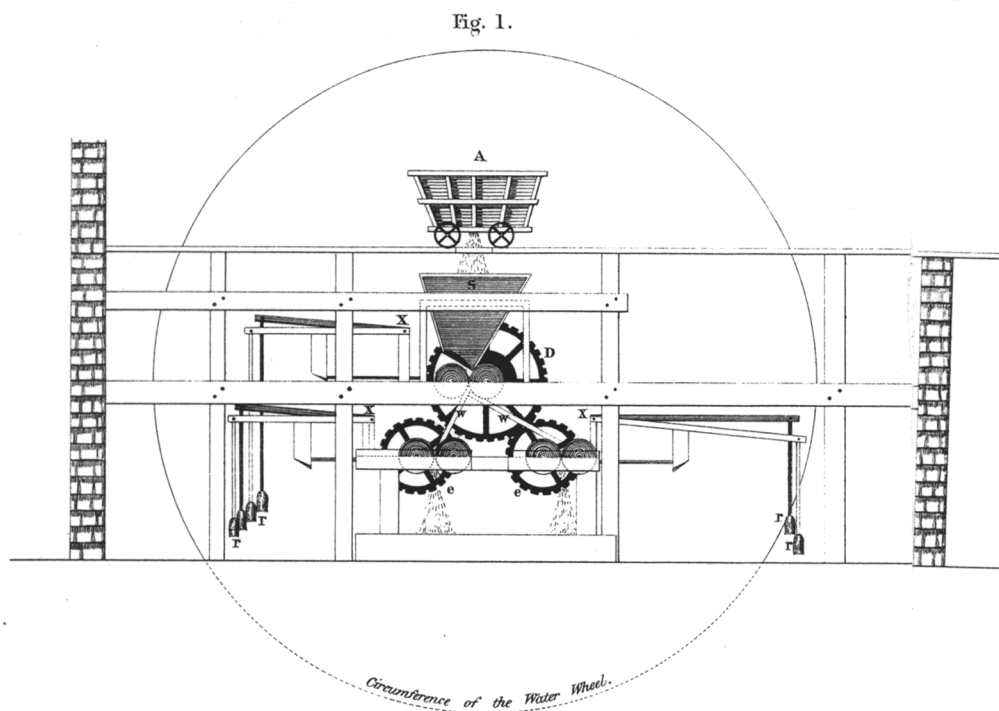


# Children's Employment Commission 1842.

**REPORT by JAMES MITCHELL, Esq., LL.D.,  
on the Employment of Children and Young  
Persons in the Lead-Mines, &c., in Durham,  
Northumberland, and Cumberland; and on  
the State, Condition, and Treatment of such  
Children and Young Persons.**



Edited by Ian Winstanley

## The Evidence

**Lead-Mines, &c., in Durham, Northumberland, and  
Cumberland**

**Published by:-**

**PICKS PUBLISHING  
83. Greenfields Crescent,  
Ashton-in-Makerfield,  
Wigan WN4 8QY  
Lancashire.  
Tel:- (01942) 723675**

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# COMMISSION

(UNDER THE GREAT SEAL)

## FOR INQUIRING INTO THE EMPLOYMENT AND CONDITION OF CHILDREN IN MINES AND MANUFACTORIES.

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**VICTORIA**, by the Grace of God, of the United Kingdom of Great Britain and Ireland Queen, Defender of the Faith: To Our trusty and well beloved Thomas Tooke, Esquire, Thomas Southwood Smith, Esquire, Doctor in Medicine, together with Leonard Horner and Robert John Saunders, Esquires, two of Our Inspectors of Factories, Greeting:- WHEREAS, an humble Address was presented unto to Us by Knights, Citizens and Burgesses and Commissioners of Shires and Burghs in Parliament assembled, humbly beseeching Us that We should be graciously pleased to direct an Inquiry to be made into the Employment of the Children of the Poorer Classes in Mines and Collieries and the various branches of Trade and Manufactures in which numbers of Children work together, not being included in the provisions of the Acts for regulating Employment of Children and Young Persons in Mills and Factories and to collect information as to the time allowed each day for meals and as to the actual state, condition and treatment of such Children and as to the effects of such Employment, both with regard to their morals and their bodily health; NOW KNOW YE, THAT WE, reposing great trust and confidence in your ability and discretion, have nominated, constituted and appointed and do by these presentiments nominate, constitute and appoint you the said, Thomas Tooke, Thomas Southwood Smith, together with, Leonard Horner and Robert John Saunders, to be Our Commissioners for the purposes aforesaid and We do hereby enjoin you to obey all directions touching the premises which shall from time to time be given you, and any two or more of you, by one of our principle Secretaries of State and for the better discovery of the truth in the premises, we do, by these presentiments, give and grant to you, or any two or more of you, full power and authority to call before you such persons as you will judge necessary, by whom you may be the better informed of the truth in the premises, and to inquire of the premises and every part thereof, by all other lawful way and means whatsoever and We do hereby also give and grant unto you, or any two or more of you, full power and authority when the same shall appear to be requisite, to administer an oath or oaths to any person or persons whatsoever, to be examined before you, or two or more of you, touching or concerning the premises and Our further will and pleasure is, that you Our said Commissioners, or any three of you, do, with as little delay as may be consistent with a due discharge of the duties hereby imposed upon you, Certify to Us, under your hands and seals, or under the hands and seals of any three of you, your several proceedings in the premises; And We further will and command, and by these presents ordained, that this Our Commission shall continue in full force and virtue, and that you, Our said Commissioners, or any two or more of you, shall and may from time to time proceed in the execution thereof, and of every matter and thing therein contained, although the same be not continued, from time to time by adjournment: AND WE HEREBY COMMAND all and singular Our Justices of the Peace, Sheriffs, Mayors, Bailiffs, Constables, Officers, Ministers, and all other of Our loving Subjects whatsoever, as will within Liberties as without, that they may be assistant to you and each of you in the execution of these presentiments. And for your assistance in the due execution of this Commission, We have made choice of Our trusty and well beloved Joseph Fletcher, Esquire, to be the Secretary of this Our Commission, whose services we require you to use from time to time, as occasion may require. In witness thereof, We have caused these Letters to be made Patent. Witness Ourselves at Westminster, the Twentieth day of October, in the Fourth Year of Our Reign.

By Writ of Privy Seal,

EDMUNDS.



**LETTER OF INSTRUCTIONS EXTENDING THE TERMS OF THE COMMISSION TO  
“YOUNG PERSONS”**

*Whitehall, February 11th, 1841.*

GENTLEMEN,

THE QUEEN having been pleased to comply with the prayer of an humble Address presented to Her Majesty, in pursuance of a Resolution of the House of Commons, dated 4th. of February, 1841, ‘That Her Majesty will be graciously pleased to direct that the Commission appointees in answer to an Address of this House, on August 4, 1840, for the investigation of certain branches of Infant Labour, do include within its inquiry the Labour also of Young Persons designated as such by the provisions of the Factory Act’ I am delighted by the Marquis of Normanby to desire that you will include within your inquiry the Labour of Young Persons designated as such by the provisions of the Factory Act accordingly.

I am, Gentlemen,  
Your Obedient Servant,  
(Signed) F. MAULE.

*The Commissioners for inquiring into the Condition  
of Children employed in Mines, &c.*

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# Children's Employment Commission.

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## REPORT by JAMES MITCHELL, Esq., LL.D., on the Employment of Children and Young Persons in the Lead-Mines, &c., in Durham, Northumberland, and Cumberland; and on the State, Condition, and Treatment of such Children and Young Persons.

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### THE LEAD COUNTRY OF NORTHUMBERLAND, DURHAM, AND CUMBERLAND.

THIS country though politically distributed amongst three counties, is one and the same in all its characteristic features. From it flow the Tyne, the Wear, and the Tees, and many branches which fall into these rivers. Along the banks of these and of several smaller streams which fall into them, are dales or valleys, cultivated near the banks and for a short distance up the sides of the hills but soon cultivation and enclosures cease and beyond them rise dark fells, covered with peat moss and heath and between one vale and another is a wide extent of high moor land extending sometimes for a dozen of miles. In these upland tracts are no inhabited houses, but thousands of black-faced sheep are scattered over them and there breed the grouse which attract the sportsman at the proper season of the year in this country.

The rivers do not, as in rich, flat, clayey lands, form for themselves a winding serpentine course. They flow right onward in a straight line, and with a rapid current. The channel, of which the water occupies but a small portion in dry weather, is covered with boulders and of some hundred weight down to small pebbles and here and there accumulations of sand. After rain and in winter, the stream flows in a powerful flood. Everywhere at only short distances from each other on both sides of the rivers, are vales and gullets with the banks feathered in wood, through which with thundering noise the smaller streams, here called burns, rush over the stones to join the united great stream below. These deep fissures are of importance to the subject of our inquiries as they often lay open to view the veins of ore and direct the operations of the miner to the places where it is met with in sufficient plenty to reward his toil.

As much of the fate of the miners will be found to depend on the romantic nature of the country and the consequent attachment of the inhabitants and the impossibility of bringing themselves to leave it for any other land, I shall enter into a more particular account of each several dale.

Weardale will be held by many to be the most beautiful of them all. It gradually contracts into narrower spaces and the hills become loftier on proceeding westwards from the low country. Strictly, Weardale is a valley 15 miles in length and is considered commencing about three miles below the village of Stanhope and from where it commences up to that village the grass lands are interspersed with fields of wheat, oats and turnips and for three miles higher up than Stanhope occasionally corn land may be seen and the soil is fertile and the crops abundant. Hitherto there is much woodland interspersed but gradually as we ascend the patches of woodland are fewer and farther between. Still for some miles there is a considerable show of trees by the river banks and thick plantations on the sides of the ravines, through which over rocks and stone the burns dash downwards. But towards the upper part of the dale the trees are solitary, in twos or threes near human habitations, or occasionally on the river side. At last is Wearshead, a hamlet where two burns meet and first give a name to the Wear and each rises a mile or two higher up to the centre of wild, treeless, heath-covered hollows of the mountain.

Both sides of the dale for three-quarters of a mile back from the river at Wearshead and still further back lower down, presented in August last the most beautiful green and a rich vegetation.



The whole of the dale is well enclosed with stone fences and is subdivided into holdings of about five acres each. Houses are accordingly distributed over it on both sides of the river, like a continuous scattered village. These houses are substantially built of blocks of stratified hard sandstone and are covered with slate and, as lime is abundant, they are well whitewashed and present a clean, neat appearance; the fronts are towards the sun. Here and there is a little hamlet by the road side, the residence of tradesmen, to whose stores and workshops the population of both sides of the vale resort. There is much travelling backwards and forwards along the road, but seldom does an inhabitant of the dale pass far beyond its bounds. On the Saturday were many carts, conducted by miners, loaded with coal, for which they had gone to the nearest pit on the edge of the coal country. But for the week that I was in this dale I did not see so much as one coach and pair and only two gigs and these belonged to corn men travelling on business.

The inhabitants of the dale see few but themselves, and, of course, intermarry together; so that, in fact, by nearer and more remote relationship and affinity, they constitute but one great family.

Altogether the natives of the dale grow up with an attachment to their native land and their own people which nothing can overcome. Hence it is that, although by removing only 20 miles lower down into the coal country a young man might nearly double his income and have the prospect of adding many years of health and strength to his life, he cannot remove. He clings to his beloved dale and follows an occupation which in most instances allows but a short life, the last years of which are spent in sickness and in sorrow. And this, too, is the effect on a population well educated and of intellectual capacity and acquirement surpassing any I have ever met with in England.

The river Tees rises in a hollow near the foot of Cross Fell, and is soon augmented by other mountain torrents. For many miles it flows through a desolate valley, with a little grass land on each side, a few solitary houses, with only now and then a solitary tree. Gradually the vale widens and for three or four miles before coming down to Middleton-in-Teesdale is well adorned with wood. On the Yorkshire side the rude hills approach very near the river and in some place present to it lofty cliffs. Middleton-in-Teesdale is an exceedingly pleasant village embosomed in woods, with the Tees flowing on its south side and here the Yorkshire hills recede for several miles. Below Middleton, and down to Barnard Castle, Teesdale is an exceedingly beautiful vale, and its grass lands are interspersed with fields of grain.

From Stanhope it is ten miles in a northerly direction to the mines and washing-floors on the Derwent. At first is a turnpike road; then a road made by the parish of Stanhope, almost as good; then a road by the parish of Edmondbyers which is continued by the parish of Hunstonworth, both portions as bad as a road can be made. The fell is altogether uninhabited and it may be stated as a proof of the severity of the climate in winter, that there are high posts of wood painted white and the top parts black, to enable the traveller to find his way during the snow. Such posts are usual on other fells in this country.

The vale of the Derwent, near the works of the Derwent Company is not 100 yards wide and the uncultivated land of the fells comes very near to the water. The miners and washers come from a distance and lodge in the lodging-shops provided for their use.

The upper part of West Allendale and of East Allendale, where the miners and washing-floors are situate, are very wild, narrow vales, enclosed with lofty dark fells.

From Weardale to Alston Moor the road lies over a high uncultivated dreary tract, which at last conducts to the busy village of Nenthead, with its smelting-mills and its washing-floor, on which may usually be seen a multitude of children engaged at work.

The little river Nent flows five miles to the town of Alston Moor through a narrow vale of beautiful green grass, divided into small holdings, and studded with white houses like Weardale, but with very little wood.

The town of Alston is agreeably situate on the side of a hill close to the river Tyne. It is beautifully surrounded by wood. The vale of the Tyne below the town is richly cultivated. This vale ascends for about five miles between lofty hills, to where the river rises in a hollow at the foot of Cross Fell; which lofty mountain on the south, with other mountains on the west, give an interesting grandeur to the prospect from every place in the vicinity of Alston.

The whole of the lead country possesses great beauty, though of diversified, character, and it is no wonder that it rivets the attachment of the natives. They think of no other world but this little world of their own and mining is their sole resource. To this attachment to the country and to each other we may attribute their continuing to engage in an employment which ill remunerates their toil

and brings many of them to an untimely grave.

The lead country, in a geological sense, is below the coal measures and above the old red sandstone. The lead measures consist of many strata of siliceous sandstone, limestone, clay shale, with beds of indurated clay between them. The lead is found in all these strata, though not often in clay or in clay shale and a vein will descend from the surface down through all the strata until it is so deep that it can no longer be followed on account of water and other physical difficulties. Amongst the more remarkable beds is the encrinal limestone, with abundance of its peculiar fossil remains. It may be seen in the bottom of a large burn, which falls into the Wear some miles below Stanhope, near Frosterly Bridge, at a place called Bishop's Crag. Limestone-boulders, gathered from the bed of the Wear, supply lime kilns and there are large limestone-quarries now worked about two miles below Stanhope, and also near the commencement of the Stanhope Railway. Near the same place are beds of ironstone of excellent quality, which are expected to be worked and carried by the railway to furnaces in the coal country.

In this country the mines now worked are all lead-mines. There was a considerable quantity of copper found in a mine near Garrigill Gate in Alston Moor and a little in some other mines but there is none obtained at present. Much farther west in Caldbeck Fells there is a mine called Roughton Gill, in which there is copper as well as lead and both ores in the same veins; so that in the large lumps brought out one half is copper and one half is lead.

The population of this country has been devoted to mining as far back as records can be obtained. As Cumberland was not surveyed by the Conqueror, we have no account of it in Domesday-book. But in the Record-office, in the Tower of London, in the Patent Roll of the 20th year of Henry III., membrana 13, being A.D. 1235, is a copy of a charter which shows that the mines were then worked and had been so during the time of the former kings of England.

De minera comitatus Cumbriæ  
Rex omnibus minitoribus suis de comitatu Cumbriæ.

Salutem. Mandamus vobis quatenus ad mineram nostram de Aldeneston salvo ac secure veniatis ad fodendum ac miniendum in predictæ minera scientibus quod minitoribus illis qui illuc venerint ad officium illud faciendum concedimus liberas ac liberas consuetudines quas minitores nostri partium illarum consueverunt habere temporibus prædecessorum nostrorum Regum Angliæ. In cuius rei testimonium Teste rege apud Westmonasterium quinto die Decembris.

Et mandatum est Vice-comiti Cumbriæ quod omnes minitores de balliva sua yenire faciat ad mineram regis in balliva sua ad fodendum et miniendum ibidem sicut facere consueverunt temporibus priedecessorum Regis Regurn Angliæ, faciat etiam vemie ad prædictam mineram mercatores de balliva sua cum victualibus ad sustentationem dictorum minitorum sicut illuc venire consueverunt temporibus priedictis. Teste ut supra.

That the inhabitants of the lead country are a people who have had little intermixture for ages past is proved by their language, which has characteristic points differing from that of the neighbouring country. Many of the words of the people of the lead country may never have been spoken at all in the south of England and many which long since were in use there are now fallen in desuetude; but the native of the north of Scotland will recognise them as still familiarly spoken in that part of the island and he will hear many words pronounced in a manner to which his ear is accustomed, but which he has been taught at school to eschew as improper, and contrary to the usage of England. The Glossary of the Poems of Burns is as little wanted here as it is in Ayrshire. A few such words are occasionally heard on each side of the lead country in the west side of Cumberland and in the coal country of Durham but here the whole language and accent is the same as with the men of the North. Away from the tide of human intercourse, they have continued the same in their language from age to age, unaffected by the changes going on around them.

Very few strangers come to settle in these vales. Out of 180 boys and young persons employed inside and outside the mines of Mr. Beaumont, in the parish of Stanhope, there are 179 who are returned as natives of the parish and only one is a stranger from a parish near Newcastle. Also out of 252 boys and young persons working inside and outside the mines of that gentleman in Allendale, 240 are natives of that parish, and 12 only are strangers, and these 12 are only from the adjacent parish of Alston. The miners, therefore, are as much as possible an unmixed race and are likely so to continue. In addition to what is strictly the lead country, I visited some mines farther to

the west in Cumberland, which are worked in primary rock. One of these is Greenside, and within the vale of Glenridding, which runs northwards from Ulleswater, within about a mile of the west end of that lake. There are also some very small mines in that vicinity. I likewise visited the mine of Roughton Gill, in Caldbeck Fells; a mine having copper and lead in the same veins and where a new mode of washing lead-ore has been introduced. I found that attempts were making to discover ore in the south side of the mountain Saddleback, near Keswick and also between that town and the coast but had not yet been rewarded with much success. The Borrodale Mine is situate nine miles from Keswick, but I found no children or persons under 18 there employed.

I now proceed to give the particulars of the young persons and children under the twelve heads stated in the Instructions of the Central Board.

### I - OF THE AGES AND NUMBER.

No exact enumeration has ever been made of the miners employed in Weardale, Teesdale, Derwentdale, East Allendale, West Allendale, and Alston but sufficient is known to enable to arrive at an approximation. A Return has been received from Mr. George Crawhall, of the number working inside and outside the mines of Mr. Beaumont, in the parish of Stanhope, as follows:-

Adults	823
Young persons under 18	108
Boys under 13	77
	1003
No females are employed.	

A Return from Mr. William Crawhall, of the miners working inside and outside the mines of Mr. Beaumont, in East and West Allendale, is as follows:-

Adults	806
Young persons under 18	147
Boys under 13	105
	1058
No females are employed	

The ore is not so easily crushed as in Stanhope parish, which occasions a greater proportion of young persons and children.

Mr. Beaumont is considered to employ about two-fifths of the mining population, the total of which will therefore be upwards of 5000.

This was the estimated number of miners stated by Mr. William Crawhall and the same number was named by Mr. Thomas Dickinson, agent to the Commissioners of Greenwich Hospital.

These Commissioners are in possession of a large portion of what formed the estate of the unfortunate Earl of Derwentwater, which was forfeited in 1715. The mines are let on a royalty to "The Governor and Company for smelting down lead," commonly called the 'London Lead Company,' and to sundry small companies; and their agent has an account, from time to time, of all persons employed in the mines. Of course the number is constantly varying a little but Mr. Dickinson reports the average to be as follows:-

Adults	1200
Young persons under 18	240
Boys under 13	40
There are also females between 13 and 8	20
	1500

This will be sufficient to show the relative proportion of the numbers employed of the different descriptions specified. The young persons and children are, rather more than one-fourth the number of the adults.

As to the age when children first begin to work in washing the ore, there are a few and but very rare instances between 8 and 9; the greater part begin between 9 and 10. In the mines of the London Lead Company the rule is to admit children at 12 years complete but in practice they are allowed to begin to work in their 12th year. The importunity and poverty of the parents, particularly of widows, procure this relaxation of the strict rule. The Returns shows the above to be ages for the commencement of labour, and the same appears from all the evidence and was confirmed by personal inspection of many of the washing-floors where the children were employed. Children under nine are seldom so strong as to be of any use whatever, which is the best security against their being employed. There are no apprentices at any description of work.

## II - HOURS OF WORK.

The number of hours a-day of work in the mines is eight and for five days in the week. Occasionally the miners may choose to work longer, more particularly if they 'fall in with a canny bit of ore' but it is very seldom. They have to come from home and return back, sometimes to a great distance, which makes the hours 'out of the house,' as is the phrase in the coal districts, considerably more. Some begin at six and leave off at two, some at seven and leave off at three.

There are mines where the men work double shifts, that is, one set goes in to work when the other set comes away: and in some mines there are three shifts working one after another for the whole 24 hours. It is thought to be better for the health, when the work can be got done in the day-time.

At washing the lead ore the usual time is from seven to six, with an hour for dinner. Very often some extra hours are employed during the five days of the week, in consideration of which the washers are allowed to go home so much sooner on Saturdays. Sometimes when time has been lost in summer, for want of water, and at last rain falls and water becomes plentiful the washers will come early and stop late, to make up a little for lost time.

The people of every mine do as they like, but in general the hours are from seven to six, and one hour for dinner; and no one witness has ever made complaint of too long hours at work. No doubt the desire to get what money they can reconciles all parties to make exertions, which but for the money they would describe as much too severe and beyond their strength. The washers begin their work sometimes as early as the end of February but frost may come on and then the water will no longer separate the dirt from the ore and they must discontinue. In this cold upland country they are not secure against interruption even in the beginning of April, and if strong frost take place they must stop. In the short days the children and young people work from daylight to dark. When the hard winter frosts set in the washing is necessarily stopped but in soft winters at some places they may go on till near Christmas. But, in general, it may be said that there is a cessation from washing from three to four months every winter and most of the men and bigger boys go and work in the mines.

The hours of work in the smelting-mills will be stated in describing the operations carried on in them.

## III - OF THE MEALS.

The children and young people employed in washing lead ore take an hour for dinner, from twelve to one. They sit where they can, very seldom having any other covering over them than the canopy of heaven. During the dinner all the machinery stops, and in places where the water requires to be accumulated in a dam the sluice is shut, and the water is preserved.

On the Saturday the meal is taken an hour earlier at most of the washing places.

In the mines the pickmen, young men, and boys, take a hasty meal when they can. Some allow themselves a certain length of time and have what they intend to be a regular hour but often there is not a watch amongst the partnership and they must guess the time when to sit down by the state of their appetite. They must in like manner guess in the best way they can when their eight hours are up. The miners are pretty much at liberty in regard to their work, but still on the whole they must please their master for fear of his discontinuing to employ them. If by their idleness or neglect it should be found at the end of the season that they had not gained enough to make a fair

living out of the mine, they might tease him to advance the price, and also the mine might get a worse character than it deserved, and other miners might be unwilling to work in it, except at a high rate. Every master likes his mine to stand well in the opinion of all the workpeople, and therefore he will not allow his people to be idle, and take too long time to their meals.

#### IV - NATURE OF EMPLOYMENT.

There are three grand divisions of employment connected with the mines:-

- I. The working of the mines.
- II. The washing of the lead ore.
- III. The smelting mills.

Of each of these divisions it is now attempted to give a description.

##### Of Working the Mines.

Entrance into the mines is almost always by a level driven into the sides of the hills. In former times shafts were frequently sunk from the top, but that is seldom the case now. The level is made about six feet high, sometimes seven feet high and from three to four feet wide and, where necessary, it is arched with stones. A railway for the waggons is laid at the bottom. By means of this level a great deal of water may be brought out of the mine, the carts may be drawn in by the horses to a certain distance and the ore may be brought out, and the miners may walk in to their work, or at least to the places where they ascend and descend. The level is usually driven into the hill, as far as possible, in the stratum called plate, being clay shale, if such there be, that stratum being softer and more economically worked than any other.

The object in view in penetrating through the hill by means of a level is to arrive at a vein of ore and when the working can be got on the first level it is most advantageous to all parties. In the level of the mine at Stanhope Burn which I visited, after going nearly half a mile forward, there were several chambers in which the men were at work, breaking down the lead ore by hammers and picks, drilling holes, charging with gunpowder and firing off shots. It was stated to me that the level extended through the vein of limestone rock with lead in it, as much as 200 fathoms, and I saw no reason to doubt it.

I now describe the work, first observing that the tools used by the miners are few and simple:-

1st. The jumper. - This is an iron chisel, pointed with steel. The usual length is eighteen inches and sometimes two feet. One miner holds it against the rock and another miner or a boy strikes the end with a hammer. From time to time the dust has to be taken out of the hole.

2nd. The hammer. - This is used for striking the end of the jumper.

3rd. The pricker. - After the cartridge is put into the hole, the pricker which is a thin iron rod and the outside end formed into a ring, is driven into the hole and through the cartridge. It is usually made of iron, which may cause sparks when the boring takes place in siliceous rock, or even in limestone, for frequently the limestone elicits sparks, as I have myself seen it do, both from the hammer and the spade, probably from siliceous matter mixed up with it. A copper pointed pricker would obviate this risk.

4th. The driver. - This is a piece of iron with a broad head, which is used to drive the shale down along the side of the pricker. The head ought to be of copper but it is seldom so.

5th. The scraper. - This is used for taking out the dust from the hole which has been made by the jumper and hammer.

