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SOME NOTES ON THE LEAD MINES OF GREENHOW HILL YORKSHIRE

J.M. Dickinson

The village of Greenhow lies approximately half way between Wharfedale and Nidderdale at a height of some 1,300 feet above sea level. This scattered community consists in reality of two villages; Greenhow Hill, situated between Greenhow and Coldstones Hill, and the much older village of Kell or Keld Houses.

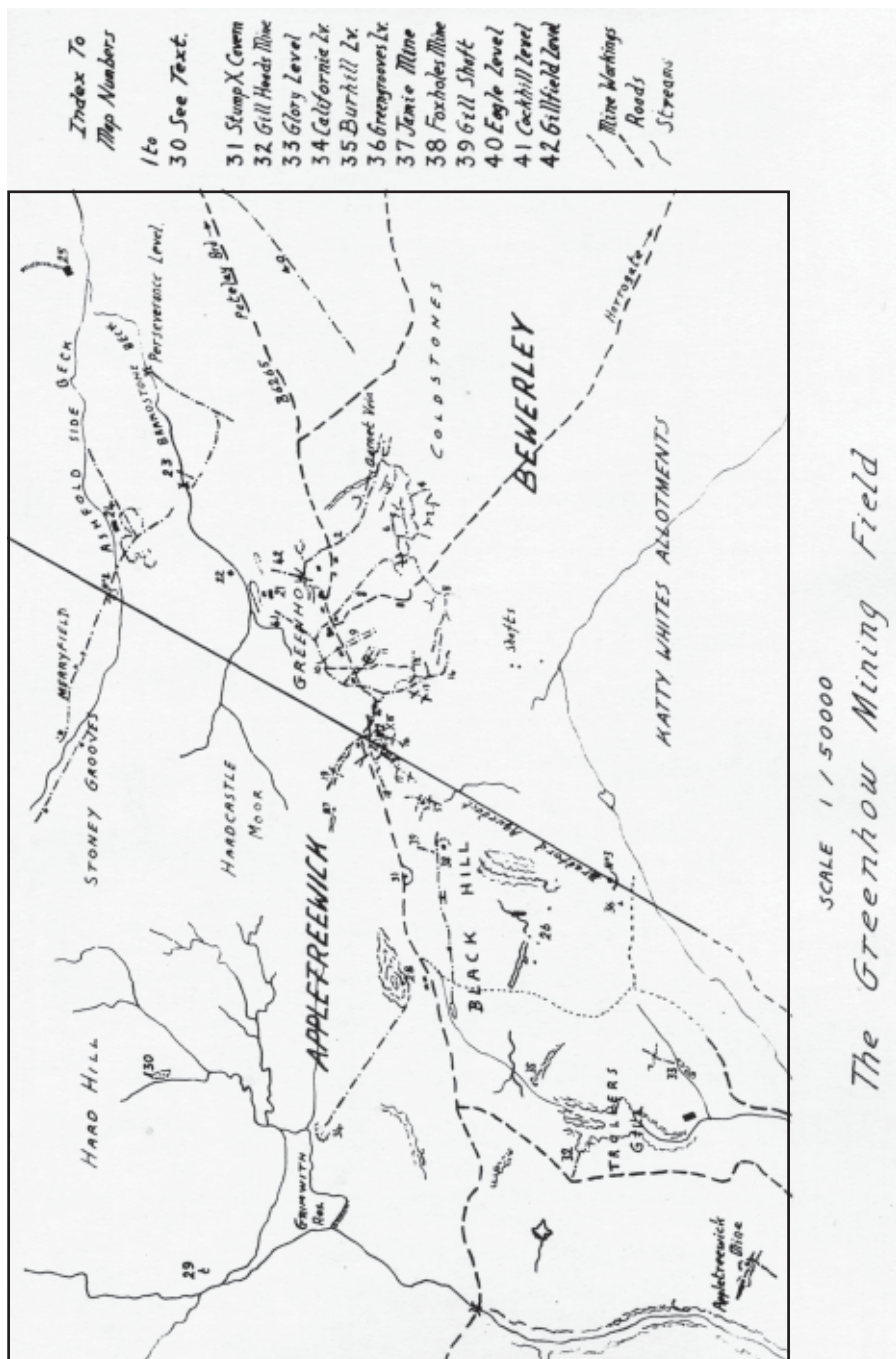
History does not record when man first came here in search of lead, but it is known that the mines were worked during the Roman occupation as three pigs of lead have been found which date from this period. One of these pigs discovered in 1735 bears the abbreviated inscription, 'Imp. Caes. Domitiano. Aug. Cos. VII.' which can be extended to Emperor Caesar Domitiano Augustus Consul. VII. This indicates that the pig was cast in 81 A.D. On the side of one of these early pieces appears the word 'Brig' denoting that the pig of lead was probably cast from lead mined by the local Brigantes. The third pig, weighing 85 pounds was found near Nussey Knot sometime before 1885, bore the inscription 'Trajan' and is dated about 98 A.D.

In the 12th century the mines were controlled by the Abbeys of Fountains, Bolton and Byland. The Canons of Bolton Priory possessed the whole manor with the mineral rights of Appletreewick, whilst Fountains Abbey had rights over the adjoining moors of Hebden and Grassington. The manor of Bewerley which encompasses the Pateley Bridge area of the mining field was in the possession of Rodger de Mowbray, founder of Bylands Abbey. This baron owned property extending from Masham to Hebden, including the whole of Nidderdale. The monks had mineral rights within their Lordship building a grange at Bewerley. On Greenhow, the Abbots of Fountains built a grange near what is now the hamlet of Cross Houses (nowadays only two houses are occupied), taking its name from the cross marking the boundary of Knaresborough Forest.

