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Royal Forest of Dean Caving Club

Contents

Diary Dates 2
Forest Geology 3
Lea Bailey Light Railway 5
FODCCAG News 7
Westbury Brook 8

It's Christmas

Editorial

Merry Christmas and a happy New Year to you all.

Editing this newsletter is a little like waiting for a bus. Just as you are beginning to think that you're going to have to write a couple of articles yourself, three turn up at once. Thanks to everyone who has contributed.

Diary Dates

Xmas Party and retro trip 19th Dec. If you need carbide lamps you'll need to contact Mole PDQ. £4 cap lamp. £8 hand lamp. Last year's hirings raised £39 for FoDC
Puddings and raffle prizes for the party please. The retro trip starts at 6:45pm and the party will be at 8pm after the trip.

News Years Day Walk. This starts in Longhope and will go to the Greyhound in Littledean via St. Anthony's Well and then back via Flaxley. Start 10 am at the layby on the Gloucester Road OS 162 GR 683184 **http://tinyurl.com/bt62qlu**

A Rough Guide to Forest of Dean Carboniferous Geology for Forest Cavers

First let me admit that I am not a Geologist and only have basic ideas on the subject, but over the years with much digging behind me, with very mixed results, I have learned some valuable lessons, and I think I should pass them on hoping to avoid fruitless effort and expense. Sticking my neck out, the following are my uneducated opinions on the Forest and Chepstow Carboniferous rocks ability to maintain caves, and is intended for those who have got the digging bug.

References:-
Geology Explained in the Forest of Dean by William Dreghorn published by David and Charles
Geology of the Country Around Monmouth And Chepstow HMSO *1960/1961*
Geology of the Forest of Dean Coal and Iron-Ore Field HMSO *reprinted 1964*
1" Geological Maps 233 and 250
I have omitted Sibley as this is not available and I am not sure if the ones above are now.
The one inch maps lack much surface information but the six inch are very expensive. What I did was to carefully transfer the one inch boundaries of the Carboniferous Series onto two and half inch maps, and these are very useful.

"The Carboniferous Series", is the usual reference in geological books of the Forest written about our area of interest; unfortunately none are written with caving in mind. This broad heading covers a range of strata with very different properties for us, some good and some bad. So with reference to the 1" geological maps (relatively cheap but difficult to discern in places) let's go down through our particular slice of the Forest "cake" starting at the top.

Drybrook Limestone.
This is a dense rock and achieves considerable thickness in the Chepstow area. Small caves are found in it at road level above Ban-y-Gor and some fox and badger sized holes in a small quarry in Milkwall. No sinks or resurgences known but could do with more investigation.
There is a thin level of Drybrook Sandstone separating it from the next strata which is:-

Whitehead Limestone
Forms "The Lid" above the Crease limestone. It has a number of bands of messy limestone in it and has a tendency to fracture and fall apart as seen in the iron mines and Miss Graces Lane cave.
No sinks or resurgences known. One reasonable cave and could be more. Old Stone Well hardly qualifies as a cave.

Crease Limestone
A light grey crystalline rock which has the most of the iron ore and hence many mines. There are caves in the Symonds Yat area and The Doward, some of which have been extended and mined for iron ore. One micro sink just below “Old Stone Well”. No resurgence known though I am not sure what feeds the one in Clearwell.

Lower Dolomite
Great stuff! And is my favourite rock. Blue grey in colour and is uniform, very hard, strong and real caves like Otter Hole and Slaughter Stream Cave can be formed in it, also fascinating iron ore mines. Unfortunately sinks and resurgences are few. More “footwork” needed on the surface where it is found.