In breaking down the rock the lead-miners use a pick, very like that employed in the coal-mines, also a great hammer.

The first thing is to drill a hole in the rock with the jumper and hammer. The miners then

insert a cartridge of gunpowder and this they do in the same way as if charging a gun with a cartridge, so that it is the same whether the hole been bored perpendicularly, horizontally, downwards, or sideways. Boys and young persons may drill the hole but they are seldom trusted to charge with powder. The next thing is to take a pricker and insert it in the hole, and drive it through the cartridge and keep it there for a time. Then they take what they call plate, which is pieces of black shale and put it in at the sides of the pricker, and with a driver which has just been described, they force the plate down as far as it will go and keep on at this work until they have filled up the whole of the hole round the pricker. Then the pricker is drawn out by inserting the scraper in the ring at the end and which leaves a hole open down to the powder. The men thrust down this hole a squib and they make a match, and one man puts it on the end of the squib. All the people, except this man, run away, and get into the level or some place where the stone directly coming from the explosion cannot hit them and they turn their backs for fear of any piece being reflected back into their faces. The man who has to fire off then lights the match and runs off as fast as he can and presently the shot goes off with much noise, smoke, and dust. The men return and find a chasm made in the rock and with hammers and picks they strike upon every projecting piece of rock and bring it down. The chamber where they work is now full of smoke and every additional shot fired off makes the place worse and worse as they continue their work throughout the day.

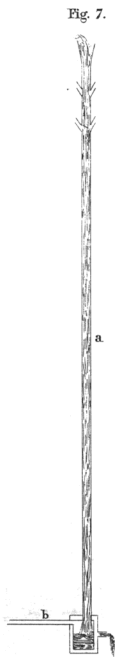
When the rock is wet, the patent fuse, being a slow match inside a rope, is found convenient.

When the miners have cut out the ore which is near the level, the level is arched over, and they proceed working upwards. The deads or rubbish, that is the rock not containing ore, is let down behind them and they keep ascending. Different sets of men will be working in places above each other and they are protected by scaffolding. When the ore is to be removed, it is let down a channel made for it, through an opening called a hopper into the cart or waggon in the level

In some mines there is much work in the first level which is driven, but frequently it is necessary to ascend upwards and make another level, and this is effected by drilling and blasting out the rock by gunpowder, and placing scaffolding by which the miners may climb up to their work. It is easier to work upwards than to work downwards, because in working upwards all the dust and broken pieces fall down, whereas in working downwards they accumulate at the bottom and it is troublesome to remove them. The miners in their upward work make a small landing place and go from one stage to another, so that they may be able to place ladders or pieces of wood from side to side, and be afterwards able to climb up and have halting places at short distances all the way. When arrived at the height thought best to fall in with the veins they move forward horizontally, or in a line parallel to the first level which was driven in from the air. It may be necessary to work upwards a second time and form another flight of ladders and then after getting to a certain height again to move forward further into the mountain in a line parallel to the preceding two and it may be several times repeated.

In like manner it may be expedient to follow the vein downwards, by sinking from one stage to another an opening for ladders, or flights of steps, to go down perhaps 18 to 20 fathoms, or 108 to 120 feet. Then they may run an opening forward horizontally, or parallel to the first level, and after a time they may have to descend again, as much as before, and then move forward, and so on several times, perhaps four, five, or six times, until the place of working may be 500 or 600 feet lower down than the first level.

The miner who works in such a remote situation walks into the level and comes on as far as the first descent by the ladders, down which he goes, perhaps with a load of tools on his back. He then goes on till he comes to the second flight of ladders, and descends; then onwards to the third, and descends and so on until he comes to the far remote place where he has to perform his work. He has no air except what comes from the level by which he has entered. There is nothing to make a current. Only slowly and very slowly, can the air about him, merely by the effect of a difference of temperature, wind its way upwards and make room for other air which may penetrate to take its place.



Means may be taken to diminish an evil which cannot be removed. Sometimes a body of air may be forced in by a fall of a stream of water from the top surface of the hill. An opening is made for it to descend down to the level, which it does with great violence, driving a body of air before it, and then it runs out along the bottom of the level from the mine. **Fig. 7** in the diagram will show how this is done; **a** is the stream of water descending, and **b** is the level extending to where the miners are at work.

Machines, or fanners, are also used, being worked by boys, and the air is carried along pipes to places to which it would otherwise only very slowly penetrate. Forcing pumps are also employed to force forward the air in a similar way.

Sometimes a supply of fresh air may be got by running a second level from the air into the hill and making a communication. In that case the air may be put in action and may enter at one level and go out by the other.

Sometimes a shaft may be carried up to the open air or let down from the open air into the level and when that is done a current of air may be effected. Whatever is within the range of such current, of course, is well ventilated.

Such things, however, are not the general rule. In most mines there are not two levels communicating with the open air, neither can there be shafts from the open air down to the levels. Where nature does not interpose a physical impossibility, there is what is equally powerful - the dread of expense. The sum required to sink a shaft or to run a level may be so great that the mine is not worth it. The proprietor would rather discontinue working it than submit to the burthen and the men, young persons, and boys having no other means of existence are eager to be allowed to work at the mine such as it is.

When self-interest and duty to others come in opposition to each other the former too often prevails. There is no doubt that there are mines where better ventilation could be effected at an expense which might very well be afforded no rule can be laid down, every case must rest on its own merits; and without a particular survey, the most experienced could not venture, to decide.

The ore which is dug out of the level which enters from the open air is conveniently brought out by a horse and cart, the wheels of which run upon a railway. But the mine which is dug in what we may call the levels but here are usually called shafts, above the first level are let down holes or channels made the purpose, from one level to another, down to the first or chief level and are then brought out. The ore which is dug out in the sumps or levels, which are into from the first level, is hoisted up by whimseys from one level to another until brought up to the first level, where it is brought out to the open day. Young boys are employed to drive the horses in whimseys and in carts.

Water is raised from great depths by steam-engines and by the haudraulic engine. This is a great water-wheel which works a pump. The water at the surface falls into the buckets of the wheel and by its gravity causes the wheel to revolve and the water from the buckets is discharged into the level. The pump brings up the water from a great depth below the level and discharges it into the level and then it runs out. This machine is cheaper than the steam engine as it requires no fuel and very little attendance, and of itself requires no fuel and very little attendance and of itself keeps working day and night.

Mr. Beaumont has no steam power in his mines in the parish of Stanhope but he has water power equal to that of 120 horses. In the mines of Allendale belonging to the same proprietor, there are 14 water-wheels, possessing a power equal to 300 horses. It is obvious that this hydraulic machine can be used only on the side of a hill and where there is a stream of water on the surface, which however is very often the case in the lead country.

The length of the levels driven into the hills depends on whether veins of lead are soon got or not. Some levels are half a mile in length, and some a mile but not very often. There are, however, levels much longer and there is one very remarkable level nearly five miles in length, called the Nent Force which begins near Alston, close by the fall of the Nent, called Nent Force, and extends forward to near Nenthead. For a long time there was water in this level deep enough to carry boats, by which the ore was brought out and an old boat was to be seen half sunk in the water

in August last. The ore is now brought in carts to the foot of a shaft near Nenthead and it is hoisted up by a whimsey. Several shafts for the purpose of ventilation were let down into this level.

### **Of Hushing.**

A considerable quantity of ore is obtained by a method called "hushing". Where a great ravine has been formed by the streams on the side of a hill and water comes down over the stones and clay and earth and ore has been discovered, then it is known that it is a good place for hushing. A dam is made at the upper part and a channel is made for the water, some of the larger stones being laid to one side, then, when the dam is let out, the flood of water, rushing down with all its fury, tears up the earth and stones with immense devastation and lays bare new surfaces to view. Then the man who has undertaken the work and the boys who assist him, go into the ravine and pick up all the ore laid open by the water.

At Silver Gill, close to Roughton Gill, five miles beyond Hesketh Newmarket, two Yorkshiremen had just taken the ground in August last and were about to begin hushing. It was an old mine, and they were to hush the rubbish. But hushing is chiefly carried on where the ravines disclose new veins and the water running along in its fury tears up the stones containing the metal. Of course rainy weather, which will enable quickly to collect a dam of water, is favourable to hushing. The work is about as agreeable as washing the ore and wages are much the same, according to the ages of the boys.

There are many hushing places seen on the road side from Weardale to Nenthead in Alston Moor.

### **Of Washing the Lead Ore.**

The object of washing the lead ore after it has been brought from the mine is to separate the lead from the limestone, sandstone, barytes, or other matter with which it is united or mixed up. Some men, and very many boys under 13, and young persons under 18, are employed.

The operations for carrying into effect this purpose depend on a supply of water. The work is necessarily suspended by the frost and when the frost has permanently set in it is discontinued altogether until the spring. The work is also partially liable to be interrupted in dry weather, in places where water is not abundant. It is chiefly performed by water flowing off the surface and is seldom an opportunity of doing it at streams bursting out from the interior of the mountains, and accordingly there is the smallest supply of water in the beginning of June when the water in draw-wells and issuing from the interior of the ground, is most abundant. On the other hand it becomes more abundant in the end of July and following months, when the springs from the bosom of the earth are most deficient. The practical effect of this state of things is, that at one time the boys and young persons work fewer hours than usual, and at the other time they work more hours to make up for it.

It is a great advantage to a mine when it is situate near a river or a large and copious burn of never-failing water but frequently it is necessary to take advantage of the smallest streamlets and artificial means are taken to collect water by means of dams, the outlets of which can be stopped up at nights or at times when the people are not employed. In East Allendale Mr. Beaumont has a dam which is said to cover seven acres of land but in general the dams are not nearly so large.

In former days the washing of the ore was a very simple and rude operation. It was placed on a buddle, or space of ground, made a few inches lower down than the other ground and in extent not much larger than the door of a house, and with a gentle declivity, so that water coming at one end might slowly flow over the stony bottom to the other. The water carried off the loose dirt or clay, or pulverized stone. The solid pieces of ore were broken by a rude instrument called a bucker, which is not yet entirely out of use. This instrument consists of a flat piece of iron about the size of a man's



open hand: at the back of it is a broad ring, through which is thrust a piece of wood for a handle. The boy takes this instrument in his hand and striking the ore with it, breaks it into pieces, by which means the water is able to carry off the earthy matter and leave the metal behind. The large pieces of lead thus separated from extraneous matter are carried away in a state fit for the smelting mill. Other pieces are put on a sieve, as will hereafter be described.

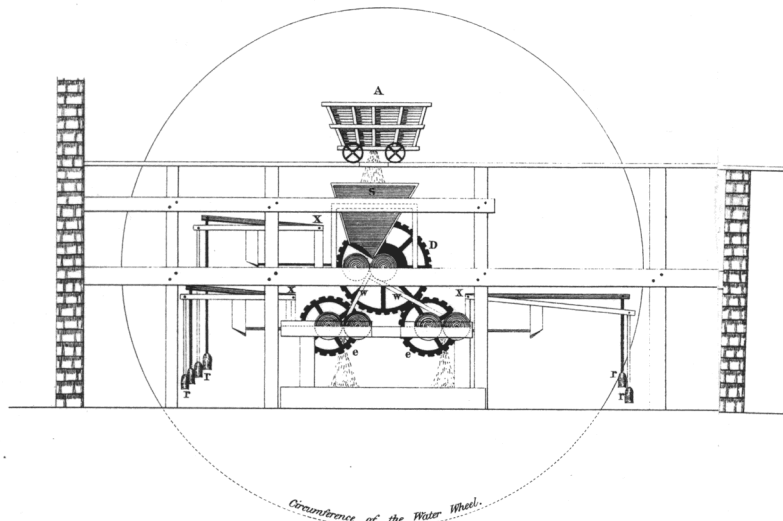
In small concerns in the distant fells, which will not afford the expense of machinery, and where also there may be but a small supply of water, this mode is still in use. A few persons may also be seen employed in this way as auxiliary to washing establishments, working at buddles along the side of a gill, taking advantage of the little streams of water which flow down after a heavy fall of rain.

It is obvious that in this mode of washing many small particles of lead must be carried away and although this is in part obviated by the water falling into pits and there depositing and leaving much of the lead, still a portion is carried off and for ever lost. About 40 years ago crushing-mills were introduced and other improvements have since been made, by which the lead is separated from earthy matter at much less expense and also a greater proportion of the lead is obtained. The consequence is, that the good mines are rendered more profitable and some poor mines which, on the old system, would not have yielded a profit, can now be worked to advantage.

As preliminary to the operations of the crushing-mill the larger pieces of ore are picked out by boys from the heaps. Sometimes large pieces of pure galena, without any earthy matter and sometimes large pieces which may be broken off with the hammer from the stone, in the same lump. These are carried at once to the bingstead, as requiring no washing to be done to them. The ore may also be placed upon bars of iron called a grating, and a stream of water flows upon it. The smaller pieces are carried by the water through the bars and down an inclined plane to a place below. Upon the grating remain pieces too large to get through. Some of these are dead pieces of stone containing no metal; these are picked off by boys and thrown aside. Pieces of unmixed galena are also picked off. The remaining matter of ore and stone goes to the crushing-mill. Much depends on the nature of the stratum from which the ore is obtained. Some which is found in strata of barytes comes out in dust or small fragments, and may be carried by the waggons, so as at once to be let down by opening the hole the bottom into the hopper, which is over the mill. Where the pieces are many of them of a larger size they must previously be broken and grated, as has already been stated. The crushing-mills require a plentiful supply of water to drive the great water-wheel, as well as to perform the other subordinate operations but these mills are very far from being all upon the same scale. The great water-wheel is in middle and on one side, generally the left-hand side, to a person looking forward in the direction in which the water runs, are the wheels which break the bouse-ore or the ore in its rough state and on the other side are the chat-mills, which are for breaking and bruising the ore which has been crushed or ground into smaller pieces.

The bouse-ore is let out from the hopper by a machine called a shoe or else a boy or young person gradually lets it out. In either case it falls between two rollers, which are deeply fluted, and revolve and work into each other. A body of water falls down between the rollers at the same time. In passing between these fluted rollers the ore is crushed into smaller pieces and these pieces, together with the smaller ore which accompanied them, on coming from between these two rollers fall down two inclined planes; one inclined plane to the right and other to the left, to two rollers on the right and two rollers on the left, both of these pairs of rollers being of the same sort. These rollers are smooth and between them the ore passes, along with a body of water, and is further ground, and falls into pits below. A certain portion of the ore still escapes of a large size because if a large piece of ore comes between the rollers, they are forced to recede sufficiently far to let this stone pass through and then other pieces of stone as well take the opportunity and slip through unbroken.

Fig. 1.



These three pairs of rollers are not fixed altogether to the same position. In case of a large piece of stone coming between them they may recede and let it through and but for this contrivance the mill might be damaged or choked up. The rollers, however, are immediately brought back to their right position means of levers, at the end of which are attached large weights, usually stones for effecting this purpose and the depression of the lever brings up the roller attached to it to its proper position. **Fig. 1** in the diagram is the side elevation of the crushing-mill. **D** is the great wheel attached to the axle of the water-wheel, of which the circumference is seen in the figure. The bouse ore is brought in waggons **A**, and is let out by a door which opens in its bottom into the hoppers. From the hopper it is let out and falls between the two fluted rollers immediately beneath it. From these fluted rollers the ore, now partially crushed, descends along two inclined planes, *w w*, to between the two pairs of smooth rollers turned by the wheels, *e e*, by which it is still further crushed and falls down into water. Any of the pairs of rollers, in case of a great stone coming between them, may move asunder from each other, to let the stone pass and are brought close together again by the weights, *r r*, which pull levers which turn on fulcrums, *w*.

From the pits below the crushing-mill the broken ore is drawn up to the chat-mill, on the right-hand side, by means of iron buckets on an endless chain, much in the same way as we see, on a larger scale, the ballast dragged up into the barges from the bottom of the river Thames. Every bucket on arriving at the top discharges its load upon a grating, by the bars of which the larger pieces are retained and are passed again through the crushing-mill, or sent to the stamping-mill. The smaller pieces are made to pass the three pair of chat-rolls, which are exactly on the same plan with the crushing-rolls, only being on a smaller scale and adapted for ore of a smaller size.

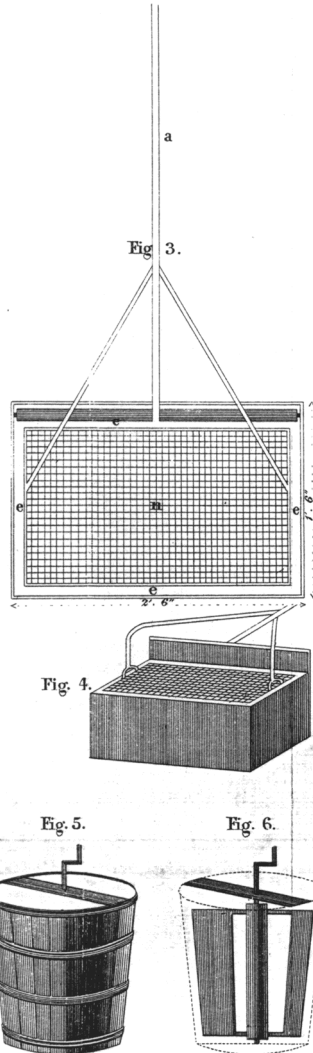
As the crushed are comes down from the chat-mill a boy stirs it and much is disentangled and much of the small lead, with dirt adhering to it, is carried by the stream of water to pits lower down.

The stamping-mill is used for breaking the hard refractory pieces of ore which resist the rollers of the crushing-mill and chat-mill. In some places the stampers are separate and distinct from the crushing-mill, and in other places the same water-wheel turns the rollers of the crushing-mill and raises the stampers. The broken ore is carried down an inclined plane by a stream of water.

Where the matrix of the ore is usually soft and easily broken a stamping-mill may be dispensed with but for very hard ore it is exceedingly useful. Some washing establishments have not got a stamping-mill.

After the ore has come from the chat-mill and the smaller portion has been carried off by water, it is taken up and put into a sieve to undergo the process technically called hutching. The sieve is made of iron wire and it is let into a box which is full of water. From the stalks or chains of the sieve proceeds a long lever, which rests upon a fulcrum, and at the end of the lever stands a boy who places his two hands above his head and pulls the end of the lever down to him, and lets it up again a few inches, and, in consequence, the sieve with the ore upon it is raised up and down with

agitated motion in the water in the box. The boy keeps on doing this for some time. The effect of this motion on the sieve is, that much of the very small lead or dust falls through the sieve, and sinks to the bottom of the box and is called smiddum and then, of that portion which remains above the sieve, the lead being the heaviest part, works down to the lowest place next the wires of the sieve. Immediately above the lead are the larger pieces of stone with portions of ore, which are called chats and above the chats are lighter bits of stone, called cuttings.



**Fig. 3** is the ground-plan, and **fig. 4** is the elevation of the brake-sieve, by means of which the operation called hutching is performed; **a** is the end of the brake or lever, **n** the wire sieve, and **e e** the cistern or tub.

The cuttings are removed off by a limp, which is a broad piece of iron and is given to the cutting cleaners and is again put into a sieve and treated as before, and the chats are sent back to the chat-mill to be again ground.

It has already been stated that when the ore was laid on the grating the smaller portions were carried through the bars to a pit below by the stream of water. Part of this matter carried into the pit below is sludge, or slime, which is carried farther down the stream to pits, in which it settles; but there is another, portion much too large and weighty to be thus carried off. This portion is taken up out of the pits and is put on the sieves and is hutchied; that is, it is jerked or tossed up and down on the sieve in the water, by the boy pulling at the end of the lever, and when sufficiently well hutchied the stony matter is carried off by the limp and the clean ore lying at the bottom is taken to the bingstead.

The smiddum is taken from the bottom of the boxes in which the sieves were agitated and it is removed to a running buddle. This is a space of ground with a stone floor made a little lower than the ground about it, and with a little declivity and over which water is made to run very gently. Upon the upper end of this buddle the smiddum or ore from the boxes is put, and the water is let in upon it. The washing boys and young persons stir this smiddum with an instrument called a colrake and the water carries away much dirt and the little fragments of stone called cuttings, and the lighter ore, both called smiddum-tails, are brought to the lower end of the buddle, whilst the weightier ore is left at the upper end. Thus the two are separated, and the

weightier ore is removed to the bingstead.

It will appear a necessary consequence to every one who has paid attention to the description of the preceding operations, the grating and crushing of the ore under the action of water, that a great quantity of finely pulverised earthy matter must have been produced, and much lead in the form of minute detached particles must have been brought away in company with the pulverised matter, and carried down the stream with the water. Now there are pits one after the other into which the water is made to flow, and in which the water deposits all this matter, which is merely mechanically diffused through it. This composes a mass more or less stiff and that portion of it which is coarse, and contains larger grains of lead, has been called sludge and the matter consisting of smaller and finer particles has been called slime.

It would be tedious and of little utility to give a minute account of the labours of the children and young persons in the treatment of the sludge and slime, in extracting from the earthy matter as many as possible of the particles of metal. It is put into trunks and agitated with water; it is laid on the floors of the buddles, and streams of water pass over it, and through it; and it is stirred and

rubbed against the bottom of the buddies, whilst the water is flowing over it, the object being to separate the lead and send the water off down the stream with the clayey matter diffused through it. The last process of all is to put the slime into the dolly-tub. By means of a handle the board in the tub is turned round and round and agitates the slime: the lead comes to the bottom of the tub and the worthless matter above it is taken away. **Fig.5** is the dolly-tub, and **fig.6** shows its internal construction. After all that can be done to get all the lead from the ore, many particles are carried down in the muddy water of the river, or burn and no man allows himself or his cattle for many miles below a washing-place to take the poisonous draught.

The boys and young persons engaged in washing the ore are substantially clothed and must be sufficiently warm so long as their clothes are not soaked by the rain from above. Their feet are well protected by clogs. The soles consist of wood, say three-quarters of an inch thick, with iron all round the edges and doubled down to come a short way beneath the sole: there is iron also on the heels. The upper part consists of very thick leather, which comes up about the ankles. The grown men engaged in washing and many of the miners who work in the mines where there is much water, also wear clog-shoes or clog-boots.

In all the operations connected with the washing of the sludge and slime boys and young persons are engaged.

Of their employment in the whole branch of washing a few observations may now be made:-

- 1st. The work is not too laborious. The medical men do not find it to injure their health. The men who have been washers themselves, and whose sons are now engaged in it and the boys and young persons, make no complaints of any severe labour and, on the contrary, speak in favour of it.
- 2nd. The hours, compared with the time occupied by boys and young persons in the coal-mines and other branches of industry, are not too long.
- 3rd. Though often accompanied with severities from the cold, the wind, and rain the boys and young persons bravely endure all hardships.

Altogether it is impossible not to admire the fine spirit of these boys and one must be the more desirous that they should not be exposed to unnecessary hardship.

The proprietors might mitigate considerably the hardships of the employment and might do so at a very slight expense.

At the washing-place, a mile lower down than Coaleleugh, in West Allendale, the agent of Mr. Beaumont has erected some sheds under which this work may be done. In other washing-floors I saw one or two such sheds; but generally, and with exceedingly few exceptions, it may be asserted that this work is done in the open air, with nothing to shelter the poor lads from the cold and freezing blast; and nothing to shelter them from heavy thunder-storms, and continued rain or from excessive heat on some days in summer, which may be succeeded by cold. An exceedingly small sum, not worthy of so much as being named, from the profits of a great company or rich proprietor would be sufficient to defray the cost of such sheds and it is to be hoped that the agents of Mr. Beaumont and of the London Lead Company will persevere until all this is accomplished, and the smaller companies will be compelled to imitate their good example.

The London Lead Company has at some of its floors what the witness called fleaks, which are large boards nailed together forming a wall of timber, which may be moved about from one spot to another and so placed that the boys working at washing may be protected from the direct violence of the wind and tempest of rain. But this is no protection when the rain falls directly downwards and is a very imperfect protection under any circumstances.

No doubt the space on which are the sieves, the buddies, and dolly-tubs, is very considerable, but the expense of erecting sheds to screen the children from the rain could be no object. I was informed that the London Lead Company had lately taken this subject into consideration, and it is to be hoped of such a company that their decision will be as honourable to themselves as it will be humane towards the children who depend upon them for subsistence.

## **New Method of Washing Ore.**

A new method of washing lead ore was brought into use in 1840, by Mr. John Leathart, of Alston Moor, the principles of which are so sound and at the same time so simple and easy of being put into operation, that it cannot fail to come into general use. I say this the more readily as the inventor has generously given the benefit of his invention to the public and can derive no personal advantage from it except by the use of it in the mine of which he is one of the proprietors. It may be seen at Roughton Gill, situated in Caldbeck Fells, about five miles from Hesketh Newmarket, in the county of Cumberland. The mode of conducting the washing at this mine is given very distinctly by Mr. John Wallace, who superintends the washing department and as it will not bear abridgement I refer to it for the particulars. The benefits of this method are; that it is a very great saving of labour; that it obtains a greater proportion of the lead; that it readily separates the different kinds of lead ore, so that ores of the same size are obtained together and may be afterwards treated as the smelter may deem most advantageous in the processes to which the lead is afterwards subjected.

It was stated to me that preparations were making for introducing this method at several mines in the lead country.

### **Of the Smelting Mills.**

At the first smelting-mills which I visited there were no boys or young persons under 18 and in answer to inquiries it was stated that none but grown men were ever employed. At the next smelting-mills a roaster told me that his father had begun to work in smelting-mills at 14 and he himself had begun at 19; but one of the smelters stated that he had begun at 17. Information of other young persons and even of boys being employed in smelting-mills, was afterwards received. One of the witnesses, Mr. George Metcalf, says:-

Boys are not employed except to wheel in peats, or lime, or such like. Sometimes a man takes in his own son, or perhaps another boy, to help him. A youth of 16 may be taken into the roasting of ore if strong enough.

