham went to check the water level in the 67 yard tunnel. This was as high as I had seen it so no attempt to access the Derby Rise would be possible soon.

After a few more pics we all then climbed up the shaft and out into the sludge of the field. We derigged and set off to take Mark up on his kind offer for a brew. On the journey back to Hatton Base Camp discussions turned to Wales the following day ……

Rhiwbach Slate Quarry, 18th Feb
Michael Oddie, Mark Hatton, Graham Derbyshire

An early start was on the cards and after meeting in various laybys near the M6, we set of to North Wales. The journey down was uneventful other than Mark's choice of music, but as he was driving and I was a mere passenger I respectfully kept my opinion to myself. We arrived in Cwm Penmachno around 9.30 and loaded the bags with goodies before setting off. A nice gentle walk up a small incline gives a grand view of the lower quarry workings with the spoil heaps fanning out into the distance.

We carried on through a magical forest of moss covered trees which with the winter sunshine looked like a scene from a fantasy film. We arrived at the spoil heap of Cwm Tunnel and donned our helmets ready for the day's adventure. Graham had previously arranged access and, once the magic code was punched into the lock, the gateway to underground fun was open.

A short walk up the tunnel brings you to the boats; well I'm not going to expand much but myself and Captain Hatton don't have the best record when it comes to underground sailing!!!
Either way, I was selected as the most expendable member of the group to paddle across the underground lake to retrieve the larger (and hopefully) more stable dinghy. Once all safety briefings had been completed, and both myself and Mark were under strict instructions not to lean over the side, we cast off. I'm sure Graham was nervous but did well not to show it.

Safely back on dry (ish) land Graham led us on our way pointing out artefacts and chambers that we just don't see on the same scale in the Lakes. One of the said chambers had an intriguing looking manway/tunnel at high level with an old metal ladder hanging out of it. A newly fixed rope led towards it so to satisfy my SRT cravings I slithered up for a look. Unfortunately, the rope just led to a hanging traverse to access the tunnel, so I decided to descend, with thoughts of returning another day.

Zip lining, traversing and rope play followed for the next few hours before we arrived at the stunning incline leading to surface some 800m above. This was where all the won slate was removed uphill, powered by a steam engine high on the hill top. After climbing the incline and exploring more of the workings it was time to reluctantly return to day. We chose the "more interesting route" as Graham described it, which was an old ladder way up a shaft. Once on the surface we regrouped and made our way back to the car.

This was my first time in this quarry and I enjoyed every minute of it. I'm sure a CATMHS meet here would go down very well! Thanks goes to Graham for leading and arranging access and to Mark for driving.

Michael Oddie

A Journey into Underground Photography.

My underground photography journey started around 2 years ago, before that I was accustomed to working in the dark a little, having photographed a few of my daughter's dance shows. On the whole my photography is spontaneous and not being a great fan of a tripod, I go for a walk and capture what I see, always keeping an eye out for interesting subjects, light, patterns. I also like to get to know a landscape and visit it many times, looking for something new as I go. So many times I've captured an image that I liked and thought to myself, if I'd have set up the tripod I'd have missed it.

However, finding myself underground and in need of a tripod, I realised hand holding a camera just didn't work. On my first trip to Lucy Tongue Level one person had a Cree light purchased off Ebay welded to their helmet, inexpensive and very bright, so that was my first purchase, 15,000 blinding lumens and probably capable of frying an egg. Got some very nice results with it but unfortunately the battery had a habit of dying with little warning; not very clever in a hostile mine environment.

Early days, Michael Oddie crosses the famous plank in Hospital Level. Handheld shot 1/60 f3.5 ISO 4000 18mm (Canon EF-S18-135mm f3.5-5.6 IS lens). Lit by Cree light on helmet.

So, off the helmet it came, although it is still used for light painting and having tried other various lights I've recently upgraded to a Fenix HP25R, being quite inspired by the results Mark Hatton was getting with the combination of the Fenix lights and the Olympus TG5 (though I wasn't going to splash out on the TG5).

Learning curve again, new light, new shades of white. Discovered when photographing the last dance show that there were some really good settings on the camera for low light and also needing to turn around over 1000 images quickly. Normally I shoot RAW files which means editing every single image you would want to keep. With the discovery of the new settings you

can shoot jpegs, which would need minimal editing, and it worked, turning around the dance show photos faster than I'd ever done. This made me think about those settings and using them underground; getting everything right in the camera, producing the jpeg, and having some images to share the same day as the mine trip I'd been on rather than weeks later, would make a nice change. So, here's where I'm at, shooting jpegs means being able to get the white balance setting right at the time, but unable to alter it later like I can on a RAW image and expecting that the next couple of mine trips would involve a lot of faffing about to achieve this. The good thing I've found about the Fenix is that the exposure times have shortened, as has the need for light painting, unless you are in a large chamber like a close head.

Currently my kit list is the trusty Canon EOS 70D in a silicone case to protect it from dust and drips, tripod (lightweight), Fenix HP25R on helmet (spot and flood setting), Cree light for light painting, Cree GoPro diving light which sits on the hot shoe of the camera and is great for lighting the foreground. Lens wipes and a cloth. My go to lens is usually an 18mm-135mm f4 though on occasions I take the 10-18mm which gives some nice wide angles without going too fisheye. Usually it's one or the other, so you don't need to change lenses underground too much, to save dust getting in the camera. A lens hood also helps keep drips off the lens but only if you remember to pack it. On a specific photo trip, I'd pack a Speedlight, remote trigger and stand, maybe an umbrella for the stand. There are some great effects to be had with off-camera flash, though that I think that is a whole new journey.

Playing around with off-camera flash in Bakestone Barrow, Coniston 1/125 f10 ISO 500 18mm (Canon EF-S10-18mm f4.5-5.6 IS STM lens) plus Yongnuo Speedlight and remote controller.

My absolute must these days is on setting up everything level. I'm done with fiddling with angles in editing software and my pet hate is a wonky image. So many times in my camera club days we were slated for this, and it's so easy to fix, either in camera or in software. Another hate is not having a lens cloth or a wipe to hand.

Warren Allison in Silver Gill 4 sec f13 ISO 100 10mm (Canon EF-S10-18mm f4.5-5.6 IS STM lens)

In terms of editing, I don't do a lot, just like to recover detail out of the shadows and highlights, something which a DSLR and a RAW image allows you to do. Controlling the level of black and white in an image can be really useful too, especially if going to print and upping the exposure a bit too if needed. Using an Adobe Lightroom provides me with a good way of cataloguing images and re- ordering them for various projects.

Trying out lighting with the Fenix HL55 in Carrock Mine 3.2 sec f11 ISO 200 18mm (Canon EF-S18-135mm f3.5-5.6 IS lens).

