BRITISH MINING No.98

MEMOIRS 2014

Editor: Richard Smith

ISSN 0308-2199

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EXCAVATION OF AN EARLY LEAD SMELTING SITE AT HAGG FARM, FREMINGTON, SWALEDALE

Richard Smith, Timothy Laurie, Alan Mills and Rob Vernon

INTRODUCTION

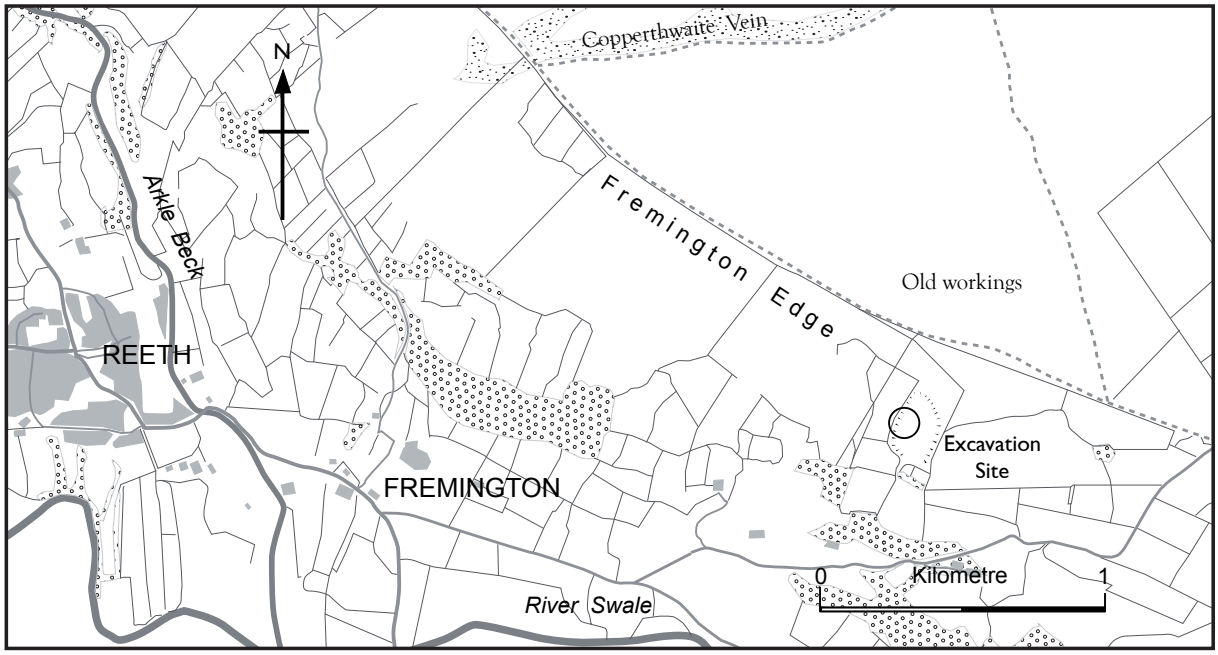

Figure 1. Location map of the excavation site at SE 05939 99141 335 m AOD.

In 2012, Tim Laurie of the Swaledale and Arkengarthdale Archaeology Group (SWAAG) identified clear evidence of lead smelting and a potential lead bale site centred at SE 05939 99141. The site was noted to be under direct risk of severe damage from rabbits and was characterised by looking at slag and charcoal within and outside the rabbit burrows. A joint project was then set up in the summer of 2013 between SWAAG and the Northern Mine Research Society (NMRS) to archaeologically investigate the bale site, with Richard Smith of NMRS directing the fieldwork alongside Tim Laurie together with Tony Liddell of Vindomora Solutions providing professional archaeological recording support.

Initially, on 24 July 2013, a geophysical survey was undertaken of the site by Dr Robert Vernon who identified features consistent with bale technology.[1] The results of this survey were used to guide the selection of the areas to be excavated.

The excavation centred on an area where there was the highest concentration of slag and charcoal, together with an adjacent natural gulley and some outlying areas where slag had been located by preliminary fieldwork. The principal objective of the excavation was to locate the centre of activity at which smelting had taken place and if possible to identify the type of technology which had been employed.

Figure 2. Alan Mills inspects the site before excavation, showing the main feature [F2] in the foreground, the steep bank behind and the drystone wall running N-S which contained some stones splashed with slag.