Lower Limestone Shales
On initial investigation it seems very attractive as it has lots of sinks, collapses and resurgences. BUT, it is what it says on the tin, that is a collection of limestone’s of variable thicknesses each separated by a thin layer of shale or clay between the next band of limestone. This makes the structure very weak as the bond is very soluble allowing the limestone bands to separate and fall apart in blocks. A good example is just before St Briavels there are pots on the left of the road and down over the bank on the right is resurgence with a tight cave.
Drafts are possible and some are very good, but I do have a theory how these occur. In “proper” caves the total volume formed by passages, chambers etc are big enough to create the necessary volume and thus create a noticeable difference in air pressure with the outside world. In the lower Limestone Shales the multitude of interconnected fissures and gaps between the blocks also add up to a necessary volume.
Two resurgences have short “caves” i.e. you can get between the fallen blocks for a short distance.
As “named” strata its lack of mechanical strength allows vertical pots and collapses to form with minimum ease, but horizontally it just can’t keep it up.

Someone will now prove me horribly wrong and I will get corrected or kicked very bluntly! But I hope this will get people thinking and we end up eventually with a cavers simple guide to the Forest and Chepstow area Carboniferous rocks.

Warning! I have more ideas to research on this subject and you will eventually get bored again by another article.

Roger Bailey

Lea Bailey Light Railway and Hunslet 4wDHF Mines Loco

Built by Hunslet Engine Company of Leeds.
Weight 4 tons, engine 28hp Perkins 3152 diesel

HE w/no 7446, ex works 30/7/1975, gauge 2' 0"
New to NCB, Prince of Wales Colliery, Pontefract, delivered but unused
Moved to Sharlston Colliery, Yorks, 8/1975, used underground
Carried identifying numbers No 7, ML49, ML65
Reported as transferred, sold or scrapped after 5/1994
But also reported as moved from Sharlston to Clearwell c5/1993
Moved to Lea Bailey at some time between 6/12/1996 and 1/10/1997
Returned to Clearwell by 10/4/2000
Industrial Railway Society records show now (2012) at Clearwell as '7'
Engine started at Clearwell in early November for first time in 5 years. On 16th November it was started and moved, but only within the shed due to lack of space. On 25th November it was started and moved out of shed and along the limited length of track available at Clearwell. It is hoped to move it to Lea Bailey as soon as there is suitable secure covered storage available.

This is a true mines locomotive, being a flameproof design certified by Buxton as safe to work underground in gaseous coal mines. Hence it has no electrical system, other than an alternator to supply power for the headlight. Starting is with a compressed air starter, and drive to the wheels is hydraulic. About half a dozen locos of this type remain in use in collieries in the North of England, but their use on preserved railways is very rare.

Work at Lea Bailey to revive the railway project continues, albeit rather hampered by the recent wet weather. A shipping container has been purchased and is being converted into a secure loco shed. At present the Simplex loco and 5 wagons are stored in the mine when not in use. It is hoped that when the container is ready for the Simplex, the Hunslet mines loco can be moved to Lea Bailey and kept in the mine. Long term the plan is to rebuild the metal shed to provide storage and maintenance facilities for the larger Hudswell Clarke mines locomotives currently stored out in the open at Clearwell. If anyone is interested in joining the efforts to revive the railway please contact Rob Needham on (01594)823487 or visit our website at www.leabaileylightrailway.co.uk

Robert Needham

Jack Whiting driving the Hunslett at Clearwell Caves.

Steve Jackson driving the Simplex loco at Lea Bailey

FODCCAG News

DEVIL'S CHAPEL:-

The area concerned is slightly larger than before, but unlike before, needs to be pre-booked through Dave Tuffley, giving a couple of dates, & allowing at least 3 weeks before the date of the proposed trip. Your proposed date may not be suitable for several reasons – someone else has already booked it, or it is not convenient to the Estate,

BCA Membership cards **MUST** be carried by each person.

There is a **LIMIT** of **8** persons per visit, & **12** visits per year.

The access will be open to clubs other than RFDCC, via FoDCCAG, & will include any proposed bat counting, & GCRG practice. For the latter 2 , 1 off negotiations will be carried out by Maurice, & Mole respectively, & will still require a permit from Dave.