The monks at Cross Houses as well as providing for the weary traveller, employed the local people to dig for lead. They do not appear to have been particularly peaceful as they continually waged war against Foresters and lead poachers and even on those who had Royal Warrants and charters. A document dated 6th March, 1529 states that, 'they employed riotous persons' to drive off any would-be miners. The situation became such that a Royal Commission was directed to look into the disturbances. Sir William Mauleverer, as head of the commission, duly arrived on Greenhow, whereupon these same 'riotous persons in great numbers threatened him and behaved so outrageously', that Sir William and his followers had to make a hasty retreat.

The manor of Bewerley came into the possession of the Yorke family in 1674, when it was purchased by Mary, widow of Sir John Yorke, from a John Dove for the sum of

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£300. The bargain included amongst other things, 150 acres of pasture land and 2,000 acres of moorland. The conveyance however, did not include the rights to the mines of lead and coal on the common wastes of Beverley; these mines had been severed from the manor at a remote period and were held as a separate property by Sir Thomas Woolaston White. The Yorke family acquired these rights at a later date.

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The Greenhow mining field is divided into two separate Manors or properties; firstly the Appletreewick area and secondly that of Beverley. The Appletreewick property is at present held by the Yorke family of Halton Place, Hellifield, and the Beverley property, in part by Lord Mountgarrat of Nidd Hall, Ripley. Details of the manorial rights for the two properties make interesting reading and are as follows:

Regarding the saving of Manorial Rights

Session 1814-15, 55, George III

‘An act for inclosing lands in the township of Appletreewick in the Parish of Burnsall, in the West Riding of the County of York.

Royal Assent, 12th May, 1815

And that the said John Yorke, and all the future Lords, Ladies, and owners of the said Manor for the time being, shall and may from time to time and at all times hereafter have, hold, work and enjoy all Mines, Minerals and Quarries, of what nature or kind so ever, within or under the said stinted pastures, Open Field Lands, Moor or Common, intended to be divided and inclosed as aforesaid, as well as those not opened out as those already opened, and to have, enjoy, and be vested with all convenient and necessary ways, way-leaves, and liberties of laying, making and repairing Waggon Ways, and other ways, in, over and along the same or any part thereof, and of searching for, draining, winning and working the Mines and Quarries and dressing, smelting and leading, and carrying away the Coals, Lead, Tin, Copper, Stones, Limes, Slate, Metals and Minerals to be gotten thereout, or out of any other lands or grounds, and making Pits, Shafts, Pit rooms, Heap-rooms, Drifts, Levels, Heights, Dams, and Reservoirs of water, and water courses, and taking, diverting, and using springs, or brooks and other waters, erecting and using Fire Engines and other engines, Smelt Mills and other Mills, Houses and other buildings, and all and every other Matters and Things now in use of hereafter invented for the purposes aforesaid, or any of them, in, upon, through, over or along the said stinted Pastures, Open Field Lands, Moor or Common, or any of them or any part or parts thereof, and all other Powers, Privileges and Authorities, for all or any of the Purposes aforesaid, without paying any damage or making compensation, in the same manners as if the act had not been passed’.

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Extract from the award of the inclosure of Bewerley Moor and Hardcastle Moor situated in the Township of Bewerley, in the County of York:

‘James Powell of Harrogate, Land surveyor, was duly appointed the Valuer in the matter of the said inclosure and made his award in writing bearing the date 31st day of March, 1858, and which award was confirmed under the hands and official seal of the Inclosure Commissioners for England and Wales on 15th day of April, 1858. The inclosure of the above Moor was duly authorised under the provisions of “The Acts for the Inclosure, Exchange and Improvement of Land” ‘.

Inter Alia

‘And I declare that the claim of Sir Thomas Woollaston White, Baronet, The Reverend Taylor White, Thomas Fowke, Andrew Burnaby, John Manwaring and Elizabeth his wife, and Anna Kirke - to the Mines of Coal, and Lead [35] Smelting House and Mills and to all other Mines and Minerals - except stone and to all Springs of water lying and being upon and under all the messuages, lands, commons, waste grounds and hereditaments situated and being in Bewerley Moor and Hardcastle Moor with exclusive right of sinking shafts and other works for searching for, working, and obtaining the said Mines and Minerals and carrying away the same without making any compensation for the same or for any damage or injury done to the surface and in the exercise of such rights, was duly allowed and that such right is not affected by this inclosure.’

In the 1800’s, the population of Greenhow was comprised of a varied group of people. The bulk of these people were of Yorkshire stock, with a sprinkling of Welsh, Scots, Irish and Cornish migrants. There was also a large floating labour force of Welshmen.

These people lived in squat cottages, usually small two-storied buildings with barn attached and scattered near the road to Pateley Bridge. Most of the miners owned a few cattle and hens so as to eke out their often meagre pay from the mines. In religion they favoured a nonconformist attitude although a small church representing the Church of England was eventually built.

Marriage took place as a rule without much thought as to the future; but in spite of this casual approach they usually made successful partners. Such a marriage was that of Jamie Pratt who took his new bride to live in an old mine office, rejoicing in the name of Carr House. This single roomed shack, standing in the middle of the moor without even a road to it was sparsely furnished with only a frying pan, a barrel sawn in half, a few planks and two mugs. In spite of this humble beginning these two raised a family of 23 children. Large families were then very common, the average number on Greenhow being 12 children. This living crowded together in often insanitary cottages, soon by death weeded out all but the strongest in each family.

