

# CAT

The Newsletter of the Cumbria Amenity Trust  
Mining History Society

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Keppel Cove dam, Greenside Mine

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No. 141

November 2020

# **Cumbria Amenity Trust Mining History Society**

## **Newsletter No 141, November 2020.**

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### **Society Officers and Committee Members**

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## Membership

As our activities during 2020 have been so limited due to Covid 19 restrictions, we have decided to waive next year's basic membership fee for all members current on 1<sup>st</sup> August 2020. You will still need to purchase Insurance Cover and pay for Postal Delivery of Newsletters if you want either of these during 2020 – 2021. In order to maintain our records, it is essential that you confirm your continuing membership, even if you do not require BCA Third Party insurance or a printed newsletter. For your convenience a renewal form accompanies this newsletter. A prompt return would be helpful.

**New members:** Martin Lawton, from Cockermouth  
Kris Wilkinson, from Keswick

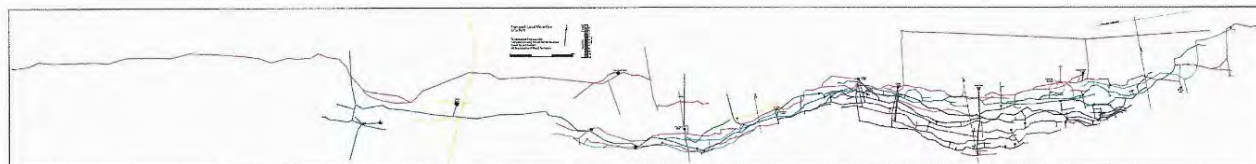
## CATMHS Anniversary photographs

An appeal to members enabled us to put names to all but one of the 21<sup>st</sup> anniversary participants pictured on the cover of Newsletter No 63. An extra page with a key has been inserted in that newsletter, which can be found on the CATMHS website and it now has a revised cover with a brighter, clearer photograph. We intend to do the same thing for the 30<sup>th</sup> anniversary photograph, which appears on the cover of Newsletter No 98, February 2010. Unfortunately, as far as we know, no group photograph was taken at the 40<sup>th</sup> anniversary weekend.

## Plan of Frongoch.

Leif Andrews has submitted another of his mine plans, this one of Frongoch. His maps are of high quality and contain a lot of detail which needs to be viewed in high resolution.

Printing them in the newsletter cannot do them justice so this is just a draft. If you want a pdf of the original then email a request to [membership@catmhs.org.uk](mailto:membership@catmhs.org.uk)



## Coniston Ore Barge Elizabeth

Built at Waterhead, Windermere around 1830, this barge was filled with copper ore and rowed to Nibthwaite Quay at the foot of Coniston, from where the ore was taken by road to Greenodd. The barge was bought by GH Pattinson in 1880 for sand-getting on Windermere and was used until 1910. I photographed her here on the site of Pattinson's yard in 2016. The site became Windermere Dock Museum, and Elizabeth disappeared during the three year redevelopment of the site, which became known as Windermere Jetty Museum. I was told that she was too far gone and had been destroyed. However, on further enquiry the Curator, Sophie Terrett emailed: The vessel is not currently on display. but is being held in storage pending further conservation work that can stabilize the boat. There is a scale model of Elizabeth on display in the "Conservation Store Gallery" at the Jetty Museum, which can be viewed through the window in the Wet Dock. It was painstakingly constructed and kindly donated by Ted Gregg. IM.



## Coniston Deep Level Adit



Two or three years ago a landslip partially blocked the entrance to Deep Level at Coniston and damaged the portal. Some concerned individuals took it upon themselves to make temporary repairs in order to prevent it from collapsing. Following the completion of the Coniston Copper Project it was the intention of the Lake District National Park Authority to address the issue. The partial blockage of the adit has been cleared so that the level can drain properly. Work was carried out to reinstate the bridge abutments over the beck, and the footbridge shown in the photo above has been installed. It is not known whether this is the final structure or whether a wooden bridge is to be constructed. Under construction in the foreground is a concreted drain which is to be the water supply for the restored sawmill waterwheel.

The bridge, intended to provide access for walkers to Red Dell, leads to the south side of the adit and the rather deep gulley which exits from the mine makes further progress difficult. Two baulks of timber have been placed across the obstacle, hopefully a temporary measure.



Provision of a structured walkway close the Deep Level portal might entice unwary visitors to explore the level, and so it was decided to install a gate inside the adit as a deterrent. CATMHS was approached to measure up, design and install the gate, the cost to be borne by the LDNPA. The CATMHS Digging Team took this on and a vertically swinging gate similar to those installed at Kernal Level and Tilberthwaite Horse Level has been constructed and is awaiting installation when Covid protocols allow. It is not envisaged that the gate will be locked or prevent access by mine explorers. IM.

## Progress at Newland

The last normal work meet at Newland was held on 29<sup>th</sup> February, two new members turned up and progress was made exposing structure in the floor which might have supported the mechanism driving the blowing cylinders, then all work stopped until July. Dan Elsworth was able to record the work to date in our absence and our neighbours started work converting the next door garage into a house. We are regularly asked by visitors what the garage was used for and have to reply “don’t know”, but what we can say is that when the furnace was in operation, the only access to the machinery in the blowing chamber was through the big arch, now walled up or through the little passageway at the back.



A socially distanced committee meeting was held at the furnace in July to discuss the possibility of opening for Heritage Open Days but it was noticed that the principal rafter, previously damaged by rot and woodworm had broken completely. Subsequent meetings have been mostly concerned with propping the roof to survive the winter and planning a repair. We managed to do some digging on the July meeting but this was more about tidying the site for Heritage Open days than revealing the workings of the furnace. There can be little progress on this project until we can dispose of spoil at the tip again.

Heritage Open Days passed safely with a steady stream of visitors in fine weather. We took £198.65 in sales and donations from 77 visitors.

It is a condition of our lease that the buildings are insured and this year the insurers insisted that we should have a proper valuation. The previous valuation was based on an estimate of the cost of work needed to stabilise the furnace. It cost £594 for the valuation and £285 extra to fully insure the buildings in the year ending 15 March 2021. Next year the premium will be over £700. The cost of buildings insurance has always been a burden, CAT has helped us out with this in the past but I do not think we can pay this much for long.

Peter Sandbach.

### **Glenridding Common Lease Extension**

The John Muir Trust have had a three year lease to manage Glenridding Common, which expired in October 2020. Because of the success of the relationship to date, the National Park are looking to renew the JMT occupation on the Common. The new lease would be granted on essentially the same terms apart from one important addition, namely the inclusion of an Option Agreement that would grant the JMT the future right to purchase the area of land which they occupy should they so wish. The National Park consulted key stakeholders and interest groups and sought their comments. CATMHS expressed concern regarding the sale of the land.

From John Muir Trust E-Newsletter concerning Glenridding Common Lease Extension:

The John Muir Trust has welcomed input from the Glenridding community to explore a variety of ownership and management models for Glenridding Common following the recent stakeholder consultation held by the Lake District National Park Authority. ... It concluded that the JMT should be offered an extension to its lease for a year to allow further discussions on the future management of the land to take place. ...

During the Trust's three year lease period at Glenridding Common it has invested in the area to create: two jobs, one of which is with a local young person; employ local footpath contractors to maintain paths on the fell; host our national AGM in the village; work with local volunteers to increase populations of rare arctic alpine plants and in partnership install a temperature sensor on Helvellyn crag to inform winter climbing conditions; provide cash support to two environment and heritage community projects and continue long term educational and engagement work with local schools and other groups. ... The JMT remains open to all ideas, partnerships or governance models that would support their continued investment in this special place, while allowing all parties to pursue shared objectives.

### **The Lake District Slate Industry**

Following a business year in the Lake District like no other in recent times, and with Lakeland's prominent industry of tourism all but collapsing, it is interesting to review how another local Lake District industry, the slate industry, has fared during the recent pandemic. Reports from the ground seem to suggest that sales, and therefore production levels, have remained extremely high, to the extent that at some sites it has been a struggle to achieve sufficient production to meet orders.

At the start of lockdown Burlington Stone halted production for just a few weeks, but then re-started to meet the orders that were mounting up. A similar situation occurred at Honister where the mine was out of operation for only a short period, but then had to restart to obtain fresh rock from the Kimberley Mine to meet demand. In the workshops at the Hause orders were being received for all categories of slate products from kitchen worktops and flooring tiles to roofing slates. It was good to see the front-loaders starting to trundle rock down from the mine again and life quickly returned to normal, apart for the fact that there were no visitors for Honister's visitor attractions.

Reports from smaller operations are similar. At the High Fell workings, above Tilberthwaite, Nev Walker comments that it has been a struggle at times this year to meet orders, and at Parrock Quarry, near Hodge Close, Darren Woolcock and his partner continue to develop their small business producing a range of products with slate from the quarry.

It is interesting to compare this industry with Lakeland's principle industry of tourism. Tourism will always be the high-ranking industry but many feel it is important to reduce its massive

prominence to a certain extent and promote the development of other traditional Lake District industries that do not have such potentially serious effect on local communities if things go wrong. In the past slate-working, fell-farming and other traditional industries have been much more resilient under such conditions and also have never created the overcrowding in Lakeland communities or congestion on local roads that tourism is now starting to do.

### **Update report on the Coniston Old Man Quarries project**

The stabilisation and interpretation work has progressed steadily at the Old Man Quarries site during the summer, despite problems caused by the Covid-19 pandemic. The main key problem was that an important member of the team, Eleanor Kingston, the Lead Strategy Advisor for the National Park, was unable to take part as she had been furloughed. Fortunately she is now back at work and the project is progressing well.