A copy of the permit will be carried by each party.

Westbury Brook Iron Mine © Dave Tuffley

Part 1

Introduction

The mine, also known as Edge Hill Iron Mine, lay at the top of the Plump Hill, near Mitcheldean. It was situated at the head of the Westbury Brook Stream, which winds its way eventually down through Flaxley and into the River Severn. For general minesite refer to location NGR SO6603 1686..

It is lost in the distant mists of time when man first attempted to hew the iron ore from the rock in the outcrop at Edge Hill. The mining of iron by the Romans in the Forest of Dean has been traced by the finding of various coins and pottery buried in the vast heaps of ancient charcoal iron cinders that were found throughout the Forest of Dean until recent times. The nearby Roman settlement of Ariconium could well have received ore from this area, although this is subjective and cannot be proven. In 1988 a fine example of a bloomery era, iron smithing hearth, was discovered by the Royal Forest of Dean Caving Club (RFDCC) amongst the debris that had slid from the surface down into a scowl hole called the Old Sally Mine, on the Westbury Brook Gale. The hearth is now preserved at the Dean Heritage Museum. This, however, is no indication of when extraction first commenced as this bloomery technology stretches from the Late Iron Age period and right up to the 1600's. Ore was certainly being sent by packhorse from the numerous scowls to the various furnaces scattered about the Forest of Dean until the Kings Ironworks were demolished by direct order of the Crown in 1674. This was done in order to preserve the stocks of naval timber then being quickly consumed as charcoal fuel for the furnaces, and also due to the passing of the Dean Forest (Re-afforestation) Act 1667.

By 1796 Thomas Teague began building a coke-fuelled blast furnace on Crown land in the valley of the Cinderford Brook. It was reported that some of the ore used was brought from Edge Hill on the backs of mules. Teague's furnace failed in approximately 1806, not because of Crown opposition but more likely from low productivity. At that time Whitecliff Furnace also failed. The problem lay probably with poor coke and rich Forest ore. The problems were not resolved until 1825 when Moses Teague produced better coke and restarted the Cinderford Ironworks.

19th Century Development

After 1832 the granting of gales by the Crown was suspended due to the forthcoming reorganisation of the local coal and iron ore mining industry under the Dean Forest Mines Acts. These Acts eventually showed that the mine as being awarded in 1841 to three freeminers, Moses and Thomas Teague and James Mountjoy. The royalty was then set to be 1.7p (4d old pence) per ton of ore and the dead rent on the gale set at £50 per year. At that time the mine was being continually worked and developed by the Dowlais Iron Company, near Merthyr Tydfil, South Wales, owned by Sir John Josiah Guest, and the company continued as if the gale had been already granted to the three compliant freeminers. It is not yet known when the Dowlais Company first took a working interest in the mine. The company worked the mine continually from this time until its closure in 1893 without respite. It was almost certainly Guest's money that sank the Old Pit shaft to a depth of 360 feet prior to 1837, but no details have yet

been found of the exact date of its sinking. (NGR SO 6606 1698)

The first official report of ore being raised from the mine by the Dowlais Company was shown in the gale records for 1843. The ore was then sent down the Gorbrook Valley on a licensed tram road and then down through to Whimsey, and then onto Bullo Pill by way of the Forest of Dean Railway Company's tramway, where the ore was loaded onto small coastal vessels and shipped to Cardiff. Driver James Hale worked driving a tramway engine on the Whimsey route for about 50 years and must have done this from the beginning of the mine until its closure. The ore was then taken to Dowlais, near Merthyr Tydfil, where it was mixed with the local ore to improve quality of the iron made in the Dowlais Company's furnaces. (In 1845, Guest's iron empire at Dowlais, was the biggest producer of smelted iron in the world, with 18 blast furnaces, 88,400 tons of pig iron produced a year by 7,300 employees.) Later in 1854 the Forest of Dean Railway, with its newly laid broad gauge railway line, made its way mainly up the route of its old tramway to Cinderford and the ore was later transhipped from the tramway wagons onto rail wagons at a wharf at Whimsey, situated between Cinderford and Steam Mills.