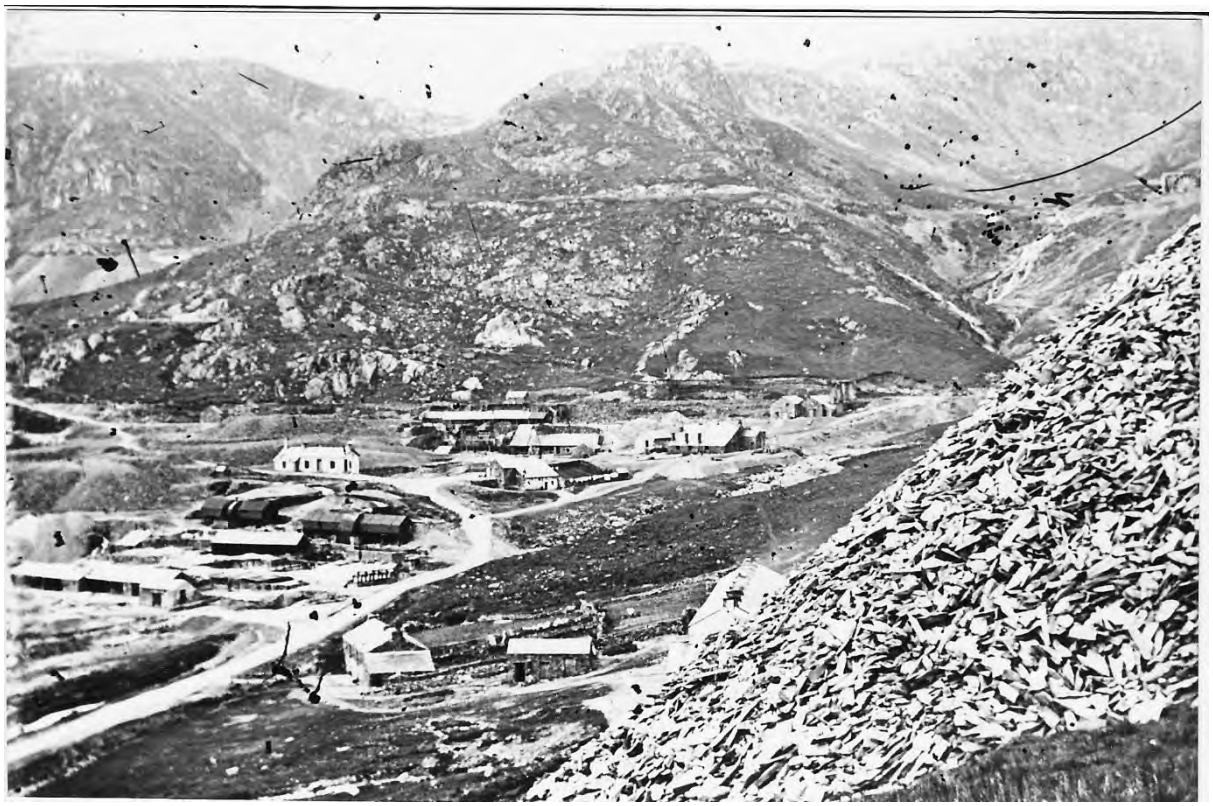
As with most things in life there is always something new to learn and this is definitely the case with photography. This year will bring a variety of mine related projects, including another book on Honister Slate Mine with Alastair Cameron, a journey into the world of film making about Horse Crag Level and Penny Rigg Mill, Tilberthwaite with Mike Mitchell and Mark Simpson, photographing the Lucy Level at Greenside Mine with Richard Beadnall and mineral specimens from Force Crag Mine near Keswick. I like to be busy.

Liz Withey

Ore Dressing at Coniston circa 1850

Copper production at Coniston reached a peak of 3,600 tons of dressed ore per year between 1850 and 1860. Here are two contemporary accounts of the dressing process. Machinery was driven by water power and it is said that there were 13 water wheels in operation.

This photograph of the Bonsor dressing floors, from the Eric Holland collection in the CATMHS archive, is thought to have been taken by photographer Henry Herbert in about 1880.



From 'Ravings And Ramblings around Coniston written in 1848 by Alexander Craig *Gibson, surgeon to the mines.*

'And now, … you may examine the processes through which the ore has to pass, before it is fit for the market, for, unlike most other mining, one-half of the work is not done when it is brought above ground. Well, first, you perceive, it is thrown from the waggons into a heap, where water runs over it, and by cleaning the lumps, shows more plainly what each piece is made of. Then from the heap it is raked by men to a platform, or long low bench, along which a number of little boys are actively engaged in picking or separating the richer pieces from the poorer, and it is highly amusing to watch the expertness and celerity with which the imps make the selection, and toss each lump into its proper receptacle.

The highest portion is carried at once to the crushing mill, the poorer is thrown into another shed below, to be broken up and further picked, and the mere stones are wheeled off to the spoil heap. The ore being broken small is thrown into the crushing mill, and passed once or twice through it, being returned to the mill by an endless chain of iron buckets, which dip into the heap of crushed ore below, and, carrying it up, empty themselves into the mill. When ground to the size of coarse sand, the ore is carried to the "jigging troughs," which are large square boxes, filled with water, and having inside a smaller box, with a grated bottom, suspended in it to a beam above, and filled with ore, a "jigging" motion being imparted to the grated boxes

by water-power. This jigging under water causes the grains of pure ore which are heavy, to sink and pass through the grating of the inner box, and the particles of spar and rock, which are lighter, to rise to the top, whence they are scooped off and wheeled away to undergo another pounding and washing.

The pounding is effected by means of two lengths of stamps or heavy iron-shod pestles, kept incessantly rising and falling in beds fronted with perforated iron plates, and fed with the material, and a flow of water to wash it, when fine enough, through the holed plate. It is, after

that, collected to go through the process of buddling, which consists of laying it on slanting shelves, at the head of long wooden troughs, also slanting longitudinally, and a limited stream of water being allowed to run through it and wash it slowly off the shelves and down the inclining troughs, the heavier and valuable portion remains at the head, whilst the lighter and worthless portion is washed down to the lower end. All the waste water used in any of the dressing processes is made to flow through a series of large tanks or reservoirs, in which it deposits all the fine particles of ore that may be floating away, and from these tanks some thousands of pounds worth of ore is collected annually in the form of slime and looking like bronze, which, with all the other ore, is shipped to Swansea to be smelted.'

A handwritten letter written circa 1858

The description of the dressing process below is from a copy of a handwritten note, given to me in 1990 by John Owen of the Cleveland Industrial History Society, following reciprocal CAT meets in Coniston and Cleveland. He got it from an old fellow who worked as a roadman for most of his life and who lived with his two sisters near Coniston railway station, Nick Carter was his name, and he had lost a hand in his youth and wore a steel hook in its place.