As reported in past Newsletters three dry-stone wallers have separately bid for carrying out the stabilisation work at the three sites selected, Saddlestone Bank, Smithy Bank and Scald Kop. Subsequently some significant change has been made to the project specification in that Richard Fox, of the 'Fix The Fells' team, has suggested we may be able to transport material up onto the Old Man using the helicopter that they charter. Team member Robert Gurr is also considering using this method of transport for the project he is managing, which is the stabilisation of the Old Man quarries' former smithy & power station below Smithy Bank. However since then further changes are to be made to the specification. Both Eleanor and Robert have recommended that most of the wall-head capping should be replaced by traditional dry stone wall capping, which will be more resistant to weather and strengthen the walls. This should mean that helicopter-lifts will not be necessary, or at least significantly reduced, as much less mortar will be required up at the sites. We have also decided to restrict stabilisation work initially to Saddlestone Bank and Smithy Bank and to leave other sites to the Stage 2 of the project.

A serious problems of vandalism occurred during the past summer months on this part of the Old Man, including at both sites that are part of this project. On one occasion the damage was witnessed by a passing walker who happened to be a local guy. A group of approximately fifteen 'youths' were demolishing the wall of one of the buildings on Smithy Bank to build a platform for 'eating their sandwiches'. Later they were seen at the Fell Gate loading rucksacs into a large van. The registration was taken and police informed. This is the first significant damage to the Smithy Bank buildings since the site closed eighty years ago. Subsequently I checked the smithy itself, below Smithy Bank, and no damage appears to have been done there, which is a big relief.

On 15<sup>th</sup> October Eleanor and I went up to the site for an in-depth site discussion. This was an excellent event and we were able to progress the plans significantly for both stabilisation and interpretation details. We are now able to take the project forward by a significant degree. The next step will be to meet up with the three wallers who have bid for the stabilisation part of the work, explain how the specification for the work has changed, note down their comments and then re-draft a final specification for them to bid against.

As far as the Smithy, goes Robert has suggested that the starting date should be put back for about six months. We have located one of the sales documents that were produced by the European subsidiary of the American Pelton Company, Schram Harker & Co Ltd., when the pelton wheel installed in the Smithy was purchased by the Mandall Company shortly after the turn of the century, although several conflicting dates when this actually took place have been

suggested. It is possible that the components for the wheel in the Smithy might have actually been constructed in San Francisco and shipped over before any production facilities were set up in Europe. It's good that the wheel is virtually intact but, unfortunately, the speed control system, based on sets of governors, was stolen a few years ago. However, both Robert and I have got photographs of the original governors and we plan to take a trip to Threlkeld Museum at some point to see if they have anything there that might match, or perhaps know where one can be obtained.

Alastair Cameron.

### **Low Water Powerhouse and Blacksmith**

As has been previously reported, it had been hoped that the proposed project to stabilize and conserve the structure and machinery of the smithy would have advanced a good way forward by now, or at the very least the planning stage and applications to the Estate. However, Covid 19 has smashed our original planned time schedule. Now that a good number of months have passed and that we have started to adapt to the new way of living, thought will be given to how to proceed with the project in 2021.

The related Coniston Old Man Quarries Project that Alastair Cameron has been progressing on behalf of Eleanor Kingston and the National Park, to stabilize Smithy Bank and Saddlestone, will have the same issues of safety to deal with and the Government Covid-19 safety guidance and laws. These safety recommendations and laws change and will continue to change with the unpredictable virus situation, making it difficult to plan ahead affectively at this stage.

Although our plans have been largely put on hold these last few months, inspections have taken place of all the structures and workings from Low Bank to Scald Cop. Due to the alarming increase in foot traffic and mountain bikes, erosion of these fragile sites has dramatically increased. The old quarry road path that the majority of walkers use cuts directly through the planned work sites of Smithy Bank and Saddlestone and will be an addition concern for contractors to take into account. The Smithy/Powerhouse being in a slight better location and slightly off the 'beaten track'. Nevertheless, members of the public will undoubtedly want to come over out of sheer interest if they see people working; this needs to be taken into consideration.

There is one significant difference with the Stabilizing plans for Saddlestone and Smithy Bank from that of the Powerhouse. Contractors will carry out the majority of the proposed work on the two higher banks; as professionals, they will follow a well-practised safety procedure. The Low Water Smithy/Powerhouse will be a voluntary workforce, and some differences of operation would therefore apply. This is something we will be giving considerable thought to in the coming weeks, and for all working sites.

A CATMHS meet was planned for October to walk up to the smithy for people to view and talk about the proposed project. However, at the time, we felt it was not a good idea considering the rise in virus cases in the north. This is an exciting project and in a great location, something for us all look forward to. We will therefore, arrange a date for a walk-up meet as soon as it is deemed safe to do!

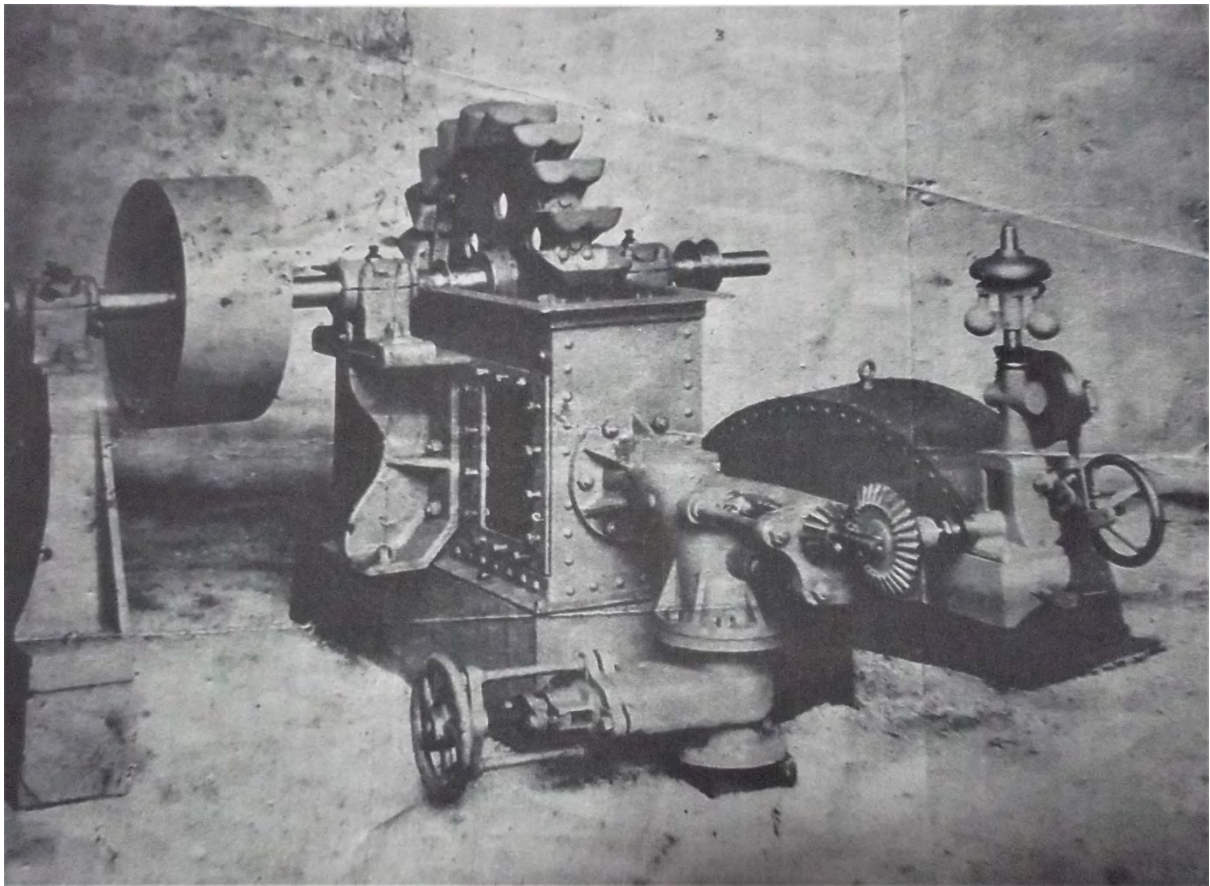
A quick update of the Powerhouse machinery:

Both Alastair Cameron and I have been attempting to find information on the machinery within the building. This has proved quite difficult as the machinery manufacturers no longer exist.



Furthermore, none of the companies concerned appear to have been taken over by other companies, simply vanishing into history, taking their archives with them. It would appear that the second world war was the death knell of numerous companies, 'ours' included, but we will eventually find what we are looking for and hopefully enough components to complete some level of cosmetic restoration.

There is however, some progress regarding the pelton wheel turbine, as Alastair Cameron has mentioned. Alastair was in contact with a resident of Coniston from the slate industry who had connections with the 'OLD Man' quarries, Alastair was given a picture from a Scram Harker sales catalogue of the exact model and power output as the one in the powerhouse. This will be of some considerable help.



During a September inspection I was shocked at the amount of damage underfoot from the sheer number of walkers. This is most notable on Saddlestone. Removal of stones from the structures was always a problem but this has significantly increased with people removing stone to make their own group seating arrangements. I have on previous inspections spent some considerable time returning stones to the walls but it is now proving impossible to keep up. Conservation of the wall heads will help reduce this. Due to the location of the Smithy it does not suffer the damage from feet and stone removal and I am pleased to report no deterioration in this structure. The now collapsed roof truss has been stacked at the side leaving the floor clear again. The failure of this timber saved us the complicated task of dismantling!

Robert Gurr.

## Meets, October 2020

Unfortunately the ongoing Covid pandemic has put serious restraints on people meeting up. We did manage to run a successful surface meet at Greenside on the 6th September. Two groups of six had a lovely walk around the surface remains while maintaining social distancing. I was hoping to have a few more meets similar but the ever changing lockdown restrictions plus a duty of care to members has pretty much scuppered plans for the rest of this year.

As you will see below we had ten meets planned that have had to be postponed; when restrictions are relaxed a little more I shall start putting meets up again. I have other ideas for meets which would include a visit to the Isle of Man and possibly a return to Cornwall. I am always open to meet ideas and especially any meet leaders that would like to take the reins and lead a meet. It doesn't have to be anything extraordinary, maybe a gentle stroll around some surface workings or an invite to a place you have maybe discovered yourself.