Levels 1 & 2 were driven from the Old Pit shaft at 280 and 360 feet depth respectively by means of crosscut tunnels driven from the shaft. (Crosscuts were usually short tunnels driven usually at right angles to, and through the various strata, until the one to be mined was reached)). The depth of the levels emulated the 'old men' in order not to have recourse to expensive pumping equipment. It is highly likely that a lot of old, shallow, empty and abandoned ore chambers were encountered near to this shaft. However, the levels would have been driven both north and south and eventually new untapped ore bodies would have been reached and worked.

Level 1 must have been an exploratory level only as it was recorded as being completed in 1846.

New Pit

As the shallow ore above the natural water table had been largely mined away, the mine needed to find further ore deposits and it was decided at around 1837 to sink yet another shaft to the deeper ore measures by sinking through more solid ground in the Drybrook Sandstone to the west. The new shaft, now called New Pit, was sunk to about 650 deep, further up the hill, and substantial pumping equipment was installed to reduce the water table to allow the continuing development to proceed. (NGR SO 6603 1686) The shaft was solidly masonry lined from top to bottom and was oval in shape, 16 feet by 8 feet and used a "double bond" system, with one ore cart descending and one ore cart ascending at the same time. The shaft also housed the pumping mechanism, which was operated by a Cornish beam engine. Cross cuts were again driven out and Levels 3 & 4, at approximately 570 and 650 feet depth respectively, were then driven north and south along the Crease Limestone, the strata which bore the iron ore measures. An incline was eventually driven northwards from Level 3 to Level 2, which was completed in 1864, this was in order to facilitate the removal of the ore from this latter level, which was still being driven and worked for 7,000 feet along the strike of the ore. Level No 3 was driven for a total distance of just over 9,300 feet to the northern boundary of the mine.

It is likely that the New Pit head frame was made of substantial baulks of pitch pine timber, probably along with two grooved flanged winding wheels up to

10 feet in diameter, which was typical of that period. However, there are no photographs known to exist to prove this supposition.
The boilers were fed from a deep triangular shaped pond just to the west of New Pit, and adjacent to the Mitcheldean/ Monmouth Turn Pike Road and this is still in existence.

Early working

In February 1855 it was reported that 1,500 tons of ore was raised, of which 800 tons was raised up the New Pit, and so presumably 700 tons was raised up the Old Pit shaft. The level headings were all in solid stone but scarcely any ore was being won from the south headings of the New Pit. At the same time there was notice give for a 10% reduction in wages and the mine manager, Thomas Evans, was quite concerned that he could loose many of the iron ore miners to the adjacent and financially buoyant coal mines. Obviously things were not going so well in the iron industry at this period, as two of the sub-contract hauliers that moved some of the ore down the tramway to the wharf at Whimsey, had taken their 20 horses away and gone on strike.

The Eastern portion of the wider Deans Meend gale to the North, had been added to the mine's area of working but the date of owning or leasing this part of the gale is not known. This gale was unusually split into two unequal parts with the Dowlais Company working the smaller Eastern or upper part.

As previously mentioned the early mining of ore in the mine had reached quite deep into the ground and the Reverend H. G. Nicholls in 1866 reported in his book, 'Iron Making In The Forest of Dean' that the 'old men's' workings had reached the natural water table some 480 feet below the surface. Plank ladders, along with the remains of wooden shovels, mattock (pick) heads and leather shoes and footprints were found as proof of their industry at this depth. The average breadth of the workings was then reported as 16 yards. Between the years starting 1863 to end of year 1865, 39,002 tons was recorded being won from the Westbury Brook gale, and 29,136 tons being won from the Deans Meend gale. This is making a total of 68,138 tons (an average of 607 tons per week). Nicholls also reported the fact that the mine in 1865 employed over 200 hands and was wound by a 36 horsepower engine and had a plunging pump that produced 33 gallons per minute to dewater the workings.