LOCATION AND TOPOGRAPHY

The Hagg Farm smelting site lies approximately two kilometres due east of Reeth, on the north side of Swaledale (SE 05939 99141) at a height of about 335 m AOD. The area where the slag was noted consists of undulating rough pasture with a steep slope on its western side. At the top of the slope there is a gritstone wall, that contains occasional pieces of slag and burnt stone. The wall is aligned roughly north-south and was constructed at some time between the 1839/52 tithe maps and the 1st edn. O.S. map of 1857.[2] To the west of the wall the ground is relatively flat and there is a suggestion of ridge and furrow in this field. The main excavated area to the east of the wall lies in what is probably a large landslip, which according to various editions of the 6-inch O.S. maps between 1857-1953 has been worked as a quarry. At the extreme southern end of the landslip there is a second concentration of slag at SE 05947 99055 and about 314 m AOD. Coincidentally this site has also been heavily ravaged by rabbits.

Approximately 0.5 Km above the site and to the NNE along Fremington Edge is a series of lead smelting sites which appear to have been robbed out (SE 06095 99199, 370 m AOD to SE 05901 99403, 396 m AOD). The main evidence for them is a widespread scatter of stones splashed with slag and smelting residues. Part of this area has been surveyed and a geophysics survey carried out.[2] Four bales are shown here on the map of Marrick of 1592.[3,4]

WARWICKSHIRE COAL MINING

Nigel A. Chapman

INTRODUCTION

The Warwickshire Coalfield is almost the smallest of the coalfields of this country, stretching from Tamworth to Coventry a distance of 18 miles. The outcrop occurs along a line almost parallel with the A5, also known as Watling Street from Roman times. It has been suggested that Watling Street was constructed along the outcrop to aid extraction from an early date. This immediately gives some indication of the accepted origins of coal mining in Warwickshire. As the coal seams dip south from the outcrop they disappear under the strata of the Permian rocks, so that once the outcrop had been worked the need to either drive levels or sink shafts became necessary. Once underground mining had developed, it became usual to sink shafts to the deep of the royalty and lower the coal down to the shafts for winding. This method was also applied to the water, which was allowed to gravite into a sump at the shaft bottom ready to be pumped. Because of the geology of the dipping coal seams, the collieries had a tendency to gravitate to the south or south east.

HOCKLEY HALL

Hockley Hall Colliery was situated at the northern edge of the coalfield, a distance of 3 miles from Tamworth, with a royalty of 900 acres leased from the trustees of Sir Robert Peel and the executors of the late John Martin. The sinking of two shafts 66 yards apart was commenced in 1868 and reached the 7 Foot Seam in 1869 at a depth of 120 yards. The 4 Foot Seam was passed through at a depth of about 45 yards. Each shaft was of 7 feet diameter, one in front of the winding house and one behind. The steam winder had two horizontal cylinders and turned a drum of 9 feet and 12 feet diameters. This design was to permit the double deck cages to wind from the 4 Foot and 7 Foot Seams at the same time. For underground haulage a twin-cylinder horizontal engine was placed at the base of the shaft in the 7 Foot Seam with a single 7 feet diameter drum. The engine haulage road was 850 yards in a south east direction with a dip of 4 inches to the yard. So the empty descending tubs pulled out the rope ready for the next journey of 13 loaded tubs.

The 4 Foot and 7 Foot Seams were the only coals worked at the colliery, however an ironstone seam averaging about 34 per cent iron was mined and sold. To ventilate the workings a furnace was placed at the bottom of the Upcast Shaft.

Being sunk on the nearest coalfield to London much of the output was taken by railway south. The company made great efforts to have their coal accepted on the London market and were keen to tell shareholders of their success. The colliery was operated by the Hockley Hall Collieries Company with profits made and dividends paid to the shareholders.

WHATELEY

With finance available a second colliery was sunk in 1873 about half a mile south of the Hockley Hall plant. Known as the Whateley Colliery, two shafts of 13 feet diameter were sunk to the 4 Foot and 7 Foot Seams at depths of 100 yards and 176

EAST PANT DU LEAD MINE

Tony King

INTRODUCTION

In North East Wales a belt of limestone runs from Prestatyn in the north to Llangollen in the south. Veins of lead ore are found throughout most of this limestone. In the region between Loggerheads and Llanarmon yn Ial the veins run approximately NW to SE (Figure 1). Further to the east, the Cefn y fedw Sandstone overlies the limestone and lead ore is found in pockets or 'flats'. The best known mine here is the Jamaica lead mine which produced a profit of £17,000 during its short life (1846-1858).[1]

The East Pant du lead mine lies about 2km south of the Jamaica Mine on Nercwys Mountain, in the parish of Nercwys, Flintshire, close to the boundaries of the adjacent parishes of Llanarmon yn Ial and Llanferres. The mine lies within the mineral ownership of the Lordship of Mold. The main mineralised fault through the mine sett is the Pant du Vein. The extreme west of this vein, in Llanferres parish, is known as the Waenlas Vein. The vein passes eastwards under the hollow of Pant du from whence two branches leave the south side of the vein.[2-4] These branches are known as the Goodwin and Pentrehobin Veins. During the launch of successive mining companies it was claimed that three veins crossed the East Pant du sett. On several mine plans two of these veins are attributed to be extensions of the Goodwin and Pentrehobin Veins. However there is some confusion about the correct naming and possible positions. (Two otherwise identical mine plans by one surveyor are inconsistent and they also disagree with a later plan by another surveyor. [5-7]) As the three veins in the Pant du area had been productive the identification of the latter two veins on the East Pant du sett may have had more to do with influencing investment than with accuracy.