Another witness, Mr. William Walton, says:-

I went to smelt ore at 16; they do not take any under 16 as regular workmen at smelt-mills.

The work of the smelting-mills therefore falls within the limits of the inquiries of the present Commission, and it is my duty to describe the operations.

The name of smelting-mills has been given to all those buildings which are used for the purpose of reducing the crude ore to marketable lead, and separating it from the silver contained in it. Most large mines have such an establishment; and there are also smelting-mills, the proprietors of which buy the crude ore and smelt it.

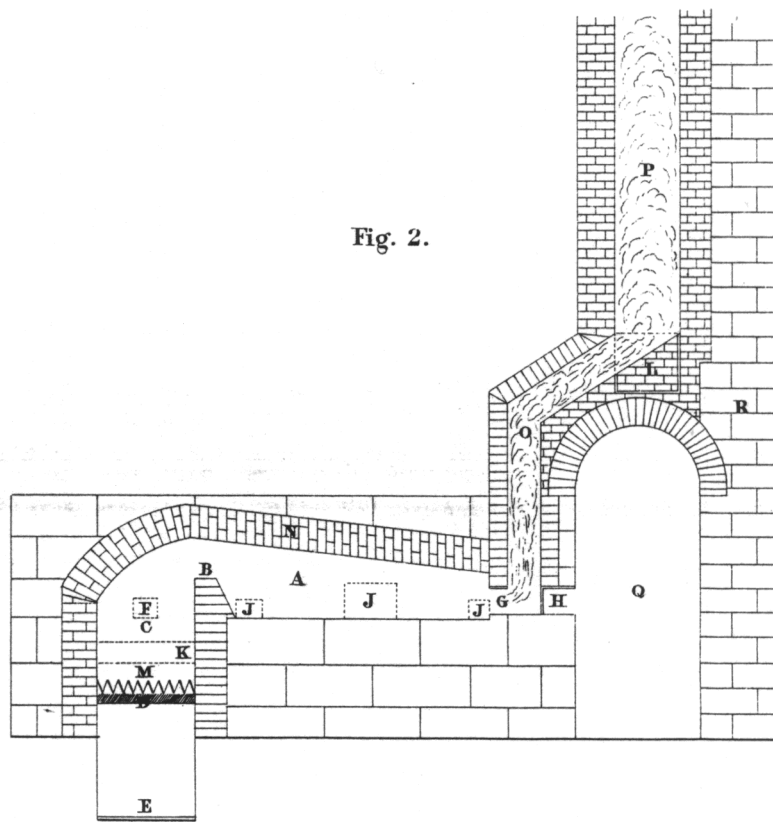
There are several operations to be performed.

1. Roasting the ore.
2. Smelting the roasted ore at the smelting-hearth.
3. Roasting and smelting the ore in one operation in a smelting-furnace.
4. Refining the metal by exposing the lead to the flames of a reverberatory furnace, by which the lead is converted into litharge, and the silver is left behind.
5. Separating the silver and lead by a process lately invented, and removing the greater part of the lead, and sending to the refining-furnace only the remaining portion containing the silver.
6. Reducing the litharge back to lead in a furnace.
7. Reducing the slag of the smelting-hearth and smelting-furnace to lead in a furnace.

These several operations are now to be described. They are beautiful applications of scientific principles, easily to be understood, however much it may require skill and practice to be able to perform them to the best advantage.

## Of Roasting the Ore.

The lead-ore is roasted in a reverberatory furnace. It is precisely on the same principle as the reverberatory furnaces used for puddling iron and the balling furnace used for heating the iron before passing through the rolls. A bing of lead-ore is introduced at one time and the heat applied. The ore is heated to ignition, but not to melting; that is, the ore is made to approach in heat as near to melting; as possible, but still is not melted. Too little heat or too much would be equally bad. The flame of the fire strikes against the ore and it soon shows a yellow flame. The ore is stirred with what is called a paddle, which is an iron rod with a broad piece of iron at the end. The stirring must be repeated five, six, or seven times in a heat. The time of a heat depends much on the nature of the ore, and may be one hour and a half, two hours, two hours and a half, or three hours. About two hours and a half is the medium. Meanwhile a barrow, containing a bing of ore, is wheeled from the bingstead and is placed right over the furnace, to be ready to be let in when it is wanted.



When the ore is sufficiently roasted it is raked forward little by little and let fall into a cistern of water. This takes place with great noise and the heated water flies up, but is prevented reaching the workmen by a plate of iron which intervenes. The roasting furnace is exhibited in the diagram, **fig.2**. It is a reverberatory furnace; that is a furnace in which the flame and heat are carried forward by the draught of air and dashed against the bodies that are to be heated or smelted. The puddling furnaces and balling furnace used in making iron on the same general principle. **A** is the inside of the furnace; **B** is the fire-bridge over which the flame passes from the fire-place; **C** is the fire-place one of the grate-bar supporters; **E** is the ash-pit; **F** is the place where the coals are introduced. **G** is a flue; **H** is a doorway, through which the ore is raked and stirred longitudinally; **J, J, J**, are doors for raking and stirring the ore transversely; the middle one, being larger, is also used for charging and drawing; **K** is an opening for taking the coal-slag out of the fire-place; **L** is a hole for cleansing

the chimney, which is closed when the chimney is at work; **M** is the ends of the great bars; **N** is the roof of the furnace; **O**, passage for the smoke and flame; **P** is the chimney; **Q**, passage round the furnace; **R**, the gable end of the house. The roasting furnaces and reducing furnaces vary in their construction but this diagram will show the general principle on which all reverberators are built. The figures in this diagram are taken from a work by the late Mr. Westgarth Foster.

When one heat is done another bing is let into the furnace, and the same work goes on again. Two men are engaged at a time, and they work eight hours; then two other men come on and work eight hours; the first set again come on and work eight hours; and so they go on, work in eight hours and resting eight hours day and night, for four days in the week. They then go home and have three days cessation from their labours. It is a great saving of fuel not to let the furnace cool. The masters also say that it is a high benefit to the men to work hard and then get away for a considerable time, to bring themselves all fresh again.

The effect of roasting the ore is to drive off the sulphur from the galena or sulphuret of lead, of which the ore is composed; also antimony and other matter more volatile than the lead; also the small dust-ore is made to adhere together, whereas if it were to be put into the smelting-hearth and exposed to the blast a great portion would be blown away. It is however the case, that at places far from coals, and where in consequence fuel is very expensive, there is much ore which does not undergo the process of roasting, but is put at once to the hearth.

The roasted ore is let fall into water to prevent its forming into too large unwieldy lumps, if it were to be thrown down and left to cool in a heap.

The ore is taken from the water and carried to the smelting-house.

### Of the Smelting Hearth.

The usual size of the smelting-hearth is about 22 inches long and 22 broad and about the same in depth; but the dimensions vary exceedingly at different places. It is made of cast-iron. It is usual to charge it with the half-melted matter of former operations and then with peat, and coal, and the roasted ore. A large bellows is made to throw its blast into the hearth; two men working together stir the melted lead: and gradually add more ore. There is a small channel from the hearth in which the melted lead may flow down into a pot at the side of the brickwork in which the hearth is fixed, and from time to time the melted lead is let run down, and from this pot the men lift up large ladles of the metal, and pour it into moulds of eight stones each, or sometimes 12 stones each.

At most smelting-mills the smelters are divided into three sets of two men each and they come in turns 10 hours each set at a time, so that a man works 10 hours and rests 20 hours; and the smelting goes on from early on Monday morning to Saturday afternoon.

If the shifts were all 10 hours exactly they would begin as follows:-

Monday	1	11	9
Tuesday	7	5	
Wednesday	3	1	11
Thursday	9	7	
Friday	5	3	
Saturday	1		

Which would make the last shift terminate at 11 on Saturday. But there are three shifts of 11 hours each, and that brings the time when they leave off for the week to two o'clock on the Saturday afternoon.

If the three sets at one smelting-hearth be called A, B, C, the first week A has five shifts, B and C have four shifts; next week the set B have to begin and will have five shifts, and A and C four shifts; and the third week C has to begin and takes five shifts, and A and B have four shifts. The men need not come on Monday until it be near their time to come on duty, and when their shifts are done they may go away for the week.

Different mines have different rules. Mr. Thomas Dixon worked as a smelter at Greenside. He came on Thursday morning, worked that day, and on Friday, and on Saturday, and then went home and had the Sabbath-day's rest. He came on Monday morning and worked that day, and on Tuesday, and on Wednesday, and then went home and had rest for a week. The three days in each

week were considered a week, and paid for accordingly. But the labour on every day as excessive, the shifts being very long, according to him 17 hours a-day; and sometimes if they found that they were behind in the amount of work, he says that they would work even still more hours. On Wednesday they stopped smelting at 12, to give time to weigh the lead which they had smelted from the preceding Thursday morning. So long hours in so great heat at smelting cannot but be exhaustive, and the week's cessation from labour is not likely to do more than to recover the body from the effects of excessive labour.

Lime is sprinkled on the edge of the hearth, when the melted slag is running off, which has the effect of uniting with the slag, and converting it into a solid form.

### **Of the Smelting Furnace.**

The smelting-furnace is of the same description with the roasting-furnace, and, in fact, it is a roasting-furnace as already described, and the roasting and smelting are both done in one heat, which, however, occupies about five hours. Coal is mixed up with the ore in order to make it smelt. A bing of ore is roasted and smelted at one shift. The smelting-furnace takes more fuel than the smelting hearth, and it is not used where the place is at a distance from coals. The process of roasting goes on first, and when that operation is effected the doors of the furnace are shut, and the heat is increased so as to smelt the ore.

### **Of the Horizontal Chimneys.**

The most important circumstance connected with the smelting-mills. is the chimney by which the smoke and effluvia are carried off. About 20 years ago they had begun to make what are called horizontal chimneys about 100 yards in length, but many are much longer now. In going across from Stanhope to the Derwent Company's mines and smelting-mills on the river Derwent, I saw at the top of a hill a tall white circular turret rising up out of the ground, and a cloud of white smoke issuing from the summit. The road came to within the distance of a quarter of a mile from it, and the smoke, as we passed through it, was disagreeable. The ling, or common heath, had its blossom and leaves entirely destroyed. The bell heather (*erica cinerea*) was more hardy. This chimney was a mile from the smelting-mills, and it was stated by the people that it proceeded under ground all the way from the mills up the side of the hill to the foot of this turret, to carry off the destructive smoke. It was also said and the same statement was made at many other places afterwards, that if the smoke from the smelting-mills should fall on the ground around the mills, the grass would become so poisonous that horses or cows partaking of it would die, chiefly from constipation of the bowels.

Mr. John Robinson, the agent of the Derwent Lead Company, gave the following evidence on this subject:-

To save the surface of the land from injury, we carry from the smelting-hearths a tunnel arched a mile long, and let the smoke up by a chimney. At the end of the year we clean the chimney and smelt the matter obtained, called fume and get from this a great quantity of lead, sufficient to remunerate for the expense of making the tunnel and yield a profit besides. Mr. Beaumont is now making a chimney in Allendale three miles long. It is known that must make many thousands a-year by his chimneys. We think of lengthening our chimney. The farthest smoke we find is the richest in lead and we expect that by lengthening our chimney we shall derive more advantage.

The tunnel, or chimney, is made three feet wide and six feet high, so that a man can walk along it to clean it and bring out the deposits.

Subsequently to receiving Mr. Robinson's evidence, I had an opportunity of seeing the chimneys of Mr. Beaumont's smelting-mills. There is also a long chimney of the Langley smelting-mills within a few miles of Haydon Bridge.

The effluvia from the roasting-furnace is not reckoned so injurious as from the smelting-hearth, or furnace, and sometimes it is not introduced into long chimney, sometimes it is.



The smelting-mills are of course in a low situation on account of the water to turn the wheels, which give motion to the blasts. It is obvious that a tunnel carried from such a situation up the side of a hill to a great height will have a great draft of air and consequently will draw off the smoke and effluvia from the metal and consequently the noxious matter which is found to be ruinous to health of the men, will be carried away and the mills will be rendered much in healthy. We should expect, therefore that at all the smelting-mills there were such chimneys, more especially as they are found to have so much lead deposited in them as to pay the expense of erecting them and after that to yield a large profit. But improvement is slow. Many have not adopted the use of these chimneys, and others have done so only to a limited extent.

Even in the case of the London Lead Company the smelting-mills at their Nenthead station are near the public road, and when the wind carries the smoke upon the road, as from the prevalence of south-westerly winds in this country must be the case about three parts of the year out of four, it is most offensive to travellers and in a populous district it would not be endured for half an hour. Even at the distance of half a mile it was disagreeable and would be destructive to the health if a person remained long in it. When the wind blows in such a direction as to carry the smoke to the washing-floors upon the children, or upon the it must be disagreeable.

Smelting-mills in a hollow amongst the hills, where there is little or no current of air, must in consequence be exceedingly unwholesome.

The Greenside smelting-mills in Glenridding, a dale running up from the west end of Ulleswater, were spoken of by many of the miners and smelters as the, most unwholesome of all, and I went to see them. When at some distance I met some of the men, who confirmed the previous bad accounts but they added the very agreeable information that preparations were going on for carrying the chimney up the side of the steep hill, which would remove the smoke far above the mills and but of the way of mischief. The manager, Mr. Little, confirmed this account and I saw myself the men at work making the deep trench in the hill in which the chimney was to be built. The proprietors would then be able to have their washing-floor near their mills, which at present was quite out of their power

All the men who were examined have stated their decided opinion from their on their own experience, that the smelting-mills were sufficiently healthy if well-ventilated. No excuse can be tolerated where such is not the case, more particularly as it has been found that the means for producing ventilation, instead of being a loss, are a source of great profit to the proprietors.

### **Of Refining the Lead and Silver.**

The process of refining the lead and silver depends on this principle that lead exposed to heat readily imbibes oxygen from the atmosphere and becomes oxide of lead, whilst the silver remains unaltered.

The process is carried on in a reverabatory furnace. The flames from the fuel strike against the lead and silver, and the lead is converted into litharge. The silver forms a plate which remains below.

Before the metal is put into the reverabatory furnace, a test is made from bone ash and the ashes of burnt ferns, or bracken (*pteris aquilina*). This plant when burnt yields a great deal of vegetable alkali, or potash in its ashes, and to this quality it owes its value as a test.

A mixture is made of the bone ashes and of the fern ashes, and the whole is beat up with water and a figure is made into an oval form, which is placed within an iron frame and then the iron frame is placed in the furnace, and the pig of lead is placed over it. The use of the test is that it absorbs some of the litharge which comes in contact with it, below the silver.

The furnace acts, and the flames change the lead into a semi-vitrified oxide of lead, or litharge, the melted lead abstracting oxygen from the air. There is an opening at one side, and from the other side comes the blast of a large bellows, which blows the litharge from off the surface to that side and also makes it fall over through the opening into an iron vessel placed to receive it. This vessel is removed when nearly full, and another vessel put in its place.

The test absorbs such litharge as is below the silver, and part of the silver. It may last three days. When it is fully saturated it must be removed, and another test is put into its place.

## **Of the Separation of Lead and Silver.**

The new mode of separating the lead and silver is a discovery made about 10 years ago, by Mr. Hugh Lee Pattinson, of Alston. He was an agent of the Greenwich Hospital and it was his duty to test the lead paid to them as their royalty, to ascertain the quantity of silver which it contained and to determine its value. He observed, in the course of conducting his operations, that part of the lead crystallised before the rest and was led to attempt to discover the cause; and on analysis he found that the portion which continued longest liquid contained a larger proportion of silver. The principle once discovered, the application of it was not difficult to effect.

The benefit of the new process was so obvious that it was speedily adopted by the lead proprietors, and the inventor has liberally profited by his discovery.

Of this operation I shall endeavour to give a description, as I first saw it performed at the Bolyhope smelting-mills in Weardale.

There were three large pots of cast-iron, built into brick along the middle of the room. We may call the pots No.1, No.2, and No.3. Near No.1 was a small pot, and there was another small pot near No.3.

The lead is melted in pot No.1, and a man stands on one side with an iron rod and stirs the metal, and every now and then he strikes off the lead which adheres to his rod with a great hammer. On the other side is a man with an iron rod, at the end of which is a great ladle full of holes. He dips it into the pot of melted lead No.1, and pressing the rod on the edge of the pot as a fulcrum, he raises up his ladle, which appears nearly full of lead, curled, crisping, and frosted, and from the holes in his ladle runs out clear liquid metal. The workman holds his ladle above the surface, and shakes it until no more liquid metal will run out, and then he empties out the lead in his ladle into pot No.2. He dips his ladle into the little pot, which has lead in it and is kept very hot, and thereby melts the lead which had adhered to his ladle.

He keeps on repeating this operation until there be very little liquid metal left in pot No.1.

If there be a breeze of wind through the room the lead cools faster, and the work goes on more rapidly. The metal left in pot No.1 is brought into moulds, and cast into pigs. The lead which was put into pot No.2 is melted, and is treated in exactly the same way as the lead in pot No.1, as now described. The lead taken away is put into pot No.3. The lead in pot No.3 is melted, and treated in the very same way again. The lead will now contain so little silver that it would not defray the expense to melt it a fourth time.

But there are mines where the lead is much richer and at Greenside Mine there are five pots in the separating room and the lead is separated five times. In the lead of this mine there are, however, from 12 to 14 ounces of silver to the ton of lead and there will be sufficient silver in the lead after it has been melted and separated the third and fourth time, to cover the expense and yield a profit in melting it a fifth time.

It was stated to me, that at Newcastle, where coals were cheap, the lead of some mines was melted and separated as many as seven times. A much greater quantity of silver is extracted in this way than by the former method.

Under the old plan, where the silver could not be obtained but by converting all the lead into litharge, and they had to reduce the litharge back in to lead again a great deal of lead was lost; now it is necessary merely to convert into litharge those pigs in which the silver remains. Four tons of pig lead, as it comes from the smelting-hearth, will by separation leave only 12cwt. which will require to be made to litharge, instead of the whole quantity, as under the former system. The lead which is separated in the way explained is merely melted and cast into pigs of eight stone or twelve stone, as may be thought fit. At Greenside Mine 757 tons of lead were made in 1840, and under the old system the manager said that only 700 tons could have been obtained. At some smelting mills there are several sets of pots, but one set resembles another.

## **Of the Reducing Furnace.**

Under the new system of separating as much as possible of the lead before the remaining lead and silver is subjected to refining, comparatively little litharge is now made. More, however, is made than can be sold at a remunerating price either to the glass-makers or to the colour-makers,

and therefore much litharge is reduced back to the form of the regulus of the metal: this is done in a reverberatory furnace. A layer of coals is laid at the bottom of the furnace and the litharge is mixed with small coal and the mixture is put into the furnace and is exposed to the flames. During the combustion the small coal abstracts the oxygen from the litharge, and the pure lead is the result. It is cast into pigs of 12 stone each and is in a marketable state.

### **Of Reducing the Slag.**

The slag is put into a furnace and is mixed with coke and peat, heated by fuel beneath. The oxygen of the slag enters into combination with fuel and the lead is separated and it runs out from beneath, and it is cast into pigs. This lead is less valuable than other lead and the pigs are very easily broken.

## **V - STATE OF THE PLACE OF WORK.**

The inside of the mines is in general warm, though there may be situations in which, from a current of air, there may be considerable cold; of this however there is not often cause of complaint, the great evil is having to work in many places where there is an exceedingly great want of fresh air, as has already been shown and the effects of which are very deleterious. At the washing of the ore outside, the chief grievance is the exposure, at all seasons, to the weather as has already been noticed.

The smelting-mills are warm, and when there is not good ventilation they are very unwholesome but they are not disagreeable when ventilated, and according to the evidence, not unwholesome.

The place of work in the mines is injurious to the health of the miners even where there is not just cause of complaint of the want of ventilation.

Mr. George Arnison says:-

Although the ventilation of the mines is, with few exceptions, good and efficient, much superior to what it was some 30 years ago, yet even in those parts of the mine where it is the best and where there is neither a deficiency or vitiation of the air, the miners are continually respiring whilst at work in the mine an air (however good in other respects) highly charged with minute particles of dust, smoke, and other effluvia, arising from their constant operation with the pick, the jumper, &c., and the frequent explosions of gunpowder used in blasting the mine.

Mr. John Robinson says:-

A man by inhaling the powder-smoke and effluvia of the mine injures his lungs. There is the perspiration off the men as well which hurts them. There is a great quantity of sulphuric in the spar, and the miner inhales it. There is arsenic combined in the stuff.

That the air is often very bad, is proved by the evidence of practical miners. Mr. Jacob Crawhall says:-

Sometimes there is foul air sets into the mine; sometimes, when we are driving far from the air-course and are obliged to do it, the air comes in which puts the candle out, and we are obliged to leave. Not many are suffocated by it, only very few.

It is not proper to stop after the candle goes out. Sometimes we must hang the candle half perpendicular, that the grease may flow down to the flame of the candle and burn in spite of the foul air. It is seldom necessary to do this, but perhaps it may be a place in which this must be done.

We never have any air which explodes; we have only the heavy foul air, the damp. We have most foul air when the weather is dull and the clouds hang low. In clear dry weather it is much better. When the foul air is breathed it breaks a person's wind. It is very

seldom that men stop in so long as to fall down, and need to be carried out. In mines where there is bad air the boys are of little use, and cannot stand it, and it is thought best not to have them.

Mr. John Rain, a working miner, says:-

I am not aware of any difference of the mine between summer and winter, but when it is wet and dull the air is bad. We have a level below the level by which we enter, but it does not come to-day. Some days the air comes well into the lower level, some days it does not; and what between the powder-reek and the want of fresh air, we have sometimes great difficulty of breathing.

Mr. John Robinson, a working miner, says:-

I do not like it. After the first shot goes off we have the reek about us all day. Our mine is badly ventilated. Our master won't do what would make it well ventilated, and the men cannot afford to do it.

On the subject of the deleterious air in the mines, and in the smelting-mills, information was solicited from James F. W. Johnston, M.A., F.R.S., F.G.S., &c. of the University of Durham, which he has kindly supplied in a letter, of which the following is a copy:-

DEAR SIR, Durham, 15th September, 1841.

I beg to acknowledge the receipt of your letter of the 6th-inst., containing some queries regarding the gaseous substances inhaled by the lead-miners, or given off during the smelting of lead.

I cannot speak with any degree of certainty in regard to every mine you may have visited, but in the lead-mines in general the most abundant, and, I believe, the most deleterious gaseous exhalation is carbonic acid. This is particularly injurious in the dead-work, or drifts where there is no ventilation. It comes out sometimes in distinct jets from the sides of the passages and chambers but more frequently it escapes from the rock in numerous places and in quantities too small to be easily observed at each place of escape. The deleterious effect of this acid is heightened by that of the gases which are formed during the combustion of the gunpowder employed in blasting. These fumes float long in the atmosphere, especially of the longer drifts and to a stranger coming immediately from the purer air render the air almost irrespirable.

In the air by which the miner is surrounded there float also continually minute particles of ore and other stony materials, which contribute in no little degree to the production of those distressing complaints by which the latter years of a miner are almost always rendered miserable, and the lives of all shortened many years.

In the smelting of lead the gaseous matters that escape from the chimney are chiefly sulphurous and carbonic acids, and carbonic oxide. It is the first of these that exercises so destructive an influence on the surrounding vegetation. There issue along with them, however, variable quantities of arsenious acid, in the state of vapour, and of lead fume, a mixture of sulphate with oxide of lead, oxide of antimony and other volatile substances contained in the ore. These are all injurious to animal and vegetable life, though- from their tendency to fall, their injurious action will not extend at so great a distance from the mouth of the chimney as that of the sulphurous acid, which is a permanent gas, and which, by its affinity for moisture, among other causes is also naturally inclined to attach itself to the leaves of living vegetables.

I have, &c.

Dr. Mitchell, (Signed) JAMES F. W. JOHNSTON.  
Sub-Commissioner, &c.

That the health of the people in the smelting-mills, where there is proper ventilation, is by no means bad, is proved by the evidence of others, as well of the men themselves. Mr. George Arnison, surgeon at Stanhope, says:-

Owing to the adoption of horizontal chimneys, and the superior ventilation of the smelting-mills, the workmen employed at them rarely suffer in their health through their peculiar employment; and the duration of their lives is upon a par with that of other persons in the

district engaged in laborious pursuits

Mr. William Walton, an operative smelter, says:-

The smelting is as good for the health as any other work about the mills. The people about the smelting-mills are very healthy; they are better in health than the mines. There are now two men working at our mills upwards of 80 years old. The smelters are whiter looking than the farmers' labourers, and do not bear so much flesh. Roasting does not injure the health much, any more than smelting, if they work the same hours. In the slag-furnace we use cinders along with the slag. It is healthy work enough slag work. There are mills where things are badly arranged and the men suffer very much from the smoke, there not being proper flues to take the smoke away. I have been to of smelting where the smoke was not carried off properly and the men suffered very much. If there be not a good draught of air and there is smoke, it is most injurious to the men. Reducing the litharge is the worst job there is. There is a dust rises from the litharge and it hurts the health.

Mr. George Metcalf in his evidence states the true remedy:-

I consider that the smelting-mills are sufficiently healthful if they are kept clear of reek. The chimneys ought to be carried to a great distance, in order to produce a draught, and thereby remove the reek, and all foul air, and draw in good air into the mill, A well ventilated mill is more healthy than the mines.

### **Of the Lodging Shops.**

Many of the miners, including young persons and boys, will go three miles and upwards from their own homes in the morning to work in the mines; or to wash the ore and return again after their work at night. Some miners who are too far off to be able to go and come in this way, are able to find lodgings, for the four nights in the week which they are from home, and the washers for five nights at some houses not too far from the mines. The usual price is 6d. a week each for which there is a bed between two of them, leave to make their crowdy on the fire in the morning and they have their potatoes boiled for them in the evening. They bring their provisions in a wallet on the Monday morning and the miners go back on the Friday, and the washers of ore on Saturday.