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The miners' tastes in amusements were very varied and apart from much reading by a very few, ranged from drinking beer to pranks such as setting fire to the ling besoms which hung outside nearly every cottage. A prank for misty days was for them to lift a cow into another field, much to the confusion of the owner! Once for a bet two miners ran naked from the Miners Arms to Keld Dike in a raging snow storm; when they got back they found that their mates had burnt all their clothes. Sometimes they took great pains to achieve their object, as was the case when they unscrewed the horses from a showman's roundabout and placed them on the walltops and cow sheds scattered all over "the Hill".

Wagering was also another popular amusement. Wagers as to who could drink the most beer were often made in the nearby Miners Arms. One form of such wager was to fill a lard bucket with ale each man in turn trying to lower its contents the most in one breath. It is said that on a Saturday night beer used to flow over the doorstone of the 'Dry Gill Public' (formerly the Grouse Inn, now closed). The heaviest drinking, was however done by the Welshmen; no love being lost between them and the local Greenhow people, although the former were treated with respect, as most of the mine agents were Welshmen. Considerable quantities of ale must have been consumed to merit the landlord of the 'Queens Arms' (believed to be Keld House), to travel to Harrogate and [36] bring back a barrel of 'Spar Water', for which he had a ready sale on a Sunday morning at one halfpenny a pint. For all their obvious faults, it is to their credit that the miners built a school and provided for a teacher, long before Pateley Bridge had these assets.

Although the miners worked hard in the mines, it was sometimes unfortunate that they did so on their own account, for their lack of capital prevented systematic exploration and development. The simple honest miners were often unmercifully cheated by some of the agents. They submitted to signing undisclosed pay sheets and had to accept what the agents offered to them, hardly daring to air their grievances to the mine owners. Both miners and even promoters were often swindled and company after company went bankrupt. Agents would drive trials and stop before they cut ore, reporting failure. This was only done with a view to taking up the trials again at a later date on their own account. As a consequence of these practices the name of 'The Hill' was of bad repute in the lead world and when prices fell and money was urgently required to carry on, no one would back what appeared to be a worked out field. Workings collapsed and as nearly all the plans had been destroyed or stolen, the lack of these greatly hindered any chance of the mines being reopened.

During the period from 1916 to 1938 one or two mines were reopened with some small success, but here again the lack of capital prevented any serious development taking place and the mines soon became a poor proposition.

The principal mining grounds were the Craven Moor and Merryfield areas (Fig. 1). The former mines worked numerous veins which ran in an east to west direction

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mainly in the limestones; whilst the latter were in the main, sunk on to the Black Vein which runs for a distance of three to four miles eastwards towards the mines on Grassington Moor, here it is worked as the Bycliffe Vein. This vein runs for most of its length in the Millstone Grits and Shales.

The above account is based mainly on information recorded in the Society's files and these are by no means complete for this area. Bearing this in mind, it will be realised that a detailed account, cannot be given on all the aspects of the work carried out. Although several plans of the workings have been saved, the contemporary written word is rarely found. It is proposed therefore, to deal with the two companies which between them worked the main part of the mining field and of whose activities we have a reasonable account; namely The Nidderdale Lead Mining Company and the more recent Greenhaugh Mining Company.

The Nidderdale Lead Mining Company

The above company was incorporated on 31st August, 1859, with a nominal Capital of £15,000 divided into 11,000 ordinary shares (No. 1 to 6,000 and 10,001 to 15,000) of £1 each and 4,000 preference shares (No. 6,001 to 10,000) of £1 each. The preference shares were created and authorised to be issued by resolutions passed at a special general meeting of the company, held on the 6th May, 1863. The holders thereof being entitled to a dividend out of the profits of £20 per cent per annum, in priority over and above the dividends on the ordinary shares. The residue of the profits was divisible and payable at an equal rate per cent on all shares including the preference shares, according to the amounts respectively paid thereon. The first subscribers were: R. Fawcett, C.P. Smith, J. Horsman, S. Arnold, F. Crabtree, J. Hill, J. Redfern, C.H. [37] Manger, H. Smith, H.P. Baldwin and C. Reece. These men were traders and manufacturers from the towns of Bradford, Leeds, Sheffield, and Castleford. The solicitor and secretary to the company was Thomas Sykes of Pateley Bridge. (This worthy gentleman appears to have been the secretary and advisor for practically every other local mining company in the area).

The ground (Fig. 2) which this company worked bordered the side of Brandstone Beck, near to where they had their main drainage adit, (Perseverance Level) for the whole of the workings on Black Vein. The Prosperous and Providence Lead Mining Company had Wonderful Level which drained into Ashfoldside Beck, but was 57 feet higher up the gill than the Perseverance Level. From January, 1837 to December, 1842 some 1,314 tons of lead were raised from the ground between Asquith Shaft and Sir Thomas Shaft, (Fig. 2) between the surface and the 30 fathom level. The average weekly production in this part of the mine was only 4 tons.

Providence Mines were subject to an annual rental of £250 and a royalty of ten shillings each fodder of 19½ cwt., on all lead obtained. The Prosperous portion of the ground was at this same time held to a royalty or duty of one sixth of all lead raised. The veins below the Wonderful Level remained unworked and under water

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after the stoppage of the mines in April, 1843. Some idea of the output from these mines at this period is given in the following table:

‘Returns of Lead raised from Prosperous and Providence Mines.