EARLY WORKINGS

Lead mining took place in the Pant du area during the eighteenth century.[8] However, a report prepared for one of the Lords of Mold in 1791 makes no mention of any mining activity having taken place on Nercwys Mountain.[9] It is likely that mining was started by a private company in about 1851.[10] The mine sett covered about 220 acres and the mine was operated under a three year takenote which was renewed regularly.[11] The royalty was fixed at $^{1}/_{8}$th. The proprietors included Samuel Merryweather of Wigton, Cumbria, Charles Harrison, an iron and coal master of Tryddyn, Flintshire and William Clemence, a mine agent, of Llanarmon yn Ial, Denbighshire. William Clemence, who supervised the trials, also held a takenote on the Black Mountain Mine immediately adjacent to the southern boundary of the mine sett. The proprietors were not wealthy and with their limited capital progress was slow. They successfully petitioned the mineral owners for a reduction in royalty to $^{1}/_{10}$th in 1857.[12] The following year they achieved their first success when a bunch of ore was discovered. The value of the company's shares rocketed from about £25-£50 to £500 per share with the usual extravagant claims (*'one rock will weigh ten tons'*).[13, 14] Unfortunately the find soon fizzled out and only 72 tons of ore were obtained from that deposit.[15]

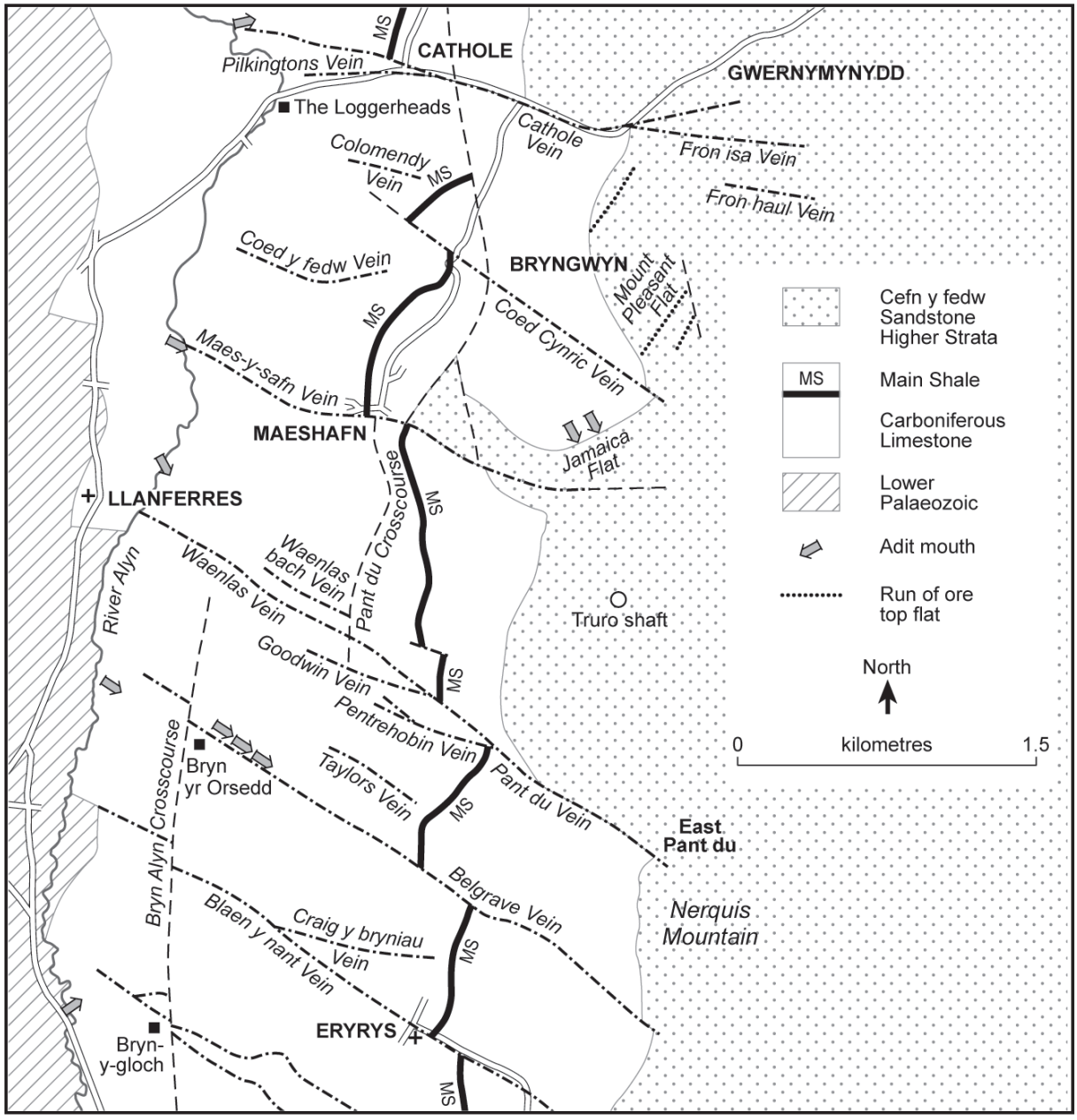

Figure 1. Mineral veins in the Loggerheads to Eryrys area (after Earp [4]).

Samuel Merryweather was the majority shareholder (with a holding of $^{33}/_{64}$ths) at the time of this limited success.[16] He had formerly been a major partner in the Keswick Mining Company and was at this time also engaged in mining at the Roughtengill Mine on the Caldbeck Fells in Cumbria.[17-19]

The company had sunk a shaft to a depth of 100 yards on the principal (or Pant du) Vein and had driven several levels along its course. The mine was dry as it was drained to a depth of about 150 yards by a swallow, or natural watercourse.[20] The company employed twelve miners.[21] By 1863 the mine had become unproductive and urgently needed an injection of fresh capital to further its development.[21] Merryweather approached the Lords of Mold with a request for a lease for the area covered by the existing take. A lease was granted for an area of 200 acres for a period of 21 years.[12]

SOME MAJOR LIMESTONE WORKINGS IN THE WEST RIDING OF YORKSHIRE

John Goodchild

INTRODUCTION