'The work was drawn out at the rate of 8 trips a shift with 3 big iron waggons which held 2 tons each. (Similar to the one still in Penny Rigg Horse Level, Tilberthwaite? IM) Then it was dumped down a screen which sized it into 3 sections, then it was sorted into 4 lots. The first was the solid ore which was put out by itself. The next was what was called Douse. It was the second best. The third was a class quartz and copper mixed which had to go through the crushing mill to be ground to a fine sand. Then it was taken to the water sives. There was 6 sets of them with 2 sives to every set. Each set of tubs was emptied twice a week and each set of tubs held 5 tons. that ment 60 tons a week of jigged ore. Then it was put into a pile and the solid pile was ground and thrown over it so that they got a average sample. After that it was all turned over and weighed and then carted to Coniston Hall and taken to Nibthwaite by boat and then carted to Ulverston and put on rail and sent to Sent Elens'

Smelting advances at Keswick and Wales in the late sixteenth century

Much has been written about the growth of the copper mining and smelting industry that thrived up around Keswick in Cumberland under the Mines Royal in the reign of Queen Elizabeth I. Less perhaps, has been written about the sometimes controversial later developments and improvements to the copper smelting, in both Cumberland and Neath in South Wales, by a German called Joachim Gaunse, of Jewish descent. Joachim's role is noted in the various learned books on the subject but perhaps his contribution has not been given the recognition it may deserve. This article looks at how Joachim came to Keswick and what contribution he may have made to the achievements of the Mines Royal operating in the wider area around Keswick, and to copper smelting further afield.

Early in the sixteenth century a new era in the history of English mining dawned. In 1528 Henry VIII commissioned Joachim Hockstetter to develop the mineral resources of the realm. Joachim was given the title of "Principal Surveyor and Master of all Mines in England and Ireland". Generally, this arrangement must have been successful since Joachim's son, Daniel Hochstetter, was made "Master of the Royal Mines" in 1571. Hockstetter was a member of a noted Augsburg family which had accrued wealth and fame by extensive mining operations in the Tyrol and by commercial undertakings world-wide. The founder of this family, Ambrose Hockstetter, had close relations with the even greater Augsberg family firm of the Fuggers. Jacob Fugger at the time of his death in 1527 was apparently the richest man "of all time" – a banker, merchant and very knowledgeable in the copper trade. Ambrose Hockstetter, likewise, was a rich man with an opulent lifestyle. However, his extended credit, linked to a quicksilver misfortune, the loss of one of his ships and the seizure of one of his land convoys by highway robbers, led to near financial ruin in 1529. Ambrose was imprisoned as a result and is thought to have died in prison. This left the Hochstetter family impoverished compared to the Fugger and Welser families of Augsburg. Joachim, Ambrose's son, who had one of the most opulent lifestyles, was found in England utilising his mining expertise gained in the Tyrol to good effect for Henry VIII.

Daniel Hockstetter came to England in 1563 and later brought his family to settle at Keswick in Cumberland in 1571, quickly becoming a part of the Keswick elite. In 1571 Daniel was also made Master of the Royal Mines and was able to find significant copper deposits in and around Keswick on behalf of the Crown.

In 1563 a charter had been granted to the Mines Royal Society with the partners being Thomas Thurland, Master of the Savoy, and Daniel Hockstetter, their heirs and assigns. The members of the Privy Council all more or less shared in the risks and profits of the enterprise. A smelter was established at Brigham where by 1567 six furnaces were in operation and they had succeeded in producing pure copper with a sample sent to Queen Elizabeth I. At this time a minor shareholder, George Nedham, is also commended by Thurland and Hockstetter for his diligence at the mines. In 1568, Daniel noted his surprise at the mineral wealth of the country, and, was seeking a foreign preacher to speak in the language of his workmen!

The smelting process was a somewhat dark art; closely guarded by the mining experts and passed on by word of mouth. The smelting in Keswick by the Hockstetters took considerable time and used large quantities of fuel (wood) and in particular the ore from Caldbeck proved difficult to smelt. The market became difficult and the shareholders became dissatisfied with their profits. Several German rivals came to England and tried to denounce Hockstetter and to offer greater profit from the labours. Around 1577-79 mining around Keswick was interrupted and progress was slow. Hockstetter complained of "diverse and slanderous reports" circulating behind his back and asked that William Cecil (Lord Burghley), a key shareholder in the Mines Royal, should not be misled by offers of greater profit from others. Hockstetter died on the 12th May 1581.

In 1581 Jochim Gaunse, a Jew from Prague, who may have been related to David Ganz, the eminent historian and astronomer, was invited by the Royal Mining Company to come to England to enhance and progress ore refinement. Using his expert skill Joachim brought fresh vigour to the mining operations in Cumberland and also at Neath in Wales. Joachim certainly had knowledge of chemistry and metallurgy, probably gained from the copper mining and refining works on the Tyrol. Letters in the Domestic State Papers of the reign of Elizabeth describe the doings of Joachim Gaunse at Keswick in 1581. These letters were written by George Nedham to Walsingham, Secretary of State. George Nedham was an energetic and resourceful operative who in 1565 had gone to Ireland to find wood for the smelting at Keswick, and in 1568 had built a wharf at Workington.

In 1584, Britain was preparing for war with Spain and desperately needed copper, a critical element in the production of bronze from which the English manufactured the accurate cannons that gave their warships an advantage over the Spaniards' inferior cast cannons. Indeed, the superior firepower provided by bronze cannonry proved crucial in the English navy's victory in 1588 over the much larger Spanish Armada.

Against this backdrop, Gaunse had revamped the English methods for smelting copper. He had scientifically analysed the impurities in the copper ore from both Caldbeck and the Newlands area, identifying nine main contaminants or "hurtful humors" and determined how to remove them from the copper. Nedham reports that Gaunse's analysis of the ores was a new procedure that had not been carried out by the Hochstetters, or any of the other specialists. The removal of the iron as Iron Sulphate, one of the chief contaminants of the Lake District ores, was a new innovation and a significant simplification of the process; which also yielded a valuable commercial cloth mordant (a dye fixative), and the vitriol (sulphuric acid) was also a significant cloth dye. Gaunse had succeeded in turning previous waste products into products which could be utilised by the northern woollen industry and which had been previously imported. These were novel procedures to England and meant that Gaunse could complete in four days, what had previously taken sixteen weeks. He was able to cut out 21 of 40 separate operations normally used to produce copper, and was able to produce a purer copper. Further, Gaunse was also active in the production of lead and possibly was able to smelt using peat as a fuel, rather than the scarcer commodity of wood. He could also readily use the lower quality ore from the Caldbeck

Fells rather than the superior God's Gift Mine. He may have indeed utilised some sort of reverberatory furnace.

Effectively Gaunse rescued production of copper at Keswick and the smelters enjoyed a second peak of production. This peak between 1581 and 1584 followed a sharp fall in production between 1577 and 1580. Gaunse's expertise was noticed further afield and he spent time at the Great Works at Neath in South Wales, where, in conjunction with Ulrich Frosse, who had previously been at Keswick and Cornwall, they were able to smelt 24 cwt of ore in 7 hours and spending not above 8 or 9 sacks of charcoal and three horse loads of sea coal.