But there are many mines, and some of them very large, in remote situations in the fells, far away from all dwelling-houses, where lodgings might be had and the proprietors have erected for their miners and washers buildings called lodging-shops, which I now am about to describe.

The first one of them which I saw was about nine miles across the fell south from Stanhope. It was a plain building, constructed of sandstone, covered with a coarse slate and all very substantial. There was no opening or window at either end, or at the back, or on the roof. On the front or south side was a door towards the west end and two windows, one a little above the other. On entering the door it was seen that the lower part was one room, lighted by one of the windows and had a great fire burning at the east end. By pacing the floor the length was ascertained to be about 18 feet, and the breadth about 15 feet and the one side, that next the window, was a deal table, extending the whole length of the room, and alongside of it was a form, and there were two other forms in the room. All along the other side on the wall were little cupboards, 48 in number, in four tiers above each other, six of the cupboards with the doors off but the rest carefully locked with padlocks, and in which the several miners had deposited their wallets, with their provisions for five days. Throughout the room, more particularly at the end farthest from the fire, were hung, from hooks and nails in the joists, miners trousers and jackets, to be ready to be put on in case of the miners returning wet from their work.

In addition to the articles already named were the following:-

- One earthen pitcher to fetch water.
- One tea-kettle.
- One pan for boiling potatoes.
- Two pans for frying bacon.
- Iron fender, poker, and shovel.

### A besom.

There was a large box in the room, secured by a padlock, said to contain the clothes which the masters put on when they came to see the mines.

On ascending to the upper room by a ladder, it was seen to be a sleeping room. The dimensions of the floor were of course the same as of the room below. There was no fire-place, which indeed was not wanted; but neither was there a opening into the chimney to produce circulation of air. Along one side of room were three beds, each six feet long, by about four feet and a half wide - the three beds extending the length of the room; then there were three other beds on the other side; and at the farther end was a seventh bed, extending from the one line of beds to the other. Immediately over these seven beds, and supported on posts, were seven other beds, placed exactly in the same way. Of course the person who slept in each of the six beds next the wall of the upper tier could raise his head only a very little way, on account of the roof. Each of these 14 beds was intended for two persons, when only few men were employed at the mine, but they might be made to receive three men each; and, in case of need, a boy might lie across at their feet. There was no opening of any sort to let out the foul air. Yet from 30 to 40 persons might have to sleep there; the men perspiring from their work, and inhaling the small dust from their clothes floating in clouds. The beds were stuffed with chaff. There were blankets, but no sheets. The furniture of the lodging-shops is supplied by the masters. The beds and blankets are supplied by the miners themselves. They are taken home sometimes to be washed. On Friday, when the miners leave, the beds are rolled up to prevent damp. I visited the lodging-shop on Monday morning. The beds had not been slept in for the Friday, Saturday, or Sunday nights preceding, yet was the smell most noxious.

There was one excellent thing connected with this lodging-shop. There was a small but beautiful stream of water, which was conducted across the fell to this spot, and came through an iron pipe near the door, so that the men had an abundant supply of the pure element.

I next went to see another lodging-shop on a larger scale. On the ground floor were five rooms. The first is a blacksmith's shop. Next to it is the cooking and eating-room of the washers of ore, from 20 to 30 men and boys, if so many were employed. It was locked up and I did not see it. The upper room, extending over the blacksmith's shop and the cooking-room, is the sleeping-room of the washers, men and boys. The next room on the ground floor is a cooking and eating-room of the miners, exactly like the room of the lodging-shop already described. Adjoining to it is a room in which they hang up their wet clothes. At the end is a stable for the horses, which are employed to draw the waggons with ore from the pits. By a ladder close to the wall, between the cooking-room and drying-room, is an ascent to a room exactly like that in the lodging-house already described, with the same number of beds. One little pipe of about two inches diameter was the only communication with the exterior air. Through the partition wall is an opening into a bed-room, extending over the drying-room and the stable. Across this room extended two beds, leaving a space for passing. Above these two was a tier of other two beds. Then at a short interval was a second set of beds, four in number, and farther on a third set, similarly arranged, four in number. Thus in the space above the cooking-room, drying-room, and stable, were 26 beds, each intended for two or three men, as it might be, and perhaps more, and the same beds for sets of miners in their turns, as one set came from their work and another went off. Though the beds had not been occupied for the three preceding nights the smell was to me utterly intolerable. What the place must be in the summer's nights is, happily for those who have never felt it, utterly inconceivable. The medical men are best able to give a judgement on these matters, but, for my own part, I cannot but believe that these lodging-houses are more destructive than the air of the mines. I should think it no hardship to have to remain 24 hours in a mine, but I should be terrified at being ordered to be shut up quarter of an hour in the bed-room of a lodging-shop.

Many miners speak of the horrors of lodging-shops of former days; but the only difference I could learn was, that at many mines there were not how so many men and boys at work, and, consequently, the lodging-shops were not so crowded. Some mines are not now wrought which formerly had large lodging-shops, for example Manner Gill, of which a miner stated to me that he was one of 120 who lodged in a suite of rooms there and he declared that the nuisance was much aggravated by the great number.

In such a dense accumulation of bodies, one man who might be ill was a disturbance to all the rest. The coughing of a few interrupted the sleep of others. Men coming from the mine at 12 o'clock at night, and frying their bacon at the fire below, sent up an odour which added to the

already too suffocating smell in the sleeping-room above. The great number was an aggravation of what is intolerable at best.

The miners showed me a tank through which running water passed, in which they had placed their bottles of milk which they had brought with them for their coffee.

There was an excellent supply of running water of the best quality and it was the only beverage which the men had, for they stated that there was no public house or beer-shop nearer than seven miles and, if there were one, they durst not go into it for fear of being discharged.

The men all said that their lodging-shop was a fair sample of all the lodging-shops in the country, the only difference being the greater or less number of men lodging in them, which would depend entirely upon the state of the mine. I have, however, since seen one refinement of which these men did not seem to be aware, and that was a lodging-shop in which were not only the beds in tiers all round the room, but there also was a bed suspended or swung from the top of the room, which economically filled up a space which otherwise would have been vacant.

Respecting the lodging-shops, the miners have given the following evidence:-

Mr. Joseph Longstaff, says:-

The lodging-shops of the miners are most destructive to the health. The men come there in their working clothes. Far too many sleep in one apartment. The place is quite stifling, and the smell is very bad. One set of men succeeds to another in the occupation of the beds. The masters find the firing, and the tea-kettle, and some small things, but there is often a very scanty supply, and the men lose much time in consequence in preparing their victuals. It is common enough for three men to lay in one bed, but the general way is two.

Mr. William Eddy says:-

Our lodging-rooms were such as not be fit for a swine to live in. In one house there were 16 bedsteads in the room upstairs, and 50 occupied these beds at the same time. We could not always get all in together, but we got in when we could. Often three at a time in the bed and one at the foot. I have several times had to get out of bed and sit up all night, to make room for my little brothers, who were there as washers. There was not a single flag or board on the lower floor and there were pools of water 12 inches deep. You might have taken a colrake and raked off the dirt and potato peelings six inches deep. At one time we had not a single coal. After I had been there two years, rules were laid down, and two men were appointed by the master to clean the house upstairs twice a-week. The lower apartment was to be cleaned twice a-day. Then the shop floor was boarded and two tables were placed in the shop. After that two more shops were fitted up, but the increase of workmen more than kept up with the increased accommodation. The breathing at night when all were in bed was dreadful. The workmen received more harm from the sleeping-places than from the work. There was one pane of glass which we could open, but it was close to a bed-head.

Mr. Joseph Eddy says

I consider the lodging-shops more injurious to the health of the miners than their work itself. So many sleep in the same room, so many breaths, so much stour arising from their working clothes, so much perspiration from the men themselves, it is impossible to be comfortable. Two miners occupy one bed, sometimes three. The beds are shaken once a-week on the Monday morning, when the miners come. Some miners make their beds every night. The rooms are in general very dirty, being never washed, and very seldom swept, not over once a-month. There is no ventilation, so that the air is very close at night. The men cannot have any clothes over them in summer, it is so warm. If any one is unwell he disturbs all the rest. Men are coming out of the mines at all hours, 10 at night, 12, 1, or 2 and when they fry their bacon the smell is enough to suffocate the men in bed.

## VI - OF ACCIDENTS.

Miners are liable to accidents by the explosion of the compounds of hydrogen gas; by being suffocated by carbonic acid gas, or choke-damp; by stones or earth falling upon them; by falling down the ladders; by being crushed by waggons; and by the explosions of shots bored in the rock before they have got to a sufficient distance to be out of danger.

Accidents from the explosion of hydrogen gas are not common in the lead mines, especially where the levels and workings are in limestone. But there are very different strata, even where the lead is chiefly found in limestone. There are beds containing ironstone and iron pyrites from which hydrogen gas makes its escape, and explosions are far from being unknown. Several were mentioned to me by which men had been scorched, but none which had been known to be fatal.

Such things are very rare.

Choke-damp or carbonic acid gas is much more frequent, but is seldom fatal.

In Weardale, according to a return obtained from the Registrar-General, there were killed in 1838 one man, aged 42, by fall of earth in the mines and six, aged 15, 18, 29, 33, 33, and 42, by fall of stones and roof.

In Alston parish, between the 1st of July, 1837, and 30th June, 1841, Report by one man, aged 22, was killed by fall of stone; two men, aged 44 and 54, were killed by fall of stones and one man, aged 26, by an explosion.

An explosion by the gunpowder going off when a man is within the reach of danger may arise from gross carelessness on the part of the man himself, or it may be attributable to the master. Sometimes the squibs and matches are carelessly made and the explosion may take place before the man is sufficiently out of the way. Sometimes an explosion takes place from a spark struck from the rock by the pricker or the driver. Even in limestone rocks there are siliceous particles and I have seen abundance of sparks struck from the picks and from the spades.

Mr. Thomas Dickinson says, in a return about Alston Moor, that the use of copper prickers and beaters has been adopted in blasting. Mr. Crawhill, of Allenshead, says, 'the men are not allowed any metal but copper for charging the holes, that is prickers and drivers, when there is the least apprehension of danger.'

Evidence so expressed does not convey the idea of the invariable use of copper, and is perfectly consistent with that of the men, who speak of the use of copper prickers and drivers as only the exception to the general rule.

An accident occurred in the Greenside Mine, after which copper prickers and drivers were given to the men, and there has been no accident from sparks igniting the gunpowder since that time.

There is so little of descending or ascending by shafts that it is very rare that any accident arises from that cause. Where shafts have been sunk for the purpose of raising ore, they are not left exposed and accessible to any one, as in Shropshire and Staffordshire.

## VII - OF HOLIDAYS.

The miners work five days in the week and have from Friday evening till Monday morning every week in the year. Men employed in driving a level work three days long shifts, each day of 12 hours, then rest on the Sabbath and then work other three days. They have now seven days to recruit their strength. This violent working notwithstanding the long rest, cannot be otherwise than injurious. It is, however, only occasionally that such work is going on.

The washers of lead-ore get away at twelve or one on Saturdays. These unfortunate young persons and boys have but too many holidays forced upon them by the inclemency of the weather, as in most places where they work there is no protection whatever, arid in the best places the protection is exceedingly imperfect. Altogether a washer is prevented from working above 21 or 22 days in the month, and he works at washing from eight to nine months in the year. In the winter time, when the washing becomes impossible, many of the young persons go to work in the mines and the young boys go to school.

Some persons in the smelting-mills work the three last days of the week, then rest on the Sabbath and work on the Monday, Tuesday, and Wednesday very long shifts. They then have seven days to refresh themselves before returning to work. Some work four days in the week, and have three days to refresh themselves.



## VIII - OF THE HIRING AND WAGES OF CHILDREN AND YOUNG PERSONS EMPLOYED IN THE MINES.

Some of the boys and young persons under 18 working in the mines are hired and paid by the masters, as those who work the machines, that is, the fanners, to force in air; and those who drive the horses. But most of them, all those who engage in the work which is properly called mining, are hired and paid by the partnerships whom they serve and some few, but then only an exception to the general rule, are admitted into partnership with the men. Although therefore the partnerships for the most part consist of grown men, yet as some young persons belong to them, and they are the employers of young persons and boys, and as all young persons and boys are looking forward to become members of partnerships, I feel it necessary to describe this system of doing business.

The miners, with few exceptions, speculate on the produce of the mines in which they work. Four miners, say A, B, C. and D, form a partnership together, and they make a bargain that they will work in a certain part of a certain mine for the next three months, for so many shillings for every bing of ore which they dig out: the expense of washing and cleaning the ore and making it fit for the furnace, being charged to them. All the other men in the mine, in parties of 4, 5, or 6, or more, make bargains in the same way. These bargains are entered into a book, and the miners sign them.

An account is opened against each miner and he receives say 40s., which is called lent-money, on the first Friday in every month, which is entered against him. So also if any tools be supplied to him, or gunpowder, an entry is made against him. So also his quota of the expense of washing the ore. Then when the ore has been washed which the partnership have dug during the three months, the part of the money to which the miner is entitled is entered on the other side of the account to his credit. If the same partnership go on, then the proceedings of the second period of three months are the same as the first three months and so it is with the third period of three months and with the fourth period of three months, If the miner shall have entered into partnership with any other persons it makes no difference in the manner of keeping his account; after the three months ore has been washed his proportion is put to his credit. Suppose that the miner's year has terminated at Michaelmas, it will be some time before the ore shall all be washed, but when that shall have been accomplished the masters are now in a condition to make up his year's account. If the money which he has earned shall exceed the lent-money of £2. every month, and the other moneys chargeable against him, then there is a balance coming to him, and that is paid over. Some may receive £5 at such times, some £10, £15, or even £20 or £30. All depends on what is called his good luck. When any man has much to receive masters and men noise it abroad and it tends to bring a good character to the mine.

But it may happen that, instead of having money to receive, the miner is found not to have earned as much as stands in the book against him. In that case the balance is struck and entered against him in his next year's account and it may go on year after year; but if he shall in course of time have a good year he may be able to extinguish all his debt, and even have something coming to him.

It is very disheartening for a miner to go on year after year and have nothing to receive at the year's end but still he has his lent-money on the first Friday of every month and he lives in hope.

Such a thing as suing a miner for the balance due by him is totally unknown and all persons pity the poor man for his bad fortune.

A miner will very rarely, scarcely ever, leave the mine in which he has been working, although there may be a debt standing against him and go to another master with whom he might open a clean account. Local attachment, and a regard to character, are security against such dishonourable conduct.

In some cases the miners work by the piece and are paid a certain price per cubic fathom, or 216 cubic yards, for what they remove. This would seem to be the fairest plan of paying them, but the lottery of the mine, like every other lottery, has a strong influence on the mind and the men go on between hope and fear, and trust to the result at the year's end.

Two pounds a month have hitherto been spoken of as the lent-money and such is the case in all the mines of the London Lead Company but some rich proprietors and many small companies, advance only 30s. a-month, and some 35s. which is not so favourable. No doubt, when the miner who gets only 30s. lent-money comes to settle at the end of the mining year, he is more likely to

have money to receive than the man who has had £2 a-month on account but then suppose there be nothing to receive, the case is much otherwise. Besides the man who draws £2 a-month is better able to supply himself with necessaries, without getting into debt, than the man who has only 30s.

Some companies reckon and settle with their men at the end of every three months, instead of waiting until the end of the season.

The average earnings of the miners working in the mines of Colonel Beaumont have for some years varied from 14s. 6d. to 15s. 4d. per week per man. These mines are considered as having turned out well for some years past. The agent of the London Lead Company considered that the men working in their mines got on the average from 12s. to 15s. a-week. Some of the men themselves have estimated the average at from 12s. to 14s. and some at 12s. 6d.; but it is impossible for poor men to form an opinion, except from the experience of their own mine, or one or two more in their vicinity. The men of the London Lead Company have many advantages besides their wages, as will in another place be pointed out. In general the miners consider that they do not gain more money than the agricultural labourer but they have a great deal more spare time and are less under restraint.

The agent of the Derwent Company stated:-

Many of the men who get 30s. a-month get into our debt by the quarter's end, but take the average a man's earnings will be only 9s. or 10s. a-week. Some are more fortunate, and get much more by falling in with rich ores. When the men work at dead-work they are paid by the fathom and on the average at such work get 12s. a-week. They are good picked men and relieve each other, some working at night, in order that we may get on. The men hire the boys. Often they are the sons of the men themselves. The boys work till 18 years of age at daily wages. A boy begins to work in the mine at about 11 or 12 [we think 12 little enough age] and gets about 4s. 6d. a-week or 9d. a-day, and gradually advances in wages to 10d. or 1s a day till 18.

Those persons grossly deceive themselves who fancy, when they have obtained the average of the wages of any body of men, that they thereby can form an idea of their condition. The average is only ideal it has no real existence in fact. To illustrate this by example. Suppose that 20 men earn 8s. a-week each and that other 20 men earn £1 each. The average here is clearly 14s. a-week and an unthinking person would argue that these men were well off for with 14s. a-week they could procure the necessaries of life and even some of the comforts of men in their station. But the 20 men earning each 8s. a week, however, have only their 8s. each and can barely get the most common necessaries to preserve life and if the 20 men earning £1 each can procure comforts with their wages, the poorer 20 are none the better off for that. Instead of saying then that the 40 men spoken of were in comfortable circumstances, an accurate observer would say that one-half of these men were in extreme misery and the other half were well paid for men in their station.

So it is with the miners. The agents of great companies and many other witnesses, have proved that very many miners receiving their 30s. a-month when they come to reckon have no money to take, and are left with a debt against them to begin the next account and this may go on for year after year. The large gain of the miners who are fortunate in falling in with rich ore in no way benefits the other men, except as affording them hope that one day it may so happen with them but it is a delusive hope to many which is never realised.

Some men disingenuously put forward extreme cases, and wish them to be received as a fair sample of the whole. The facts which they state may be true but the impression which they wish to produce is false and they know it. Taking refuge one day from a heavy storm of rain, near the head of Weardale, I found the parlour of the inn full of persons connected with mines. I turned the conversation so as to inquire in what condition the working miners in that part were. An over-looker of work in the mines said to me, "*Sir, the miners are exceedingly well off here. They earn a great deal of money. I could point out six men who each of them have made up £60 at the year's end and they have done so for these nine years past.*" I replied - "*I am very glad that these men have done so, but I think I should have no difficulty in finding you 600 who have not earned half the money.*" The company all said that I was right and the man himself admitted it; yet he would have passed his rare case as an ordinary sample if he could. Such a manner of acting is but too common with some masters, and the persons whom they put in office.

There is a difference in the earnings of boys working in the mines. Some begin at 9d. a-day, at the age of 14, and gradually get on to 1s. a-day and some more, even as high as 1s. 6d. a-day, until 15 years of age, when it is usual to admit the youth of full strength into a partnership. If his father or brother be already working in the mine his advance to be a partner is much facilitated. He then gets his subsistence-money, or lent-money, at the beginning of every month, and has his chance of receiving an additional sum at the end of the year, if the mine shall have been fortunate.

When children go to wash ore at nine years of age the usual wages are 4d. or 5d. a-day, and it is customary to advance the child a penny a-day for every additional year of his life. Some years there is a rise of 1.5d. or 2d. a-day.

Some grown men work in the washing and perform those operations which require strength and skill. They earn 2s. and 2s. 6d. a-day. Some of the overlookers may get 1s. or 2s. a week more.

In the mines of Thomas Wentworth Beaumont, Esq. in East and West Allerale, there are 17 boys and young persons working in the mine, who are paid as follows:-

- 1-Aged 11 to 12 at 4s. a week.
- 3-Ages 13 to 14 at 4s. 6d., 7s. 8s. - Average 6s. 6d.
- 3-Ages 14 to 15 at 6s. 6s., 6d., 8s. - Average 6s. 10d.
- 6-Ages 15 to 16 at 5s 6d., 6s. 6d., 7s., 7s., 8s., 9s. - Average 7s. 2d.
- 3-Ages 16 to 17 at 7s., 7s., 8s. - Average 7s. 4d.
- 1-Aged 17 to 18 at 9s 6d.

There are three boys opening and shutting air-doors, ages 10, 11, and gaining 3s. each a-week.

There are two young persons of 17 years of age employed to clean levels at 9s. a-week each.

There are five boys employed in working air-machines, or fanners, viz. one aged 10, at 6s.; one, aged 14, at 6s.; one, aged 14, at 7s.; one, aged 15, at 7s.; and one, aged 16, at 7s.

There are 13 young persons employed in driving waggons in the pits.

- 2-Aged 14, at 5s. 6d. and 7s. 6d.
- 4-Aged 15, at 6s., 6d., 6s. 6d., 7s.
- 4-Aged 16, at 7s., 7s., 8s., 9s.
- 3-Aged 17, at 7s., 7s., 8s. 6d.

There is one young person driving a horse turning a whimsey on the bank aged 15, at 5s. 6d. a-week.

### **Of the Hiring and Wages of Children and Young Persons Employed in Washing the Lead Ore.**

Some companies hire the boys and young persons and pay them themselves and set men over them to see that they do their work. This is the case with the London Lead Company. But at most mines the custom is to contract at so much per bin of dressed ore, and the contractor engages and pays the people who work for him. A man may have 10 under him, or he may have 40; there is no rule. A contractor at the washing-floor of the Derwent Company was pointed out me, and I entered into conversation with him. He told me that he had 40 persons working for him. I said to him, "*At that rate you ought to be making a little fortune?*" He replied, "*No, no, Sir, I am watched too closely for that; if they see that I am making more than they think fit that I should do, then when my contract for this quarter is out they will reduce me the next quarter.*" This man was working himself and making others work. On visiting another washing-place I learned more distinctly the meaning of what the man had told me. I there saw the pay-list which a contractor made out and

delivered to the manager at the end of every month, containing the names of all the people employed, what they have done each day and the amount of the earnings for the month. By such returns the company know to a farthing what the contractor has paid for labour and what has been able out of his contract price to reserve for himself. So they may easily lower him if they see that he is gaining more than they like. The manager explained that the company guaranteed to the workpeople the payment of their wages and they ought to know that they were paid and how much they were paid; and that also by these lists they knew how much they ought to advance to the contractor on account, to enable him to pay the people. After all it is a complete disclosure of the amount of his profits and he is not very likely to make beyond the wages an overseer under engagements so made.

There was only one washing-place at which I saw females employed. There were two of them full grown and I was informed that there was a third. They were earning 1s. a-day. I heard of them at a second place. At all other places where I made inquiry they said that no women were now employed at this work in the whole country. The reason generally given for not employing women was, that they considered it was work not fit for women. Certainly the labour is not too severe for women, but it must be admitted that the exposure to the weather is so great an evil that it is neither fit for men, women, or children. A more definite reason was given by Mr. Parmley, of Stanhope:-

We do not think it suitable to the modesty and delicacy of the sex to be so much associated in labour with boys. The discontinuance of the employment of girls is all but universal in Weardale and in all our company's mines everywhere it is so.

The working-men in Teesdale said:-

We think in this place that it is very improper that girls should be allowed to work at washing ore. It is worse than Indian slavery. It is not suitable for girls to have to work along with grown boys, and to hear what the boys may say to them.

The following are the weekly wages paid to boys and young persons, when in full employment, for washing lead-ore at the mines of Thomas Wentworth Beaumont, Esq., in the parish of Stanhope:-

Age.	Number.	Wages.	Average.	Age.	Number.	Wages.	Average.
		<i>s. d.</i>	<i>s. d.</i>			<i>s. d.</i>	<i>s. d.</i>
8 to 9.	1	3 0			2	3 6	
9 to 10.	{ 6 1 —7	{ 3 0 3 6	3 0 $\frac{7}{8}$	13 to 14.	{ 4 9 4 4 2 1 1 —27	{ 4 0 4 6 5 0 5 6 6 0 6 6 7 0	4 10
10 to 11.	{ 16 4 —20	{ 3 0 3 6	3 1 $\frac{3}{4}$		{ 1 1 9 9 7 1 1 —29	{ 4 0 4 6 5 0 5 6 6 0 7 0 7 6	5 6
11 to 12.	{ 10 10 3 1 1 1 —26	{ 3 0 3 6 4 0 4 6 5 6 6 6	3 7 $\frac{3}{8}$	14 to 15.	{ 2 1 6 2 2 —13	{ 5 0 5 6 6 0 6 6 7 0	5 6
12 to 13.	{ 1 4 10 4 1 1 —21	{ 3 0 3 6 4 0 4 6 5 6 6 0	4 1 $\frac{7}{8}$	15 to 16.	{ 1 3 2 2 1 1 —10	{ 6 6 7 0 7 6 8 0 9 0 10 0	7 9
16 to 17.	{ 1 1 3 3 3 1 —12	{ 3 6 6 0 6 6 7 0 7 6 9 0	6 9	17 to 18.	1	10 0	
				18.	1	10 0	

An account is given also of the following boys and young persons:-

**Driving Horse in the Level.**

Age 11, one at 7s. a-week.  
15, one at 8s. and one at 9s. a-week.

**Driving Whimsey Horse.**

12, one at 5s. a-week.

**Teaming Level Waggons.**

16, one at 10s. a-week.

**Working in the Mines.**

15, one at 7s. 6d. a-week.  
16, three at 7s. 6d. and two at 8s. a-week.  
17, one at 9s. and one at 10s. a-week.

These 13 with the 167 washers of ore make 180.