If anyone would like to give a presentation via Zoom or Facebook that would be very welcome. Myself and Chris Twigg have each done one and members enjoyed watching from the comfort of home. It may just be a slide show of old photos you may have? You could just present them and talk us through them? Anything would be welcome.

I hope everyone is getting through these troubled times and hopefully next year we can get back out there in full force and enjoy our hobby to the max!

Meet Secretary  
Michael (Bill) Oddie

## Meets list 2020

January 19th Gunpowder works - Michael Oddie

February 2nd Hodbarrow - Steve Cove

February 16th Middlecleugh - Nick Green

**February 23rd Lucy Tongue - Warren Alison**

March 1st Derbyshire - Robert Stevenson

**March 21st SRT practice - Nigel Addy**

**March 22nd Lost Johns - Graham Derbyshire**

**April 19th Jet mines - Chris Twigg**

**May 16th-17th Dorothea - John Peredur Hughes**

May 28th Live talk No1, Preesall Salt Mines - Michael Oddie

**May 31st Coniston - Mark Hatton**

June 8th Live talk No2, Ironstone Mining in Marske - Chris Twigg

**June 21st Whitehaven surface walk - Warren Allison**

**July 11th-12th Maenofferen - Jon Knowles**

**August 9th Kirby Steven Lead and Copper Mines - Warren Allison**

September 6th Greenside Surface walk - Warren Allison, Michael Oddie.

**September 11th Birkshead Gypsum Mine - Alasdair Roberts**

**Bold** indicates meet postponed due to Covid.

### **Greenside Mine surface meet**

Meet leaders Warren Allison and Mike Bill Oddie; Lorraine Crisp, Kevin Crisp, Robert Gurr, Claire Harvey, Mark Hatton, Liz Withey, Steve Dalgleish, Derek Mitchell, Michael Pringle, Chris Bunker.

As Government guidelines were eased, we decided to run a surface walk to Greenside but in two separate groups. We arranged to meet in Glenridding, which was a shock; as Liz and I drove in there was a triathlon underway and the village had hundreds of people either milling around or starting the fell run. We had already had word from Robert when en-route that Glenridding was heaving, which made a mockery of us having organised the meet in the way we did.

After gathering everyone up, following the guidelines we drove up to the mine and set off through the lower buildings. Once we were at the level of No2 tip, we detoured and walked up the old incline railway which came down from the Low Horse Crushing Mill, passing the base of the original smelt mill chimney before it was extended to prevent the fumes travelling down the valley.

At one-point washout has exposed the sleepers and rollers of the incline, which was a twin track affair. We arrived at the ruins of the brake house where broken slates litter the area. The tubs were brought out of two huge ore bins behind it and below the crushing mill, one for the material which could go straight for processing and the other for the crushed ore. This is a remarkable site, built while the Low Horse Level was being driven and started around 1835.



Slowly we wound our way up through the remains and exiting at the waterwheel pit which drove the adjacent crusher. Here Steve solved a long-time question of how the power was transferred from the wheel to the crusher and it was via a belt driven from a drum attached to the wheel.

As people looked around the site with impressive ore bins and tried to work out how the spoil was transported across the beck at a lower level than the tramway, some decided it was lunch time, and the views down the valley were stunning. After lunch we followed the route of the pipeline which provided water to No2 power station down at the lower workings and arrived at the intake point with a dam/weir behind, which provided water via a leat to the Low Horse crushing mill.

Soon we arrived at the top workings (locally called Top Dam), pausing at the settling pits before walking to the end of the spoil heaps, which are like the fingers on a hand and are, in my biased opinion, the most spectacular set in Cumbria. Walking along the top gives one a very good view of the main crushing mill which was still apparently being worked in the 1890's and was where Joe Bowman, the famous huntsman of the Patterdale pack, said he got his great strength from when working there as a boy.

The collapses on the fell-side are hugely impressive. They occurred on a Sunday in 1862 when 120,000 tons of rock fell through the workings, and are where the ancient men worked the vein by top and middle levels. At the start of the spoil heaps there is fine sand like material mixed in with the larger spoil and I am certain there was another mill on this site which predates the main one.



Arriving at the collapsed entrance to the High Horse level, I explained about the lodging shops on either side, which the Royal Commission in 1842 described “as not being fit for swine to live in” and how the water in the dam was siphoned to keep the underground dam supplying the turbine at the winding engine at the top of the Willie Shaft on the Low Horse level.

We wandered up to the bottom of the lower hole and spent time discussing the site below us which has remains of ancient hand dressing floors, levels, hushing, water management, etc. Michael managed to poke his head and camera into the collapsed entrance to Gilgowers Level which had been stone walled on either side and metal supports with timber forming the roof. As time was getting on, we headed back down the valley using the main cart track after a very enjoyable day, and it had been nice to see people again out on a meet. There is still plenty to discover at the upper workings especially regarding the ancient parts and we will be back once Covid allows.

Warren Allison.

### **Greenside Mine upper workings by drone**

On our last meet I took a chance with the weather and carried my DJI Mavic Mini with me for the meet. Rather surprisingly the weather took a turn for the better later in the day and while the group headed up to the collapses, I took the chance to get some flying in. It's an ideal location in many ways, not so busy in terms of walkers, well away from the RAF and plenty of interest to view from above. These tips really are impressive and hopefully I will get back for more flying over them in the not too distant future. Liz Withey



### **Coniston mining records at Cardiff University.**

Colin Woollard has been in touch with an archivist at Cardiff University regarding documents relating to Oscar Gnospelius and the Collingwood family. She has sent him some information on Coniston mines and Brimfell. These records are part of the 462/19/1 collection held at Cardiff. Copies of these can be obtained from Colin on request.

Various Copper Ore sales from Coniston 1834 - 45 and 1884 – 1899

Correspondence between Gnospelius and Borlase regarding Wetherlam Mines, 1925.

With expenditure, invoices and an outline map of Wetherlam Mines.

Correspondence T Warsop, B Johns and Oscar Gnospelius

A typed copy of the Bowes Needham report of 1616.

An assay book belonging to Oscar Gnospelius dated 1929 - 1932.

Quarterly mining reports for Brimfell dated 1930-33

An abandonment report for Coniston mines dated 1917.

The abandonment report is interesting and is reproduced below. Original punctuation and spelling has been kept. Unfortunately the diagrams referred to in the text are not available.

Report on  
**THE CONISTON COPPER MINES**  
Coniston, North Lancashire.

Mine abandoned since the outbreak of War  
Properties & Dues to S. H. le Fleming Esq.

Estate Agent  
R. E. Porter, Rydal Estate Office,  
Ambleside. Westmorland.

Mines worked for Copper Pyrites.

Report by J.C. Cunningham A.R.S.M. M.I.M.M.  
August 1917.

### **SITUATION**

The Coniston mines are situated in the north extremity of the county of Lancashire in the District of Furness, about 1 mile N.E. of the village of Coniston, in the upper basin of Church Beck. The property occupies a large portion of the Coniston Fells on the east side of the range of heights. Coniston Old Man, 2633ft. Brim Fell Great Howe Craggs 2625ft. and Wetherlam on the North 2,502ft.

### **ACCESSIBILITY**

The mines are reached by the Lancaster Railway from Furness Abbey to the Village of Coniston. From the Village a fair but high gradient road follows the Church Beck up the valley to the Mines, a distance of a little over a mile, all transport from the mines to the rail head at Coniston has been done over this road.

## ACERAGE & ROYALTIES

The area under Mr. le, Flemings' holdings comprises some 5,000 acres comprising the land east of the chain of Mountains, North East of Coniston, in which the tarn called Levers Water is roughly the centre.

The general conditions for leasing the properties are as follows:

The charge of £1,000 for use of the plant, goodwill, disposing of the water power, to be used for mining purposes only:

A dead rent of £300 per annum to merge into Royalties.

Royalties to be 1/15 of the price of the ore extracted and sold when metal is at £100 per ton, and a sliding scale of 1/17 to 1/20 when metal is at a lower price. 30/ per ton on any metal brought to be treated at the mines; this is a prevention clause, so that the water power available should be used for the mines used to treat or work the ores from other mines of the neighbourhood at the detriment of the Coniston Mines.

The Landlord is ready to lease the mines for 60 years.

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## HISTORY

The Coniston Mines are in all probability the oldest mines in the north of England, and were probably worked before the occupation of the Romans. It is believed that these mines have been worked at irregular intervals for over 2,000 years.

From a more modern source the mines were taken over and worked in the early fifties by Messrs Taylor of London, when the mine was worked energetically, employing several hundred men and made returns from £30,000 to £36,000 per annum, the normal monthly wages were then about £2,000, the production of ore shipped was about 300 tons per month.

Mr John Barratt has the credit of reopening the mines and forming the Coniston Mining Company in 1835 and worked them to 1840 and did good mining work, he died in 1866, left the mines in the charge of his son Joseph Barratt, who neglected the mines; Joseph Barratt's stewardship ended in 1869. The Company then advertised for a manager and a Mr Ralph Goldsworthy was engaged and was in charge until 1873, his work does not appear to have been satisfactory; then Mr William Bawden was appointed agent, but the mining work seems to have been disappointing as the mine was closed down.

In 1876 the Coniston mine was bought by Mr Thomas Wynne for £3,000 and Mr Bennett Johns of Keswick was appointed Agent to 1884. Mr Johns (whom I saw) worked the Paddy End of the mine, from the Hospital shaft and assures me that in the 20 fathom level West and he left in the forebreast 6" of solid Chalcopyrites, assaying 7% copper. All the ore obtained from the mine was cobbled and sent to market without any further treatment, only the refuse was milled and dressed. Mr Johns showed me several sales notes of his production during his management, the following one will give some idea of the production and values obtained at the time.