A great achievement from a learned Jew and great benefit to England. It seems that Sir Francis Walsingham decided it would be wise to use Gaunse's expertise in a new venture to North America in 1585. Consequently; Gaunse went with Sir Walter Raleigh on his second expedition to establish an English colony near Cape Hatteras in what is today the State of North Carolina. Gaunse set up the first scientific centre in the Americas when he constructed his surveying, assaying and distilling equipment on Roanoke Island. He was recorded as being the first practicing Jew in America. Unfortunately, this settlement was not successful and Gaunse returned to England. In 1586 he was back in South Wales where he stayed for some three years in the employ of the Society of the Mines Royal.

The fate of Joachim Gaunse is unclear, as he became involved in a heresy allegation when he had a discussion with a Protestant cleric, Richard Curteys, about the interpretation of the bible. In 1589 Jochim publicly declared himself a Jew to the Mayor and Aldermen of Bristol. The Mayor and his men declared Joachim to be "a moste wicked infidel" and he was then sent for trial to the Privy Council in London. The outcome of this trial is unclear, but he may have been removed from England under the dormant edict of expulsion of Edward I - which was the penalty that befell some other Jews of this period.

Jochim was clearly a rational empirical thinker, experimental chemist, metallurgist, explorer, colonist and America's first Jewish citizen. He was a master of one of the most difficult feats in early modern metallurgy; the correct assay and smelting of copper sulphide ores. Strange why he is not more openly remembered for his contribution.

References:

1. Joachim Gaunse – A mining incident in the reign of Queen Elizabeth by Israel Abrahams.
2. The amazing life of Joachim Gaunse and the Jews of the lakes by Marcus Roberts and Yaakov Wise.
3. Joachim Gaunse – American Jewish Historical Society.
4. Smelting of Copper in the Swansea District of South Wales by Col Grant-Franc

Colin Woollard

More Tornblad letters

In 2015 a visitor to Newland Furnace asked whether we would be interested in some papers he had in his shed. The papers turned out to be twelve letter books written by the manager of Backbarrow furnace to the offices on Lindal Moor. An account of these appeared in NL122.

We have since found another 5 volumes in the records office which fill in some of the gaps. These letters show that, with the company approaching insolvency, Harrison Ainslie still had no intention of abandoning the manufacture of charcoal pig iron and if only a reliable supply of charcoal and ore could be found, the ironworks, if not the mines would have remained profitable. They also reinforce the impression given by the other letter books that the mines manager, Charles Edmund Ray, was not a man to inspire loyalty and devotion from his workforce.

The first book starts in November 1908 when the furnace manager, Yakob Tornblad, was building a calcining kiln. A later letter explains that the kiln is needed because of the wet ore they are now getting. He was trying to make white pig iron consistently but the ore supplied gave him little control of whether the pigs were white or grey:

Backbarrow
Aug 30th 1909
C E Ray Esq, Lindal Moor Mines, Nr Ulverston

Dear Sir,
The furnace is working fairly well today but still slipping so that one cast turns out very grey and the next hard white. The mortar mill is hopelessly broke down. To get it in working order would mean an entire foundation and wooden structure as what is in now is entirely rotted away. Could not the mortar we require for this job be made at the mines and sent up by rail?

Yours faithfully,
Yakob Tornblad

In particular, he did not like the “clayish” ore from Pennington pit:

Backbarrow
Sept 15th 1909
C E Ray Esq, Lindal Moor Mines,

Dear Sir,
Please do not send me any more of the Pennington ore. It is worse than the ore we have before. Besides being very lumpy it contains an awful lot of stone, some pieces as large as my fist. This ore matter is getting very serious. It has blocked up the hearth now to such an extent that we have to cast every 3 hours and we are getting an unusual amount of nasty slag and very little iron.

Would be pleased if you had time to come over and have a look at the ore.

Yours faithfully,
Yakob Tornblad

The difficulty of managing the furnace brought one blast to an end:

Backbarrow
Jan 28th 1909
Messrs Harrison Ainslie & Coy Ltd, Lindal Moor Mines

Gentlemen,
On leaving the furnace last Thursday night, everything was right, furnace making grey. Coming down on Friday morning I found the furnace working nearer and through the neglect of the founder in charge one of the tuyeres blocked up with iron. I immediately lightened the burden and did everything to get the closed tuyere opened again but without success. The furnace began setting worse and worse at the side where we could get no blast in. The only way to save her now was to get a lighter burden down so I put in two charges of coals only and after that lightened the burden from 6 cwt 2 qr to 4 cwt. I also increased the blast. We managed to keep the notch open until Saturday morning. In the meantime I had opened the brick tuyere but could not get a hak there. The only tuyere we had open began closing up too and we alternately tapped slag and blew through it till it finally also closed up with iron. The light burden was then only half way down the furnace. Got a hole put above the notch and also the blast in just above the tuyeres and kept the furnace going until the brickwork gave out where the blast come in and we had to stop blowing. She was now nearly hopelessly set. Under Professor Loui's direction we now tried to get a hole through in the bottom but without result so we raked out as much of the charges as we could. This morning we got it out to about a foot above the bottom. The remainder is a lump of iron, coals and slag mixed together and will have to be gotten out by taking a hole in the brickwork at the notch.

Yours obediently,
Yakob Tornblad

The furnace manager planned to cast white pigs in chill moulds and explained his intentions to Mr Ray thus:

Backbarrow
Aug 27th 1909
Messrs Harrison Ainslie & Coy Ltd, Lindal Moor Mines, Nr Ulverston

Gentlemen,
Re white iron cast in chills
The iron made thus is in no way insuperior to white iron cast in sand. The only difference between the two grades that can be is, that some of the white iron cast in chills might contain a little more silicon and also combined carbon, however not enough to make it in any way insuperior to white iron cast in sand. The advantage of casting in chills is that when the furnace is working white it is sure to turn pure white in the chills whereas casting the same iron in sand on account of the slow cooling process, some graphite sometimes is liable to separate and make the iron spotted with specks of graphite. The main difference between white and high mottled iron is that the former contains no graphite whereas the latter does. The other elements such as Silica, Manganese, which might be exactly alike in all three grades, namely high mottled, white cast in chills and white cast in sand. To be sure of getting this graphite changed into combined carbon casting in chills does it the best.

Yours obediently, Yakob Tornblad

Another letter describes using a chill to harden a part of the casting:

Re iron for stone crusher jaws:

The most suitable iron for this purpose would be a mixture of same parts of of low mottled (No3) and high mottled (No6). When cast in chill that is to say the front of the jaw, it will make that side hard white, whereas the back of the jaw cast against the sand mould will be of grey iron. In this way hardness will be combined with strength as half of the jaw, the wearing part, will be hard white and the other half or back will be tough grey iron. If the jaw was made of white alone it would be too brittle and liable to crack. As Lorn iron is much tougher than any other kind of pig iron is a great factor to figure with. The reason why it is so is; first the process by which it is made and second the absence of impurities such as phosphorous and sulphur.