Returns made to the Owners by Mr. Watson, the Lessee:

	Duty lead in pigs of 1½ cwt. Each	Total quantity raised in pigs of 1½ cwt. each
Working Period		
January to December 1837	660	3,960
January to December 1838	400	2,400
January to December 1839	400	2,400
January to December 1840	440	2,640

Returns made to Owners by Yorkshire

District Banking Company.

From

January to December 1841	580	3,480
January to December 1842	440	2,640

Total quantity raised from January, 1837 to December, 1842: 17,520 pigs or 1,314 tons of Lead, at the rate of 219 tons per year.’

The Nidderdale Lead Mining Company proposed in 1863 to partially unwater the Prosperous and Providence Mines by driving the north branch of Perseverance Level a further 200 yards so as to connect it with the 53 Fathom level at Providence Shaft. The lead vein at the Providence Mine, 76 Fathom Level, was said to be 14 (!) yards wide and had only been worked for a short way. The maximum proposed development in depth was to be 40 fathoms below Wonderful Level, or 78 fathoms from the surface at Providence Shaft.

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In order to drive Perseverance Level the required further 200 yards the Viponts Estate was to be purchased for the sum of £750, including the mineral rights. This land, 20 acres, 2 roods and 34 perches in extent, contained the Sun and Dry Drift Veins each with a length of 200 yards. The Society has no data to suggest that this purchase was ever made; if it was made, none of the plans in the possession of the Society show this connection. An attempt to verify this point was made by members of the Society in 1960. Members entered Perseverance Level and penetrated to the North Branch; here they were forced to abandon exploration due to foul air.

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Sir Thomas Shaft close to the Nidderdale Company's boundary with the Prosperous and Providence Mines raised £850 of lead between November, 1859 and October, 1862. Much of this rich ground was said to be under water and one of the miners who last got metal in this working said that it would pay the men well at 26 shillings a bing of 8 cwt., four bings being required to produce one ton of lead.

The accounts of the Nidderdale Lead Mining Company given in detail from the date of the second year of working (1861 to 1870) and stated half yearly are as follows:

Lead sold	1st Half of year	2nd Half of year
1860	£197 13 0	
1861	£221 7 0	£161 3 0
1862	£298 1 5	£ 95 16 7
1863		
1864	£ 71 4 6	£ 97 6 6
1865	£ 84 1 0	£547 2 2
1866	£107 11 3	£331 9 7
1867	£402 15 10	£ 45 4 9
1868	£193 1 10	£ 75 1 5
1869	£112 3 7	
1870	£156 12 7 to 30th June.	

The Nidderdale Lead Mining Company was reconstituted on 14th February, 1872, its new title being, 'The Sunside and Merryfield Lead Mining Company' with a share capital of £15,000. The first subscribers were George Priestley-Smith, surgeon. James Sutcliffe, surgeon dentist. Howard Croft, bankers clerk. Charles Phillips, stoneware manufacturer. Josua Hartley, sanitary tube manufacturer. James Richard, grocer, and David Snowden, machine maker. With the exception of Wadsworth (26 shares), each of the latter took 50 shares. The society at present has no details of the working or success of this new company.

The Greenhaugh Mining Company

This company operated in the Greenhow area from 1915 to 1939. The name of the company was altered several times and although our records are vague with regard to dates and titles, it is clear that the late J. H. Clay, of Thornton-in-Craven was the driving force behind the ventures of this period.

The first actual mining operation was the re-opening of Jamie Mine under the direction of J.H.L. Bruff around 1915. This gentleman, of Norwegian extraction, as well as being a mining engineer, was also a foremost authority on welding practice, [39] a railway engineer, author, and dialect expert, living on Greenhow Hill for many years. The old mine here was sunk 30 fathoms on to Jamie Vein; its workings also touched the Lonsdale and Lodge Veins at 25 fathom depth. Several sumps were sunk on the vein and proved that the ore continued good in depth; the vein carried a 12 inch wide