1873	Tons	Percent	Price Cu Standard	Returning charges	Price per ton	Value of Parcel
Mch 26 <sup>th</sup>	39. 7. 3	7.3/4	104.	55/-p.t	5.6.2	190.11.10
Mch 27 <sup>th</sup>	21.11.1	12.3/4	94.10	“	9.6.0	190. 2. 0
Mch 29 <sup>th</sup>	28.13.1	5.5/8	114.	“	3.13.3	87. 0. 7
Mch 31 <sup>st</sup>	36. 4.0	5.1/8	117.15	“	3. 5. 8	112.16. 2
Mch 31 <sup>st</sup>	<u>22.15.0</u>	5.1/8	117.15	“	3. 5. 8	<u>70.15. 8</u>
	<u>148.9. 1</u>					<u>651. 6. 3</u>

A great number of these sale notes give an average production of about 150 tons of dressed ore per month varying from 5% to 13% copper (probably by dry assay in 1873).

The Coniston Mining Company sunk the new Engine Shaft in the old Coniston mine from the 190fm. to the 205fm. and did some development at the 205 level, the width of the vein was 2' to 3'. Only specs of chalcopyrite were found in this level and the ore was estimated at less than 1 ton per square fathom.

From 1880 to 1884 the production fell from 150 tons of concentrates per month to 40 tons per month, this is said to be due to the neglect of the Paddy End section of the mine. Mr Wynne having no encouraging results from the mine, gave up the lease and the mine was taken over by Mr Charles Edwin Day, now of 314 Kew Road, Kew, Surrey.

Mr Day took the mine's lease over in 1871 and worked them after a fashion up to 1908. He does not seem to have been very successful for according to the accounts he lost all his money. Mr Day however asserts that the crude ore in the mine is worth 2.3/4 tons of 8-9% concentrates to the fathom, which on a 3' lode would mean about 2.2% copper in the crude and that a production of 300 tons of concentrates per month could be obtained.

This assertion is confirmed by Mr J. J. Calderwood, now with the Mineral Separation Co., with whom I had an interview.

Mr Calderwood informs me that the general run of ore to be obtained from the Paddy End of the mine will average about 2-5% copper and much richer when the mineralisation forms solid bunches at fault plane.

From 1908 to about two years before the war the mine was abandoned.

In 1912 a French Company leased the mine from Mr Le Fleming with the intention of testing a patent process of extracting the Copper from the dumps by electrolysis, by using the acid produced in roasting concentrates to release a solution of the copper contained in the roasted concentrates and treat the crude liquors by electrolysis.

The Mineral Separation Company put up a plant to concentrate the sulphides contained in the crushed dump stuff and these concentrates were treated afterwards in the electrolytic plant.

The French Company never did any mining except to obtain samples to test the patent process plant with, and at the outbreak of the war, as all its members were called up to serve in the army work was suspended. Mr J. J. Calderwood was the general manager at the mines for the French Co. until March 1917, the date at which he ultimately left Coniston.

The French Co. is said to have lost about £12,000 in testing their electrolytic process, but this can hardly be put down to mining losses if they would only work the mine and produce concentrates for the market. The French Co. however refused to entertain the idea of working at the mine.

The mine has thus been unproductive since about 1908.



A section follows about the possibility of forming a Company for working the mine.

### Conditions and Accommodation of Labour

The mine being only about one mile distant from the village of Coniston the accommodation of labour is of small importance, however, there are 10 cottages erected on the property capable of accommodating 30 men, two small houses which might be used for minor officials. There is also a fairly good house for the accommodation of a manager and his offices. This house is partly furnished and in good condition.

### Labour:

The mines having been stopped since the outbreak of the war what little labour was then available in the district has found employment in the neighbouring iron mines around about Barrow-in-Furness etc. The mines are now in charge of a caretaker Mr. Shaw who was underground foreman during the French Co.'s occupation of the mines.

### Mining Costs, Estimated

The cost of driving ends in the quartz vein stuff with rock drills would not be more than £6 per fathom, the air compressors being driven by hydraulic power.

Raising Winzes would cost about £10 to £12 per fathom.

Shaft sinking in rock requiring little or no timbering for a section of 14' x 6'6" might be done for £20 to £25 per fathom as it is said there is very little water in the mine.

Breaking Ground: Breaking ground in stopes would depend very much upon the width and value of the vein that could be taken out as stoping ground. In some places where the vein bunches out to 15" to 20" wide the cost of breaking would be very small, while in narrow stopes of 15 to 20" the cost would increase considerably.

The average cost of breaking ground in a 3' stope would not exceed 5/- per ton or about £3 per fathom.

In certain cases where the mineralisation penetrates the country beyond the walls of the load forming a stockwork of small quartz veins carrying values, this would have to be considered as to the advisability of taking a much wider stope and sorting out the mineral portions in the stope, leaving the refuse as a filling, this method would imply overhand stoping.

### Tributing:

Tributing work might be given out in the old levels where ground of some value is said to be left standing, the tribute would of course depend upon the quality of ore that could be obtained.

### Value of Crude Ore:

The value of the crude ore is difficult to obtain as the majority of openings are now nearly inaccessible or dangerous to visit. It is reported however that the quartz stuff averaged from 2% to 7% Copper, and a considerable amount is found where the vein is faulted by cross courses, forming at these junctions large pockets of pure ore assaying as much as 12 and 17% Copper. Such bunches were found in the old Coniston mine and called Cobblers Hole and Bonsor's bunch and in Paddy End, Warsop's bunch.

From points I was able to examine in the mine and at outcrops I am of the opinion that the crude ore may, on average, run to 4% of Copper.

From the appearance of the dumps at the mine, the ore seems to have been well hand-picked, but there are still portions of them that would be worth re-treating. From old notes found in the assay office, the dumps treated in the mineral separation plant assayed at 0.90% Copper, from which a concentrate of 12% to 18% of copper was obtained, the tailings assaying 0.2 to 0.3% copper.

A better idea of the value of these dumps can be obtained by examining the stuff now in the hopper of the mill that has been crushed by the breaker, the fresh surfaces show much more copper pyrites than can be seen in the dump stuff at the head of the mill.

If the dumps that seem to have been carefully sorted in the mine when the ore was broken now gives an average of 0.90% Copper, there is not much doubt that what constituted this ore must have been at a much higher percentage, and 2½ or even 3 times the value of these dumps may be expected from the crude mined ore.

#### Cost of Dressing:

The cost of dressing given to me by Mr Bennett Johns was 9/- per ton, stamping and hand jigs, but with modern methods such as that of the Mineral Separation Plant now existing on the mine, I should think the cost of dressing would not be more than 3/- to 4/- per ton of crude ore milled.

The Mineral Separation Plant is in perfect order etc.

(Note this plant has now been sold.)

#### Railway & Road Freights.

The produce of the mine can be eliminated by the road to the railway head at Coniston, about one mile, gradient in favour of the load, at the cost of 1/- per ton.

Railway freights to Liverpool 8/4 per ton.

#### Market & Prices:

(This is of no interest now.)

#### Power & Plants.

All the power required by the mines has been obtained from hydraulic installation.

At present the power plant is as follows.

Description of power plant and mill with electrolytic plant.

Most of this is now sold.

#### Geology and Occurrence:

The district west of the junction of Upper and Lower Silurian West of Coniston Lake and south of the Keswick district is most interesting country with regard to its possibilities as a copper producing area; except for the Coniston mine on the North East fringe of the area, a test at Seathwaite and a small mine opened North of Coniston at Tilberthwaite and at Greenburn, the whole country, although reticulated with veins, has remained unprospected, this seems to be a large field worth further investigation.

The area under review is composed of metamorphic rock of the lower Silurian period probably altered volcanic ash or metamorphosed igneous rock, traversed by a great number of shearing planes and often in large belts fissured by pressure to assume a slate constitution.

These rocks are traversed also by quartz veins that contain invariably copper, but blende and galena have also been found in some of the veins.

The quartz veins vary from a few inches to 8ft to 10ft thick, on an average about four feet thick. The joints or faults, known as cross courses, displace the quartz veins and generally produce, at the intersection with the veins, enrichment of the mineralisation of the latter.

Such junctions were the cause of the rich bunches found in the Old Coniston Mine and in the Paddy End, in fact nearly all of the work done in the mine west of the Redgill Cross Course seems to have been to discover such junctions, ignoring what the veins may have contained outside these fault zones, as nearly all the work seems to have been made along cross courses rather than on the known veins themselves.

This last method of prospecting was the later method although the example of the Old Coniston Mine that kept to one vein and worked it out to 205 fathoms depth, had given such good results, the method of looking for cross course junctions seems to have been universally adopted although it gave unsatisfactory results over and over again.

The quartz veins seem to have been very well defined with quite smooth walls, but often contain a large amount of country cemented by the quartz magma. The most usual minerals are Chalcopyrites, often in ribs of several inches, but generally as grains or speck impregnations in the quartz fillings, common iron pyrites is abundant as also, when the vein becomes less quartzose the presence of magnetic iron oxide seems to become predominant. Blende is said to be abundant in the Eastern extremities of the workings in the Old Coniston Mine, galena is found now and again, but rarely.

The general run of the mines crude ore can be considered as a quartz gangue with admixture of country (fine grained dolomite and diabase) containing Chalcopyrites, Pyrites and Magnetite.

The country rock is hard and stands well and from all accounts is not very wet, so that the mines make little water.

#### Mines:

The mine workings embrace a large number of veins and a great number of openings have been made on the different points where the outcrops occur or where the veins could be cut from the surface at convenient points.

The general strike of the veins is roughly East West with variable dips, the majority however dip to the west at variable angles, in some parts of the mine the veins seem to be so numerous as to form a real stockwork.

The principal veins are from east to west, as shown in the adjoining section. The Drygill Vein, the South Vein or Old Coniston, with extension west of Triddle cross course, in the Bonsor country in which the openings called Flemings level, middle level and top level have been driven. This vein continues over the crest of Kernal Crag, right away West, passes through Levers Water and is known on the other side workings near the top of Black Scar. The total length of this outcrop as known at present, is a little over a mile.

The next vein on which work has been done is called the Kernal vein, and more to the West, a group of four or five veins known as the Hospital Shaft Veins, then the Paddy End Veins and Stephens (Stebbins) Vein. These veins are all South of the Old Coniston or South Vein.

The principal cross courses or faults is the Redgill or Triddle fault nearly N.S. at the East of Old Coniston Mine; this is said to fault the South Vein over 1,000ft to the south, but it seems more probable that the continuation of this vein as described above is more likely to be true.