The following are the weekly wages of the children and young persons employed in washing lead ore in Mr. Beaumont's mines in East and West Allendale

Age.	Number.	Wages.	Average.	Age.	Number.	Wages.	Average.
9 to 10.	{ 3 4 -7	s. d. 3 0 3 6	s. d. 3 3 $\frac{3}{4}$	14 to 15.	{ 2 10 2 6 1 3 1 -25	s. d. 4 6 5 0 5 6 6 0 6 3 6 6 7 0	s. d. 5 6 $\frac{3}{4}$
10 to 11.	{ 9 10 2 1 1 -23	3 0 3 6 4 0 4 6 5 0	3 5 $\frac{1}{3}$	15 to 16.	{ 1 1 1 7 4 4 1 2 -21	4 6 5 0 5 6 6 0 6 6 7 0 7 3 8 0	6 4 $\frac{1}{2}$
11 to 12.	{ 7 8 8 3 3 -29	3 0 3 6 4 0 4 6 5 0	3 9 $\frac{2}{3}$	16 to 17.	{ 1 2 2 1 4 5 1 1 1 2 1 -20	4 6 5 6 6 0 6 9 7 0 7 6 8 0 8 6 9 0 9 6	7 2 $\frac{1}{4}$
12 to 13.	{ 1 5 10 12 1 9 1 -39	3 0 3 6 4 0 4 6 4 9 5 0 6 0	4 4 $\frac{5}{13}$	17 to 18.	{ 1 1 1 1 2 2 2 3 -12	4 0 6 3 6 6 7 0 7 6 8 0 8 0 9 0	7 4 $\frac{3}{4}$
13 to 14.	{ 9 8 6 5 2 4 1 -35	4 0 4 6 5 0 5 6 5 9 6 6 6 9	5 1 $\frac{1}{2}$				

There are no apprentices working inside or outside of the mines in the lead country.

Many of the miners have another source of income besides what they derive from working in the mines. The land in greater part of the mining country is too far elevated above the sea for the corn to ripen, and accordingly it is laid down in grass and is divided into small enclosures, and is let in portions of about five acres each to the miners. Upon the five acres he is able to keep two cows and if he have a small patch more he may keep a galloway. A certain portion he reserves in hay to feed his cows during five or six months in winter. His galloway may feed on the edge of the fell and in winter he is sent down into the low country and is kept by the farmers at 1s. or 1s. 3d. a-week. The galloway is of use to bring home the coals and the cows give employment to the miner's wife and daughters and yield milk, butter and cheese. Very often there is no cabbage-garden attached to the miner's cottage but sometimes there is. It was the hay-time, in the middle of August when I first came to the country and there was everywhere a heavy crop, which on account of the rainy season there was some difficulty of saving. From the lateness of the time of year when the hay is got in there is not much time for a second crop.

Some masters lay stress on what the miners and smelters may gain on the days when they do not come to work but the men who, by over-exertion, require to stop at home on those days to rest themselves, are not likely to be able to do much by which they can add to their earnings.

### IX - OF THE TREATMENT AND CARE.

I have already expressed regret at the want of proper protection from the weather for the children engaged in washing the ore and also at the close and ill-ventilated and crowded lodging-shops and having so done I am happy to be able to devote this chapter to a more agreeable theme,

the Treatment and Care which the London Lead Company bestow on the whole of the workpeople employed in their mines, and on their wives and families.

As to their health, the London Lead Company employs a medical practitioner in every part of the country where their mines are situate, paid by the company, and his duty is to give medical attendance, advice, and medicine, without any charge, to all the workpeople and to their wives and all members of their families dependent upon them for support. This includes accouchements as well. The utility of such an arrangement is beyond all calculation.

A man who suspects that he is likely to be ill is not deterred by the dread of expense from taking immediate advice. The mother of a family may at any time go and consult the medical practitioner respecting her own health, or that of any member of her family. Disease is thus in cases innumerable prevented, or it is checked in an incipient state before it has had time to take a strong hold of the constitution. The conduct of the London Lead Company is worthy of the imitation of all employers of large bodies of workmen.

There is a fund for the relief of the workpeople in time of sickness. The members consist of all regular workmen in the employment of the company. Every member contributes 30s. a-year towards the fund until 65 years of age and the money is taken through the medium of the due papers when there may be a balance owing to him. The company's workmen throughout the whole of their mines belong to the fund, which gives a better average and renders the fund more secure than if it consisted of a smaller number of members. The superintendents of the company and the district agents are members of the committee, and the superintendent is president at all meetings.

The company makes a direct payment to every workman of his money and never at any public-house. In almost all districts of the kingdom it is the rule, though there are honourable exceptions, to make a list of a certain number of workpeople, and the amount due to each and cast this up into one sum and then to give bank-notes, and sometimes cheques to the keeper of a public-house or beershop, who undertakes to get change how he can and to pay each man. Of course he pays at his own house, and every man must expend a certain sum, and is probably induced to spend still more. This leads to much mischief, which the London Lead Company avoids by paying to every man his own money, and never at any public-house.

The company encourages their people paying in ready money for what they have, and discourages their getting into debt. They advance to the men 40s. at the beginning of every month and to the young persons and boys in proportion. They have encouraged the establishment of ready-money shops, in which goods are sold at a lower rate than where credit is given. If any persons let the workmen let into debt with them no facility is afforded to them in recovering their money, and the company will not keep back any part of the wages to pay such debts, nor at all interfere with their influence in the matter.

None of the agents of the company are allowed to keep shops, or engage in any branch of trade, so that there can be no influence direct, or indirect, for the men to lay out their money with them. None of the men are allowed to keep beer-shops.

Serious offences are visited with dismissal from the service of the company and amongst these is drunkenness. Other offences of a less heinous nature incur a penalty generally of a pound. As the penalty is only charged against the offender in his account and is only paid from the balance coming to him at the end of the year, if such balance there be, there is less difficulty of enforcing the fines. All penalties are paid over to the sick-fund, so that the loss to one man is for the good of the body generally.

At Middleton there is a large school, and a master and a mistress are paid by the company. All the children of the workpeople above six years of age and not at work, are expected to attend. Children of an earlier age may be sent if the parents choose. In the winter-time, when the washing of the ore cannot be carried on, the children under 14 are also required to attend the school. The education includes reading, writing, and arithmetic and the children are also taught a knowledge of geography, natural history, and other branches of knowledge calculated to expand their minds, and give them a taste for reading.

This instruction in geography, and other branches of knowledge calculated to inspire a taste for reading, is of the utmost importance. In most districts of the kingdom, whilst the children are taught to read, the fact is, that nevertheless after leaving school they do not read and they have no desire to do so; and they continue perfectly ignorant of everything and to a degree which without personal examination would hardly be credible. To render reading useful and a source of intellectual improvement, the seeds of knowledge must be sown in the mind, and the happy effects

of so doing will be seen in after-life, as happily is the case amongst many of the inhabitants of the lead country, in the general intelligence and good conduct of the whole body of the people.

Girls are taught knitting and sewing. There is a similar school at Nenthead. The company has a library at Middleton for the use of the workmen and their families and they are allowed to take the books home and read them gratuitously. There is a similar library for the company's workpeople at Nenthead, and for their workpeople in Westmoreland.

The company's schools also meet on Sundays and the young persons who are at work during the week are also expected then to attend and to do so until they have passed a satisfactory examination in scriptural knowledge, when they are excused. After the school separates the children are expected to attend at their own several places of worship twice every day and a confidential person at each place gives each of the children present a ticket, which is to be produced at the Sunday-school next Sunday morning, and an account is kept of the attendance.

The happy effects of this paternal care of the workpeople and of their families is, that the workmen as a body are steady, orderly, industrious, good members of society.

That the men are exceedingly sensible of the kind treatment which they receive I have had ample opportunity of knowing; indeed all persons speak with feelings of great respect and good will of the London Lead Company, and much praise is bestowed on their superintendent, Robert Stagg, Esq., for the benevolent and wise regulations which he has been the means of establishing.

Some persons have remarked, that in all this good done to the workpeople in promoting their comfort, their moral and intellectual improvement, the company has been promoting its own interest at the same time, as they are able thereby to obtain more efficient service, and altogether not at a greater cost. No doubt this is true; and other great companies who would follow their example would promote their own advantage by so doing. Happy is it when men can take such an enlightened view of their own interest, as to see that they most effectually benefit themselves by doing good to those whom they employ.

## **X - OF THE PHYSICAL CONDITION.**

The young men appeared very healthy but exceedingly few of them were of a large size and in general it may be said they are of a small size. On Sundays they might be seen in groups in the little villages and along the sides of the roads. Their dress was very different from the superfine black cloth of the coal miners but their linen was clean and their clothing, though economical, was also clean and neat, and altogether they made a very decent appearance.

The women, like the men, are not of a large stature, but a great proportion of them had soft agreeable countenances. The boys at the washing-floors looked well and seemed to go through their work with great spirit. At the national school at Stanhope are about 50 boys and 50 girls the manifested the usual animation of children, in their march to church, and their countenances announced mental activity and intellect.

The same observation might be made of the children of both sexes at the school supported by the London Lead Company at Nenthead, in Alston Moor and at Middleton-in-Teesdale. In the clothing of the children economy was evidently the first consideration and substantial strength was more thought of than ornament but altogether their clothing seemed quite sufficient. I have already spoken of the dress of the children at the washing-floors.

The medical witnesses state that the children are not subject to any particular diseases so also state the workmen themselves. If any country be favourable to health, we may say so of this. Intimately connected with the physical condition is the diet and lodging. As to the diet, it will appear, from the evidence of the witnesses, that it consists much more of vegetable food than amongst the miners of the coal districts. One never sees the droves of fat pigs with which the eye is familiar in Shropshire and Staffordshire beer is not nearly so much drunk. In the parish of Hunstonworth; which is seven miles long and three broad and in which are the works of the Derwent Company, there is not a single beer-shop or public-house of any sort. In fact, very little beer is drunk in this country, and many of the teetotallers have long been so in practice before they adopted the principle. A miner in the lead-mines, as some of the witnesses have observed, does not require so much food as in the coal-mines and this arises from want of ventilation to procure him an appetite and so much the worse. The houses of the miners are substantial and well whitewashed, but the furniture is nothing like so valuable as the furniture of the miner in the coal districts; the wages



will not afford it.

As to the effect of the air and work in the mines and its tendency to shorten the lives of the men, I refer to the evidence of Mr. George Arnison, which is printed No.1. It is so clear an account that it would be doing injustice to it to attempt to abridge it. I also refer to the important letter of Mr. Johnston, of the University of Durham, already given in this Report. The evidence of the working miners themselves on this subject is exceedingly clear, and is uniformly consistent in every district, that it cannot reasonably be doubted.

### **Duration of Life of the Miners.**

All the evidence of the miners themselves and of the medical men agrees in proving that the lives of the miners are shortened by the nature of their employment yet I met with an agent of a large mining establishment who boldly asserted that the miners lived even beyond the average duration of life and in proof of his assertion produced a paper drawn up by a surgeon, showing that the miners connected with his mine who have died for the 28 years past had averaged, one with another, 51.5 years.

As persons do not become miners until 19 years of age, the above result, if correct, would show that the chance of life to a miner entering on the employment at 19 was 32.5 years. This will no doubt appear a long period, but it falls short of the probable duration of life as ascertained by the Swedish tables, which, for men of 19, is 38 and 50 hundredths, or upwards of seven years longer than the average given by this surgeon of the miners. The Swedish tables are generally considered as more applicable to the body of the working people than any other which we possess and give a shorter probable duration of life than tables formed from select bodies of men, as the government annuitants, or persons whose lives are insured in the Equitable Life Office.

Having no means of testing the authenticity of the data for the table formed by the surgeon, I thought it expedient to consult the public register of the deaths for the district of Alston Moor for the last four years, from July 1, 1837, to June 30, 1841, being the whole period for which it has been kept. I found there the deaths of 79 persons entered as miners but as four of them are under 19 and they probably were not regularly working in the mines, I omit them, and I find that the 75 miners who died above 18 had amongst them lived the aggregate number of years 3389, being on the average 45 years; from which 19, the time of commencing their labours, being deducted, gives us 26 as the average duration of the life of a miner after commencing his profession. This is six years and a half less than the time in the table formed by the surgeon, and it is nearly 14 years less than the time ascertained by the experience of the males of the whole kingdom of Sweden.

Out of the 75 deaths the cause of death stated in 37 cases was consumption. There were also six cases of death from asthma, also a disease of the lungs; there were also four deaths by accidents, of which two were from the falling of stones, one was by the falling of earth, and one by the explosion of a fiery shot in the stone.

Considering it of importance that the truth as to the age of miners at death should be fully ascertained and the value of the evidence of the medical men and miners rigorously tested, returns were obtained from the office of the Registrar-General in London of the deaths of the miners for the four years from July 1, 1837, to June 30, 1841, from the parishes of Allendale, in Northumberland; from the parish of Stanhope, including the chapellry of St. John's, Weardale, in the county of Durham and the parish of Middleton-in-Teesdale in the same county. From these returns the following results were obtained:-

In Allendale, during the four years, there were the deaths of 79 miners of 19 years of age and upwards, and their aggregate ages amount to 3802 years, making the average age at death 48 and ten seventy-ninths. This is more favourable than in Alston Moor but falls short of the number of years given by the surgeon and greatly short of the Swedish tables for the probability of life of persons of 19.

The number of deaths from consumption is 36, and from asthma 2; together 38.

The deaths from violence amongst the miners in the four years are as follows:-

Age 44, explosion of gunpowder.

55, stone falling upon him in the mines.

19, explosion of gunpowder in the mine.  
40, explosion of gunpowder in the mine.

In the parish of Stanhope, including the chapelry of St. John's, Weardale, the number of deaths of the miners of 19 years and upwards, was 129, and their aggregate ages come to 6383 years, giving an average of 49 and sixty two one hundred and twenty ninths years.

The number of deaths from consumption is 64, and from asthma 6; making together 70.

The deaths from violence are as follows:-

Age 48, perished in the snow at Middleton fell.  
42, by falling of the earth in the mine.  
29, by falling of the metal at the lead-mills.  
33, by the falling of the roof of the mine at Sedling Mine.  
36, killed in a lead-mill at Cowshill.

There is also the case of a boy of 10, killed by a stone crushing machine.

At Middleton-in-Teesdale the number of deaths of miners 19 years of age and upwards in four years is 57, and the aggregate ages make 2693 years, giving an average of 47 and fourteen fifty sevenths The deaths from consumption are 19 and from asthma 18 making together 32 deaths from diseases of the lungs, out of 57 deaths altogether.

Two deaths occurred from violence:-

Age 28 killed by fracture of the spine.  
25, killed by limestone rock falling upon him at Newbiggin.

The evidence of the medical men and of the miners is fully borne out from the authentic registers of the districts and it is to be observed, that the young persons who go into the mines to begin the profession of miner, have survived the dangers of childhood and boyhood and are probably in almost every case in at least an average state of health, or they would not likely undertake so laborious an employment. The average expectation of life in the table formed from the experience of the capital of the county of Cumberland, and commonly called the Carlisle Table, is, for persons of 19 years of age, 42 and seventeen hundredth years; that is to say, the average age at which they die is 61 years and far exceeds that of the miners of the fine healthy, upland vales of the lead country.

## XI - OF THE MORAL CONDITION.

Of the moral condition of the lead country there is every reason to give the most favourable report.

The people manifest their attachment to religion by a punctual and steady attendance at public worship. The parishes are of enormous extent and the accommodation in the churches and chapels of ease of the Established Church would be quite inadequate for the now great population but the void is filled up by the chapels of Wesleyan and Primitive Methodists, and of other denominations.

Offences against property are very rare. It may be doubtful whether we may consider it a proof of the honesty of the people, that pigs of lead may be seen lying by the road sides and in the fells as much exposed as so many stones. There is no magistrate nearer to Alston than a distance of 14 miles. Offences against the law are very rare.

As to the intellectual condition of the people, it is decidedly superior to the of any district of England of which I have any knowledge. The witnesses uniformly manifested a clearness of comprehension of the inquiries made of them and gave distinct replies and added of themselves other information bearing on the subject. Almost all of them could sign their evidence and most of them wrote exceedingly well

Of 432 boys and young persons under 18 employed by Mr. Beaumont, 419 are stated to regularly attend public worship; 270 attend Sunday-schools; 415 are stated to be able to read an

easy book; and 291 have signed their names. Many of these who have not signed their names are still attending to their education in winter and may yet acquire the art of penmanship. This return shows a much more favourable state of things than in other parts of England.

At Stanhope there is a national school, having about 50 boys and 50 girls. Throughout all Weardale there are schools established, and partly endowed, by the late Dr. Shute Barrington, Lord Bishop of Durham. The incomes of the masters and mistresses are partly made up by the subscriptions of the neighbouring gentlemen and small fees from the scholars, generally about 1s. 6d. a-quarter from each pupil.

There is a public library at Westgate, in Weardale, established 52 years ago; there is one in Stanhope, established in 1819; and two years ago a third library was established at Weardale. There are about six miners members of the library at Stanhope; but at Westgate and Wearshead the members are chiefly miners. There are also public libraries in Teesdale. At Middleton there is a school supported by the London Lead Company. At Allenshead there is a school, supported by Mr. Beaumont, for the children of the workpeople and there is a library, of which books are circulated.

The means of education in Alston parish are extensive: there is the grammar-school, the master of which must be acquainted with Latin, but he gives a general education there is a charity-school, and a school kept by a master on his own account; there is the school of the London Lead Company at Nenthead, at which other children besides those of their own workpeople are allowed to attend. There is a school at Garrigill Gate, and one at Tynehead, and another at Leadgate. There are also many dame-schools, and 10 Sunday-schools.

The children in the lead country have the benefit of the example of their parents, and their encouragement to attend to their education whilst in many other districts the fathers, never having learnt to read themselves, make no effort to stimulate their sons to acquire an instruction of the value of which they are themselves ignorant. It can only be in the second and third generation that the full effect of education can be felt.

The means of attaining religious knowledge in Alston parish are abundant. There is the church and a chapel of ease at Garrigill Gate, of the Established Church. As for Dissenters' chapels there are two of Independents, six of Wesleyan Methodists, four of Primitive Methodists, one of the Society of Friends. The places of worship are all well attended and they have Sunday-schools attracted to almost all of them.

As for libraries, there is one belonging to the Mechanics' Institution and the members have the privilege of taking home the books. There are also four libraries in the town of Alston and altogether in the parish the libraries are seven in number, of which the books are circulated. There is a reading-room at the Mechanics' Institution, and occasionally there are lectures, some gratuitous and some paid for. Many of the members are working miners, as is the case with the libraries.

Alston, small as it is, boasts of its agricultural society and its annual cattle show for prizes, which is particularly noted for black-faced sheep of their own district.

I procured the catalogues of several libraries and the books are such as to convey valuable information, and are far superior to most of the works which are found in the catalogues of the institutions called literary and scientific, in and about the metropolis.

The evidence of the employers and the parochial authorities, as well as of the men themselves, fully proves that there is a very general sobriety, and that the contrary practice is exceedingly rare. Teetotalism is very common, which some say is caused partly by poverty as well as principle. More than half the witnesses who came to the inn at Stanhope were teetotallers. The landlord, however, kept a variety of drinks which were permitted to the teetotallers, by the sale of which, he said, he derived as much profit as by spirits or beer. These drinks are coffee, soda-water, ginger-beer, lemonade, black-beer, and peppermint. Black-beer is a bitter stuff of which the chief component parts are said to be treacle and the juice of spruce fir; it is in great favour. The teetotal peppermint is as clear as water, and is sweet and pungent. It is evidently a saturated solution of white sugar, afterwards strained and peppermint added to it to make it pungent. The landlord charged for it the same price as for rum. He stated that the teetotal miners would call for this liquor and sit and sip it, and smoke their pipes for hours together, enjoying the sociality of the public-house. The landlord remarked to me, what a pity it was that poor men should be deluded to spend their money on such stuff, when they might get good wholesome invigorating beer. Strict teetotallers as continue to frequent the public-house will in all probability come to be of his opinion.

## XII - OF THE COMPARATIVE CONDITION.

The pecuniary condition of the miners in the lead country, as compared with the colliers in the low country of Durham, is greatly inferior. As compared with the agricultural labourers it is much on a par, some having rather more and others not so much. It is better than that of the hand-loom weavers in the manufacturing districts.

As to the sanitary condition the miners in the lead-mines are greatly equal either to the colliers or to the agriculturists.

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### OF THE BORODALE MINE.

Proceeding from Keswick along the banks of the lake Denwentwater we enter the vale of Borodale. It is exceedingly narrow, and is bounded on each side by steep romantic cliffs of the mountains, varying in height from 300 to 500 feet, a river running in the middle. At the distance of nine miles this vale terminates by the mountains on each side meeting and the little hamlet of Seathwaite seems the last boundary of civilisation and the extremity of the habitable world. High up on the side of the mountain on the west side was the celebrated mine of Borodale, which yielded, and it is to be hoped may again yield, a mineral substance of great utility, the carburet of iron, which has obtained very improperly the vulgar appellation of plumbago and of black lead. It is also called Wad. The mine has been worked upwards of 100 years, but since 1818 it has yielded only 140 casks of 1.25cwt. each. For the last two years it has yielded none whatever. There are now attempts making in two places to discover fresh ore. Eight men are employed, four at each place and each party works in two shifts two at a time. If not soon successful more men, it is expected, will be employed, for the stock on hand is not sufficient for the consumption of above two years and a half.

The mine was worked in several levels and in the levels were some ascents and drifts. The veins are pipe-veins. The rock is greywacke, though there are secondary strata a mile lower down the valley. Strings are generally found to lead to the vein. When a vein is found there is usually a great mass of the ore together. One vein was discovered more than 50 years ago perpendicular. Its height was 97 yards, its breadth five yards and its depth or thickness 2.3 yards. This vein was at last lost but by digging it was found again a little lower down and it then continued eight yards downwards and at last was lost, and never again appeared.

Most veins are inclined 45 degrees. In 1803 there was found as much ore as made 500 casks of 1.25cwt. each. The general price was 30s. a pound sold in small quantities and it is considered that the whole was worth £95,000. The mine was then closed for six years and after that it was worked in the summer months only. There were obtained in 1812, 87 casks; in 1815, 103 casks; in 1816 and 1817 the mine was closed. In 1818 the mine was opened, but with so little success that only 140 casks have been obtained from that time to this.

So much is this mine a lottery. Trials have been made at many places upon the mountain without success. Trials have been made and are still making, in Lord Egremont's lands to find this ore. There are two mines of this ore in Scotland but not equal in quality to ore of the Borodale Mine and a great quantity is imported from South America or Mexico. The imported ore is not firm enough to be worked of itself but is used in composition. Much of this ore is brought up by the plough and there are women who collect it in the bed of the river and sell it to strangers.

The steward stated that he has seen as many as 30 lights at a time during the night of people who had come to search in the rubbish thrown out from the pits. This was put an end to by scattering the rubbish and collecting such pieces as were of any value. The fidelity of the workmen is secured by paying them high wages, 30s. a-week. The property belongs to a company, of which the half is held by Mr. Bankes, of Corfe Castle. The other half is divided into 24 shares, which may be divisible into half twenty-fourths. A twenty-fourth and a half of a twenty-fourth share were sold in 1838 for £510. The company's lease has 15 years to run and Mr. Bankes has purchased the reversion after the lease has expired.

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# EVIDENCE COLLECTED BY DR. MITCHELL.

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## LEAD-MINES OF DURHAM. NORTHUMBERLAND, AND CUMBERLAND.

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### No.1 George Arnison.

**REPORT of George Arnison, surgeon to the workmen employed by the London Lead Company at their smelting-mill and lead-mines in Weardale, and medical officer of the Stanhope district of the Weardale Union.**

I have been in practice nearly 12 years, the latter six of which I have spent in this dale during which period I have had considerable practice amongst the lead-ore miners of this district.

They are not subject to colica pictonum, or lead colic, or to paralytic or epileptic attacks, which lead occasions when introduced into the system; nor are the diseases to which they are peculiarly liable, chronic bronchitis and pulmonary consumption, induced by the poisonous metallic ore amongst which they are employed being in any way imbibed.

The miners, generally speaking, are healthy and robust in early life and do not exhibit any striking indications of their health being impaired by the nature of their employment before they reach the age of 30. From that to 40 their peculiar complaint imperceptibly steals upon them and at the latter age they are generally affected with a degree of constriction in the chest and difficulty of breathing, attended with increased embarrassment on ascending a hill, or using any extra exertion. Few old miners are exempt from this dyspnoea which, instead of regarding in a serious light, they look upon as a matter of course, and numbers of them continue their employment for many years after, suffering in a partial degree in this way. Some few individuals continue their work in the lead-mines to the verge of 70 years but they constitute a comparatively small number who are enabled to continue that employment even to the age of 60; very many of them, I might say the majority of them, being permanently disabled at 50, very frequently at 40, or from that to 50. The habitual dyspnoea becomes seriously aggravated, so that the miner is no longer able to pursue his employment. Cough and expectoration occur. The latter at first scanty and frothy, but as the complaint advances it becomes more copious and purulent, or muco-purulent, and in the latter stages of the disease frequently exhibits the dirty blue, or almost black colour, peculiar to miners, and considered by them as an accumulation of the dust and other effluvia they have inhaled whilst engaged in the mine, or groove, and designated by them '*Groove-muck.*' For although the ventilation of the mines is, with few exceptions, good and efficient, much superior to what it was some 30 years ago, yet even in those parts of the mine where it is best and where there is neither a deficiency nor vitiation of the air, the miners are continually respiring, whilst at work in the mine, an air (however good in other respects) highly charged with minute particles of dust, smoke, and other effluvia, arising from their constant operation with the pick, the jumper, &c., and the frequent complaint occurs most frequently as a chronic inflammation of the bronchia and lining membrane of the lungs, presenting the usual characters of habitual asthma. The cough and dyspnoea. &c.. aggravated by easterly winds, humid state of the atmosphere, neglect of the bowels, or irregularity of diet. Not uncommonly, either from the continued exposure to the exciting cause, or to the vicissitudes of the weather, &c., an acute attack of thoracic inflammation supervenes, and the patient may be cut off in a few weeks. In those individuals not previously much affected with dyspnoea,

recovery may be expected to attend the adoption of the usual antiphlogistic measures, and the miner may again be restored to health, and resumes his employment. More commonly the chronic disease merges into pulmonary consumption, which gradually undermines the constitution, and after months and in some cases even years of protracted suffering, they sink into a premature grave.