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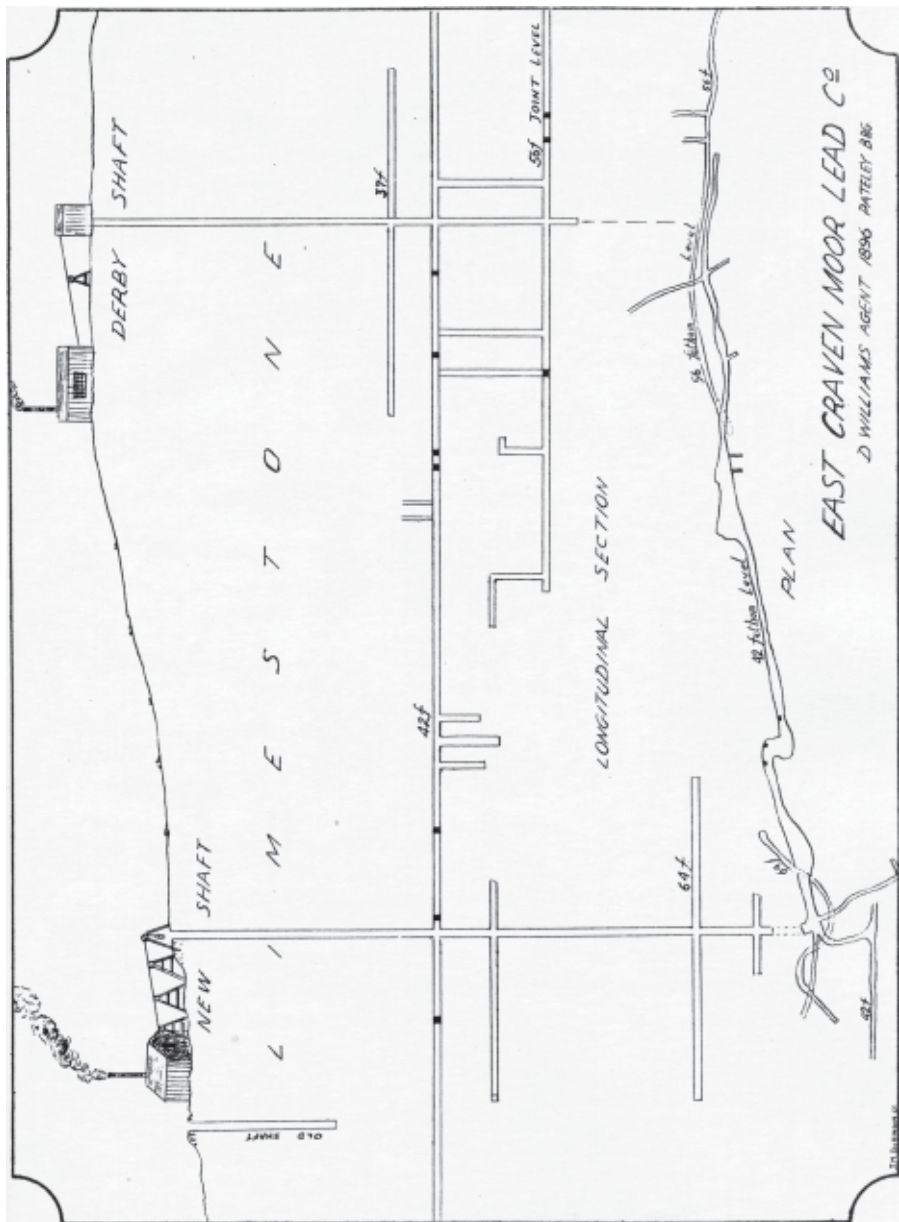
solid rib of galena. Owing however to the heavy water encountered during wet weather and the difficulty of obtaining coal during the war, work ceased. The pump used during this venture was a steam sinking pump, of capacity, 10,000 gallons an hour; this pump had to be worked continuously in wet weather. The next scheme was to re-work Foxholes Mine, situated about 400 yards west of Jamie Mine. This mine connected with the Blackhill Level and here it was proposed to drive eastwards and de-water Jamie Mine. Foxholes Mine was reopened and it is believed that a drive to the east was started, but owing to labour shortage and dwindling capital, operations were soon suspended. The following two letters were written by Bruff at this period:

16th May, 1918: 'The development work has mainly been confined to the fixing of the needles and guides for the cage in Foxholes Shaft, as well as chiselling off the rock in the shaft, where it obstructed the cage. We have made the cage, and got ready part of the materials for the pit head, built the drum pit and erected part of the winding engine. There is one important point that we have been able to establish namely; that even through prolonged rain the quantity of water in the bottom will not hamper the work, so until the opening out northwards to Willie Waters Vein is commenced, there is no necessity for reopening the Black Hill Level.'

? April, 1918: 'Since I last wrote to you on 3rd April, as to the position at the mine, we broke on the 16th, into the bottom workings, but first, on the 18th could I enter and examine these. The depth of the shaft, which is the same as the level sole is 36 fathoms from the shaft collar. The bottom of the shaft is somewhat less roomy than the top length, but the restriction, owing to the more perfect alignment, the shaft having been driven in sounder rock, will not restrict the general and intended gauge of the shaft. Directly south from the bottom of the shaft foot, about 20 feet, a level opens out eastwards for about 50 feet, where it cuts a fault, which follows a southerly direction for about three yards and then continues on the vein, east for another three yards. Owing to a fault where the sump on the 30 fathom workings is located, this level is dammed up forward, to a depth of 3 feet beyond the fall. For this reason I could not get to the face, but the foreman could, having waders on and by holding his lamp to the face I could see ore in the face, about 2 inches wide for about 18 inches above the water. The vein here slants across the face to the south. Except for the sump mentioned no stoping has been done here.'

Briefly the history of the mine (Fig. 3) is that the company which worked this ground (Craven Moor Lead Mining Co.), worked it first through Foxholes Low Shaft (also known as East Shaft). Desirous of obtaining better ore and to get a safer shaft, they sunk Foxholes Shaft (West Shaft) and at the same time drove the West Level for 120 feet connecting it with Low Shaft. When the ore at Foxholes was exhausted, the company next cut good ore in the Hardgate End Shaft; leaving only a few men at Foxholes to carry on development. The Blackhill Level was driven as far as this mine

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and the shaft deepened to 36 fathoms. A crosscut was made from the level to Gill Shaft. Shortly after this work had been carried out, the price of lead dropped so low that all work stopped and was never started again.