The second cross course is the Kernal cross course, then two other courses west of Hospital shaft, and the Cross course at the east edge of Levers Water, and the great cross course forming the depression north of Brimfell. All these cross courses have been extensively tested by adit level drives in the old workings, and bunches of ore have usually been found at the intersection with the veins.

#### South Vein or Old Coniston mine vein:

The Old Coniston Mine opened on the South Vein East of Triddle fault, was worked from two shafts as shown in the adjoining vertical section to a depth of 205 fathoms below adit level, and for a lateral extension of 240 fathoms; the ground in the old mine seems to have been uniformly stoped out showing a probable uniform vein throughout the ground developed; large quantities of ore were extracted from this mine.

It would seem from reports that the lower level was decidedly poorer, only specs of chalcopyrites are said to mineralise a three foot quartz vein.

The eastern development seems to stop abruptly at the limit of stoping ground; this is due to, it is said, the pressure of blende in the vein giving, at that time, a vein stuff useless as a copper or blende ore, as each mineral interfered with the other.

The Deep Level or adit, about 300 feet below the outcrop is pushed all through the mine from east to west right up below the Paddy End, and has been the lower level in all the workings West of Triddle fault, no work has been done below this level except in the Old Coniston Mine. East of the Triddle fault the South vein has been worked by a number of levels to the top of the hill (1,425 ft.), the passage of the vein at the creek being about 1,000 ft.

The work done on this section of the mine is,

- (a) Flemings crosscut at 1,020 ft, caved in.
- (b) Flemings 1<sup>st</sup> level at 1,100 ft. at the top of a surface incline or sled, caved in.
- (c) Flemings middle level about 1,200 ft.

This level is opened by a 20 ft. cross cut going west on a fault and cuts a quartz vein striking N.15 W, dip 62 West, the vein varies 2'6" to 3' formed of crushed country and strings of quartz impregnated with chalcopyrites specks; the average value of this end was estimated 2½% copper. The vein stuff is fairly soft and should break with ease, the walls are hard and stand well, the head above the drive is about 30' to 35' but would increase on driving. This end has been driven 129 ft. on this vein, at 54 ft. from the end a rise of 30' communicates with the top level. This end was driven for £4.0.0 per fathom in 1905.

The ore opened up by this level is about  $\frac{129' \times 3' \times 30'}{12} = 967$  tons

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- (d) Flemings top level, about 1236 ft.

At this point the outcrop has been opened out by an open cut disclosing the junction of two veins or bunches of the same vein

The work is shown in the following sketch.

The drive on the middle level was on the XY vein in the outcrop at Flemings No 3, the P".I. was to be crosscut later on.

It would appear that little work has been done on this section at least on the surface and there are no signs of the lower working or Flemings cross cut and No 1 level coming to the surface at any point, so this portion may still be worth investigating.

From Flemings top level over the hill to Levers Water there are no other workings, so this portion may be vergin for a distance of 1,200 ft.

#### Paddy End:

From the Old Coniston Mine the adit level or Horse level was pushed along the Triddle Cross course south, until it cut a vein going west, supposed to be the South Vein, this was followed west, through the whole ground to somewhere below Levers Water and is the lowest worked level in the Paddy End.

#### Hospital Shaft:

From the accompanying section it will be seen that the Hospital Shaft sunk in the Paddy End or west portion of the mine has opened up ground 20 fathoms below the horse level but very little work was done from that level, 25 to 30 fathoms were driven west and 8 to 10 fathoms east.

The ground is said to be worth 1½ to 2 tons per fathom. The vein worked out above the adit and from the hospital shaft crosscut west was very productive as a large bunch called Warsop's bunch was found at this point.

Warsop's bunch was cut about 90 to 100ft. west of Hospital Shaft and all the ground above the adit has been stoped here. The vein at this point was 10 to 15ft. wide as judged by the now open stope I was able to see.

If the Mine is to be worked the Hospital Shaft is the point that seems to give the most promising position as to richness of ore and access to vergin ground.

The Hospital Shaft is in solid ground and in good condition. It could be opened up to surface and sunk below all the old workings and a new mine could be made from this point.

Above Hospital Shaft there are a number of old workings driven west and stoped out nearly to surface, good ore is reported to have been got from these, but the opening up of such workings would be a costly business; if anything is to be done the bottom of Hospital Shaft is the only place to start work from.

#### Brim Fell:

Further west on the east slopes of Brim Fell two tests have been made on quartz veins bearing copper pyrites, both these points are interesting, and show that the region is a cupriferous one, where copper veins may be discovered at any time and prove as rich if not more so as the Old Coniston Mine.

These prospect on Brim fell however, are points for later consideration.

#### Conclusion:

The district in which the Coniston mines occur is important with regard to its possibilities as a copper producing area.

The country North and North West of Coniston is reticulated with veins bearing copper, on which little or no work has been done, probably for the reason of their inaccessible position in the past.

The Coniston mines proper have been producers of copper from the most remote ages up to the present day; work on similar veins at Tilberthwaite has demonstrated that good copper exists at that point, only about 2.1/2 miles north of Coniston, as well as at Seathwaite. If a glance be taken at the Geological map of this district (sheet 98 N.W.) it will be noticed that a great number of veins have been traced and marked on the map, these as far as I could ascertain have never been tested. The possibilities are that many of them may be as good, if not better, than the Coniston veins. This point is interesting and deserves further consideration.

The Coniston mines proper, that is the East extremity, have been worked to 205 fathoms depth and no doubt leave little scope for further working that section, although it was reported that the East portion was entering blendy ground and was therefore abandoned. However, the old mine is full of water and would hardly be worth pumping as the quantity of ore left would probably not justify the expense of pumping.

The section West of the cross course Triddle or (Redgill fault) seems to be an interesting point for as far as one can see in the existing workings no extensive developments or stopes have been made in the Fleming levels, in fact unless these veins have been worked by lower levels now inaccessible, this portion of the property is probably vergin to a large extent. The veins are quite well formed and where they could be reached show fairly good ore (Flemings middle and top level) Development on these might open up a quantity of ore.

#### Portion between Old Coniston and Paddy End:

The portion of veins comprised between these two sections is inaccessible and nothing could be seen of any of the workings.

Paddy End:

This section of the mine is vergin below the Horse Level and is the most important section of the mine. The Hospital shaft has been sunk 20 fathoms below the adit and good ground is said to exist at this level, any further development of the mine should proceed from this shaft

The value of the ore is probably not much higher than 3% copper, but I am of the opinion that good ore can be developed from this shaft. The average width of the vein can be taken at 3ft. and there is an ore course of about 40 fathoms proved more or less extensively by the old workings (see Paddy End section). The amount of ore that can be developed is therefore considerable.

The whole of the power required by the mine for a very long time can be obtained from Levers Water, about 1,000 HP can be obtained from this source alone; the Red Gill or Triddle creek can furnish another 200 HP.

The cost of mining, winding, and crushing ore of 2 to 3% copper should, under the favourable circumstances of the locality, be no greater than 20/- per ton including all the expences on the basis of 150 to 200 tons of crude ore per diem.

The water should be taken by force pipes from Levers Water and by pelton wheel transformed partly into electricity for winding engines and the other portion to compress air enough to drive 60 hammer drills to be used in rapid development and breaking ground. These would have no difficulty in breaking 200 tons a day.

The capital required to open up the Paddy End for production would be about,

Plant .....	£20,000	
Development .....	£10,000	£30,000

This would be sufficient to instal 3 force mains of 16" from Levers Water to Paddy End each for a pelton wheel developing about 300 HP.

- 2 pelton wheels working compressors
- 1 pelton wheel for electric generation

The electric current to be used for winding, pumping and electric traction and for working the mill.

The 200 HP Pelton wheel now existing at the mine might be used to reduce the above power plant expenditure or kept as a stand bye.

Alternative:

The mine on a smaller basis could be started on the following scheme.

The Hospital shaft could be rigged up with a small hoist and the mine developed from the 20 fathom level below the adit.

The present power used on the electrolytic plant about 200 HP might be used to generate electricity to be used at Paddy End for hoisting and pumping, compressed air would be installed later on.

To execute the above plan, about £1,000 would be sufficient for plant and some development, enough however to convince one of the exploitability of the veins below adit level.

Sgd. J. H. Cunningham

28<sup>th</sup> August 1917.

## Dodd End mine.

(Be careful what you wish for. Your wish may be granted!)



This photo has appeared in the Newsletter<sup>1</sup> once before; left to right are Ian Tyler, two unknown participants, Anne Danson, Ian Matheson and Edd Brown. Taken in 1987 following the descent of the 200 foot shaft at Dodd End Mine, it seems clear that everyone had had an enjoyable time. From the Meet Report<sup>2</sup> it's apparent that Mike Mitchell had previously descended and bolted the shaft in 1983.



Back in 2010 when I came across the photo I was completely unaware there was a 200 foot shaft near Hartsop, so I looked at the early OS maps and on the 1897 survey found the two adits shown on the left, along with the valley level adit, all of which were clearly disused at that date. The earlier 1859 survey shows only the lower of the hillside adits along with the valley adit, but both are active then.

Adams<sup>3</sup> describes the mine “*The vein close to the Hartsop Dodd ridge contained much quartz and a little galena. The lowest level of the three is about 130 fathoms in length, and the one above it 40 fathoms, the two being connected internally by a 200 foot deep shaft. The latter level is connected to surface by a 25ft deep shaft and above this is a small trial level.*” The dates he gives for operations fit those from the surveys.

Keen to descend the shaft I contacted Roger Ramsden to find out what he knew, to be told that he and Tony Holland had dug out the lower level some time before and bolted the shaft. On request Tony promptly organised a meet for March 2011 and his report is available<sup>4</sup>. I quote “As I set off down the rope, I wondered whether I should call the trip off. The water flow was serious, drenching me to the skin and the physical impact of the water made manoeuvring difficult..... The final rebelay was dreadful to rig, under a torrent so fast and furious it was actually difficult to breathe.” Hence my sub-title!