Yours faithfully,
Yakob Tornblad

The chill moulds were cast at Lindal Moor foundry. The ironworks supplied charcoal, blacking and scrap iron to the Lindal Moor foundry. After the calcining kiln Mr Tornblad went on to build a hot blast stove and rebuilt the furnace stack with the red bricks and iron bands which can still be seen today. Mr Ray was unable or unwilling to supply a consistent quality of ore;

Repairs to Backarrow furnace stack, 8th January 2018

Tornblad asked for ore like the stuff he had seen in Kennedy's wagons, but to little effect. Charcoal was also in short supply and although chemical charcoal was expensive, they tried charcoal from Russia, Sweden and Norway. There were even plans to set up their own chemical charcoal works at Backbarrow and plans to use local peat.

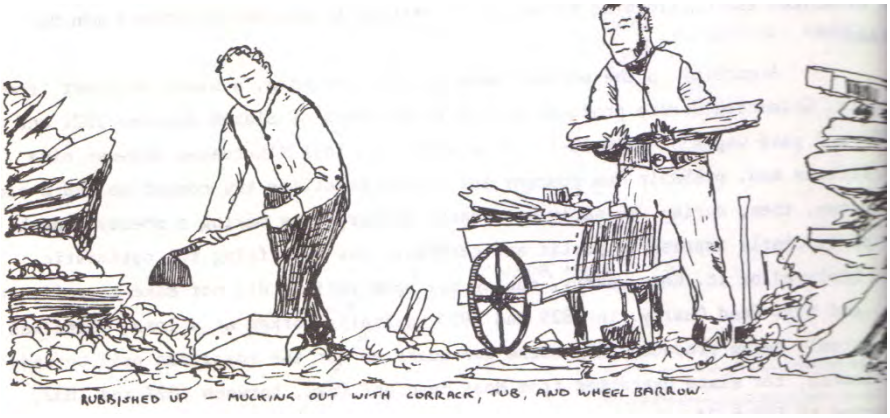
In May 1911 he wrote pleading for a holiday for the sake of his wife's health, and also to attend a meeting of the Swedish Iron and Steel Institute. On another occasion he had to explain how both his own men and a gang of stonemasons from Lindal Moor were found drying themselves in the casting house during their lunch break.

The waterwheel was painted in 1911, it seems the steam blowing engine was still being installed when the last letter book ended in 1926.

On 26th July 1912 Mr Tornblad wrote that he would be in Manchester on private business on Monday, and shortly after that he was gone.

Other matters contained in the letterbooks are requests for oil lamps, followed by a trial of an acetylene lamp in 1909, and in 1913 by repairs to the electric light, a shortage of horses for carting charcoal and the supply of corrakes.

Alen McFazdean wrote about the use of corraks, a kind of heavy duty hoe, in Journal 2. Tornblad ordered 100 corrake heads (his spelling) from the Lindal Moor workshops and 200 corrake shafts to be supplied by Bevins the River Watcher.



Alen McFazdean demonstrates the use of a corrak, photos from Facebook

If anyone would like to read the letterbooks I can supply a transcript by email.

Peter Sandbach.

The Ray family

Two members of the Ray family held senior positions in Harrison Ainslie. They were the son and grandson of a gentleman farmer from near Cark, and, like many of the ironmasters of the day, were members of the North Lonsdale Agricultural Society.

Three generations of the Ray family served on the committee or won prizes at the show. The first record of Edmund Ray Senior was in October 1838, when he took the award for best brood mare at the North Lonsdale show. His farm at Ayside was awarded second prize for the best managed farm in 1851. The judges were impressed with the layout of the farm but thought that a tenant farmer with a larger acreage could not be expected to match his standards. Another award came in 1848, this time for exhibiting an engraving at Mrs Parker Bowyer gallery, London. In 1854 he was inspector of crops for the North Lonsdale Society.

1857 saw the death of an infant son, followed by a barn fire in which 6 cows died. The farm was sold the same year. In some of the news reports Edmund Ray was described as a carrier, and the farm sale included four powerful work horses and 5 carrier's carts. When he died in February 1869 at the age of 63, probate was granted to his sons Edmund Ray and John Airey Ray and his widow Agnes. His grandson, Charles Edmund Ray was born the same year.

Edmund Ray Junior was born in 1840. It is not certain when he joined Harrison Ainslie, but he was living at Whinfield in 1869 when the previous mines manager, Robert Kendal, died and he took on the post. From 1876 he was also Harrison Ainslie's chief mineral agent.

The Wadham diaries are strangely silent on the subject of Edmund Ray although they both superintended the Poaka water level in 1876, Wadham for the Duke of Bucchleuch and Ray for Harrison Ainslie. It was only about 1885 that there was more than the occasional meeting. First there was an exchange of horses. Wadham sold the grey mare “Flower” to Ray for £30 and bought a pony from John Ray for William George Ainslie for £32 10s. The following year Ray went with Wadham, W G Ainslie and George Bargate, prospecting for manganese in Merionethshire. They examined mines at Red y Fen, Harlech, Mynydd Llanbedhr and Cwm Mynach. George Bargate was a successful mineral dealer and a spectacularly unsuccessful shipowner. The search for manganese was the reason for many meetings over several years with no apparent outcome.

Edmund Ray junior died on 23rd December 1903. Harrison Ainslie was in receivership at the time but Edmund Ray’s son, Charles Edmund Ray, took the position of general manager in the new company.

C E Ray played cricket for Ulverston in 1894 but was more famous as a showjumper and horse breeder. From 3rd prize for leaping at the Hawkshead show in 1900 to a prize at the Royal Lancashire show, two at Windermere show and 4 at Harrogate show in 1911, Mr Ray's horses won awards all over the district in the time he worked for Harrison Ainslie.

The newspapers record that C E Ray represented the Company at the inquest on John Wilkinson, a miner killed by a rock fall in Diamond pit in 1901. In 1910 he was soon on the spot after a collapse in Lowfield shaft killed one man and trapped another. Ray and the underground foreman organised a relief party and got William Bower out alive after nine hours.

In 1907 the newspapers made much of the new electric pumping plant at Lowfield and the general manager's part in it. With its usual accuracy, the Daily Mail predicted a turning point in the Furness Haematite mining business.

Edward Wadham saw it differently. From 1905 he left out the Mr in his diary when recording meetings with Mr Ray after complaining about delays to the High Crossgates shaft. One of the last entries reads:

20 September 1907 Friday: In office till 10.30 – To Grievson Pit to meet Ray – gave him a good "talking to" about the necessity of getting his Pumps fixed etc – called on Antony Sharpe and ordered some Straw – Home to lunch at 1 o'clock – calling at Longlands on my way – Lady Jane all right at grass - In afternoon drove down to Aldingham with the family and had tea on the shore.* (Lady Jane was Wadham's cow)

**Mr Ray promised to have an Electrically actuated Centrifugal Pump at work within three weeks.*

The following year, 1908, Wadham's health deteriorated and he had a leg amputated. He lived until 1912 but there is little about mining in the remaining diaries.