Gill Shaft mentioned in Bruff's above letter was originally sunk on to a pipe of lead. It is said that upwards of £8,000 of ore was raised here sometime in the eighteenth century. The Greenhaugh Mining Company re-opened this shaft at a cost of about £20,000, after the failure of Foxholes Mine. Before any extensive work could be done the price of lead again dropped by one half and the mine closed. A detailed description of the workings is given by Bruff in 1918, whilst he was opening up Foxholes Mine:

'From the Black Hill Level the length of the crosscut appears to be about 500 feet, and is partly slurried up at its low end, as in the main Black Hill Level. This crosscut is intersected by a clay joint at 120 feet. At 240 feet the crosscut intersects a well defined vein trialed for a couple of yards in an easterly direction, which shows ore. Towards the far end the crosscut is intersected by a vein and innumerable strings of barytes and fluor spar, containing traces of lead ore. The forefield likewise shows similar strings. There is a rise of about 40 feet in height at a position approximately 20 feet back from the forefield. This rise is laddered and gives access to a drift running N.E. and S.W. The N.E. drift runs for 45 feet, where it ends in a fall. On the plan this coincide with the Upper Gill Shaft which it is proposed to re-open. The length of the drift S.W. is about 40 feet and at the end is another rise, giving access to a north and south drift containing barytes and fluor spar; this bed dips to the north. At the top of the rise is a vein which has been driven into and shows ore. Close to the end the roof has been stoped; here "T'Owd man" has been cut. This place on the plan is immediately under Low Gill Shaft and it appears that a considerable amount of water enters here, which is consistant with the conditions on the surface, as the water from our present dressing shed sinks in Low Gill Shaft.'

Details of other mines worked by Clay and his company now follow, the correct sequence of working is not certain, hence they are described in alphabetical order.

Appletreewick Mine. This mine is situated on the western boundary of the Appletreewick property. In 1860 it was producing good ore and had been worked to a depth of 140 feet. At a more recent date the mine was re-opened, the shaft sunk a further 48 feet and some 300 feet of level driven into the vein to the east of the shaft. The ore between the 140 and 188 foot levels was stoped out, yielding 25/30 cwt. of ore bearing material to the fathom. A sump was put down a further 40 feet at the shaft foot, making the lowest depth reached as 228 feet below the surface. The Greenhaugh Company was to have sunk to 248 feet and driven east and west on the vein, thus giving a further 60 feet of backs for stoping. However, once again the

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price of lead dropped, at this time to £18 a ton with the result that the company decided to concentrate work at their Craven Cross Mine.

The principle mining here had been done on one vein, namely the South Vein. This strong vein was some 20 feet wide in places and had an infilling of calcite and disseminated lead ore; at points the ore occurred as a 6 inch thick solid rib.

[41]

‘T’Owd man’ had worked the nearby Derby and Limekiln Veins, the former by an adit level near the village. The workings on Limekiln Vein were the subject of a law suit, due to the company concerned working beyond their boundary. The case was found against the company and the ensuing fine put an end to their activities.

Craven Cross Mine. The mine here is on the western boundary of the Appletreewick property (Fig. 4) and situated on the south side of the Grassington to Pateley Bridge road at Cross Houses near the village of Greenhow. The shaft was originally an old shaft called Harris Shaft and was later used by the Bradford Corporation when driving the underground aqueduct through this section of the mining field. Mr. Clay purchased the shaft and a small patch of ground round it from the Bradford Corporation in 1929. The conveyance from Bradford Corporation to Pateley Mines Ltd., is dated, 8th January, 1869 and states:

‘Sale for £500 of 1 acre, 2 roods, 24 perches of land at Greenhow and the shaft, excluding a safety zone 20 yards in diameter measured from the centre of the shaft, increasing in diameter by 1 yard for every 3 yards vertically below aqueduct. The mining Company may drive across this zone but may not mine it.’

The shaft was sealed off from the aqueduct and old workings and started at the 392 foot level.

On the surface the stone head gear building is still standing to-day but in a ruinous condition. Up to a few years ago the engine and boiler houses together with the smithy were still standing. Unfortunately, some ‘vandals’ arrived one day and cut up the machinery for scrap.

The Corporation shaft is circular, 8 feet in diameter, lined with concrete and 400 feet deep to the aqueduct, or to use the local term, to the ‘Pipe Track’. One of the main drawbacks to this shaft was its small diameter, which allowed only one small cage carrying a single tub to be raised at a time. The winding and compressed air machinery was powered by steam engines, worked from old locomotive boilers. It is said that the first steam engine used here arrived under its own power in the form of a traction engine.

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The 'Pipe Track' proved 13 veins over a distance of 3,245 yards and in each case these veins had been worked by 'T'Owd man' from the surface, or by workings not exceeding 30 fathoms in depth. The veins cut were as follows:

Woodhouse Vein	.....	.....	Carries 6 inch thick vein or ore.
New Vein	.....	.....	Promising vein.
Redhill Vein	.....	.....	Promising vein.
Pity Me Vein	.....	.....	Promising vein.
Fielding Vein	.....	.....	Promising vein.
Jamie Vein	.....	.....	Promising vein.
Black Hill Vein	.....	.....	Carries a 12 inch thick rib of ore.
Harker Vein	.....	.....	Carries a 12 inch thick rib of ore.
Longthorne Vein	.....	.....	Carries good ore and fluor spar.
Hardgate End Vein	.....	.....	Carries 3 foot thick vein of ore.
Stee Shaft Vein	.....	.....	Carries lead and fluor spar.
Cross Vein	.....	.....	Carries lead and barytes.
Lumb Vein	.....	.....	Carries lead and fluor spar.