The significance of limestone to the developing industrialisation of the West Riding of Yorkshire would be hard to over-emphasise as without its accessibility numbers of .major industries would not have been established during the Industrial Revolution. Not only were its uses as a raw material of central significance to the industrialists but its carriage was a factor in the economic success of the waterway systems around which the industries were located.

Carboniferous Limestone from the Yorkshire Dales and Derbyshire was available in the west of the county, however, a narrow band of Permian magnesian limestone and limestone running south from Piercebridge on the River Tees to beyond the Yorkshire/ Nottinghamshire border was even more favourably placed for the growing industries of the West Riding. Not only was the magnesian limestone well-situated for this but it could be used as a return load by boats carrying coal along the valleys of the Aire, Calder, Dearne and Don.

The Marl Slates, the Lower Magnesian Limestones and the Hayton Anhydrite comprise the Don Group of Upper Permian sediments. The Lower Magnesian Limestone is divided equally into upper and lower sudivisions, separated by the Hampole Discontinuity. At outcrop the two subdivisions are up to 55 and 30 metres thick respectively and become thicker as they progress eastwards beneath later sediments.

Magnesian limestone was used as a flux and a refractory in the manufacture of iron, steel and non-ferrous metals and as a raw material in the manufacture of glass, where it was essential to inhibit the devitrification of flat glass. It was used in the curing of hides prior to tanning, in soapmaking, cloth dyeing and in the preparation of candles. It was used in the purification of coal gas, in medical preparations, for water softening and for limelight for cinematographic projection and theatrical use. Lime enabled the improvement of acidic moorland soils for agricultural use as pastures and arable fields. From about 1820 it became used increasingly in the laying down of road foundations and surfaces. Before the 1830s, limeburning became an essential outlet for almost worthless small coal and was a necessary part of the viability of some collieries. (Afterwards, small coal became used for coke making).

It was often transported as stone rather than as calcined lime - partly because it made sense to take it to the source of coal but also to avoid the violent reaction caused by wetting and rehydration of quicklime. Lime mortar was used for building, plastering and as a hygienic wash for the interior and exterior walls of buildings. The better qualities of stone were used for the construction of churches and other large buildings;