C E Ray fell out with Harrison Ainslie over the horses. In March 1913 Harrison Ainslie claimed £205 as repayment of a loan. This loan was to establish a stud farm in Ulverston. Ray claimed that the loan was to be repaid when the stud farm showed a profit, and in any case "the plaintiff had forgiven him the loan in consequence of certain private matters in which the defendant had obliged the plaintiff". Ray counterclaimed for £800 as a years salary and expenses, and claimed for wrongful dismissal. The company claimed that he had used their servants for his own purposes. Ray lost the case and also won no more prizes at the North Lonsdale show. Yakob Tornblad's last letter addressed to Mr C E Ray was dated November 28th 1911. Ray died in Sheffield on 18th May 1945.

Two more managers followed before the final collapse of the company in 1913, F W Linck and T R Glass.

Peter Sandbach.

References

Soulby's Ulverston Advertiser on CD
Wadham diaries
Newspaper cuttings from Gale Newsvault
The Lancashire and Westmorland Mineral Statistics, R Burt et al.

Eagle Crag Mine

Following the article in the CATMHS May 2017 newsletter on the meet, and conversations with Mark Hatton about the mine, which is one of the unknown gems in the Lake District, I had a look through my photographs taken nearly 30 years ago of the site, when Ian Tyler and I were carrying out research for his book on the Mines of the Ullswater Valley. I have always had a fascination for the mine as it was a relatively large operation of which very little is known about and was always in the shadow of Greenside Mine. My personal view is that it is of some antiquity, probably first worked hundreds of years ago, but with little extraction occurring after the 1840's, although work did continue in some form.

The site is owned by Dalemain Estates and is quite extensive, starting from the top of the crag where the East-West lead vein has been worked on surface and is the location of No 8 level (Tyler), and No 7 (W T Shaw) and appears to have been stoped internally hundreds of feet down to No 3 level, with a connection to No 2 level. No 1 level, being the lowest working, was driven just above the beck, but it did not connect with the upper workings.

The remains of the buildings and other structures are quite complete, probably due to its remote location, but the ore processing seems to have been done entirely by hand, as there appears to be no sign of waterwheel pits, which is quite remarkable for its size. There was also a level on the North side of Nethermost Cove Beck and another one,, which has a stone arched entrance, was driven into the lower part (at 850 feet) of St Sunday Crag, presumably to try and find the continuation of the vein on the opposite side of the valley.

There has been little written about the mine or reported in the newspapers. Ian Tyler in his book listed several leases, but no source is indicated and he appears to have given his own interpretation of the development of the mine.

Using the "findmypast" web site, I have looked at census, marriages, etc. for some of the people (in red) who worked the mine to see who were they, where did they come from, etc, and several newspaper articles have been obtained from the British Newspaper Archives web site. There can be slight discrepancies in some of the ages or dates of birth in the census.

24th May 1794 - Lease granted by William Hasell of Dalemain to John Walker, John Edmonson from Keswick, Mr Walker and Mr Dyer for a period of 21 years. Apparently they also worked the adjoining Ruthwaite Mine further up the valley (Tyler).

12th February 1807 - Lease granted by Edward Hasell of Dalemain to John Little from Alston and John Monkhouse from Penrith (Tyler).

4th December 1832 - Lease granted by E W Hassel of Dalemain to the Eagle Crag Mining Company formed by John Errington, originally from Alston, but living in Patterdale (Tyler).

Shareholders:

John Errington	Patterdale		(see census records)
George Errington	Patterdale		(see census records)
William Errington	Patterdale		(see census records)
John Walker	Patterdale	Blacksmith	(see census records)
William Longrigg	Penrith	Grocer	
James Scott	Penrith	Painter	
Jas Smith	Penrith	Grocer	
John Smith	Penrith		
Mr Irving	Penrith	Innkeeper	
George Foster	Penrith	Innkeeper	
Robert Clark	Penrith		
Mr Mayhill	Penrith	Attorney	
Thomas Atkinson	Penrith	Gent	
Edward Heylin	Penrith	Draper	
Thomas Harrison	Penrith	Skinner	
Thomas Hetherington	Penrith	Gent	
George Dixon	Penrith	Innkeeper	
Thomas Smith	Penrith	Accountant	
Mr Richardson	Penrith	Spirit Merchant	
John Gale	Penrith	Grocer	
Joseph Salkeld	Penrith	Gent	
John Harvey	Berrier		
Mr Tyson	Penrith		
Charles Scott	Penrith	Plumber	
Edward Nicholson	Penrith	Schoolmaster	
Henry Nicholson	Thorpe		
G B Hagg	Sunderland		
Thomas Bowman	Hartside		
John Wright	Barton Church		
Robert Hetherington	Maryport		

Kendal Mercury 30 04 1836
Eagle Crag Mine is also re-opened and the shares gradually advance.

Carlisle Patriot 23 01 1836
LEAD ORE MINE FOR SALE
To be SOLD by PRIVATE CONTRACT
47-64ths PARTS or SHARES OF EAGLE CRAG LEAD ORE MINE situated in PATTERDALE, Westmorland; with the like shares now of all the ore raised and lying at Bank and materials thereto belonging.

Further Particulars may be known by applying to JOHN ERRINGTON of PATTERDALE the owner who will show the mine &c and treat for the same, either personally or by letter, post-paid to Penrith.

The above shares will be sold together, or in lots to suit Purchasers.
Patterdale Jan 14th, 1836.

Kendal Mercury 18 02 1837

VALUABLE

SHARES in LEAD MINES FOR SALE.

To be Sold by Auction,

At the SWAN INN, PENRITH, Cumberland, on Tuesday the 21st February instant, at Six o'Clock in the Evening,—

LOT I.

TWO 64th SHARES in the rich and highly-improving LEAD ORE MINE, called **Eagle Cragg**, situate in Grisedale, near Patterdale, Westmorland.

This MINE is working by a respectable Proprietary, with great success; the LEAD ORE is FOUND in STRATA similar to the FORTUNATE GREENSIDE MINE, from which Eagle Cragg is but a short distance. The purchasers of these shares will be entitled to particidate in the Lead Ore now on Bank, estimated to be worth £450 or thereabouts.

LOT II.

TWO **64th** SHARES in the **Wythburn Copper Mine**, Situate in the Manor of Wythburn, in Cumberland, now working with every prospect of success, by a respectable Company.

LOT III.

ONE **64th** SHARE in the **Swarthbeck Lead Ore Mine**, near to Pooley, in Westmorland, with the RIGHT of SEARCHING FOR MINES AND MINERALS in an EXTENSIVE MINING DISTRICT, in MARTINDALE.

☞ Apply to Mr E. HEVLIN, of Penrith, Secretary to the Eagle Cragg Mining Company, or to Mr MAYCHELL, Solicitor, Penrith.

Penrith, 2d Feb. 1837.

Carlisle Journal 08 07 1837

EAGLE CRAG MINE- We are glad to hear that the enterprising mining company at Eagle Crag Mine in Patterdale, Westmorland cut a vein of lead ore last week, a single knocking of which was upwards of 30 stone weight and is now working with every prospect of success.