The mine had stables situated somewhere on the northern part of Level No 3 but it is not known how many, nor how big, were the horses or ponies used in the long haulage distances along the main levels.

Young lads, called 'jockey boys', either led the horses pulling the ore laden carts along the levels to the winding shafts or completed the same task by riding on the front of the first ore cart according to the mine manager's instructions. They took the ore out to the shaft landing and often brought timber and other equipment back in on the return journey.

Level No 3 Northern Drivage was completed in 1864 but the last 1,300 feet was practically barren ground. The Southern Drivage was completed in 1884 and was connected to the old Beech Pit workings right on the southern gale boundary. However, Trow Ditch Level, which was the drainage level for Beech Pit, was above the Level No 3 and therefore could not be fully used to drain Westbury Brook Mine and ease the pumping costs. The last 3000 feet of the Southern Drivage found only small ore bodies
The deeper Level No 4, in the south of the Westbury Brook gale was completed

in 1884 and was also found to have thin ore bodies along with large areas of barren ground. It was generally proving that the quantity of ore gradually diminished throughout the mine with depth, although the quality of the ore was still rich.

Iron Ore and its extraction

Gold for my lady,
Silver for the maid,
Copper for the coppersmith
Who's cunning at his trade;
But said the miner, picking up a fall,
A big churn of Brush Ore
is better than them all.
Anon.

The miners located the ore bodies by 'following the lid', which was the distinctive junction between the Crease Limestone and the above strata of the generally red coloured Whitehead Limestone or 'Lidstone'. The other boundary of the ore laden Crease Limestone, was the lower Dolomite Limestone or 'under edge' The ore appeared to be of random occurrence and the miners use to drive along the upper junction in order to intercept the ore bodies, or churns as they were called by the miners. A term that described the use of this technique is "scowling a brow" and was reliant on the miner's skill in reading signs given by the geology. The churns could vary from providing a few tons of ore, to over 35,000 tons and even larger. The ore was classified as a non-phosphoric brown Haematite, and consisted of various mixtures of Haematite and Limonite. It was generally divided into three distinctive types:

Stalactitic Ore or 'Brush Ore,' that was a hard, dense, or cellular Limonite that strongly adhered to the walls of the ore body. Properly cleaned and graded it would vary between 45 to 55% of metallic iron, and the heavy solid lump ore between 50 to 60% metallic iron. When truly embedded in the surrounding rock it could be classed as a Haematite. Its appearance has been described as finely columnar which gave the look of fine bristles in a brush, hence, presumably its name.

'Smith Ore' was a powdery or gravelly brown or red Limontite that filled the rest of the ore body, or churn, and could also vary between 40 to 60% metallic iron This latter ore was easily extracted by pick and shovel and it was not unusual for miners to be stood at the same spot for many weeks shovelling Smith Ore that just kept running out of the bottom of the emptying churn.

'Grey' Ore was a lower grade ore consisting of a mixture of Haematite embedded in the Dolomite Limestone, the rock that sat beneath the Crease Limestone. It averaged from about 20 to 30% metallic iron. The silica content was low, whilst that of Carbonate of Lime was high, usually up to 24% that made it ideal for fluxing in the blast furnaces.

The ore that strongly clung onto the side of the walls of the churns was also known as 'clingings' or 'scabbings'.

From the churns of ore very often came 'leads' that were traces of iron ore following the characteristic joint-veins of the limestone generally leading from

one ore body to another and these the miners followed until they either eventually petered out or struck yet more ore. These were called ‘String Ore’ or ‘Pipe Veins’ by the miners.