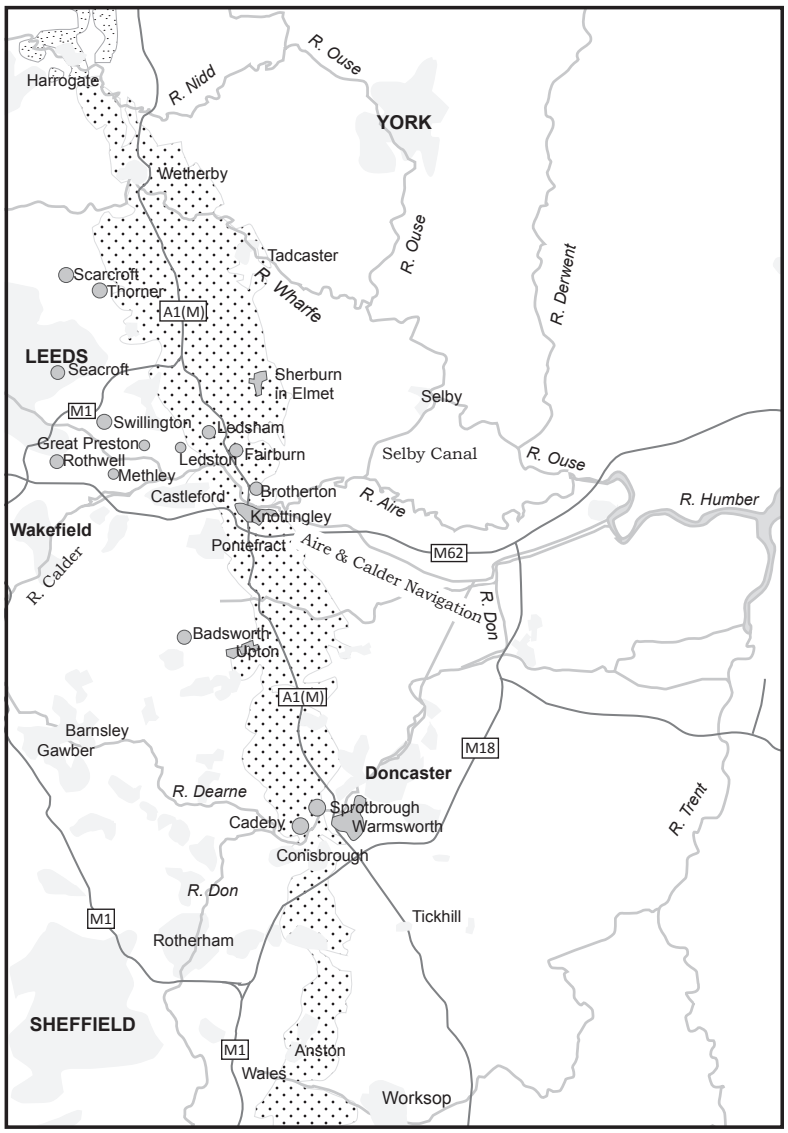

Figure 1. Central Yorkshire with the magnesian limestone belt shown as a dotted area.

in medieval times, two canals were constructed from the magnesian limestone outcrop to the River Ouse for the building of York Minster, the tower of Fountains Abbey, Selby Abbey and other buildings. Beverley Minster and the city walls of York were built from magnesian limestone and stone for the vaulting of King's College Chapel, Cambridge came from Roche in South Yorkshire and in the 19th century, Yorkshire limestone was used in the building of the Houses of Parliament at Westminster.

Of particular note was the 'plaster stone' extracted from the quarries at Fairburn. This was a deposit of the Hayton Anhydrite, which had become hydrated and converted to gypsum throughout Yorkshire. The long-abandoned 'plaster pits' were located near Ledsham, Fairburn, Ferrybridge and Marr and further north around Ripon as well as being obtained from surface workings near Hillam.

The shallow ridge of the outcrop has been utilised as the course of the Great North Road since Roman times. The working of the magnesian limestone ridge took place along a width of about four miles from Tickhill and Wales in the south to almost as far as the Tees in the north and is a characteristic feature of the vernacular architecture of the area. Quarries still flourish today, although largely producing roadstone and fill. Further north, in County Durham, the magnesian limestone quarries around West Cornforth, Co. Durham were used for raw materials for making magnesium chemicals and in the extraction of bromides from seawater near Hartlepool. Around Knottingley, in the Don Gorge near Sprotbrough or in the Carboniferous Limestones of the Yorkshire Dales around Skipton, quarries were often situated close to more ancient workings. A curious example of misjudgement was in the valley of the River Went, where in the 1820s a substantial and expensive railway was laid from near Wentbridge to Heck Bridge on