Carlisle Patriot 05 09 1840

TO MASONS

To be SOLD by AUCTION at the King of Prussia Inn, PENRITH on THURSDAY the 10th SEPTEMBER 1840 at seven o'clock in the Evening one or more 64th Shares or parts in the following MINES:

EAGLE CRAG, Patterdale

Enquiry may be made of the Agents at the different works.

1841 census:

	Age	Born	Occupation	Relationship
Born				
John Errington	57	1784	Lead miner	Head
Mary Errington	55	1786		Wife
John Errington	20	1821	Lead miner	Son
Thomas Errington	15	1826	Lead miner	Son
Henry Errington	15	1826	Lead miner	Son
Hannah Stephenson	13	1828		Lodger

Living at Eagle, Patterdale

George Errington	25	1816	Lead miner	Head
Ruth Errington	25	1816		Wife
Mary Errington Patterdale	4	1837		Daughter
John Errington Patterdale	2	1839		Son
William Errington Patterdale	3 months	1841		Son

Living at Place Cottage, Patterdale

William Errington	25	1816	Lead miner	Head
Hannah Errington	20	1821		Wife

Living at Eagle, Patterdale

John Walker Westmorland	60	1781	Blacksmith	Head
Sarah Walker	50	1791		Wife

Living at Township, Patterdale

1851 census:

	Age	Born	Occupation	Relationship
George Errington Grassington	38	1813	Lead miner	Head
Ruth Errington Westmorland	38	1813		Wife
Mary Errington Patterdale	14	1837		Daughter
John Errington Patterdale	12	1839	Lead ore Washer	Son
William Errington Patterdale	10	1841	Scholar	Son
Thomas Errington Patterdale	7	1844		Son
Ann Errington Patterdale	5	1846		Daughter
Ruth Errington Patterdale	3	1848		Daughter
George Errington Patterdale	0	1851		Son
Michael Mattinson Patterdale	24	24	Lead Miner	Lodger

Living at Side Cottage

Mary Errington Alston	65	1876		Head
William Errington Grassington	35	1816	Iron Ore Miner	Widower
John Errington Patterdale	9	1842		Grandson
William Errington Patterdale	4	1847		Grandson
John Whitefield Keswick	78	1823	Iron Ore Miner	Lodger

Living at Church Lane, Egremont

Deaths:
John Errington died in Q1 1846 at West Ward (Patterdale area)
Hannah Errington died in Q1 1849 at Whitehaven

John Errington, who seemed to be the driving force behind the venture, appears to have come from Grassington in Yorkshire where his two sons involved in the venture were born. He died in 1846, so that probably brought the operation to an end, as his wife and one of his sons, William, were listed in the 1851 census living in Egremont. They may have taken the decision to move to West Cumbria after John's death, but sadly Hannah, William's wife died in Whitehaven in 1849. John's other son George was still in Patterdale in 1851.

At the present moment, I feel it was this company who did much of the work at the mine and were responsible for the building of the various structures.

7th January 1862- Lease granted for three years by Edward William Hasell of Dalmain to James Philips and Thomas Redfern, both labourers and Jacob Johnston and John Pattinson all from Patterdale (Tyler).

1861 census:

	Age	Born	Occupation	Relationship	Born
William Philips	36	1825	Mine Agent	Head	Gwennap, Cornwall
Elizabeth Philips	37	1824		Wife	Lllogen, Cornwall
William Henry Philips	10	1851	Scholar	Son	Ulverston, Lancashire
John Philips	8	1853	Scholar	Son	Dalton, Lancashire
Jane Philips	7	1854	Scholar	Daughter	Dalton, Lancashire
James Philips	5	1856	Scholar	Son	Dalton, Lancashire
James Philips	30	1831	Lead miner	Brother	Gwennap, Cornwall

Living at Greenside Cottages

In the 1851 census, all of the above are living at Ulswick near Ulverston, where William and James are iron ore miners. In October 1860 William became the mine agent at Greenside Mine, where he stayed for three and a half years until he resigned in March 1864 when he took charge of the Hartsop Hall lead Mine which was being operated by the directors of Greenside Mine (Murphy: Grey Gold).

1871 census:

	Age	Born	Occupation	Relationship	Born
Thomas Redfern	39	1832	Lead miner	Head	Wetton, Staffordshire
Mary Redfern	38	1833		Wife	Bampton, Cumberland
Elizabeth Rowlandson	17	1854		Sister-in Law	Whitehaven

Living at Bleaze End, Patterdale

In the 1851 census Thomas is living with his father's family at Back of Ecton in the village of Wetton, Staffordshire where, like his father, he is a Lead and Copper miner, possibly working at the Ecton copper mines. He married Mary Rowlandson in 1855 in the district of West Ward, which includes Patterdale and Bampton. In the 1861 census, Thomas and Mary are living at Aldby Street, Cleator Moor where he is an iron ore miner and they must have moved to Patterdale shortly afterwards.

1861 census:

	Age	Born	Occupation	Relationship	Born
Jacob Johnstone	62	1799	Lead miner	Head	Alston, Cumberland
Mary Johnstone	70	1791		Wife	Unthank, Cumberland
Mary Birkett	38	1823	School Mistress	Lodger	Dacre, Cumberland

Lived at Middle Row, Glenridding

I have not been able yet to find out more information about Jacob.

1861 census:

	Age	Born	Occupation	Relationship	
John Pattinson	64	1797	Lead miner	Widower	Patterdale
Ann Pattinson	31	1830	Dress maker	Daughter	Patterdale
Margaret Pattinson	16	1845		Daughter	Patterdale
Jane Pattinson	5	1856		Grandaughter	Borrowdale

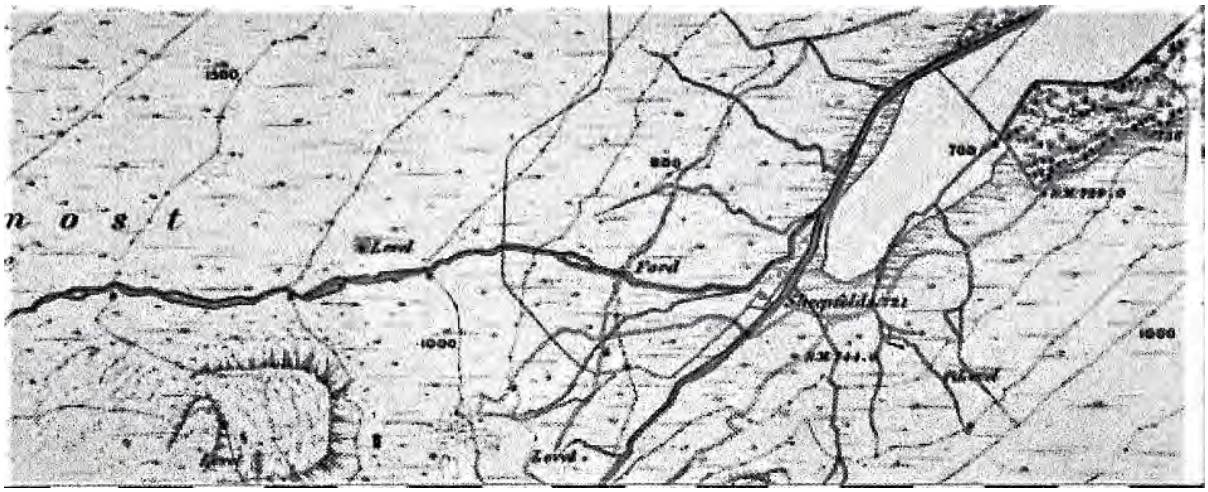
William Pattinson Patterdale	0	1861		Grandson	
Lancelot Pattinson Martindale	92	1769		Widower/Boarder	
John Pattinson Ambleside	37	1827	Lead miner	Visitor	
Lived at Township, Patterdale					