A 1930 report written for the local freeminers, stated that the ore from the Forest of Dean, when compared with samples from other districts in the country, was second only to the ore from Cumberland in regards to the percentage of iron present in the ore.

The miners often referred to the ore itself as ‘mine’ and not as ‘ore’, which can be confusing when reading contemporaneous accounts.

Ochre or ‘Colour’ was also a highly valued mineral in iron mines and worth much more per ton than the ore itself, although the royalty was generally set at the same rate. It was found near to the Whitehead/ Crease Limestone junction in association with the ‘Brush’ or ‘Smith’ ores and it was primarily used as a colour pigment in oil paint. It could be found in various shades of red, yellow or purple. However, even though uniform red ochre of excellent quality known as ‘Crawshay Red’ was found in substantial quantities in the adjacent St Annals Mine, there is no record that any quantities were to be mined in Westbury Brook.

The ore from the sandstone veins, which were parallel to the Crease Limestone, was not mined in this gale but was mined around the early to mid 1860’s in the nearby Tingle’s Iron Mine gale, but only on a much smaller scale.

The working in the mine was done by the soft yellow light of tallow candles and the rock broken and removed by hand drilling shot holes and then shattered by using black powder charges. The fuse used to ignite the charge was usually a goose feather quill filled with finely ground gunpowder which one end was inserted through the clay retaining plug and the other end was ignited by the miner’s candle flame. Not a very safe method which was very unpredictable and many accidents were reported in the Forest of Dean caused either by premature or delayed detonation. At an unknown later date the conventional safety fuse was used, which again was lit by a candle flame.

Very often the miners would calculate the length of the shift by the number of candles they had used during that period. However, this was subject to the draughts of ventilating air that could alter the burning times considerably throughout the mine. The miners certainly were not affluent enough to afford fripperies such as a pocket watch to take underground which could get easily damaged.

It is usually easy to tell if the shot holes were driven by hand or compressed air drill. The hand-driven shot holes were driven by a miner holding the drill bar in position whilst he supported it on the top his shoulder. Usually two other miners in turn hit the drill bar with sledgehammers from behind with coordinated strikes whilst the first miner turned the bar between each strike. The resultant hole was of a three lobed shape as the miner was generally only able to turn the drill bar through 120 deg due to the restriction of his wrist movement. The drill bar which usually had a rounded chisel point, was sharpened at the end of the shift by the mine’s blacksmith, along with the blunted miners picks. The later compressed air driven holes were completely round in shape due to the random rotary percussion action of the drill. The general direction of the shot holes also confirmed the direction the level was driven

Young boys were also tasked with carrying the ore out from the low workings to the roadways in a ‘Billy’, which was an open oval shaped metal box with a wooden floor, which was carried and strapped on their backs. It was certainly a hard, gruelling task. It has been reported that if the boys did not work hard or fast enough for the miners they were working with, then the miners would thrust gravel and stones down the back of the boy’s shirt so that they dug into the boy’s back when the weight of the hod was upon it. This would mean that the boy would have to move faster in order to rid himself of the excruciating pain of the ore in the billy at the end of the journey. The boys used in this labour were called ‘Billy-boys’ and were expected to carry from 60 to 70 lbs of ore in the billy upon their backs on each loading.

The wooden mine carts typically used in this mine had a front panel hinged at the top which, when a simple catch was released, allowed the miner to lift up the cart at the rear and tip the ore down into an ore chute or ‘trill’ so that it fell down into the level below. The front panel swinging back into place and snapping shut when the cart was put back down onto the rails.

There has been evidence found of different complete sets of wheels used on the ore carts, and are either of the earlier plain un-flanged type or ‘biscuit’ wheel which ran on right angled plate rail; and also of the later flanged wheel variety which was used on the modern type of edge rail which has recently been found on Level No 2.

Part 2 follows in the next Newsletter.

Scanned picture of Fairplay with most buildings in place circa 1920's

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