Just in case readers who do not know Tony think him over dramatic I must point out that in 2020 he completed the Spine Race (the whole length of the Pennine Way) in appalling weather in 132 hours 25 minutes, coming 19<sup>th</sup>.

All six of us found ourselves chest deep in the lower adit, which was sumped up. Ruthlessly assessing my chances of survival I insisted on climbing out first. Idiotically I failed to remove my glasses which led me to cross the first re-belay by feel, being quite unable to see anything at all. At this point not only was I in the water but a continuous flow was running into the collar of my oversuit, exiting via the legs having long since completely filled my wellies. Luckily, as I climbed the flow reduced slowly, but in spite of exerting myself to the absolute maximum I was quite unable to generate any body heat and exited at the top into the sunshine to find myself shivering quite uncontrollably. I was followed out by the others, with Tony last, managing to de-rigg.

So what’s the point of this story? Well we had really broken all the rules quite unconsciously; firstly none of us had appropriate clothing for immersion, “*but I advised that this was a dry trip*” (Tony at the carpark), secondly we knew that there was no exit from the lower level since we had seen the blockage on the way up the hill, and thirdly, (knowing the first two) since the water flow increased all the way from the top downwards, all of us should at some stage have stopped and gone back up and out. Tony pressed on down because he didn’t want to disappoint the others who then felt that they had to follow, and had the lower adit been open the decision would have been questionable (given the clothing) but defensible. Knowing that we had to climb out through the water flow should have changed everything, this really was dangerous. Ignoring the risk of hypothermia, the shaft is not large so should anyone have had a problem at any of the re-belays there was no chance of any access to them from above or below. A typical serious accident in the making where a succession of events lead inexorably to disaster due to failure to see the overall picture clearly.

I can honestly say that the party’s descent back to the carpark was made in an even better mood than that displayed by Ian Tyler’s group all those years before.

In mining terms it’s difficult to see what possible reasoning could have led to the excavation of this shaft, since a number of adits could have been driven into the hillside at far less expense. There is really no visible sign of ore anywhere but economic return does not seem to have been a feature of Hartsop mining.

John R Aird.

#### References

- 1 CAT Newsletter 103 May 2011 Page 13
- 2 CAT Newsletter 17 Summer 1987 Page 19
- 3 “Mines of the Lake District Fells” John Adams
- 4 CAT Newsletter 103 May 2011 Page 12



### **From Cobalt in Coniston to Lithium in Cornwall**

Former Coniston resident, Jeremy Wrathwell, has always had an eye for a good business venture. I knew him when he used to live next door to my brother at Brocklebank Ground and ran an outdoor clothing supplier operation at Lake Road, Coniston.

However Jeremy had never planned to go into clothing retail, in fact he had trained as a mining engineer at the Camborne School of Mines at Penryn, Cornwall. But he had a very real interest in Coniston's mining history and on one occasion joined a small group I was taking into Grey Crag Level, Coniston. While underground it was extremely difficult to drag him away from the deposits of erythrite, a secondary-mineral of cobalt, which is very evident on the walls of the level.

During his time at home in Coniston he became extremely interested in copper workings in Zambia. This led him to have weekly commutes from Coniston to the agent's offices in London, which is something one would not want to do for long. Ultimately, as China took control of much of the world's copper production, he abandoned this project.

Eventually, about ten years ago, he left the land of copper and slate and moved back down to the land of tin.

Just north of Redruth, and only about five miles from South Crofty, a considerable amount of development work has been carried out recently on geothermal power, at a location known as United Downs. The technology involves the circulation of water through hot granite rock at a depth of up to three miles. This results in the water being heated to temperatures of up to 190°C and this can provide power for the local area via heat exchangers and turbines. Jeremy was aware that such flows of 'geothermal water' from these deep wells might also contain extractable amounts of lithium and he started to investigate. He collected a small group of colleagues together and arranged for metal analyses to be carried out on samples of the water.

According to his blog he didn't believe the first set of results he received back from the lab, possibly thinking that someone had got the decimal point in the wrong place. So another set was collected and sent off to a different lab - and it gave an identical result, of extremely high levels of lithium!

Subsequent tests showed that Cornwall's 'geothermal water' could provide some of the world's highest grades of lithium and that the concentration of up to 0.22 grams of lithium per kilo of water was also extremely high.

Jeremy reported that this was all "staggeringly good" and that the deposits of lithium were "largely untouched from the old days of Cornish mining". He was clearly conscious of the decline of Cornwall's mining heritage and was aware that only a small amount of lithium had ever been mined in Cornwall in the past, during the Second World War. He was also aware that some exploration for lithium using conventional mining techniques was in progress near St Austell. In his blog he stated that he felt all this would "kick-start a renaissance for Cornwall's traditional industry".

His initial work quickly led to the establishing of Cornish Lithium, a ‘start-up company’ with Jeremy as the chief exec. His calculations suggest that sufficient lithium can be obtained from these hot springs to meet Britain’s future need for this ‘battery-metal’ for some time. Cornish Lithium is currently building a pilot extraction plant close to Britain’s first geothermal electricity plant, which was developed in 2019, and funding appears to be rapidly flowing his way. Part of this will be to trial a method for extraction of lithium from the geothermal water, which can then continue its journey on to power the turbines.

Jeremy is already thinking ahead and realises there will also be a huge demand in future years for other so-called battery-metals such as cobalt, especially to help with the development of battery powered vehicles and the expansion of 5G technology.

So, if you happen to be walking up from Coniston to Paddy End, past Philp Johnston’s place and the water treatment plant, and you see a lone individual walking purposefully up towards Grey Crag Level carrying an equipment bag, you could always ask him if he wants any help with collecting samples. I’m sure he would be pleased with your offer, and your efforts might even end up being mentioned in a future up-grade of the book on Coniston’s history, ‘*The Story of Coniston*’.



*A photograph of the trial equipment installed to extract geothermal water samples from the granite rock deep below the surface at United Downs, Cornwall to assess the concentration of lithium present in the water.*

## **The Lecht Iron and Manganese Mine**

The Lecht Mine can be found in the eastern foothills of the Cairngorm Mountains in the Highlands of Scotland and is within the Cairngorm National Park.

Understanding of this mine is somewhat complicated. The few details that are known appear to have been 'borrowed' from each other leading to a confusion of the facts. As a result it has proved difficult to cross reference the available data. It is generally known that iron ore was smelted on the banks of the River Nethy on a site close to the old railway station and on land that is probably now occupied by the hotel. It is also recorded that the company that set up the works invested some considerable sum into the smelter, constructing road infrastructure, saw-mills and an iron foundry, not to mention the dwellings for the local workforce. Initially this was probably a significant boost or even 'a God Send' to the local population.

The smelter, according to parish records, opened in 1731 and saw significant investment, and probably initially a success, with cast iron items sold across Inverness-shire and Moray. It is also plausible that some of the iron was bought for military purposes and maybe was taken for use at Fort George. Iron ore may well have come from several places but the bulk was probably from the Lecht Mine. It is commonly accepted that the Lecht Mine itself opened around the same time and was in operation until 1737, the same period of operation as the smelter.

With regards to the name of the company there seems to be confusion, but it is highly likely that the 'York Building Company' who were the promoters of the iron smelters and foundry at Nethy, also had some financial input into the mine.

It has to be remembered that this was not a politically stable period in the Highlands. After the controversial treaty and formation of the Union of England and Scotland in 1707, the Catholic (Jacobite) population was under considerable pressure to fall into line with the new system of Hanoverian government. Any investment must have come with considerable risk, most probably with split loyalties between the locals and the governing bodies. Strathavon (Tomintoul), the parish of Kirkmichael, was very much loyal to the Jacobite cause and for a return to independence. The scattered communities trying to scrape a living off the wild landscape were probably viewed as unpredictable, posing a risk to law and order. This was a considerable problem to the British Government as is well documented in the Highland clearances post Culloden.

Several methods were deployed to control the Highlanders in the years after the 1715 uprising and leading up to and after the second uprising of 1745. One of those was to encourage land owners to provide housing and employment on lands confiscated by and coming under Government control. There is a tale, whether fact or folklore, (or a bit of both), that the assistant and later successor to General Wade, Major William Caulfield, whilst constructing the military road from Perthshire through highland Aberdeenshire and on into Strathavon (Tomintoul), was tasked with finding a method to appease to lawless locals and reduce the risk of them following the rebel cause. It is well documented that money was not so forthcoming from government to police the roads and no barracks or garrison was funded for the Tomintoul area. Encouraging agriculture was not an option in this highland tundra so Major Cauldfield supposedly posted his Chaplin to the Strath and constructed a basic church. From here the Chaplin, it is said, oversaw contracts awarded to families for employment at the mine which was four miles away. However, as the local population were all Gaelic speakers and totally illiterate, and with the interpretation biased towards the military, the folk had, in fact, signed themselves into the army. There is one factor that possibly supports this theory. The promoting company for the iron

works at Nethybridge, 'The York Building Company', who were instrumental in numerous engineering projects in the south such as water treatment works, pumping stations and even interests in lead mining, were sponsored significantly by government and would have worked closely with the military planners. The military road that ran through Tomintoul also passed close to the mine.

The planned village of Tomintoul that exists today is the result of confiscated lands re-allocated to the Duke of Richmond after 1715, with the construction of the present village dating from 1780. The original chapel is now replaced by the Telford designed church, the mineral rights to the mine also going to the Duke, though there is no evidence of this being exploited in the following decades, somewhat strange considering the huge quantities of iron remaining.

The second recorded phase of the Lecht mine wasn't until 1841, where the present Duke of Richmond was encouraged to re-open the mine to exploit the substantial deposits of manganese minerals. Significant investment was ploughed into the mine infrastructure which included the substantial stone-built mill building which we see today, this sitting at right angles to the burn (beck) of the infant Conglass water.



The building is quite unusual in that, it would appear, all the mechanical processes were carried out under one roof with the stamps situated on a substantial stone platform backing onto the inside of the wheel pit wall. Other apparatus would have included trommels and jiggs.