	Age	Born	Occupation	Relationship	
John Pattinson	59	1802	Lead miner	Head	Old Cumnock, Scotland
Mary Pattinson	54	1807		Wife	Alston
Lived at Place Fell Cottage, Patterdale					

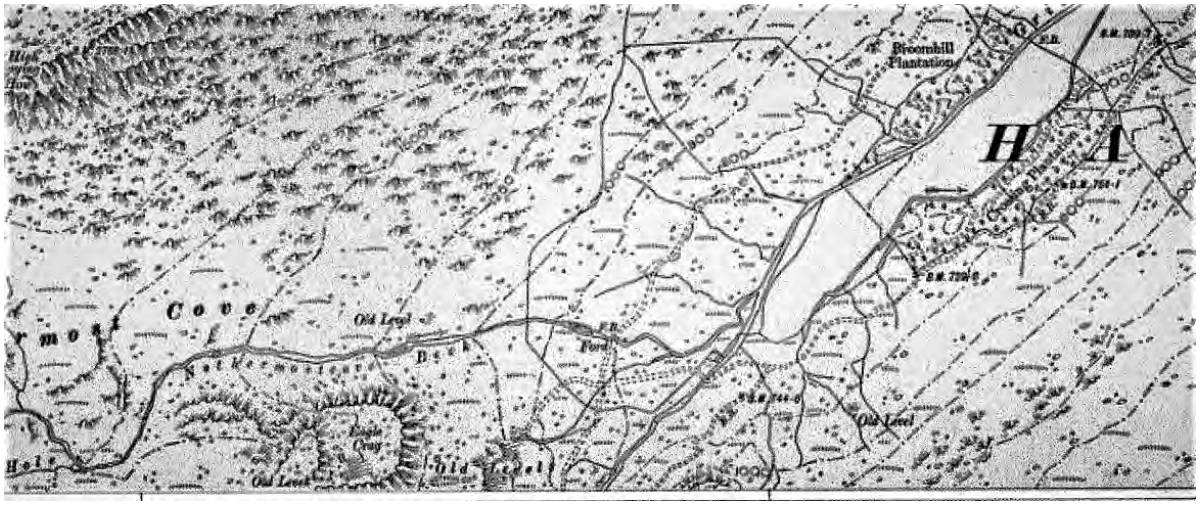
According to the census, John Pattinson who had an interest in the mine could have been one of three of the above, but given that John (age 64) was widowed and had a young family to look after, and John (age 37) was a visitor from Ambleside and did not live in Patterdale, I suggest that it was John (age 59) who had the interest in the mine.

6th August 1872 - Lease granted for one year by John Edward Hasell of Dalemain to George Head-Head, John Jameson, William Whitwell, Robert Bradshaw Smith, Lancelot Harrison and Charles Stephenson who were directors of the Greenside Mining Company. (Tyler). Note W T Shaw in his book "Mining in the Lake Counties" has this as a syndicate of the same men, but called the "Patterdale Mining Company" with George Head-Head as Chairman and Richard Grenfell as Mine Manager.

Tyler states that it was this company who drove the levels at Nethermost Cove Beck and St Sunday Crag, but the first edition Ordnance Survey map surveyed in 1860, marked Nos 2 and 5 levels, with the levels on the north bank of Nethermost Cove Beck and St Sunday Crag as "level", which means the mine was in operation and the levels he mentioned were driven or started some twelve years earlier.



6th August 1876 - A similar lease was drawn up and signed by the same directors (Tyler).



The second edition Ordnance Survey map was revised in 1897 and all the levels are marked as "old levels", which meant the mine was closed.

Past exploration

There appears to have been little written about any exploration of the mine, but in CATMHS newsletter No 77, November 2004, Pete Fleming wrote a meets report which stated that he, Eric Holland and Alan Westall had re-opened No 2 level some 30 years earlier and tried to get up the shaft to No 3 level, which was unsuccessful.

In April 1989, Ian Tyler, Anne Danson and I re-entered No 2 level, and on the 15th April 1989, Ian and I also re-opened, probably for the first time, the level at the base of St Sunday Crag.

In the early 1990's members of Mines of Lakeland Exploration Society (MOLES) re-opened No 4 level which is in the gulley running up the front of the crag directly on the vein, and carried out much exploration. There appears to be no sections or plans which have been published of any of the exploration, which needs to be addressed.

Mark Hatton took Eleanor Kingston from the LDNPA to view the site in the summer and the Society has written to Historic England recommending that the site should be scheduled.

This is a fascinating site and my personal view is that a survey should be carried out by either professional archaeologists, or as has been done at Coniston Copper Mines and Penny Rigg Mill, by a joint venture between volunteers and professional archaeologists, which should also include the accessible underground workings. This could help to enable a sequence to be put together of how the mine was worked. It is a site which is still in a remarkable state of preservation, and I feel there is much to still discover, especially given its antiquity, size of operation when all the ore seemed to be hand dressed, and is worthy of being a scheduled ancient monument. This could be a good project for the CATMHS, which has been fortunate in that Matson Ground Estates, who own the preceding land, has given permission to drive to its property at Elm How on a couple of occasions. It is then a relatively short walk to the mine, which saves having to come in from Patterdale. The society also has a very good relationship with Dalemain Estates who may have information in their archives which could shed more light on the mine.

The following are some of the photographs taken in 1989:

The lead vein is the gulley running up the middle of the photograph, with No 3 level being marked by the large spoil heap at the bottom of the gulley and No 5 level is not far below the top of the crag.

No 2 level with wooden rails still in-situ on the floor and secondary deposits of Hydrozincite, which is a zinc mineral

No 2 level

A pair of clogs left for good luck in No 2 level.

Surface remains at No 3 level

The building at the workings above the top of the crag, which could be of some antiquity.

The stone arched entrance to the level at the base of St Sunday Crag which is nearly 300 yards long and opened for the first time on the 15th April 1989.

One of the first photographs of the level with wooden rail still in situ. It was difficult in those days to take good quality underground photographs.

Warren Allison.

CUMBRIA AMENITY TRUST MINING HISTORY SOCIETY

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