The complaint resembles the disease which prevails amongst the grinders of cutlery in and near Sheffield, and called by them grinders' asthma and is unquestionably chiefly attributable to a similar cause, the irritation of the pulmonary apparatus by aerial acrimony.

Miners often complain of a pain under the sternum and of a weight and uneasiness at the stomach, which they ascribe to '*bad air and powder rick.*' These complaints are generally removed by an emetic and an aperient.

Some few, from the attacks being of a more obstinate and protracted nature, may suffer from chronic dyspepsia for weeks, or even months, before they regain their health. This chronic dyspepsia is frequently the result of inflammation of the mucous membrane of the stomach and bowels and occasionally terminates in a state of chronic ulceration of the membrane, characterised by tympanitic distention, severe tormina or twisting pain in the bowels and frequent attacks of diarrhoea, and discharges of flatus, &c. This disease is attended with extreme emaciation and suffering, of which the countenance of the patient is generally sufficiently expressive, and phthisical symptoms are often developed in its course and for a time perhaps partially mitigate the abdominal complaint but ultimately accelerate the uniformly fatal catastrophe.

These are the only complaints to which miners are peculiarly subject or which can be properly attributed to the nature of their employment.

Owing to the adoption of horizontal chimneys and the superior ventilation of the smelting-mills the workmen employed at them rarely suffer in their health though their peculiar employment and the duration of their lives is upon a par with that of other persons in the district engaged in laborious pursuits. Colica pictonum and paralysis used to be of frequent occurrence many years ago, but not a single case of the other has occurred at the Company's smelting-mill in this neighbourhood during the six years I have practised here. There are other two mills in this district, at which a few cases of the lead or mill colic have occurred during that period.

Notwithstanding the deleterious effect which the employment exerts upon his health, the miner has a decided preference for it, and generally quits it with reluctance. About 10 years ago, in consequence of the discontinuance of many of the poorer mines in consequence of the low price of ball, many families were under the necessity of leaving the neighbourhood and going into the coal districts for work. Although they could earn almost double the amount of wages in the coal-mines, yet, on work becoming more plentiful in this district, many of them returned again to the lead-mines a few years after, to which their early habits, local associations, and family connections, may possibly have greatly contributed.

Teetotal principles, inculcating total abstinence from intoxicating liquors, have been extensively disseminated amongst them and have greatly contributed to ameliorate their condition and to prolong their lives. It is a palpable fact, that the intemperate are among the first to suffer from the hurtful nature of their employment.

The temperature of the mines, I believe, does not materially vary throughout the year; they are generally warm, except in those workings exposed to a current of air introduced for the purpose of ventilating them and the miners generally pursue their work clothed in a coarse flannel shirt and drawers. Some parts of the mine are damp and yet, but not commonly and these situations are less hurtful to the miner than those which are dry and dusty.

As a necessary consequence of the miners being so short-lived, widows and orphans are unusually numerous in the parish and constitute the chief source of pauperism.

Accidents are by no means frequent in the mines now and then however such occurrences take place, either through the falling in of a portion of the roof of the mine, or through the operation of blasting with gunpowder, or similar cause, by which an individual is sometimes either killed on the spot, or temporarily or permanently disabled.

Scrofula prevails to a great extent amongst the children and youth of both sexes in the district, as does bronchocele amongst the females. Neither of these diseases are attributable to the father's employment in the mines.

The boys employed in washing the lead-ore are liable to catarrhal and other affections, like others exposed to the vicissitudes of the weather, but are not subject to any complaints peculiar to themselves. In this district they are seldom or never employed before the age of 9 or 10 and the

employment is wholly suspended during the inclemency of the winter quarter, during which period the older boys (those about 14) are allowed to work in the mines under the direction of their parent or an experienced miner. They are not permanently admitted to work in the mines until they are 18 years of age at which time they are considered as regular workmen, and entered as members of a sick-fund, established by the Governor and Company for the benefit of their sick or disabled men.

### **No.2 Edward Routledge.**

I am a medical practitioner of 34 years practice, residing in Alston, and one of the medical officers of the parish. The children engaged in washing ore enjoy good health, and are very hardy, and seldom catch cold. The young persons under 18 are very healthy. From that age to 20 they engage as partners in the mines, and before they reach 30 the dust affects them in the lungs and they generally die asthmatical. Many linger on a great many years, but are not able to follow any employment.

### **No.3 John Parmley.**

I am agent for the mines of the Lead Company of London. They are in possession of the Stanhope Burn, near Stanhope, in Weardale; also of Middlehope Mine, seven miles N.W from Stanhope; Irishope Burn, eight miles W. from Stanhope; all these are in Weardale. They have a great number in Teesdale, ten or upwards. They have also mines in Alston Moor, and mines in Westmoreland.

Mr. Beaumont is a large occupier of mines, which he holds of the Bishop, situated in Weardale. He has also mines in Allendale, entirely his own property.

The Derwent Company has mines in Derwent Head. There are many mines occupied by individuals, who work them on a small scale.

Weardale is chiefly supported by the mines. Most of the miners occupy small portions of the land, to which they attend when they can. The land is chiefly in grass, and all which the miner does is to keep a cow or two to assist in maintaining his family. The miners work eight hours in the day and have the whole of Saturday. The miner's income is therefore not solely what he derives from the mine. As miners' boys grow up to be 10 or 11 years of age, they get employed in washing. Our Company does not take them earlier, nor does it employ any girls whatever. Formerly children of 8 or 9 would be employed, but not so of late years. We do not think it proper to employ girls. In some districts a few girls are employed by others. We do not think it suitable to the modesty and delicacy of the sex, to be so much associated in labour with boys. The discontinuance of employing girls is all but universal in Weardale, and in all our Company's mines everywhere it is so.

Our Company has a large school at Middleton in Teesdale, and Nenthead in Alston Moor and in other places, where the children are not sufficiently numerous to form a school, they encourage the parents to send them to such schools as are within their reach. In the four winter-months we do not wish to employ children under 14 to work in the mines, and never do so except in some few cases, where there are widows or very large families and it may be considered as an indulgence on account of their circumstances. At Middleton and Nenthead the children and the young people under 20 are required to go to the Sunday-school, and in other places where the Company has not schools the children are encouraged to go to Sunday-schools within their reach, and generally do so.

The Company employs a medical man in every district, at a salary greater or less according to the population employed. All persons employed by the Company and their families dependent upon them, have the benefit of advice and medicine without any expense to them. We have a fund amongst the men of all the districts, the income of which is employed in giving pecuniary relief in sickness and old age. It is all one fund, although a separate account of the receipts and disbursements is kept in each district. The Company in some places has cottages, and small portions of land cultivated as gardens, which are let at very moderate rent to the more deserving workmen.

There are many schools in Weardale built and partly endowed by the late Bishop Barrington, and the incomes of the masters and mistresses are partly made up by subscriptions of neighbouring gentlemen, and by a fee of 1s. 6d. a quarter from each of the scholars.

There are three libraries at Weardale. One of them at Westgate was established 52 years ago; that at

Stanhope was established in 1819; and the third was established at Wears Head two years ago. The late Bishop Barrington gave £50 in his lifetime to the libraries. At Stanhope the entrance-money is 1s. and the subscription is 1s. per quarter. About half a dozen of the miners are subscribers but the members at Westgate and Wears Head are principally miners. There has been a book-club in Stanhope with about 60 members, many of them miners. At the end of five years the books were divided, and another club has been formed also for five years. Our men have a great deal of leisure and when disposed to employ it well they may acquire a great deal of information and many of them do so. There are two friendly societies in Stanhope, besides a club of Odd Fellows, and a tent of Rechabites with 60 members. As a general rule throughout the whole dales, the people are temperate and sober, with no remarkable exception. There is a marked change for the better in the men of Weardale in the last 20 years. Much benefit has been derived by the Company's men in the several districts by the exertions of Robert Stagg, Esq., the superintendent of the Company.

#### **No.4 Robert Walton Bainbridge.**

I am law agent and general mining agent to the London Lead Company, residing at Middleton-in-Teesdale, in the county of Durham. Our men are allowed 10s. a-week for subsistence, and are paid the balance coming to them about Christmas, and average 12s. to 15s. a-week.

We have medical men employed and paid by the Company, and medical attendance and medicine are afforded to the workmen and their families without charge. This includes accouchements as well.

We have a large school here for boys and girls, for which a master and mistress are engaged and paid by the Company. The education includes reading, writing, and arithmetic and the children are also taught a knowledge of geography, natural history, and other branches of knowledge calculated to expand their minds and give them a taste for reading.

The girls are taught sewing and knitting. The parents are required to send their children from 6 years of age until 11 throughout the year; and in the winter, when the ore-washing operations are not carried on, the boys must come till 14. We allow children to attend under six, if the parents choose to send them.

We have a library for the use of the workmen and their families; and they are allowed to take the books home to read them gratuitously. There is also a library appropriated to the use of the Governor and Company's workmen at Nenthead in Alston Moor, and at Dufton in Westmoreland.

The children are all required to attend the Sunday-school, until they are able to pass a Bible examination. They are also required to attend some place of worship twice every Sabbath. The books are found by the Company, both for the day-school and Sunday-schools.

We have a person at each place of worship who gives tickets to the children who attend and they are delivered to us the following Sunday at the Sunday-school and we keep an account.

In the London Lead Company's schools are used '*The instructor, or Progressive Lessons in General Knowledge,*' published by the Society for promoting Christian Knowledge; and in the week-day schools as well as in the Sunday schools religious instruction is given through the medium of the Scriptures, which the children are taught to read, and in which they are daily examined, so as to lead them to a better comprehension thereof. They also commit to memory Catechisms containing an explanation of the doctrines in which all Christians are agreed, but carefully excluding everything of a sectarian or party character. They also undergo frequent catechetical examinations at the week-day schools. When a Sunday-school scholar is able to pass the Bible examination, and is consequently liberated from further school attendance, a donation of a Bible is made to the scholar by the Company as a reward for his attention. The choice of the place of religious worship at which the children attend on the Sabbath, is left to their parents, and there is no limitation as to sect. The Company have at Middleton and Nenthead some cottages with gardens attached, which are let at a low rental to some of the most meritorious workmen.

We have a benefit club, of which all persons of 18 years and upwards must become members.

Bastardy is punished by exclusion from the service of the Company. Drunkenness is punished in the same way and so also is fighting, and any other gross irregularity forbidden by the rules of the Company. For minor offences we impose a fine, generally of a pound, which we place to the benefit of the workmen's relief fund.

We never stop any part of men's subsistence money, or balance coming to them at Christmas, on



account of any application from tradesmen, as we wish to discourage a system of credit.

We have encouraged persons to set up ready-money shops, and they are able to sell their goods at a more moderate rate.

We never transact business with the men at a public-house. We prohibit our men from frequenting public-houses.

In general I may state, that we find these rules to produce great good, and our workmen, as a body, are steady, orderly, industrious, good members of society.

We never allow any of our agents, who superintend the labour of the men, to keep shops of any description, or to engage in any description of trade. None of our men are allowed to keep beer-shops. The workmen, therefore, have the full disposal of their own money without any influence, direct or indirect.

### **No.5 John Robinson.**

I am agent of the Derwent Mine Company. The works are on the River Derwent and the mines penetrate into the hills on each side. About 36 years ago, when I came to this place, there were only eight people, the former lessees having almost discontinued working. There were, only very lately, about 440 people at work in the mines, and engaged in the works above ground. The parish is Hunstonworth, which has a population of from 500, to 600. We have a workhouse in the parish, but no paupers to put into it. Some have out-door relief. The parish is 10 miles long and 3 broad and there is not a public-house in it, and not any exciseable liquor sold in it. Some of our work people live in the Blanchland parish. We have men from Stanhope and Allendale, 10 miles off. They fetch a wallet or bag of victuals on Monday morning and the miners go home on Friday afternoon and the washers on Saturday at noon. The miners work over-time, so as to get done all the turns by the Friday. The men find their candles, and powder, and tools; and they are paid by the bing for what lead they get, the bing being 64 stone of 14lbs. each, or 8cwt.

We reckon and pay every quarter, and in the mean time advance for subsistence 30s. per man every month and the balance being paid quarterly. Many of the men who get 30s. a month get into our debt by the quarter's end; but take the average, a man's earnings will be only 9s. or 10s. a-week. Some are more fortunate, and get much more, by falling in with rich ores. When the men work at dead work they are paid by the fathom, and on the average, at such work, get 12s. a-week. They are good picked men, and relieve each other some working at night, in order that we may get on. The men hire the boys. Often they are the sons of the men themselves. The boys work till 18 years of age at daily wages. A boy begins to work in the mine at 11 or 12, (we think 12 little enough age,) and gets about 4s. 6d. a-week, or 9d. a-day and gradually advances in wages to 10d. or 1s. a-day till 18. At 18, if he be a good hand, he is thought fit to be a partner with the other men. The usual time is eight hours a-day. The boys shovel the rubbish out of the way. An active boy if the groove be easy to work, may turn a drill and such like light work. The turning the drill is the chief work, as it is chiefly by blasting that everything is done.

When a miner comes to 55 he is an exhausted man. At 50, or 55, he is able to give his judgement and to drill, but is unfit for hard work. A man by inhaling the powder-smoke and effluvia of the mine injures his lungs. There is the perspiration off the men as well which hurts them. There is a great quantity of sulphur in the spar, and the miner inhales it. There is arsenic combined in the stuff.

A smelter can stand longer than a groover. By roasting the ore a great deal of the pernicious effluvia is driven off, and the smelters do not suffer as they formerly did; besides, we think the roasting an improvement to the smelting. The roasting takes place in a reverbratory furnace. The ore is roasted to ignition, that is, until it is ready to run, but stops short of running. The roasting takes, per charge, three hours. The roasters are paid by the bing and they stand long shifts 12 or 14 hour, and they work three days. They sleep in barracks close to the place. It is disagreeable work, and it is thought good that the men should have long time to be absent, for the benefit of their health. They work at what they like at home, either in gardens or in any jobs which they may get. The roasters and smelters get about 12s. a-week.

Many of our men will go to be coal-miners, and after a while will come back; but a coal miner is not able to do the work of a groover, not being skilled in the work. The tools are quite different.

To save the surface of the land from injury, we carry from the smelting hearths a tunnel arched over

a mile long, and let the smoke up by a chimney. At the end of the year we clean the chimney, and smelt the matter obtained, called fume; and get from this a great quality of lead, sufficient to remunerate for the expense of making the tunnel and yield a profit besides. Mr. Beaumont is now making a chimney in Allendale three miles long. It is known that he must make many thousand pounds a-year by his chimneys. We think of lengthening our chimney. The farthest smoke we find is the richest in lead and we expect that by lengthening our chimneys we shall derive more advantage.

To work these mines we are under the necessity of having a great deal of machinery. We have three steam-engines, principally for drawing and crushing the work for washing. Two flood or pressure engines are used for pumping and work day and night, with less attention far than the steam-engines and they consume no fire, only water; they are called hydraulic flood engines. We have water-wheels for various purposes, one 50 feet diameter pumping-wheel, and one 44 feet pumping-wheel. We have two smelting-houses, a crushing-wheel 20 feet diameter and 2 drawing-machine wheels, to draw out the ore from the mine from the different shafts. At Deborah's level we go in 600 yards east and upwards of a mile west. The ventilation of our mines is from one drift into another. We have only to fear choke-damp. When the mercury falls very low the men cannot go to work but when the mercury rises the foul air goes off. We might sink shafts, but to get through 150 fathoms would be a heavy expense. We have too many openings to be able to regulate the air as in the coal-pits. We must go up and down and pursue the ore wherever we can find it. This statement is upon Ramshaw's and Jefferies' mines.

### **No.6 Jacob Crawhall.**

I am now 46; I went to be a lead-miner at 20 years of age, but many regularly go much earlier, at 9 or 10, and are employed to wash the ore. Some go into the mines to break the deads, that is, stone not containing metal and that is thrown back; they assist to load the waggons or barrows. There are none employed in sweeping the roads; the roads are not encumbered with dust as in the coal-mines. We drive levels seven feet high and four feet broad, so that the horses can go with the waggons and fetch the lead ore out. Some levels go in a mile, but very rare; some half a mile, some a quarter of a mile; some veins are perpendicular, some are half perpendicular; sometimes the vein flats out five or six fathoms horizontally; sometimes the veins are six inches or eight inches in wideness, some five or six fathoms.

In some mines there is not much occasion for gunpowder, that is when the vein is soft; in other mines they use a great deal of gunpowder. The miners bore a hole nine inches or a foot, sometimes 18 inches or two feet but not very often two feet; 18 inches is a regular fair hole; then the miners charge the hole with powder; the powder is in a cartridge and the hole may be charged whether horizontal or perpendicular; it is like charging a gun; there is a pricker put in, then the hole is filled with plate, which is a sort of soft black stone; then they draw the pricker; then a squib is filled with gunpowder and inserted in the place of the pricker; then a match is applied and attached to the squib by a piece of clay; then the match is lighted, and the men get away from it as fast as they can, to be out of the way of danger, before the powder explode. Sand is sometimes used when plate cannot be got, but plate is much better than sand. Accidents sometimes happen, but not very often if people be careful, but accidents will happen by the powder going off too soon. Sometimes when we think it is not going to go off we come up to it, and sometimes we find the match gone out, and sometimes it will then explode but that is very rare. Sometimes when we are charging it with plate, we strike fire out of the stone; it is not always pure limestone, but other kinds of stone; the vein will go through all the strata of the stone, so that the holes may be made in many other strata besides limestone. When the sill is very fiery, we sometimes use prickers made of copper. Some places are not so very dangerous; not all alike.

When we can enter the mine by levels, we prefer doing so rather than sinking shafts; and it is less expense to bring out the ore by the level than to hoist it up the shaft by the whimsey. The water also runs off by the level and it is not necessary to pump it up. Horse-power is much used, and when water can be got it is used to drive a water-wheel; it is cheaper than horses. Steam-engines are very seldom used, as we are so far from the coal.

Sometimes there is foul air sets into the mine; sometimes when we are driving far from the air-course and are obliged to do it, the air comes in, which puts the candle out and we are obliged to

leave. Not many are suffocated by it, only very few.

It is not proper to stop after the candle goes out. Sometimes we must hang the candle half-perpendicular, that the grease may flow down to the flame of the candle, and burn in spite of the foul air. It is seldom necessary to do this, but perhaps it may be a place in which this must be done.

We never have any air which explodes we have only the heavy foul air, the damp. We have most foul air when the weather is dull and the clouds hang low; in clear dry weather it is much better. When the foul air is breathed, it breaks a person's wind. It is very seldom that men stop in so long as to fall down and need to be carried out.

In mines where there is bad air the boys are of little use and cannot stand it, and it is thought best not to have them.

The miners here consider the lead-mines much safer than the coal-mines. There are miners up to 60 years of age, and fresh men too; these are men who, happily for them, have had an extraordinary constitution and have not been in mines where there was much bad air. We consider that the stone-dust gets into the men's lungs, and a man does not get shut of it and that is the cause of some men getting hurt at an early age. I have known men of 25 and 30 cut in their wind; but it is very rare at 25; but at 40 it is not uncommon.

Sometimes the miners are paid by the fathom for cutting the stone out of the mine, sometimes they are paid by the bing of ore after it is cleaned. A bing is 64 stone, of 14lbs. each. Sometimes, if they are lucky, a great deal of money is got, when they are paid by the bing; sometimes it happened so. There is very little drinking here: it is owing in part to poverty, and bread is high. Very little falls to the miners.

## **No.7 William Walton.**

I went at 11 years of age to wash the lead ore; I am now 41. At that time crushing-mills were not so much in use as now and boys broke the stone to separate the ore with buckers as we call them. Buckers are not much in use now except in small concerns. I washed the ore to get rid of the crushed stone before the ore was put to be roasted. I went at seven in the morning and worked till six in the evening and had an hour for dinner; such is the rule in this neighbourhood. It is hardish work, but not destructive, and a boy who can stand that work is thought fit for any boy's work. It did not bring on any disease. When I was 11 I had 8d. a day and had six day's work a-week but we were allowed to leave off at about four on Saturday, such is the rule still. About 14 years of age I went into the mine for two washing the ore; in winter it is impractic cold so the custom is to accumulate ore in winter and wash in summer. Sometimes in fresh weather in winter ore is washed, but not in frosty weather. At 14, when I went into the mine, I had 1s. a-day. It is usual to advance the wages a penny a-day for every year of a young miner's age, till about 18 years of age; after that, according to size and strength, perhaps sometimes not before 20 or 21, a young man is put into the bargain, that is, he works along with other men, and they all work by the piece, and he gets his share of the wages along with the others. The wages are much lower than in the coal-mines. We begin at seven in the morning and leave off at three; there is no regular time for leaving off to meals, but a man can get time to eat his victuals. After three we go home to dinner; some have two miles to go and some three. We take off to our work, hat, neckcloth, and coat, and when it is wet we take off waistcoat and shirt, and have them dry to put on when we leave off to go home. We have not a hovel on the bank, as in some of the mining districts.

In general the work is destructive of health; people are in general of short life. If a miner has begun at an early age, he has fallen off from regular work at 40 years of age; he is then put to some easier place of work by himself, where he is not confined to work with regular strong men; he, of course, gets less wages. There are some who work in the mines after 50, but there are more who are not able at 50 to go to work in the mines. After a man is done, he is not competent to go to any other work. The mining is not hard work, but it is destructive; a man's health is destroyed by the foul air which arises in the mine, also by the reek of the powder which gets into his lungs. After firing a shot the miner may have to take his waistcoat and drive away the reek before he can sit down to work. The effect does not in general take place for a few years, but when a miner gets to 30 years of age he begins to feel his breathing affected. In some places, when a heading is carried forward, there is so much bad air that the candle will not burn when held straight up, but must be hung slanting downwards. There are machines for forcing air like fanners, and also for pumping air, and

also water-blast, sent down a shaft to improve the air; but these means never produce very good air. We never employ fire to cause a current. In some mines, where the ore is very rich the men have suffered much from the air; a moisture arises from the workings; the smell is not very bad, but it hurts the health of the men. Some men who work by the piece go on for years and perhaps do not average above 7s. 6d. a-week, but they may happen to fall in with rich ore, and get a great deal of money. Altogether we think the farmers' men as well off as to money as the miners, but they are more confined.

The greater part of the children now learn to read and write. We have a national school as Stanhope, and there are Sunday-schools.

In the winter season we have two night-schools. In general the men are temperate; there are exceptions; the district is much reformed; formerly the people were much intemperate. The wages of the miners are not so high as formerly, and the people are more enlightened. The sobriety has put an end to man-fighting, and we have no bull-baiting, badger-baiting, or fighting of dogs or cocks. There is very little swearing now.

The mines are worked on a royalty and the men are all employed and paid by the masters. The employers and the men live on good terms with each other.

The boys in the mine remove the stone which has no metal in it; they load the carriages also they load the kibbles which are drawn up the shafts, and when not otherwise engaged a man will get a boy to strike with the hammer, whilst the man guides the jumper which bores the holes. The boys who go into the mines get their work done in eight hours, and that suits them well.

When the men are affected in the lungs the medical men cannot cure them; they give them medicine in summer which gives them a little relief, but cannot cure them if they have once been thoroughly affected. Many men spit as black as your hat; we attribute it to working in powder-reek and stone-dust; that form of disease is very common. Men are obliged to keep on working in the mines as long they can, because there is no other employment for them; they must continue there or leave the country. There are three sets of men and boys to work in the mines in the 24 hours, eight hours each; they shift every Monday, so that it regularly comes round to each set to work at different times. In some very bad mines there are four sets, of six hours each; the men cannot stand the foul air longer than that time.

### No.8 Joseph Longstaff.

I am 44 years of age, and I have been a miner all my life. I consider that most of the miners are cut off between 40 and 50; few are good for anything after 50. Some have better places to work in than others. Many have only 30s. a-month, and have nothing falling in at the year's end; it is quite a lottery sort of a business. Some have 35s. a-month, and the men employed by the Governor and Company, called the Lead Company, have 40s. a-month for subsistence.

Expenses of a man, his wife, and two children not able to earn anything:-

	s.	d.
Bread, 2 stones, 28lbs.	4	0
Potatoes, 1 peck	0	6
Bacon, 2lbs.	1	4
Coffee, 2 oz.	0	0
Sugar, 1 lb.	0	8
Milk	0	7
Butter, half pound	0	6
Taxes, 6d. a-time, five times a-year	0	0.75
Rent of cottage and garden	1	6
	9	1.75

To pay for clothes and shoes it is necessary for a miner to stint himself of some of those things, or to substitute a cheaper article for the more expensive. The Lead Company supplies medical aid if required, but no other masters do it for their people. Many men have no more than the subsistence, though sometimes men have better success.

A great many miners have oatmeal crowdy to breakfast, which is cheaper than bread. Men who have no cow have no milk to the crowdy, they have only a bit of sugar or a bit of butter.