[42]

The company later drove a crosscut westwards for a length of 672 feet at a higher level than the aqueduct with the intention of intersecting the two nearest veins, Woodhouse and Hardgate End Veins. Hardgate End Vein was cut and found to carry a two foot thick rib of galena. This vein was proved for a distance of 700 feet and stoped up to 110 feet above the level, with an average vein width of 18 inches. Woodhouse Vein was proved over a distance of 300 feet, being stoped to 90 feet above the level with an average vein width of 9 inches. A further crosscut was driven towards Stee Vein. In 1930, the estimated ore reserves of this mine assuming that the veins continued to yield for a further 100 feet in depth, were 65,500 tons of lead ore on the three main veins; that is Woodhouse Vein 2,500 tons, Hardgate End Vein 23,000 tons, and Blackhill Vein 40,000 tons, the general matrix of these veins was fluor spar. The surface plant at the mine consisted of screens, picking belts, crusher, jigs, slime tables and concentrating tables powered by fuel oil engines. The total capacity of the mill was 50 to 60 tons of ore bearing material each shift of eight hours. The average annual output of the mine in 1829 was 1,300 tons of lead ore and 2,500 tons of fluor spar gravel. To open up and bring the mine to this output had cost some £25,000.

Gill Heads Mine. This mine is located in a branch of Trollers Gill near Appletreewick. It had been worked from a level parallel to the main vein and running to the west. A great deal of stoping has been carried out, both above and below the main level. The vein is approximately 20 feet wide and has been stoped in a near vertical plane for 70-100 feet along its length. At one time the ore was taken up the side of the gill by a cable railway, where it was then treated and carried a short distance along a horse

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drawn tramway to hoppers situated near the roadside. This tramway also ran to the Appletreewick Mine. At a later date a road was made to the engine bank of the mine. The Greenhaugh Company worked this mine for fluor spar in conjunction with the waste dumps of Blackhill and Jamie Mines. In 1922 the company had re-opened workings running 100 yards along the vein; surface workings indicate a further 350 yards of activity. The lower level was 40 feet below the above main adit and was drained by a fissure into the limestone. This lower level proved the vein for a distance of 150 feet and was found to average a thickness of 5 feet in fluor spar countryrock. The output of the mine for the twelve months ending 30th September, 1922, was as follows:

Gill Heads Mine	2,990 tons of Fluor Spar.
Blackhill Wastes	850 tons of Fluor Spar.
Jamie Mine Wastes	880 tons of Fluor Spar.
Total output	4,720 tons fluor spar.

The cost of working the mine during 1922 amounted to 30s. 2d. a ton against a selling price of 28s. 4d. a ton. During the second half of the year the cost of working was 29s. 1d. a ton against a selling price of 29s. 6d. a ton; not particularly encouraging figures. Transport charges in the second half of the year were 9s. 2d. a ton and Royalties were 1s. 11d. a ton, giving a mining cost of 18 shillings a ton. The veins in general proved to be patchy and although yielding fluor spar abundantly needed vigorous development to ensure a regular output. This work was not possible due to the financial difficulties which ensued through the above development.

Nursery Knott Mine. This mine lies about one mile west of Craven Cross Mine, on the north side of the Grassington to Pateley Bridge road, on the hillside above Nussey [43] House. This house used to be called the Grouse Inn or as the miner knew it, 'T' Dry Gill Public'. At this time a series of flatting beds with an infilling of barytes, clay and lead ore were found. The beds were intersected by a series of veins running north and south, these beds having a dip of 12 degrees to the north. This part of the property had been worked by the 'old man' and again in more recent times for lead ore. The presence of large quantities of barytes in the surface dumps led to operations being restarted. There are three flatting beds, Top, Middle and Bottom; the outcrop of the top bed can be traced for three-quarters of a mile in an east-west direction. A deep adit, namely California Level is situated about one and a half miles to the north and cut into the Top Bed. Good white barytes was worked together with the lead ore. The beds vary in height from three to eight feet, the lead occurring in clean nodules weighing a few pounds to two or three hundredweight each. The barytes is in places solid from sole to roof and of good quality, comprising 98%, Ba.SO₄ and 1% SiO₂. 'T'Owd man' sunk a 30 fathom shaft to work the middle bed, and at this depth they had two feet of solid galena. Unfortunately, one winter the mine was watered out and the work had to be left until the following summer, during the winter the shaft ran in and all was virtually finished.

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The Greenhaugh Mining Company later put incline drifts into the Top and Middle Beds, their policy being to drive these headings down to 30 Fathoms depth and overhand stope up the beds. It was optimistically estimated that one tenth of the bed area would yield some 72,000 tons of barytes.

Cockhill and Gill Field Levels. In studying the accompanying plan of the workings, two long levels can be noted each with their entrances in a valley to the north of the Miners Arms Inn at the village of Greenhow. These are the Cockhill and Gill Field Levels which were originally worked by the Sunside Mining Company. Gill Field Level or North Coldstones Low Level as it was named on early plans was driven in the main along Sun Vein; extensive stoping was carried out above the level for nearly the entire length. Once in the 1860's the level was closed down under rather strange circumstances. One night two miners were working in the sump of an under level off the side of the main level. They had entered the mine during the evening at 10 o'clock and closed the air door at the top of the sump sealing its edges with clay. Two hours later they heard someone walking up the main level above them, the footsteps stopping at the door to the sump. They then heard the 'miner's knock', given to warn them to shield their candles against the incoming draught. The door then opened and closed; they waited for the person who had entered to climb down the ladder, but they waited in vain for there was upon inspection no one there. Thoroughly puzzled, they returned to work, when a few minutes later the whole sequence was repeated. This time one of the miners climbed up the ladder to look at the door, only to find that the clay seals were still intact. Uneasily they started work, but again the eerie footsteps were heard; at this they hurriedly packed up and went home. The morning shift arrived at six o'clock and found the old under-level flooded to the sump top. There was consternation until the bearers of the bad news arrived at the miners' houses and found them both in bed. From that day the miners refused to work in the level and the mine closed down for an unknown period. The coffin carving mentioned previously and cut into the roof of the level marks the place on the surface where in about 1820 a soldier was buried. During the 'plug drawing riots', in Lancashire and Yorkshire, a company of soldiers was marched over Greenhow Hill from York. It was a hot summer day when one of [44] them named John Kay died of heat stroke. He was buried at the side of the road with full honours. At a much later date it is said that some of the miners dug at the place where he was buried; they did in fact find his bones, his sword and his rifle.