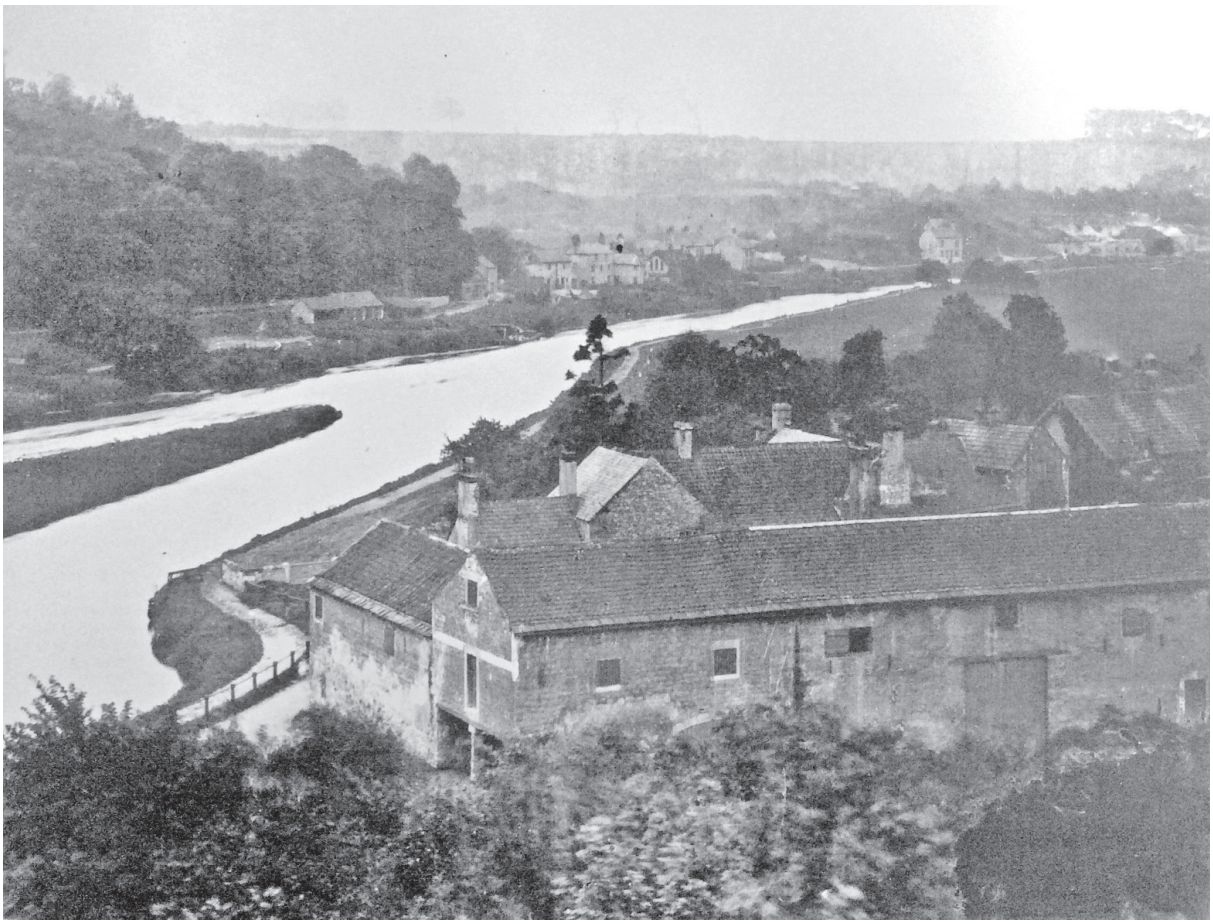

Figure 8. Houses on the River Don with Warmsworth Cliff quarries on the skyline.

quarries and river; the quarry owners Longden & Co. anticipated being able to sell lime into a larger market but were concerned about the cost of suitable rail trucks. A wagon to carry 5 tons of lime would cost at least £60 (or £12 per ton) whereas a keel to carry 70 tons cost £350 (or £5 per ton). The South Yorkshire Railway's plan of its proposed route of 1846 shows five short railways from quarry face to kilns - there were four batteries of kilns having 4, 2, 4 and 2 kilns respectively. One line, apparently for limestone connected the quarry with the riverside directly. This network opened in July 1849.[10]

The limestone worked at Warmsworth Cliff by Lockwood, Blagden & Crawshaw became well known and was much used as building lime and was described as *'being both hydraulic and magnesian'*, it expanded in use by 50-70% and set very hard. An illustrated booklet published by the firm in 1927 refers to the use of this lime in Sir Gilbert Scott's rebuilding of Doncaster Parish Church in 1868, after the fire there in 1861. It was also used by Alfred Waterhouse in the building of Lime Street Station in Liverpool and subsequently in the construction of Assize Courts in Manchester, Salford Gaol, the Infirmary, the Royal Exchange, 13 seven-storey warehouses adjoining the Ship Canal as well as Vickers Ltd's. works at Sheffield, the Midland Bank at Wakefield etc. The firm had a similar quarry at Anston in the southernmost part of the West Riding; a controlling interest was acquired by Yorkshire Amalgamated Products Ltd., established as a conglomerate in 1920.