The building consisted of two floors, the ground floor containing the framework for the majority of the machinery with the upper floor for access to the mill to drop the ore, with the stamps probably rising up above the upper floor at the gable end. The sides of the building have large apertures to provide ventilation and noise reduction.



The manganese ore was barrowed into the mill via a 30ft bridge onto the upper floor from an adit in the hillside opposite and lateral barrow ways from both directions running on linear ledges above the burn some 20ft up.

*The picture shows the stamps bed plinth.*

On the opposite end of the building from the burn is the supporting wall for the water wheel, this must have had a

diameter of around 20ft. Water was taken from a dam a quarter of a mile up the valley and carried via a leat (lade in Scotland) on the hillside 40ft to the north. For anyone working the mill, the noise would have been deafening, (quite literally), and most probably included the women and children of the men and boys working the mine. It is recorded that 63 miners were on the pay role, plus their families.

The ground to the west of the building may well have been used as settling ponds, though the rich pickings from the mine meant that the poorer mineral could be discarded. This area was probably the site of timber structures used for storage, mine office and accommodation blocks for the workforce.

There is no evidence of any other stone buildings associated with the later manganese mining. This is probably down to two reasons. The only stone that was suitable for construction was quartzite, very difficult to work and often with frustrating non-parallel faces, certainly the wallers nightmare stone! The quartzite blocks were quarried out of shallow quarries west of the mine on the steep hillside above the Conglass Burn. A substantial cart track has been cut into the hillside for this purpose at what must have been at some considerable expense.

Visitors to the glen will be immediately aware of the total lack of natural trees with only the now felled plantation a little to the west. This treeless landscape of open heather moor, which is the stereotypical image most folk have of Scotland but is in-fact totally man made, is a result of the failed uprisings and land confiscations of the 18<sup>th</sup> Century. After Culloden the wild scrub forest of the upland landscape and Caledonian pine forests were felled and cleared, initially to limit the possible hiding places of rebels but then to establish the grouse shooting moors of the sporting estates and landed gentry. However, at this time, although the grouse moors were well established, considerable scrub woodland would have still existed in the valley near the mine and such timber would have been a cheaper and easier choice with which to build.

In the 1980s The Institute of Materials, Minerals; and Mining carried out a detailed study of the mine. This was a very thorough examination of the minerals present, with excavations and core samples taken. Around the same time, the Moray Council commissioned an archaeological

study of the main working site and mill building. They restored the walls and re-roofed the structure including replacing the huge timber that the wheel axle bearing sat on. The restoration was carried out to a very high standard and the whole site was then scheduled as an ancient monument, this effectively closing the door on any future life as a working mine.

Although there is a passing reference to ‘other’ structural remains it seems that one of the most interesting archaeological features is on the west side of the mine and has been largely overlooked. These are the remains of an earlier mill complete with wheel pit. On investigation this mill site was reached by a barrow- run running downhill from the western side of the mine. The stone foundations are heavily covered with moss to an incredible depth but the layout of the structures is still apparent.



*Early mill with wheel pit on right.*

*Barrow run heading down into the mine (on the left)*

There appears to be a building of two rooms, one around 10ft by 6ft and the other 10ft by 20ft. The barrow-run lands on an earth platform next to a dry water course or small header pond. Water appears to have been delivered from here onto the wheel via a wooden launder. On the other side of the earth platform water may have been delivered into the mill with a by-pass channel sending it back into the mill leat.

The first and smaller building has no doorway and probably held some sort of machinery. The second larger building (though joined) does have a doorway but probably also held machinery and hand workings. A drive from a wheel parallel to this building would have driven the machinery inside. The earth platform previously mentioned may well have been for delivery of ore into the machinery. There is a third, smaller, structure that may have been a store. The water wheel itself was possibly held on a timber structure as there is no masonry lining the pit, although it is possible that any stonework had been robbed.

It is notable that the foundations that remain have no fallen stone around or with-in, supporting the theory of stone removal for re-use on the new building. On the opposite side of the building from the wheel pit is a small work area/cart track head, and next to the burn side, a cart track follows the burn down some fifty yards where it joins the main Conglass Burn. It is on this low lying area before the junction of the burns that two small round hollows are evident in the grass and appear to have once had stone lining, presumably also ‘robbed’; possibly buddle pits?

The mine workings themselves are of considerable interest, consisting of three large open pits with a network of barrow runs exiting on an incline to various waste tips, mineral dumps and

tailing dams of fine riddled material. One of these is rich in iron and at least two others are dark fine silt of manganese nature. Vegetation struggles to grow on the manganese spoil.

There are two main periods of working here. It is difficult to determine them apart as iron ore was mined in both periods of working, but in the early period the manganese was dumped as waste. In the latter it was the iron ore that was discarded, or at least piled in salvageable heaps in case it was required. Sizeable dumps of iron rich rock are notable.

On the west side of the pits, exit from the pit is on a level or steady fall. A barrow run and drainage channel run out of the workings and onto the tailings of the fine material previously mentioned. Water appears to have been channelled into shallow settling ponds or buddles though this is inconclusive due to the complexity of the ground which has had several changes of operation. Another possible use of this 'bund' was dry storage for ore. This area appears to relate to the later workings and sits higher than the early mill. It is also noted that, although the moor has surface run-off towards the mine and there are run off channels going down into the pits, there is a complete absence of water in the bottom, nor any water loving vegetation, indeed, the ground is totally dry.

Typical of an ironstone working, the mine is predominately deep open pits. However, there is an account of the company sinking at least one shaft to a depth of eighty feet and adits driven into the hillside from the mill intersecting the workings. The evidence on site seems to tie in with this account. In the middle pit, which is around a 100ft by 50ft and 30 plus feet deep, there is evidence of a sump at the deepest end. Natural water run-off channels funnel surface water into the pit, yet there is no pooling or resistance to drainage, suggesting this is the shaft in question.

A low curved mossing ridge, possibly a wall, holds back a working platform of fine debris. Barrow runs climb steadily on an incline out of the opposite end and onto the tipping area. This is about fifty feet above the mill. There is evidence of a barrow run terminating above the mill, possibly to discharge ore down an open ore pass or chute. This has, however, been over-tipped suggesting its use was discontinued.

The ore arrived at the mill on the hillside adjacent to the upper floor level previously mentioned. The archaeologists back in the 80s suggest a level was driven through to the pit, and there is clear evidence of this. My own theory is that mined ore was dropped down the shaft (as an ore pass) and into the level driven from the mill access bridge. It was then collected and barrowed out of the adit, the spoil being barrowed away upwards by the network of inclined barrow runs. There is also some evidence of a second shaft in the floor of the most westerly pit and a level driven through from the north of the workings.

#### The Geology:

This account is my own interpretation of the site. I have no formal qualifications in geology beyond school but gained a reasonable understanding from my father who was a professional geologist. In the past I always had the luxury of being able cross reference my findings with my dad. I no longer have that source of reference and will say now that this account is open to interpretation or correction. A detailed record of the mineral deposits was taken in 1983 by The Institute of Material, Minerals and Mining. Anyone who is member of this professional organisation will be able to access their records on this mine. Indeed, a professional account of the complex mineralogy of this site would be most welcome, possibly in a later newsletter or CATMHS social media page!

The Lecht mine lies to the east of the Cairngorm massif which is a granite plume/intrusion. The National Park covers a much larger area and the majority of the rocks are from the Dalradian super-group. The rocks present in the area of the mine are shales over-laden with breccia and quartzite, the quartzite and breccia having been fractured and 'confused' by glaciation. The ridge or promontory of rock the mine occupies has been eroded by melt water on three sides.

The iron/manganese bearing rocks are found in decomposed breccia and a result of metasomatic replacement and the complex mineral 'soup' being formed in this oxidation zone. Several forms and variation of oxides and hydrous oxides of both iron (possibly derived from magnetite) and manganese are evident. Other minerals are also found including zinc and lithium. Manganese minerals found include Cryptomelane (Psilomelane) and probably Manganite, plus other forms of manganese hydrous-oxides and oxides. Iron is found in numerous oxides including goethite and limonite. There are also amalgamations of several minerals including Lithiophorite, producing an array of colours.



*Examples of Iron rich Breccia with traces of Manganese, Goethite in centre.*

Other facts:

In 1859 the Keith and Dufftown railway company opened a station on the south side of the Banffshire town of Dufftown, on a mile long branch from the main route north. The idea behind this was to forge a line through to Glenlivet and over the hills to Tomintoul and tap into mineral traffic from a proposed re-opening of the mine. A route was surveyed and costed. The report stated that this was a relatively uncomplicated project with no major engineering challenges. Sadly the consortium promoting the mine re-opening failed to convince investors. A second attempt for a mineral railway may have been in the 1920s.

Robert Gurr.



### **Greenside Mine locomotive, new information.**

While looking at the British Newspaper archive website I came across the two articles below, which appear not to have been reported on before, relating to the original electric locomotive at Greenside Mine, which was the first in a UK metal mine.

Penrith Observer 6<sup>th</sup> September 1892:

*An electric locomotive is a novelty but there is one at the Greenside Silver Lead Mine. The Greenside Mine is attested to as our readers are aware near the head of Ullswater, on a spur of the Helvellyn range of mountains. The Managing Director is Mr. J Pattinson of Messrs. Pattinsons and Winter, Penrith and Whitehaven. The Greenside Company now have an electrical installation and an electric locomotive for hauling the ore, etc. from underground. It runs upon a 22-inch gauge. The length of the road is 1200 yards and the current is collected from two bare copper wires carried on insulators overhead. The electric-motive force is reduced from 500 to 200 volts. The whole installation is most interesting, and the prime power is a natural source - a waterfall that drives a turbine. In all about 100 horsepower is developed. The mine above and below ground is to be lighted by electricity. The General Electric Power and Power Company have supplied the installations and the locomotive has been specially developed to the requirements of the narrow roads.*



This is probably the first photograph of the locomotive and was from a set taken by Joseph Lowe, a well photographer from Patterdale. I believe that he was commissioned by the company to take the photographs. At the same time the above newspaper article was written. The first loco driver was Thomas Allinson, followed in January 1898 by my great grandfather Joseph Jenkinson, who drove it until the mine was put on care and maintenance in 1935. The gentleman behind Thomas with the top hat is Captain Borlase. My uncle Wilfred, nicknamed Pym, used to make some extra money by going to his house, Greenside Lodge, on his way to school and polish his shoes.