Cockhill Level emerges near the yard of the Cockhill Smelting works, some 40 feet higher than the Gill Field Level. This horse level at one time ran as the 56 fathom joint level to the limits of the Hardgate End Vein. Greenhow Rake branches to the south from this level. It is near this place that some of the deepest workings on 'the Hill' are to be found, (550 feet below the surface). There was here an underground boilerhouse with small shaft serving as the chimney. The boilers powered underground winding and pumping machinery serving a sump at this point. It is said that at one time the pumps broke down at a time when ore prices were low. The company

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somehow managed to raise enough money to buy new pumps, but unfortunately lost them down the sump when refitting. In modern times this sump was again pumped out and the wreckage of the machinery found.

In the 1930's Oay re-opened both the Cockhill and Gill Field Levels for fluor spar. The new work which he carried out in Cockhill Level was in the Greenhow Rake area where fluor spar was found in large quantities. The miners encountered very bad ground between the head of the level and the Rake Vein. This area known as 'the Corkscrew' defied all efforts to hold the passage secure mainly due to natural pressure on the hanging wall. It was the practice of the men to return through 'the corkscrew' before any explosives were fired, such was the nature of the ground.

In Gill Field Level extensive stoping was carried out on Waterhole Vein and in parts of Sun Vein. The washing plant which was situated near the ruins of the Cockhill Smelting Mill, was said to be so efficient that a pin dropped in a tub at the forefield would be picked out in the mill! Work ceased in these mines at the outbreak of war in 1939 and they were worked only spasmodically by several parties up to 1945. Since then the work carried out has been to regain materials from the old waste heaps.

Notes on the Map of The Greenhow Mining Field

Gill Field Level

1. Waterhole Vein, Clay's Stoping.
2. Sun Vein.
3. Sun Vein West and Top Levels.

Cockhill Level

4. Haiding Vein.
5. Blue Rigg South Low Level.
6. Cleavers Vein.
7. Sir Thomas Vein. Extensive stoping was carried out on the vein at six levels connected by shafts with the surface.
8. Sun Side Low Level, Green Grooves Vein.
9. Greenhow Rake Vein, East Low Level.
10. 56 Fathom Joint Level. A large horse level which ran from the head of Cockhill Level to Derby Shaft on Hardgate End Vein.
11. Primgap Vein. The Waygate into this vein was Andrable Shaft; until a man was killed by a falling stone. The shaft was then sealed and never used again.

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12. Galloway's Vein, South West Low Level.
13. Duke Shaft. Depth, 64 fathoms, one of the deepest shafts in the area. Following

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the closure of Andrable Shaft the men were wound out of this shaft on a 'Jack RowI' by their women folk.

14. Galloways Vein.
15. 56 Fathom South Cross Cut.
16. 42 Fathom South Cross Cut.
17. Crosscut at a presumed 42 fathom level (No data available) cutting Harrup, Redhill and Lodge Veins.
18. Hardgate End Vein. Maximum depth worked was 64 fathoms at New Shaft.
19. Marshalls and Woods Levels; depth 42 fathoms?
20. Craven Cross Mine Shaft.
21. Cockhill Smelting Mill. Built about 1785 and owned by the Sunside Mining Co. This company worked Cockhill and Gill Field Levels. Some 80 men and boys were employed at the mill and on the dressing floors.
22. Providence Mill. Small mill now in ruins; nothing known of its detailed history.
23. Ebenezer Level. Driven on to Black Vein, 15 ft. from the surface.
24. Prosperous Mill. Last worked in 1872.
25. Heathfield Mill. Built by John Yorke, Esq., of Bewerley Hall in 1855. Ore smelted here came from the Appletreewick Mining Co., Craven Moor, Burhill and Merryfield Mines. One unusual feature of this mill was the use of water powered fans for the furnaces instead of the more usual bellows.
26. Burhill Mines. One of the shafts here entered a natural cavern with a large stream flowing through it. The mine agent offered £5 to anyone who would explore it. One, Joss Pounder, duly obliged the agent and reported that it was 'the worst place' he had ever been in.
27. North Rakes Shaft.
28. Nursery Knott Mine.
29. Grimwith Deep Level. Sometimes called Yorke's Deep Level. Intended to dewater the Middle and Bycliffe Veins. Work started in 1863 but stopped after driving 60 yards and was never finished.
30. Speculation Level. Driven through the shales towards Black or Bycliffe Vein, said to have been too high in level, for success.

The surveys of the workings on Cockhill and Gill Field Levels shown on the map are taken from the original surveys by Matthew Newbould, dated 1860. They would appear to be rough surveys only, as the lining up of the surveys with the surface features has proved to be an almost impossible task. Therefore as here illustrated, they have been made to fit as near as they will. The result gives some idea of the layout of the workings; although in some cases these positions cannot now be shown accurately. The workings as shown on the plan are mainly of the adit levels only.

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