NOTES ON OPENCAST COAL WORKINGS IN THE WEST RIDING COALFIELD BEFORE 1941

John Goodchild

The story of opencast coalmining in Britain, from 1942 to 1992, has been told by P.N. Grimshaw in his work of that title and in it he alludes to a number of West Riding examples.[1] The working of coal from open quarries where seams outcrop close to the surface is an ancient practice: a rental of 1539 refers to such a mine, valued at £5 a year, which had been owned by the recently dissolved Priory of Nostell and was then in Crown hands. It lay at Birkwood in the manor and parish of Crofton near Wakefield and a reference in the following century describes it as having been a:

> *'mine of Coles in Crofton which att the dissolucon was in the Abbotts possession being then an open mine in an enclosed place called Birkwood and then in use only for the provision of the house of the said Abott called Nostell being neer Crofton'.*

This may hare been the mine which is mentioned by John Leland, the royal antiquary, in his itinerary of the mid 1530s. Such workings were apparently rare but the 1st edn. 6-inch O.S. sheet which covers the eastern part of Leeds and was surveyed in 1846-47 shows 'Open Coal Workings', with a tram road running from in the excavation to a landsale depot at Knostrop, to the Aire & Calder Navigation nearby and to the Thorpe Hall Iron Works; in 1889 the Garforth Coal Company had an 'openworks', the only one such listed then in Yorkshire.

The first major boost to encourage opencast coal working in the exposed part of the West Riding coalfield was provided by the General Strike of 1926. As a result of the consequent coal famine, numbers of opportunists set up in business to produce coal from sites where it could conveniently be quarried. At Batley, one A. Jubb met Joseph Kemp one Friday evening and told Kemp that he believed there was a seam of coal outcropping in a field which was a part of the Old Hall Farm at Carlinghow; after dark, they went with a small shovel and found a thin seam. Next day, Jubb agreed with both the landlord and tenant of the property to share the profits of working the coal in thirds, and the mine was begun on the Bank Holiday Monday, with Kemp as manager and Joseph Thresh as foreman. It is unusual for the circumstances of the origination of the workings to be known, although, as is usual with such enterprises at that time, the period of operation was short.

At Crigglestone near Wakefield, Person & Moody Ltd. worked a coal outcrop in 1926. They were coal merchants at Birstall railway goods yard and during the strike they took a tenancy together and bought land with its subjacent coal. In June 1926 they bought from Henry Musgrave Ltd., colliery owners at Blacker Hall Colliery in Crigglestone, some Beamshaw seam coal and in the August some Winter seam coal also. At Calder Grove nearby, land was stripped of its surface soil and the coal got by Pearsons, trench by trench, while at Hollingthorpe nearby the firm also worked coal by opencast. At Crigglestone, Oddie, Hinchliffe & Eyre worked coal during the 1926 strike; W.H. Eyre was a mining engineer, C.H. Hinchliffe was of Calder Vale Colliery and W.M.

Oddie was an accountant of Ossett. They produced coal from June 1926 and worked until the November of that year, selling their coal to hospitals, asylums, etc. Their tax assessment was set at £14,172 and their sales to the end of the November were some £46,000, with a profit of £7,000.

At Outwood, John Wild worked outcrop coal in 1926, while Wilson Bros. (Ossett) Ltd., A.E. Lloyd and Holme & Waterhouse all worked outcrop coal apparently in Kirkhamgate on the Cardigan Estate. In all of these instances disagreements over their taxation led to their cases coming before the local Commissioners of Taxes and being hence recorded, albeit only in outline.

The Geological Survey's survey of 1926 shows 'Open-Cast Workings' in the Halifax Hard Seam at Crow Edge near Penistone. These were perhaps rather for clay than for coal, although a number of surviving photographs show both bellpit and earlier underground coal workings. At Emley an opencast working was established in 1926 with a complex tub incline down to a substantial wooden staith, from which solid-tyred lorries were used.

The Geological Survey's Wakefield Memoir, published in 1940, makes no reference to opencast workings or working and it was not until 1941 that the beginnings of the modern industry were laid as a result of both the implementation of the 1938 Act which nationalised coal and the demands of war-based industry for more fuel.

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These notes are based largely upon the minute books of the Lower Agbrigg Tax Commissioners and (for the early Crofton references) upon the Newland MSS, both in The John Goodchild Collection at West Yorkshire Archives, Wakefield.

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John Goodchild,
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Wakefield, WF1 2DE.

Manuscript submitted: 14 May 2014.

Figure 8. The fall in the horse level which prevents access to the sump top. The tailrace, taking water from the wheelcase, is on the left. [D. Carlisle, 2008].

something to be undertaken lightly. The mine is remote and, while the Main Level is now accessible without descending Eweleap Scar Pot and squeezing through a tight slot, the deep and tenacious silt remains in the first 200 yards or so. This is totally enervating and forces many people to turn back.

ACKNOWLEDGEMENTS

The author is grateful for information and assistance from: Lawrence Barker, Sallie Bassham, Gavin Brett, David and Margaret Carlisle, Jeff Clegg, Steve Mitchell, Martin Roe, Ian Spensley, Malcolm Street, Chris Twigg and Les Tyson.

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6. The beck has changed course and eroded the entrance section of Raper Level, including the internal dam.
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14. NYCRO, ZAW 160, (M1318, frame 2228), letter from Thomas Bradley to Timothy Hutton, 4 May 1837.
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EMRG Earby Mines Research Group
NYCRO North Yorkshire County Record Office.