Penrith Observer 26<sup>th</sup> March 1895:

#### *A PATTERDALE ELECTRIC LOCOMOTIVE*

*The Greenside Mining Company have written to the makers of their electric locomotive stating that she has just completed her 6000 miles of running with an average working load of 20 tons at a cost of £12 and this for renewing the training wheels, which have just been replaced. The wearing of these can be to a great extent accounted for, seeing that some of the gradients are equal to 1 in 20, necessitating a heavy brake to be applied occasionally. The Greenside Company say the electrical part of the locomotive has required no repair whatever, the armature and commutator apparently being as good as at first. Taking into consideration the exceedingly sharp curves and their frequency in the line of rails, the wear and tear is, to say the least, surprisingly low.*



*Two of the conductors back in place on an original timber.*

Sam Murphy in his book “Grey Gold” has a starting date for the loco of the 21<sup>st</sup> February 1893, which might be a typo given the newspaper report. The length of the road which is quoted in the paper as 1,200 yards corresponds with Grey Gold, as the ore at this time was coming from the area above the Lucy Level and from the Lucy Shaft which was sunk on the vein as soon as the Lucy level hit the southern end of the ore body.

The Lucy shaft is located just beyond the flooded stope which you see when the end of the crosscut is reached and was a fully equipped engine room using the water from the Willie shaft to drive the engine. This was going to be a project for the digging team at one point, as the dig through the collapsed stope is only about ten feet.

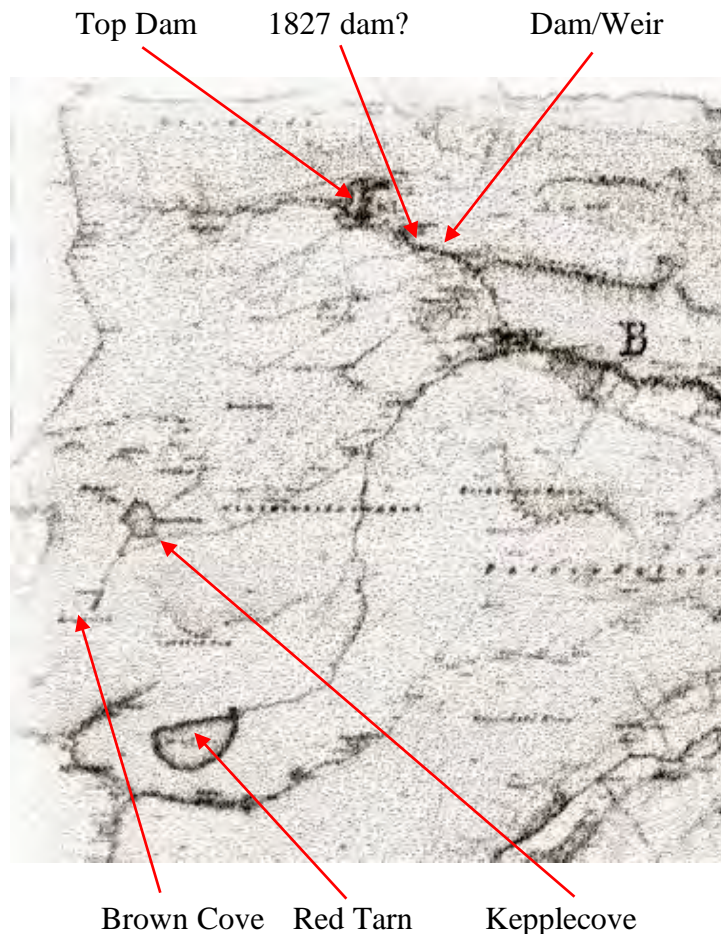
The report from 1895 shows just how many miles a year the loco was doing and how well it must have been built. I calculated on a six-day week, it was doing three trips a day and bringing out between 18,000 and 20,000 tons of ore.

Warren Allison

**Devastation of the Greenside Mine Smelt Mill in 1851.**

Sam Murphy in “Grey Gold” mentions that, on the night of New Years Day 1851 following violent storms, a dam burst at the mine and washed away parts of the dressing floors and the smelt mill. However, this could not have come from the mines dams at Red Tarn, Kepplecove or Brown Cove and so must have been a dam near the High Horse workings.

The breached dam that is there now, known by the miners as Top Dam, cannot be the one that was responsible for the damage caused in 1851, as part of it is made up of the waste from the driving of the High Horse level(?). However, just as you enter the upper area of the mine when walking up Swart Beck, there are the remains of the footings for a dam which Sam labelled as the 1827 dam(?). But it is only about eight feet high and would not have had sufficient water behind it to cause the damage to the mill. There are also the remains of a dam/weir just above the Low Horse Level which appears to have been much higher than it is currently and was used to provide water to the Low Horse mill.



Two newspaper reports that have recently appeared shed additional light on the damage to the mill.

The Westmorland Gazette and Kendal Advertiser January 11<sup>th</sup>, 1851:

*At the Greenside Mines in Patterdale, the effect of the storm and flood appear to have been more serious. In the course of Wednesday night the water, which poured into a large*

*reservoir connected with the mining operations at that place, was so intensely overpowering that the embankment gave way, and damage to a considerable amount was occasioned to the works by the water in its progress to the lake. We have heard the injury variously estimated at from two to three thousand pounds, and that if the occurrence had taken place during the daytime instead of at night, the probability is that several lives would have been sacrificed.*

The Westmorland Gazette and Kendal Advertiser March 29<sup>th</sup>, 1851

*SHOCKING AND FATEFUL ACCIDENT- On Wednesday week an elderly man, named Joseph Shaw, met with a horrible death at the Greenside Mines. It appears the smelting mill had not been in use since Christmas, at which period it sustained considerable damage by the heavy floods which then prevailed. And the washing away of the reservoir, etc., and it would seem that on the day named Shaw was engaged putting the machinery forward again, but finding it did not work properly, he commenced an examination into the cause. While doing so he unfortunately approached too near the small wheels and his clothes being entangled in them he was drawn into the machinery and literally torn to pieces in less than a minute.*

The tragic report into Joseph Shaw's death suggests that the damage to the smelt mill was considerable, taking a full three months before the machinery was being put back into operation.

About 25 years ago when having a look in the beck below the Smelt Mill, under and just downstream of the bridge over Swart Beck, I spotted some strange coloured rocks, and picking them up found they were extremely heavy and resembled slag. The large piece in the photograph weighs 10.3 kilo or 22.6 pounds. I made the mistake of filling the haversack up and couldn't pick it up there was that much weight in it.



I gave a piece to a good friend of mine John Hodkins who worked for Bill Shaw at Force Crag Mine in the 1960's. He then built a smelter in his back garden and smelted the slag, producing a disc of lead (photograph below) and a bead of silver (which he has). It is probable that this slag is from the floods of 1851.

The newspaper report states that the embankment gave way, so perhaps Top Dam was responsible and rebuilt after the flooding and is certainly worthy of further investigation.

Warren Allison.

## Brown Cove Mine

The mine is located at the head of the Glenridding valley well beyond Greenside and must be one of the highest set of workings in the Lake District, only a few hundred feet below the summit of Helvellyn, and is presumed to have worked an east-west lead vein.



There is very little known about the mine although there is a substantial smithy at about 2,000 feet, a very fine stone arched level at 2,200 feet which is collapsed underground, but from the size of the dump it could have been around 200 yards long and the top level at about 2,400 feet.

*Ann Danson and Ian Tyler at the smithy*

Ian Tyler in his book “Greenside - A tale of Lakeland miners” says very little about the history apart from a reference to the Greenside Company intending to develop the mine in 1870. However, Sam Murphy in “Grey Gold” states the following:

*In 1865 “The Directors of the Greenside Company were opening up mines at Hartsop, Eagle Crag and Brown Cove at this time....”.*

*“In May 1863 William Marshall was approached by Mr R Rowe of the Laxey mines in the Isle of man, with a view to obtaining a take-note of the mine at Brown Cove, Marshall thought it only fair to first offer it to the Greenside Company. In June 1863 Captain Philips inspected the mine and considered that although it did not have a first-rate appearance, it would be worth a trial. A lease was taken in 1<sup>st</sup> November 1864, and the mine was worked unsuccessfully for some years thereafter. D/BS unclassified documents CCRO Carlisle”.*



*Lower level, note the large number of rail chairs in the remains of a building to the left of the entrance*



*The stone arched level had wooden rail, of which there are remnants, and was driven in a straight drive.*



*This photograph shows a level off to the right which then turns left, indicating that there may have been two different periods of working, as the level to the right gives the impression it was trying to bypass the main drive.*

When Ian was researching for his book, we decided to have a look at opening up the top level and so on the 31<sup>st</sup> July 1990, we made our way up the valley and started the dig. Ann Danson had arranged to meet us, but she took a different route coming over Helvellyn and initially we thought she was a LDNPA ranger as she made her way across the fell. We managed to open up the entrance and saw that the level had been driven directly on a vein, initially in good ground, but as we came to the forehead after approximately 100 yards it had hit much softer ground and no sign of the vein.



*Top level entrance opened up, note the vein in the roof.*



*There was a piece of graffiti on the left-hand wall near the forehead which we deciphered as JM 1802.*

The three of us returned in 1991, with Jean Tyler and “Old” Pete Blezard to see if we could get better photographs of the level. That same day we explored higher up the fell to the north-west above the top level and in a gulley found lead and barytes along with a wedge, so perhaps there are further buried workings still to be found.



*Old Pete Blezard, Jean Tyler and either Ann Danson or Ian Tyler to the right, where the level opened out as the miners appeared to have been looking for the vein.*



*The forehead of the level.*

The mine is an interesting place, well preserved probably due to its isolated location and worth a visit on a nice day. Warren Allison.

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