There is not much beer drunk now by the miners; the temperance societies have made a great change. A miner in general does not eat so much as a man working in the open air; the foul air takes away the appetite. The men in the coal-pits are seldom cut off in their wind like the miners; the wind of a miner is the first thing that goes. The masters could improve the ventilation very much, only it would put them to expense; they often could sink shafts down from the air to the level, but shafts cost a great deal of money. The levels often might be made so as to allow the horse and waggon to go farther on, nearer to where the men work, and thereby save the laborious and fatiguing work of carrying the ore in harrows to the horse; the miners have to do this work themselves, and this prevents getting so much done of what is properly the miners' work, and keeps down their gains. Sometimes the men have to pull the ore by ropes up sumps and that takes up their time. This severe laborious work injures men much more than the regular work. Fanners are employed in some places in the mines to throw forward air into parts where it is impossible to work without this being done; but wherever the part is such that the men can possibly work without fanners they are not used. The fanners employ boys, and that brings expense on the masters. A level is usually opened into the hill from the air, and afterwards, when it has penetrated a very long way, a shaft is sunk and another level is made below the first, which has no opening into the air but only into the top level; a third level may be made lower down than the second, and having no other opening except in the level above.

The distance of the second level below the first may, on an average, be taken at 20 fathoms, 30 or 120 feet, and the third level may be an equal distance below the second level. I have known some mines in which were levels 90 fathoms below the first level, and no other means of getting but from the first level. The deeper men work, and the farther distance they penetrate, the worse the air is. The mines are cleared of water by the water-engine carrying the water up to the top level. The lodging-shops of the miners are most destructive to the health; the men come there in their working clothes; far too many sleep in one apartment; the place is quite stifling, and the smell is very bad; one set of men succeeds to another in the occupation of the beds. The masters find the firing and the tea-kettle, and some small things, but there is often a very scanty supply, and the men lose much time in consequence in preparing their victuals. It is common enough for three men to lay in one bed, but the general way is two.

I work at the mine Hare-hope-gill, three miles and a half off; I have to walk there and back in addition to my work. We have to descend a shaft by ladders from one stage to another; I have to go down near fifty fathoms by about twelve ladders altogether. There are other shafts not so deep, and where we go down to a level, and go forward a certain distance and then go down again.

I have never heard of any place built on purpose for the shelter of the people and the children employed in washing the ore, and there are many washings near which is no building whatever; hence the men and children may become wet early in the day, and may work all day in wet clothes. There is not infrequently a box, in which a clerk of the Company sits, and is protected from the weather. The work-people generally live at a distance and have, in addition to the work, the time of going and coming, so that they are a long time altogether on their legs.

The widows of the miners are not nearly so liberally treated as the widows in the coal-districts some individuals may assist widows, but it is not the rule; there are many widows, and some left with young families. Men working under the great companies have their work more regular. Many miners have become teetotallers, and are much better for it. We have no tommy-shops in this part of the country, and the workpeople lay out their money where ever they please.

## **No.9 John Emerson.**

I went to wash the lead-ore at 15; we usually worked from seven to six, but occasionally we were interrupted in summer by drought, and then when rain came and we obtained water we would work

extra hours after our day's work, perhaps till nine; sometimes in such cases we came early in the morning; such things are not so usual now; they manage not to need to do this now. In some parts they have a mill-dam, but seldom more than one day's water in it; they might make the dams larger. A boy of 15 or 16 now gets only 10d. or 1s. a-day. I had 7s. 6d. a-week when I began, and after half a year they raised me to 9s. a-week; but the London Company was then in a flourishing state with their mines; this was 16 years ago. I have known when a young man working in the mines only has got 1s. a-day; that was 10 years ago. Many went down to the coal district and got 3s. a-day; some of them remain there, and some have returned. I went down myself but my parents entreated me to return, and my heart softened and I came back. My brother was getting only 7s. 6d. a-week about three years last spring, and went to the coal-pits and would average 50s. a-fortnight; we persuaded him to return; we had had advice that he was hurting his health and he came back again; he is now working at the limestone quarries, and is getting 15s. a-week. There is now and then a chance in the lead-mines, and a man may get a great deal of money, but very few do so, and it is altogether a poor trade. We can work at the lead-mines with less food, and food of inferior sort from what is required in the coal-mines; it is canny work rather than hard; our mines do not excite an appetite like the coal-mines.

I kept at washing till I was 20, and I was working at 10s. a-week; I went then into the mines, and have got 7s. 6d. a-week, and when the lead turned out well I have got as much as 18s. a-week. The houses of the miners in Weardale are not furnished at all to compare with the furniture of the houses of the coal-miners; some lead-miners may have such furniture, but very few. We do not eat so good victuals, nor near so much, nor do we drink so much beer, because we cannot afford to do those things.

The miner's breakfast is usually crowdie of oatmeal. He takes a bait with him to the mine, bread, perhaps a little bacon, sometimes a little coffee, or some milk; he takes his bait about 11 or 12; he comes home at four or five, and gets a few potatoes and a bit of salt bacon; some take a little supper, and some not; he is in bed soon after nine, and rises between five and six.

The young boys live in the same way and keep the same hours; boys have a better appetite than the men, and take crowdie twice a-day; they may get a little milk or beer to their crowdie; the miners have very little fresh meat; there is very little beer drunk; some are heavy drinkers, but the greater part seldom have any.

The London Company, in 1839 and 1840, imported a great deal of rye-corn, and had it ground and sold to the workpeople. The bread did not agree with many, and those who could possibly do without it gave it to the pigs; the medical men disapproved of it as food.

I wrought from four to five years in the limestone quarries, and am now working in the mines. Accidents are not common. Last week a young man was killed in Derwent by stone, falling on him; he did not die on the spot, but within a week after. It is usual to hold an inquest if a death take place immediately, but if the man survive a few days after the accident it is not usual. About eight or ten years ago a man fell down and died, and it was thought to be by the damp. Accidents of broken limbs occasionally occur. There are far more widows than there are men who have survived their wives.

## **No.10 Joseph Fleming.**

I am 14; I went to washing at 11. I am at the Stanhope Burn Works; I get 10d. a-day. We can keep our feet dry; we wear thick clogs. In the winter months I go into the mine many boys go into the mine in winter. I strike with a hammer, and bring down the mine; washing is easier. I get up at six in the morning, and take some coffee and bread; seldom anything to the bread. I go to the mine and am ready to work at seven. I have a little white cake, and some coffee in a bottle, for bait at 11 or 12 o'clock; we sit an hour to bait; after bait we work till eight hours' work are done. I come home and put on other clothes; I wash my face and neck; on Saturdays I wash down to my navel; after washing we have supper a few potatoes and a bit of mutton, whiles bacon; I go to bed at nine; I say the Lord's Prayer as soon as I get into bed; I do not say it in the morning; I get up at six.

I can read and write; I learned at the school of St. John's Chapel, in Weardale. I never read any book but the Bible; I have read the 'Newcastle Chronicle' I often read it I can play at trap-ball and marbles, and at cricket, and at throwing the sticking-knife; I fish in the river sometimes.

### **No.11 John Rain.**

I am 18, just turned last June. I have been working as a miner three-quarters of a year in Harehope-gill Mine. It is hard work for all the money which we get; we have 35s. on the first Friday in every month, and we reckon at the end of the year, and if there be any more coming to us we get it and if it be the other way they put it down in the book against us and if we should have better success another year they deduct it from us. Our mine is not dangerous, as it is a very hard rock, but it is laborious to work.

There are about 30 men in our mine, but very few boys. There is so much water comes down that some of the men have clog-boots; such as have not clog-boots must get into the waggon and ride in it up to the works. The water is carried out from the level by an engine called the water-engine. I am not aware of any difference of the mine between summer and winter, but when it is wet and dull the air is bad. We have a level below the level by which we enter, but it does not come to day. Some days the air comes well into the lower level, some days it does not and what between the powder-reek, and the want of fresh air, we have sometimes great difficulty of breathing. There are four of us in our partnership, and we fire off six or eight shots a-day.

### **No.12 Stephen Collingwood**

I am 15. I work at washing lead-ore. I come at seven and leave at six, and have an hour for dinner. I get 5s. a-week: they pay us 4s. on account and reckon at the end of the year. I like the work middling, not very well; it is cold work, and the wages are low. We often catch cold; very often it does not hurt us much.

I can read, and write, and cipher. I have read the Bible, English Reader, History of England, and nothing else. I have never heard of Manchester, Liverpool, or Dublin. The Cheviot Hills are on the borders of Scotland. We have one Scotchman amongst us. I have seen Irishmen; they come from Ireland. I have heard of Birmingham; I have heard of London. I can say the Lord's Prayer; I have said it different times lately; I do not say it every night and morning; I can say the Creed and the Ten Commandments, and the Catechism; I read them sometimes.

The boys play are marbles and jack-ball; we strike it against the wall; we play at cricket and football. I often go fishing in the river and catch trout; I never go bird-nesting. I go to church on Sundays, sometimes twice I read a little after church-time. On Saturdays we get up at four and begin work at five, and leave off at one; we dine at 10 on that day; take only 20 minutes to it and then go to work; on other days we dine at 12; we leave off at six and come home and take supper at seven. We sometimes change our dress after we come home, and put on dry clothes. We have wooden soles to our shoes to protect our feet from wet, and iron about the heels, and iron about the sides, to make them strong.

The last two winters I have been into the mines. We start at eight, and leave off at four. I like it better than washing in cold days; in summer-time washing is better. The mine is warm. There are no mice in the mines that I know, but there are rats; no other animal. It is warm, but sometimes very bad for air we can hardly breathe; they put pipes, and water comes down and great air comes up out of the water; they have a thing which they call the machine [fanner]. Very few work till 50 years of age.

### **No.13 George Sanderson.**

I am 15 years of age. I work at washing the lead-ore in summer, and in the mines in winter. I get 4s., sometimes 5s., at washing ore. I get about the same in the mines. I have heard the evidence of Stephen Collingwood about the mines and the works and it is all correct.

I can read, write, and cipher. I have read the Bible and the History of England and nothing else. I go to church generally once a-day, in the morning; in the afternoon I go to the Methodist meeting. I can say the Lord's Prayer; I said it a month or five weeks ago. I never say it when I go to bed. On Sunday evening I read sometimes.

I intend to be a miner. I should not like to be a farming man. I should not like to go to the coal-mines.

#### **No.14 Whitfield Eddy.**

I work in the mine called Hare-hope-gill, about three miles from Stanhope. I go to it every morning and return at night; I have worked there a year and a half; before that I worked in Cumberland. In this mine we drill holes, and fire off with gunpowder. The metal is drawn with a roll in kibbles and put into a cart and the horse draws to the bank out of the level. We work from six to two. we have not any stoppage, except to eat a bit or two, and work to get done as quickly as we can. The mine is in a poor state, and the ore is not such as to yield a good profit. We are at the expense of bringing out the ore and afterwards we have to defray the expense of washing; the masters pay 50s. a bing, and they cannot well give more.

When the miners are paid by the companies by the fathom, the master takes all the work and pays for the washing and the men have nothing to do with it.

I have spent half my time in washing. I liked it very well. The boys like it well in good weather. When I washed in Yorkshire we worked from eight to five, nine hours a-day. It was Swaledale.

#### **No.15 Ralph Elliott.**

I am 19. I went into the lead trade to wash ore at 10 years. There are very few under 10 and none under nine. I worked from seven to six and had an hour for dinner. There is a shed in case it rains and there is a fire in it; there is a shed at all the London Company's works but it is not usual at other places. We work, if possible, notwithstanding rain, but if it rain very much we go home; we change our clothes when wet.

I now drive the horse in the Stanhope Burn Pit and have done so two years and a half I get 1s. 7d. a-day. I like it very well, but would prefer a little more money. I work under an undertaker. I can read and write. I go to church sometimes. Sometimes I sit at home and read the Bible. I never read any other book. I can say the Lord's Prayer and Creed. I say the Lord's Prayer sometimes, but not regularly.

#### **No.16 Joseph Collingwood.**

I am near 55 years of age. I began to work at washing at different places at nine years of age, and got about 3s. a-week. I went to place, and at 17 I went into mines and got, one week with another, about 10s. I worked along with my brother and we had three guineas per bing, and my brother got 1s. and I got 9d. and at that rate we divided what we gained.

After some years I left my brother and took to washing and hired boys under me, and was paid by the bing. The people who employ boys get more money than the men. The company after some years put us all upon wages and employed the boys themselves. The first year I had 16s. per week, the next year I had 15s. a-week, and the following year I had only 14s. the next year 16s., and then I had 17s., and now I have 18s., all at the same employment of washing. I have served nearly 37 years. Mr. Masterman is governor of our Company. We come at seven and leave at six and take an hour at dinner. We have much machinery in the washing of lead. It was not so when I first began. We usually leave off washing about the latter end of November and begin again sometimes in the end of February, sometimes in the middle of March, sometimes not until April, according as there is much to wash. The boys stand it very well. When the winter comes I go into the mines and take eight, or ten, or a dozen boys with me. I am paid so much a bing or so much a fathom. The strongest boys bore holes and charge them with gunpowder and the others pick out the rubbish and shovel the metal away. Some like it very well, some do not like it, and do not like to breathe in the mine. When I go back to washing they go back to it with me.

Most of the children here are taught to read and write; if any do not read and write he must belong to the farmers. We have night-schools and a national school; very few miners' children do not receive education. The national school meets on Sundays.



Many of the miners are teetotallers. They stand the work as well as other men and I believe better. They have not their bodies disordered. There is a savings' bank but very few miners belong to it. We have an Odd Fellows' club, but not many miners belong to it. We have a society of Rechabites, to which many miners belong. They pay 1s. 4d. a-month, and get 10s. a-week when sick. They have an annual procession, with colours and music. On Good Friday 411 met, and had a sermon preached to them, and took tea.

**No.17 William Willis.**

I am a miner, working under the London Lead Company. We are allowed £2 a-month, and settle once a-year and I consider that we earn on the average 12s. or 14s. a-week. We are paid by the fathom, and the price per cubic fathom, according to the nature of the work, is about £1.4s. or £11. 5s. it has been as high as £11. 10s.

I went to work at 10 years of age, and washed. I worked along with my father. I worked in the summer season until I was a man; I then went into the mines. My father had an accident by a stone falling from the roof and died in five weeks after. Such accidents do not often happen. I do not recollect of any being choked by damp; a great many work where there is very little air. There is sometimes a shaft sunk from the air into the level. We sometimes make a double drift, and cut from one to the other. We suffer from the powder reek and the dust. I have known of three or four men burnt by explosions, but I never knew of a man being killed. Many miners keep on working to 50, some to 55, but not one miner in 50 work to 60 years of age. They are obliged to leave by difficulty of breathing.

**No.18 John Appleby.**

I am turned 14. I went to wash ore at nine. This summer I have gone to work in the Buckley Dale Mine. I get up at five and am ready to begin work at six; we bait at 10 or 11 and have barely time allowed to eat it. We then work till three, which makes up a day's work. We sometimes work overtime till four, sometimes five, and sometimes six. That is very fatiguing work. I strike down mine with the hammer and sometimes drill holes and put in the gunpowder, but I am not allowed to put in the pricker, nor to apply the match; I could do these things, but the men will not trust any person so young. I intend to be a miner. I do not like it very well, but I cannot get off being one, as there is nothing else to do. I feel able to do the work, but it is very laborious. In our pit there are only three or four men and myself. I get 6s. a-week. Lads get admitted as partners sometimes at 16 or 17, but some not till 20.

We enter our mine by a level and a horse draws the waggon till we come to a rise, and he cannot go up it. The ore is brought down by the men, and put into the waggon at that place.

I can read and write. I learned at the national school. I do not go to Sunday-school. There I is not one, except at the Methodist chapel and I go to church.

**No.19 Hall Robinson.**

I am 15. I went at nine to wash and got 6d. a-day. I liked it very well. It is cold in winter. I have never been at anything else. I now get 1s. a-day. I can read and write. I do not go to any Sunday-school. There is not one at Stanhope. The national school meets on Sundays but other boys who work during the week do not attend school on Sundays. I regularly go to church in the morning, but I sit at home in the afternoons and sometimes read the Bible. I can say the Lord's Prayer and the Creed and the Ten Commandments. I say the Lord's Prayer on Sundays. In the Sunday afternoons I go out into the fields and pick flowers. I never read anything but the Bible. I have heard of Ireland. It lies west. Scotland lies north. I have seen the Cheviot Hills. I have been to Newcastle, and seen ships. I should like to be a sailor.

**No.20 Joseph Collingwood.**

I am just turned 18; I began to wash ore at nine years of age and have been at it ever since. I now get 1s. a-day. I intend to continue at washing. I like it better than going into the mine; but in winter months, when there is no washing, I am obliged to go into the mine. I consider it very dangerous and the air is very bad. Some men get 2s. a-day at washing ore. The boys are used only middling. The big boys beat the little ones but they seldom do them much harm.

### **No.21 Nicholas Hardy.**

I am a miner, 53 years of age. I went into the mine at 17 and have been at it ever since. I work for the London Lead Company. We begin at eight in the morning and work till four, for five days a-week. The company advances 40s. a-month and we reckon at the end of the year and settle all accounts. There are many men who have nothing to receive, but there are others who have to receive sometimes a considerable sum, as far as £10 or £15. There are some very lucky men who may have to receive £20; some men found to be in debt to the masters and it is entered in the book against them and if the account of the next year should be in their favour the sum which they owe is deducted. Altogether the masters estimate and state that the men, one with another, gain 12s. 6d. a-week, and this is as much as they wish to allow men to earn.

When a miner receives his money at the end of the year he settles his debts, if the money be sufficient, or, as far as it goes; some men will not have any pay to take for 5, 6, or 10 years and I know a man who has not taken any pay for 15 years and he has a wife and seven bairns and as they are girls except a boy who is six years of age, none of them can earn anything. He could not have lived at all but that he had many friends. He never has a new pair of shoes himself but gets sometimes shoes, old or new, from his friends; there are many in a similar situation.

We think in this place that it is very improper that girls should be allowed to work at washing ore. It is worse than Indian slavery. It is not suitable for girls to have to work along with grown boys and to hear what the boys may say to them. The masters keep the boys in order, as far as they possibly can. If a boy swear, he is fined 6d. for it and the men are fined 1s. for the first offence, after the first offence the fine is higher. The masters do all they can to ventilate the mines and we have everything for air and for the comfort of the men which the masters can provide. The agents wish to do everything that is necessary. At the washing-places there are houses under which the boys may take shelter in case of rain and in case it is a day of steady rain there are fleaks under which the people may work and be under shelter and the fleaks are moveable, so that they may be placed in such a way that the wind and rain may not come in them. There are many places in this country in which no protection whatever is provided for the people; these places are at what we call by- mines and do not belong to any large company.

The London Lead Company is the best in this part, and in all the North of England. They do all they can for their men to make them as comfortable as possible. The boys at the washing of ore could not have anything more done for them except more. They begin at 4d. and may rise 1d. a-day every year. In our mines in this part we enter by a level and then, instead of going down, we work up 40 wards. We begin by driving a level in the plate-bed, which is the easiest to work. We then work upwards until we come to a bearing-sill, and follow the vein. We go through many dangers;. Many of the men have their limbs broken and some are killed but we are fortunate in our mines here, and only very few have been killed. I can recollect six killed within the last seven years.

There are some miners who begin to feel the effect of the mine at 27, and at 35 men feel themselves going back fast. There are differences of constitution and some have much better air than others. I have heard men say at 40 and 45 years of age, that they had not any lungs at all. Many men spit black stuff as black as the wine in your glass. I spit it many times myself. It is a regular thing amongst miners.

The children of the miners are in general very healthy. Their constitutions are good, having, with few exceptions, been born before their fathers fell into a state of bad health.

### **Nos.22 and 23 George Armstrong and Thomas Bell.**

We have been present whilst Nicholas Hardy has given his evidence, and we concur in everything

which he has said.

#### **No.24 Joseph Walton.**

I will be 17 on the last day of October. I am a teetotaller. The teetotallers are a canny few in this part. We drink no spirits nor beer, except black beer. The teetotallers strictly observe the rules. There are sometimes teetotaller meetings and many attend and 60 speakers come and address the meeting. There are people in the place who sometimes get drunk.

I work for the company at the High End. We send the ore through the hopper, which lets it into the rollers and it is crushed small. It afterwards goes through sieves into tubs and the hotch and the cuttings come to the top and there is no more in it. They take out the ore out of the tubs into the buddles and wash away the dirt.

I like it middling. One has to stand long hours and only middling wages for it. We are from half-past six to six at night. At our washing-place there is no shelter to which a person can go to be out of the way of the rain. If it rain very hard, we go home. We very often work all day quite wet. We never get any harm by it. We are used to it; it is not agreeable. There is a rule of the Company by which there is a fine for swearing, 6d. for a boy and 1s. for a man. It is not often they swear, very seldom. Some of the masters, who look after our work, swear, and some of them do not. Nobody will tell on the masters. We give over washing in December and are in the mine till March and sometimes a little longer. We keep on washing until the frost come and freeze the water and we do not come out to work till the frost seem to be gone.

I went to the Company's school. I go on Sundays now. I am obliged to go. I afterwards go to the Ranters'. I have joined them and taken the bread and wine of the Lord's Supper.

The men pay to the fund for relief in sickness, but the boys do not. They do not pay till 15 years old. The miners have a medical man to attend them, and give them medicine without any charge to them, being paid by the Company.

If the men get drunk and fight the Company turns them off but the men do not always tell on each other.

In the mines here we enter by a level and after walking a great distance we ascend by ladders to a drift, which has been run forward to the vein and then we work. Sometimes there is another drift above the first drift. There are some mines all a sump. It is much the same as a level, only it does not go forward to the air. Some mines have a great deal of water and it is very wet and uncomfortable. When we have fired off a few shots the place is very bad for air, and sometimes the smoke remains in all day. In some mines it is blown away. It is warm in the mines. Sometimes there are accidents; one was killed last spring. We have a library here from which the miners may take books, and some do it.

#### **No.25 Matthew Dowson.**

I shall be 16 next November. I went to work in the washing at 10 years of age and am still a washer. We come to work at half-past six in the morning and work till six. We have an hour from twelve to one for dinner but we generally take only half an hour and by so doing we obtain overtime, and in consequence are allowed to leave on Saturday at twelve.

I like the washing very well. It is cold sometimes, but we do not mind the cold, but work away. I like rainy days very bad. We have a shop to go into in case of rain and there is a fire in it. I am able to do the work required of me. I am often tired, but after a little rest I feel comfortable.

When I first went to washing I turned the handle of the thing in which they work the stuff, the buddle. I next went to drawing slime. There is a trunk and water comes over it and a boy puts in the slime and we rub it with a colrake, and the water runs through it and washes away all the mud and leaves the lead. I worked a year at this: when I first started I had 4d. a-day, afterwards 5d., then 6d., after that 7d. and now I have 8.5d., a-day. I keep my health very well. I am well used, and have nothing to complain of.

I go to the Company's school on Sundays once a-day. I go sometimes to church and sometimes to meeting. I can read. I have read the Testament and some little books which they have at school. The men and boys are not allowed to swear at the works, but they whiles do it. There is a fine, but it is not often that a man is found out.

I have worked at Shaunbury, and lodged in one of the shops, the lower shop, 21 of us slept in the same room. There were 12 bedsteads. There was a bad smell.

I went on Monday morning, and took with me bread, white and brown, potatoes, bacon collop half a pound, coffee an ounce and sugar half a pound and that supplied me till Saturday at twelve. I took with me on Monday three pints of milk and we kept it up the level a little to preserve it sweet. We worked 12 hours a-day, being over-time to make up for getting away on Saturday. I worked at Shaunbury at hotching and drawing slimes and doing German buddles, that is, turning with the hand, and working stuff in. I also drew out stuff at the grinding-mills.

### **No.26 Joseph Walton.**

I am engaged in mining near Alston in Cumberland. Our mines here are not in a flourishing state at present and are not so productive as formerly. The earnings of the men are small. It is the custom to advance 30s. every month and to reckon with the men at the end of the year. The Lead Company advances 40s a-month, which is good for the men at the time but when the men reckon at the end of the year it is usually found that what has been advanced to them comes to as much as what they have earned and they have nothing to receive. It is beneficial for the miner to have to receive a sum of money as he can then provide himself with necessaries, which he would not have been able to save sufficient money for if on weekly wages.

Boys go to assist in washing at from nine to ten. Some few, if unusually strong, may go before that age. They have at first only 4d. or 5d. a-day but are a equally advanced. There are very few boys in the mines under 14.

Our mines are much better ventilated than they were in former years but many are still in a very bad state and might be much improved, but for the heavy expense, which the masters are unwilling to incur. Many men are injured in the lungs before 40. A very large proportion are dead before 50. Some suffer in the lungs much earlier than 40.

There is an abundance of schools at Alston, so that the children in general are well educated. There are Sunday-schools connected with the Established Church and connected with the Wesleyan Methodists, and some connected with other denominations.

In general there is very great sobriety and there are very many teetotallers. The poverty of the people in part contributes towards the increase of the teetotallers. Altogether the morals of the people are as correct as reasonably may be expected.

The mode of working the mines and the general condition of the people, are nearly or altogether the same as in Weardale, indeed, there is little difference between one part of the lead country and another. Some fatal accidents have occurred from damp. The men are very daring and do not take sufficient caution. Many will work in close air, when the candle would go out if it were to stand upwards and they suspend it horizontally between two wires to keep it burning. Almost no corn is grown in this part of the country, and grass answers much better. The miners derive great benefit by holding a few acres and keeping two cows or so to supply them with milk, butter, and cheese.

The London Lead Company has extensive mines in this district but the other mines are chiefly wrought by small partnerships of a few individuals.

### **No.27 John White.**

I am relieving officer and registrar of the parish of Alston, in the county of Cumberland. By the census of this year our population is found to be 3078 males and 2985 females, making together 6063. This is less than the former census in 1831, which was 6858 but I feel certain that there must then have been an error, for at the time when the census was taken, in 1831, a great many miners had left, and gone to Northumberland and Durham, many of whom subsequently returned. The number of inhabited houses is now greater, there being now 1195, whereas in 1831 there were only 1006. The houses uninhabited are now 100 and in 1831 were 115. There must have been an error as to the number of houses as well as of people. We have a great many widows receiving relief, of which I

will furnish you with an account; of whom the greater part are the widows of miners, indeed nearly the whole and having amongst them a considerable number of children.