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38 Main Street,
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Manuscript submitted: 7 July 2014

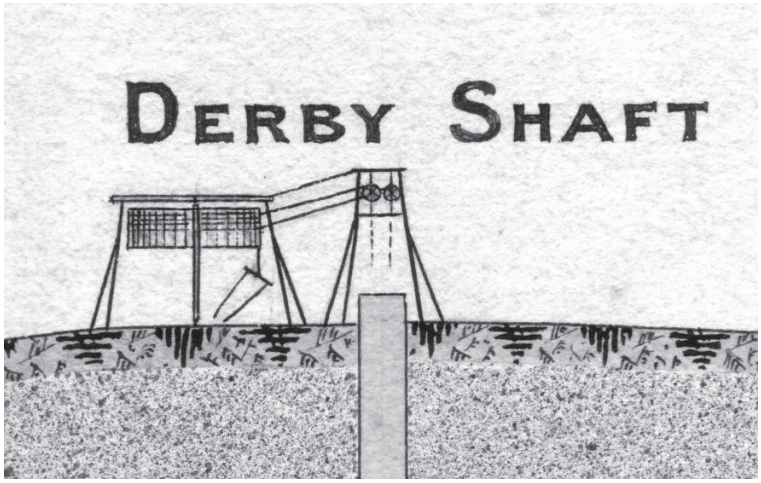
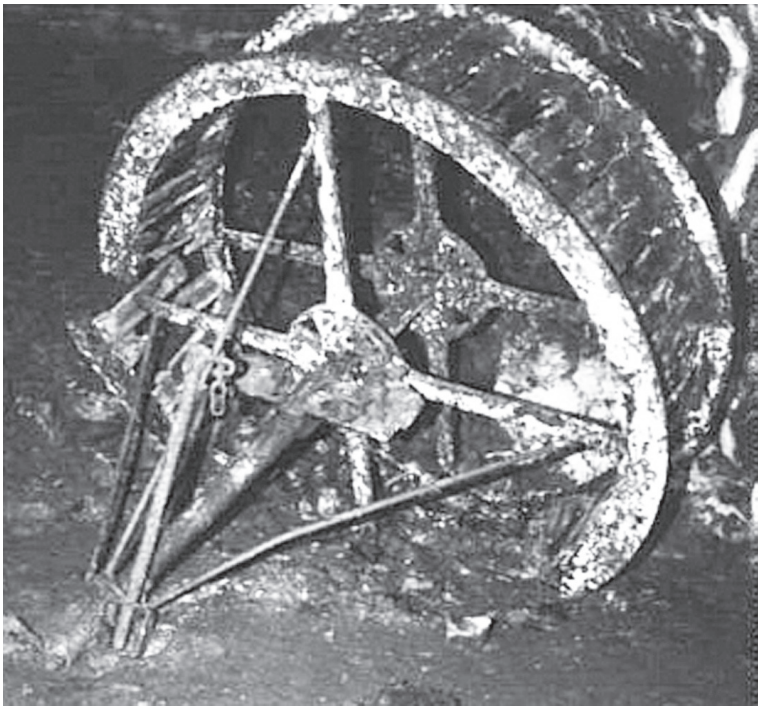


Figure 3 (left). Derby Shaft Whim, Craven Moor at Appletreewick, 1880.

Figure 4 (below). Horse whim used to wind from a sump on Scaleburn Vein at Nenthead (S. Mitchell, 1999).

paper makes a few educated guesses but while rope drums were typically in the region of five feet radius there were exceptions, as Figure 3 shows. The latter shows a whim with a much larger diameter drum and no lever arm, which was used at Derby Shaft. It was taken from a section by David Williams, the mine manager and is felt likely to be a fair representation of what was there.[12] All obvious traces of this whim have now disappeared, but a similar whim has survived in an underground chamber of Scaleburn Vein at Nenthead (Figure 4).



ACKNOWLEDGEMENTS

The authors are grateful to the following for their contributions: Sallie Bassham, Hazel Martell, Shaun Richardson, Martin Roe and Frank Walker. Especial thanks are due to Tony Brewis, Nick Green, Malcolm Henry and Brian Plemper, of the Mining History List, for sharing their knowledge of the mechanics involved and to Jo Ashby, Secretary of the Dales Pony Society

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   John Ashbrook, who was baptised at Halton Gill in 1772, is otherwise absent from local parish records, but in the 1841 census he is listed as a Farm Labourer, aged 65. Michael Musgrave is variously described as a carrier or a labourer in parish registers. In the 1841 census, he was aged 60 and living in High Street. Richard Parker, was born in 1777 and worked as a miner from 1801 to 1823. By 1841 he was described as a farmer, living at Yarnbury House.
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Manuscript submitted: 7 July 2014