We generally can get our pauper boys employed by the miners or farmers, but we do not bind them. There has not been one instance of binding since the New Poor Law Act came in force amongst us. We have never given assistance to able-bodied miners.

The means of education in this parish are sufficiency ample for the population. In the town is the grammar-school the master of which must be acquainted with Latin, but he gives a general education. It has a small endowment. The Greenwich Hospital gives an annual sum as well and the pupils pay moderate fees. We have a charity-school supported by subscription, and no charge is made for education. There is a school kept by a master on his own account. The London Lead Company supports a school at Nenthead for boys and for girls, with a master and mistress which is numerously attended. The workmen's children are not charged any fee and only a very small fee is paid by the children of other persons. There is another school at Nenthall, which is chiefly supported by the Greenwich Hospital and Hudgill Burn Mining Company and small fees. There is a small school at Garrigill Gate, supported by endowments and an annual sum from Greenwich Hospital. There is a school at Tynehead, which is partly supported by an annual sum from Greenwich Hospital, and the rest by fees. There is one supported in the same way at Lead Gate. There are also several schools for young children, taught by widows. We have in the town four Sunday-schools, six in the other parts of the parish and they are all exceedingly well attended.

We have no regular police in this parish. We have one constable who continues permanently in office, who is paid for what services he may render, and two constables are chosen every year. Their office for some years has been a sinecure. Our nearest magistrate is about 14 miles distant from us, and we very seldom trouble him and we have to go to Penrith, 20 miles distant, when we have parish business requiring the sanction of two magistrates. There have been no riots for very many years and very few breaches of the law of any sort. Robbery and housebreaking are now never heard of. Our rates are higher than in the agricultural districts. For the last year we have paid 3s. in the £1. for general purposes, and 6d. for building an addition to the workhouse. Our total expenditure for the year ending 25th of March, 1837, was £1824. 0s. 10d. and for the year ending 25th of March, 1841, was £1597. 5s. 3d. for general purposes, and £234 for the building. The illegitimate births for the year, ending on June 30th, 1841, were 24, which was about the usual number. In several instances the parents have since married. There were 18 males receiving relief on the 19th day of August, 1841, of whom 12 were miners, 3 (ages 59, 61, and 75) unable to work, 1 (aged 39) blind from explosion of gunpowder, 1 (aged 31) dumb, 4 on account of sickness, 2 partially disabled and having families, 1 with chronic disease, rheumatism. There were 100 widows receiving relief, of whom 88 were widows of miners, having amongst them 88 children and 12 widows of men not miners, having amongst them 17 children.

## **No.28 Robert Walton.**

I have resided in Alston all my life. I have been engaged in the several institutions for the promotion of knowledge and am the secretary of the Mechanics' Institution; that institution was established in 1837 and our numbers have averaged from 50 to 60. We have had as 65 many as from 70 to 80. We have a library and museum, consisting chiefly of minerals of the country. A great proportion of our members are working miners and many of them take a great interest in it. The books are taken out for reading, and there are three evenings in which they may be changed. The reading-room is also open from five to half-past nine on those three evenings. We occasionally have lectures, sometimes gratuitous, sometimes paid. There is a friendly society at Garrigill Gate, in this parish, consisting of about 500 members. It has existed for a dozen of years at least and has now a fund of £800 and upwards.

We have an Odd Fellows' lodge connected with the Manchester Union, the members are nearly 300. They have the advantages of a benefit society and the regularity and even ceremony, with which the business is conducted, tend to produce habits of order and good behaviour. They have a fund of upwards of £600.

There is another society, called the Lodge of Ancient Druids, which may number about 100 members. They are a friendly society, with certain forms of conducting business peculiar to themselves. The Druid societies are in correspondence with each other.

We have four libraries, of which the books are circulated, in addition to the Mechanics' Institution. The books are well selected for the diffusion of useful and religious knowledge.

We have an agricultural society and an annual cattle-show, in which prizes are distributed for cattle, sheep and pigs produced in the district. Prizes are also distributed, for which cattle from other districts are allowed to compete. The show in last October was considered by judges to be very good, particularly in black-faced sheep.

In this parish we have the church in the town and a chapel of ease at Garrigill Gate belonging to the Established Church. We have also chapels of Dissenters, two of the Independents, six chapels of the Wesleyan Methodists in different parts of the parish, four of the Primitive Methodists or Ranters, also a meeting of Quakers. The places of worship are all well attended and the Sabbath is generally well observed.

To every place of worship, I believe without exception, there is attached a Sunday-school and the great proportion of the children of the parish attend one or other of them. We see the good effect in the behaviour of the children.

The working people spend their wages with great prudence and economy and make the best of their menus. They are generally very orderly and temperate in their habits and the middling and higher classes have much cause to be satisfied with them.

### **No.29 Levi Salkeld.**

I am turned 14. I went to work at 12 to knock, that is, to break the ore small with a bucker. I picked grating, that is, I took away the ore from the stones lying in the grate. I sometimes do that still. I sometimes work in the mine. I wheel the work back out of the drift to the side of the level. It is very clarty and wet. I work sometimes eight, sometimes nine hours. I like washing best, because it is sometimes not wet. When it is very wet weather I go and work in the mine; it is Blaygill Mine. The boys sometimes thumped me when I was washing because I did not behave myself and because I called them by-names and sometimes I did not work hard enough. I had 10d. a-day. I get the same in the mine. I am sometimes tired but very often not.

I attend Sunday-school. I can read and write. The boys are pretty well used and it is not hard work. I never much mind the heavy rain, we are gaily used to it. Sometimes if the rain gives over the clothes will dry on our backs, but if it rain all day they are kept wet. I had rather be kept dry, as it feels rather more comfortable. I intend to be a miner.

### **No.30 William Davidson.**

I am 12. I work at washing. I like it very well. I do not like the wet. It is fatiguing work but I am able to play after it. I play at all kinds of things, as marbles, spelling, bull, football and hiding. When we are washing by stint I get a penny a kibble for knocking and can make 7d. a-day. I can get done whilst working at stint by two or three. I like to go to work. I have lately gone into a mine to push a waggon, to bring out the refuse of former times. When we have got a great quantity out after three days' work we stop to wash it, which will take a long time. I like washing better than pushing the waggon. It is not too hard work.

I cannot read. I never go to school. I was a bad boy and did not learn anything when I went for a quarter of a year to the charity school. I sometimes played the truant.

### **No.31 William Salkeld.**

I am turned 17. I went to wash ore at 11. I began at seven and left off at six. When I boys go at first they are not put to hard work, but to pick grates, that is to pick the ore from I the stone. I next went to hotch, that is, I took the stuff off the sieve after the ore was gone out of it and that was thrown away. That was the whole which I did, except that I sometimes worked at knocking the ore. It was not too hard. I liked it very well. I had 4d. a-day at first when I went and I was raised 2d. every year, so that the third year I had 10d. a-day. Sometimes the rain knocked us off and we were forced to go home but we were paid for what we had wrought. Sometimes we continued on

working in our wet clothes. Working in wet clothes did not hurt me much. some were not so able to bear it as I was. I am now working in the Blaygill Mine. It is wet climbing up to the place of work. We enter the level and go forwards three-quarters of a mile and then we climb up by sticks set across the rise 24 yards and then there is drift which is dry and we put off our wet coat and work without it and sometimes we put off other clothes. It is very warm where we are blasting. We have no watch and do not know when to come away but we come away by guess, when we think we have wrought eight hours.

We carry our dinners with us and take it when we guess it is 12 o'clock. We go in at eight and generally come out between four and five but I have been in as late as seven o'clock in winter, when we had a bit of canny ore. I have been three years at it. We have upwards of 20 men in our pit. I assist in blasting. The master does not trust me with the gunpowder to charge it. I make the squib and master puts it in. I make the match and master fixes it, and we all run away and master lights the end of the match and runs away too, and the shot goes off. We come back and knock all that we can with hammers, wedges and picks. The reek is often disagreeable. We fire sometimes (that is, master and myself) six shots, sometimes seven in a-day but sometimes only four. Some shots are put into holes which have been bored much deeper down than others and therefore there cannot be so many of them. I have never heard but of one man being killed in our mine and that was some years ago. A boy was killed driving waggons a good bit since. I like the mine very well, as you see, Sir; I am forced to it, and have nothing else to take to. The air is sometimes good, sometimes bad. When it is rainy or heavy weather, the reek is very disagreeable.

I get up between five and six o'clock. I have oatmeal pottage to breakfast. I have milk with them. I take with me to the pit milk and brown bread and white bread, the brown bread is made of rye. It is very black but not so black as your hat. It tastes pretty well. Sometimes the bad air takes away the stomach and we cannot eat. I take this all the year round. When we come home we get boiled potatoes and sometimes butter and sometimes a piece of bacon. We have rather a better dinner on Sundays and have some meat to it. I never drink beer, because I cannot get it.

I can read and can write in part, but not perfect. I have read the Bible and Testament and take books from the library of the Church Sunday-school. They are books on purpose for children to take out. Many of the boys take them out. I can say the Lord's Prayer, the Creed, the Commandments and the whole of the Catechism. I go to church once a-day on Sundays and sometimes twice.

Sometimes I feel the stour in my breast. It comes up black, that is, I spit black. We go on with work all the same. It makes me cough when the reek is strong. It is a good thing to be a miner but it is better to be outside in the good air.

### **No.32 John Robinson.**

I was 18 in March last. I have been two years working in Holywell Mine. I am working along with three men and am paid regular wages, 7s. 6d. a-week. I do the same work that the men do but am not in partnership and may not be so for a year or two. I do not like it.

After the first shot goes off we have the reek about us all day. Our mine is badly ventilated. Our master won't do what would make it well ventilated and the men cannot afford to do it.

There are 16 or 18 men and half a dozen or eight lads. We have to washers who come on us to work in our mine in winter. We enter by the level and take a quarter of an hour to walk up to the workings. We begin at seven and work till four. We have just time enough to get our dinner and then go to work again. If we were to sit too long at dinner and master should know it, he might discharge us, and work is so scarce we should not know where to go.

### **No.33 William Whitfield.**

I am 12 years old. I began to wash last summer. I was taken from school. I work from six to six. We work till 12, and then rest an hour for dinner. I go to quarters for dinner. I pay 6d. a-week for lodging, for which I have a bed and they make the meal ready. My brother sleeps with me and he pays 6d. My father lodges in the same place and two brothers. We go there on Monday and bring our victuals and we come home on Saturday at 12 and stop at home until Monday. I work at washing. It is at Nenthead. I get crowdy and milk to breakfast. I get tatoes to dinner and salt,

sometimes butter. I take tea for supper and eat bread with it. I drink beer sometimes. I get a sup when I can I like it.

I like the washing very well. We play when we have any time. I can read but I cannot write. can say the Lord's Prayer and the Creed and the Commandments. I say the Lord's Prayer when I go to bed and when I get up. I go to Sunday-school and to church.

### **No.34 Thomas Davidson.**

I am turned 16. I have been accustomed to wash ore; I like it very well. I have got wet sometimes but we are accustomed to it and do not mind it. If the place were covered it would be much better. We begin at seven and give over at six. We breakfast before we start. We dine at 12 and sit an hour. I get 14d. a-day. We wash in the winter, except it be frost. In frosty weather we cannot wash, it is so cold in water. We middling like it but are forced to put up with it. We cannot fly off in winter. At that season we begin at daylight and leave off at dark. The big boys beat the little ones when they do not behave themselves. It serves them right, when they deserve it. I am sometimes but middling but I stand it pretty well. After the day's work I sometimes play at marbles, spelling the bullet [trap-ball], football, hide-and-seek, sometimes I gang to fish in the river but there is very little got. We sometimes get wet as early as eight o'clock. It would be a vast deal better if we could go under some place during the rain and keep ourselves dry, than stand wet all day. We do not complain of anything else.

### **No.35 Robert Hetherton.**

I am 12. This is the third summer that I have washed ore. I began with picking grates and kept a month at it and then they put me to knocking with the bucker. I am now at hutching. I like it very well. It pays badly. I had 5d. a-day at first and now I have 7d. I work at Bentfield Mine. I come on Monday morning, bringing victuals to last till Saturday at 12. I pay 6d. a-week for lodging and boiling the potatoes. I make my own crowd myself on their fire. I have milk to it. I formerly had butter and sugar to it. I have beer sometimes, about once a-year. I dance in the fair held here in the Autumn, after dark in the evening. I pay nothing for going in, but have to buy beer, a pint of beer for 3d and am allowed to dance as long as I like. Many other washer-boys go in to dance and there are girls who dance with us. I never drink beer but at this time.

### **No.36 John Wallace.**

The washing apparatus of the Roughton-gill Mine was invented by Mr. John Leathart, of Alston, in Cumberland. It was put up last year [1840], and has since been improved and is found to be of great use, not only in facilitating former operations but also in enabling to wash poorer lead than formerly would have paid the expense.

The grand principle is the separating of the different kinds of ores by passing them through plates full of holes of different sizes.

The ore after being brought from the mine is grated, that is to say, certain portions are thrown away which are considered not to contain lead. The large pieces of ore are broken up collected by with hammers and are made to pass through the crushing-mill and the other ore is broken and made to pass through the crushing-mill, in fact all the ore passes through it.

After passing through the mill the ore comes on the separator, which is a broad plate with holes in it of half an inch diameter; what remains on the plate which cannot get through the half-inch holes is sent back to the crushing-mill to be ground again; what passes through the holes is carried by the water down to plate No.2, of which the holes are a quarter of an inch diameter; what remains on plate No.2, and which is too large to pass through the quarter inch diameter holes, is taken to the sieve or the shaking apparatus, where it is shaken, and the small particles called smiddam go through, and the cuttings are thrown out, and the small ore at the bottom is taken to the bingstead.

Plate 3 is an inclined plate, the smiddam goes over, and the sludge goes through. The chat-mill is similar to the chat-mills in other places. The chats come out of the sieves or shaking apparatus and



are ground and come to a plate, No.1, the holes in which are a quarter of an inch in diameter: the rough cannot pass through the holes, and it is taken off, and is sent back into the chat-mill again; what falls through is carried by the water to the surface of plate No.2. Plate No.2 is inclined; the smiddam goes over and the sludge goes through; the smiddam is then put into the shaking apparatus to be again separated in the same manner as in other washing places; the cuttings are taken out and the lead is removed to the bingstead.

### **The Sludge Separator.**

The sludge is carried by water to the surface of plate No.1. The holes are one-eighth of an inch in diameter. The rough sludge is carried off by the water and the small falls through the holes and runs into the sludge-trunks or buddles. The rough goes into another buddle. The rough and the small sludge are treated in the same manner as in other washing places on the old system.

The slime has a special apparatus; it is made by water to pass over a plate, No.1; what comes over this plate is dirt or stones and the lead passes through and is carried to plate No.2, which is inclined. The rough passes over and the small falls through, and is afterwards treated as in the old way. The lead which remains at the high end of the buddle or trunk put into the dolly-tub and the matter at the lower end is put into another separator of exactly the same kind.

The cuttings which come from the sieves are carried by water to a small grate. The stones remain above the grate and are then removed and thrown away. What falls through the grate on to an inclined plate with holes in it. The rough goes over and is put back again to undergo the same operation and the small goes through and is sludge, which is treated as other sludge.

### **No.37 John Walton.**

I have worked at Roughton-gill, washing and inside together, 14 years. There are about 80 men inside. We have two levels into the hill, which enables us to have good ventilation. We have drifts above the levels and shafts below. The air is good. There is no limestone but only rock. We have had only one accident in seven years, and that was a fiery shot and two men were hurt but they recovered. We have no boys only in winter, when some fathers take in their children [the eldest of them]. Partners divide into two sets and they work at different times for the greater convenience. We have had partnerships divided into three sets but not at present. We are not fashed with foul air. In charging the stone round the tamper we use iron drivers and not copper-headed driver as the drivers all are at Greenside. We have none of them. We use the patent fuse in the work, in the dry work we use the ordinary squib. The miners, take them altogether, in Roughton-gill, may average 15s. a-week.

I never resided in the lodging-shops. They are most disagreeable places.

The washing-boys begin to work at eight on Monday morning and work till seven. In the winter they work from the first light in the morning to the last light at night. The usual number of hours is 12, out of which is one hour for dinner. All the washers stop at the lodging shops. The lodging-shops are never washed. The beds and bed-clothes are washed once or twice a-year, being taken home by the men. The master finds the bedsteads and men find the beds and bed-clothes. The lodging-places are close and a great stour in them. The washers on the average, make 20 or 22 days a-month, that is, by deducting the Sunday and such days as they do not work. They lose many days by wet weather. If there be a week or two of soft weather, that is weather without frost, in the winter time, the washers go out to work. Their hands suffer a great deal sometimes. Nothing but hard frost stops them. They often work all day in wet clothes. They often get colds but, on the whole, they keep their healths very well. Sheds might be put up under which most of the work might be done.

### **No.38 William Eddy.**

I have been a washer of ore at Holyfield Mine and Hudgill Burn Mine, in Alston Moor. After the bowse-washers had done their work at the end of the year we continued on till we had washed all the sludge, slime and cuttings. The year's work of the men is reckoned up to Michaelmas and we

washed until we had got all the ore cleaned which had been got out before Michaelmas. When we began again, at Lady-day, we entered on the work of a new account. We have washed till very late in the year. Once it was till after Christmas; after we had once left off we never began again till Lady-day. It was very cold towards the ends of the year, several got cold, many had the hands cut by the cold, the finger-ends, or points of the fingers and the hollow part between the thumb and the first finger. It was cold at the commencement after Lady-day but it grew gradually warm. The washers are liable to be knocked off after that by snow. The trunk or washing department ought all to be covered or done under a shed, on account of the cold and rain and in summer of the heat too. When persons are warm much and then have to wait awhile, they take cold. All the washing department might very easily be covered. It would not be so easy covering the men wheeling away the cuttings to a distance.

I went to work at the mine at Holyfield. We drove a level and went up to three flats. In the upper flat it was exceedingly bad air. Two men worked and one managed the candles. I was one of the three; the two others were taken ill, the doctor said from the bad air. One died before the three months bargain was up and the other died a few weeks after. I caught a pain in my side, of which I have never yet fully recovered.

The roofs are supported in the mines of Alston Moor by cross-beams of great strength and thickness and other beams crossing them about three inches diameter. Large stones are put above them to break the fall of anything falling down. Such beams generally form a protection, but not always.

I went to work in Greenside four years. Our lodging-rooms were such as not to be fit for a swine to live in. In one house there was 16 bedsteads in the room upstairs and 50 occupied these beds at the same time. We could not always get all in together but we got in when we could. Often three at a time in the bed and one at the foot. I have several times had to get out of bed and sit up all night to make room for my little brothers, who were there as washers. There was not a single flag or board on the lower floor and there were pools of water 12 inches deep. You might have taken a coal-rake and raked off the dirt and potato peelings six inches deep. At one time we had not a single coal. After I had been there two years rules were laid down, and two men were appointed by the master to clean the house up stairs twice a-week. The lower apartment was to be cleaned twice a-day. Then the shop floor was boarded and two tables were placed in the shop. After that two more shops were fitted up, but the increase of workmen more than kept up with the increased accommodation. The breathing at night when all were in bed was dreadful. The workmen received more harm from the sleeping places than from the work. There was one pane of glass which we could open but it was close to a bed-head.

The mines at Greenside were well ventilated and in that respect there was nothing to complain of.

In the winter time the icicles came through the roof, and within 12 inches of the people sleeping in bed. During a thaw water dropped plentifully into the beds. In the upper beds the person sleeping next to the wall cannot raise his head or change his shirt.

Very few accidents occur at Greenside. There is most powder exploded at Greenside of any mine known in this part of England, including Alston Moor. Four men will explode 130lbs., being five quarter barrels, in 13 weeks. The reason is, the ore is found in solid primary rock and not in strata, as at Alston Moor and that country.

### **No.39 Joseph Eddy.**

I have worked as a washer of ore for three years and a half, and as a miner for five years at the Greenside mine. It is well ventilated but when the air brought the powder reek of other parties upon us, it was as bad as if we had suffered from our own reek. I consider the lodging-shops more injurious to the health of the miners than their work itself. So many sleep in the same room, so many breaths, so much stour arising from their working clothes, so much perspiration from the men themselves, it is impossible to be comfortable.

Two miners occupy one bed, sometimes three. The beds are shaken once a-week on the Monday morning, when the miners come. Some miners make their beds every night. The rooms are in general very dirty, being never washed and very seldom swept, not over once a-month. There is no ventilation, so that the air is very close at night. The men 55 cannot have any clothes over them in summer, it is so warm. If any one is unwell he disturbs all the rest. Men are coming out of the

mines at all hours, 10 at night, 12, 1, or 2; and when they fry their bacon the smell is enough to suffocate the men in bed. I have taken off 12 fleas from my flannel-shirt in the morning; other vermin get admission.

The young persons and boys sleep exactly in the same way, along with the men. I used to leave Penrith on Monday at four o'clock, and travelled 15 miles to Greenside with a week's provision and left at 12 on Saturday when I was a washer, and returned 15 miles. I had the Saturday night's comfortable sleep and had to get up early on Monday. I had always been used to it and knew no better, but it is like transportation. I became a miner. I had 40s. a-month for the first two months of the quarter, and at the end of the third month of the quarter they reckon and settle. I know men who have nothing to receive for the third month, but often it is otherwise. It is a good mine, on the whole. When a man undertakes a portion of the washing, at a price agreed on per ton, still they make the man give in a weekly account of all the people whom he employs for him, and what they have earned, so that if he be found to make a higher gain than the masters think fit he should have, they lower the price when they make the next bargain. There ought to be more shelter for the children engaged in washing the ore.

The miners work five eight-hour shifts in the week. The washers work from Monday morning to Saturday at 12.

Men who go to the lodging-shops take with them on Monday from a quarter to half a stone of bread, few more than a quarter of a stone; one pound of bacon; some a quarter, some half a pound of sugar; two ounces of coffee and oatmeal to make crowdy in the morning and sometimes in the evening and a few potatoes. Some take no bacon at all.

One man who worked along with me lived for three years on oatmeal and water and never had anything else, unless the other men gave him bread. He had 9s. a-week and had a wife and family to support. The boys and young persons live in the same way at the lodging houses.

The boys at washing have very little shelter, which might very easily be afforded them.

#### **No.40 William Walton.**

I am 22. I went to smelt lead ore at 16 and I have also been employed in washing and I have been working at the slag-hearth. They do not take any under 16 as regular workmen at smelt-mills. In the smelting-furnace there are three sets of men and we work 10 hours, two men on at a time and then the next set come on for 10 hours; and after that the third set come on for 10 hours then the first set begins again, and so on; so that we are 10 hours on and 20 hours off, and go on day and night from one o'clock of Monday morning to two on Saturday afternoon. Some shifts are at work 11 hours, so as to make the time come to two on Saturday. The smelting is as good for the health as any other work about the mills. The people about the smelting-mills are very healthy. They are not so robust and strong as country people. They are better in health than the miners. There are now two men working at our mills upwards of 80 years old. The smelters are whiter looking than the farmers labourers and do not bear so much flesh.

We smelt a bing of ore at a heat and do it in five hours. Some ores are much easier smelted than others. We have some ore that requires six hours to smelt a bing.

I worked a while at roasting ores. We were eight hours on and eight hours off all the week, the whole six days from six on Monday to two on Saturday afternoon, day and night, that the furnaces might not cool, which would lose a great deal of time.

Roasting does not injure the health much, not any more than smelting, if they work the same hours.

We roast a bing of ore in two hours and a half.

In the slag-furnace we used cinders along with the slag. It is healthy work enough slag work. Much depends on the contrivances which we have for taking away the smoke.

I have not worked at refining, but I think the men at it are much the same as to health as the rest of us.

There are mills where things are badly arranged, and the people suffer very much from the smoke, there not being proper flues to take the smoke away.

I have been told of smelting where the smoke was not carried off properly and the men suffered very much. If there be not a good draught of air and there is smoke it is most injurious to the men.

Reducing the litharge to lead is the worst job there is. There is a dust rises from the litharge and it hurts the health. It is heavy work, and the dust is of an injurious nature.

**No.41 George Metcalf.**

I have been a smelter and a roaster in the smelt-mills. Boys are not employed, except to wheel in peats or lime, or such like. Sometimes a man takes in his own son, or perhaps another boy, to help him. A youth of 16 may be taken into the roasting of ore, if strong enough. I consider that the smelting-mills are sufficiently healthful, if they are kept clear of reek. The chimneys ought to be carried to a great distance, in order to produce a draught, and thereby remove the reek and all foul air and draw in good air into the mill. A well ventilated mill is more healthy than the mines. I have tried both and like the mill best. The men get from 15s. to 16s. a-week.

**No.42 Thomas Dixon.**

I have been two years and a half a smelter at Greenside. I work three days in a week. I go on Thursday and work to Saturday night. I come back again on Monday morning and work to Wednesday night. There are two hearths at work and there are two men for each hearth. We work 17 hours generally, but on Wednesdays we work 12 at smelting and when that is done weighing the lead which we have made in the six days, which is usually eight tons. We have a certain quantity of ore to smelt every week and if we that we are behind we sometimes work 21 hours a-day. At the end of Wednesday night we have a week's cessation from labour, until Thursday the following week. Working so many hours near the hot smelting hearths is injurious to our health. The hours are much too many and the work is hot. During the week of idleness we come home, and do nothing, spending the time in dozing and sleeping to recover ourselves from the exhaustion. Other men take our places during the six days that we are not at work.

The men approve of this arrangement, chiefly on account of having a week's rest. We are paid for the three days ending on Saturday the wages of a week and also the same wages for the three days ending on Wednesday. Men do not suffer more than the men who go into the mines. Some break down from weakness of constitution.

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